FIELD MEDICAL SERVICE TECHNICIAN

STUDENT HANDBOOK

“THE BEST FORM OF TROOP WELFARE IS TOUGH, REALISTIC TRAINING”

REVISED JULY 2011

Mission and goals form

Paragraph 1: Situation

Name:
Plt advisors names:
Unit Address: Field Medical Training Battalion Box 555243 Camp Pendleton, Ca 92055

Paragraph 2: Mission

Unit mission: To educate, train and prepare Navy Medical Department personnel to serve with the Marine Corps Operating Forces.
Student's critical role in support of the unit's mission:

Paragraph 3: Execution

Goals(3 or 4 specific, measurable, attainable, realistic)

Professional Goal:
Personal Goals:
Combat Skills/Readiness Goals:

Tasks (action plan for accomplishing goals)

Action steps	deadline

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
BOX 555243
CAMP PENDLETON, CALIFORNIA 92055-5243

IN REPLY REFER
BnO 1050.4
Ser S-1/0041
26 Feb 08

BATTALION ORDER 1050.4

From: Commanding Officer, Field Medical Training Battalion, Camp Pendleton, CA
To: Distribution List B

Subj: STANDARD OPERATING PROCEDURES FOR STUDENT PERSONNEL ASSIGNED TO FIELD MEDICAL TRAINING BATTALION

Ref: (a) CNETINST 1540.20, Navy Military Training Policies
(b) NAVPERS 156651, U. S. Navy Uniform Regulations
(c) Training Command Policy Letter 3-06
(d) BnO 1050.3, Force Preservation Policy
(e) BnO 6110.1, Physical Readiness Program

1. Purpose. To set forth the Standard Operating Procedures (SOP) for Sailors assigned to Field Medical Training Battalion Camp Pendleton (FMTB). This order is to clearly establish the rules, regulations, and standards of conduct applicable to all Sailors in the pay grades of E-1 through E-9 while assigned for training at FMTB. Any violation of the provisions set forth in this order may, at the discretion of the Commanding Officer, subject the violator to punitive action as set forth in the Manual for Courts Martial and in accordance with the Uniform Code of Military Justice.

2. Cancellation. ScolO 1050

3. Standards of Conduct. All Sailors assigned to FMTB will conduct themselves in a mature and professional manner. Their conduct and attitude will exemplify the high standards and core values set forth by U.S. Navy and U.S. Marine Corps regulations.

4. Accountability. Accountability for all Sailors assigned to FMTB rests with the Commanding Officer. In order to maintain accountability, there are daily formations for Sailors from E-1 through E-9. All Sailors will be present for every formation, unless excused by staff chain of command.

5. Barracks Life. Sailors are reminded that their actions and standards of conduct in such close quarters impacts those around them. Inconsiderate, sloppy, and unsanitary behavior and

conditions will not be tolerated. The following rules and expected tasks govern Sailors living in barracks:

a. Upon reporting aboard, each Sailor is assigned one rack space, one wall locker and one-foot locker. Sailors will not use empty wall lockers to store their belongings, nor will they augment their personal storage space by placing any extra three drawer chests taken from empty wall lockers into their wall locker.

b. The wearing of uniforms/civilian clothes in the rack is prohibited.

c. Pornography is prohibited in the FMTB barracks area to include the inside of wall lockers. All pornography found will be confiscated and destroyed.

d. Sailors should not keep large amounts of cash on their person or in their wall locker.

e. Outboard ladder wells are designated as emergency exits and are used only in emergencies.

f. Food and any drinks other than water are prohibited from the squad bays, but are authorized in the recreation room.

g. Visitors must sign in with the DNCO and are only authorized to visit in the recreation room. Visiting hours are from 1700 until 2130.

h. Any damage or unsatisfactory maintenance condition (e.g. an overflowing toilet) will be immediately reported to either a platoon advisor or the staff OOD.

i. Radios and electronic media devices are authorized with the following exceptions:

(1) They will be played with headphones only.

(2) They are not authorized during working hours.

(3) They will not be left plugged in or turned on.

(4) Equipment left plugged in will be confiscated, and the Sailor responsible may be charged with violating Fire Safety Codes.

(5) No audio equipment will be authorized after Taps.

j. DNCO will stand and greet any Officer or Staff NCO (E-7 or above) when they enter the duty office.

k. Taps will sound each night at 2200. All lights will be turned off in the squad bays.

l. The lounge is closed during working hours except for lunch. The lounge television will be secured at 2200 Sunday through Thursday and at 2400 Friday and Saturday. Lounge will always remain open for studying.

m. Morning clean up will be completed each morning prior to beginning training/class.

n. Field day will be conducted in accordance with the training schedule. Sailors are not to be secured from Field Day until the Platoon Chief has completed an inspection.

o. Linen survey will be conducted every week. Each Sailor will survey two sheets and one pillowcase. Report all unserviceable linen during this time for exchanges.

p. Sailors will not enter the duty office in the barracks unless they are in a duty status.

6. Grooming Standards. Navy grooming standards will be enforced. Sailors will strictly adhere to grooming standards.

a. Uniforms will be clean and neat and correct daily.

b. Hair will be worn neatly and closely trimmed IAW reference (a). Hair will be cut on a weekly basis, typically on the day prior to the work week commencing.

c. The face will be clean-shaven every morning after reveille.

d. Boots will be scrubbed or polished daily.

e. Dog tags will be worn and the I.D. card will be carried at all times.

f. Additionally, while on liberty, the following dress code will apply:

(1) All articles of clothing will be in good condition. Soiled clothing or clothes that have been ripped and/or torn are prohibited.

(2) Clothing with rude or offensive slogans will not be worn.

(3) PT gear is not authorized liberty attire. It will only be worn when in the barracks area, while out exercising, or when traveling to or from the gym.

(4) Pierced body parts are not authorized in accordance with reference (a).

7. Leave and Liberty.

a. Annual Leave. Normally annual leave will not be granted to Sailors while they are students aboard FMTB. Annual leave may be granted on a case-by-case basis by the Commanding Officer if sufficient justification exists. Sailors must keep in mind that missing more than two days of training will result in recycle into the next class.

b. Emergency Leave. Sailors will be authorized emergency leave in accordance with the standard Navy policy. The office of the American Red Cross must officially verify the facts regarding any circumstances requiring a Sailor's immediate presence. The party requesting the Sailor's presence through their local Red Cross Office normally initiates this verification. Their local Red Cross Office will contact FMTB, who will then relay the request and any pertinent information to the Sailor. Once verification is received, the Commanding Officer will decide whether or not to grant the Sailor's request. Sailors must keep in mind that missing more than two days of training will result in recycle into the next class.

c. Liberty. A Sailor's performance, both as a student and as a Sailor, shall bear heavily on any decision to modify liberty.

(1) All Sailors (E-1 through E-9) will fall into one of four phases of liberty:

(a) Phase I: This liberty status is for Sailors who demonstrated behavior that has a potential to place themselves or others at risk in accordance with reference (c). Sailors are required to maintain an 80% academic average during the course of

instruction. If a Sailor's average falls below 80% they may be placed on Phase I liberty. This will allow the Sailor to study without distractions. Failure to comply will result in administrative action. This phase of liberty will only be assigned by the Commanding Officer on an individual basis. Stipulations for Phase I liberty include:

1. Utility uniform must be worn

2. All Sailors must check out on liberty with a buddy in same or greater phase. The Sailor in the greater phase will adhere to the lower phase guidelines. The Sailor will not leave the 21 Area for any reason without an approved request chit from the Chain of Command. Examples of reasons to leave the area are:

a. Religious Service

b. Medical appointments

c. Legal appointments

3. Liberty expires 2200

(b) Phase II: This liberty status is for Sailors with acceptable military professionalism and academic standing. All Sailors will begin in Phase II liberty and will stay in Phase II for a minimum of one (1) week. The purpose of Phase II liberty is to acquaint Sailors to the MCB Camp Pendleton area, and to focus Sailors on successfully completing the Course. The Sailor's chain of command will recommend this phase of liberty to the Commanding Officer via the S-3 department. Stipulations for Phase II liberty include:

1. Utility uniform must be worn

2. The Sailor may visit anywhere onboard MCB Camp Pendleton area.

3. Liberty will expire at 2200 weeknights and 2400 on weekends and holidays.

4. All Sailors must check out on liberty with a buddy in same or greater phase of liberty. The Sailor in the greater phase will adhere to the lower phase guidelines.

5. The Sailor must sign out in the liberty log with DNCO if staying in 21 Area of Camp Pendleton. The Sailor must sign out with the Liberty Watch at the schoolhouse if going outside of 21 Area.

(c) Phase III: This liberty status is defined as liberty in the city of Oceanside and the immediate surrounding area not to exceed a 50 mile radius. This liberty status is for Sailors with acceptable military professionalism and academic standing who have accomplished the following tasks:

1. Sailors must pass initial PFA.

2. Sailors must pass initial test #1.

Phase III liberty consists of the following stipulations:

1. Liberty will expire at 2200 weeknights and 2400 on weekends and holidays.

2. The Sailor may check out on liberty in appropriate civilian attire.

3. The Sailor must sign out in the liberty log with DNCO if staying in 21 Area of Camp Pendleton. The Sailor must sign out with the Liberty Watch at the schoolhouse if going outside of 21 Area.

4. If the Sailor is E-3 or below, he/she must check out with a liberty buddy in the same or greater phase of liberty. The Sailor in the greater phase will adhere to the lower phase guidelines.

5. Any Sailor may be placed back to Phase I liberty by the Commanding Officer or Phase II liberty by the S-3 Officer or Alpha, based on a failure of military professionalism or academic standing.

(d) Phase IV: This liberty status is for Sailors with acceptable military professionalism and academic standing who have accomplished the following tasks:

1. Sailors must pass initial tests 1 and 2 and all subsequent tests.

2. The Sailor must spend a minimum of 1 week on Phase III.

Phase IV liberty consists of the following stipulations:

1. Liberty will follow traditional liberty hours and will secure at reveille.

2. The Sailor may check out on liberty in appropriate civilian attire.

3. The Sailor must sign out in the liberty log with DNCO if staying in 21 Area of Camp Pendleton. The Sailor must sign out with the Liberty Watch at the schoolhouse if going outside of 21 Area.

4. If the Sailor is E-3 or below, he/she must check out with a liberty buddy in the same or greater phase of liberty. The Sailor in the greater phase will adhere to the lower phase guidelines.

5. Any Sailor may be placed back to Phase I, II, or III liberty based on a failure of military professionalism and academic standing.

d. Accountability: The following accountability information pertains to all Phases of liberty:

(1) The Staff OOD will conduct a muster at 2200 on evenings prior to a workday and 2400 on weekends.

(2) The Staff OOD may conduct random I.D. card checks.

(3) Limits of the distance all Sailors may travel on liberty are:

(a) Phase I liberty: 21 Area, MCB Camp Pendleton.

(b) Phase II liberty: MCB Camp Pendleton area.

(c) Phase III liberty: City of Oceanside and surrounding Area limited to a 50 mile radius.

(d) Phase IV liberty: Normal liberty limits are 100 miles for 48 hours, 150 miles for 72 hours, and 300 miles for 96 hours. Command approval required for travel greater than 200 miles.

e. Special Liberty: Special liberty is defined as any liberty granted to a Sailor other than normal liberty during non-working hours. Examples of special liberty are: the "day off" to attend a wedding or other special function, or a 72 or 96 hour pass. Special liberty will be considered on a case-by-case basis. Requests for special liberty will be forwarded to the Commanding Officer through the chain of command. Sailors granted special liberty or out of bounds chits will check in and out with the staff OOD. Failure to check out with the staff OOD will result in administrative or disciplinary action.

8. Buddy System. All Sailors will be assigned a Force Preservation buddy in writing in accordance with reference (d). The purpose of the "Buddy System" requirement is to ensure the safety of the Sailors while on liberty by having them watch out for one another, help each other to avoid bad situations and poor choices. Sailors E-4 and above are not required to check out on liberty with a buddy, but if they are E-3 and below then they must sign out with another student as a liberty buddy.

a. E-4 and Above. Once these Sailors enter Phase III liberty, they will be assigned a Force Preservation buddy that they will be required to make phone contact with by noon on non-training days. If they are unable to contact their buddy, then they will immediately notify the OOD. Although they are not required to physically be with their buddy, they are required to be aware of their buddy's liberty plans and location.

b. E-3 and Below. These Sailors will be required to check out with a liberty buddy and remain with this liberty buddy during liberty hours while on all Phases. If the member chooses a liberty buddy who is in a lower phase of liberty, then that Sailor must adhere to the limits of the lowest assigned liberty phase of the buddies. Sailors' first choice of liberty buddies should come from within their Platoon. However, Sailors E-3 and below on Phases II - IV may go to the following places in **21 Area** without a liberty buddy: Fitness Center, PX, and chow hall. The beach remains off limits without a liberty buddy.

c. Sailors with Dependents. A list of Sailors with dependents who maintain a local residence will be kept on file at the quarter deck of the school. While on Phase III or IV liberty, these sailors may check out on liberty without a buddy. Residing with dependents does not excuse them from the limits of the liberty phases. These Sailors will be assigned a Force Preservation buddy that they will be required to make phone contact with by noon on non-training days. If they are unable to

contact their buddy, then they will immediately notify the OOD. Although they are not required to physically be with their buddy, they are required to be aware of their buddy's liberty plans and location.

9. Mexico. Liberty in Mexico is expressly prohibited for all student personnel at FMTB regardless of liberty status or rank.

10. Physical Training. The purpose of unit PT is to establish or strengthen unit camaraderie, esprit de corps and military professionalism. In addition to the purpose mentioned above, company PT is conducted with the goal of sustaining or improving the individual Sailors level of physical fitness in preparation for their entry into the operating forces. However, company PT alone will not ensure that the Sailor is fit enough for daily life in the operating forces. ***It is the personal responsibility of each Sailor to ensure that they remain constantly ready for the rigors of combat***. Remedial PT will be held for those Sailors failing to meet Navy standards for physical fitness in accordance with reference (e).

11. Consumption of Alcohol. Consumption or storage of alcoholic beverages by Sailors is prohibited in any area under the control of FMTB. The legal drinking age in the state of California is 21 years of age. In accordance with the Department of Defense policy, Sailors under the age of 21 are prohibited from consuming alcoholic beverages. This prohibition applies both on and off base. All establishments whose primary business is the sale of alcohol (i.e. bars) are off limits to Sailors under the age of 21. Sailors are not allowed to consume alcohol while in a duty status and must stop consumption 8 hours prior to assuming duty or beginning training and must be fit for duty at that time.

12. Privately Owned Vehicles. Sailors are authorized to maintain and drive POV's while on liberty but not during working hours providing their vehicles pass a safety inspection. Sailors must provide a valid state driver's license, proof of insurance and registration. Any driver 25 and under must show proof of completing the Driver's Improvement course.

13. Cell Phone Use. Cellular phones are authorized only in the barracks area when off duty. Cell phones are not authorized to be carried in uniform or to be taken to class.

14. Use of Tobacco Products. Sailors assigned to the FMTB are prohibited from using tobacco products while on a working party, in formation, or while in a duty status. Tobacco products are

defined as cigars, cigarettes, snuff, or chewing tobacco. Sailors are authorized the use of tobacco products consistent with the rules and regulations established by the Department of Defense, U.S. Navy and U.S. Marine Corps while on base. Smoking and tobacco chewing are only authorized in designated areas.

15. Administrative Matters. Sailors requiring assistance regarding administrative matters, (i.e. pay problems, dependency applications, travel matters, promotions, lost ID cards, powers of attorney, etc.), should bring the matter to the attention of the Platoon Advisor as soon as possible.

16. Mailing Address. This is how your address will look:

RANK, NAME
Field Medical Training Battalion
CLASS Number, PLT NUMBER
Box 555243
Camp Pendleton Ca 92055-5243

17. Weapons. Personal weapons of any type are not authorized (this includes knives with a blade of over 3 inches). A weapon is defined as anything that is expressly manufactured to enable one to cause bodily harm to another individual. If a Sailor reports aboard with a personal weapon, he/she will turn it in to his/her Platoon Advisor to be locked and stored until their departure from FMTB. All guns will be registered with the base Provost Marshall and turned over to the armory in accordance with Marine Corps Base Camp Pendleton orders. Sailors who turn in a personal weapon will receive a receipt for the weapon. While in the field for training, a knife with a blade less than 3 inches is authorized to be carried.

18. Controlled Substances (Drugs). The use, possession, or sale of illegal drugs, the abuse or distribution of prescribed medications, or the use of steroids is not tolerated in the U.S. Navy. In order to combat illegal drug use, the FMTB conducts random urinalysis testing of all incoming students. In addition to all Sailors returning from UA status, PTAD and leave will be required to conduct a urinalysis testing. FMTB also conducts a program of unannounced, urinalysis testing. Under this program, every Sailor assigned to FMTB is subject to urinalysis testing at any time and will have been tested at least once before their class graduation date.

19. Basic Allowance for Housing(BAH)/ Basic Allowance for Sustenance(BAS). Unmarried student personnel will not normally be permitted to receive BAH/BAS while in a student status. Individual cases may be reviewed by the command; however, the student **SHALL NOT** make any housing arrangements without command approval.

20. Conduct yourself in a mature, responsible, professional manner at all times, and remember, wherever you go, whatever you do, you represent the United States Navy.

G. M. HUET

STUDENT GUIDELINES

SCOPE:

Welcome to Field Medical Training Battalion! Whether you are a seasoned Sailor or have just graduated from Hospital Corpsman "A" school, there is a great purpose for your training here. Your respective course is designed to challenge you. The purpose of this document is to prepare you for the day-to-day operations at FMTB. You will be asked to spend a good portion of your day, including personal time, in preparation for upcoming events. This information will help you succeed at FMTB, so it is imperative that you read the entire guide.

TOPICS:

Morning reveille
Formations
Leadership positions/roles
Sick call procedures
Uniform standards
Field day
Exams/study/mandatory and remedial study
Navy PRT/USMC PFT
Corrective Lens Eyewear
Special Items to purchase
Discipline/Respect
Personal awards
Civilian attire
Off-limit establishments
Prohibited possession and consumption of alcoholic beverages
Prohibited access to berthing areas
Parking of POVs
Students Mailing Address and Emergency Telephone Numbers
Student Liberty
Smoking Policy
Student Watchstanding

A. **MORNING REVEILLE:** Reveille will be at 0500 and all brown baggers will be on deck by 0515 unless otherwise specified. Reveille may be earlier for events such as field training, conditioning hikes, obstacle courses, and practical training. Attention to the schedule, listening, and understanding of information being passed by advisors, instructors and staff is your responsibility. The schedule for the upcoming days and weeks will be posted in your barracks. Stay flexible, the schedule is subject to change.

B. **FORMATIONS:** Every student will muster in formation 15 minutes prior to any scheduled event. The morning formation is usually scheduled for 0530. The morning report will be delivered by the Company Gunny to the respective platoon advisor following morning formation. After chow, students need to prepare for departure at 0630 (or earlier) to commence the training day. Students shall be in their classroom seats 15 minutes prior to the start of class, e.g., 0715 in seats for

a 0730 class. Everyone, including brown baggers (individuals collecting Basic Allowance for Housing and authorized to reside in the local community with family), will be present for morning muster and all personnel will march to chow. At the morning formation, the *Platoon Sergeants* will conduct daily uniform inspections. The following will be checked during uniform inspections: clean, serviceable and pressed uniform, blackened collar devices, clean boots, and personal grooming to standards, etc.

C. **LEADERSHIP POSITIONS/ROLES:** All leaders, regardless of their position, must set the example. If you have questions concerning your role and position, ask your platoon advisors. Remember, leaders are not born but made. Use this training opportunity to develop and perfect your leadership skills. As always, leaders are held to a higher standard of conduct, professionalism, and accountability.

D. **CHAIN OF COMMAND**

1. **Fire Team Leader**: Within each squad, Fire Team Leaders are reponsible for the execution of task-oriented direction and coordination, inherent and routine fire team responsibilities within the squad, and the fire teams welfare, readiness, and understanding of orders and mission to successfully achieve objectives.

2. **Squad Leader**: The squad leader is reponsible for the execution of task-oriented direction and routine squad responsiblities within the platoon, and for the squad's welfare, readiness, and understanding of orders and mission to successfully achieve objectives.

3. **Platoon Sergeant**: The platoon sergeant is responsible for performing the duties given by the Platoon Commander, Company Gunnery Sergeant, Company Commander or Platoon Advisors. He must ensure full compliance with the instructions. The platoon sergeant is responsible for holding platoon formation, conducting musters, keeping all the troops well-informed, and for marching the platoon to and from all destinations. Assistance with calling close order drill is available from the platoon advisors. The Platoon Sergeant will count all personnel, including weapons when carried, and report them on the morning muster sheet.

4. **Company Gunnery Sergeant**: The Company Gunny reports to the SMI and is responsible to the Company Commander. The Company Gunny normally is the second highest ranking student in the company. His function is to set the example, ensure the morale, good order and discipline are kept at a high state throughout the course of instruction. The Company Gunny will assign tasks to the Platoon seageants in order to accomplish the mission. Additional responsibilities include, but are not limited to:

   - All tasks handed down by the platoon advisors
   - Compiling morning reports
   - Organizing company formations
   - Supervise and ensure company field days and morning clean up are completed
   - Establish and manage the Duty squad, Fire and Security, and Roving Patrol watch bills
   - Organize and manage company level working parties
   - Prepare and submit MRE rosters for brown baggers

- Conduct company gear survey. Status reports and any problems that arise will be directed to the SMI. The Company Gunny is **not authorized** to give EMI or punish another student.

5. **Platoon Commander**: The platoon commander is normally the most senior person in the platoon. His function is to supervise and carry-out the instructions given by the platoon advisors and/or Company Gunnery Sergeant. The platoon commander serves as a focal point of contact and receives instructions to be passed down. The platoon commander is responsible for keeping his platoon leaders well informed. In the event the platoon advisors are not present, the platoon commander will carry out the routines designated in the schedule. The platoon commander should take the initiative to use hip pocket lectures and other techniques to make productive use of down time. Any problems that arise should be directed through the chain of command. The platoon commander is not authorized to give EMI or punish another student. Any problems that arise must be discussed with the Company Gunnery Sergeant, Company Commander and platoon advisors.

6. **Company Commander**: The Company Commander reports to the SMI. The Company Commander is usually the most senior Sailor in the class and is responsible for the entire company. The Company Commander is to set the example and ensure that morale and discipline, are both kept at a high state throughout the course of instruction. The Company Commander will ensure that the Platoon Commander is responsible for all tasks passed down by the Platoon Advisors. He will ensure that there is full accountability of the company and gear is maintained at all times.

7. **Platoon Advisor**: Each platoon has Marine Corps and Navy advisors who are responsible for the overall coordination, function, accountability, readiness, mentoring, and counseling of all students assigned to the platoon.

E. **SICK CALL PROCEDURES:**

1. The staff **IDC** will hold student sickcall from 0800-1000 Monday through Friday. Sickcall check –in is from 0700-0730. If a student needs needs medical attention after normal sickcall hours or in the absence of the IDC, an appointment can be made with 21 Area Branch Clinic (BMC). Should a student need to be seen outside of normal working hours, they require more advanced treatment, or the 21 Area (BMC) is secured, the FMTB Officer of the Day (OOD) or Range Safety Officer (RSO) will arrange for appropriate transportation to the Naval Hospital Camp Pendleton

2. On the morning there is PT scheduled, any student needing to be seen will wait under the oak tree in front of the barracks for the IDC and wait for further instructions. Those on light duty must have a chit.

3. Each platoon will have two designated Platoon Corpsmen. The Platoon Corpsmen are responsible for screening all platoon members for sickcall prior to seeing the IDC, and treating all minor ailments or injuries within their platoon. No student will be seen for routine sickcall that has not first been screened by their Platoon Corpsman.

F. **UNIFORM STANDARDS:** The camouflage utility uniforms will always be clean and serviceable and collar devices will be blackened at all times. If collar devices start to chip, you can purchase collar device paint. Utility name tapes will be ordered and sewn on at no-charge (free) at base cleaners or at the cash sales office. Boots will be cleaned everyday. The utility uniform or any portion there of will not be worn in town. However, the complete utility uniform may be worn while stopping at a drive-through window (not inside),and can be worn to and from work. You may wear the utility uniform anywhere on base. The complete list of appropriate uniform wear can be seen in the Utility Uniform and Individual Combat Equipment class FMST 1105.

G. **FIELD DAY:** Field day will be conducted when directed or when dictated by the schedule. The platoon barracks are normally inspected the following morning. Daily cleanup assignments will be delegated by the Platoon Sergeants and Squad Leaders. As always, daily maintenance of the barracks will result in an easier field day. Barracks trash will be emptied in the dumster, at a minimum, three-times daily (prior to 0615, 1800, and 2045 daily). The barracks and all common-spaces are subject to inspection at any time.

H. **EXAMS/STUDY AND MANDATORY NIGHT STUDY:**

1. The written tests are broken into five (5) different blocks.

2. All hands mandatory night study will be held for the whole company the night prior to each test.

3. First time test failures will be placed on mandatory night study until they pass the next consecutive block.

4. Two (2) time test failures will be placed on mandatory night study and their liberty will be restricted to Camp Pendleton with liberty securing at 2145 until they pass Casualty Assessment at the end of the course.

5. Three (3) times failures will be academically disenrolled or recycled.

6. Mandatory night study will normally be held Sunday through Thursday from 1800-2000.

7. The senior student will march the mandatory night study group to the school house. The Education Petty Office (EPO) will report to the OOD when everyone is accounted for.

I. **NAVY PFA / USMC PFT:** It is your responsibility to be prepared for the Navy's physical fitness assessment test (PFA) and Marine Corps physical fitness test (PFT). No time is alloted in the training to conduct a remedial physical training program. It is recommended that you PT on your own in safe conditions. Regardless of what you've been told, your participation and performance in daily physical training, PFA, conditioning hikes, and PFT are factored into your overall course performance. Although the PFA/PFT are unofficial, a failure of the PFA/PFT may result in disenrollment from FMTB. The only training that will prepare you for the PFA/PFT is to do the sit-ups, push ups, pull ups, and runs. Failure to successfully complete the Navy physical readiness test or to be within Navy weight and percent body-fat standards prior to graduation constitutes a course failure. All failures will be disenrolled or recycled..

J. **SPECIAL ITEMS OF PURCHASE:** There is a requirement for all students to bring or purchase selected items essential for training and for duty with the Fleet Marine Force. These items are not issued and the best place to purchase them is at the Exchange upon your reporting to FMTB. The items to be purchased are:

1. Key locks –x5
2. Flashlight with red lens
3. Standard Navy PT gear
4. Boot bands-x4 sets
5. Rank insignias-x4 sets**
6. Shower shoes
7. White mesh laundry bag
8. Cammie face paint
9. White body towel-x2
10. (Optional) 1 box of large zip lock freezer bags (2 gallon) to waterproof your clothes before going to the field.

** All students should purchase the proper rank insignia. The exchange sells rank insignias.

K. **DISCIPLINE/RESPECT:** At no time will anyone disrespect another shipmate. If a problem arises, it should be brought to the Platoon Advisors's attention and they will resolve the issue. Do not misconstrue training, guidance, accident prevention, and leadership for hazing. It is incumbent upon all members of this command to conduct themselves in such a manner that they, at all times and under all circumstances, set the best possible example for subordinates, peers and seniors. Every interaction between seniors and subordinates is an experience that should enhance the development of each as members of the Navy or Marine Corps. All members of this command by their actions must avoid creating a perception of inappropriate conduct or behavior that may be viewed as a violation of this order. Therefore, military personnel are required and expected to conduct themselves in a proper manner at all times, whether in uniform or civilian attire. Unseemly conduct while in and out of uniform tends to reflect discredit upon the Navy and the Marine Corps and may be considered an infraction of the Uniform Code of Military Justice (UCMJ). This is a formal Marine Corps School and we represent the Navy's finest on a Marine Corps Base.

L. **PERSONAL AWARDS:** There are three personal awards that can be achieved at FMTB. If you are motivated you can earn more than one of them.

1. Honor graduate: Awarded to the person with the highest overall Grade Point Average. Recycled students are not eligible for this award

2. Platoon High PFA/PFT- -Awarded to the student highest combined PRT/PFT scores from each platoon.

3. Motivational Awardee: Awarded to the student from each platoon who displays the most motivation, professionalism, and leadership. Students will vote for their platoon's award winner.

M. **CIVILIAN ATTIRE:** When you leave this base you will be in proper civilian attire. Pants and shorts with pockets are acceptable as long as they are not fraying and in disrepair. Belts and

shoes or tennis/running sneakers/shoes are to be worn. Halter tops and white and green undershirts are unacceptable. Remember you represent the Navy, in and out of uniform, so take pride in your personal bearing and appearance.

1. You are **NOT** permitted to enter the Marine Corps Exchange or visit the ATM on base in PT gear.

2. You are **NOT** authorized to mix civilain clothes and footwear with utilities or other uniforms at any time.

N. **OFF LIMIT ESTABLISHMENTS:** Upon reporting, you will be advised of social and commercial establishments which are off-limits to military personnel. Military personnel may subject themselves to personal risk if they use the off-limits facilities. If found at these establishments you may be charged for a violation of the UCMJ. The base newspaper, The Scout, publishes current off-limit establishments weekly and these lists are posted on command bulleting boards. Additionally, The Scout can be attained in the OOD hut or exchange. Additionally, these lists are posted on command bulletin boards and your platoon leadership will have copies.

O. **PROHIBITED POSSESSION AND CONSUMPTION OF ALCOHOL:**

1. The legal drinking age in the State of California is **21**.

2. Driving under the influence carries harsh penalties, regardless of the outcome in the civilian court. Members charged with drinking under age or drinking under the influence shall be referred for evaluation and counseling for substance abuse, lose their base driving privelegies. Regardless of the outcome in civilian court, members charged with drine Non- Judicial Punishment at a minimum.

3. The possession and consumption of alcholic beverages in a privately owned vehicle is strictly prohibited while on, or assigned to, the Camp Pendleton, Camp Del Mar and Field Medical Training Battalion. Additionally, n**o alcoholic beverages are authorized on the grounds, parking areas, or buildings, training areas or barracks of Field Medical Training Battalion.**

P. **PROHIBITED ACCESS TO BERTHING AREAS :**

1. Only students assigned to a barracks wing are authorized to enter or visit students in that, or any other barracks.

2. Visitors will be logged in by the DNCO and will remain on the quarterdeck. Visitors are not permitted in the squad bays or lounges.

3. Unauthorized persons subject to the Uniform Code of Military Justice who enter any barracks to which they are not authorized to enter shall be prosecuted, and all other persons not subject to the Uniform Code of Military Justice shall be arrested and charged in Federal Court for treaspassing and unauthorized entrance. Students that inappropriately allow, authorize, or who do not report an unauthorized entry may be subjected to the same disciplinary action.

4. Members of the opposite sex are **not allowed** in berthing spaces other than those designated for their own gender. While on duty or in an emergency, a member of the opposite sex may enter a berthing space only after announcing their presence and allowing ample time to ensure that members in the space are clothed.

Q. **PARKING OF PRIVATELY OWNED VEHICLES (POVs):** Students will park all vehicles in the student parking area at the barracks. **At no time** will a student drive his or her vehicle to the school house.

R. **STUDENT MAILING ADDRESS AND EMERGENCY TELEPHONE NUMBERS:**

1. **Mailing Address**:

Student Name (Rank, Full Name, USN or USNR)
(FMST CLASS #) (PLATOON #)
BOX 555243
Camp Pendleton, CA 92055

2. **EMERGENCY Telephone Numbers:**

The following telephone numbers are for EMERGENCY purposes only.

OOD: COM: (760) 725-2559 **STUDENT DNCO:** (760) 725-2325

S. **SMOKING/DIPPING POLICY**- Smoking or use of chewing tobacco/dipping is not authorized during training hours, and only at other times if in authorized and designated areas onboard Field Medical Training Battaliion.

T. **STUDENT WATCHSTANDING** : See attached/integrated Student Watchstander Guide.

TO LEARN MORE ABOUT FIELD MEDICAL TRAINING BATTALION, CAMP PENDLETON, AND ALL TRAINING PROGRAMS, CHECK OUT OUR WEBSITE AT:

http://www.tecom.usmc.mil/fmtbwest/

UNITED STATE MARINE CORPS
TRAINING COMMAND
3300 RUSSELL ROAD
QUANTICO, VIRGINIA 22134-5001

IN REPLY REFER TO:
5800
B052
OCT 1 2003

TRAINING COMMAND GENERAL ORDER 01- 03

From: Commanding General, Training Command

To: Distribution List

Subj: **PROHIBITED ACTIVITIES**

Ref: (a) Uniform Code of Military Justice, 10 U.S. Code 801, et seg.

1. Purpose. This order prohibits conduct that, in addition to those proscribed at the reference, is to the prejudice of good order and discipline of this command, is of a nature likely to bring discredit upon this command and the United States Marine Corps, is harmful to the health and well-being of members of the command, or is detrimental to command relations with other military and organizations as well as civilian agencies and communities.

2. Applicability. This order is applicable to all US military personnel assigned or attached to this command, or any of its subordinate commands, units and organizations.

3. Definitions. As used in this order, "permanent personnel" refers to any member, regardless of service, who is involved in training or providing support to student personnel. For purposes of this order, "student personnel" is defined as all persons, regardless of service, in one of the following categories:

a. Awaiting training or course entry;
b. Attending training or educational programs; or
c. Completed, eliminated, or discharged from training and awaiting reassignment or discharge.

4. Prohibited activities. In addition to those offenses proscribed by the reference, the following activities are also prohibited:

Subj: PROHIBITED ACTIVITIES

a. Fraternization. Professional relationships are essential to the effective operation of any military command or organization. Any unprofessional relationship with a student or a member of the student's immediate family can compromise the integrity and leadership of the staff in a training environment. Accordingly, permanent personnel and student personnel will refrain from any unprofessional relationship. Permanent personnel and student personnel will not, while on duty or in leave or liberty status, associate with each other in an informal, personal or intimate manner which reflects a familiarity that is inappropriate for the workplace. Permanent personnel and student personnel will not engage in any conduct that creates an actual or perceived conflict of interest between their military duties and their personal activities.

b. Underage drinking. No person, either permanent personnel or student personnel, will provide alcohol to permanent personnel or student personnel under 21 years old. This includes buying or sharing alcohol, or condoning its use by any permanent personnel or student personnel under 21 years old. Additionally, no person under the age of 21 years, either permanent personnel or student personnel will buy, possess, share, provide or consume alcohol.

c. Integrity violations. No permanent personnel or student personnel will knowingly use unauthorized assistance in submitted work designated to represent one's own efforts or to knowingly fail to indicate properly any authorized assistance received. No permanent personnel or student personnel will submit another person's work, whether published or unpublished, or ideas by claiming them as one's own and not giving proper reference to that work. Further, no permanent personnel or student personnel will knowingly condone any of these actions taken by other permanent personnel or student personnel.

5.Punitive Order. This order is punitive. Persons subject to the Uniform Code of Military Justice who violate any portion of this order may be court-martialed or receive adverse administrative action, or both.

6. Subordinate Command Responsibilities. Commanders and supervisors are expected to exercise good judgment in reinforcing this General Order and they will ensure that all personnel are briefed on its prohibitions and requirements.

7. Effective date. This General Order is effective immediately, and will remain in effect until rescinded by the Commanding General, Training Command.

FMTB BARRACKS REGULATIONS AND GUIDELINES

A. **BARRACKS PROTOCOL:**

1. Lounge is closed during working hours. Lounge television will be secured at 2200 Sunday through Thursday and 2400 Friday and Saturday. The study lounge will always remain open for **STUDYING**.

2. NO eating, drinking (except water), dipping smoking, or open flames (candles, incense) in the squad bays. Eating is only allowed at the smoking pit or in the student lounge.

3. NO hot plates or cooking appliances are permitted in the barracks.

4. No hair cutting inside the berthing spaces or the heads.

5. No sleeping on top of the rack with your uniform on.

6. **DO NOT** enter or exit through the fire exit doors.

7. All personnel will wear proper uniforms, PT gear or civilian attire when leaving the squad bays. No half naked bodies running around the barracks.

8. English will be the only language spoken in mixed company.

9. All lockers will remain secured/locked, even if you are sleeping. Secure all of your personal items.

10. No alcohol on or in the barracks surrounding grounds. This includes the parking lot.

11. Absolutely no members of the opposite sex are allowed in berthing that is intended for the opposite gender (with the exception of duty personnel).

12. The duty cell phone is not for personal use. Only duty personnel are allowed in the duty hut, all other business will be conducted outside..

13. The storage room in the duty hut is not for personal use. Any gear left behind will be thrown away.

14. Keep feet off the lounge furniture.

15. Shoes and 782 gear are not to be washed in the washing/drying machines.

16. Report any discrepancies through the student chain of command.

17. Any violators of barracks regulations are subject to punishment under the UCMJ.

18. Any matters concerning the barracks or it's furniture should be directed to the BEQ manager.

STUDENT WATCHSTANDER RESPONSIBILITIES

A. **General:**

1. The Company Commander, Company Gunnery Sergeant, Platoon Commanders, and Platoon Sergeants will not stand duty. All other E-4 through E-6 personnel will stand the Duty Non- Commissioned Officer (DNCO) and Assistant Duty Non-Commissioned Officer (ADNCO) watch. All E-1 through E-3 personnel will stand the fire and security or "rover" watch.

2. The Company Gunnery Sergeant will submit a watchbill to the watchbill coordinator every Thursday morning by 0800 for the following training week. While in garrison, the watch bill will consist of one (1) DNCO, one (1) ADNCO and four (4) rovers. The watchbill must be initialed by all watchstanders before submission. The watchbill will be posted outside the War Room at the schoolhouse and at the quarterdeck of Barracks 210825.

3. While on in duty status, the DNCO is a direct representative of the Commanding Officer. The DNCO will exercise the necessary authority and control to ensure routine Functioning of school activities and facilities within established guidelines.

4. Any matter that is not withing established guidelines nor covered by routine procedures, which require immediate action will be referred to the OOD at (760) 725-2559.

5. All watchstanders shall be thoroughly familiar with all guidelines and orders pertaining to their post.

B. **Period of Duty:**

1. On normal working days, the duty crew will assume the duty at 1800 until 0600 the following morning. Members of the SATT platoon will assume the duty throughout training day.

2. Duty turn over will be at 0645 on weekends and holidays.

3. All duty personnel are restricted to Camp Del Mar during their 24-hour watch period even if they are a brown bagger.

C. **Uniform:**

1. All duty personnel will wear the camouflage utility uniform and duty belt.

D. **Duty Swaps:**

1. All requests for duty swaps must be submitted seven (7) days prior to the actual duty day. Requests will be routed through the platoons scribe and signed by the Platoon Sergeant, and Platoon

Advisor before coming to the watchbill coordinator. Emergency situations will be dealt with accordingly.

STUDENT PFA/PFT, HIKE & ACADEMIC FAILURE POLICY

A. PRT REQUIREMENTS:

1. All students are required to pass a standard Navy PFA and participate in a standard Marine Coprs PFT while attending FMTB.

2. Any student who does not meet body weight and body fat requirements upon check-in will be recommended for recycle to the next convening class.

3. Students will have 2 opportunities to pass the Navy PFA. Failure of both will result in recommendation for physical recycle to the next convening class.

B. HIKE REQUIREMENTS:

1. Each class will have a four (4), six (6), seven (7) and eight (8) mile conditioning hike.

2. Failure of any two (2) hikes or failure of the eight (8) mile hike will result in recommendation for physical recycle or disenrollment.

3. Any student who fails a hike or is deemed a "low performer" will be placed in the remedial hike program.

4. Any student who does not hike due to medical reasons will be counted as a hike failure.

C. ACADEMIC REQUIREMENTS:

1. There will be five (5) test blocks throughout the class that students must pass with an 80 % or better.

2. If a student fails a test, they will be issued a re-test the following morning. All passed re-tests will be counted as 80% towards the student's final average.

3. Failure of two (2) tests will result in an academic review board.

4. Failure of a third test to include re-test failures will result in recommendation for academic recycle or dis-enrollment.

D. NOTE:

Recycling to the next convening class or dis-enrollment from the school may result in the Loss of student's advanced training/C-school, co-location assignments and eligibility for Special programs and career incentives.

RULES AND REGULATIONS FOR ALL FIELD EVOLUTIONS

A. FIELD PROTOCOL

1. All students will adhere to the following rules and regulations while in the field:

   a. Students requiring medications must inform their Platoon Corpsman two (2) days prior to step off.

   b. Identification card will be carried and identification tags will be worn.

   c. No dew rags (cravats on the head) will be worn at any time

   d. Tobacco use in the field will be designated by the Range Safety Officer (RSO).

   e. Stay hydrated !!! Follow your WBGT chart.

   f. Accountability reports of personnel and weapons will be given to the Platoon Advisors after every evolution.

   g. A Blank Firing Apparatus (BFA) will be worn on the M4 carbine at all times !!! Remember muzzle awareness !!!

   h. Use designated trash receptacles only. Do not place inside the porta-johns unless you wish to clean it.

   i. Student leadership will always have a memo book and something to write with.

   j. **All students** will strickly adhere to the "buddy system" while in the field. At no time will any student be alone in the field.

OPERATIONAL RISK MANAGEMENT

Operational Risk Management (ORM) is the process of dealing with the risk associated within military operations, which includes risks assessment. Risk decision-making and implementation of effective risk controls.

ORM is a tool for identifying hazards, assessing risks, developing and implementing controls to prevent safety mishaps. Every individual should be able to make effective risk management decisions, based on experience, judgement and situational awareness.

Safety is paramount and our number one concern here at Field Medical Training Battalion. It is important to obey the guidelines established for you to prevent any unforseen mishaps. You will encounter a very dynamic training environment here and your attention to detail could help prevent an injury. Below are specific points of concern involving ORM for FMTB.

Know your Environment
Assess the Situation
Universal Precautions
Sharp Hazards
Risk of Infection
Using Proper Body Mechanics

For further information and details regarding Operational Risk Management, see OPNAVINST 3500.39A and/or MCO 3500.27A

Point of contact: http//:www.safetycenter.navy.mil

FIELD MEDICAL TRAINING BATTALION
VISION STATEMENT

To be the entry point Center of Excellence for the Fleet Marine Force operational medicine

MISSION STATEMENT

To educate, train and prepare Navy Medical Department personnel to serve with the Marine Corps Operating Forces.

GUIDING PRINCIPLES

The following are what “we value” as a command:

- Safety: “ A professional Sailor is a safe Sailor”
- Highly qualified staff as the key to effective student training.
- Wise stewardship of resources.
- Effective communication

MILITARY SONGS

ANCHORS AWEIGH

Stand Navy out to sea, fight our battle cry;
We'll never change our course, so vicious foe steer shy-y-y.
Roll out the TNT, Anchors aweigh! Sail on to victory
And sink their bones to Davy Jones, hooray!

Anchors aweigh, my boys, anchors aweigh.
Farwell to foreign shores, we sail at break of day-ay-ay-ay.
Through our last night ashore, drink to the foam,
Until we meet once more. Here's wishing you a happy voyage home.

Blue of the mighty deep, gold of God's great son.
Let these our colors be till all of time be done, done, done, done.
On the seven seas we learn Navy's stern call:
Faith, courage, service true, with honor, over honor, over all.

MARINE'S HYMM

From the halls of Montezuma to the shores of Tripoli
We fight our country's battles in the air on land and sea
First to fight for right and freedom and to keep our honor clean
We are proud to claim the title of United States Marine

Our flag's unfurled to every breeze from dawn to setting sun
We have fought in every clime and place where we could take a gun
In the snow of far off northern lands and in sunny tropic scenes
You will find us always on the job The United States Marines

Here's health to you and to our Corps which we are proud to serve
In many a strife we've fought for life and never lost our nerve
If the Army and the Navy ever look on heaven's scenes
they will find the streets are guarded by United States Marines

COURSE ACCREDITATION

This course is accredited by:

COUNCIL ON OCCUPATIONAL EDUCATION
41 PERIMETER CENTER EAST, NE SUITE 640
ATLANTA, GA 30346

Program Grievance Procedure for students

Students may utilize the following chain of command to submit program grievances or issues regarding curriculum, quality of instruction and facilities, student services and safety:

Instructional Rating Forms (IRFs)
End of Test Block Critiques
Platoon Advisors
Senior Military Instructor (SMI)
Training Officer
Command Master Chief
Executive Officer
Commanding Officer
Commanding General, Training Command.

Only after all resources and avenues for redress have been exhausted may a student then contact the Commission of the Council on Occupational Education, 41 Perimeter Center East, NE, Suite 640, Atlanta, GA 30346, (800) 917-2081 regarding non-military related order or regulation (administrative or disciplinary) and disposition complaints.

Some Recommendations on Study Techniques

Attending class is essential!
Concentrating during class and effective study out of class is also necessary. Study along the way - after each class - not just before a test.

BE ACTIVE IN YOUR STUDYING!
Just reading your text or notes over and over again is not effective and just does not work well.

BE ACTIVE IN YOUR STUDYING!
Pretend you are making out the test - literally make up and write down possible questions and possible answers. The process is the important part here, not the final product. This will both help you to focus on important points in the text and notes and help you to understand and remember the material better.

BE ACTIVE IN YOUR STUDYING!
Try making and using flash cards to study definitions and principles. The process of making the cards and using them is the important part, not the product.

BE ACTIVE IN YOUR STUDYING!
Using as many of your senses as possible while you study is helpful: Read a section of your text or notes and then

1) Write a summary of those notes from memory - then check yourself and do it again.

2) Summarize the material out-loud, even if (or especially when) no-one else is there.

BE ACTIVE IN YOUR STUDYING!
Study with others along the way - set up a regular study group. Talk about the subject material. I recommend that you do this along the way but not the night before the test.

Don't stay up late studying the night before the test. This backfires. You will not be rested and your brain will not work well during the test. Get a good night's sleep the night before the test. If you study effectively along the way you will be prepared and only need to review a little the night before the test. It is a gigantic mistake to wait until the night before the test for your most serious studying.

Study for every test as if you know it will be the hardest test you have ever taken - then it probably won't be as hard - since you have studied. If you think the material is not very hard - or not very interesting - and study accordingly - you will then think it was a hard test when you take it and not do as well as you could have.

Stay away from other students who are not serious about their studying.

Try different techniques. Find what works for you. The general principle here is to BE ACTIVE IN YOUR STUDYING! Find some new techniques that work better than your current techniques. One definition of insanity is trying the same thing over and over again. And expecting different results (e.g., just reading the notes over and over again and expecting a better grade.)

- *Adapted from Dr. Ray L. Winstead*

BE ACTIVE IN YOUR STUDYING!

http://nsm1.nsm.iup.edu/rwinstea/study.shtm

About Multiple Choice Exams

Multiple-choice exams have standard formats. Typically, the question has a "root" which poses a problem, followed by a series of alternatives, which are the answer and related alternatives.

1. READ or LISTEN carefully to all the directions about the exam.

2. READ through exam once. Answer all the questions you know. Don't dwell on the tough ones at this point; take advantage of the time you have to think through the question.

3. READ each question fully and try to identify key terms.

4. After reading each question, try to think of the answer WITHOUT looking at the alternative answers given.

5. Then read all choices to find the correct one (DON'T stop after the one you think is right, without reading the others. There could be a better answer. The directions on the exam usually state that you are to "Select the BEST answer"

6. Eliminate the alternatives that are obviously wrong.

7. Correct answers will read as a true statement when you match the question and the answer.

8. When you have answered all the questions that you could do readily, go through exam again and work on the remaining questions. Spend a reasonable amount of time on each question, but move on if you get stuck.

9. Don't just guess at the answer for any of which you are unsure. Try to at least narrow down your options by eliminating one or two of the alternatives.

10. Save time at the end to double-check your answers (check that your answers are the ones you think are correct and that you haven't filled in the wrong circles by mistake) and try the tough questions again. If you are not penalized for incorrect answers, do not leave any blank answer on your sheet.

Compiled by H. Addy from:

* Drewes, F. and K.L.D. Milligan. 2002. How to Study Science. 3rd ed. McGraw-Hill, Boston, MA
* Ellis, D.B. 1985. Becoming a Master Student , 5th ed. College Survival Inc., Rapid City, SD
* McKeachie, W.J. 1986. Teaching Tips, 8th ed. D.C. Heath & Co., Lexington, MA
* Nilson, L.B. 1998. Teaching at its best. Anker Publ. Co., Bolton, MA.
* and hard-won personal experience

Hospital Corps History

The U. S. Navy Hospital Corps: A Century of Tradition, Valor, and Sacrifice

by HMCS (FMF) Mark T. Hacala, USNR

Few military organizations can look upon their histories with the same degree of pride and, in some cases awe, as can members of the Navy Hospital Corps. In its century of service, the Hospital Corps has proven itself ready to support Marines and Sailors by giving them aid whenever and wherever necessary. As the years have progressed, the tools and techniques used by Hospital Corpsmen and their forerunners have evolved, but the level of dedication has remained a strong current running through the corps' history.

Revolutionary War

The first direction given to the organization of Navy medicine consisted of only one article in the *Rules for the Regulation of the Navy of the United Colonies of North America* of 1775. Article 16 stated:

"A convenient place shall be set apart for sick or hurt men, to be removed with their hammocks and bedding when the surgeon shall advise the same to be necessary: and some of the crew shall be appointed to attend to and serve them and to keep the place clean. The cooper shall make buckets with covers and cradles if necessary for their use."

Interestingly, the cooper or barrel-maker, whose skills could be used to make bedpans, had a more detailed job description than did any kind of trained medical assistant.

A typical medical section was usually limited to two, perhaps three men: the surgeon, the surgeon's mate, and possibly an enlisted man. The surgeon was a physician. The surgeon's mate, usually a doctor as well, held status like that of a modern warrant officer but signed only for a particular cruise. Although usually viewed within the history of the Medical Corps, surgeon’s mates’ position and responsibilities appear more to be equivalents to senior hospital corpsmen.

Few things changed in medical techniques and organization between 1775 and 1814, the period covering America's first naval wars. Among the less dramatic responsibilities of caring for the non-combat ill and injured was feeding and personal care of the sick. The simple daily ration of porridge or "loblolly" was sure to be carried down to those in the medical space by untrained attendants.

Surgeon’s Mate and Loblolly Boy

Congress approved an act on March 2, 1799, which copied the words of the Continental Congress's medical department article 16 of 1775 exactly. As a result, there was still no title or job description for enlisted medical personnel. The nickname "loblolly boy" was in common use for so many years that it became the official title in Navy Regulations of 1814. The loblolly boy's job, described in the regulations of 1818, included the following:

> The surgeon shall be allowed a faithful attendant to issue, under his direction, all supplies and provisions and hospital stores, and to attend the preparation of nourishment for the sick.
>
> The surgeon's mates shall be particularly careful in directing the loblolly boy to keepthe cockpit clean, and every article therein belonging to the Medical Department.
>
> The surgeon shall prescribe for casual cases on the gun deck every morning at 9 o'clock, due notice having been previously given by his loblolly boy by ringing of a bell.

The U.S. Navy's first loblolly boy of record was John Wall, who signed aboard the U.S.S. *Constellation* on June 1, 1798. The ship sailed with a surgeon, George Balfour, and a surgeon's mate, Isaac Henry, as well. Eight months later, in February 1799, Capt. Thomas Truxton won a decisive victory against the French frigate *L'Insurgente* in the Caribbean. This would have been Loblolly Boy Wall's first opportunity to care for shipmates wounded in battle.

Other loblolly boys who are documented in Navy records include Alexander Wood, who served aboard the U.S.S. *Essex* in 1802 and John Domyn aboard the frigate *Philadelphia* in 1803. Domyn and the rest of the crew of the *Philadelphia* were captured at Tripoli by Algerian pirates in October 1803 and remained captive until June 1805. Further, there was a 16 year-old loblolly boy aboard the U.S.S. *Eagle*, Joseph Anderson, about 1800. Anderson has the distinction of being the first known African-American loblolly boy.

Surgeon's Steward and Loblolly Boy

A new, senior enlisted medical rate, surgeon's steward, was introduced in the ensuing decades. The term is first seen in 1841 in Navy pay charts, but it appears that the new billet was only allowed on larger ships. By 1 April 1843, the Navy Department issued an order allowing surgeon's steward to be assigned to brigs and schooners. The relative importance of medical Sailors was hereby increased. Surgeon's stewards would rank second in seniority among the ship's petty officers, next only after the master-at-arms.
Herman Melville, famed author of *Moby Dick*, gives a description of the surgeon's steward aboard the frigate U.S.S. *United States* in *White Jacket*, his account of Navy life in 1843:

"An official, called the surgeon's steward, assisted by subordinates, presided over the place [sick bay]...He was always to be found at his post, by night and by day."
Melville's detailed description of the ship's medical department notes that "Pills," the surgeon's steward's nickname, performed a variety of duties. He assisted in preparing and passing surgical instruments during an operation. He also ran the ship's apothecary shop, which he opened for an hour or so in the morning and in the evening. Melville remembered how he went to the steward several times when he felt a need for medicine, only to be given his freshly-ground, bitter-tasting powders in a plain tin cup. While he commented on the unpleasant taste and after-effects, Melville also noted that the potion was free of charge.

Surgeon's Steward and Nurse
The year 1861 brought a horrible civil war to this country. With the massive increase in the Navy, changes and developments in the medical department were sure to ensue. On 19 June 1861, a Navy Department circular order established a new name for the loblolly boy.

> "In addition to a surgeon's steward, 1 nurse would be allowed for ships with a complement of less than 200; 2 nurses would be allowed for ships with a complement of more than 200; and sufficient nurses would be allowed on receiving ships in a number proportionate to the necessities of the vessel."

While the shipboard medical department may have only changed titles of personnel, new techniques in mass care of the sick and wounded were developed. A captured sidewheel steamer was repaired and modified to care for patients. Revisions to the ship were to include bathrooms, kitchens, laundries, even elevators and facilities to carry 300 tons of ice. On 26 December 1862, the U.S.S. *Red Rover* became the first Navy vessel specifically commissioned as a hospital ship. The medical complement included 30 surgeons and male nurses, as well as four nuns.

While the Civil War was often not as intense at sea services as it was for the Army, there were a number of terrible battles which necessitated a competent medical department. Pvt. Charles Brother, a Marine stationed aboard Admiral David Farragut's flagship U.S.S. *Hartford*, recalls such an account in his 1864 diary. After the admiral cursed the sea mines awaiting his fleet in Mobile Bay ("Damn the torpedoes!"), Farragut directed the *Hartford* into the fight. Heavy Confederate fire from the Confederate ram *Tennessee* ensued. As would often be the case during combat action, Navy medical personnel risked becoming casualties from hostile fire. In their attempts to minister to battle casualties, medical personnel are themselves targets and sometimes do not even have the chance to render aid. Pvt. Brother noted, the shell from the ram burst as it came through killing the Docts Stew'd [sic] instantly...Very few were slightly wounded, all were either killed instantly or horribly mangled. Our cockpit [sick bay] looked more like a slaughterhouse than any thing else. Admiral Farragut's after-action report listed a grisly count of 25 killed and 28 wounded on his ship.

Apothecary and Bayman
Post-war reductions in the size of the Navy brought new classifications to enlisted medical personnel. The title surgeon's steward was abolished in favor of three grades of apothecaries in 1866. Those selected as apothecaries had to be graduates of a course in pharmacy, or to possess the knowledge by practical experience. The Apothecary, First Class ranked with a warrant officer, while the second and third class were petty officer equivalents. The three rates were reduced one petty officer apothecary on 15 March 1869.

Nurse, as a title for junior enlisted medical personnel, was replaced by the title "bayman," one who manned the sick bay, in the early 1870s. U.S. Navy Regulations of 1876 used the title officially, and it remained a valid for 22 more years.

Charles Shaffer began a 50-year career in Navy medicine in 1897 as a bayman. His career path was typical for one enlisting in the medical field. Shaffer was required to enlist as a landsman (seaman apprentice), earning $16 a month. It was not until transfer to his first command that Shaffer's rating was changed to bayman. And since the naval hospitals used civilian male nurses as opposed to baymen, Shaffer would go to a ship.

With his new title, Bayman Shaffer's pay was upped to $18 a month. His uniform now bore two strips of piping on the cuff and a "watch mark," a half-inch white stripe sewn around the shoulder seam of the blue jumper (blue on white uniforms) denoting him as deck force or non-engineering personnel. This stripe was worn on either the left or right shoulder seam, depending on whether the individual was assigned to the port or starboard watch. Prior to the establishment of the Hospital Corps, no specific medical insignia was worn by junior personnel.

Shaffer's senior counterpart, the apothecary, was wearing new insignia as well, that of the newly-created (1893) chief petty officer. Its three chevrons and three arcs were surmounted by an eagle, and had a caduceus in the angle of the chevrons. An eagle whose wings extended horizontally surmounted the arcs. The rating badge described in the 1894 uniform regulations established the style which has continued, virtually unaltered, to the present day.

An apothecary of the 1890s mixed and dispensed all medication aboard ship. He was responsible for all medical department reports, supply requests, and correspondence. The apothecary administered anesthesia during surgery and would be the primary instructor for new baymen. Some of the medical skills were easily learned, though. "As a rule, baymen became skillful at bandaging," Shaffer noted, "perhaps due to their previous training in seamanship."

Their responsibilities did not end there, however. During shipboard surgery, the bayman focused an electric light on the incision site while the surgeon did his work on what was listed as the "combination writing and operating table". He sterilized surgical instruments by boiling, then storing them in a solution of 5 percent phenol. Bandages and dressings were sterilized by baking them in a coffee can in the ship's oven. Sick bay itself was prepared for surgery by wiping the entire room down with "a weak bichloride solution". On days when the ship's routine called for scrubbing bags and hammocks, a bayman was responsible for washing those of the sick. He assisted in the maintenance of medical department records, and had to paint the ship's medical spaces when required.

In the last two decades of the 1800s, many in the naval medical establishment called for reforms in the enlisted components of the medical department. Medicine had by now progressed far more as a science, and civilian hospitals all had teaching schools for their nurses. Foreign navies had trained medical Sailors, and the U. S. Army had established its own Hospital Corps of enlisted men on 1 March 1887. Navy Surgeon General J. R. Tryon argued, in his annual report of 1893, against the practice of assigning landsmen to the medical department with nothing more than on-the-job-training. He advocated the urgent need for an organized hospital corps.

Physicians in the fleet were equally certain of the need for changes. Surgeon C. A. Sigfried of the U.S.S. *Massachusetts* made his views known in his report to the Surgeon General in 1897.

The importance of improving the medical department of our naval service is more and more apparent, in view of the recent advances in the methods and rapidity of killing and wounding. The great want is a body of trained bay men or nurses, and these should be better paid and of better stamp and fiber. Now and then we procure a good man, and proceed with his training as a bay man. He soon finds opportunity for betterment in some one of the various departments of the ship, in the matter of pay and emolument, either in some yeoman's billet or in some place where his

meager $18 per month can be suddenly increased to $30, $40, or even $60 per month. The bay man, who should be an intelligent, sober man, and well trained in many things pertaining to nursing, dieting, ambulance, and aids to wounded, and have a moderate amount of education, finds his pay at present among the lowest in the ship's company; even the men caring for storerooms get more per month.

Hospital Corpsman: Hospital Steward and Hospital Apprentice

Arguments for a professional, well-trained group of individuals to provide medical care for the Navy finally paid off. Unfortunately, it took the imminent danger of combat in the Spanish-American War to spur Congress into action. Within a bill aimed at building the armed forces was a section to provide for the Navy's long-needed Hospital Corps. It was approved by President William McKinley on 17 June 1898. From that date to the present, either generically or by rating title, medical Sailors have been called "hospital corpsmen."

The corps would again change the rate titles. The hospital apprentice would be the equivalent of an apprentice seaman, the hospital apprentice first class was a third class petty officer, and the hospital steward was a chief petty officer. Pharmacists were warrant officers, the first of a line of commissioned hospital corpsmen that continued until the establishment of the Medical Service Corps following World War II.

Early history of the corps set a pace of conspicuous service and involvement that would continue to the present. Before there was even a hospital corps school, Hospital Apprentice Robert Stanley was serving with the U.S. contingent at Peking. Actions by a Chinese political group that was opposed to foreign presence in China, the so-called Boxers, prompted attacks on foreign embassies in July 1900. During this action, Hospital Apprentice Stanley volunteered for the dangerous mission of running message dispatches under fire. For his bravery, Stanley became the first in a long line of hospital corpsmen to receive the Medal of Honor.

In order to ensure that the members of the new Hospital Corps were adequately trained in the disciplines pertinent to both medicine and to the Navy, a basic school for corpsmen was established at the U. S. Naval Hospital Norfolk (Portsmouth), VA. Originally called the School of Instruction, it opened 2 September 1902. Its curriculum included anatomy and physiology, bandaging, nursing, first aid, pharmacy, clerical work, and military drill. The first class of 28 corpsmen was graduated on 15 December 1902. Hospital Apprentice Max Armstrong, at the top of the alphabetical list of graduates, was naturally given his diploma first and has been heralded as the Navy's first graduate hospital corpsman.

The school continued for a brief time and was then moved to the Naval Hospital in Washington, DC, staying in existence there until 1911. For the next three years there was no basic school for corpsmen, but the concept was revived in 1914. The next two Hospital Corps Training Schools were opened in Newport, RI and on Yerba Buena Island, CA.

Development of the Navy's hospital corps training courses would prepare the first generation of hospital corpsmen for arduous duty, both in peace and war. A graduate of the Hospital Corps School’s sixth class, Hospital Steward William Shacklette, would find himself aboard the U.S.S. *Bennington* in San Diego harbor on 21 July 1905. When the ship's boiler exploded, Shacklette was burned along with almost half the crew. The other half was killed outright. He

rescued and treated numerous of his shipmates and was awarded the Medal of Honor for his bravery. Another young corpsman, Hospital Apprentice First Class William Zuiderveld of Michigan, landed at Vera Cruz, Mexico in 1914 as part of a force of Navy and Marine Corps personnel. During intense street fighting in which he was wounded himself, Zuiderveld, a graduate of the 16th class of the School of Instruction, risked his life on several occasions to aid wounded shipmates. He, too, received the Medal of Honor.

Hospital Corps: Hospital Apprentices and Pharmacist's Mates

The next revision in the structure of the Hospital Corps would come by act of Congress on August 29, 1916. Under this plan, the rates would be hospital apprentices, second class and first class (both of whom wore a red cross on the sleeve), pharmacist's mates, third, second, and first, and chief pharmacist's mate. The officer contingent of the Hospital Corps would include the two warrant officer ranks of pharmacist and chief pharmacist. The reorganization would allow for a massive increase, five-fold, in the size of the Hospital Corps.

At the start of 1917 the Hospital Corps counted 1,700 men in its ranks. A concerted effort to recruit and train new personnel enabled the corps to reach its authorized strength of 3 ½ percent of the Navy and Marine Corps, or 6,000 men. But as these plans came to fruition, the United States entered World War I in April. By the end of 1918, the corps would peak at about 17,000.

Hospital Corps: Pharmacist's Mates in World War I

The massive war increase in Hospital Corps strength necessitated additional schools to train the newcomers. Hospital Corps School, Great Lakes, IL was established in January 1913. Wartime schools were created in Minneapolis at the University of Minnesota, in New York at Columbia University, and at the Philadelphia College of Pharmacy. A school for Naval Reserve Force hospital corpsmen was set up at Boston City Hospital. Other crashcourse schools for shipboard personnel were conducted at a number of other civilian hospitals. Hospital corpsmen that were needed to serve as medical department representatives on small vessels such as destroyers were trained at the Pharmacist's Mate School at Hampton Roads, Virginia, the forerunner of the Independent Duty Hospital Corpsman School.

Hospital corpsmen were assigned to the multitude of duty types and locations needed to support a Navy involved in a world war. Naval hospitals were opened and staffed. Ships and aircraft squadrons were given medical support. At sea, the dangers of the new war were ever present. When the troop transport USS *Mount Vernon* was torpedoed by a German U-boat, Pharmacist's Mate First Class Roger Osterheld contends with over 50 casualties, over half of whom were killed.

Naval training facilities and shore establishments needed hospital corpsmen as well as did occupation forces in Haiti and other bases around the world. But World War I provided the Hospital Corps a role that would afford it some of the most gruesome and dangerous challenges it would ever face: duty with the Marine Corps
.
Assignment to Marine Corps units was not completely new. Hospital corpsmen were

serving with Marine occupational forces in Cuba, Haiti, and Santo Domingo at the outbreak of the war and had seen other similar service. It was the change of the Marine Corps' role, to one of expeditionary forces in a large scale ground war that changed what hospital corpsmen would do. Sick call and preventive medicine were continuous roles that remained unchanged. Facing artillery, mustard gas, and machine gun fire were new experiences.

Two to four hospital corpsmen were assigned to each rifle company. A first or second class petty officer would act as the company hospital corpsman and the others as platoon hospital corpsmen. In the trenches and more fixed locations, *postes de secours* or company aid stations were established by these contingents. A battalion aid station would have from five to seven hospital corpsmen and a chief. The senior Chief Pharmacist's Mate and six to eight more hospital corpsmen would serve at the regimental aid station.

These hospital corpsmen lived and worked in arduous battle conditions. In one occurrence, a predawn mustard gas attack on the 6th Marines at Verdun in April 1918 had devastating consequences: 235 of the 250 in one company succumbed to the gas and had to be evacuated. The two company hospital corpsmen worked furiously to treat these patients despite their own gas injuries. One died and the other was permanently disabled. Assaults on German positions offered hospital corpsmen further chances to show their commitment. Their performance in woods well known to Marines would cause the 5th regiment's commanding officer to write, "there were many heroes who wore the insignia of the Navy Hospital Corps at the Bois de Belleau."

In all, some 300 hospital corpsmen, doctors, and dentists served with the 5th Marine Regiment, the 6th Marine Regiment, and the 6th Machine Gun Battalion, assigned to the Army's 2nd Infantry Division. Their professionalism and heroism were reflected in some of the statistics they compiled. During their time in Europe, in the bloody engagements such as Meuse-Argonne and Belleau Wood, they treated over 13,000 casualties. Eighteen of their own were killed and 165 were either wounded or injured by mustard gas.

A heritage of valorous service with the Marines was born. Two hospital corpsmen received the Medal of Honor. Other decorations to hospital corpsmen included 55 Navy Crosses, 31 Army Distinguished Service Crosses, 2 Navy Distinguished Service Medals, and 237 Silver Stars. A hundred foreign personal decorations were granted to Navy hospital corpsmen, and 202 earned the right to wear the French Fourragère shoulder aiguillette permanently. Their 684 personal awards make the Hospital Corps, by one account, the most decorated American unit of World War I.

Following the war there was an inevitable decrease in the strength of the armed forces. Despite the loss of hospital corpsmen, there were still missions to perform. Nicaragua was added to the list of occupational duties to which the Marines and their hospital corpsmen were assigned in 1927. Ships and naval hospitals still required Hospital Corps staff. Dedicated members of the Hospital Corps remained in the service, doing what they loved, despite the lack of advancement opportunity. In the years between the wars, time in rate from pharmacist’s mate second class to pharmacist’s mate first class was 8 years.

Hospital Corps: Pharmacist’s Mates in World War II

World War II became the period of Hospital Corps’ greatest manpower, diversity of duty, and instance of sacrifice. Between 1941 and 1945, the ranks of this small organization

swelled from its pre-war levels of near 4,000 to over 132,000 personnel. This increase came to fulfill new responsibilities with new technologies at new duty stations. In the face of great adversity, the Hospital Corps would cement its reputation for effectiveness and bravery.

The Navy's fleet expanded to thousands of ships and the Marine Corps grew from a few regiments to six divisions. A two ocean war produced horrific numbers of casualties. The Hospital Corps would have to grow to meet the needs of casualty collection, treatment, and convalescence. To educate the influx of new Sailors, Hospital Corps Training School at Portsmouth, VA was augmented by a temporary school at Naval Hospital Brooklyn, NY. The school at Great Lakes was recreated in 1942, and others were started at Farragut, ID and at Bainbridge, MD in 1943. A separate Hospital Corps Training School was established for women at Bethesda, MD in January, 1944. Specialized schools were opened to train pharmacist's mates for independent duty and for service with the Marines. Additionally, courses were established to instruct personnel on new equipment and techniques in dozens of developing medical fields.

Shore-based duty sent Hospital Corps personnel to hospitals and dispensaries in the United States and abroad. Advance base hospitals on newly-captured Pacific islands formed a crucial link in the chain of evacuation from battle sites. Those facilities in Hawaii or England received casualties from their respective fronts. Stateside hospitals watched over wounded service personnel as their recuperation continued. Hospital corpsmen made the treatment of American casualties possible at each of these by providing technical support and direct patient care.

Duty on surface ships afforded hospital corpsmen numerous challenges and abundant environments in which to face them. Hospital ships required the services of personnel in much the same way as shore-based hospitals, except that those on ship were afloat and subject to attack. Other classes of vessels, such as landing ships, tank (LSTs) and patrol craft, escort and rescue (PCERs) became large floating clinic/ambulances which required additional Hospital Corps personnel.

Combatant ships and transports in the Atlantic, Pacific, and Mediterranean theaters took casualties from ships, aircraft, and submarines throughout the war, necessitating the service of well-trained hospital corpsmen. Casualties could be staggering on attacked ships. In one example, the aircraft carrier USS *Bunker Hill* sustained 392 killed and 264 wounded when it was hit by two kamikazes.

Role of submarine hospital corpsmen developed into one of great importance. Hospital corpsmen treated 549 survivors of air or sea calamities, U.S. and enemy alike. In one case, three Sailors were seriously wounded, the submarine's C.O. wrote, "the chief pharmacist's mate is particularly commended for his quick and efficient action in caring for these three wounded shipmates...He has been recommended for promotion and the Bronze Star Medal."

The most dramatic accomplishments of submarine hospital corpsmen were three who had to do surgery while submerged. Pharmacist's Mate First Class Wheeler "Johnny" Lipes performed a successful appendectomy aboard the USS *Seadragon* on 11 September 1942. Lipes, who had been a surgical technician, used improvised instruments made from mess deck utensils and instructed assistants as the procedure went on in the officers' wardroom. PhM1c Harry Roby performed the same act on the USS *Grayback* as did PhM1c Thomas Moore aboard USS *Silversides*, both in December 1942.

Approximately 300 hospital corpsmen sat out all but the early days of the war when they were captured by the Japanese who invaded the Philippines. In prisoner of war camps and huddled in POW "hell ships", they endured malnutrition, disease, torture, and brutality. One hundred thirty-two hospital corpsmen died as prisoners during World War II, a death rate almost 20 percent higher than among other American POWs.
Hospital corpsmen served on the beaches not only in the island campaigns of the Pacific, but in Europe as well. Teams of Navy medical personnel formed aid stations with beach battalions at Sicily and Normandy, treating Army and allied wounded under fire. Hospital corpsmen ensured the survival of these casualties until they could reach hospitals in England.

Of all the hospital corpsmen in World War II, Fleet Marine Force personnel endured, perhaps, the most grueling side of war. As they swarmed numerous beaches in the Pacific, they became targets themselves as they braved fire to reach downed comrades. At Guadalcanal, Tarawa, Peleliu, Saipan, Tinian, Kwajalein, Iwo Jima, and Okinawa, hospital corpsmen bled and died, often in greater numbers than the Marines for whom they cared. Hospital Corps casualties in the 4th Marine Division at Iwo Jima, for example, were 38 percent.

Pharmacist's Mate First Class Ray Crowder made notes of his combat experiences in his diary:

> Most of the men who had been wounded previously were hit again...I was hit by a piece of shrapnel in my leg but I overlooked it until later. As soon as I could get my wits together...I began to do what I could for the guys. Two of the men were screaming with shock. Darkness had already fallen and I couldn't see what I was doing. All that I could do was to feel the blood and try to get a pressure bandage put over it to stop the bleeding.

Pharmacist’s Mate Second Class John H. Bradley’s heroism with the 28th Marines on Iwo Jima is typical of acts repeated by hospital corpsmen throughout the war. On seeing a wounded Marine, Bradley rushed to his aid through a mortar barrage and heavy machine gun fire. Although other men from his unit were willing to help him with the casualty, Bradley motioned them to stay back. Shielding the Marine with his own body, the hospital corpsman administered a unit of plasma and bandaged his wounds. Through the gunfire, he then pulled the casualty 30 yards to safety.

PhM2c Bradley was awarded the Navy Cross for his valor, but he is not usually remembered for this act. Days later, he and five Marines were captured in Joe Rosenthal’s photograph of the second flag raising on Mt. Suribachi. The image was reproduced more than perhaps any photo in history. It was the theme for the Marine Corps War Memorial in Arlington, VA and made Bradley the first U.S. Navy Sailor to appear on a postage stamp. His likeness as a dedicated American serviceman is the most famous in the Hospital Corps’ history.

Members of the Hospital Corps treated some 150,000 combat casualties during the war.
This does not include thousands of others, those plagued by disease and injured in the line of duty, who were aided by their medical shipmates. The cost of this service was high: 1,170 hospital corpsmen were killed in action and thousands more were wounded. But their valor in doing their jobs was great. Hospital corpsmen earned 7 Medals of Honor, almost half of those awarded to

Sailors in the war. In addition, they earned 66 Navy Crosses, 465 Silver Star Medals, and 982 Bronze Star Medals.

A New Hospital Corps:

Massive reorganization of the armed forces took place after World War II. A new Department of Defense was established, and the Army-Navy Medical Service Corps Act removed commissioned allied health and medical administration officers from the Hospital Corps. This law also provided for a separate Dental Technician rating, which remained a component of the Hospital Corps until 1972. Women in the Hospital Corps had previously been WAVES, or members of the Women's Reserve, U.S. Naval Reserve. New legislation permitted women to enlist in the Regular Navy, and HM1 Ruth Flora became the first hospital corpsman to do so on 12 July 1948

Effective 2 April 1948 the Navy changed the names and insignia of the Hospital Corps. The new titles were hospital recruit, hospital apprentice, hospitalman, hospital corpsmen third, second, and first class, and chief hospital corpsman. The red Geneva cross, which had marked corpsmen for 50 years, was replaced in the rating badge with the original mark of the winged caduceus. The rates of senior chief and master chief hospital corpsman were added in 1958.

Hospital Corpsmen in Korea

As part of a United Nations force, Marines were committed to the Korean peninsula when South Korea was invaded by its northern neighbor in the summer of 1950. Within the first year, hospital corpsmen had participated in the dramatic landing at Inchon and the frigid retreat from the Chosin Reservoir. By the summer of 1951, a stalemated line of opposing forces took static positions. For the next two years, the war would be reminiscent of World War I, with bunkers, trenches, raids and artillery fire. The slow war of attrition was nonetheless lethal. In late March 1953, 3,500 Chinese Communist Forces soldiers attacked three outposts--Reno, Vegas, and Carson--of 40 Marines and one hospital corpsmen each. Out of this fighting came two Medals of Honor and numerous other decorations. In the Nevada Cities Outpost battles, most of the hospital corpsmen who were involved at the small unit level were either killed or wounded.

Although only one Marine division was involved in the war, the Hospital Corps lost 108 killed in action. Disproportionate to their numbers was their heroism. In Korea, hospital corpsmen earned 281 Bronze Star Medals, 113 Silver Star Medals, and 23 Navy Crosses. All five enlisted Navy Medals of Honor were awarded to Navy Hospital Corpsmen serving with the Marines.

Hospital Corpsmen in Vietnam

American military commitment in Southeast Asia grew in the decades following World War II. As early as 1959, a few hospital corpsmen provided medical support for U. S. military personnel as part of the American Dispensary at the U.S. Embassy. Four years later, in 1963, Navy Station Hospital, Saigon was created. Ninety hospital corpsmen would staff the facility, which provided care for U. S. and allied (Australian, New Zealand, Filipino, and South Korean) military, as well as South Vietnamese civilians. These medical personnel conducted routine medical care and treated the victims of combat and terrorist actions until the hospital was transferred to the Army in 1966.

A new hospital was constructed in 1965 at Naval Support Activity Da Nang. A staff of 485 hospital corpsmen worked with doctors and nurses to care for combat casualties. The hospital, which was designed primarily to care for Marines in the I Corps sector, treated 23,467 patients in 1968 alone. Although not on the front lines, the hospital corpsmen here were subjected to routine rocket and mortar attacks.

Hospital corpsmen were assigned aboard ships of various kinds, providing off-shore medical support to U. S. forces. The largest commitment here was on the hospital ships USS *Repose* and USS *Sanctuary*. Some 200 hospital corpsmen, representing the gamut of technical specialties, worked on each ship. Teams of 20 hospital corpsmen served on LPH class amphibious ships. Others supported the Riverine force on APB class base ships.

U. S. State Department initiatives and the Medical Civic Action Program (MEDCAP) provided medical support for Vietnamese civilians. Beyond routine aid and treatment, the hospital corpsmen working through these programs provided guidance in sanitation and preventive medicine throughout South Vietnam.

By far the Hospital Corps' largest contribution in Vietnam was with Marine Corps units. Starting with the 50 who landed with the Marines at Da Nang in 1965, the enlisted medical component would grow to 2,700 hospital corpsmen assigned to 1st and 3d Marine Divisions, 1st Marine Air Wing, and other combat support units. Two medical battalions and two hospital companies operated field hospitals, collecting and clearing units, and dispensaries which treated the flow of combat casualties from the field. Closer support was provided at the battalion aid station (BAS) level, where casualties could be stabilized before evacuation to more definitive care. The BAS was often bypassed because of the exceptional medical evacuation capabilities of helicopter medical evacuation (MEDEVAC).

The most dangerous role of the hospital corpsman in Vietnam was in the field. Special units, such as Navy SEAL teams and Marine reconnaissance units took medical Sailors with them, as did the artillery, air, and infantry elements of the Marine Corps. Most of the 53 hospital corpsmen assigned to an infantry battalion served with rifle companies, one or two men per platoon of about 40. These Sailors patrolled with their Marines, risked the same dangers, and rendered the aid that saved the lives of thousands.

Contributions of hospital corpsmen in Vietnam were noteworthy, as they cared for over 70,000 combat Navy and Marine Corps combat casualties and countless military and civilian sick call patients. Their valor was great. HM3 Donald E. Ballard, HM3 Wayne M. Caron, and HM2 David R. Ray earned the Medal of Honor for heroism. HM3 Robert R. Ingram received his Medal of Honor for Vietnam in 1998. Additionally, 30 hospital corpsmen received the Navy Cross, 127 the Silver Star Medal, and 290 the Bronze Star Medal. The names of 638 hospital corpsmen were killed in action there, more than in any other war except World War II. Too many more--4,563--would earn the Purple Heart.

HM2 Chris Pyle wrote the following letter home before assignment with 1st Marine Division in Vietnam.

> "Many people have died to save another. The Navy Corpsman has had more honors bestowed on him than any other group. My life has but one meaning, to save or help

> someone. Soon I will be going over to Vietnam. I have my fears and beliefs, but they lay hidden under my emotions. That's why God has made me so. Someday I will see before me a wounded marine. I will think of all kinds of things, but my training has prepared me for this moment. I really doubt if I will be a hero, but to that Marine I will be God. I am hoping that no one will die while I am helping him; if so, some of myself will die with him. Love for fellow man is great in my book. It's true they make me mad at times but no matter who it is, if he's wounded in the middle of a rice paddy, you can bet your bottom dollar that whatever God gave me for power, I will try until my life is taken to help save him, and any other."

Five months later, on 28 May 1969, HM2 Pyle was killed in action.

Hospital Corpsmen in Beirut

A different part of the world would beckon hospital corpsmen in the 1980s, southwest Asia. The objective was a "peacekeeping" mission in Beirut, Lebanon, in which U.S. forces participated with those of France, Italy, and the Great Britain in a Multinational Force. Here, hospital corpsmen from the ships of a Mediterranean Amphibious Ready Group and a Marine Amphibious Unit were assigned to stop a bloody, eight-year old factional civil war. By the end of August, 1983, the peacekeepers had become targets and responded in a ground war that was all but unknown back in the U.S.

Firefights at isolated outposts soon produced casualties, and hospital corpsmen responded under fire to treat their wounded Marines. When a mortar round hit one of the Marine positions, one hospital corpsman, HN Victor Oglesby, found himself with five wounded Marines, his platoon sergeant dead, and his platoon commander barely alive. Two months later, on 23 October a uniformed suicide truck bomber attacked the headquarters of 1st Battalion, 8th Marines. The truck bomb unleashed the largest non-nuclear blast ever detonated, and killed 241 Americans. Almost the entire battalion aid station--15 hospital corpsmen and the battalion surgeon--were killed. The casualty count for the Hospital Corps would be the next costly after World War I. One of the three hospital corpsmen who survived the blast, HM3 Donald Howell, tended to wounded Marines while trapped in the rubble and wounded himself. The relief unit for the 24th Marine Amphibious Unit would not arrive in Lebanon until they had invaded the small Caribbean nation of Grenada.

Hospital Corpsmen in the Persian Gulf War

The 1990-91 Iraqi invasion of Kuwait gained a strong response from the U.S. and the world. Preparations were made to drive the Iraqi Army out of the tiny country, and corpsmen were readied to respond to the needs of their shipmates. Hospital corpsmen around the globe reacted, as their ships, stations, and Marines deployed or prepared to receive casualties. In fact, the first Navy casualty of the war was a hospital corpsman. Of the vast number of Naval Reservists called to active duty, the largest single group activated was hospital corpsmen. Of an inventory of just over 12,000 hospital corpsmen in the Naval Reserve, 6,739 were recalled to active duty. The largest group of them, 4,617, served at medical treatment facilities and casualty receiving centers. 1,142 went to Marine Corps units, 841 to Fleet Hospitals 6 and 15, 471 of them were assigned to the hospital ships *Mercy* and the *Comfort*.

Hospital Corpsmen in Somalia

U.S. forces would again try to bring stability to a troubled land: Somalia. Hospital corpsmen there faced both bullets and the needs of a starving populace. One, HM3 Timothy E. Quinn, wrote a letter describing his experiences in February 1993. "I was on a foot patrol that got pinned down by automatic weapons fire, and here I am tucked up against a tree trying to get small..." He continued, "I go out to orphanages and do simple sick call and such...the people there tell us that food is now plentiful, and that no one is dying of hunger anymore, but now the medical problems are much more apparent."

Hospital Corpsmen in 1998

In its first century, the Hospital Corps has compiled a truly honorable legacy of valor and sacrifice. In addition to the wars and conflicts recounted here, hospital corpsmen have responded to natural disasters, military accidents, and other peacetime emergencies. Moreover, they have maintained the regular health of their Sailors and Marines, giving immunizations, conducting preventive medicine efforts, and holding sick call. Today, the 23,000 regular and 6,000 reserve members of the Navy Hospital Corps continue to serve around the globe. They are assigned to naval hospitals and clinics, to surface ships and submarines. They fly search and rescue missions and deploy with Seabees. They maintain constant battle readiness with Marine Corps units and SEAL teams.

Hospital corpsmen have always had the job of maintaining the health of their shipmates. Their innumerable instances of heroism, of consciously exposing themselves to danger to save lives, are not spectacular because they were required to act. Their displays of courage have been noteworthy because these men and women cared about their shipmates.

Next portion added at FMTB – Article by Cpl. Anthony R. Blanco

15th MEU (SOC) combat corpsmen uphold proud legacy

Ever since the birth of the Corps in 1775, Marines and Sailors have served side-by-side on naval vessels beginning their long and adventurous history.

Rich within that history is the bond between the Marine and the hospital corpsman. Only twenty three short years after the first Marines began their sea service, Navy corpsman stepped up and began providing the medical care of Marines. To this day Navy corpsmen, also known as ‘Doc, have saved countless numbers of Marines’ lives during every American conflict since 1798.

The Navy corpsmen attached to the 15th Marine Expeditionary Unit (Special Operations Capable) are no different from the past corpsmen and still carry the special Marine Corps and Navy bond.

Marines and Sailors recently debarked from the Tarawa Amphibious Ready Group in support of United States and Coalition forces building up in Kuwait. Navy corpsmen are here to support any action necessary and that includes adding another page to their illustrious history with their participation in Operation Enduring Freedom and the possible confrontation with Iraq to destroy potential weapons of mass destruction.

During World War II, Navy corpsmen performed emergency medical treatment on wounded Marines while under heavy enemy fire.

In 1945, the Secretary of the Navy, James Forrestal, commended corpsmen when he said, “The hospital corpsmen saved lives on all the beaches Marines stormed. … You corpsmen performed foxhole surgery while shell fragments clipped your clothing, shattered the plasma bottles from which you poured new life into the wounded, and sniper’s bullets were aimed at the (red cross) brassards on your arms.”

Seven Navy corpsmen received the Medal of Honor, the nation’s highest award, and 67 corpsmen received the Navy Cross, the Navy’s second highest award, by performing above and beyond the call of duty during World War II.

Although corpsmen don’t usually have a degree in medical science and are younger than most doctors, they are doing more than what some doctors only dream about, according to Chief David D. Jones, 37, the BLT 2/1 medical chief, who is a native of Brooklyn N.Y. Jones has spent 12 of is 18 years in the Navy with Marine Corps units.

By working in an environment where a fighting hole or a bunker could be the operating room, the Navy implemented Field Medical Service Schools at Marine Corps Base Camp Pendleton, Calif., and Marine Corps Base Camp Lejeune, N.C., in 1950 to better train corpsmen in the field. Before corpsmen can attach to an infantry unit they must complete the course, according to HM2 (FMF) Tommy L. Johnson, who is a hospital corpsman with Trailer Platoon, Battalion Landing Team 2/1, 15th MEU (SOC). Johnson, whose previous duty assignment was at Siganelli Naval Air Station, Italy, said he was looking forward to working with an infantry Marine unit.

“When I got orders to [Camp Horno on Camp Pendleton], I was excited because I got the opportunity to work with the best fighting force in world,” the 23-year-old Richmond, Calif., native said.

Because medical doctors don’t fight on the front line with the Marine units, corpsmen are challenged by making-on-the-spot life-threatening decisions.

In Vietnam, approximately 16 percent of casualties on the front lines were critically injured and it was up to the corpsman to save the lives of those Marines, according to Navy Lt. Michael B. Humble, 30, the BLT 2/1 surgeon, who is a native of Russellville, Ky. “I trust them to make [important] decisions,” Humble said. “I believe that the Marines fight better when they know that they have a corpsman there. It’s a comforting feeling knowing that someone is behind you willing to take care of you.”

Johnson, who worked for the Navy before coming to a Marine unit, said he wanted to raise the bar and test himself to hang with an infantry unit. “I wanted to bring myself to another level,” Johnson said. “When I walk into a [Naval] hospital and other corpsmen see me wearing my Fleet Marine Force badge, they look at me with pride.”

Even Marines in his unit know that he’ll be there to take care of them, whether in battle or back home at Pendleton. “I love field corpsmen because they do everything we do and they have to know more than we do,” said Sgt. Iradj M. Navai, 26, a squad leader with Trailer Platoon, BLT 2/1, who

is a native of San Clemente, Calif. “He (Johnson) went out of his way and gave us all medical blow out kits so we could perform self aid and buddy aid if he wasn’t available during combat.” A “blow out” kit is a medical kit that contains a variety of field medical dressings and bandages.

Johnson also takes the opportunity during down time to teach his Marines basic medical care.

“In the field, my Marines come first,” Johnson said. “They depend on me and I know that my Marines are going to take care of me if I become injured.” Corpsmen throughout history have proved they are vital to the healthcare of Marines during combat. Lt. Gen. Lewis B. “Chesty” Puller, said to his corpsmen during the Korean War, “You guys are the Marines’ doctors; there’s no better in the business than Navy Corpsmen.”

As many Marines agree with Chesty, Navai puts corpsmen on a different level.
“They keep us alive in combat, they are our angels,” Navai said. “If you get scared or hurt, all you have to say is ‘corpsman up’ and there’s your angel.”

COMBAT CORPSMEN
Cpl. Anthony R. Blanco
15th Marine Expeditionary Unit (Special Operations Capable)

INTRODUCTION TO THE UNITED STATES MARINE CORPS

INTRODUCTION TO THE USMC

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UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

Navy and Marine Corps Rank Structure

FMST 1101

TERMINAL LEARNING OBJECTIVE

1. In a military environment, **identify the rank and rate structure of Armed Forces Personnel**, per the reference. (FMST-HSS-1101)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a list, **identify rank equivalencies between the rank structures of Navy and Marine Corps personnel**, per the student handout. (FMST-HSS-1101a)

2. Without the aid of references, given a description or list, **identify the equivalent rank insignias of Navy and Marine Corps personnel**, per the student handout. (FMST-HSS-1101b)

3. Without the aid of references, given a description or title, **identify the leadership responsibilities of Marine Corps personnel**, per the student handout. (FMST-HSS-1101c)

4. Without the aid of references, given a list, **identify the responsibilities of the Hospital Corpsman within an Aid Station**, per the student handout.

1. ENLISTED RANKS

Categorized into three groups

-Junior Enlisted
-Non-Commissioned Officers
-Staff Non-Commissioned Officers

Junior Enlisted

PAYGRADE	MARINE CORPS	NAVY
E-1	**Private** **NONE**	**Hospitalman Recruit** **NONE**

Roles: 1. Entry level Marine/Sailor
2. Platoon member responsible to their fireteam leader.
3. An HR may be assigned as a Platoon Corpsman or General Duty Corpsman within an aid station.

E-2	**Private First Class** 	**Hospitalman Apprentice**

Roles: 1. Entry level Marine/Sailor
2. Platoon member responsible to their fireteam leader.
3. An HA may be assigned as a Platoon Corpsman or General Duty Corpsman within an aid station.

E-3	**Lance Corporal** 	**Hospitalman**

Roles: 1. Entry level or experienced Marine/Sailor
2. Platoon member responsible to their fireteam leader.

3. Experienced Lance Corporals can assume the duties as a fireteam leader.
4. An HN may be assigned as a Platoon Corpsman or General Duty Corpsman within an aid station.
5. Experienced HNs maybe assigned as Senior Line Corpsman.

Non-Commissioned Officer / NCO

PAYGRADE	MARINE CORPS	NAVY
E-4	**Corporal**	**Hospital Corpsman Third Class**

Roles: 1. Experienced Marine assigned as fireteam leader or squad leader
2. An HM3 may be assigned as a Platoon Corpsman or hold the Senior Line Corpsman position.
3. Within an aid station, an HM3 may be assigned a commodity such as Physicals PO, Supply PO, PMR, etc.

E-5	**Sergeant**	**Hospital Corpsman Second Class**

Roles: 1. Experienced Marine assigned as squad leader, but can assume duties as Platoon Sergeant.
2. An HM2 at the company level is assigned as the Senior Line Corpsman.
3. Within an aid station, an HM2 will have added responsibilities ranging from Administration PO to Assistant LPO.

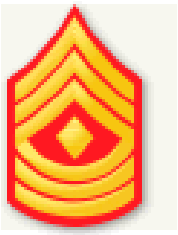
Staff Non-Commissioned Officer / SNCO

PAYGRADE	MARINE CORPS	NAVY
E-6	**Staff Sergeant**	**Hospital Corpsman First Class**

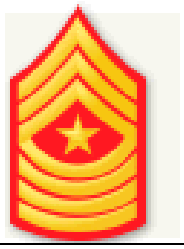
Roles: 1. Senior Marine assigned as Platoon Sergeant, but can assume duties as Platoon Commander.
2. An HM1 is assigned to the aid station with administrative responsibilities.
3. Leading Petty Officers are tasked with the day to day operations of the aid station.

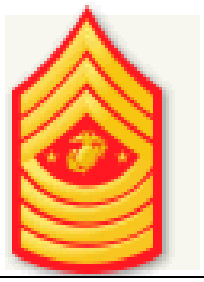
PAYGRADE	MARINE CORPS	NAVY
E-7	**Gunnery Sergeant**	**Chief Hospital Corpsman**

Roles: 1. Senior Marine assigned as Company Gunnery Sergeant; can assume role as Company 1stSgt.
2. The Chief of an aid station is responsible for all sailors within a unit as well as the functioning of the aid station.
3. The Chief reports directly to the SgtMajor and the Battalion Commander.

PAYGRADE	MARINE CORPS	NAVY
E-8	**Master Sergeant (Technical Expert)** **First Sergeant (Administrative)** 	**Senior Chief Hospital Corpsman**

PAYGRADE	MARINE CORPS	NAVY
E-9	**Master Gunnery Sergeant (Technical Expert)** 	**Master Chief Hospital Corpsman**

PAYGRADE	MARINE CORPS	NAVY
E-9	**Sergeant Major (Administrative)** 	**Command Master Chief**

PAYGRADE	MARINE CORPS	NAVY
E-9	**Sergeant Major of the Marine Corps** 	**Master Chief Petty Officer of the Navy (MCPON)**

2. OFFICER RANKS

Marine Corps Officers wear gold or silver rank insignias on the shoulder lapel of their coats or overcoats. They also wear small replicas of the insignia on their shirt collar. The color and shape of the insignia varies with their rank.

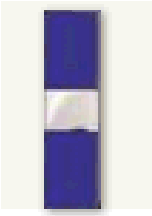
Officer ranks within the Marine Corps are categorized into three (3) groups

-Company Grade: W1 to W5 and O-1 to O-3
-Field Grade: O-4 to O-6
-General Grade: O-7 to O-10

Company Grade

PAYGRADE	MARINE	NAVY
W-1	Background is **GOLD** and markings are **SCARLET**.	There are no W-1 Warrant Officers in the Navy

PAYGRADE	MARINE	NAVY
W-2	Background is **GOLD** and markings are **SCARLET**	Background is **GOLD** and markings are **BLUE**

PAYGRADE	MARINE	NAVY
W-3	Background is **SILVER** and markings are **SCARLET**	Background is **SILVER** and markings are **BLUE** 

PAYGRADE	MARINE	NAVY
W-4	Background is **SILVER** and markings are **SCARLET**	Background is **SILVER** and markings are **BLUE**

PAYGRADE	MARINE	NAVY
W-5	Background is **SILVER** and markings are **SCARLET**	Background is **SILVER** and markings are **BLUE**

NOTE: W-1 in the Marine Corps is known as Warrant Officer. W-2 through W-5 are called Chief Warrant Officers.

PAYGRADE	MARINE	NAVY
O-1 (Bar is Gold)	**2nd Lieutenant**	**Ensign**

PAYGRADE	MARINE	NAVY
O-2 (Bar is Silver)	**1st Lieutenant**	**Lieutenant Junior Grade**

PAYGRADE	MARINE	NAVY
O-3 (Bars are Silver)	**Captain**	**Lieutenant**

Field Grade

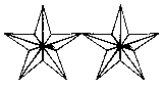
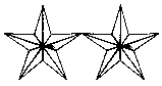
PAYGRADE	MARINE	NAVY
O-4 (Leaf is Gold)	Major	Lieutenant Commander

PAYGRADE	MARINE	NAVY
O-5 (Leaf is Silver)	Lieutenant Colonel	Commander

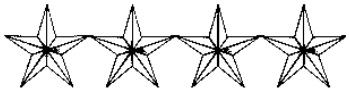
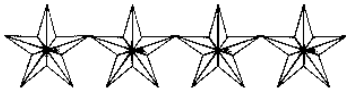
PAYGRADE	MARINE	NAVY
O-6 (Eagle is Silver)	Colonel	Captain

General Grade Officers

PAYGRADE	MARINE	NAVY
O-7	Brigadier General	Rear Admiral (lower half)

PAYGRADE	MARINE	NAVY
O-8	Major General 	Rear Admiral (upper half) 

PAYGRADE	MARINE	NAVY
O-9	Lieutenant General	Vice Admiral

PAYGRADE	MARINE	NAVY
O-10	General 	Admiral 

Senior Officers

Each branch of the Armed Forces has a senior officer grade of their respective branches of the service:

-Marines: Commandant of the Marine Corps
-Navy: Chief of Naval Operations
-Army: Chief of Staff of the U.S. Army
- Air Force: Chief of Staff of the U.S. Air Force

REFERENCE

Blue Jackets Manual, 22nd Edition, Pgs 60-62

Rank Structure Review

Match the Marine Corps rank with the proper name. (Not every name will be used)

Captain

Private

Lance Corporal

First Sergeant

Sergeant

Major General

Lieutenant General

Colonel

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Identify the Organizational Structure of the USMC

FMST 1102

TERMINAL LEARNING OBJECTIVE

1. In a military environment, **identify organizational structure and chain of command within the Marine Corps**, per the reference. (FMST-HSS-1102

2. In a military environment, **identify the elements and generic employment missions of a Marine Air Ground Task Force (MAGTF)**, per the reference. (FMST-HSS-1103)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or title, **identify the chain of command within the Marine Corps**, per the student handout. (FMST-HSS-1102b)
2. Without the aid of references, given a description or title, **identify the four broad categories within the Marine Corps**, per the student handout. (FMST-HSS-1102a)
3. Without the aid of references, given a description or title, **identify the roles of the four core elements within a Marine Air Ground Task Force (MAGTF)**, per the student handout. (FMST-HSS-1103b)
4. Without the aid of references, given a description or title, **identify the different types of Marine Air Ground Task Forces (MAGTFs)**, per the student handout. (FMST-HSS-1103b)

OVERVIEW

The Marine Corps, within the Department of the Navy, is organized as a general purpose "force in readiness" to support national needs. Deploying for combat as a combined-arms Marine Air-Ground Task Force (MAGTF), the Marine Corps provides the National Command Authority (NCA) with a responsive force that can conduct operations across the spectrum of conflict. The Marine Corps' most important responsibility is to win the Nation's battles.

MISSION OF THE U.S. MARINE CORPS

The primary mission as stated in the National Security Act of 1947 "…is to provide Fleet Marine Forces of combined arms together with supporting air components, for service with the fleet..." This act also states that the Marine Corps minimum peacetime structure shall consist of "…not less than three combat divisions and three aircraft wings, and such other land combat, aviation and other services as may be organic therein…" In addition, the Marine Corps maintains a fourth Marine division and aircraft wing in reserve.

1. MARINE CORPS CHAINS OF COMMAND

Two Parallel Chains Of Command Within The Marine Corps

Service Chain of Command

President

Secretary of Defense

Secretary of the Navy

Commandant of the Marine Corps

Operational Chain of Command

President

Secretary of Defense

Commanders of Combatant commands

2. BROAD CATEGORIES OF THE MARINE CORPS

The Marine Corps is divided into Four broad categories

Headquarters, U.S. Marine Corps:

Consist of the Commandant of the Marine Corps and staff. The Commandant of the Marine Corps is directly responsible to the Secretary of the Navy for: The administration, discipline, internal organization, training, requirements, efficiency, and readiness of the Marine Corps. The operation of the Marine Corps material support system and the total performance of the

Marine Corps.

Operating Forces:

Marine Corps Forces (MARFOR) - The MARFOR is a balanced force of combined arms comprising land, air, and service elements of the Marine Corps.

Marine Corps Security Forces (MCSF) at Naval installations

Marine Security Guard (MSG) detachments at embassies and consulates around the globe.

Marine Corps Reserve (MARFORRES):

MARFORRES can augment and reinforce any operation in which MARFOR participates.

Supporting Establishments

The Marine Corps supporting establishments consists of those personnel, bases, and activities that support the Marine Corps Operating Forces. The supporting command also includes:

Marine Corps Recruiting Command

Marine Corps Combat Development Command

Marine Corps Systems Command

Training activities and formal schools

3. ELEMENTS OF A MARINE AIR-GROUND TASK FORCE (MAGTF)

Definition and Purpose - a balanced, air-ground combined arms task organization of Marine Corps forces under a single commander, structured to accomplish a specific mission.

Designed to fight, prevent conflicts and control crisis.

Primarily organized to conduct amphibious operations but are capable of sustained operations ashore.

Structure - Regardless of size or mission, each MAGTF has the same basic structure (See Figure 1):

Command Element – MAGTF headquarters organized to provide command and control capabilities.

Air Combat Element - task organized to provide a flexible and balanced aviation organization that is capable of providing the full range of aviation operations.

Ground Combat Element – Organized to execute amphibious assault operations and such operations as may be directed

Logistics Combat Element - a composite grouping of functional components that provides Logistics Combat Support

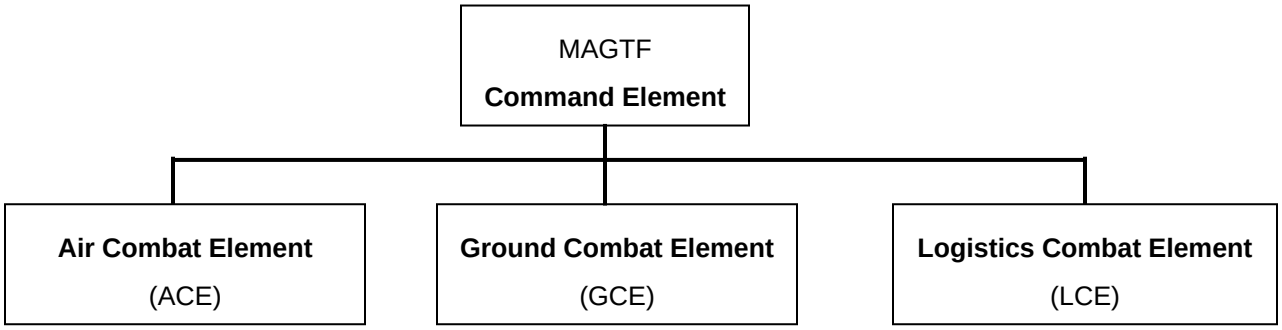

Figure 1. Four (4) Core Elements of all MAGTF's

4. TYPES OF MAGTFS

There are four (4) basic MAGTF organizations: Marine Expeditionary Force, Marine Expeditionary Brigade, Marine Expeditionary Unit and Special Purpose MAGTF.

Marine Expeditionary Force (MEF) (See figure 2)

Definition of Capabilities – The largest standing MAGTF, exists in peacetime and wartime MAGTF and is the principal Marine Corps war fighting organization. The three (3) standing MEF's provide a reservoir of capabilities and combat power from which all smaller MAGTF's are formed. There are three (3) standing MEF's:

-I Marine Expeditionary Force (I MEF) - Elements are located in California and Arizona.
-II Marine Expeditionary Force (II MEF) – Elements are located in North and South Carolina.
-III Marine Expeditionary Force (III MEF) – Elements are located in Hawaii and Japan.

Purpose - Win our Nation's Battles
Commanded by - Lieutenant General or Major General
Size - Approx. 20,000 to 90,000 personnel
Elements consist of:
-Command Element (CE)
-Ground Combat Element (GCE) = Marine Division (MARDIV)
-Aviation Combat Element (ACE) = Marine AirCraft Wing (MAW)
-Logistics Combat Element (LCE) = Marine Logistics Group (MLG)

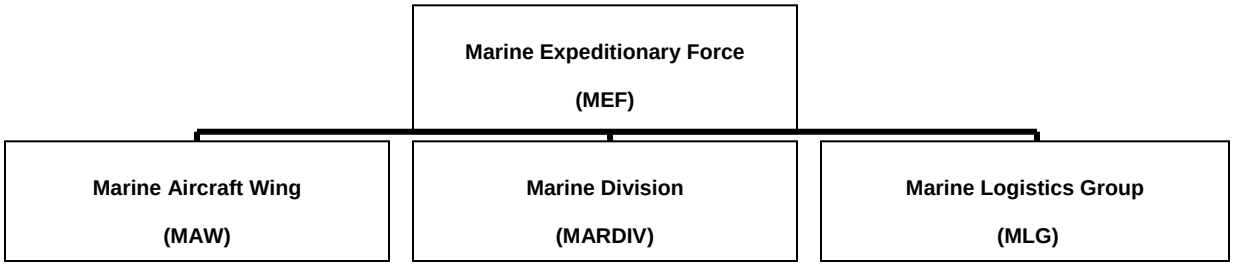

Figure 2. MEF

Marine Expeditionary Brigade (MEB) (See Figure 3)

Definition of Capabilities - This is a medium sized, infantry reinforced, **non-standing MAGTF** that is task organized to respond to a full range of crisis.

Purpose - Respond to Crisis
Commanded by - Brigadier General
Size - Approx. 3,000 - 20,000 personnel
Elements consist of:
-Command Element (CE)
- Ground Combat Element (GCE) = Marine Regiment (MARREG)
-Aviation Combat Element (ACE) = Marine Air Group (MAG)
-Logistics Combat Element (LCE) = Combat Logistics Regiment (CLR)

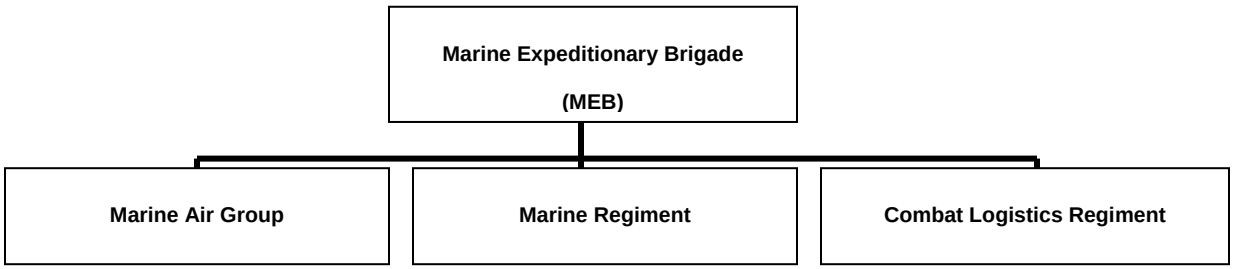

Figure 3. MEB

Marine Expeditionary Unit, Special Operations Capable (MEU/SOC) (See Figure 4)

Definition of Capabilities - The standard forward deployed Marine expeditionary organization. MEU (SOC) is capable of a wide range a small scale contingencies (e.g. Noncombatant evacuation, clandestine recovery, maritime interdictions, tactical recovery of aircraft and/or personnel, etc.)

Purpose - Promote Peace and Stability (First on the Scene)
Commanded By – Colonel
Size - Approx. 1,500 - 3,000 personnel
Elements consist of:
-Command Element (CE)
-Ground Combat Element (GCE) = Marine Infantry Battalion Landing Team (BLT)
-Aviation Combat Element (ACE) = Composite Marine Air Squadrons (Fixed wing and Rotary Wing)
-Logistics Combat Element (LCE) = Combat Logistics Battalion (CLB)

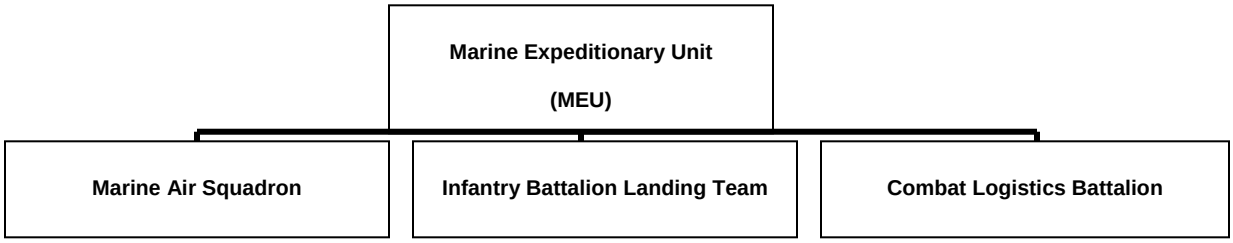

Figure 4. MEU

Special Purpose Marine Air-Ground Task Force (SPMAGTF)

Definition of Capabilities - The SPMAGTF is a **non-standing** MAGTF temporarily formed to conduct a specific mission.

Purpose - Crisis response, regionally focused training exercises and peacetime missions.
Commanded By - Dependent on size of MAGTF
Size - May be any size, but normally it is the size of a MEU or smaller.
Elements consist of:
-Command Element (CE)
-Ground Combat Element (GCE) = Composites of MARDIV
-Aviation Combat Element (ACE) = Composites of MAW
-Logistics Combat Element (LCE) = Composites of MLG

MAGTF SIZE (Largest to Smallest)	ELEMENT		
	GCE	**ACE**	**LCE**
Marine Expeditionary Force (MEF)	Marine Division (MARDIV)	Marine Aircraft Wing (MAW)	Marine Logistics Group (MLG)
Marine Expeditionary Brigade (MEB)	Marine Regiment (MARREG)	Marine Aircraft Group (MAG)	Combat Logistics Regiment (CLR)
Marine Expeditionary Unit (MEU)	Battalion Landing Team (BLT)	Reinforced Helicopter/Fixed Wing Squadron	Combat Logistics Battalion (CLB)
Special Purpose MAGTF (SPMAGTF)	Composites of MARDIV	Composites of MAW	Composites of MLG

REFERENCE

MCRP 5-12D, Organization of Marine Corps Forces: Ch 1, 2

MCDP 1-0 Marine Corps Operations, Ch. 3: Pgs 3-10 through 3-20

U.S. Marine Corps Concepts and Programs 2005: Appendix A, Pgs 267-273

USMC Organizational Structure / Chain of Command Review

1. List the four broad categories of the Marine Corps.

2. List the four elements of a Marine Air-Ground Task Force (MAGTF).

3. Describe a Marine Expeditionary Force (MEF).

4. List the Ground Combat Element, Aviation Combat Element, and Logistic Combat Element for a Marine Expeditionary Brigade (MEB)

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
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FMST 1104

Identify Leadership Traits and Principles of Marine Corps

TERMINAL LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify leadership traits and principles of the Marine Corps**, per the stated reference. (FMST-HSS-1104)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify Marine Corps leadership traits**, within 80% accuracy, per MCRP 6-11B w/CH 1. (FMST-HSS-1104a)
2. Without the aid of references, given a description or list, **identify Marine Corps leadership principles**, within 80% accuracy, per MCRP 6-11B w/CH 1. (FMST-HSS-1104b)

INTRODUCTION

"Leadership is intangible, hard to measure, and difficult to describe. Its quality would seem to stem from many factors. But certainly they must include a measure of inherent ability to control and direct, self-confidence based on expert knowledge, initiative, loyalty, pride and sense of responsibility. Inherent ability cannot be instilled, but that which is latent or dormant can be developed. Other ingredients can be acquired. They are not easily learned. But leaders can be and are made."

General C. B. Cates,

19th Commandant of the Marine Corps

LtGen Lewis "Chesty" Puller

LtGen Puller steadily worked his way up the ranks proving his outstanding leadership qualities. He received a direct commission and began collecting awards for valor. By the time he retired from the Marine Corps in 1951 he had earned more awards than any Marine in history; five Navy Crosses, the Distinguished Service Cross, the Silver Star, two Legions of Merit with "V" device, the Bonze star with "V" device, the Bronze Star, the Air Medal and the Purple Heart.

The traits and principles of leadership are the basic fundamentals that Marines use to develop their own leadership abilities and that of their subordinates. There are 14 leadership traits and 11 leadership principles listed in this lesson.

1. **<u>14 LEADERSHIP TRAITS</u>**

The fourteen leadership traits can be remembered with the acronym **JJ-DIDTIEBUCKLE:**

- **<u>J</u>**ustice
- **<u>J</u>**udgment
- **<u>D</u>**ependability
- **<u>I</u>**nitiative
- **<u>D</u>**ecisiveness
- **<u>T</u>**act
- **<u>I</u>**ntegrity
- **<u>E</u>**nthusiasm
- **<u>B</u>**earing
- **<u>U</u>**nselfishness
- **<u>C</u>**ourage
- **<u>K</u>**nowledge
- **<u>L</u>**oyalty
- **<u>E</u>**ndurance

<u>Justice</u>

<u>Definition</u> - Giving reward and punishment according to the merits of the case in question. The ability to administer a system of rewards and punishments impartially and consistently.

<u>Significance</u> - The quality of displaying fairness and impartiality is critical in order to gain the trust and respect of subordinates and maintains discipline and unit cohesion, particularly in the exercise of responsibility.

<u>Example</u> - Fair apportionment of tasks by a squad leader during field day.

<u>Judgment</u>

<u>Definition</u> - The ability to weigh facts and possible courses of action in order to make sound decisions.

<u>Significance</u> - Sound judgment allows a leader to make appropriate decisions in the guidance and training of his/her Marines and the employment of his/her unit. A Marine who exercises good judgment weighs pros and cons accordingly when making appropriate decisions.

<u>Example</u> - A Marine properly apportions his/her liberty time in order to relax as well as to study.

<u>Dependability</u>

<u>Definition</u> - The certainty of proper performance of duty.

<u>Significance</u> - The quality that permits a senior to assign a task to a junior with the understanding that it will be accomplished with minimum supervision.

<u>Example</u> - The squad leader ensures that his/her squad falls out in the proper uniform without having been told to by the platoon sergeant.

Initiative

Definition - Taking action in the absence of orders.

Significance - Since an NCO often works without close supervision; emphasis is placed on being a self-starter. Initiative is a founding principle of Marine Corps Warfighting philosophy.

Example - In the unexplained absence of the platoon sergeant, an NCO takes charge of the platoon and carries out the training schedule.

Decisiveness

Definition - Ability to make decisions promptly and to announce them in a clear, forceful manner.

Significance - The quality of character which guides a person to accumulate all available facts in a circumstance, weigh the facts, and choose and announce an alternative which seems best. It is often better that a decision be made promptly than a potentially better one be made at the expense of more time.

Example - A leader, who sees a potentially dangerous situation developing, immediately takes action to prevent injury from occurring.

Tact

Definition - The ability to deal with others in a manner that will maintain good relations and avoid offense. More simply stated, tact is the ability to say and do the right thing at the right time.

Significance - The quality of consistently treating peers, seniors, and subordinates with respect and courtesy is a sign of maturity. Tact allows commands, guidance, and opinions to be expressed in a constructive and beneficial manner. This deference must be extended under all conditions regardless of true feelings.

Example - A Marine discreetly points out a mistake in drill to an NCO by waiting until after the unit has been dismissed and privately asking which of the two methods are correct.

Integrity

Definition - Uprightness of character and soundness of moral principles. The quality of truthfulness and honesty.

Significance - A Marine's word is his/her bond. Nothing less than complete honesty in all of your dealings with subordinates, peers, and superiors is acceptable.

Example - A Marine who uses the correct technique on the obstacle course, even when he/she cannot be seen by the evaluator.

Enthusiasm

Definition - The display of sincere interest and exuberance in the performance of duty.

Significance - Displaying interest in a task and optimism that can be successfully completed greatly enhances the likelihood that the task will be successfully completed.

Example - A Marine who leads a chant or offers to help carry a load that is giving someone great difficulty while on a hike despite being physically tired, he encourages his fellow Marines to persevere.

Bearing

Definition - Creating a favorable impression in carriage, appearance, and personal conduct at all times.

Significance - The ability to look, talk, and act like a leader whether or not these manifestations indicate one's true feelings.
Example - Wearing clean uniforms, boots, and collar devices. Avoiding profane and vulgar language. Keeping a trim, fit appearance.

Unselfishness

Definition - Avoidance of providing for one's own comfort and personal advancement at the expense of others.
Significance - The quality of looking out for the needs of your subordinates before your own is the essence of leadership. This quality is not to be confused with putting these matters ahead of the accomplishment of the mission.
Example - An NCO ensures all members of his unit have eaten before he does, or if water is scarce, he will share what he has and ensure that others do the same.

Courage

Definition - Courage is a mental quality that recognizes fear of danger or criticism, but enables a Marine to proceed in the face of danger with calmness and firmness.
Significance - Knowing and standing for what is right, even in the face of popular disfavor. The business of fighting and winning wars is a dangerous one; the importance of courage on the battlefield is obvious.
Example - Accepting criticism for making subordinates field day for an extra hour to get the job done correctly.

Knowledge

Definition - Understanding of a science or an art. The range of one's information, including professional knowledge and understanding of your Marines.
Significance - The gaining and retention of current developments in military and naval science and world affairs is important for your growth and development.
Example - The Marine who not only knows how to maintain and operate his assigned weapon, but also knows how to use the other weapons and equipment in the unit.

Loyalty

Definition - The quality of faithfulness to country, Corps, unit, seniors, subordinates and peers.
Significance - The motto of the Marine Corps is *Semper Fidelis*, Always Faithful. You owe unswerving loyalty up and down the chain of command.
Example - A Marine displaying enthusiasm in carrying out an order of a senior, though he may privately disagree with it.

Endurance

Definition - The mental and physical stamina measured by the ability to withstand pain, fatigue, stress, and hardship.
Significance - The quality of withstanding pain during a conditioning hike in order to improve stamina is crucial in the development of leadership. Leaders are responsible for leading their units in physical endeavors and for motivating them as well.
Example - A Marine keeping up on a 10-mile forced march even though he/she has blisters on both feet.

2. **11 LEADERSHIP PRINCIPLES**

Know Yourself and Seek Self Improvement

- This principle of leadership should be developed by the use of leadership traits. Evaluate yourself by using the leadership traits and determine your strengths and weaknesses.
- You can improve yourself in many ways. To develop the techniques of this principle:
  - Make an honest evaluation of yourself to determine your strong and weak personal qualities
  - Seek the honest opinions of your friends or superiors
  - Learn by studying the causes for the success and failures of others
  - Develop a genuine interest in people
  - Master the art of effective writing and speech
  - Have a definite plan to achieve your goal

Be Technically and Tactically Proficient

- A person who knows their job thoroughly and possesses a wide field of knowledge. Before you can lead, you must be able to do the job. Tactical and technical competence can be learned from books and from on the job training. To develop this leadership principle of being technically and tactically proficient, you should:
  - Know what is expected of you then expend time and energy on becoming proficient at those things
  - Form an attitude early on of seeking to learn more than is necessary
  - Observe and study the actions of capable leaders
  - Spend time with those people who are recognized as technically and tactically proficient at those things
  - Prepare yourself for the job of the leader at the next higher rank
  - Seek feedback from superiors, peers and subordinates

Know Your People and Look Out For Their Welfare

- This is one of the most important of the leadership principles. A leader must make a conscientious effort to observe his Marines and how they react to different situations. A Marine who is nervous and lacks self-confidence should never be put in a situation where an important decision must be made. This knowledge will enable you as the leader to determine when close supervision is required.
- To put this principle in to practice successfully you should:
  - Put your Marines' welfare before your own
  - Be approachable
  - Encourage individual development
  - Know your unit's mental attitude; keep in touch with their thoughts
  - Ensure fair and equal distribution of rewards
  - Provide sufficient recreational time and insist on participation

Keep Your Personnel Informed

- Marines by nature are inquisitive. To promote efficiency and morale, a leader should inform the Marines in his unit of all happenings and give reasons why things are to be done. This is accomplished only if time and security permits. Informing your Marines of the situation makes them feel that they are a part of the team and not just a cog in a wheel. Informed Marines perform better.

- The key to giving out information is to be sure that the Marines have enough information to do their job intelligently and to inspire their initiative, enthusiasm, loyalty, and convictions.
- Techniques to apply this principle are:
  - Whenever possible, explain why tasks must be done and the plan to accomplish a task
  - Be alert to detect the spread of rumors. Stop rumors by replacing them with the truth
  - Build morale and espirit de corps by publicizing information concerning successes of your unit
  - Keep your unit informed about current legislation and regulations affecting their pay, promotion, privileges, and other benefits

<u>Set The Example</u>

- A leader who shows professional competence, courage and integrity sets high personal standards for himself before he can rightfully demand it from others. Your appearance, attitude, physical fitness and personal example are all on display daily for the Marines and Sailors in your unit. Remember, your Marines and Sailors reflect your image!
- Techniques for setting the example are to:
  - Show your subordinates that you are willing to do the same things you ask them to do
  - Maintain an optimistic outlook
  - Conduct yourself so that your personal habits are not open to criticism
  - Avoid showing favoritism to any subordinate
  - Delegate authority and avoid over supervision, in order to develop leadership among subordinates
  - Leadership is taught by example

<u>Ensure That The Task Is Understood, Supervised, and Accomplished</u>

- Leaders must give clear, concise orders that cannot be misunderstood, and then by close supervision, ensure that these orders are properly executed. Before you can expect your men to perform, they must know what is expected of them.
- The most important part of this principle is the accomplishment of the mission. In order to develop this principle you should:
  - Issue every order as if it were your own
  - Use the established chain of command
  - Encourage subordinates to ask questions concerning any point in your orders or directives they do not understand
  - Question subordinates to determine if there is any doubt or misunderstanding in regard to the task to be accomplished
  - Supervise the execution of your orders
  - Exercise care and thought in supervision; over supervision will hurt initiative and create resentment, while under supervision will not get the job done

Train Your Marines And Sailors As A Team

- Teamwork is the key to successful operations. Teamwork is essential from the smallest unit to the entire Marine Corps. As a leader, you must insist on teamwork from your Marines. Train, play and operate as a team. Be sure that each Marine knows his/her position and responsibilities within the team framework.
- To develop the techniques of this principle you should:
  - Stay sharp by continuously studying and training
  - Encourage unit participation in recreational and military events
  - Do not publicly blame an individual for the team's failure or praise just an individual for the team's success
  - Ensure that training is meaningful, and that the purpose is clear to all members of the command
  - Train your team based on realistic conditions
  - Insist that every person understands the functions of the other members of the team and the function of the team as part of the unit

Make Sound And Timely Decisions

- The leader must be able to rapidly estimate a situation and make a sound decision based on that estimation. Hesitation or a reluctance to make a decision leads subordinates to lose confidence in your abilities as a leader. Loss of confidence in turn creates confusion and hesitation within the unit.
- Techniques to develop this principle include:
  - Developing a logical and orderly thought process by practicing objective estimates of the situation
  - When time and situation permit planning for every possible event that can reasonably be foreseen
  - Considering the advice and suggestions of your subordinates before making decisions
  - Considering the effects of your decisions on all members of your unit

Develop A Sense Of Responsibility Among Your Subordinates

- Another way to show your Marines you are interested in their welfare is to give them the opportunity for professional development. Assigning tasks and delegating authority promotes mutual confidence and respect between leader and subordinates. It also encourages subordinates to exercise initiative and to give wholehearted cooperation in accomplishment of unit tasks. When you properly delegate authority, you demonstrate faith in your Marines and increase authority, and increase their desire for greater responsibilities.
- To develop this principle you should:
  - Operate through the chain of command
  - Provide clear, well thought out directions
  - Give your subordinates frequent opportunities to perform duties normally performed by senior personnel
  - Be quick to recognize your subordinates' accomplishments when they demonstrate initiative and resourcefulness
  - Correct errors in judgment and initiative in a way, which will encourage the individual to try harder
  - Give advice and assistance freely when your subordinates request it

- Resist the urge to micro manage
- Be prompt and fair in backing subordinates
- Accept responsibility willingly and insist that your subordinates live by the same standard

Employ Your Command Within its Capabilities

- A leader must have a thorough knowledge of the tactical and technical capabilities of the command. Successful completion of a task depends upon how well you know your unit's capabilities. If the task assigned is one that your unit has not been trained to do, failure is very likely to occur. Failures lower your unit's morale and self esteem. Seek out challenging tasks for your unit, but be sure that your unit is prepared for and has the ability to successfully complete the mission.
- Techniques for development of this principle are to:
  - Avoid volunteering your unit for tasks that are beyond their capabilities
  - Be sure that tasks assigned to subordinates are reasonable
  - Assign tasks equally among your subordinates
  - Use the full capabilities of your unit before requesting assistance

Seek Responsibilities and Take Responsibility

- For professional development, you must actively seek out challenging assignments. You must use initiative and sound judgment when trying to accomplish jobs that are required by your grade. Seeking responsibilities also means that you take responsibility for your actions. Regardless of the actions of your subordinates, the responsibility for decisions and their application falls on you.
- Techniques in developing this principle are to:
  - Learn the duties of your immediate senior, and be prepared to accept the responsibilities of these duties
  - Seek a variety of leadership positions that will give you experience in accepting responsibility in different fields
  - Take every opportunity that offers increased responsibility
  - Perform every task, no matter whether it is top secret or seemingly trivial, to the best of your ability
  - Stand up for what you think is right. Have courage in your convictions
  - Carefully evaluate a subordinate's failure before taking action against that subordinate
  - In the absence of orders, take the initiative to perform the actions you believe your senior would direct you to perform if present

REFERENCE

MCRP 6-11B w/CH 1, Marine Corps Values: A User's Guide for Discussion Leaders, Chapter 15. Appendix A, B

Traits & Principles Review

1. Match the Trait with the appropriate definition.

Courage	_____	A. The ability to deal with others
Endurance	_____	B. Uprightness of character
Unselfishness	_____	C. Mental and physical stamina
Tact	_____	D. Avoiding one's personal comfort at the expense of others
Integrity	_____	E. Proceeding in the face of danger

2. State the three leadership principles that *you believe* are the most important.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1105

USMC Utility Uniform and Individual Combat Equipment

TERMINAL LEARNING OBJECTIVES

1. Given individual combat equipment and cleaning materials, **maintain combat equipment**, with no uniform violations, per the reference. (FMST-FP-1108)
2. Given individual combat equipment, **prepare individual combat equipment for tactical operations**, to support mission requirements, per the reference. (FMST-FP-1215)
3. Without the aid of references, given a list of uniform items and ownership marking locations, **identify the proper wear and location markings of the USMC combat utility uniform**, per the references. (FMST-HSS-1105)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given the prescribed combat equipment, **maintain all items** with no uniform violations, per MCO P1020.34G. (FMST-FP-1108a)
2. Without the aid of references, given combat equipment, **assemble gear**, to make ready for tactical operations, per MCO P1020.34G. (FMST-FP-1215a)
3. Without the aid of references, given assembled gear, **wear combat equipment**, to make ready for tactical operations, per MCO P1020.34G. (FMST-FP-1215b)
4. Without the aid of references, given lists of uniform items and ownership marking locations, **identify the proper marking location for each uniform item**, within 80% accuracy, per MCO P1020.34G. (FMST-HSS-1105a)
5. Without the aid of references, given a list of uniform items and ownership marking locations, **identify the proper wear for each item**, within 80% accuracy, per MCO P1020.34G. (FMST-HSS-1105b)

1. **MARINE CORPS COMBAT UTILITY UNIFORM (MCCUU)**

The Marine Corps prides itself with exceptional adhearance to uniform standards. Marines are expected to always present a sharp, well maintained, squared away image. All Navy personnel assigned to Marine units are expected to present the same image. Wearing of the utility uniform requires complete compliance with Marine Corps uniform regulations.

Items issued - standard issue to Navy personnel serving with Marine Corps units.

Infantry combat boots	1 pair
Hot weather boots	1 pair
Utility cover (without Marine emblem)	1 Woodland 1 Desert
Booney/field cover	1 Woodland 1 Desert
Combat utility blouse	2 Woodland 2 Desert
Combat utility trousers	2 Woodland 2 Desert
Cushion sole socks	6 pairs
HM/RP collar insignia	2
Name tapes	4 sets each
Sweat shirt	1
Sweat pants	1
Web belt	1
Belt buckle	1
Glowbelt	1
Shorts (green)	1
Sweater	1
Green undershirt	6 (3 cotton and 3 synthetic)

2. **WEAR**

Proper wear of the MCCUU

Design - the utility uniform is designed for field wear and should be loose-fitting and comfortable. The size selected should fit loosely to allow for some shrinkage without rendering the garment unusable.

Blouse - the utility blouse will not be tucked into the trousers. At the option of local commanders, sleeves may be rolled up or down depending on time of year or weather. The woodland uniform will be worn in the winter with sleeves unrolled. The desert uniform will be worn in the summer months with sleeves rolled up. When sleeves are worn “up” they will have a three inch fold terminating about two inches above the elbow. The utility blouse should always be kept buttoned. Large or heavy objects should not be carried in the pockets.

Trousers - when combat boots are worn, the trousers will be bloused in a neat and uniform manner. In garrison, the cargo pockets on the trousers will not be used.

Cover - all personnel, E-4 and above, will wear a subdued (black) cover device. Navy personnel are to use the cover without the embroderied Eagle, Globe and Anchor. If unable to obtain a cover without the Eagle, Globe and Anchor, nothing will be placed over the emblem.

Belt - all personnel will wear the tan khaki web belt or a Marine Corps Martial Arts Belt. The Marine Corps Martial Arts Program (MCMAP) has a designated belt ranking system. Only those individuals who attend the MCMAP course and qualify are authorized to wear the appropriate belt.

Sweater - Navy officer and enlisted personnel may wear the green (wooley pully) or black service sweater with the combat utility uniform. The sweater will be worn underneath the utility blouse with sleeves down.

Raingear - Navy personnel will wear the Navy issued black raincoat or organizational rainwear as issued by the Marine Corps with the combat utility uniform.

Insignia

The **rating insignia** is worn on the left collar, bisecting the angle of the point of the collar, and equally spaced ½ inch from either side of the collar (see figure 1).

Figure 1. HM Rating Insignia

The **rank insignia** is worn on the right collar, bisecting the angle of the point of the collar, and equally spaced ½ inch from either side of the collar (see figures 2, 3, and 4).

Figure 2. E-2 through E-3 Rank Insignia

Figure 3. E-4 through E-6 Rank Insignia

Figure 4. E-7 through E-9 Rank Insignia

The bottom edge of the **warfare device** will be centered over the left pocket on a horizontal line (parallel to the ground), even with the highest point of the service tape. If a second device is authorized, it will be worn 1/8 inch above the first device (see figure 5).

Figure 5. Warfare Device

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3. **UNAUTHORIZED WEAR OF THE MCCUU**

The wearing of the MCCUU and its policies are much like the Navy's utility uniform (Dungarees). Members are ***prohibited*** from wearing the utility uniform off base with the following exceptions:

- to and from work while in a vehicle
- during medical emergencies
- circumstances that are beyond your control (vehicle breakdown)
- while visiting drive-thrus that do not require you to exit the vehicle

4. **CARE OF THE MCCUU**

The MCCUU is designed for easy care. These uniforms are designed as a wash-and-wear uniform. If needed, a hand iron on a low heat setting may be used. The use of starch, sizing and any process that involves dry cleaning or a steam press will adversely affect the treatments and durability of the uniform and is NOT recommended.

5. **MARKING**

Enlisted Sailors will plainly and indelibly mark every article of uniform clothing with the owner's name (except for organizational clothing).

Size - letters will be of a size appropriate to the article of clothing and the space available for marking and will consist of block leters not more than ½ inch in size. Marking machines, stencils, name tapes or stamps may be used.

Color - names are marked in black, on light colored material and utilities, and in white on dark material. Marks will be placed so that they do not show when the clothing is worn.

Location - the precise location for marking the following gear is as follows:

Duffel bag - on the outside of the bag on the bottom
Web belt - on one side only, as near to the buckle end as possible
Cover - inside, on the sweatband
Coats and overcoats - inside, on the neckband
Drawers - outside immediately below the waistband, near the front
Gloves - inside, at the wrist
Shoes and boots - inside, near the top
Socks - outside, on top of the foot
Utility blouse - name-tape sewn above right breast pocket, service tape sewn above left breast pocket; mark inside of blouse as well
Trousers - name-tape sewn above right rear pocket; mark inside of trousers as well
Undershirt - inside back, near the neck-band

6. **GROOMING STANDARDS/PERSONAL APPEARANCE**

Members will present the best possible image at all times and continue to set the example while in and out of uniform. Members are prohibited from:

- Mutilation of the body or any body parts in any manner

- Attaching, affixing or displaying objects, articles, jewelry, or ornamentation to, through or under skin, tongue or any other body part. Female members may not wear earrings in combat utility uniform.
- Tattoos or brands on the neck and head. On other areas of the body, tattoos or brands that are prejudicial to good order, discipline and morale or are of a nature to bring discredit upon the Marine Corps are also prohibited. Sleeve tattoos are likewise prohibited. A sleeve tattoo is a very large tattoo, or a collection of smaller tattoos, that covers or almost covers a person's entire arm or leg. Half-sleeve or quarter-sleeve tattoos that are visible to the eye when wearing standard PT gear (t-shirt and shorts) are likewise prohibited. A half-sleeve or quarter-sleeve tattoo is defined as a very large tattoo, or a collection of smaller tattoos that covers, or almost covers, the entire portion of an arm or leg above or below the elbow or knee. Tattoos or brands that are prejudicial to good order, discipline and morale, or are of a nature to bring discredit upon the Marine Corps are also prohibited. Prejudicial to good order, discipline and morale, or are of a nature to bring discredit upon the Marine Corps may include, but are not limited to, any tattoo that is sexist, racist, vulgar, anti-American, anti-social, gang related, or extremist group or organization related.
- Having eccentric or faddish styles of hair, jewelry or eyeglasses. The good judgement of all members at all levels is key to enforcement of Marine Corps standards with this issue.
- Chewing gum, chewing tobacco, cigarettes or the consumption of food while in formation or walking in uniform.
- Articles that are not authorized for wear as a part of a regulation uniform will not be worn with the uniform such as: pens, watch chains, backpacks/bags (over the shoulder), CD/MP3 players or other similar items.
- For females, barrettes, combs, rubber bands, etc. are authorized, if concealed by the hair.
- Cellular phones (personally owned and organizationally issued) and other electronic equipment will not be worn exposed on Marine Corps uniforms.
- Sunglasses will be conservative in nature and will not be worn indoors or in formations unless authorized by a medical representative.
- The wearing of clothing articles not specifically designed to be normally worn as headgear (e.g. bandanas, doo rags) is strictly prohibited in civilian attire and while in uniform.
- No part of a prescribed uniform, except those items not exclusively military in character, will be worn with civilian clothing.

7. **INDIVIDUAL COMBAT EQUIPMENT**

- Improved Load Bearing Equipment (ILBE) (see figure 6) : the ILBE is a load carrying system designed to provide a durable and lightweight means for the deployed Marine/Sailor to transport their individual combat clothing and equipment. It is an integrated load bearing system that is light, durable and can easily be configured for the mission at hand and to maximize the mobility, survivability and lethality of the Marine/Sailor in combat environments.

Figure 6. ILBE Sideview

- Fighting Load Vest (to include belt) - the vest is designed to reduce heat build up on the back with minimum area of coverage with the H-Harness design. The wide shoulder straps of the vest help distribute the load without the need for excessive padding that can hinder mobility and sighting a weapon.
- Corpsman Configuration - will receive four zippered medical pockets, the vest and two double 30 round magazine pockets. In addition to the configuration worn, the individual will also receive two single 30 round magazine pockets and two fragmentation grenade pockets.
- Sleep System Carrier - designed to carry the sleeping system.
- Patrol Pack - utilized to sustain an individual for 24-48 hour period. It is also known as the day pack.

8. **BODY ARMOR**

Small Arms Ammunition Cases.
- M16M/4 Rifle Case - holds two magazines of 30 rounds.
- M9 Service Pistol Case - holds one magazine of 15 rounds.
- Canteen Cover - the canteen covers are used to carry the plastic water canteens and metal cup. The covers have two small pockets attached for carrying water purification tablets.
- Flak Jacket - it is designed to be worn as a jacket by an individual to stop shrapnel, it is not bullet proof.
- Helmet With Cover - it is designed to be worn on the head by the individual to stop shrapnel; again, it is not bullet proof.
- ISO Mat - a foam padding used to support the sleeping system.

9. **CLEANING AND MAINTENANCE**

- Scrape dirt and dust from the item using a brush that will not cut the fabric.
- Hose or wash the item in a pail of water. Rinse thoroughly with clean water.
- Do not use chlorine bleach, yellow soap, cleaning fluids or solvents that will discolor or deteriorate the item.
- Dry item in the shade or indoors. Do not dry in direct sunlight, direct heat or open flame.
- Do not launder or dry item in home or commercial washers and dryers. Do not attempt to dye or repair. Turn in for repair or replacement.
- Remember, extremely dirty or damaged equipment can eventually fail to perform its intended function. Clean it or turn it in for repair or replacement.

REFERENCES

Marine Corps Uniform Regulations, MCO P1020.34G: Ch 2, 3, 4, 8, 10
ALMAR 035/07
MARADMIN 198/07

Uniform Review

1. Rating devices (HM insignia/Rank) are worn on which collar?

2. What type of device is worn by all personnel E-4 and above on their cover?

3. Warfare devices are worn on which side of the blouse?

4. List two places where the wearing of sunglasses is specifically prohibited.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1411

Manage Dehydration Casualties

TERMINAL LEARNING OBJECTIVE

1. Given a dehydration casualty in a combat environment and standard field medical equipment and supplies, **manage dehydration casualties**, to prevent further injury or death per the references. (FMST-HSS-1411)

ENABLING LEARNING OBJECTIVE

1. Without the aid of references, given a description or list, **identify predisposing factors for dehydration**, within 80% accuracy, per the student handout. (FMST-HSS-1411a)
2. Without the aid of references, given a description or list, **identify levels of dehydration**, within 80% accuracy, per the student handout. (FMST-HSS-1411b)
3. Without the aid of references, given a description or list, **identify signs and symptoms of dehydration**, within 80% accuracy, per the student handout. (FMST-HSS-1411c)
4. Without the aid of references, given a description or list, **identify treatments for various types of dehydration casualties**, within 80% accuracy, per the student handout. (FMST-HSS-1411d)
5. Without the aid of references, given a description or list, **identify the signs and symptoms of hyponatremia**, within 80% accuracy, per the student handout. (FMST-HSS-1411e)
6. Without the aid of references, given a description or list, **identify the proper treatment of hyponatremia,** within 80% accuracy, per the student handout. (FMST-HSS-1411f)
7. Without the aid of references, given a description or list, **identify preventive measures for dehydration**, within 80% accuracy, per the student handout. (FMST-HSS-1411g)
8. Without the aid of references, given a simulated dehydration casualty and standard field medical equipment and supplies, **manage the casualty to prevent further injury or death**, per the PHTLS Manual, current military edition. (FMST-HSS-1411h)

OVERVIEW

Water accounts for about 45 to 70% of the average person's weight. It is a fundamental component of all cells in the body and is used to carry out normal functions in the body such as circulation of blood, respiration and elimination of waste through the bladder and colon. Water is the basis of blood, lymphatic fluids, perspiration, mucous, saliva, and digestive juices. Water lubricates the joints, moisturizes the skin, provides moisture to all of the muscles and internal organs and helps regulate body temperature.

1. PREDISPOSING FACTORS

Any of the following conditions/factors will predispose a person to increased risk of suffering from dehydration:

Diseases/injuries, especially fevers, vomiting, diarrhea, heat rash or sunburn
Use of alcohol within the last 24 hours
Overweight/unfit
Over 40 years old
Fatigue/lack of sleep
Taking medication (especially for high blood pressure, colds or diarrhea)
Previous heatstroke/severe heat exhaustion
Lack of recent experience in a hot environment or improper acclimatization

2. LEVELS OF AND SIGNS AND SYMPTOMS OF DEHYDRATION

Dehydration is loss of water and important blood salts like potassium (K+) and sodium (Na+). Vital organs such as the kidneys, brain and heart cannot function without a minimum amount of water and salt.

Causes:

Vomiting or diarrhea
Excessive urine output due to diuretic use
Excessive sweating, usually from exercises
Fever
Respiration

Dehydration is divided into mild, moderate, and severe based upon its severity. With **mild and moderate** levels of dehydration, the following signs and symptoms are most frequently experienced:

Less frequent urination
Thirst
Dry skin, decreased turgor (see figure 1)
Fatigue
Light-headedness
Dizziness
Confusion
Dry mouth and mucous membranes
Increased heart rate and breathing

Figure 1. Skin with decreased turgor

Casualties experiencing **severe** dehydration may exhibit any of the previous signs and symptoms along with:

Weak, rapid pulse
Cold hands or feet
Hypotension
Dysuria
Lethargy
Cyanotic lips

3. **TREATMENT OF DEHYDRATION**

Identify the cause and treat it. (i.e. vomiting/diarrhea)

Assess the patient's level of dehydration based on signs or symptoms.

Lab Tests - blood tests will assist a clinician (MO, PA or IDC) in determining imbalances and the best type fluid to give patients to correct the problem. By obtaining blood tests the clinician can specify if the problem is a water imbalance or an electrolyte imbalance.

Re-hydrate the patient:
- Oral re-hydration - drinking fluids usually relieves mild dehydration.
- IV fluids - used for moderate to severe dehydration.

4. **MEASURES TO PREVENT DEHYDRATION**

A common finding in dehydration casualties is that the individuals consume no fluid or low volumes of fluid during daily activities. We all lose body water daily through sweat, tears, urine, water vapor exhaled through respirations and stool. During heat exposure, body water is primarily lost as sweat. Individuals can sweat approximately 1 liter per hour. The key to avoiding the onset of heat illness is to maintain a body fluid balance and to minimize dehydration during daily activities. A key point to remember is that individuals normally do not perceive thirst until a deficit of approximately 2% body weight loss has resulted from sweating. So an individual weighing 200 pounds wound not recognize being thirsty until he or she has lost 4 pounds of sweat! The following are examples of some measures to prevent dehydration:

During activity - drink ½ to 1 quart (1 standard issued canteen equals 1 quart) of fluid per hour **(do not exceed 12 canteens per day)**

Maintain a balanced diet - you can recover fluid loss from the foods you eat as well as from the fluids you drink. Fruits and vegetables can be a significant source of fluid intake. MRE's are formulated to provide the important electrolytes while in the field.

Avoid diuretic beverages - minimize consumption of alcohol, coffee, tea and carbonated beverages with caffeine.

Educate troops - education of troops is the key to prevention. There are many myths regarding hydration handed down from Marine to Marine. You need to stress that once troops are properly acclimatized to hot conditions, it is necessary to continue to properly hydrate. Hydration is a daily requirement. Just because they drank enough water yesterday does not decrease their need for today. Troops should not use salt tablets to assist with dehydration unless directed to by a medical officer.

5. **HYPONATREMIA**

The word hyponatremia means "to have a low level of sodium in the blood." Exertional or exercise hyponatremia, formerly called water intoxication, is a life-threatening condition that has increasingly been found in recreational hikers, marathoners, triathletes, and military infantry personnel. Having a low plasma sodium level disturbs the balance of sodium and water and causes a rapid influx of water into the brain, which in turn causes cerebral edema. As with similar signs and symptoms of intracranial pressure (ICP) in head trauma, a progression of neurologic symptoms with hyponatremia will occur, such as:

Headache
Mental status change
Nausea
Malaise (feeling tired)
Seizures
Coma

Causes: Exertional hyponatremia occurs when sodium and water loss in sweat results in dehydration and sodium depletion. When trying to prevent dehydration, the casualty over hydrates solely with water creating an over dilution of sodium in the blood. Typically, these casualties have not consumed sport electrolyte drinks or have consumed energy food supplements containing no salt or in quantities insufficient to balance the loss of sodium in sweat.

Risk factors that may predispose a person to hyponatremia are:

- Being a slower runner - slower runners are at a greater risk because of the greater opportunity to consume water and a greater volume consumed because they are running for a longer duration.
- Chronic NSAID use - people who use nonsteroidal anti-inflammatory drugs (like motrin) are at a greater risk than those who do not.
- Females - the most common finding in hyponatremia casualties.

6. **TREATMENT OF HYPONATREMIA**

The first step in treatment is recognizing the disorder and determining the severity. Management is based on the severity. Treatment of hyponatremia should only be performed by a medical officer. If you suspect a casualty has hyponatremia, MEDEVAC as soon as possible.

REFERENCE

Pre-hospital Trauma Life Support, Military Edition, 7th Ed, Chapter 16

Dehydration Review

1. List the signs of severe dehydration.

2. List the treatment for mild dehydration.

3. Describe the key points to address when educating your troops about dehydration.

4. Define hyponatremia. How does it relate to dehydration?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1403

Identify and Manage Environmental Heat Injuries

TERMINAL LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify and manage environmental heat injuries**, per the stated references. (FMST-HSS-1403)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify the predisposing factors associated with heat injuries**, within 80% accuracy, per PHTLS Manual, current military edition. (FMST-HSS-1403a)

2. Without the aid of references, given a list of symptoms, **identify the different types of heat injuries**, within 80% accuracy, per PHTLS Manual, current military edition. (FMST-HSS-1403b)

3. Without the aid of references, given a description or list, **identify proper treatments of heat injuries**, within 80% accuracy, per the PHTLS Manual, current military edition. (FMST-HSS-1403c)

4. Without the aid of references, given a description or list, **identify the proper method of cooling the casualty,** within 80% accuracy, per the student handout. (FMST-HSS-1403d)

5. Without the aid of references, given a description or list, **identify preventive measures for heat injuries**, within 80% accuracy, per the PHTLS Manual, current military edition. (FMST-HSS-1403f)

6. Without the aid of references, given a simulated heat casualty and standard field medical equipment and supplies, **manage the casualty to prevent further injury or death**, per the PHTLS Manual, current military edition. (FMST-HSS-1403g)

OVERVIEW

From 1979 to 1999, there were over 8,000 heat related deaths in the United States. More deaths than hurricanes, lightning, tornadoes, floods and earthquakes combined. High internal temperatures produce stress on the body, which, if not effectively counterbalanced, may result in heat injury or death. Environmental as well as physiological factors influence the body's thermal equilibrium mechanism.

Heat injuries can occur anywhere and at anytime of the year, depending upon physical activity and clothing worn. However, heat injuries most frequently occur during warm weather training and operations due to exposure to high temperatures, high humidity, and sunlight. Sweating increases daily water requirements as well as electrolyte replacement. Dehydration leads to added heat stress, increased susceptibility to heat injury, reduced work performance and degraded mission capability.

Body Temperature Regulation

Body temperature is regulated by the thermoregulatory center in the hypothalamus. The hypothalamus receives input from various thermal receptors located throughout the body. From this input, it can then tell the body to either conserve body heat or increase heat dissipation by increasing cardiac output, respiratory rate, vasodilation and perspiration.

The hypothalamus regulates the body’s core temperature not the body’s surface temperature. Normal body temperature range is usually 97.6° - 99.6°F.

1. PREDISPOSING FACTORS ASSOCIATED WITH HEAT INJURIES

Physiological (Host) Factors

Fitness and Body Mass Index - low levels of physical fitness will reduce tolerance to heat exposure. Being physically fit provides a cardiovascular reserve to maintain cardiac output as needed to sustain thermoregulation.

Age - thermoregulatory capacity and tolerance to heat diminish with age. However, this state can be improved by maintaining a low body weight and high level of physical fitness.

Medical Conditions - mild form of heat illness seen in individuals is “prickly heat rash” and has been shown to cause reduced heat tolerance. Other medical conditions that can increase the risk for heat intolerance and heat illness are diabetes mellitus, thyroid disorders, and renal disease. Cardiovascular disease and circulatory problems that increase cutaneous blood flow and circulatory demand are aggravated by heat exposure.

Previous History of Heat Injury - personnel who have a history of heat injury (heat cramps, exhaustion, and stroke) are highly susceptible to repeated heat injury. This is because the hypothalamus is damaged. Even after the patient recovers, the body may not repair the hypothalamus to its former effectiveness, therefore, the patient will become more sensitive to heat stressors.

Skin Trauma - the skin is the largest organ of the body. It serves as a layer of protection, controls the invasion of microorganisms, maintains fluid balance, and helps regulate temperature. Personnel suffering from skin conditions that hamper the heat regulatory

mechanism (sunburn, heat rash, windburn, and dermatologic disease) have an increased risk of heat related injuries.

Medications - the use of specific prescription or over-the-counter medications can place individuals at a greater risk for heat illness (see figure 1). Certain medications can increase metabolic heat production, suppress body cooling, reduce cardiac reserve, and alter renal electrolyte and fluid balance. Sedative and narcotic drugs will affect mental status and can affect logical reasoning and judgment, suppressing decision-making ability, when the individual is exposed to heat.

Increased Heat Production
- Thyroid hormone
- Cyclic antidepressants
- Hallucinogens (e.g. LSD)
- Cocaine
- Amphetamines

Decreased Thirst
- Haloperidol (anti-psychotic medication)
- Angiotensin-converting enzyme (ACE) inhibitors (BP medication)

Decreased Sweating
- Antihistamines (allergy medications)
- Anticholinergics
- Beta blockers (BP medication)

Increased Water Loss
- Diuretics
- Alcohol
- Nicotine

Figure 1. Toxins/Medications and their effects

Environmental Factors

Ambient Air Temperature - when the air temperature is above the body temperature, the body can only dissipate heat by sweating causing the heat to be slowly carried away by evaporation at the skin surface. When air temperatures are below the body temperature, heat loss to the surrounding environment is rapid.

Wind Velocity - the higher the wind velocity, the faster the heat loss. High wind velocity can produce windburn, which can have an adverse effect on thermal regulation.

Humidity - when the moisture content (humidity) of the air is high, sweat evaporates slowly and the rate of heat loss is greatly reduced. When the humidity of the air is low, sweat evaporates more quickly therefore increasing the rate of heat loss.

Radiant Heat - heat produced by the reflective energy of the sun or equipment in close proximity to the human body. Radiated heat is absorbed into the surrounding air and/or into the body. The body's ability to cool itself is hampered.

2. TYPES OF HEAT INJURIES

Heat Cramps - slow, painful, skeletal muscle cramps and spasms usually in the muscles most heavily used (legs and abdomen) and usually last for 1 to 3 minutes.

Cause - salt depletion that occurs when fluid losses are replaced by water alone. There is always a history of vigorous activity preceding the onset of symptoms.

Signs and Symptoms
- Muscle cramps and tenderness (extremities and abdomen)
- The skin is usually moist, pale and warm
- Core temperature may be normal or slightly elevated

Treatment
- Rest in a cool environment
- Drink a sports drink or other drink with added salt (e.g., tomato juice)
- Massage and stretch affected muscles

Heat Exhaustion - the most common heat-related disorder. A systemic reaction to prolonged heat exposure (hours to days) and is caused by excessive heat strain with inadequate water intake.

Cause

- Salt depletion through intense sweating
- Replacement of body fluids with water and not electrolytes
- Prolonged heat exposure

Signs and Symptoms - distinguishing severe heat exhaustion from heat stroke may be difficult, but a quick mental status assessment will help determine heat stroke (see figure 2). Any of the signs and symptoms of heat cramps may accompany heat exhaustion along with:

- Headache
- Fatigue
- Dizziness
- Hyperirritability/Anxiety
- Nausea
- Oliguria (decreased urine output)
- Heavy perspiration
- Hyperventilation (rapid/shallow)
- Tachycardia
- Orthostatic hypotension
- Moist, pale, clammy skin
- Rectal temp usually below 104° F (temp not always a reliable finding)
- Dilated pupils

Treatment

- Move to cooler location
- Actively cool casualty by wetting the head and upper torso with water and fanning
- Salt replacement with sports drink or IV fluids
- Loosen or remove clothing
- Restriction of activities for the next few days

Heat Stroke - severe, life-threatening condition. **A TRUE MEDICAL EMERGENCY!**

Cause - impaired heat loss mechanisms. It is a total failure of the thermoregulatory mechanism, resulting in an excessive rise in body temperature.

Signs and Symptoms - the most significant difference in heat stroke compared with heat exhaustion is neurologic disability which presents as mental status changes (confused, disoriented, combative, or unconscious). Other signs and symptoms are:

- Dry, hot, red skin (rectal temperature usually greater than 104° F)
- Respirations - deep, then shallow, then absent
- Pulse - rapid and strong, then rapid and weak
- Blood Pressure - elevated initially, then hypotensive
- Dizziness/weakness
- Nausea and vomiting
- Constricted pupils

Treatment

- The ***PRIMARY*** goal and focus should be to reduce the body's core temperature.
- Maintain ABC's
- Gain IV Access – give a 500 mL fluid challenge and reassess vital signs. Do not give more than 2 liters within the first hour. Vigorous fluid resuscitation may precipitate development of pulmonary edema.
- Monitor core temperature every 5 to 10 minutes. Active cooling measures should stop when core temp reaches 102.2° F
- CASEVAC

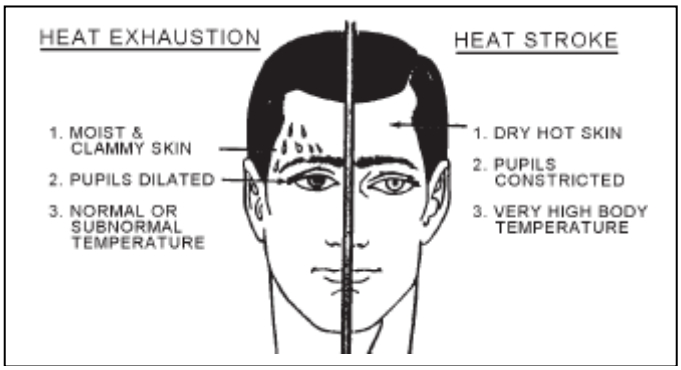


Figure 2. Differences between Heat Exhaustion and Heat Stroke

3. **METHODS OF COOLING THE BODY**

Direct Cooling

- Apply ice bags to vascular areas of the body such as axilla, groin, scalp, and neck regions.
- Place a sheet over the casualty and wet the sheet with cool fluid. Fanning the wet sheet while on the casualty will also quickly reduce the temperature.

Room Temperature Water Misting - fast method of cooling the body that requires only minimal monitoring of the casualty.

- Spray or mist a semi-nude heat casualty on a mesh hammock applying a film of water on the skin.
- A fan may also be utilized to increase the effectiveness of this method.

This method does not require cold or ice water. Room temperature water is all that is required. This method can also be used to treat multiple casualties simultaneously.

Immersion

- Cooling the body through conduction.
- Immerse the patient in a bathtub filled with ice water (not usually available in field environment).
- Requires constant monitoring of the patient during the procedure.
- This method takes 10-40 minutes.
- Concerns when using ice water immersion:
  - Peripheral vasoconstriction would impede the rate of heat loss.
  - Shivering generates heat and would increase heat production.
  - Hypothermia if the patient is left in the water too long.
  - Difficulty monitoring the body core temperature.

4. **PREVENTIVE MEASURES OF ALL HEAT INJURIES**

Education of Personnel **(MOST IMPORTANT PREVENTION MEASURE)**

Physical Conditioning and Health

- A person's physical condition has been directly related to their susceptibility to heat related incidents

Proper Water Intake

- During hot weather operations, sweating can cause loss of body water in excess of 1 liter per hour. Personnel must be educated on drinking liberal quantities of water.
- Water alone will not prevent an individual from becoming a heat casualty. Sodium and potassium must be replaced along with water. Personnel must be educated that an adequate diet (MRE's/Messhall) is essential for proper water/electrolyte balance. (*See lesson on Dehydration Casualties*).

Proper Acclimatization

- In some areas this may take from two to four weeks (3 weeks optimal)
- Gradual introduction of physical training program

Proper Clothing

- When situation permits, wear the least allowable amount of clothing
- Avoid skin exposure to direct sunlight (burned skin is less able to regulate body temperature)
- Clothing should be loose fitting to permit air circulation, especially at the neck, arms, waist and lower legs

Work Schedules

- Tailor work schedules to the situation with careful consideration to heat/humidity index, acclimatization time, type of work and place.

5. **HEAT CONDITION FLAG WARNING SYSTEM**

Wet Bulb Globe Temperature (WBGT) Index - a composite temperature used to estimate the effect of temperature, humidity and solar radiation have on humans. This index uses the combination of a dry bulb for ambient temperature, wet bulb for humidity measurement, black globe for radiant heat and air movement to provide a more accurate impact of the environmental conditions. It is NOT the same as regular air temperatures. The WBGT can be monitored hourly and the corresponding colored flag placed on a flagpole outdoors for all personnel to see. Where appropriate, adjustments of clothing, physical activity, work/rest cycles and fluid intake can then be made based on these conditions.

Flag Warning System - color-coded flags are used to help prevent heat casualties during hot weather. These flags will be prominently displayed by all commands so that every one can see them, particularly in areas where physical training takes place.

Green Flag (80° F to 84.9° F) - heavy exercises for unacclimatized personnel will be conducted with caution and under constant supervision.

Yellow Flag (85° F to 87.9° F) - strenuous exercises, such as marching at standard cadence, will be suspended for unacclimatized troops in their first 3 weeks. Outdoor classes in the sun will be avoided.

Red Flag (88° F to 89.9° F) - all physical training will be halted for those troops who have not become thoroughly acclimatized by at least 12 weeks of living and working in the area. Those troops who are thoroughly acclimatized may carry on limited activity not to exceed 6 hours per day.

Black Flag (90° F and above) - **all** nonessential strenuous physical activity will be halted for **all** units.

REFERENCES

Pre-hospital Trauma Life Support, Military Edition, 7th Ed, Chapter 20

Heat Injuries Review

1. List the six predisposing (host) factors associated with heat injuries.

2. List five signs or symptoms of heat exhaustion.

3. Identify the most significant difference between heat stroke and heat exhaustion.

4. List and describe the three methods of cooling a patient suffering from a heat injury.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1404

Manage Environmental Cold Injuries

TERMINAL LEARNING OBJECTIVES

1. Given a casualty in a combat environment and standard field medical equipment and supplies, **manage environmental cold injuries**, to prevent further injury or death. (FMST-HSS-1404)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify the predisposing factors associated with cold injuries**, within 80% accuracy, per Wilderness Medicine, 5th edition. (FMST-HSS-1404a)

2. Without the aid of references, given a description or list, **identify the contributing factors associated with cold injuries**, within 80% accuracy, per NAVMED P-5010 and Wilderness Medicine, 5th edition. (FMST-HSS-1404b)

3. Without the aid of references, given a list of symptoms, **identify the types of cold injuries**, within 80% accuracy, per the PHTLS Manual, current military edition. (FMST-HSS-1404c)

4. Without the aid of references, given a list of symptoms, **identify the stages of hypothermia**, within 80% accuracy, per NAVMED P-5010. (FMST-HSS-1404d)

5. Without the aid of references, given a description or list, **identify the proper treatment for cold injuries**, within 80% accuracy, per NAVMED P-5010 and the PHTLS Manual, current military edition. (FMST-HSS-1404e)

6. Without the aid of references, given a list, **identify preventive measures for cold injuries**, within 80% accuracy, per NAVMED P-5010 and the PHTLS Manual, current military edition. (FMST-HSS-1404f)

7. Without the aid of references, given a simulated cold casualty and standard field medical equipment and supplies, **manage environmental cold casualties**, to prevent further injury or death, per NAVMED P-5010, Wilderness Medicine, and the PHTLS Manual, current military edition. (FMST-HSS-1404g)

OVERVIEW

Throughout history the most celebrated and extreme reports of cold related injuries have been in the field of military endeavors. From Hannibal losing half of his 46,000-man army crossing the Pyrenean Alps to frostbite and hypothermia, and the tens of thousands of cases of trench foot during World War I, we have learned much. Mild to severe cold weather conditions caused 13,970 unintentional hypothermia related deaths in the US between 1978 and 1998, with 6,857 of these deaths occurring in persons 65 years of age or older. When adjusted for age, death from hypothermia occurred approximately 2.5 times more often in men than women. Cold injury is defined as tissue injury produced by exposure to cold. Cold itself is not the only factor in determining whether injury will occur. Duration of exposure, humidity, wind, altitude, clothing, medical conditions, behavior, and individual variability all contribute to the injury. Cold injuries can occur at nonfreezing and freezing temperatures. Pathologically, all cold injuries are similar. Trench foot, frostbite and hypothermia are the cold injuries of greatest military significance.

Dehydration - dehydration occurs very easily in the cold, particularly with increased physical activity. As with exposure to heat, adherence to proper fluid hydration while working in cold environments is necessary to minimize dehydration and the associated physical fatigue and cognitive changes. (*See lesson on Dehydration Casualties).*

1. PREDISPOSING FACTORS

Host Factors

Previous Cold Injury

Persons with previous cold injury, especially recent injuries, are at higher risk for subsequent cold injury. Individuals more sensitive to the cold should take actions to protect themselves.

Fatigue

Slow metabolic rate and inability to increase physical activity puts poorly conditioned personnel at increased risk. Mental and physical fatigue may cause apathy, leading to neglect of cold weather protection principles.

Age/Rank

Most cold injuries are suffered by military personnel from 17-25 years of age. The exact reason is unknown although these troops are generally “front line” troops who experience more exposure and are generally less experienced dealing with the cold. Decreased incidence of cold injury among higher ranks is a reflection of a combination of experience, less exposure and receptivity to training.

Discipline, Training, Experience

Well-trained and disciplined personnel are better able to care for themselves through personal hygiene, care of the feet, changing clothing and other simple, effective preventive measures.

Psychological Factors

Personality and motivation are significant in determining adaptability. In intense cold, such as -25° F, the mind, as well as the body, is adversely affected. An individual becomes numb and indifferent to nonessential tasks. Essential tasks require more time to complete and are more difficult to accomplish. Combat anxiety, which produces immobility, disorganization, and carelessness, coupled with sweating and vasoconstriction in the extremities can predispose a Marine to cold injury.

Try to develop a positive attitude toward the cold and the situation in general. Also, develop a degree of mental discipline to ensure unquestioning ability to follow orders.

Race/Geographic Origin

Military studies suggest that dark-skinned individuals and those from warmer regions are more susceptible to cold injuries. This relationship in race and cold is related to the greater susceptibility of pigmented cells to freeze compared with non-pigmented cells. However, with proper training and experience, a Sailor or Marine can compensate or overcome this predisposition.

Nutrition

Poor nutrition or incomplete meals contribute to cold injury. During cold weather operations, encourage personnel to eat well-balanced meals (Meals Ready to Eat (MRE) or cold weather rations).

Other Injuries

Injuries resulting in significant blood loss or shock reduce effective circulation to extremities and predispose a patient to a cold injury. Injuries that make patients immobile also lead to cold injuries.

Drugs and Medications

Medications that cause vasoconstriction, increase urinary output or produce sweating should be avoided. Tobacco and caffeine products (tea/coffee) cause vasoconstriction and poor circulation. Alcohol is a vasodilator, and because of its anesthetic effects, intoxicated subjects neither feel the cold nor respond to it appropriately.

2. CONTRIBUTING FACTORS

Environmental Factors - weather and temperature are predominant factors and will modify the rate of body heat loss.

Temperature - freezing temperatures are not necessary for cold injury. Of the 428 cases of hypothermia in one year, 69 were in Florida.

Humidity - effects rate of freezing and nonfreezing injuries

Precipitation - increases rate of body heat loss

Wind - greatly accelerates body heat loss

Activity

Too much or too little activity may cause or contribute to cold injuries. Over activity creates large amounts of heat loss through rapid and deep breathing, and perspiration trapped in clothing reduces its insulating value. Conversely, immobility causes decreased heat production with resultant cooling in the extremities.

3. **TYPES OF COLD INJURIES**

Chilblains (Pernio) - small, inflammatory, uncomfortable mild skin lesions, caused from being exposed to damp, nonfreezing ambient temperatures. The hands, ears, lower legs and feet are involved most commonly. They are more likely to develop in those with poor peripheral circulation. Historically, it is not of major clinical significance to military operations.

Cause - Exposure to air temperatures just above freezing (more likely to occur in dry, cold areas with high humidity).

Symptoms
- Usually occur several hours after exposure to cold
- Appear as nodular plaques (patches on the skin)
- Intense pruritus (itching)
- Burning paresthesia (numbness)

Treatment
- Supportive in nature
- Gradually re-warm the exposed area at room temperature
- Wash and dry the affected area
- Apply a dry, soft sterile bandage
- Symptoms usually subside with elimination of cold

Snow Blindness - the burning of the conjunctiva and superficial cells of the cornea by ultraviolet light from exposure to bright reflections from snow.

Cause - exposure to the sun's ultraviolet rays in conjunction with gray cloudy conditions, whiteout snow conditions or bright sunny conditions in a snow covered environment.

Signs and Symptoms
- Gritty sensation in the eyes
- Pain
- Increased lacrimation (tearing)
- Photophobia
- Blurred vision
- Headache

Treatment
- Prevent further ultraviolet exposure (sunglasses). If no sunglasses are available, patch affected eye.
- Oral analgesics (NSAIDS, but do not put local analgesics into the eyes)
- Do NOT put steroid medications into the eye
- MEDEVAC as the operational environment permits

Hypothermia - condition in which the core body temperature is below 95°F. Hypothermia renders a casualty unable to generate sufficient heat production to return to homeostasis or normal bodily functions. Hypothermia can occur in environments with temperatures well above freezing. Inadequate clothing and physical exhaustion contribute to the loss of body heat and the development of hypothermia.

Hypothermia, acidosis, and coagulopathy constitute the “triad of death” in trauma patients. The mortality in combat casualties with hypothermia is double that of normothermic

casualties with similar injuries. Hypothermia occurs regardless of the ambient temperature; hypothermia can, and does, occur in both hot and cold climates. Because of the difficulty, time, and energy required to actively re-warm casualties, significant attention should be paid to preventing hypothermia from occurring in the first place.

Causes

- Prolonged exposure to cold and/or wet conditions
- Inadequate clothing/protection
- Dehydration and/or inadequate nutrition
- Poor physical condition; slow metabolic rate and inability to increase physical activity puts the poorly conditioned at increased risk.
- Traumatic injuries - resuscitation with cold fluids or blood can lead to hypothermia.

Alcohol and drugs; alcohol is a vasodilator and because of its anesthetic effects intoxicated subjects neither feel the cold nor respond to it appropriately.

Frostbite - actual freezing of tissue fluids in the skin and subcutaneous tissues. Ice crystals form between and inside the cells with resulting tissue destruction (see figure 1). The most susceptible body parts are those areas farthest from the body's core, such as the hands, fingers, feet, toes and male genitalia.

Cause - Tissue does not freeze at 32°F because cells contain electrolytes that prevent tissue from freezing until skin temperature reaches approximately 28°F. When the tissue does freeze, ice crystals form, they expand and cause damage to surrounding tissue. Depending upon wind velocity and air temperature, the exposure time necessary to produce frostbite varies from a few minutes to several hours.

Figure 1. Frostbite

Classification and Signs and Symptoms of Frostbite - frostbite is classified by depth of injury and clinical presentation. The degree of cold injury, just like burn injuries, in many cases will not be known for at least 24 to 72 hours. The classification of frostbite injury is identical to burn injuries. There are four degrees on injury based on physical findings.

First-Degree frostbite - a superficial injury limited to skin that has brief contact with cold air or metal.

- Skin appears red progressing to white or yellowish plaque at site of injury
- No blister or tissue loss
- Skin has stinging and/or aching sensation progressing to numbness
- Healing occurs in 7 – 10 days

Second-Degree frostbite - involves all the epidermis and superficial dermis.

- Initially appears similar to first-degree
- Thawing is rapid, which results in superficial skin blister that has clear or milky fluid after several hours
- Tissue surrounding injury is red and edematous
- No permanent loss of tissue
- Healing occurs in 3 to 4 weeks

Third-Degree frostbite - involves the epidermis and dermis layers and frozen skin is stiff with restricted movement.

- After tissue thaws, skin swells leaving blood-filled blister, indicating vascular trauma to deep tissue.
- Skin loss occurs slowly leading to mummification and sloughing of tissue
- Healing is slow

Fourth-Degree frostbite - frozen tissue involves full thickness completely through dermis with muscle and bone involvement.

- No mobility to frozen tissue and only passive movement when thawed
- Poor skin perfusion
- Blisters and edema do NOT develop; will see early signs of necrotic tissue
- Slow mummification process will occur along with sloughing of tissue and auto-amputation of nonviable tissue.

Treatment - Casualties with first and second-degree frostbite should be placed with the affected area against a warm body surface, such as covering the casualty's ears with warm hands or placing affected fingers into armpits or groin region.

Treatment of casualties with deeper frostbite includes:

- Move to warm shelter and provide supportive care
- Rapid immersion of affected area into warm water
- Cover with loose, dry sterile dressing that is non-compressive and non-adherent
- Do NOT allow casualty to walk on affected feet
- Fingers and toes should be separated and protected with sterile cotton gauze
- Do NOT drain blisters in the field
- Provide pain meds as needed
- Start IV and give 250 mL bolus of warm saline to treat dehydration and reduce blood viscosity
- Do NOT give alcohol or cigarettes because of their vasoconstrictive properties
- Do NOT use direct heat source greater than 102°F on the affected area
- Do NOT allow the thawed part to refreeze (when the injured site freezes, thaws, and then refreezes, the second freezing causes a greater amount of severe thrombosis, vascular damage, and tissue loss)
- MEDEVAC ASAP

4. **STAGES OF HYPOTHERMIA**

Shivering - body's main mechanism to generate heat. Shivering increases the metabolic rate by increasing muscle tension, which leads to repeated bouts of muscular contraction

and relaxation. There is a wide range of individual differences at which shivering starts and stops, but typically, shivering starts when the core temperature is 94° to 97° F (34.4°-36° C) and continues until the core temperature is 84° to 88° F (29°- 31° C).

Mild Hypothermia - individual response to cold varies. In general, body temperatures from 93° to 97° F constitute mild hypothermia. In this temperature range, the casualty is in an excitation (responsive) stage. The casualty will usually remain conscious, however, they may start to exercise poor judgment or have irrational behavior. The body's natural defense mechanism, shivering, will eventually diminish. The body will attempt to retain and generate heat by increasing heart rate, blood pressure, and cardiac output. The respiratory rate will increase, which, in the long run, only cools the body more by breathing in cold air and losing moisture through respirations.

Moderate Hypothermia - moderate hypothermia occurs when the core temperature is between 86° and 92.9° F. Cognitive abilities become more difficult and the patient becomes stuporous and does not respond to painful stimuli. The body is no longer shivering as this is replaced by progressive muscular rigidity. In the initial excitation phase, heart rate, blood pressure, and cardiac output all rise. With decreasing temperatures, these all decline. The patient in this stage is at risk for lethal cardiac dysrhythmias.

Severe Hypothermia - when the core temperature is below 86° F, the patient is in severe hypothermia. The casualty will be unconscious with no response to pain. Vital signs will be barely detectable or non-detectable. Without immediate and intensive treatment, this patient will die!

5. TREATMENT OF HYPOTHERMIA

"A patient is not dead until they are warm and dead." This phrase was created after many patients survived prolonged hypothermic events and received CPR in the field. No matter what your initial impression of the casualty in the field, do NOT withhold basic or advanced life support until core temperature has returned to normal.

- Maintain ABC's. If CPR is initiated, maintain extensive re-warming efforts to ensure circulation of warm blood to the body's core.
- Move casualty to a warm shelter to prevent further heat loss
- Remove wet clothing if situation allows
- Loosen or remove constrictive clothing
- Warm, moist air via boiling water or hot shower (inhalation is the fastest way to warm the core)
- Sleeping bag re-warming (place patient in bag with 1 or 2 buddies)
- Apply heating pads or packs (groin/armpits/neck)
- Warm water bath (water temperature between 100°F and 108°F)
- Hot, sweet drinks (if conscious)
- Monitor vital signs. Observe for cardiac abnormalities
- Monitor core temperature rectally
- Warm IV solutions (Pre-warm solution in warm water or between MRE heaters)

6. PREVENTION MEASURES

Education of troops and leaders is the number one preventive measure.

Activity Levels

- Activity should be maintained at a steady, constant rate.
- Quick bursts of activity should be avoided.

Buddy System

- Train personnel to observe each other for symptoms.
- Train personnel to re-warm extremities (fingers/toes) by holding (not rubbing) their buddy's hands/feet.

Personal Measures - The Marine Corps uses the acronym "**COLD**" to describe the cold weather protection principles and preventive measures:

C - Keep clothing ***C****LEAN* and free of oil and dirt. Oily and dirty clothing quickly looses its insulating effectiveness.

O - Avoid ***O****VERHEATING*. There are more heat exhaustion cases in a cold environment because of overdressing for the type of work performed. Overdressing and over-exertion cause an increase in body heat production and decrease heat dissipation. As the body temperature increases, there is a corresponding increase in perspiration, which causes saturation of clothes with sweat. Both conditions lead to cold injuries.

L - ***L****AYER* correctly. Clothes should be loose to trap air between the layers, which produces the insulating effect necessary for survival in the cold. Tight and constricting clothing produces cold injuries. There can be as many as seven layers of clothing used to protect personnel in a cold environment.

D - Keep clothing ***D****RY*. If clothing becomes wet so does the skin, which will promote cooling and frostbite. Change wet clothing at the first opportunity.

REFERENCES

Wilderness Medicine 5th Ed., 2007, Chapter 5
Pre-hospital Trauma Life Support, Military Edition 7th Ed, Chapter 16

Cold Injuries Review

1. Explain the effect age and rank have on an individual's chance for developing hypothermia.

2. Describe the symptoms for Chilblains.

3. List three signs or symptoms of Moderate Hypothermia.

4. Define the acronym C.O.L.D.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1604

Perform Care of the Feet

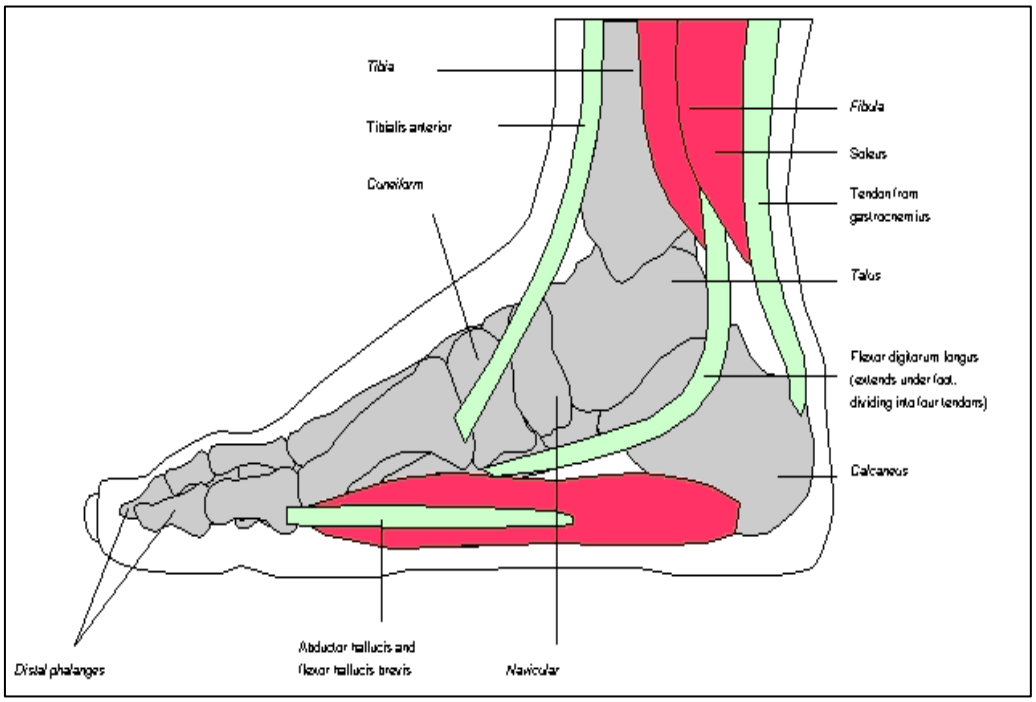
TERMINAL LEARNING OBJECTIVE

1. Given the requirement in a tactical environment, necessary equipment and supplies, **perform care of the feet**, to prevent serious foot injuries. (FMST-FP-1604)

ENABLING LEARNING OBJECTIVE

1. Without the aid of references, given a description or list, **identify the anatomy of the foot**, within 80% accuracy, per FM 21-18, Foot Marches. (FMST-FP-1604a)
2. Without the aid of references, given a list, **identify the types of foot disorders**, within 80% accuracy, per FM 21-18, Foot Marches. (FMST-FP-1604b)
3. Without the aid of references, given a description or list, **identify the symptoms of foot disorders**, within 80% accuracy, per FM 21-18, Foot Marches. (FMST-FP-1604c)
4. Without the aid of references, given a description or list, **identify the proper treatment for foot disorders**, within 80% accuracy, per FM 21-18, Foot Marches. (FMST-FP-1604d)
5. Without the aid of references, given a list, **identify preventive measures for foot disorders**, within 80% accuracy, per FM 21-18, Foot Marches. (FMST-FP-1604e)

1. **ANATOMY OF THE FOOT**



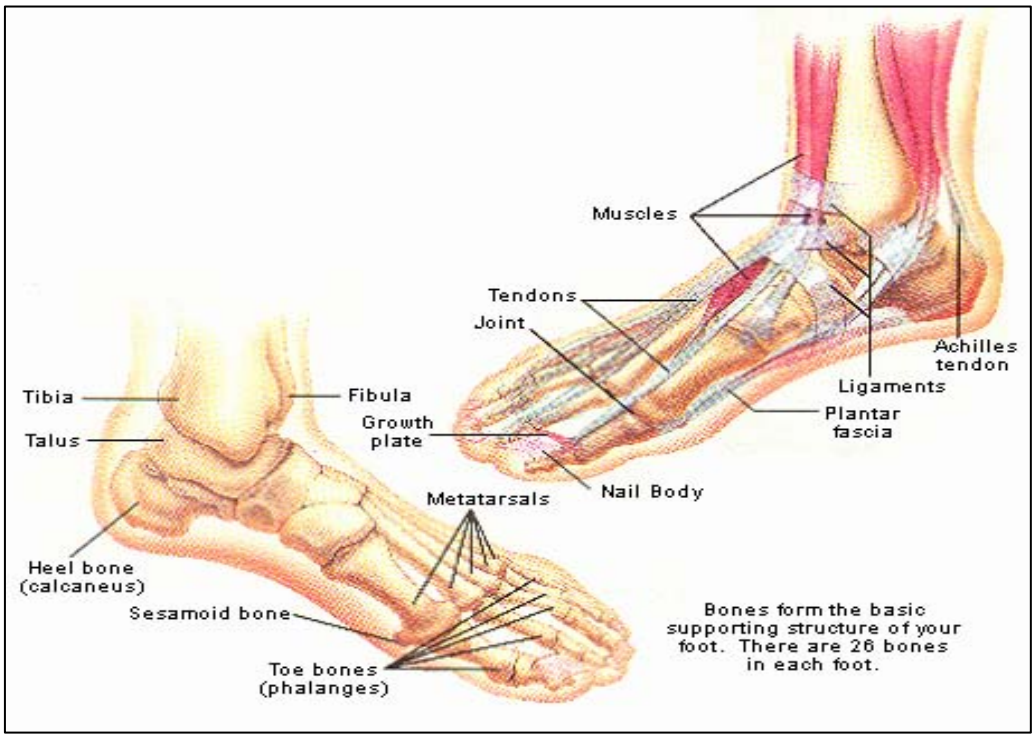


Figure 1. Anatomy of the Foot

2. TYPES OF COMMON FOOT DISORDERS

Blister - a blister is a defense mechanism of the body. When the epidermis layer of the skin separates from the dermis, a pool of fluid collects between these layers while the skin re-grows from underneath. Blisters can be caused by chemical or physical injury. An example of chemical injury would be an allergic reaction. Physical injury can be caused by heat, frostbite, or friction.

Causes

- Improperly conditioned feet
- Heat and moisture
- Improperly fitting boots and/or socks
- Friction and pressure

Signs and Symptoms

- Fluid collection under the skin
- Mild edema and erythema around the site
- Sloughing of tissue exposing sub dermal tissue layer
- Localized discomfort and/or pain

Treatment

Small blisters usually need no treatment

- Clean area with soap and water
- Monitor for signs and symptoms of infection
- Apply a protective barrier (moleskin bandage) around the blister, to prevent further irritation

Closed, Large blisters (if affecting individuals gait)

- Wash the area around the blister with Betadine solution or alcohol pad
- Drain as close to the edge of the blister as possible to allow for drainage, and then apply gentle pressure to the blister dome expelling the clear fluid
- Apply moleskin (donut) to skin surrounding the blister, using tincture of benzoin as an adhesive.
- DO NOT PUT ANY ADHESIVE DIRECTLY ON THE BLISTER
- Dust entire foot with foot powder to lessen friction and prevent adhesive from adhering to the socks
- Monitor for signs and symptoms of infection

Open blisters

- Wash with Betadine solution or clean with soap and water
- Remove any loose skin with a surgical blade or scissors
- Apply moleskin (donut) to cover skin surrounding the blister, using tincture of benzoin as an adhesive.
- Place a small amount of antibiotic ointment over wound
- Cut a telfa pad and place over open blister
- Apply moleskin over entire treated area to include surrounding skin
- Monitor for signs and symptoms of infection

Athletes Foot (Tinea Pedis) - tinea pedis is a chronic fungal infection of the feet, often referred to as athlete's foot. Athlete's foot is very common and usually begins in early adulthood. Men are more often affected than women. Once affected, recurrences are common.

Causes

- Hot humid weather, excessive sweating and occlusive footwear
- Contact with contaminated footwear and floors
- Poor foot hygiene

Signs and Symptoms

- Reddened, cracked and peeling skin
- Itching, burning and stinging sensation usually between the toes
- Sore, purulent, weeping rash

Treatment

- Apply anti-fungal foot powder daily during work hours – i.e. Miconazole
- Apply anti-fungal ointment daily during rest hours – i.e. Clotrimazole
- Treatment should be continued for 1 week after clearing has occurred
- If the patient fails to respond to treatment, refer patient to medical officer

Ingrown Toenails - an ingrown nail occurs when the nail border or corner presses on the surrounding tissue. This condition is painful and often results in an infection once the skin is broken (see figure 2).

Figure 2. Infected Ingrown Toenail

Causes

- The most common causes are improper trimming of toenails and poor hygiene.
- Trauma to the nail plate or toe
- Improperly fitted footwear
- Abnormally shaped nail plate

Signs and Symptoms

- Pain along the margin(s) of the toenail. The great toe is the most common toe affected.
- Localized edema
- There may be signs of infection (drainage of pus, blood or watery discharge tinged with blood)

Treatment

- Trim a small point off the corner of the nail to relieve the pressure. Remove any dead skin that may have accumulated in the nail groove.
- Elevate the end of the nail to prevent further irritation of the soft tissue. Proper trimming should correct ingrown toenail. If not…
- Surgically correct a chronic ingrown toenail at the BAS, by complete or partial removal of toenail, under the supervision of a clinician.
- If there are signs of infection, antibiotics should be considered.

Corns and Calluses (see figure 3) - a callus is a thickening of the outer layer of skin, in response to pressure or friction that serves as a protective mechanism to prevent skin breakdown. A corn is similar to a callus except it involves a discrete pressure spot, typically over a bone, whereas a callus can form anywhere.

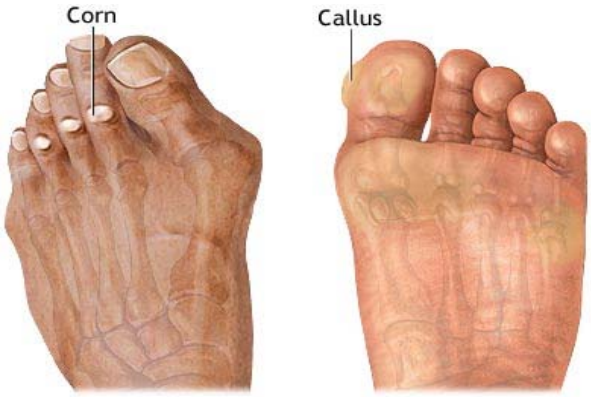


Figure 3. Corns and Calluses

Causes
- Tight fitting shoes, due to chronic friction and sheering pressure
- Deformed and crooked toes
- Prolonged walking on a downward slope

Signs and Symptoms
- Thickened, dry skin over prominent bones (corn)
- Large patches of thickened, dry skin over friction areas from walking (calluses)
- Pain on direct pressure against the corn
- Skin breakdown and possible infection with continued irritation

Treatment
- Debridement of excessive buildup of skin
- Apply various pads and devices to the toes to relieve pressure (mole skin, corn pads, etc.)
- Fix the cause (improperly fitted boots)
- In extreme cases, refer to a medical officer

Bunion (see figure 4) - a bunion is an enlargement at the 1st metatarsal head of the great toe, which deviates laterally. Often there is no bump, but rather an angulation of the first metatarsal that makes the head of this bone more prominent.

Causes
- A minor bone deformity, called hallux valgus, in which the joint at the base of the big toe projects outward while forcing the tip of the toe to turn inward toward the other toes. As a result of the pressure on the deformity, the surrounding tissue thickens.
- This condition may be hereditary.
- Poorly fitted or excessively worn shoes.

Signs and Symptoms
- Thickened lump on the medial side of the foot at the base of the great toe
- Erythema
- Pain near first metatarsal head
- Joint stiffness

Treatment
- Wear comfortable, properly fitted shoes with plenty of room in the toe area

Figure 4. Bunion

- Use of a special toe pad or corrective sock that straightens the big toe
- Non-steroidal, anti-inflammatory medications (NSAIDS)
- Orthotics
- In severe cases, surgery may be required

Plantar Fasciitis (see figure 5) - also known as heel spurs or heel bursitis. Plantar fasciitis is one of the most common foot problems. The plantar fascia's main function is to anchor the plantar skin to the bone, thus protecting the longitudinal arch of the foot. The plantar fascia is strained from overuse, causing pain along the sole of the foot, particularly where the fascia connects to the heel.

Causes

- Overuse in the physically active or a sudden increase in the volume or intensity of training
- Abnormal joint mechanics
- Tightness of the Achilles tendon
- Shoes with poor cushioning
- Abnormal foot anatomy
- Obesity
- Excess weight
- Improper shoes
- Bio-mechanical problems (mal-alignment of the heel)

Signs and Symptoms

- Tenderness along the medial fascia
- Constant pain that is worse in the morning upon rising or after physical activity
- Tearing and pulling sensation
- Altered gait

Treatment

- Stretching and strengthening exercises (lower leg muscles)
- RICE (Rest, Ice, Compression, Elevation)
- NSAIDS
- Heel and arch supports (orthotics)

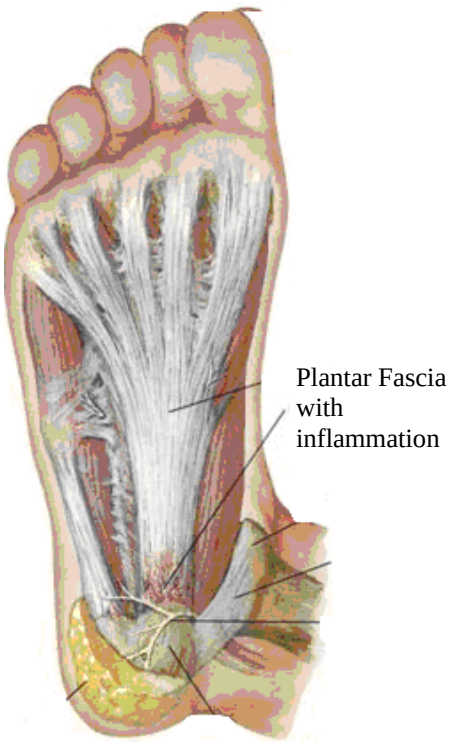


Figure 5. Plantar Fasciitis

Plantar Warts (see figure 6) - warts that are located on the sole of the foot are called plantar warts. A plantar wart can be found as a single lesion or grouped together. Most common areas include the ball of the foot and heel, where increased pressure and irritation is common. Warts are often ignored until they become painful.

Figure 6. Plantar Wart

Cause

- Caused by the Human Papilloma Virus (HPV)

Signs and Symptoms

- Plantar warts have tiny dots in the center. These dots are often black from dried blood, due to irritation. Small plantar corns are sometimes mistaken for warts.
- Tenderness

Treatment

- Shave down callus over wart and apply salicylic acid paste (metaplast).
- Apply dressing to keep paste isolated over wart. Apply donut bandage to relieve pressure.
- Leave paste in place for 3 days.
- Repeat treatment in one week.
- Refer to medical officer if no improvement.

Trench Foot/Immersion Foot (see figures 7a and 7b) - a medical condition caused by prolonged exposure of the feet to damp and cold. Trench Foot was given its current name after it was found frequently among World War I troops who had been confined for long periods in trenches filled with standing water. Immersion foot describes a more severe variant of trench foot usually seen in downed pilots and shipwrecked Sailors.

Figure 7a. Immersion (Trench) Foot

Causes

- Prolonged exposure to wet and cold conditions or outright immersion of feet in water at 32-50° F
- Condition can occur on hands due to damp or cold gloves

Signs and Symptoms (EARLY)

- Initially foot is pale, mottled, numb, pulseless and immobile
- After rewarming, severe burning pain and return of sensation

Signs and Symptoms (LATE 2-7days)

- Limb becomes hyperemic (increased amount of blood flow, skin will be warm and red). Numbness, edema, ulceration, and gangrene may develop.

Treatment

- Treatment is supportive
- Keep feet clean, warm, dry, and bandaged
- Gentle rewarming
- Elevate affected extremity to reduce edema
- Consider antibiotics if there are signs of infection
- Avoid wearing boots
- Do not drain blisters in the field
- Refer to medical officer
- MEDEVAC severe cases

Figure 7b. Immersion (Trench) Foot

Metatarsal Stress Fracture (see figure 8) - a stress fracture is an incomplete break in the bone often seen in intense training programs around week four, when bone absorption exceeds bone-building activity. The most common stress fracture in the foot, known in the military as "March Fracture," is the second and third metatarsals.

Causes

- Repetitive stress on a metatarsal due to malposition or abnormal foot structure or mechanics (i.e. flatfoot)
- Increased levels of activity, especially without proper conditioning
- Obesity

Signs and Symptoms

- Edema in dorsum of foot
- Tenderness at the top of the foot during and after exercise

Treatment

- Treat as a fracture
- RICE
- NSAIDS
- Rest for two or three weeks until the pain is gone
- Slow return to activity to avoid recurring injury
- Refer to medical officer

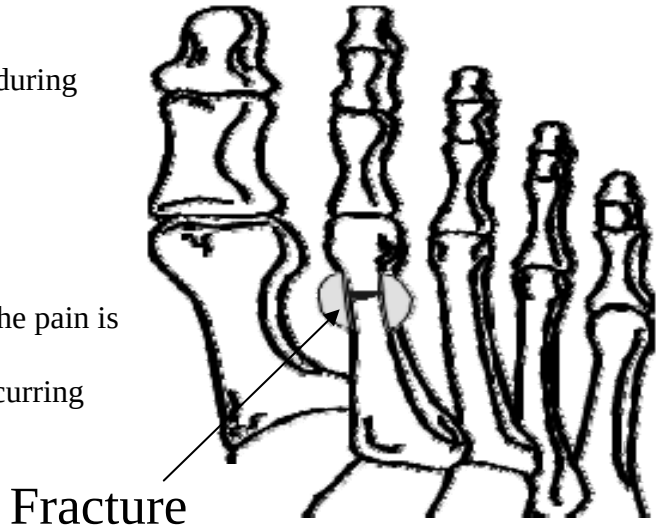


Figure 8. March Foot (Metatarsal Stress Fracture)

3. **PREVENTIVE MEASURES**

Before Marches

- Educate troops about proper foot care and wear
- Carefully fit new boots
- The toe box should be roomy enough so you can wiggle your toes
- Ball of your foot rests on the widest part of the sole
- The forefoot should not be wider than your shoe
- Determine the proper boot length. There should be a ½ inch between the end of the longest toe and the end of the boot.
- Keep feet clean and dry
- Wear clean, dry, un-mended, well fitting socks
- Socks should fit snugly on the foot without excess material over toes and heel
- If a person wants to wear two pair of socks, the outer pair should be ½ size larger to comfortably fit over the inner sock.
- Trim nails straight across, and not too short. Don't cut out or dig at corners
- Use foot powder
- Early and immediate attention to pain around toenails

During Rest Periods

- Lie with feet elevated at rest points
- If time permits, massage the feet, apply powder, change to dry socks and treat blisters.
- Relief from swelling feet can be obtained by slight loosening of the bootlaces where they cross the arch

After Marches

- EARLY ATTENTION IS ESSENTIAL! As soon as any discomfort is felt, take corrective action
- Wash and dry feet
- Treat blisters, abrasions, corns, and calluses if they have occurred
- If red, swollen or tender skin develops along the edges of the foot, the foot requires aeration, elevation, rest and as a rule, wider footwear

REFERENCES

Foot Marches, FM 21-18

Care of the Feet Review

1. Describe the appropriate treatment for large blisters.

2. Describe the difference between a corn and a callus.

3. List the signs and symptoms of plantar fasciitis.

4. “March Foot” generally involves which two bones?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1304

Ethical Considerations for the Hospital Corpsman

TERMINAL LEARNING OBJECTIVE

1. In a military environment, **identify the terms associated with ethical conduct on the battlefield**, per the references. (FMST-HSS-1304)

ENABLING LEARNING OBJECTIVE

1. Without the aid of references, given a description or list, **identify the combatant status of individuals,** within 80% accuracy, per the student handout. (FMST-HSS-1304a)
2. Without the aid of references, given a description or list, **identify the basic concepts of the Law of Armed Conflict**, within 80% accuracy, per the student handout. (FMST-HSS-1304b)
3. Without the aid of references, given a description or list, **identify the characteristics of Rules of Engagement**, within 80% accuracy, per the student handout. (FMST-HSS-1304c)
4. Without the aid of references, given a classroom environment, **discuss potential scenarios involving ethical decisions on the battlefield**, per the student handout. (FMST-HSS-1304d)

OVERVIEW

"The idea is to end the day with fewer enemies than when it started."
- General David Patraeus, United States Army

The quote above can mean many things. Although in many instances it means we must take the fight to the enemy in order to break their will to fight, it also has another, deeper meaning. The modern battlefield is populated by many groups of individuals and frequently involves operations in towns and villages. The support of the local populace is critical when battling an insurgency. Actions taken to kill a small group of individuals could inflame the passions of other groups in the area that beforehand were not openly hostile. The Geneva Conventions help us to determine an individual's status on the battlefield. The Law of War and Rules of Engagement provide guidelines for our actions.

1. THE GENEVA CONVENTIONS

The Geneva Conventions were established to curtail the atrocities of war as much as possible. Among the many provisions in these conventions were the definitions of the various types of combatants. The three types of combatants are listed below:

Lawful Combatant

Lawful combatants are authorized by a government to engage in hostilities. As such, they wear uniforms and carry their arms openly. These units have fixed recognizable emblems and have a set chain of command. When the United States first entered Iraq, the Iraqi Republican Guard met the definition of Lawful Combatant.

Marines escort two residents of a small town in the Western Anbar province of Iraq in early 2008. The residents unlocked doors for the Marines to search through buildings for any evidence of insurgent activity. Civilian cooperation has led to a much safer Anbar province due to the ability to efficiently gather intelligence.

Non-Combatant

Individuals not involved in hostilities are considered non-combatants. Operations in urban terrain are frequently conducted in areas that have many such individuals. Stabilization operations can also affect many non-combatants.

Personnel formally in the status of lawful combatant become non-combatants once they are injured to the point they can no longer engage in hostilities. Prisoners of War are also considered non-combatants. Medical personnel and Chaplains are afforded non-combatant status under the Geneva Conventions as well.

Unlawful Combatants

Today's battlefield involves many individuals who engage in hostilities without meeting the requirements of lawful combatants mentioned above. Unlawful combatants are commonly referred to as "insurgents". Although they have no chain of command or recognized emblems, they become lawful targets once they engage in hostile actions. One of the most difficult aspects of Counter Insurgency Operations is the ambiguous nature of the enemy due to unlawful combatants "hiding" amongst innocent civilians.

2. LAW OF ARMED CONFLICT

The Law of Armed Conflict, (LOAC), also called the Law of War, is designed to prevent unnecessary suffering of civilians and to minimize damage to infrastructure such as electrical power, water and buildings during a conflict. LOAC requires the United States (and other countries) to conduct operations in a disciplined manner consistent with our national values. LOAC has the following fundamental principles:

Military Necessity

LOAC requires that any target destruction must be necessary to accomplish the mission. Destroying a bridge to disrupt military supply routes is acceptable, but an order to destroy all bridges throughout the theater of operations is not.

Distinction

This requires all attacks to be directed ONLY at combatants and military objectives. Shooting into a crowd of civilians to kill a single insurgent or destroying an entire village to destroy a single insurgent would violate this principle.

Proportionality

This principle should be employed whenever an attack has the possibility of affecting civilian populations or infrastructure. This calls for using only the amount of force necessary to destroy the target. Proportionality **does not** require the use of a similar amount of force in responding to an attack from the enemy.

Unnecessary Suffering

LOAC prohibits the use of otherwise lawful arms in a manner that causes unnecessary suffering and prohibits the engineering of arms to cause unnecessary suffering.

Treatment of wounded

Sailors and Marines have a duty to collect and care for the wounded. *Prioritize treatment according to injuries.* Make NO treatment distinction based on nationality. All soldiers, enemy or friendly, must be treated the same.

A Navy Hospital Corpsman treats a wounded Afghan in a Helmand Province village in February, 2008.

3. RULES OF ENGAGEMENT (ROE)

ROE is a set of directives issued by competent military authority to delineate circumstances and limitations under which naval, air, and ground forces will initiate and/or continue combat engagement with other forces encountered. ROE can change based upon the theater or the mission. Before every operation each unit is briefed on the ROE. When discussing ROE the following terms are useful:

Positive Identification (PID) - The reasonable certainty that the object of attack is a legitimate military target. NOTE: Reasonable certainty means far more than "maybe" or "might be" and is greater than "probably." "Very Likely" or "Highly Probable" better describes the term "reasonable certainty." Identifying someone as a military aged male (MAM) is not PID and this term should NOT be used.

Hostile Act (HA) - An attack against coalition forces or property.

Hostile Intent (HI) - The threat of imminent use of force. Imminent is based on an assessment of all the facts known at the time and may be made at any level including the Marine or Sailor. Imminent does not necessarily mean immediate or instantaneous. It does require the individual to honestly believe that a HA will occur unless he or she intervenes.

SITUATIONS TO DISCUSS

Goat Thieves

Question: Your squad is on a joint dismounted patrol (US and Iraqi forces together, walking around). You approach a house with many goats in the yard. Members of the Iraqi Army (IA) throw ropes around the necks of the goats and begin to walk off with them. The owner of the house begins protesting asking the Marines to stop them from taking his goats. The IA's tell him to shut up and tells you that the man is probably an insurgent anyway. They also tell you (and you know this to be true) that they (the IA's) have not been paid or had food delivered in several weeks. What do you do?

Released Detainee

Question: During a dismounted patrol your squad is engaged with small arms fire from the rooftop of a house. After the ensuing firefight you clear the house and find bodies of several enemy killed in action (KIA) and one enemy who is slightly wounded (the injury is not life threatening). As you are taking him into custody, you recognize him as a detainee you had captured a month previously for being an IED triggerman in an attack that killed two of your Marines. The squad leader recognizes him as well as says the right thing to do is finish him off since he will just be released again to kill more Marines. What do you do?

REFERENCES

Law of War, Rules of Engagement, and Escalation of Force Guide, Marine Corps Center for Lessons Learned. 31 August 2007.

DODINST 2310.08E, Medical Program Support for Detainee Operations

Ethical Considerations Review

1. List the characteristics of a Lawful Combatant as defined by the Geneva Conventions.

2. List the four fundamental principles of the Law of Armed Conflict.

3. Describe your role in treating enemy casualties.

4. Define Positive Identification.

NOTE: The following questions are offered for review purposes. <u>This is NOT intended as a sole source of test preparation</u>. Remember all test questions are based on an ELO and any ELO can be used to create a test question.

1. A chronic fungal infection of the feet would be known as what?
2. What are the most common causes of ingrown toenails?
3. What are the causes of blisters?
4. A MEF is commanded by what ranking officer?
5. How many days of supplies is a MEB equipped with when it deploys?
6. On which side of the collar, right or left, is the rank insignia worn?
7. If a person has more than one warfare device, how far apart are they worn on the MCCUU?
8. Commanders of combatant commands come under which chain of command?
9. What are the four core elements of a MAGTF?
10. Where is 2nd Marine Aircraft Wing (2nd MAW) geographically located?
11. What causes exertional hyponatremia?
12. What is the approximate size of a MEF?
13. A leader who avoids profane and vulgar language displays what leadership trait?
14. How far from the edge of the collar is the collar device worn?
15. An E-8 in the Marine Corps who is a technical expert is a _____.
16. Who is the most senior officer of the Marine Corps?
17. What are the four broad categories of the Marine Corps?
18. What are the stages of hypothermia?
19. In the heat condition flag warning system, which flag is flown for a WBGT of 90°F and above?
20. The certainty of proper performance of duty is the definition of which Marine Corps leadership trait?
21. What are the common causes of dehydration?
22. What are the physiological (host) predisposing factors associated with heat injuries?
23. What is the normal range of the body's temperature?
24. What are the predisposing factors of cold injuries?
25. Muscle cramps and tenderness in the extremities and abdomen, moist, pale, and warm skin, and a normal or slightly elevated core temperature are signs and symptoms of what?
26. Who is authorized to wear a Martial Arts belt with their MCCUU?
27. What is the maximum amount of fluids you should drink per day?
28. What is plantar fasciitis?

29. Which heat injury is a severe, life-threatening condition; a true medical emergency?
30. What are the environmental factors that contribute to cold injuries?
31. What are the three classification levels of dehydration?
32. What are the causes of heat exhaustion?
33. What is the most important prevention measure for managing heat injuries?
34. What is the Marine Corps equivalent to a Navy Commander?
35. Where does Chilblains (Pernio) usually occur?
36. What does the acronym COLD stand for?
37. What is the cause of Immersion foot (Trench foot)?
38. What are the four colored flags of the heat condition flag warning system?
39. When do “unlawful combatants” become lawful target?
40. According to the Rules of Engagement, what three things are needed before initiating or continuing combat engagements?

MARINE CORPS FUNDAMENTALS

MARINE CORPS FUNDAMENTALS

M16/ M4 Service Rifle Familiarization FMST 1219	2-1
Field Communications FMST 1213	2-13
Five Paragraph Order FMST 1214	2-32
Patrolling FMST 1201	2-38
Land Navigation FMST 1211	2-56
Construct a Fighting Position FMST 1208	2-69
Defensive Operations FMST 1210	2-75
Squad Size Attacks FMST 1209	2-81
Antipersonnel Devices FMST 1206	2-89
IED FMST 1206	2-100
Review Questions	2-111

Rev: Jul 2010

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

SERVICE CARBINE FAMILIARIZATION

TERMINAL LEARNING OBJECTIVE.

1) Given a range, supplies, equipment, a service carbine and a fighting load, conduct a stage of fire to achieve a level of proficiency per MCO 3574.2k

ENABLING LEARNING OBJECTIVES.

(1) Without the aid of references, given a chart identify the characteristics of the M4 service carbine, without error as per MCO 3574.2k

(2) Without the aid of references, identify the safety rules that apply to any weapon, without error as per MCO 3574.2k

(3) Without the aid of a references, identify the weapons conditions that go with transporting the M4 service carbine, without error as per MCO 3574.2k

(4) Without the aid of references, given a M4 service carbine, disassemble the M4 service carbine, without error as per MCO 3574.2k

(5) Without the aid of references, given a M4 service carbine, assemble the M4 service carbine, without error as per MCO 3574.2k

(6) Without the aid of references, given a M4 service carbine, perform a functions check without error as per MCO 3574.2k

(7) Without the aid of references, given a service carbine, a parade sling, and without the aid of references demonstrate the different transports associated with the M4 service carbine as per MCO 3574.2k

(8) Without the aid of references, given a list identify the function of the safety lever as per MCO 3574.2k

1. **CHARECTERISTICS** The M16A4 Service rifle/M4 Service Carbine (M4 Service Carbine is the TO issue for Corpsman),(see figures 1 and 2) are a caliber 5.56mm, magazine-fed, gas-operated, air-cooled, shoulder-fired weapons that can be fired either in automatic three-round bursts or semiautomatic single shots as determined by the position of the selector lever.

(Figure 1, M16/M4 Carbine Rifles)

M16A4		M4 Carbine
5.56 mm	*Caliber*	5.56 mm
8.79 pounds	*Weight (w/30 round magazine)*	6.9 pounds
39 5/8 inches	*Length (w/compensator)*	29.75 inches w/butt stock closed 33 inches w/butt stock open

800 rounds per minute (approximately)	*Cyclic rate of fire*	800 rounds per minute (approximately)
	Maximum effective rates of fire:	
45 RPM	*Semiautomatic*	45 RPM
90 RPM	*Burst*	90 RPM
12 – 15 RPM	*Sustained rate of fire*	12 – 15 RPM

	Maximum effective range:	
550 meters	*Individual/point targets*	500 meters
800 meters	*Area targets*	600 meters
3534 meters	*Maximum range*	3600 meters

(Figure 2, Characteristics of each service rifle)

2. FIREARM SAFETY RULES

The following rules apply to all weapon systems at all times without exception.

1) **Treat every weapon** as if it were loaded

   a. Never trust your memory or make any assumptions about a weapon's safety status. Always confirm what condition your weapon is in if there is ever any doubt.
   b. Check your weapon for ammunition whenever it has been out of your possession.
   c. Never hand a weapon to anyone without clearing it. Clearing is a procedure for ensuring there is no ammunition in the weapon. Whenever you assume control of a weapon from someone, your first action is to clear it, even if you have witnessed its clearing.
   d. Never move in front of a weapon held by someone else.
   e. Never engage in or tolerate horseplay with or around weapons.

2) **Never point a weapon** at anything you do not intend to shoot

   a. Always be aware of muzzle direction and your surroundings. This ensures you will not unintentionally point your weapon at anything other than an intended target.
   b. Be aware of the maximum range of your weapon. If you do not know what is beyond your vision in any unprotected direction, do not point your weapon in that direction.
   c. Never allow the muzzle of your weapon to point at any part of your body.

3) **Keep your finger straight** and off the trigger until you are ready to fire

   a. Never be guilty of a negligent discharge.
   b. A common reaction to a sudden shock or loss of balance while handling a weapon is an unintentional tightening of the grip. If your finger is off the

trigger, you will eliminate the potential for firing a shot accidentally.

4) **Keep the weapon on safe** until you intend to fire

The SAFE position on the selector lever is a built-in feature that has only one function. That function is to prevent inadvertent firing of the rifle.

a. When patrolling or walking it is possible for the trigger to be unintentionally depressed by objects (e.g., branches, wire, gear) encountered en route. Keeping the weapon on safe ensures the weapon will not fire if the trigger is accidentally engaged.
b. Never trust anyone else regarding a weapon's safety status.

3. WEAPONS CONDITIONS

Condition Four

Magazine removed
Bolt forward
Chamber empty
Ejection port cover closed
Weapon on safe

Condition Three

Magazine inserted
Bolt forward
Chamber empty
Ejection port cover closed
Weapon on safe

Condition Two

Not applicable for the M16/M4

Condition One

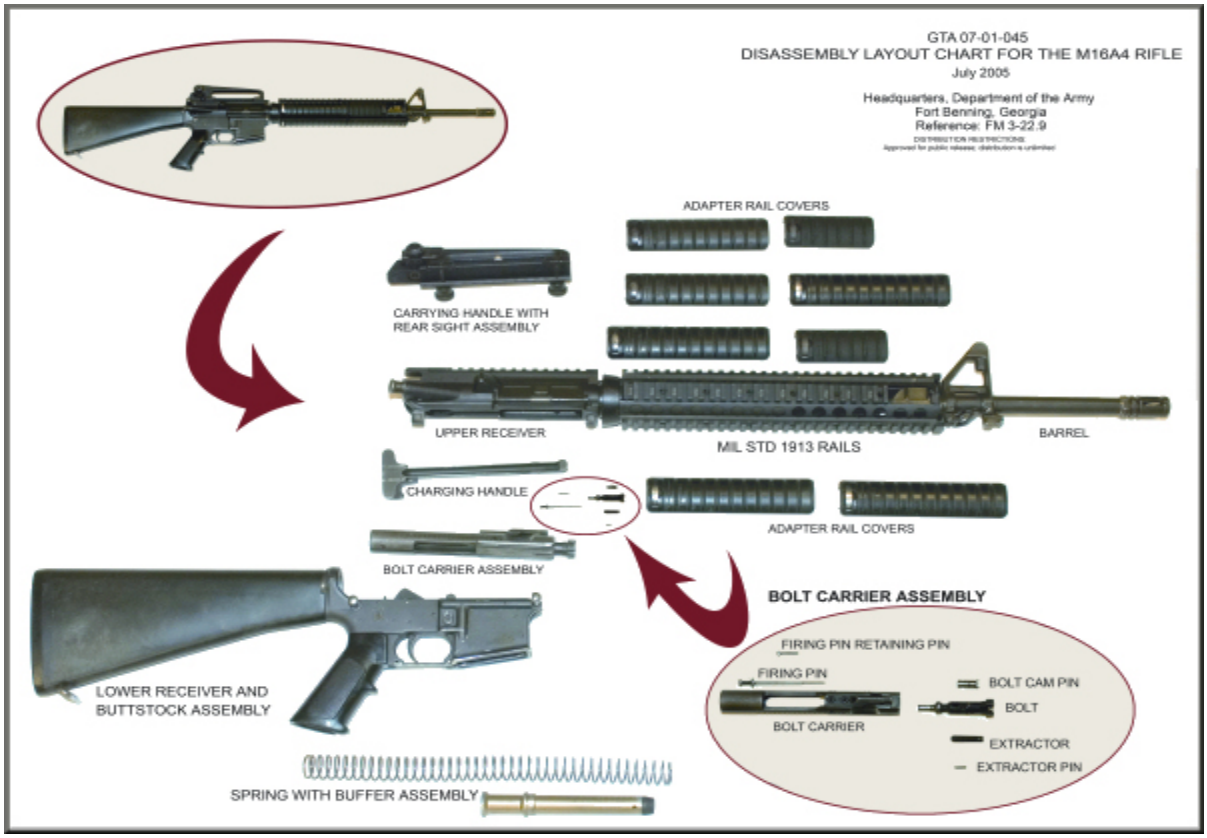
Magazine inserted
Bolt forward
Round in the chamber
Ejection port cover closed
Weapon on safe

4. DISASSEMBLE:

NOMENCLATURE OF THE M4 SERVICE CARBINE

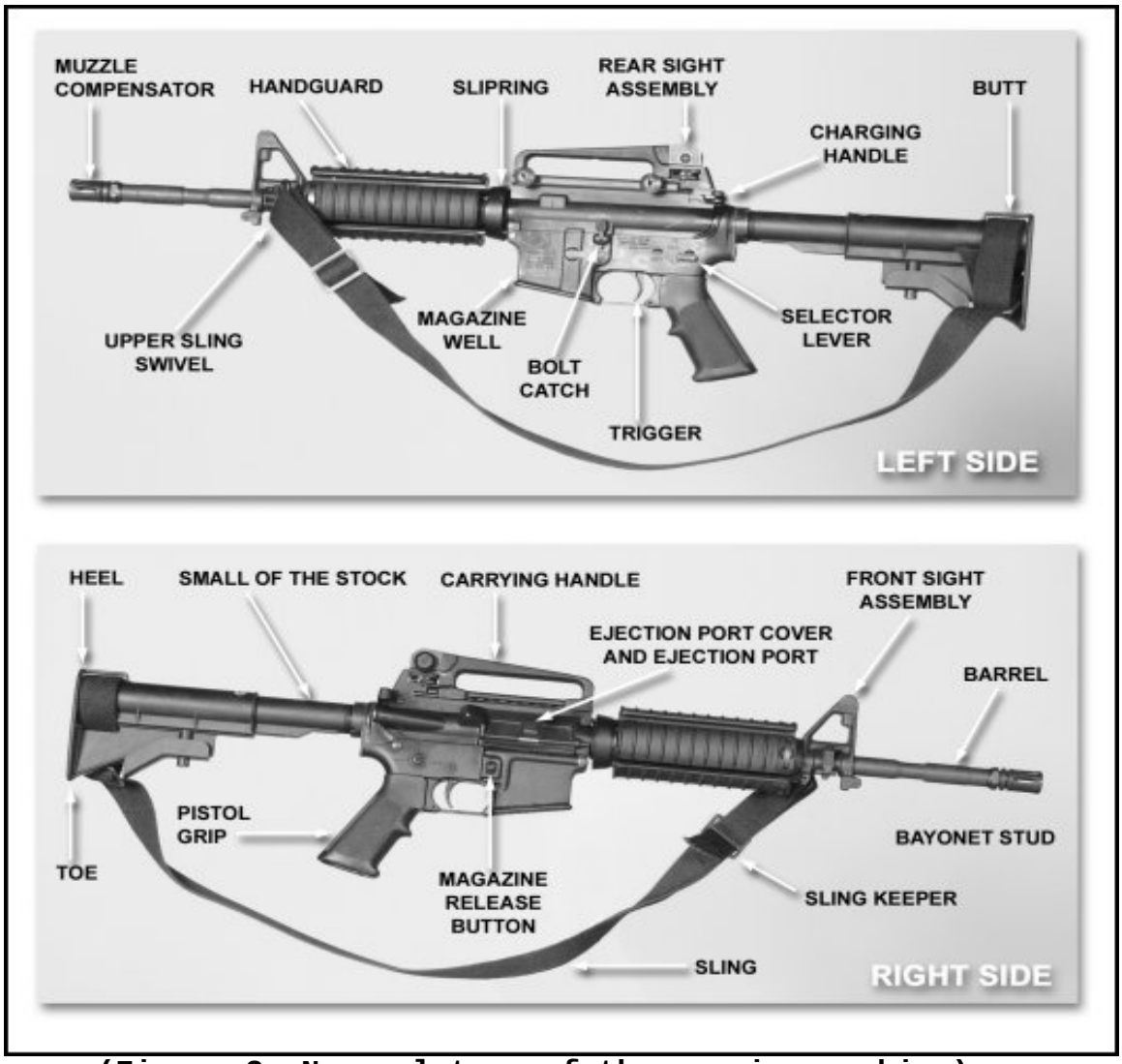
The M16A4 Rifle and M4 Service carbine all have common parts with minor exceptions. Using your own rifle, find and learn the nomenclature of all outside parts. Then, as you disassemble the rifle, learn the nomenclature of all internal parts (see figure 3&4). The steps will go as follows.

a. Ensure the weapon is in Condition 4
b. Remove the upper receiver from the lower receiver
c. Take upper receiver and remove the carrying handle and hand guards
d. Remove the charging handle and the bolt carrier assembly
e. Remove the firing pin and bolt
f. Take the lower receiver and remove the buffer and buffer spring



5. <u>ASSEMBLE:</u>

a. Place buffer spring on buffer
b. Place the buffer into butt stock of lower receiver
c. Place the bolt back I the bolt carrier assembly
d. Place firing pin in the bolt
e. Place charging handle in grooves of upper receiver
f. Place the bolt carrier assembly in upper receiver
g. Place upper and lower receiver together



(Figure 3, Nomenclature of the service carbine)

5. **FUNCTION CHECK**

   1. Pull the charging handle to the rear and release
   2. Place selector lever on SAFE
   3. Pull trigger – Hammer should not fall
   4. Place selector lever on SEMI
   5. Pull the trigger and hold to the rear – Hammer should fall

6. Pull the charging handle to the rear and release
7. Release trigger and pull to the rear again – Hammer should fall

b. Place selector lever on BURST

1. Pull charging handle to the rear and release
2. Pull trigger and hold to the rear – Hammer should fall
3. Pull charging handle to the rear three times and release
4. Release the trigger and pull again – Hammer should fall

6. **WEAPONS TRANSPORTS** Transport's are used when no immediate threat is present of enemy. They are also beneficial when both hands are needed.

1. Strong Side Sling Arms

a. Release the pistol grip of the rifle

b. Lower the butt stock of the rifle and bring the rifle to a vertical position

c. With the right hand, grasp the sling above the left forearm.

d. Guide the rifle around the right shoulder with the left hand and extend the right arm through the sling

e. Place the sling on the right shoulder and apply downward pressure on the sling with the right hand to stabilize the rifle on the shoulder.

f. Release the hand guard

2. Weak Side Sling Arms (Inclement Weather)

a. Release the pistol grip of the rifle

b. Lower the butt stock of the rifle and bring the rifle to a vertical position

c. Rotate the rifle outboard until the pistol grip is pointing toward the body

d. Reach over the left forearm and grasp the sling with the right hand.

e. Rotate the muzzle down with the left hand while sliding the right hand up the sling. Place the sling on the left shoulder

f. Grasp the sling with the left hand and apply downward pressure to stabilize the rifle on the shoulder.
g. Release the hand guard

3. <u>Cross Body Sling Arms</u>

The cross body transport is used when both hands are required for work, such as digging a fighting hole. It is employed with the web sling. The rifle is slung across the back with the muzzle up or down. Normally, the weapon will be carried with the muzzle down to prevent pointing the muzzle in an unsafe direction, unless the situation dictates otherwise. To assume this transport

a. Muzzle Down (Weak Side)

1) With your right hand, grasp the sling.
2) With your left hand, grasp the hand guards.
3) Pull up on the rifle with both hands.
4) Slide the sling over your head.
5) Position the rifle so it is comfortable across your back.

b. Muzzle Up (Strong Side)

1) With your left hand, grasp the sling.
2) With your right hand, grasp the pistol grip.
3) Pull up on the rifle with both hands.
4) Slide the sling over your head.
5) Position the rifle so it is comfortable across your back

6. **<u>SAFETY FEATURES OF THE M4 SERVICE CARBINE</u>**

The service rifles have a safety selector switch located above the pistol grip on the left side of the weapon. On the opposite side of the weapon is a safety position indicator which allows another individual to easily identify which position the safety selector is in at a glance (see figure 5). This allows for better situational awareness of all personnel.

REFERENCES

MCO 3574.2K

M16/M4 Review

1. **Describe the characteristics of the M16/M4 Service Rifle.**

2. **Describe the difference between weapons condition 3 and condition 1.**

3. **List the differences between the M16 and the M4 Carbine.**

4. **What product is used to clean the service rifle?**

NOTES

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

PERFORM RADIO PROCEDURES

FMST 1213

TERMINAL LEARNING OBJECTIVE

(1) Given a VHF radio with a fill, a frequency or net ID,and a distant station, while wearing a fighting load, operate a VHF field radio by establishing communications with the distant station.

ENABLING LEARNING OBJECTIVES

(1) Without the aid of references, given communications assets, communicate using the phonetic alphabet in accordance with MCRP 6-22C.

(2) Without the aid of references, given communications assets, communicate using phonetic numerals in accordance with MCRP 6-22C.

(3) Without the aid of references, given communications assets, communicate using procedural words in accordance with MCRP 6-22C.

(4) Without the aid of references, given a description or title, identify the components of the SINCGARS radio in accordance with MCRP 6-22C.

(5) Without the aid of references, given a description or title, identify the controls of the man-pack configuration of the SINCGARS radio in accordance with MCRP 6-22C.

(6) Without the aid of references, given a list of steps, sequence the procedures to load single channel frequencies on the SINCGARS radio in accordance with MCRP 6-22C.

1. **PHONETIC ALPHABET**. The phonetic alphabet identifies spoken letters through a set of easily understood words. Each of these

words begins with the letter being identified. The phonetic alphabet is used to:

A: ALPHA	**D: DELTA**	**G: GOLF**	**J: JULIET**	**M: MIKE**
B: BRAVO	**E: ECHO**	**H: HOTEL**	**K: KILO**	**N: NOVEMBER**
C: CHARLIE	**F: FOXTROT**	**I: INDIA**	**L: LIMA**	
O: OSCAR	**R: ROMEO**	**U: UNIFORM**	**X: X-RAY**	
P: PAPA	**S: SIERRA**	**V: VICTOR**	**Y: YANKEE**	
Q: QUEBEC	**T: TANGO**	**W: WHISKEY**	**Z: ZULU**	

Transmit isolated letters such as E5K, which is transmitted ECHO-FIFE-KILO.

a. Transmit each letter of an abbreviation such as ITB, which is transmitted INDIA-TANGO-BRAVO.

b. Spell unusual or difficult words such as HOSE, which is transmitted HOTEL-OSCAR-SIERRA-ECHO.

c. The following list depicts the pronunciation of each letter in the phonetic alphabet:

2. <u>PHONETIC NUMERALS</u>. (5 Min) The specific pronunciation of numerals has been determined in order to avoid misinterpreted transmissions. The following are the pronunciations of the phonetic numerals 0 through 9:

0: ZE-RO	**3: TREE**	**6: SIX**	**9: NINER**
1: WUN	**4: FOW-ER**	**7: SEV-EN**	
2: TOO	**5: FIFE**	**8: ATE**	

3. <u>PROCEDURE WORDS (PROWORDS)</u>. Procedure words are pronounceable words or phrases, which have been assigned a meaning for the purpose of expediting message handling over radios or field telephones. Understanding the following PROWORDS and their respective definitions is the key to clear and concise communication procedures.

a. **This Is**: This transmission is from the station whose designation immediately follows.

b. **Over**: This is the end of my transmission to you, and a response is necessary. Go ahead and transmit.

c. **Out**: This is the end of my transmission to you and no answer is required or expected. Since the phrases OVER and OUT have opposite meanings, they are never used together.

d. **Roger**: I have received your last transmission satisfactorily and understand it.

e. **Wilco**: I have received your last transmission and will comply. Since the meaning of ROGER is included in that of WILCO, these two prowords are never used together.

f. **Say Again**: I did not receive or understand your last transmission, repeat all of your last transmission, or use with ALL AFTER or ALL BEFORE. Do not substitute SAY AGAIN for REPEAT, which is a proword specific to call for fire.

g. **Say Again**: I am repeating the transmission or portion indicated.

h. **All After**: The portion of the message to which I have referred is all that which follows _____.

i. **All Before**: The portion of the message to which I have referred is all that which precedes _____.

j. **Wait Over**: I must pause for a few seconds.

k. **Wait Out**: I must pause for longer than a few seconds. I will call you back.

l. **Read Back**: Repeat this entire transmission back to me.

m. **I Read Back**: The following is my response to your instruction to read back.

n. **Correction**: I have made an error in this transmission. Transmission will continue with the last word correctly sent.

o. **Radio Check**: I want a response indicating the strength and readability of my transmission.

(1) A response of ROGER indicates transmission is loud and clear.

(2) A response of WEAK BUT READABLE indicates a weak signal but I can understand.

(3) A response of WEAK AND GARBLED indicates a weak signal and unreadable.

(4) A response of STRONG BUT GARBLED indicates a strong signal but unreadable.

4. THE SINCGARS (AN/PRC-119A)

The Single Channel Ground & Airborne Radio Systems (SINCGARS)Are radios in a family of VHF-FM combat net radios designed to provide the primary means of command and control for combat, combat service, and combat service support units.

a. **Single Channel (SC) Mode** - When using the single channel mode of operation, the radio communicates using a single frequency. For the SINCGARS radio, this single channel can be selected by use of the Receiver-Transmitter keyboard (like a telephone keypad). The advantage of SINCGARS is that eight (8) individual single channel frequencies can be loaded into the radio, and the operator can select any one of those channels by flipping a switch.

b. **Frequency Hopping (FH) Mode** - Another method of secure transmissions is using the SINCGARS in the FH mode. This mode reduces the enemy’s capability to jam your traffic or to use direction-finding equipment to establish your location. When properly loaded with data, the SINCGARS hops (cycles) through more than 100 frequencies per second during transmissions in the FH mode. When communicating in the FH mode, the communicating stations must be on the same net. This means that they both must be operating on the same time (clock) and have the same data loaded and on the same hop-set (channel). Up to six (6) channels can be loaded for FH operations at any given time.

c. **Remote Operations** - The SINCGARS radio can be operated by the use of remote equipment

d. **Retransmission** - The radio is capable of conducting retransmission operations in conjunction with other radios. Because of the SINCGARS capabilities (SC and FH) the retransmit function allows a wider use of retransmitting functions than with older radios.

e. **Frequency Range** - The SINCGARS operates in the VHF range from 30.000 to 87.975 MHz.

f. **Range** - One of the features of the SINCGARS radio is the operator's ability to select the power output of the radio by use of a selector switch. This feature allows you to reduce your electronic footprint by operating in a lower power or to reach far away stations using a higher setting. The switch has four positions: LO, M, HI, and PA. The maximum transmission ranges for each of the settings is as follows:

1) LO (low power) - 200 to 400 meters
2) M (medium power) - 400 meters to 5 kilometers
3) HI (high power) - 5 kilometers to 10 kilometers
4) PA (power amplifier) - 10 kilometers to 40 kilometers.

Only vehicle-mounted radios equipped with a power amplifier can utilize this setting. Manpack and vehicle radios not equipped with the power amplifier can only use settings LO, M, and HI. When using the SINCGARS radio, the operator should always attempt communication with the lowest setting first, thereby reducing the radios electronic signature. Once communication is established, the operator should maintain the lowest possible setting. PA should only be used when necessary to achieve communication.

g. MANPACK CONFIGURATION (AN/PRC-119A)

The Manpack configuration is made up of the following components:

1. Receiver-Transmitter (RT) - This is the common item of all of the configurations. The RT is actually the SINCGARS radio itself.

2. Handset - This is used for transmitting voice communication. The handset looks the same as the handsets you may have worked with operating other radios.

3. Manpack Antenna - The antenna radiates/receives the signals.

4. Battery Box - The battery box connects to the bottom of the RT and provides a housing for the battery that powers the RT in the Manpack configuration.

5. Battery - Connects to a fitting in the battery box and supplies primary power to the RT for operation.

6. Field Pack - The pack carries the RT and the components.

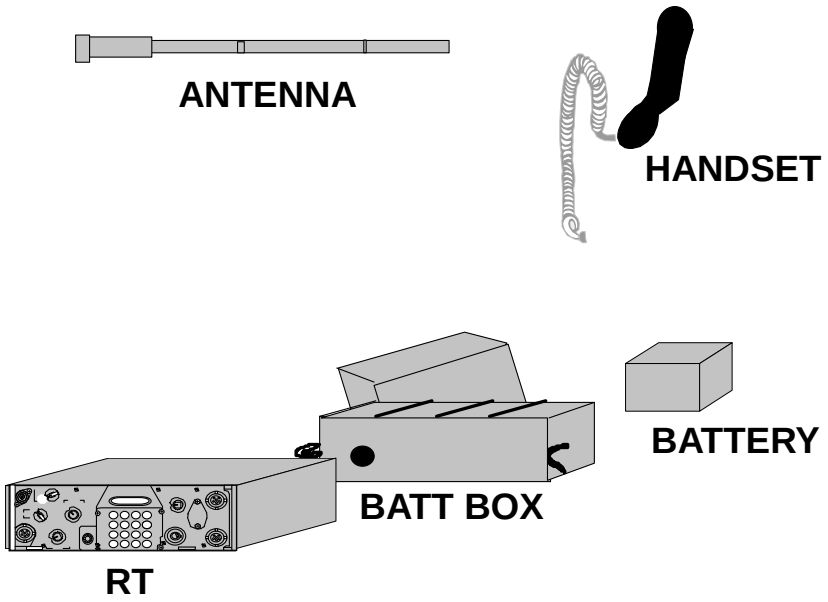


Figure 1

h.ASSEMBLY OF THE AN/PRC-119

Visually inspect battery box for dirt and damage. If the battery has been previously used, note battery life if it is written on the battery.

1. Stand RT on front panel guards, place battery box on RT and secure it to latches
2. Place battery in battery box and mate connectors
3. Close battery box cover and secure latches
4. Return radio in upright position
5. If used battery was installed, enter the battery life condition into the radio by performing the following
   (a) Set FCTN to LD
   (b) Press BATT then CLR
   (c) Enter number recorded on side of battery
   (c) Press STO
   (d) Set FCTN switch to SQ ON
   (e)
6. Screw whip antenna into base, only hand tighten

7. Carefully mate antenna base with RT antenna connector. Make sure you line up the grooves and only hand tightened. It is important not to tighten by other means.
8. Attach handset by lining up red dots and then pressing and turning clockwise

5. CONTROLS AND FEATURES

Although the SINCGARS radio demands more of an operator besides turning the radio on, operator tasks primarily involve entering data using the keyboard, turning knobs and following instructions from the net control station. In order to operate the radio, the operator needs to understand terminology of the radio so that when he receives instructions over the radio, he can follow them. Additionally, the primary function of each control will aid the operator in achieving a properly functioning radio.

NOTE: Anytime the operator moves a switch to a setting with a box around the letters, the knob must first be pulled before it is turned. This feature ensures that the knob is not accidentally moved to the position.

a. **Receiver-Transmitter (RT)** - Most of the controls that the operator will use are placed on the face of the RT.

(See fig. 2)

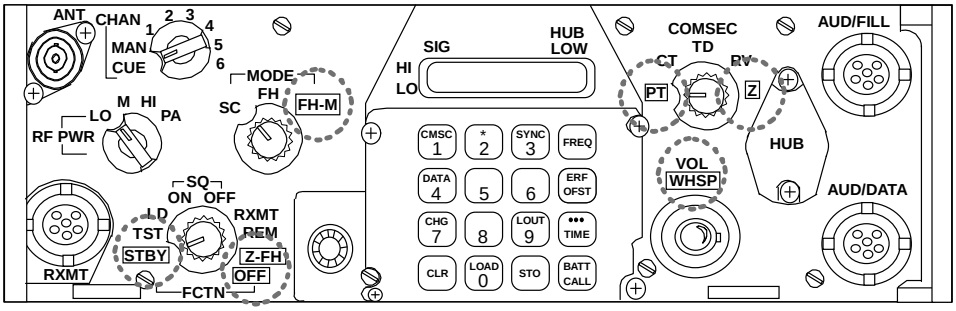
1. FCTN (function) Switch – The function switch sets the RT function. The function switch has four operating positions (SQ ON, SQ OFF, REM and RXMT) and five other positions (STBY, TST, LD, Z-FH and OFF). The function of each position is as follows:

   (a) SQ ON (squelch on) – This turns on the RT and the squelch. This feature will prevent the rushing noise from being heard in the handset/helmet. This is the normal operating position for the SINCGARS radio.

   (b) SQ OFF (squelch off) – This turns on the RT but not the squelch. This position is used when communicating in the SC mode with radios having a different squelch system.

(c) REM (remote) – This position actually disables all of the RTs front panel controls and allows the remote device used with the radio to have complete access to the controls.

(d) RXMT (retransmit) – This position is used when the radio is operating in the retransmit mode.



NOTE: PULL TO TURN

Figure 2. Face of Receiver Transmitter

(e) STBY (stand by) - The STBY position will cut the primary (battery/vehicle) power to the RT. The RTs battery (hub battery) will maintain the memory of the radio including frequencies and times. This position is used as an alternative to OFF when the operator is concerned about conserving power during non-operating periods, but wants to retain all of the data loaded for operations occurring in the near future (same day).

(f) TST (test) - When this position is selected, the RT conducts a self-test of its internal circuits. At the completion of the test, the radio will display results. Whenever the radio is put into operation, the operator should conduct a self-test.

(g) LD (load) - Putting the radio in this position allows the operator to load frequencies, data and COMSEC into the radio. In order to load any of this information into the radio for use, the operator must ensure that LD is positioned so the radio will receive the input.

(h) Z-FH (zero-FH) - Placing the function switch in this position and waiting five (5) seconds will clear all of the frequency hopping (FH) data within the radio.

(i) OFF - Turns off all of the power to the RT. When the radio is in the OFF position for more than five (5) seconds, the memory is completely cleared. This switch is used when it is the operator's intent to take the radio completely out of action.

b. **Mode Switch** - Sets the receiver-transmitter mode. The mode switch has three (3) settings that allow the operator to select the mode of operation.

1. SC (single channel) - Placing the mode switch in this position places the RT in the single channel mode of operation
2. FH (frequency hopping) - This position allows the operator to use the RT in the FH mode
3. FH-M (frequency hopping master) - This setting places the RT in frequency hopping master mode. This mode is used only by the net control station (NCS). The NCS is basically the foundation of a FH net. If more than one station use the FH-M mode, then communication can be lost. Operators do not use this position.

c. **COMSEC Switch** - Sets the RT to the COMSEC mode. This switch has five (5) settings that allow the operator to use or manage COMSEC data.

1. PT (plain text) - Placing the switch at this setting places the RT in the plain text, not a secure, mode of transmission.
2. CT (cipher text) - This setting allows the operator to use cipher, secure, transmissions when placed to this position.
3. TD (time delay) - Places the RT in secure mode. This setting is used when necessary to compensate for transmission delays due to the distance between communication links. This setting is also used when operating some data devices with the SINCGARS in order to compensate for the data rate differences.
4. RV (receive variable) - This setting is used when receiving remote fill of the COMSEC key.

5. Z (zero) - Used to clear the COMSEC fills. When turned to Z, the fills in channel 1-5 are instantly cleared. After 5 seconds in the Z position, the key in channel 6 is cleared.

d. **CHAN (channel) Switch** - Selects manual, preset and cue frequencies. Operating this switch allows the operator access to any of the frequencies loaded into the channels. This switch is the means that the operator changes frequencies that are preset.

1. MAN (manual) - This position selects the loaded manual frequency. The manual frequency is used during FH operations and will be discussed later.
2. CUE - This setting selects the loaded CUE frequency. This frequency is also used in FH operations and will be discussed later.
3. 1 through 6. These are the channels that may be loaded with operating frequencies or hopsets. COMSECs are also loaded into these channels.

e. **RF Switch** - Adjusts power level of transmissions. As earlier discussed, the SINCGARS has a variable power output. This is the switch that enables the operator to change the power output of the radio.

f. **SIG (signal) Display** - Shows appropriate signal strength. The signal display is contained in the left hand part of the LED (Light emitting diode) display. There is a bar that lights from LO to HI adjacent to the letters. The RF switch setting determines the signal output that is displayed on the SIG display.

g. **HUB/LOW (Hold Up Battery) Display** - Indicates the power level of the HUB battery. The hub battery is the source of energy for the stand by mode. This indicator notifies the operator when the HUB battery is low, empty or missing. A diamond shape symbol will flash if the HUB battery is weak. If the diamond shaped symbol appears as a steady light, the battery is extremely weak or missing.

h. **DIM Control** - Adjusts display brightness. The knob is turned clockwise to brighten the display and counterclockwise to dim the display.

i. **VOL/WHSP (volume/whisper) control** - Adjusts audio volume. Clockwise increases volume, counterclockwise to decrease volume. Pulling the knob out allows the operator to receive as normal, but give the operator the additional feature of being able to talk very softly and still transmit.

j. **Keyboard Display** - Displays keyboard information and other data to the operator. A variety of information is displayed in response to keyboard functions and operation of the radio.

k. **Keyboard -** Used for entering, holding and checking data. By using the knobs and the keyboard in conjunction, the operator is able to complete all functions required when operating the radio. The keyboard is laid out similar to a telephone keypad. Some of the keys have dual functions.

1. FREQ (frequency) Button - This button is used to check the data entered in the RT. Additionally, this button is used to load and clear the frequencies.

2. ERF (electronic remote fill) Button - Used only by the NCS (net control station) to transmit fills to other stations.

3. OFST (offset) Button - This button is used during SC operations when it becomes necessary to offset SC frequencies.

4. TIME Button - This button is used by the NCS to load and check the FH time clock. A requirement of operating an FH net is that all stations have the same time set. The NCS is responsible for this, and the time button is one of the NCS tools.

5. BATT (battery) Button - This button is used with the Manpack configuration to check the battery life of the primary battery. This button, when pressed, will show the life remaining on the battery.

6. CALL Button - The call button is used to communicate with the remote when running remote operations.

7. STO (store) Button - This button is used for data loading. Pushing this button when required transfer data from the holding (temporary) memory to the permanent memory. When loading ERF data this button is used.

8. LOAD Button - This button will load information into the holding memory and retrieve information from the permanent memory into the holding memory.

9. CLR (clear) Button - Clears data from the keyboard display if a mistake was made.

10. LOUT (lockout) Button - Used by the NCS when managing an FH net.

11. CHG (change) Button - This button is used in conjunction with other buttons in order to change data when required.

12. SYNC (late entry) Button - During FH operations, this button is used when performing late entry procedures.

13. DATA Button - The SINCGARS radio can operate in the data mode where this button selects the data rate. During this period of instruction, we will only discuss the voice mode of operation.

14. CMSC (COMSEC) Button - Pressing this button causes the COMSEC key to be displayed.

15. Number Buttons - Used to enter numerical data such as SC frequencies, and channel numbers.

l. **AUD/FILL (audio/fill) Connector** - Connects to fill devices or handsets. When loading FH data or COMSEC data, the fill device is hooked to this connector via cable. Handsets can be attached to this connector as necessary.

m. **AUD/DATA (audio/data) Connector** - Connects to external data devices during data operations and handsets during normal operations.

n. **ANT (antenna) connector** - Connects to the manpack antenna or vehicle antenna cable. If the RT is to be functioning with PA, the antenna connector connects the RT to the PA. The PA will connect to the antenna.

o. **RXMT (retransmit) Connector** - Connects to another RT during retransmit operations.

6. LOADING SINGLE CHANNEL FREQUENCIES ON THE SINCGARS RADIO

The most basic of SINCGARS operation is operating the radio in the single channel (SC) mode. When operating in the SC mode, the user is using the radio to communicate on a single frequency. The procedures for loading SC frequencies require setting the proper switches, pressing the correct number keys and storing the information in the channel desired. As discussed earlier, the SINCGARS radio is capable of accepting up to 8 single channel frequencies. Those frequencies are loaded in the manual, cue and 1 through 6 channels. The procedures for loading frequencies into the channels are identical with the exception of which channel is selected during the procedure. The first channel we will load is the manual channel.

a. TURNING ON THE RT (Receiver-Transmitter)

1. Place mode switch to SC
2. Place RF power switch to desired level
3. Place channel switch to main
4. Place COMSEC switch to CT
5. Place volume switch to desired level
6. Move FCTN switch to TST, complete test by following instructions on display window. When test is complete move FCTN switch to either STBY or SQ ON.

b. **Loading SC Frequencies** - Following are the procedures for loading single channel frequencies. The procedures are to be performed in order. In order to load additional channels with frequencies, go to step (3), change to the desired channel and repeat steps (4) through (8). Continue repeating those steps for each new channel desired.

(1) Set COMSEC switch to (P.T.) Plain Text prior to load

(2) Set the function switch to load - The load setting allows the operator to input data to the radio.

(3) Set the mode switch to single channel (SC) - When loading single channel frequencies, the setting is appropriately set on SC.

(4) Set channel switch to desired channel - This step is different for each channel loaded. This setting will change the manual frequency. Turn the channel switch to the desired channel to change other frequencies.

(5) Press FREQ (frequency) button on keypad - This procedure displays the current frequency of the channel selected, or "00000" if there is not a frequency currently entered into the channel.

(6) Press the CLR (clear) button - After pressing the FREQ button and displaying the current frequency, pressing the CLR button will clear that frequency and display five lines "_ _ _ _ _". At this point, the radio is ready to accept frequencies.

(7) Enter the numbers of the new (desired) frequency - Using the keypad, the display will show each number replacing a line as you enter the number. If you make a mistake, push the CLR button and the five blank lines will reappear. An important note is that if there is no keyboard action for 7 seconds, the display will go blank, and you will have to reenter the numbers.

(8) Press the STO (store) button - The display will blink and the frequency you just entered is moved to the permanent memory in the channel selected.

(9) Set function switch to SQ ON or OFF (squelch on) - Placing the radio in SQ ON puts the radio into the normal SC operating position. Now the operator can call another channel using the handset.

c. **Transmitting with the SINCGARS radio** - When the push-to-talk button is activated (handset or helmet), the operator talks, and the radio transmit in the voice mode. The radio will transmit on the frequency that is entered into the channel that is selected on the channel switch. Transmissions should be no longer than 3 to 5 seconds.

(1) Changing Channels - In order to transmit on a different frequency, the operator simply moves the channel switch to the channel containing the desired frequency. Each time that the channel switch is turned to a new channel, the frequency entered into that channel is displayed for the operator's reference.

d. **Clearing Single Channels** - When the radio is turned OFF for more than 5 seconds, the memory is cleared. If the operator desires to clear a SC of a frequency without turning the radio OFF, thus clearing all channels, the following procedures are used

(1) Set the MODE switch to SC

(2) Set the CHAN switch to the channel to be cleared. The frequency will be displayed allowing the operator to confirm that the frequency is to be cleared.

(3) Press the FREQ button

(4) Press the CLR button. The display will show five blank lines

(5) Press the LOAD button, the press the STO button. Pressing STO will enter NO, or a cleared, frequency into the RT.

REFERENCES

MCRP 6-22C

Field Communication Review

1. What does it mean when the squelch is switched to the “on” position?

1. What happens to the memory in a SINCGARS if it is turned off for more than 5 seconds?

2. Define the term “over” as it relates to Field Communication.

3. Provide the phonetic term for the following letters:

G-

O-

R-

E-

D-

S-

O-

X-

NOTES

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

Five Paragraph Order

TERMINAL LEARNING OBJECTIVES

1. In an operational environment, **utilize the Operation Orders,** to meet mission requirements. (FMST-FP-1214)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify the purpose of a Warning Order**, per student handout. (FMST-FP-1214a)
2. Without the aid of references, given a description or list, **identify the information in a Warning Order**, per the student handout. (FMST-FP-1214b)
3. Without the aid of references, given a description or list, **identify the information in an Operation Order**, per the student handout. (FMST-FP-1214c)
4. Without the aid of references, given a description or list, **identify the purpose of a Fragmentation Order**, per the student handout. (FMST-FP-1214d)
5. Without the aid of references, given a description or list, **identify the information in a Fragmentation Order**, per the student handout. (FMST-FP-1214e)
6. Without the aid of references, given a description or list, **identify the purpose of a Five Paragraph Order**, per the student handout. (FMST-FP-1214f)
7. Without the aid of references, given a description or list, **identify the information in a Five Paragraph Order**, per the student handout. (FMST-FP-1214g)

INTRODUCTION

Combat Order - the development of the combat order within BAMCIS begins at the receipt of the mission and does not end with combat, but continues throughout and after the fight in anticipation of the next mission. It includes the techniques by which orders and instructions are organized, sequenced, and transmitted from leaders to subordinates. The combat order is a continuing process with accomplishment of the mission as its main goal. There are many types of orders. We will discuss the three basic types of orders.

BAMCIS - six troop leading steps by which a leader receives, plans, and executes his mission. Troop leading steps are a logical and orderly process for making the best use of time, facilities, and personnel in preparing for and executing an assigned mission. It can be viewed as elements of planning and decision making cycle.

Begin Planning
Arrange for Reconnaissance and Coordination
Make Reconnaissance
Complete Plan
Issue Order
Supervise

1. **TYPES OF COMBAT ORDERS**

Warning Orders

Warning orders provide subordinates with maximum time available to prepare for an operation or action. They are either oral or written and provide advance notice of a pending operation or action.

Warning orders must, at a minimum, include information regarding the situation and mission, as well as general instructions and specific instructions.

Operation Orders (5 Paragraph Order)

Operation orders express decisions by commanders that will be implemented in order to accomplish the mission.

Operation orders set forth the situation, mission, decision, plan of action, and method of execution. They convert the commander's decision into a plan of action and gives direction to the efforts of the command.

The operation order sets forth the who, what, when, and where of the commander's decision, along with enough of the how and why to ensure intelligent compliance. Operation orders may be written or oral.

Fragmentation Orders (FragO)

Fragmentation orders are issued when the time element precludes issuance of a complete order. The commander uses the fragmentary order extensively in fast moving situations. Fragmentation orders are supplemented by visits, messages, and other fragmentation orders until the action is completed or a complete order is issued

Fragmentation orders ensure continuous action as a situation develops or as decisions are made. Fragmentation orders omit elements found in a complete order that have not changed since the order was given or the order is unavailable or incomplete at the time of issuance.

Fragmentation orders follow the sequence of the related standard order. At a minimum, they contain the mission statement and execution statement paragraphs from the 5 paragraph order format. The fragmentation order modifies or changes an existing 5 paragraph order as battlefield conditions change or as follow-on missions are assigned by higher headquarters.

1. **THE 5 PARAGRAPH ORDER FORMAT** - orders generally adhere to the 5 paragraph format, though each will differ due to time and information available or required. The purpose of the 5 paragraph order is to issue an order in a clear and concise manner by a thorough orientation of the area of operations. A 5 paragraph order gives subordinates the essential information needed to carry out the operation. The order converts the leader's plan into action, gives direction to the efforts of his unit, and provides specific instructions to subordinate elements.

SMEAC - acronym used to help remember the 5 paragraph order format:

Situation - the situation paragraph contains information on the overall status and disposition of both friendly and enemy forces. The situation paragraph contains three subparagraphs.

Enemy Forces - this subparagraph contains essential information concerning the enemy's composition, disposition, and strength based on its size, activity, location, unit, time, and equipment. While focusing on enemy forces there are two acronyms that will assist you with the information you must recall.

SALUTE - this acronym is an established method to remember how and what to report about the enemy. The purpose of SALUTE is to focus your thinking on identifying and locating enemy weaknesses that can be exploited:

Size - enemy squad, platoon, etc.
Activity - enemy digging in, bivouacking
Location - six-digit grid if possible
Unit - type and designation
Time - when the enemy was last observed
Equipment - equipment they possess

DRAW-D - this acronym is used to assist the leader in determining the enemy's capabilities and limitations:

Defend
Reinforce
Attack
Withdraw
Delay

Friendly Forces - this subparagraph contains essential information concerning the mission of the next higher unit, location and mission of adjacent units, and mission of non-organic supporting units. Information in this subparagraph can be remembered with the acronym HAS - Higher, Adjacent, Supporting.

Attachments and Detachments - units attached or detached from a squad by higher headquarters, including the effective time of attachment or detachment.

Mission - provides a clear and concise statement of what the unit must accomplish. The mission statement is the heart of the order, and should provide information on the who, what, when, where, and why of the order.

Execution - contains the information on how to conduct the operation. The paragraph is divided into three subparagraphs.

Concept of Operations - this is a general explanation of the tactical plan. It includes the Commander's intent and a brief scheme of maneuver from start to finish, type of attack, and fire support plan.

Tasks - the specific mission to be accomplished by each subordinate element of the unit will be listed in a separate numbered subparagraph. It is the subordinate's unit mission statement.

Coordinating Instructions - the specific instructions and tasks that apply to two or more units. This includes order of movement, planned combat formations, tactical and fire control measures (ie. phase lines and checkpoints), and any other tasks that pertain to the mission.

Administration and Logistics - this paragraph contains information or instructions pertaining to rations and ammunition, location of the distribution point, corpsman and other medical considerations, aid station, handling of prisoners of war, other administrative and supply matters. This is also known as the four B's - Beans, Bullets, Band-aids, and Bad guys.

Command and Signal - this paragraph contains instructions and information relating to command and communication functions. It contains two subparagraphs.

Signal - gives signal instructions for the operation such as frequencies, call signs, pyrotechnics, emergency signals, radio procedures, brevity codes, challenges, and passwords.
Command - identifies the chain of command and their location before, during, and after the operation.

ACRONYMS

BEGIN PLANNING
PLAN USE OF AVAILABLE TIME
INITIAL ESTIMATE OF THE SITUATION
MISSION
ENEMY
SIZE
ACTIVITY
LOCATION
UNIT
TIME
EQUIPMENT
DEFEND
REINFORCE
ATTACK
WIITHDRAW
DELAY

TERRAIN AND WEATHER: **K**EY TERRAIN
OBSERVATION AND FIELDS OF FIRE
COVER AND CONCEALMENT
OBSTACLES
AVENUES OF APPROACH

TROOPS AND FIRE SUPPORT AVAILABLE
PRELIMINARY PLAN
DECIDE **P**OINT
OF
MAIN
EFFORT

ARRANGE FOR
MAKE RECONNAISSANCE AND COORDINATION
COMPLETE PLAN
ISSUE ORDER
ORIENTATION
SITUATION
A. GENERAL
B. ENEMY FORCES (SALUTE/DRAWD)
C. FRIENDLY FORCE: **H**igher
ADJACENT
SUPPORTING
D. ATTACHMENTS AND DETACHMENTS
E. ASSUMPTIONS

MISSION: WHO, WHAT, WHEN, WHERE, WHY
EXECUTION: GIVE TASKS AND POINT OF MAIN EFFORT
ADMINISTRATION AND LOGISTICS:
BEANS, BULLETS, BANDAGES, BAD GUYS
COMMAND AND SIGNAL
SUPERVISE

OPERATION ORDER

1. **S**ITUATION
   a. Enemy Forces: Situation, capabilities, Indications
   b. Friendly Forces: Mission and location of higher, adjacent and supporting units. State the higher units POME
   c. Mission of units in direct support
   d. Attachments and Detachments: Units attached to or detached from your unit by higher headquarters, and effective time

2. **M**ISION
   Simply state the mission

3. **E**XECUTION
   In the first subparagraph give general summary of the tactical plan or operational concept
   In succeeding subparagraph assign missions to each organic and attached unit
   In the next to last subparagraph designate and assign missions to reserve (not normally used at platoon level)
   Assign a POME

4. **A**DMINISTRATIVE AND LOGISTICS
   Supply, evacuation, transportation, service, personnel and miscellaneous

5. **C**OMMAND AND SIGNALS
   a. Signal Instructions and information
   b. Command posts, location of commander

REFERENCES

Marine Rifle Squad, MCRP 3 -11.2A, Appendix E
Scouting and Patrolling, MCWP 3 -11.3, Pg 10-2, Appendix A, B

5 Paragraph Order Review

1. A warning order must consist of how many paragraphs? What are they?

2. Define the acronym SMEAC

3. What questions should be answered in the “M” portion of SMEAC?

4. Under which paragraph would you find information about medical support?

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

Participate in a Patrol

TERMINAL LEARNING OBJECTIVES

1. Given a tactical scenario, an operations order, individual combat equipment, **participate in a security patrol**, to accomplish the mission. (FMST-FP-1201)
2. Given a tactical scenario in a combat environment and individual combat equipment, **execute fire team formations**, to meet mission requirements. (FMST-FP-1202)
3. Given a tactical scenario in a combat environment, and individual combat equipment, **execute squad formations**, to meet mission requirements. (FMST-FP-1203)
4. Given a tactical scenario in a combat environment and individual combat equipment, **communicate using hand and arm signals**, to support mission requirements. (FMST-FP-1204)
5. Given a tactical scenario in a combat environment, a patrol order, individual combat equipment, and necessary equipment for special signals, **employ special signals**, to support mission requirements. (FMST-FP-1205)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **select the definition of patrol**, per the student handout. (FMST-FP-1201a)
2. Without the aid of references, given a description or list, **identify the two types of patrols**, per student handout. (FMST-FP-1201b)
3. Without the aid of references, given a description or list, **identify the organizational elements of a patrol**, per student handout. (FMST-FP-1201c)
4. Without the aid of references, given a description or list, **identify the missions of patrols**, per student handout. (FMST-FP-1201d)
5. Without the aid of references, given a description or list, **identify patrol leader preparations**, per the student handout (FMST-FP-1201e)
6. Without the aid of references, given a description or list, **identify the steps of conducting patrols**, per the student handout (FMST-FP-1201f)
7. Without the aid of references, given a description or list, **identify the fire team formations,** per the student handout. (FMST-FP-1202a)
8. Without the aid of references, given a description or list, **identify the squad formations,** per the student handout. (FMST-FP-1203a)
9. Without the aid of references, given a description or list, **identify hand and arm signals**, per the student handout. (FMST-FP-1204a)

10. Without the aid of references, given a description or list, **identify the types of special signals**, per the student handout. (FMST-FP-1205a)
11. Without the aid of references, given a description or list, **identify types of cover, concealment, and camouflage**, per the student handout. (FMST-FP-1205b)
12. Without the aid of references, given a tactical scenario in a simulated combat environment and individual combat equipment, **participate in patrols**, per the student handout. (FMST-FP-1201g)
13. Without the aid of references, given a tactical scenario, in a simulated combat environment and individual combat equipment, **demonstrate fire team formations**, per the student handout. (FMST-FP-1202b)
14. Without the aid of references, given a tactical scenario in a simulated combat environment and individual combat equipment **demonstrate the squad formations**, per the student handout. (FMST-FP-1203b)
15. Without the aid of references, given instructions to do so, **demonstrate hand and arm signals**, per the student handout. (FMST-FP-1204b)
16. Without the aid of references, given a tactical scenario and individual combat equipment, **employ special signals**, per the student handout. (FMST-FP-1205c)

1. **DEFINITION OF A PATROL**

A patrol is a detachment of ground forces sent out by a larger unit for the purpose of gathering information or carrying out a destructive, harassing, or security mission. Patrols vary in size, depending on the type, mission, and distance from the parent unit. Most combat patrols are platoon-sized, reinforced with crew-served weapons.

2. **TYPES OF PATROL**

Patrols are classified according to the nature of the mission assigned. The two types are Combat and Reconnaissance.

Combat Patrols - usually assigned missions to engage in combat. They gather information as a secondary mission.

Reconnaissance Patrols - collects information about the enemy, terrain, and resources without detection or engagement, if possible.

3. **ORGANIZATIONAL ELEMENTS OF A PATROL**

The Platoon Commander - designates a patrol leader, who is normally one of his squad leaders, and gives them a mission. The patrol leader then establishes their patrol units required to accomplish the mission.

Patrol Units - patrol units are subdivisions of patrols. Personnel are assigned to units based on the mission of the patrol and the individuals within the patrol.

Special Organization - patrol units are further subdivided into teams, each of which performs essential, designated tasks. (EPW team, Litter team, Search team)

Elements of Combat Patrols

Patrol Headquarters - this is the command group of the patrol. It is composed of the patrol leader, and other support personnel essential to the patrol such as the radio operator, Corpsman, and forward observer.
Assault Elements - engage the enemy at the objective.
Security Elements - secures the objective rally point, isolates the objective, and covers the patrols return from the objective area.
Support Elements - provides supporting fires for the assault unit attack and covering fires if required, for its withdrawal.

Elements of Reconnaissance Patrols

Patrol Headquarters - the command group of the patrol. It consists of the same personnel as a combat patrol.
Recon Element - maintains surveillance over the objective.
Security Element - provides early warning, secures the objective rally point, and protects the reconnaissance unit.

4. **MISSIONS OF PATROLS**

Combat Patrols – (**RACES**)

Raid – destroys or captures personnel, equipment, and destroys installations. A secondary mission is to free friendly personnel who have been captured by the enemy.

Ambush – patrols that conduct ambushes of enemy patrols, carrying parties, foot columns, and convoys.

Contact – establishes and/or maintains contact with enemy and/or friendly forces.

Economy of Forces – perform limited objective missions such as seizing and holding key terrain to allow maximum forces to be used elsewhere.

Security – patrols that detect infiltration by the enemy, kill or capture infiltrators and protect against surprise attack or ambush.

Reconnaissance Patrols

Area Reconnaissance - a directed effort to obtain detailed information concerning specific terrain or enemy activity within a specific location.

Zone Reconnaissance - a directed effort to obtain detailed information concerning all routes, obstacles, terrain, and enemy forces within a particular zone defined by specific boundaries.

Route Reconnaissance - a reconnaissance along specific lines of communication such as a road, railway, or waterway, to provide information on route conditions and activities along the route of travel.

5. PATROL LEADER PREPARATIONS- (**BAMCIS**)

B*egin Planning*

Plan Use of Time - patrol leader will schedule every event which must be done prior to departing friendly lines.

Study the Mission - identify significant tasks which must be accomplished in order for the patrol to accomplish primary mission.

Studies Terrain and Situation - the patrol leader makes a thorough study of the map terrian over which the patrol will operate. The patrol leader will also study the friendly and enemy situation.

Organizes the Patrol - determines the units and teams required in accomplishing essential task.

Selects Personnel, Weapons, and Equipment - the patrol leader will select who will go, what weapons they will carry, how much food and water they will carry, and routine equipment common to all personnel. The last thing the patrol leader will select is how they will control the patrol while moving and in the objective area.

Issues the Warning Order - the warning order will include the Situation, Mission, General Instructions, and Specific Instructions.

Coordinate - the patrol leader begins their coordination from the time they receive the order. They are primarily concerned with:

- Movement into friendly areas
- Departure and reentry of friendly lines/areas
- Fire support

- Logistic support
- Informational checklist

A*rrange Recon* - to arrange for the reconnaissance by ensuring that communication and coordination with other area commands, supporting fire teams, and other patrol leaders that may be opperating in the same area prior to carrying out the reconnaissance.

M*ake Recon* - whenever possible, the patrol leader makes or sends a physical reconnaissance of the routes they want to follow and of the objective.

C*omplete Detailed Plan* - the patrol leader will now write their five paragraph order.

I*ssue Patrol Order* - when the patrol leader has completed the plan, they assemble the members of the patrol and issue the order. They will:
- Ensure that all members are present
- Receive a status on the preparatory tasks assigned to unit leaders
- Precede the order with an orientation
- Build a terrain model
- Issue the entire order
- Conclude the session with a time check and announce time of the next event

S*upervise, Inspect, Rehearse, and Re-inspect* - inspections and rehearsals are vital for proper preparation. They are conducted even when the patrol leader and patrol members are experienced in patrolling.

6. CONDUCTION OF PATROLS

Formation and Order of Movement - the patrol leader determines the formation in which the patrol will move to the objective area. They also determine the location of units, teams, and individuals in the formation. The standard squad and fire team formations are adaptable to any patrol. Patrol formations will depend on:
- Probability of contact with the enemy
- Terrain, weather, vegetation, and visibility
- Time allotted for the patrol to accomplish its mission and return to friendly lines/areas.

Movement Control - the patrol leader positions themselves where they can best control the patrol. The assistant patrol leader moves at or near the rear and prevents straggling. The patrol leader will ensure that:
- Hand and arm signals are the primary means of communication (radios provide a means of positive control within a large patrol, when hand and arm signals are impractical.
- He speaks just loudly enough to be heard
- All personnel are accounted for after crossing danger areas, halts, and after enemy contact
- Checkpoints and rally points are designated as follows:

  Checkpoints - predetermined points along your route used for control and to remain on course.
  Rally points - easily identifiable points, designated during your patrol, where members can assemble and reorganize if dispersed. There are three types:
  Initial - point within friendly area if patrol becomes dispersed before departing or reaching first enroute rally point.

Enroute - points along route to and from the objective area.
Objective - point nearest objective for final preparation and to assemble after your attack.

Navigation - one or more men in the patrol are assigned as navigators to assist the patrol leader in maintaining direction by use of the compass. The patrol leader also assigns men as pacers to keep track of the distance from point to point. They should assign at least two pacers and use the average of their counts for an approximation of the distance traveled. The pacers are separated so they will not influence each other's count.

Security - the patrol leader organizes the formation to provide security while on the move, during halts, at danger areas, and upon reaching checkpoints and rally points.

Day Patrols
- Adequate dispersion.
- Careful not to silhouette yourself when moving along high ground.
- Avoid open areas and take advantage of available cover and concealment
- Avoid suspected enemy locations and built up areas.
- Maintain an even pace and avoid rushing or running. Sudden movements attract attention.
- Employ security elements to the front, rear, and flanks, if practical.

Night Patrols - use the same techniques as for Day Patrols, but modify, as required.
- Patrol members stay closer together.
- Silent movement is essential; sounds carry much further at night.
- Speed is reduced to avoid separation of patrol members and to keep noise down.

Night Movement Techniques

Gear
- Secure loose gear to minimize noise
- Fill canteens
- Break up your outline (camouflage)
- Camouflage shiny objects
- Secure or take off rifle slings

Walking
- Carry your body weight balanced on your rear foot
- Lift your forward foot high enough to clear any brush, or obstacles
- Lower forward foot gently, toes first
- Lower heel of the forward foot slowly and transfer body weight to that foot
- Freeze if caught in a flare that burst in the air. If during the attack, ignore the flare and continue the attack
- Do not run at night, except in an emergency

Night Vision
- Avoid straining your eyes by not concentrating too long on one object
- If a trip flare activates, drop to the ground quickly and quietly, close one eye and leave the other open to see if the enemy attacks
- Use lights only in an emergency

Immediate Action Drills - there are times when contact with the enemy is unexpected. For this we have immediate action drills.

Hasty Ambush - used when you see the enemy before being seen. You quickly move into a concealed area and engage the enemy or allow them to pass.
Danger Area - is where the patrol is vulnerable to the enemy observation and/or fire (roads, open areas).
Immediate Assault - used when you are caught in a near ambush. Turn in the direction of the ambush and assault the ambush.
Near Ambush (50 meters or less) - the killing zone is under heavy, highly concentrated, close range firing. Turn in the direction of the ambush, staying aligned, and assault through the ambush.
Far Ambush (over 50 meters) - the killing zone is under very heavy, highly concentrated firing, but from a greater range. The range allows people in the killing zone to seek cover and return fire. Those members not caught in the kill zone will envelop the ambush.

Characteristics Of Successful Immediate Action Drills

Speed - commands and movement
Simplicity - they must be easy to do
Any Unit - any size unit is effective
Any Terrain - they can be used any place in the world
Any Member - any patrol member can be in charge
Limited Rehearsal - minimal signals and commands are required, they also ensure automatic response
Aggressiveness - though out numbered, you must show the desire to live and allow the enemy to die for his country, not you for yours

7. FOUR TYPES OF FIRE TEAM FORMATIONS

Fire Team Column - consist of a rifleman, fire team leader, automatic rifleman and assistant automatic rifleman. It is mainly used when you want speed and good control of your people (see figure 1).

Advantages
- Permits fire and maneuver to the flanks
- Permits rapid controlled movement

Disadvantages
- Vulnerable to fire from the front
- The ability to fire to front is limited

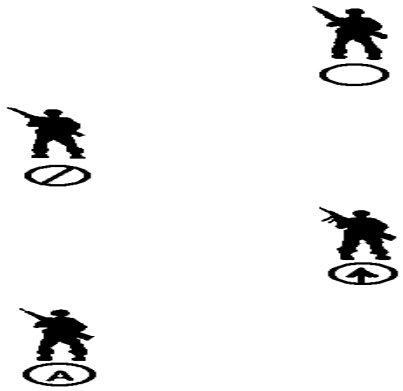


Figure 1. Fire Team Column

Fire Team Wedge - diamond shape with the rifleman leading followed by the assistant automatic rifleman to his right, the fire team leader parallel to the assistant automatic

rifleman, and-to the rifleman's left. The automatic rifleman brings up the rear and directly behind the rifleman (see figure 2).

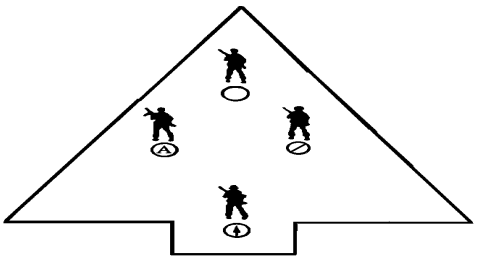


Figure 2. Fire Team Wedge

Advantages
- It is easily controlled
- Provides all around security
- Fire is adequate in all directions
- It is flexible

Disadvantages
- It can not move as fast as a column

Skirmishers (Left) - a staggered formation starting with the rifleman on the right and the automatic rifleman the left and parallel to the rifleman. The assistant automatic rifleman is behind the automatic rifleman and to his left and the fire team leader is parallel to the assistant automatic rifleman and in-between the automatic rifleman and the rifleman. Skirmishers (right) is a mirror image of the Skirmishers (left) (see figure 3).

Advantages
- Permits maximum firepower to the front
- Used when the location and strength of the enemy are known, during the assault, mopping up, and crossing short open areas.

Disadvantages
- It is extremely difficult to control
- Movement is slow.
- The ability to fire to the flanks is limited.

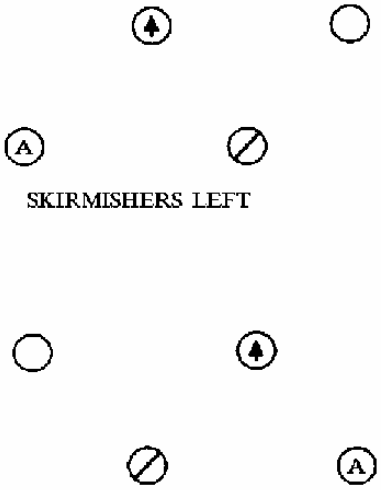


Figure 3. Skirmishers (Left and Right)

Echelon (Left and Right) - this formation is similar to a skirmish except that one flank is angled to the rear (see figure 4).

Advantages
- Permits fire to the front and one flank
- It is used mainly to protect exposed flanks

Disadvantages
- It is extremely difficult to control
- Movement is slow

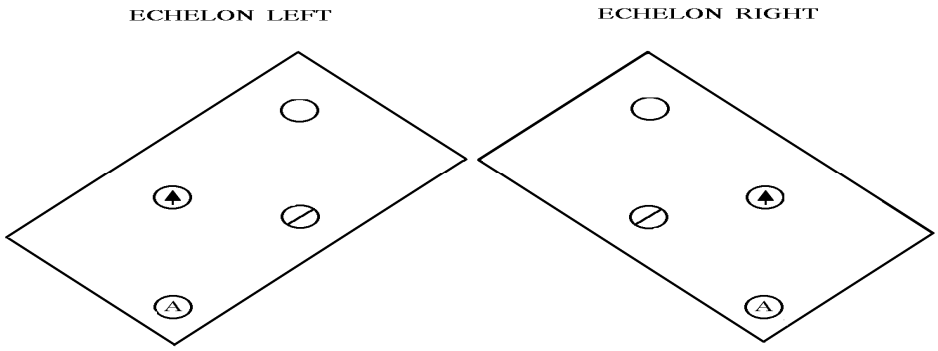


Figure 4. Echelon (Left and Right)

8. **FIVE TYPES OF COMBAT SQUAD FORMATIONS**

Column - the same as a fire team column except all the fire teams are included one behind the other (see figure 5).

Advantages
- Permits rapid and easily controlled movement
- Permits fire and maneuver to the flanks (same as fire team)

Disadvantages
- Vulnerable to fire from the front
- The ability to fire to the front is limited

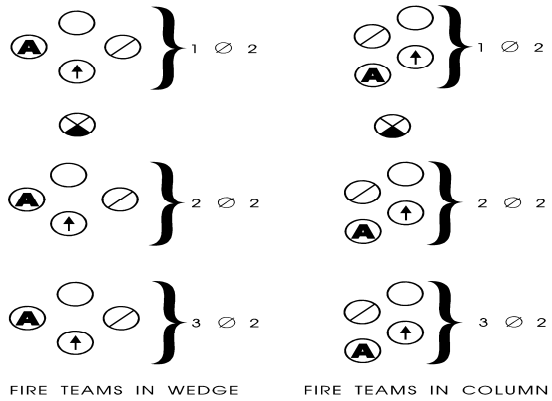


Figure 5. Fire Team in Column

Squad Line - the squad line places all three fire teams abreast or on line and is normally used in the assault during rapid crossing of short, open areas (see figure 6).

Advantages
- Maximum firepower is concentrated to the front

Disadvantages
- The ability to return fire to the flanks is limited
- Movement is slow

Figure 6. Squad Line

Echelon (Left and Right) - this formation is the same as for fire team except all fire teams are included (see figure 7).

Advantages
- It is used mainly to protect exposed flanks
- Provides heavy firepower to the front and in the direction of echelon

Disadvantages
- Difficult to control
- Movement is slow

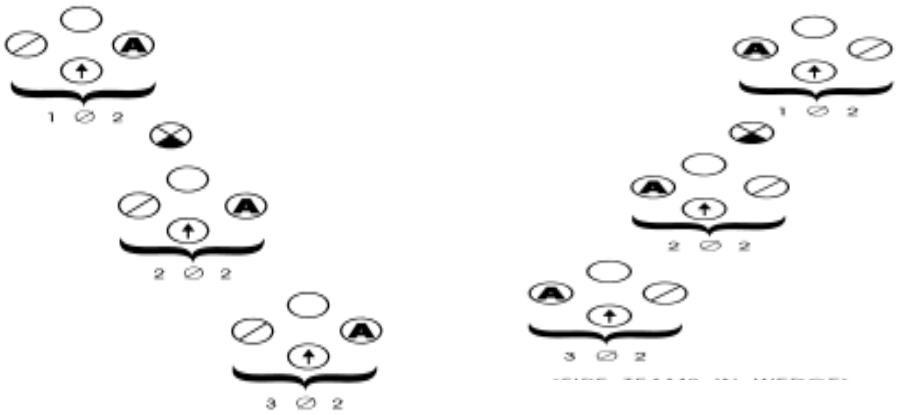


Figure 7. Echelon (Left/Right)

Squad Wedge - the squad wedge places one fire team in the front of the formation followed by another fire team to the right and diagonally to the rear, with the last fire team to the left and parallel to the second fire team (see figure 8).

Advantages
- It is easily controlled
- Provides all around security
- It is flexible
- Fires adequately in all directions (same as fire team).

Disadvantages
- It cannot move as fast as a column. (Same as fire team)

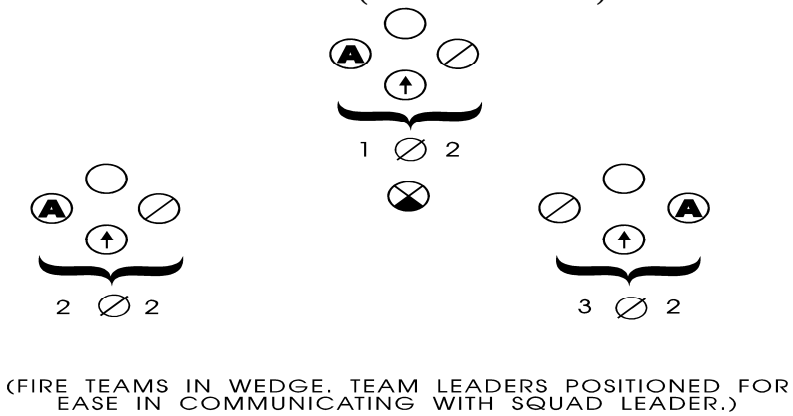


Figure 8. Squad Wedge

Squad Vee - the squad vee is an inverted squad wedge (see figure 9).

Advantages
- Facilitates movement into squad line
- Provides excellent firepower to the front and to the flank
- Used when the enemy is to the front and his strength and location are known. May be used when crossing large open areas.

Disadvantages
- It cannot move as fast as a column

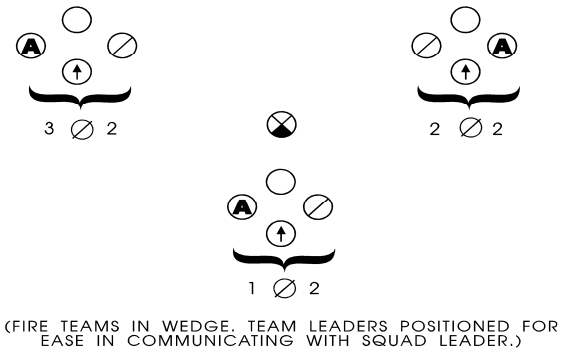


Figure 9. Squad Vee

9. **THREE TYPES OF SPECIAL SIGNALS**

Whistle

Advantages/Uses

- Is an excellent and quick way a unit leader can transmit a message from one place to another.
- It provides a fast means of transmitting a message to a large group.

Disadvantages

- It must be prearranged and understood or it may by misinterpreted.
- Its effectiveness may be reduced by normal noise, which exist on the battlefield.

Pyrotechnics - devices used to transmit commands or information. Flares and smoke grenades are considered pyrotechnics.

Purpose - is used as a ground to ground or ground to air signaling device. It is used to identify units on the ground to other ground units and to air support. It can also be used to screen the movement of small units for short periods.

Advantages and Uses

- Used to mark enemy positions
- Signals to attack, withdraw, shift, or cease-fire
- Mark landing zones

Disadvantages

- Used by only one unit at a time
- Be sure your signal does not already have another set of meanings
- Gives away your position

Hand and Arm Signals - the most commonly used form of signaling. It must be remembered that the hand and arm signals are orders or commands that must be carried out.

Advantages and Uses

- The noise of the battle does not hinder the use of the hand and arm signals.
- Used when silence must be maintained.

Disadvantages

- The signal must be seen
- Must be aware of other members location

10. **HAND AND ARM SIGNALS DEMONSTRATION**

Decrease Speed - extend the arm horizontally sideward, palm to the front, and wave arm downward several times, keeping the arm straight. Arm does not move above the horizontal plane (see figure 10).

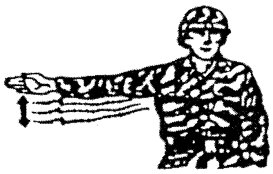


Figure 10.

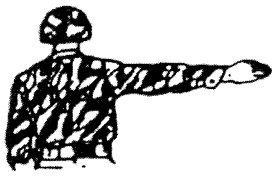


Figure 11

Change Direction - extend arm horizontally to the side, palm to the front (see figure 11).

Enemy In Sight - hold the rifle horizontally, with the stock on the shoulder, the muzzle pointing in the direction of the enemy (see figure 12).

Figure 12

Figure 13

Range - extend the arm fully towards the leader or men for whom the signal is intended with fist closed. Open the fist exposing one finger for each 100 meters of range (see figure 13).

Cease Fire - raise the hand in front of the forehead, palm to the front, and swing the arm and forearm up and down several times in the front of the face (see figure 14).

Figure 14

Figure 15

Assemble - raise the arm vertically to the full extent of the arm, fingers extended and joined, palm to the front, and wave in large horizontal circles (see figure 15).

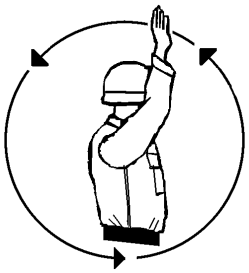


Figure 16

Form Column - raise either arm to the vertical position. Drop the arm to the rear, making complete circles in a vertical plane parallel to the body (see figure 16).

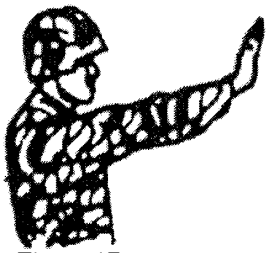


Figure 17

Are You Ready - extend the arm toward the leader for whom the signal is intended, hand raised, fingers extended and joined, raise arm slightly above horizontal, palm facing outward (see figure 17).

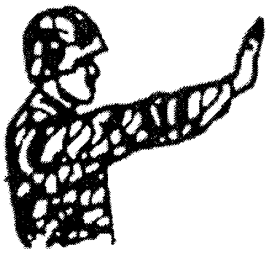


Figure 18

I Am Ready - execute the signal, are you ready (see figure 18).

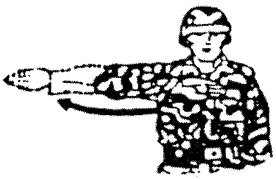


Figure 19

Shift - raise the hand that is on the side toward the new direction across the body, palm to the front; then swing the arm in a horizontal arc, extending arm and hand to point in the new direction (see figure 19).

Figure 20

Echelon - face the unit being signaled, and extend one arm 45 degrees above the other arm 45 degrees below the horizontal, palms to the front. The lower arm indicates the direction of echelon (see figure 20).

Figure 21

Skirmisher - raise both arms laterally until horizontal, arms and hands extended, palms down. If it is necessary to indicate the direction, move in the desired direction at the same time (see figure 21).

Figure 22

Wedge - extend both arms downward and to the side at an angle of 45 degrees below the horizontal plane, palms to the front (see figure 22).

Vee - extend arms at an angle of 45 degrees above the horizontal plane forming the letter 'V' with the arms and torso (see figure 23).

Figure 23

Figure 24

Fireteam - place the right arm diagonally across the chest (see figure 24)

Squad - extend the arm and hand toward the squad leader, palm of the hand down, distinctly, moving the hand up and down several times from the wrist holding the arm steady (see figure 25).

Figure 25

Figure 26

Platoon - extend both arms forward, palm of the hands down and make large vertical circles with hands (see figure 26).

Close Up - start signal with both arms extended horizontally, palm forward, and bring hands together in front of the body momentarily (see figure 27).

Figure 27

Open Up or Extend - start signal with arms extended in the front of the body, palms together, and bring arms to the horizontal position, palms forward (see figure 28).

Figure 28

Disperse - extend either arm vertically overhead, wave the hand and arm to the front, left, right, and rear, the palm toward the direction of each movement (see figure 29).

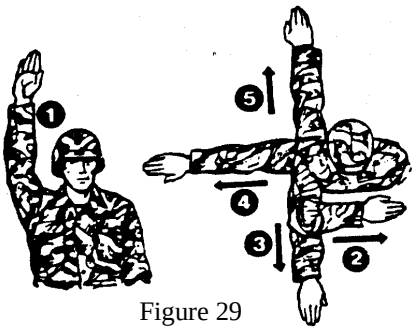


Figure 29

Figure 30

I Do Not Understand - raise both arms horizontally at the hip level, bend both arms at elbows, palms up, and shrug shoulders in the manner of universal "I don't understand" (see figure 30).

Forward - face and move to the desired direction of march, at the same time extend the arm horizontally to the rear, then swing it overhead and forward in the direction of movement until it is horizontal, palm down (see figure 31).

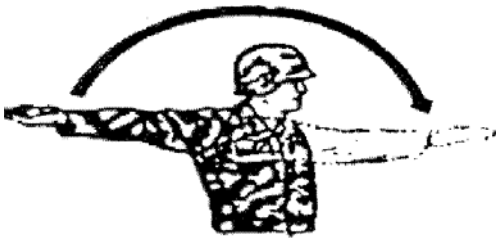


Figure 31

Figure 32

Halt - carry the hand to the shoulder, palm to the front then thrust the hand upward vertically to the full extent of the arm and hold it in the position until the signal is understood (see figure 32).

Freeze - make the signal for a halt and make a fist with the hand (see figure 33).

Figure 33

Figure 34

Down, Take Cover - extend arm sideward at an angle of 45 degrees above horizontal, palm down, and lower it to the side (see figure 34).

Figure 35

Double Time - carry the hand to the shoulder, fist closed rapidly thrust the fist upward vertically to the full extent of the arm and back to the shoulder several times (see figure 35).

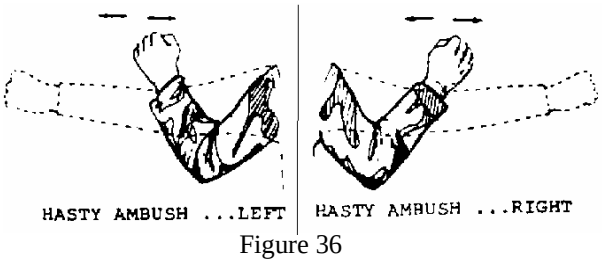


Figure 36

Hasty Ambush (LEFT OR RIGHT) - raise fist to shoulder level and thrust it several times in the desired direction (see figure 36).

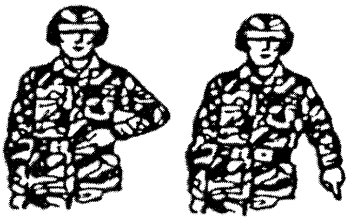


Figure 37

Rally Point - touch the belt buckle with one hand and then point to the ground (see figure 37).

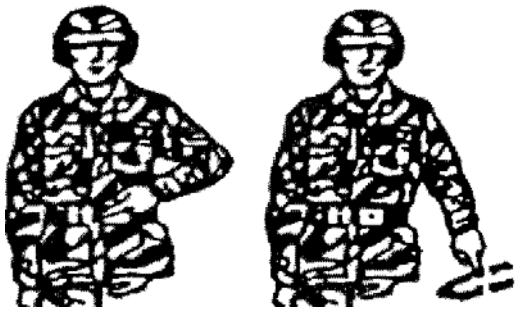


Figure 38

Objective Rally Point - touch the belt buckle with one hand, point to the ground, and make a circular motion (see figure 38).

11. COVER, CONCEALMENT, AND CAMOUFLAGE

Each Marine/Sailor must use terrain to give themselves cover and concealment. They must supplement natural cover, concealment, and camouflage.

Cover

- Protection from the fire of enemy weapons. It maybe natural or man made.
- Natural cover can be trees, logs, stumps, ravines, hollows, and reverse slopes
- Manmade cover inclues fighting holes, trenches, walls, rubble, and abandoned equipment

Concealment - anything that can hide a person from enemy, i.e. brush. Concealment does not protect you from enemy fire.

Camouflage - anything that keeps yourself, equipment, and position from looking like what they really are.

- Movement
- Shadows
- Fighting positions-not where the enemy expects to find them
- Shiny object/light source
- Shape (familiar shapes)-breakup outlines
- Colors - easily detected if contrasting
- Dispersion

REFERENCE

Marine Rifle Squad, MCRP 3-11.2: Ch 3, 4, 8, Appendix H

Patrolling Review

1. List the elements of a Combat Patrol.

2. List the three types of rally points.

3. List three types of special signals.

4. Define concealment.

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

Land Navigation

TERMINAL LEARNING OBJECTIVES

1. Given a minimum of a 1:50000 military map, a coordinate scale, protractor, paper, and pencil in a field environment, **perform basic map reading**, to meet mission requirements. (FMST-FP-1211)
2. Given a tactical scenario in any combat environment, a lensatic compass, and a minimum of a 1:50000 military map, **navigate with a map and compass** to meet mission requirements. (FMST-FP-1212)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a list, **identify the purpose of a military map**, per the student handout. (FMST-FP-1211a).
2. Without the aid of references, given a list, **identify the purpose of the five basic colors on a map**, per the student handout. (FMST-FP-1211b).
3. Without the aid of references, given a list, **identify the purpose of contour lines on a military map**, per the student handout. (FMST-FP-1211c).
4. Without the aid of references, given a list, **identify the parts of a lensatic compass**, per the student handout. (FMST-FP-1211d).
5. Without the aid of references, given a military map, protractor, and compass, and a set of eight-digit grid coordinates, **locate a position on a map**, per the student handout. (FMST-FP-1211e)
6. Without the aid of references, given a list to choose from, **compute a back azimuth**, per the student handout. (FMST-FP-1211f)
7. Without the aid of references, given a description, **identify methods used to hold a lensatic compass**, per the student handout. (FMST-FP-1211g)
8. Without the aid of references, given a military map, a lensatic compass, and a minimum of an eight-digit grid coordinate, **locate specific points on the land navigation course**, per the student handout. (FMST-FP-1212a)
9. Without the aid of references, given a description, **identify the methods used to orient a military map**, per the student handout. (FMST-FP-1212b)

1. **THE MAP**

Purpose - the purpose of a map is to provide information on the existence, the location, and the distance between ground features.

Definition - a geographic representation of the earth's surface drawn to scale as seen from above.

- Shows us what an area actually looks like without being there
- A clear and handy reference tool

Characteristics of a Map

- Designed to show us common information
- Location of ground objects
- Populated areas
- Routes of travel
- Communication Lines
- Extent of vegetation cover
- Elevation and relief of the earth's surface

Care and Importance

Maps are printed on paper and require protection from water, mud and tearing. When you mark on your map, use lighter lines, which are easily erased, without smearing. If trimming the map, be careful not to cut any of the marginal information. Maps must be protected because they can hold tactical information, such as:

- Friendly positions
- Friendly supply points

Map Illustrations

Symbols

- The mapmaker uses standard symbols
- They represent natural and manmade features
- Resemble as closely as possible, the actual features but as viewed from above

Map Colors - to ease the identification of features on the map, the topographic symbols are usually printed in different colors, with each color identifying a class of features. The colors vary with different types of maps, but on a standard, large scale, topographic map, there are five basic colors.

Black - used to identify the majority of cultural or man-made features, such as buildings, bridges, and roads not shown in red
Red - main roads built up areas, and special features such as dangerous or restricted areas
Blue - is for water features: lakes, rivers, swamps, and streams
Green - identifies vegetation such as woods and orchards
Red Brown - all landforms such as contours, fills, and cuts

NOTE: Occasionally other colors may be used to show special information. These, as a rule, will be indicated in the margin of information.

Marginal Information - instructions that are placed around the outer edges of the map are known as margin of information. All maps are not the same, so every time a different map is used, you must examine the margin of information carefully:

Sheet Name - found in two places: The center of the upper margin and the lower right margin
Contour Interval - appears in the center lower margin and states the vertical distance between adjacent contour lines on the map
Grid Box - gives basic instruction on reading grids in determination

Declination Diagram - located in the lower margin and indicates the angular relationship of true north, grid north and magnetic north (see figure 1):

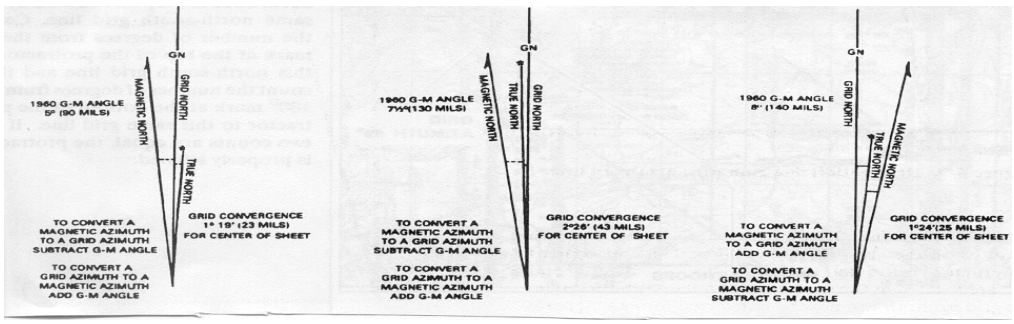


Figure 1. Declination Diagram

- True North - a line from any position on the earth's surface connects at the North Pole. Unlike grid lines, all lines of longitude are true north lines.
- Magnetic North - direction to the North Magnetic Pole, as indicated by the north-seeking needle of a magnetic compass. The North Magnetic Pole is located in Canada at Hudson Bay.
- Grid North - north that is established by the vertical grid lines on the map. The variation between grid north and true north is due to the curvature of the earth.

Grid Magnetic (GM) Angle - the GM angle is an important factor in map reading. The GM angle is used to convert magnetic azimuth to grid azimuth and vice versa:
Grid azimuth - determined with a protractor and is measured from grid north.
Magnetic azimuth - taken from a compass and measured from magnetic north.

Legend - located in the lower left margin. Illustrates and identifies some of the symbols on the map. Every time a map is used, refer to the legend to prevent errors in symbol identification (see figure 2). Other information found in the legend is the Sheet Name, Sheet Number, Series Name, Edition Number, Index to Boundaries, Index Adjoining Sheets, and Series Number.

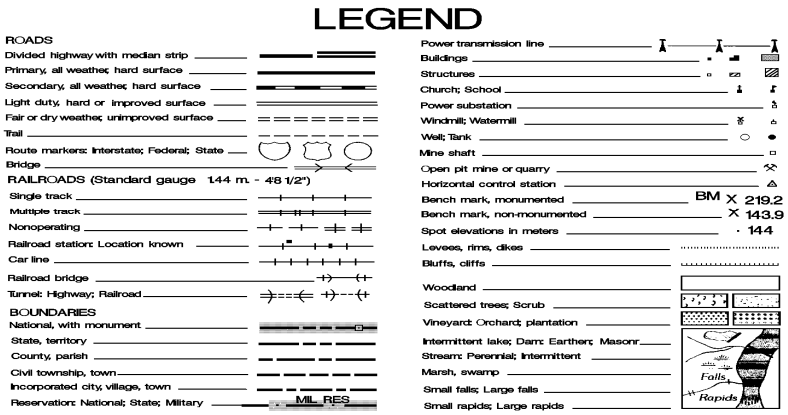


Figure 2. Legend

Bar Scale - located at the center bottom of the margin, below the map face. Special "rulers," ground distance may be measured directly without having to convert the map scale ratio. Normally, the scale for meters, yards, statute miles (land) and nautical miles (sea). Easy to use, but notice that "zero" is not at the end of the scale (see figure 3).

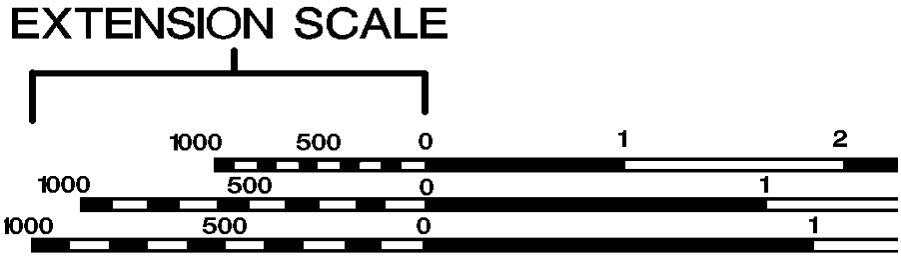


Figure 3. Bar Scale

2. MEASURING DISTANCE

Straight Line Distance - to measure line distance between two points:

- Lay a straight strip of paper on the map so the edge touches the center of both points.
- Make a tick mark on the edge of the paper at each point.
- Lay the paper strip along the scale that corresponds to the unit of measure you are working with.
- Place the right tick mark of the paper strip on the largest full unit on the primary scale (to the right of zero), allowing the remainder to fall on the extension of the scale (to the left of zero).

Curved or Irregular Distance - to measure distance along a winding road, stream, or any other curved line:

- Make a tick mark near one end of the irregular line to be measured.
- Align the paper strip along the center of the first straight portion of line.
- Make a tick mark at the other end of that portion on both the paper strip and the map.
- Keeping both tick marks together, pivot the strip at the second tick mark until another straight portion of that line is aligned.
- Continue this process until the measurement is completed, then place the paper strip on the appropriate bar scale and determine the distance measured.

3. **PROTRACTOR** (see figure 4)

There are several types of protractors. All of them divide the circle into units of angular measure, and each has a scale around the outer edge and an index mark.

- The index mark is the center of the protractor circle from which all directions are measured.
- The military protractor contains two scales; one in degrees (inner scale) and one in mils (outer scale).
- This protractor represents the azimuth circle.
- The degree scale is graduated from 0° to 360°; each tick mark on the degree scale represents one degree. A line from 0° to 180° is called the base line of the protractor. Where the base line intersects the horizontal line, between 90° and 270°, is the index or center of the protractor.
- When using the protractor, the base line is always oriented parallel to a north-south grid line. The 0° or 360° mark is always toward the top or north on the map and the 90° mark is to the right.

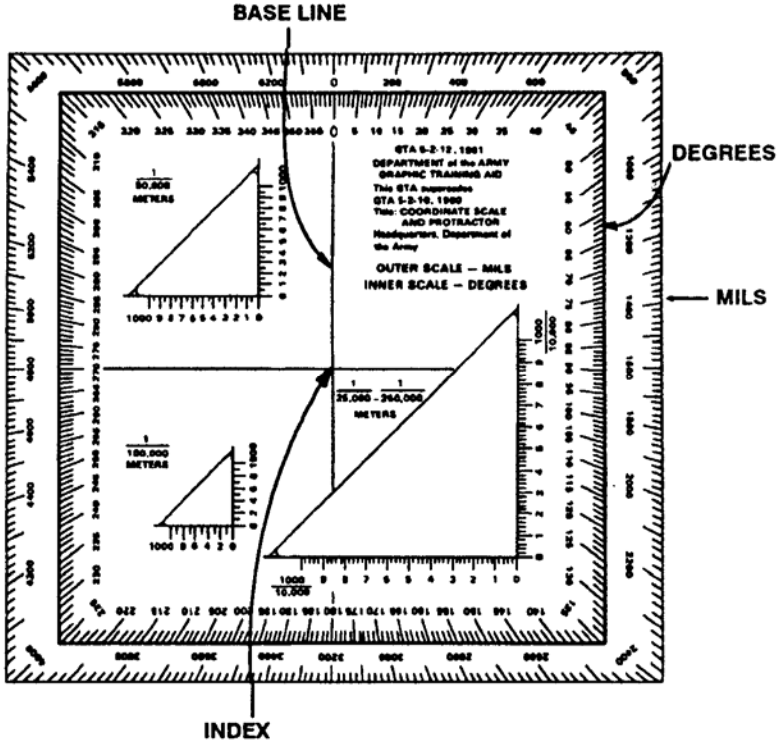
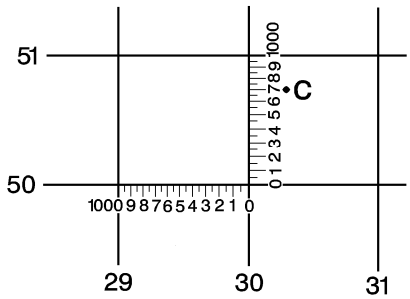


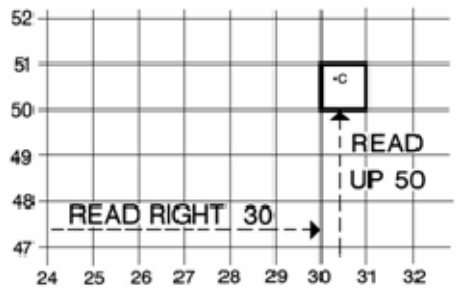
Figure 4. Protractor

4. **THE GRID SYSTEM**

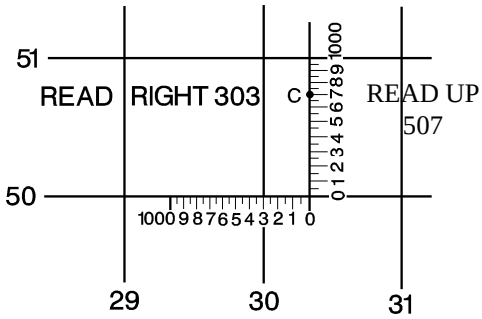
System which tells the reader where specific locations or points are (see figure 5). A network of lines, in the form of squares, placed on the face of the map. These squares are somewhat like the blocks formed by the street system of a city. The "streets" in a grid all have very simple names. The names are all numbers. Every tenth line is made heavier in weight. This will help you find the line you are looking for. Each grid line on the map has its own number. These numbers appear within the map on the line itself. Four digit numbers identify a 1000 square meter grid square. Six digits identify a 100-meter grid square. Eight digits identify a 10-meter grid square. To locate a point by grid reference is a simple matter. We follow a simple rule of map reading: READ RIGHT AND UP



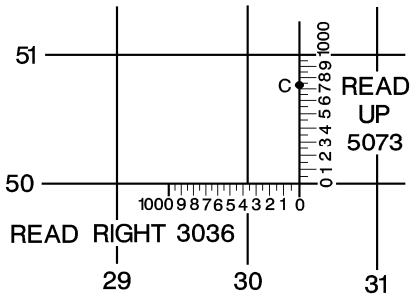
4 Digit Step 1



4 Digit Step 2



6 Digit Step 3



8 Digit Step 4

Figure 5. Grid System

5. COMPASS TERMS AND CONCEPTS

Azimuth - an angle measured in a clockwise direction from a north base line.

Grid Azimuth

- The heading due east is an azimuth of 90°
- South - 180°
- West - 270°
- North - 360 or 0°. When using an azimuth, the point from which the azimuth originates is imagined to be the center of the azimuth circle.

Obtaining a Grid Azimuth

- On your map draw a line connecting two points
  Point A represents your present location
  Point B represents your destination
- Place the index of the protractor on point A.
- Ensure the 0° and the 180° base line is parallel with the vertical grid lines on your map.
- Read the azimuth from the degree (inside) scale; this is the grid azimuth from point A to point B.

Back Azimuth

- Back azimuth is the reverse direction of a forward azimuth.
- It is comparable to doing an about face. To obtain a back azimuth from an azimuth less than 180°, add 180°. If the azimuth is 180° or more, subtract 180.

6. LENSATIC COMPASS

The primary instrument used to determine and maintain direction during land navigation.

Parts of the Compass (see figure 6)

- Thumb loop
- Short luminous line
- Luminous sighting dots
- Luminous magnetic arrow, "Magnetic North"
- Sighting slot
- Sighting wire
- Floating Dial – in both mils and degrees
- Graduated straight edge
- Lens
- Fixed index line
- Bezel ring
- Cover
- Rear sight
- Base

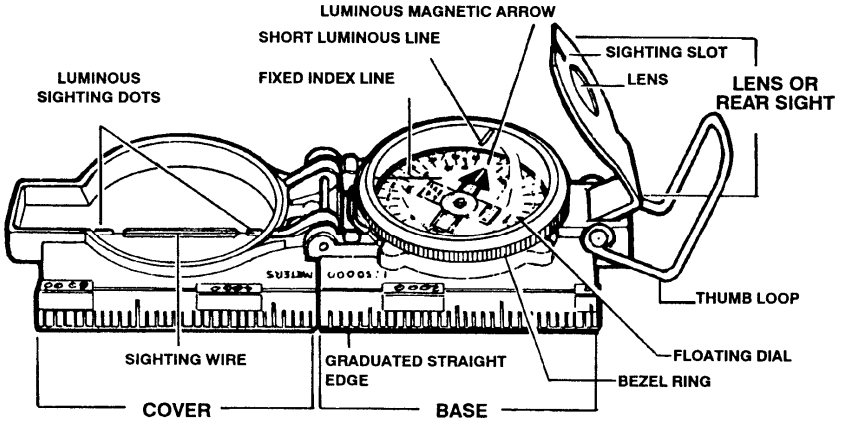


Figure 6. Lensatic Compass

Compass Precautions

- Handle the compass with care. The dial is set with a delicate balance and shock could damage it.
- Reading should never be taken near visible masses of metal or electrical circuits.
- In cold weather, always carry the compass in its carrier outside your outer layer of clothing. If it is carried inside your clothing close to your body, it will fog when exposed to the cold air.

Methods For Holding The Compass - the lensatic compass is used to determine or follow magnetic azimuth both day and night. There are two recommended positions for holding the compass when navigating:

Compass-to-Cheek Method - recommended when determining the azimuth to a distant object.

- Raise the cover (with the sighting wire) straight up and raise the sight (lens) to an angle about 45° above the compass glass.
- Turn the thumb loop all the way down and put your thumb through it. Form a loose fist under the compass to steady it with your other hand, and raise up to eye level.

- Look through the sighting slot, and align the compass by centering the sighting wire in the sighting slot.
- Keeping the compass level and the sights aligned, rotate your entire body until the sighting wire is aligned on a distant object.
- Now glance down through the lens and read the magnetic azimuth under the fixed index line on the glass.

Center-Hold Position (see figure 7)

- Recommended holding position for a predetermined azimuth, both during the day and night (you do not need to remove your helmet, weapon, grenades, or magazines as long as they are not near the compass).
- Open the cover until it forms a straight edge.
- Pull the eyepiece to the rear most position.
- Next, place your thumb through the thumb loop.
- Form a steady base with your remaining fingers.
- Using your other hand, form a solid base for your compass.
- To measure an azimuth, simply turn your entire body toward the object. While pointing the compass cover directly at the object, look down and read the azimuth from beneath the black index line.

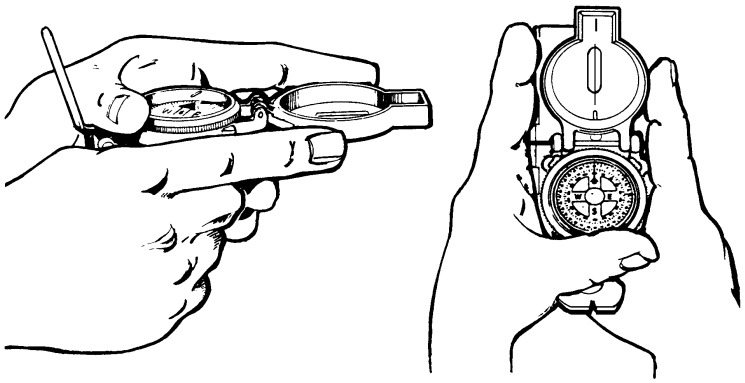


Figure 7. Center-Hold Position

Compass Use at Night

- All the luminous features on the compass will be used.
- The lensatic compass has two glass faces, one under the other. The top glass (bezel ring) rotates; **each click means it has turned three degrees.**
- Turn the bezel 30 clicks to the left (counter clockwise); this is a total of 90°.
- Using the center-hold method, rotate your body and compass until the magnetic north seeking arrow is directly aligned under the short luminous line on the bezel ring. Your compass is now set on magnetic azimuth of 90°.
- Now all you have to do to march on this azimuth line at night is keep the magnetic north seeking arrow and the short luminous line aligned and follow the direction of the luminous dots on the cover of the compass.

7. ORIENTATION OF A MAP

A map is oriented when it is in position with north and south corresponding to north and south on the ground.

Orienting a map with a compass

- With the map in a horizontal position, the compass straight edge is placed parallel to a north-south grid with the cover of the compass pointing toward the top of the map.
- This will place the black line on the dial of the compass parallel to grid north.
- Since the needle on the compass points to magnetic north, we have a declination diagram on the face of the compass formed by the index line and the compass needle.
- Rotate the map and compass until the direction on the declination diagram formed by the black index line and the compass needle match the directions shown on the declination diagram printed on the margin of the map. The map is then oriented.
- If the magnetic north arrow on the map is to the left of grid north, the compass reading will equal the GM angle (given in the declination diagram).
- If the magnetic north is to the right of the grid north, the compass reading will equal 360 minus the GM angle.

Orienting Without A Compass: Terrain Association

- When a compass is not available, map orientation requires a careful examination of the map and the ground to find linear features common to both, such as roads, railroads, fence lines, power lines, etc.
- By aligning the feature on the map with the same feature on the ground, the map is oriented.
- Orientation by this method must be checked to prevent the reversal of directions that may occur if only one linear feature is used. Aligning two or more of these features may prevent this reversal.

8. DETERMINING LOCATION BY MAP AND COMPASS

Basic method for determining locations on a map

Inspection and Estimation

- Usually the easiest and most simple
- Carefully survey road systems and topographical features in the immediate vicinity.

Orient the map to the ground

- Identify some prominent characteristic such as a road, junction, bridge, stream etc., which you can see on the ground and unmistakably identify on your map.

9. 90° OFFSET METHOD

To bypass enemy positions or obstacles and stay oriented, detour around the obstacle by moving at right angles for specified distances. Use this formula:

Right add 90°; Left subtract 90° (RALS) (see figure 8)

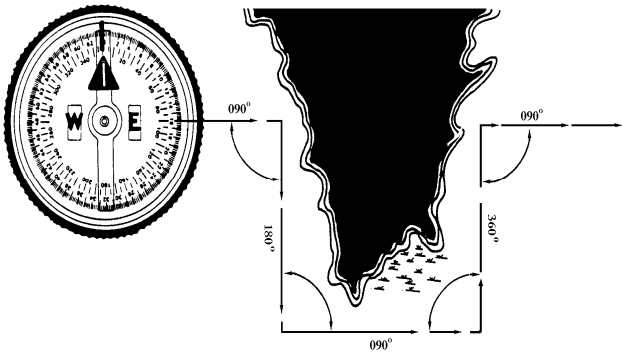


Figure 8. 90° Offset Method

10. **<u>PACE COUNT</u>**

Used to keep a record of ground distance:

- Record your count in 100-meter increments.
- Step off with your left foot and count every time it hits the deck.
- Record your 100-meter increments by putting a knot in a rope or piece of string. (Example: A student is walking an azimuth of 25°. That person must travel in this direction for 500 meters. The students pace count is 65 paces for 100 meters. To figure out how many paces the student must take – multiply your pace count by the distance.) DISTANCE divide by 100 x Pace Count (65).

11. **<u>ELEVATION AND RELIEF</u>**

<u>Contour Lines</u> - indicates elevation and relief on maps. A line representing an imaginary line on the ground, along which all points are at the same elevation. Each contour line represents an elevation above sea level and the amount of the contour interval is given in the marginal information. On most maps, the contour lines are printed red-brown, starting at zero elevation. Every fifth contour line is a heavier brown line. These heavy lines are known as index contour lines. Also, the elevation will be given along this heavy brown line.

- The spacing of the lines indicates the nature of the slope. This has important military significance.
- The closer the contour lines the steeper the terrain

<u>Land Formations</u>

<u>Hill</u> - a point or small area of high ground (see figure 9).

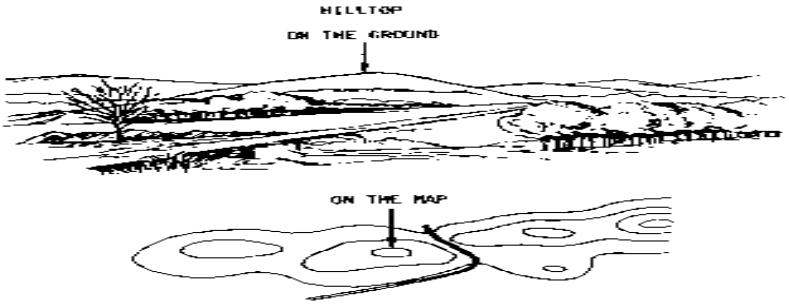


Figure 9

Valley - a stream course, which has at least, a limited extent of level ground bordered on the sides by higher ground. Contours indicate a valley that is a “U" shape, and the curve of the contour crossing always points up (see figure 10).

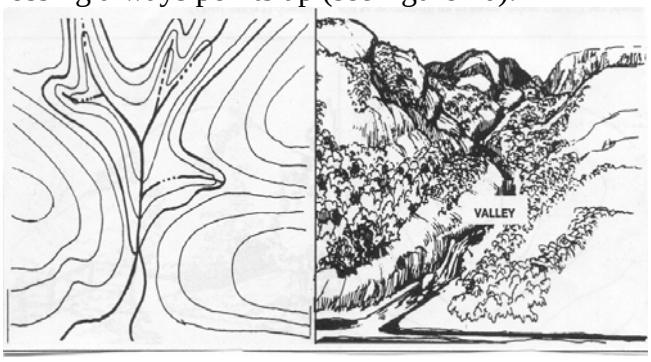


Figure 10

Draw - a less developed stream in which there is essentially no level ground and therefore, little or no maneuver room within its confines. The ground slopes upward on each side and towards the head of the draw. Contour lines indicating a draw are 'V" shaped, with the point of the "\/" toward the head of the draw (see figure 11).

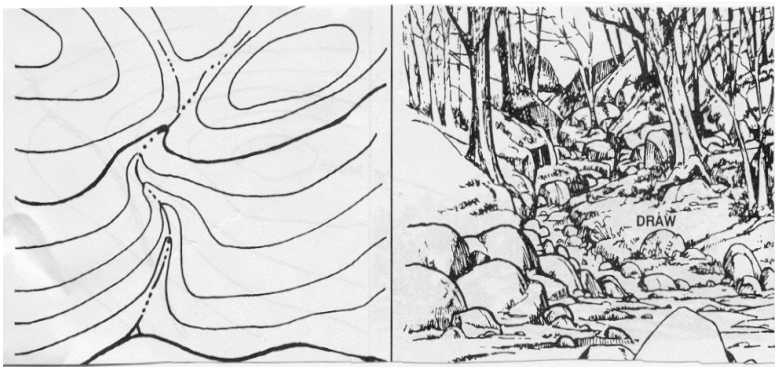


Figure 11

Ridge - a line of high ground, normally with minor variations along its crest. The ridge is not simply a line of hills but rather the ridge crest are higher than the ground on both sides of the ridge (see figure 12).

Figure 12

Saddle - a dip or low point along the crest of a ridge. A saddle is not necessarily the lower ground between two hilltops; it may simply be a dip or break along an otherwise level ridge rest (see figure 13).

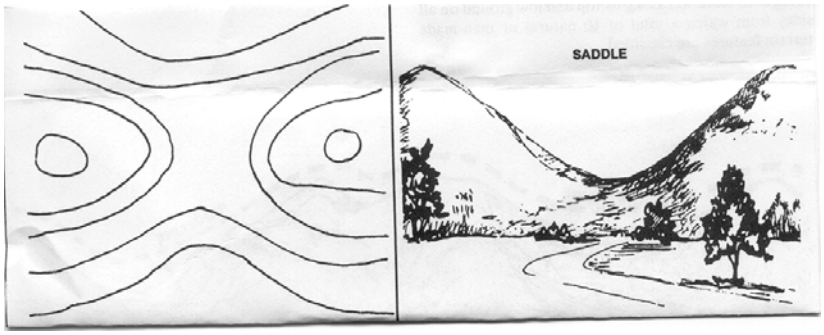


Figure 13

Depression - a low point or sinkhole surrounded on all sides by higher ground (see figure 14).

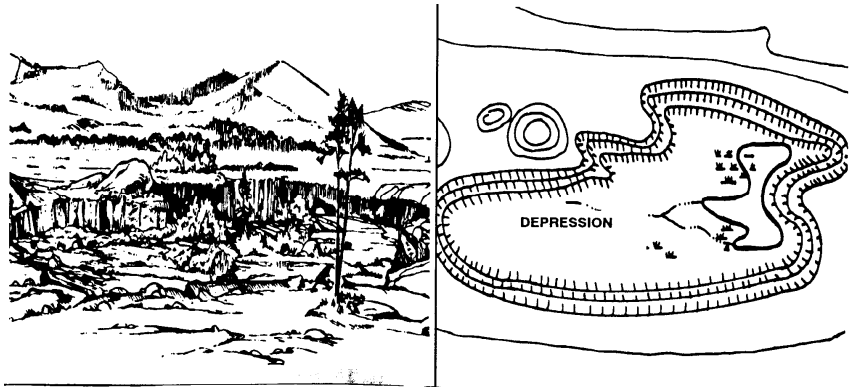


Figure 14

Cliff - a vertical, or near vertical, slope. When a slope is so steep that it cannot be shown at the contour interval, it is shown by a ticked line carrying contours. The ticks always point toward lower ground (see figure 15).

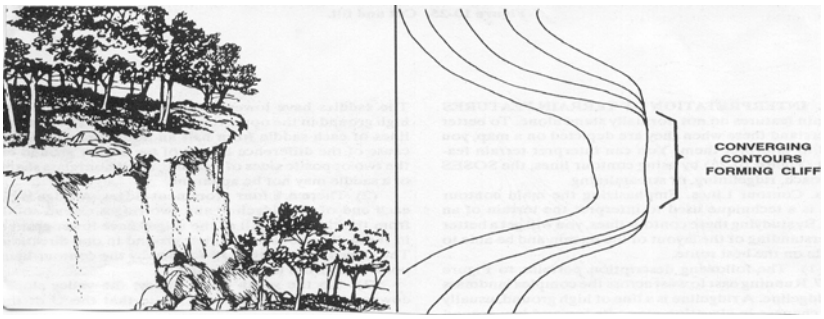


Figure 15

REFERENCES

Map Reading and Land Navigation, FM 3-25.26, Ch 2, 6, 9, 10, 11
ITS, (May 2001), Pgs 1-18-1 through 1-18-42

Land Navigation Review

1. List and describe the three different types of north.

2. A six digit grid coordinate gets you to within how many meters of your intended target?

3. Identify the two methods for holding a compass.

4. Describe the purpose of a contour line.

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

Construct a Fighting Position

TERMINAL LEARNING OBJECTIVE

1. Given a tactical scenario in a combat environment, commander's guidance, individual combat equipment, and prescribed weapon with ammunition, **construct a fighting position to provide coverage** of the sector of fire and sufficient protection from enemy fire per the references. (FMST-FP-1208)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a list of associated terms, **identify the two purposes of fighting positions**, per the student handout. (FMST-FP-1208a)
2. Without the aid of references, given a list of associated terms, **identify the basic requirements for a fighting position**, per the student handout. (FMST-FP-1208b)
3. Without the aid of references, given a list of associated terms, **identify the two types of fighting positions**, per the student handout. (FMST-FP-1208c)
4. Without the aid of references, given a list of associated terms, **identify the common features of a fighting position**, per student handout. (FMST-FP-1208d)
5. Without the aid of references, given a list of associated terms, **identify the advantages of a two-man fighting position**, per student handout. (FMST-FP-1208e)
6. Without the aid of references, given a list of associated terms, **identify the disadvantages of a two-man fighting position**, per student handout. (FMST-FP-1208f)
7. Without the aid of references, in a field environment, **construct the various types of fighting positions**, per the student handout. (FMST-FP-1208g)

1. **PURPOSE OF THE FIGHTING POSITION**

Defensive - fighting positions provide a base for protection of vital areas. They cause the attacker to mass and present a profitable target and to dissipate their combat power in the tasks of reducing the fortifications, thereby making them more vulnerable to counter-attack.

Offensive – while there is no offensive fighting position, there is an offensive purpose of a defensive fighting position. Fighting positions are used in support of offensive operations when making periodic halts to regroup, re-supply or consolidate a position gained, and where the enemy threat is known to include counter-attack capability (or probability).

Fighting Positions must:
- Allow you to fire
- Protect you from observation and direct and indirect fire (see figure 1)

Figure 1. Fighting Position

2. **BASIC REQUIREMENTS FOR A FIGHTING POSITION**

Cover - the cover of your fighting position must be strong enough to protect you from small arms fire, indirect fire, and the blast wave of a nuclear explosion.

Frontal cover must be:
- Thick enough to stop small arms fire (at least 18 in of dirt)
- High enough to protect your head when you fire from behind the cover
- Far enough in front of the hole to allow room for elbow holes and sector stakes so that you can fire to the oblique
- Long enough to give you cover and hide the muzzle blast of your weapon

Overhead - provides protection from indirect fragmentation. When possible, overhead cover is always constructed to enhance protection against airburst.

Simple and Economic - the position should be uncomplicated and strong. Should require as little digging as possible and be constructed with materials readily available.

Improvement and Development - should allow for continuous development to improve usefulness. Development can be accomplished in three steps:
- Dig in quickly. Speed is the principal consideration and no special tools or materials are required.
- Improve with materials available

- Refine, using stock materials

Camouflage - positions should be built so that all can be camouflaged. It may not be practical to conceal a defensive position completely, but it should be camouflaged enough to prevent the enemy from spotting the position by ground observation. If possible, dummy positions should be constructed around your area.

3. BASIC TYPES OF FIGHTING POSITIONS

Hasty Emplacements - used when in contact with the enemy and when time and materials are limited. They are used when there is no natural cover; they are good only for short periods of time and only against direct fire.

Shell Crater - a crater made from a shell or bomb of adequate size offers immediate cover and concealment and can be quickly made into a hasty emplacement.

Improved Crater - a crater dug with a steep face on the side towards the enemy, which provides the occupant with a firing position.

Skirmisher Trench - the trench is a shallow pit type emplacement, which provides a temporary, open prone firing position. A low silhouette is presented, and it affords protection to a limited extent from small arms fire. It can be developed further into a prone emplacement.

Prone Emplacement - this is a further refinement of the skirmisher's trench. It serves as a good firing position and provides better protection against small arms and direct fire weapons, than does the improved crater or skirmisher trench.

Rocks, Snow, and Ice - limited protection may be provided by piling up rocks, chunks of ice, or packed snow. Icecrete (mixture of dirt and water) is an effective arctic building material, which provides protection against small arms fire.

Deliberate Emplacements - deliberate positions are modified hasty positions, which are prepared during relaxed enemy pressure. Deliberate positions could be one of the following:

One Man fighting position (See figure 2)

Dimensions - the size and shape of the position are affected by certain considerations. It should be as small as practicable, exposing a minimum target to enemy fire; wide enough to accommodate the shoulders of a man; long enough to permit the use of an entrenching tool; and at least four feet deep to the fire step or chest high to the tallest man. Standing on the fire step, the Marine/Sailor should be able to aim and fire their weapon.

Advantages

- Unit can cover a wider perimeter close to the front line

Disadvantages

- When the occupant is resting, his portion of the perimeter is not covered
- Morale is lower

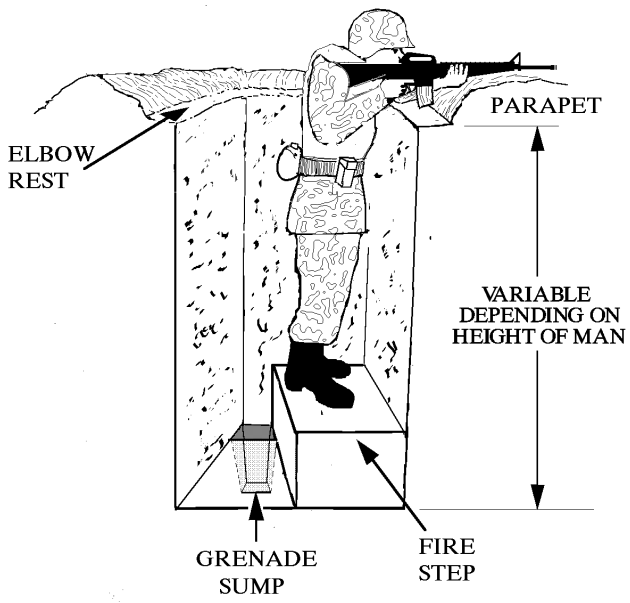


Figure 2. One Man Fighting Position

Two Man Fighting Position (See figure 3)

Dimensions - consists essentially of two adjacent one-man fighting positions.

Advantages

- One man can provide protection while the other man digs
- It affords rest and relief; as one man rests, the other observes
- Firing positions can be manned for longer periods of time
- If a man is hurt, the position is still occupied
- Morale is higher

Disadvantages

- A direct hit could cause two casualties
- Less protection against a tank crossing along the long axis
- Less protection against strafing, bombing, and shell fragments
- Decrease the fields of fire at the forward edge of the battle area

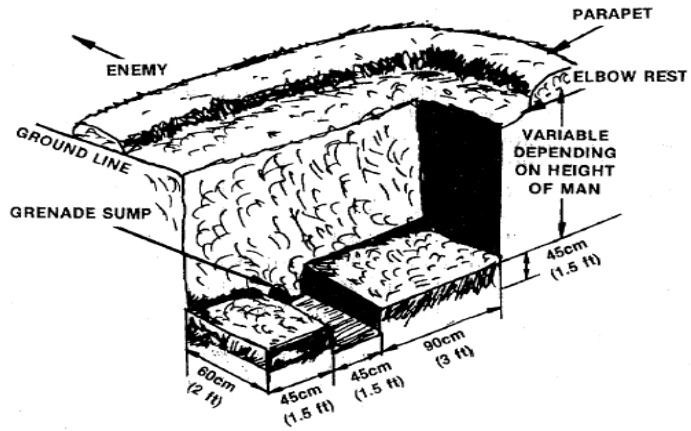


Figure 3. Two Man Fighting Position

4. **COMMON PARTS OF FIGHTING POSITIONS**

Firestep - there is one fire-step for one-man fighting positions; there are two fire-steps for two-man fighting positions. The depth of the fire-steps vary, depending on the height needed to obtain a comfortable firing position by the occupant (three to five feet) when the occupant is crouching or sitting, there should be two feet of overhead clearance to provide protection against the crushing action of tanks.

Water sump - this is dug at one end of the fighting hole to collect water or accommodate the feet of a seated occupant. The water sump may simply provide a collection basin from which water can be bailed.

Grenade sump - this is a circular grenade sump large enough to accept the largest known grenade. It is dug under and at the lower part of the fire-step riser. Grenades thrown into the fighting hole are exploded in the sump. Fragmentation is restricted to the unoccupied end of the fighting hole.

Parapet - when the fighting hole is dug, soil is used for the parapet. The soil should be placed all around the fighting hole. If a top is used to camouflage the parapet, it should be removed from the fighting hole and parapet; and then when digging is completed, place it on top in a natural manner.

Elbow rest - when constructing the parapet, insure that an elbow rest of original earth next to the fighting hole is made available to provide the occupant with an effective and comfortable firing position.

REFERENCES

Marine Rifle Squad, MCRP 3-11.2, Ch 5: Pg 14
ITS, (May 2001), Pgs 1-15-3 through 1-15-4

Fighting Position Review

1. Identify the two types of deliberate fighting positions.

2. Identify two disadvantages of a one man fighting position.

3. List the disadvantages of a two man fighting position.

4. Define the term “parapet” as it relates to a two man fighting position.

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

Defensive Operations

TERMINAL LEARNING OBJECTIVE

1. Given a tactical scenario in a combat environment, an oral Operations Order issued by the platoon commander, individual combat equipment, and prescribed weapon with ammunition, **participate in squad size defense**, to support mission requirements. (FMST-FP-1210)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a list of associated terms, **identify the terminology associated with defensive combat**, per the student handout. (FMST-FP-1210a)
2. Without the aid of references, given a list of associated terms, **identify the four purposes of defensive combat**, per the student handout. (FMST-FP-1210b)
3. Without the aid of references, given a list of associated terms, **identify the advantages of defense combat**, per the student handout. (FMST-FP-1210c)
4. Without the aid of references, given a list of associated terms, **identify the disadvantages of defensive combat**, per the student handout. (FMST-FP-1210d)
5. Without the aid of references, given a list of associated terms, **identify the two types of defensive combat**, per the student handout. (FMST-FP-1210e)
6. Without the aid of references, given a list of associated terms, **identify the three types of defensive positions**, per the student handout. (FMST-FP-1210f)
7. Without the aid of references, given a list of associated terms, **identify the fundamentals of the defensive position**, per the student handout. (FMST-FP-1210g)
8. Without the aid of references, given a list of associated terms, **identify the priorities of work in establishment of the defense**, per the student handout. (FMST-FP-1210h)

1. **DEFENSIVE TERMINOLOGY**

Defensive Area - an area of ground assigned to a unit to defend. Troops and weapons do not physically occupy the entire defensive area. Unoccupied portions are covered by fire.

Forward Edge Of The Battle Area (FEBA) - is an imaginary line joining the foremost limits of a series of areas in which ground combat units are deployed.

Sector of Fire - an area that is required to be covered by fire by an individual, a fire unit (squad or fire team), or crew served weapon.

Lateral Limits - readily identifiable terrain features are selected to indicate the line of sight along each side of the sector.

Forward Limits - established at the range at which the weapon will open fire, may extend to maximum effective ranges.

2. **DEFENSIVE COMBAT**

Four Purposes of Defensive Combat

Retain or Control Terrain

Gain Time

Develop more favorable conditions for offensive action

Economize Forces - to economize on one front for concentrating superior forces for an offensive elsewhere.

3. **ADVANTAGES AND DISADVANTAGES OF DEFENSIVE COMBAT**

Advantages	Disadvantages
- Terrain is favorable for the defense - Better control and coordination - Maximum effective use of firepower - Added protection - Fewer personnel and material losses	- Attacker has the initiative - Defensive forces must be spread out to cover all avenues of approach

4. **DEFENSIVE MISSION OF THE INFANTRY**

The mission of the infantry in the defense is, with the support of other arms, to stop the enemy by fire as he approaches the battle position. Repel his assault by close combat if he reaches the battle position, and to destroy him by counterattack if he enters the battle position. For the rifle squad, this mission can be divided into three parts:

- To delay or suppress the enemy by fire once he comes into small arms range of the squad's fighting position. The enemy is delayed or taken under fire as far forward of the squad's fighting position as possible.

- If the enemy continues to press the attack to the point where he launches an assault, the squad repels this assault by continuing to deliver fire as part of their units final protective fires and if necessary by hand to hand combat.

- If the enemy succeeds in penetrating the platoon's battle position, the squad holds its fighting position, delivering fire and participating in counterattacks to destroy the enemy and restore the battle position.

5. TYPES OF DEFENSE

There are two basic types of defenses that a unit may be called upon to construct:

Hasty Defense - this is a defense you assume when you are in immediate contact with the enemy. It utilizes hasty emplacements. It is temporary in nature and may either be a 180-degree or a 360-degree defense. This is the type of defense you would assume as part of an immediate action drill in patrolling.

Deliberate Defense - this is the type of defense you would set up when occupying an area for an extended time. In a deliberate defense you always construct fighting positions with field fortifications and set a 360-degree perimeter.

6. DEFENSIVE POSITIONS

Fighting positions located on the ground from which fire is delivered by an individual fire unit or crew serve weapon. It must allow for good fields of fire, make maximum use of available cover and concealment and facilitate exercise of fire control by the unit leader. There are three types of defensive positions:

Primary Position - the best position from which the assigned sector of fire can be covered.

Alternate Position - used by crew served weapons and is located so that a crew served weapon can continue to fulfill its original task when the primary position becomes untenable.

Supplementary Position - a position prepared to guard against attack from directions other than those from which the main attack is expected.

7. FUNDAMENTALS OF DEFENSE

The following fundamentals of defense are applicable to all tactical levels (fire teams, squads, platoons, company, etc.).

Preparation - normally, the defender will arrive at the battlefield before the attacker. Upon arrival at the position to be defended, the squad leader must ascertain:

- How much time is available to prepare the defensive position?
- If time is available, prepare the position. If not, prepare a hasty defense.

Concentration - forces must be concentrated to prepare for attacks at the most likely spots. For the squad leader this means they will establish their position as directed by the PLT commander, this is called the main effort.

Flexibility - achieved through the continuous development of various courses of action. Unit leaders continuously ask themselves "What do I do if the enemy does this?" This is called war gaming.

Maximum Use of Offensive Action - the platoon leader will normally task the squad to conduct various types of patrols to maintain contact with the enemy. Additionally, the squad leader must instill an offensive state of mind and an aggressive spirit.

Proper Use of Terrain - take maximum advantage of the military aspects of terrain. An easy way to remember these aspects is the acronym: **KOCOA**

Key terrain

Observation and fields of fire

Cover and concealment
Cover is protection from enemy small arms fire.
Concealment is being hidden from enemy observation.

Obstacles

Avenues of approach

Mutual Support - units and supporting weapons are located and employed so they can assist one another. Positions should be located so that when attacking one, the enemy comes under fire from at least one position.

Defense In Depth – the squad employs all three fire teams on line when deployed. The squad engages the enemy at maximum small arms range and continues to fire until the enemy is stopped. If the attackers penetrate the frontline squads, those squads may move to supplementary positions to continue and engage the enemy, or they may be part of a counter attack to drive the enemy back.

- Defense of depth can also be achieved by a series of patrols, delays, ambushes, and movement from one battle position to another.

Surprise - The squad leader must employ every means available to mislead the enemy. This includes the true location of the strength and the disposition of their organic weapons.

Knowledge of the Enemy - since the defense reacts largely to what the attacker does, the squad leader should find out the capabilities of the enemy facing him to help organize his defense to meet that threat. Such as:

What can the enemy do?
What weapons will they employ?
What is their strength?

8. **ESTABLISHING THE DEFENSE AND IDENTIFYING PRIORITIES**

The acronym **SAFESOC** is used to prioritize work once assignments have been made.

Post **S**ecurity
Position **A**utomatic Weapons
Clear fields of **F**ire
Entrenchment - Prepare fighting positions
Security patrols
Construct **O**bstacles
Camouflage

REFERENCE

Marine Rifle Squad, MCRP 3-11.2, Ch 5

Defensive Operations Review

1. List the four purposes of defensive combat.

2. Describe a deliberate defense.

3. Describe a supplementary position.

4. List the nine fundamentals of defense.

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

Squad Size Attacks

TERMINAL LEARNING OBJECTIVES

1. Given a tactical scenario in any combat environment, an oral Operations Order issued by the squad leader, individual combat equipment, and prescribed weapon with ammunition, **participate in squad-size attacks**, to support mission requirements. (FMST-FP-1209)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a list of associated terms, **identify the purpose of offensive combat**, per the student handout. (FMST-FP-1209a)
2. Without the aid of references, given a list of associated terms, **identify the types of attacks**, per the student handout. (FMST-FP-1209b)
3. Without the aid of references, given a list of associated terms, **identify the advantages of a daylight attack**, per the student handout. (FMST-FP-1209c)
4. Without the aid of references, given a list of associated terms, **identify the disadvantages of a daylight attack**, per the student handout. (FMST-FP-1209d)
5. Without the aid of references, given a list of associated terms, **identify the three phases of an offensive combat in a daylight attack**, per the student handout. (FMST-FP-1209e)
6. Without the aid of references, given a list of associated terms, **identify the purpose of a night attack**, per the student handout. (FMST-FP-1209f)
7. Without the aid of references, given a list of associated terms, **identify the advantages of a night attack**, per the student handout. (FMST-FP-1209g)
8. Without the aid of references, given a list of associated terms, **identify the disadvantages of a night attack**, per the student handout. (FMST-FP-1209h)
9. Without the aid of references, given a list of associated terms, **identify the three phases of a night attack**, per the student handout. (FMST-FP-1209i)
10. Without the aid of references, given a tactical scenario in a simulated combat environment and individual combat equipment, **participate in offensive combat operations**, per the student handout. (FMST-FP-1209j)

1. **PURPOSE OF OFFENSIVE COMBAT**

To destroy the enemy and their will to fight.

2. **TYPES OF ATTACKS**

Frontal Attack - moving directly forward on line to the enemy's position after gaining fire superiority.

Advantages - it is simple and requires little time and coordination.

Disadvantages - offers little chance of surprise and may move into the enemy's prepared strong points and fields of fire that may cause more casualties.

Single Envelopment - under cover of the base of fire, the maneuvering element attacks against the flanks (left or right) of the enemy.

Advantages - splits the enemy's defensive fire and surprise is easier to attain.

Disadvantages - hard to control and is vulnerable during the attack.

3. **DAYLIGHT ATTACK**

Advantages

- The attacker has the initiative
- The attacker has better control of personnel

Disadvantages

- The attacker may sustain heavy casualties due to lack of surprise
- The attacker must rely on supporting arms to neutralize the enemy and his barriers

Phases of Daylight Offensive Combat - there are three phases of offensive combat; Preparation Phase, Conduct Phase, and Exploitation Phase.

Preparation Phase - begins with receipt of a warning order. The preparation phase ends when the attacking unit crosses the line of departure (LOD) or enemy contact is made.

Movement To The Assembly Area

Route Column - probability of contact with the enemy is remote. Units within the column are administratively grouped for ease of control and speed of movement.

Tactical Column - probability of enemy contact has changed to possible. This column provides all around security when employed. The members are more dispersed than in the route column.

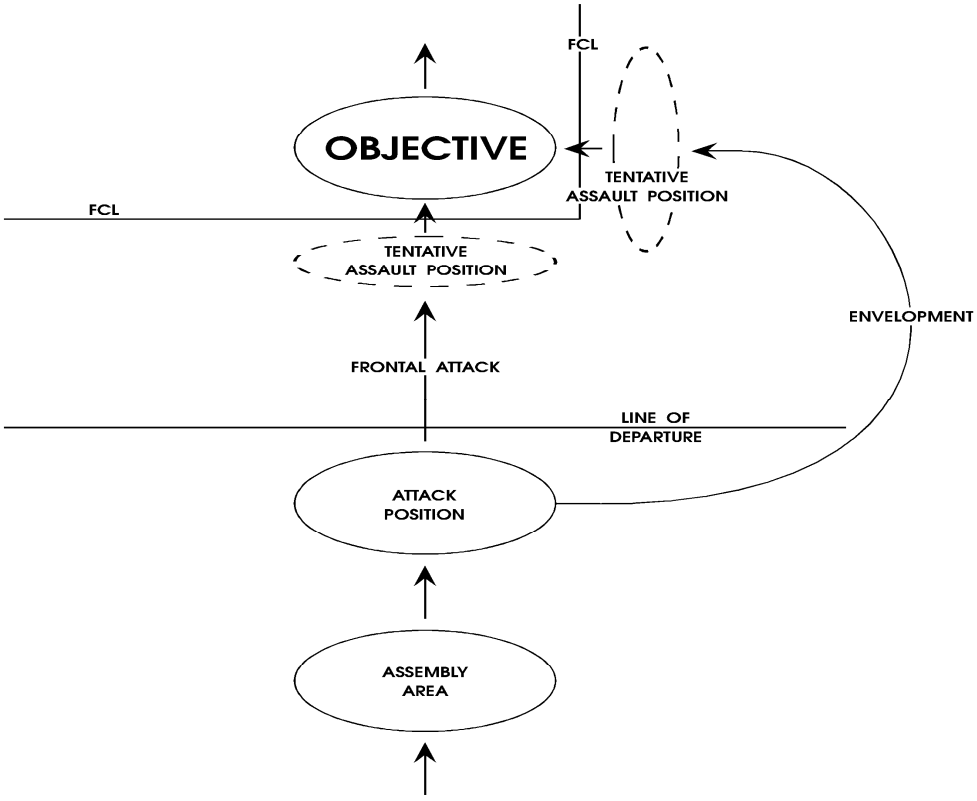


Figure 1. Daylight Offensive Combat

Final Preparation In The Assembly Area (see figure 1)

Assembly Area - an area where units assemble prior to further tactical action. Assembly areas should provide cover, concealment, and security from a ground or air attack. Steps to accomplish in the assembly area are:

- Conduct a reconnaissance of the objective
- Rehearse the attack
- Distribute ammunition
- Check weapons, equipment, and personnel for readiness
- Extra equipment is left behind
- Personnel should rest as much as possible
- Communication equipment should be checked and call signs coordinated
- BAMCIS

Movement to the Line of Departure (LOD)

Approach March - the squad leaves the assembly area and continues the movement toward the enemy in the approach march formation. The approach march formation is used when contact is imminent.

Attack Position - is the last covered and concealed position used to make any changes to the attack plan. The attacking unit deploys into its initial assault formation in the attack position.

Conduct Phase - begins when the attacking unit crosses the LOD or the attacking unit is forced to fire on the enemy in order to advance. The conduct phase ends when the attacking unit has secured the objective.

Movement from the LOD to the Assault Position - Individual and Unit Movement

Fire and Maneuver - using a base of fire while the other element maneuvers to attack from the flank. The base of fire draws the attention away from the maneuvering element and keeps the enemies' heads down by putting the maximum amount of well-aimed rounds on the objective.

Fire and Movement - once the maneuver element meets enemy opposition and can no longer advance under the cover of the base of fire, it employs fire and movement to continue its forward movement to a position from which it can assault the enemy's position. In the squad, fire and movement consist of individuals or fire teams providing covering fire while other individuals or fire teams advance toward the enemy or assault the enemy position.

Movement from the Assault Position through the Objection

Use Of Supporting Arms - when the attacking unit crosses the LOD and is in the attack, it calls for it's supporting arms. Examples of supporting arms could be artillery, mortars, naval gunfire, attack helicopters, or fixed wing aircraft. With the coordinated use of supporting arms, the enemy will not be able to shoot back. This allows the attacking unit to advance up to the enemy's position.

Assault Position - the assault position is tentatively established during the squad leader's planning and reconnaissance. It is the position between the LOD and the objective from which the assault on the enemy position is launched.

Final Coordination Line (FCL) - used to coordinate the ceasing or shifting of supporting fire and movement into the final formations just prior to the assault. It is located as close as possible to the objective.

Objective - the actual piece of terrain the enemy is holding. The mission of the attacking unit is to locate, close in, and destroy the enemy on the objective.

Exploitation Phase

Pursuit by fire - firing on the withdrawing enemy until they are no longer visable or are beyond effective range.

Continuation of the attack - to maintain pressure on the retreating enemy and destroy their combat power.

Consolidation - a rapid organization of a hasty defense to hold the objective just seized during enemy counter attacks

- Re-distribute ammunition
- Place firepower to defend objective
- Treat casualties
- Enemy Prisoners of War (EPWs) are disarmed, searched, and guarded

Reorganization - when immediate threat no longer exists, re-organization commences. Re-organization is given special emphasis upon seizure of the objective.

- Make spot assignments
- Re-distribute ammunition
- Remove casualties
- EPWs are delivered to platoon commanders

4. **THE NIGHT ATTACK**

Purpose - gain surprise, maintain pressure, and exploit a success in the continuation of the daylight attack to avoid heavy losses by using the concealment of darkness.

Characteristics

- A decrease in the ability to place aimed fire on the enemy
- Difficulty of movement
- The attacker having the psychological advantage in that it magnifies the defenders' apprehensions and the fear of the unknown. Planning and preparation can overcome the attackers difficulties.

Advantages/Disadvantages

Advantages

- Individuals are concealed by darkness
- Units can avoid heavy losses because of concealment
- Units can gain surprise on the enemy

Disadvantages

- Time consuming
- Easy to lose individuals during the movement
- Confusion sets in

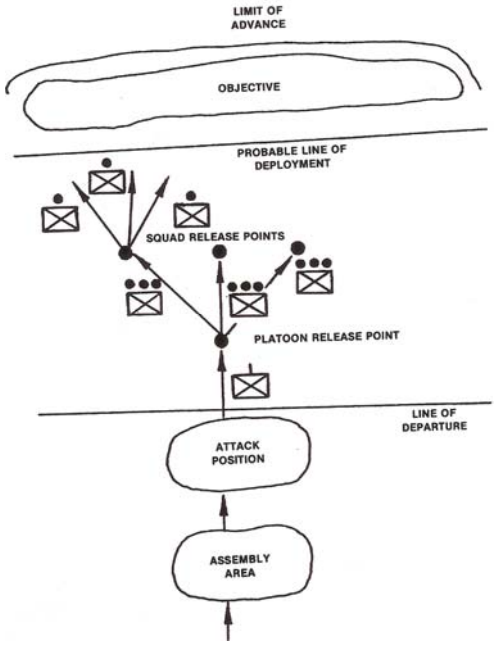


Figure 2. Tactical Control Measures

Tactical Control Measures - used for control and coordination of military operations, usually a prominent terrain feature extending across the zone of action. (See figure 2).

Assembly Area - may be closer to the LOD than for a daylight attack.
Attack Position - need not offer as much concealment as in daylight and should be easy to move into and out of at night.
Line of Departure - a line established to coordinate attacking units when beginning the attack.
Objective - may be enemy reserves, artillary units, or command and logistic installations. May also seize key terrain or establish roadblocks.
Release Points - clearly defined points on a route where units are released to the control of their respective leaders.
Probable Line of Deployment (PLD) - an easily recognized line selected on the ground where attacking units deploy in line formation prior to beginning a night attack.
Limit of Advance (LOA) - designated beyond the objective to stop the advance of attacking units. It should be recognizable in the dark (stream, road, edge of woods) and far enough beyond the objective to allow security elements space to operate.

Phases of A Night Attack - there are three phases of a night attack; Preparation Phase, Conduct Phase, Consolidation and Reorganization Phase.

Preparation Phase - is generally the same as a daylight attack, however, special emphasis is placed on:

Reconnaissance by Squad and Fire Team Leaders - to locate assigned contour features for night operations, the reconnaissance should take place in three different conditions of visibility:

- Daytime
- Dusk
- Night-time

Rehearsal - practice during the day and night continuously until each member can perform their own job, as well as every member's job without a mistake.

Equipment - carry only the equipment absolutely necessary for the attack.

Camouflage - individual and equipment must be covered completely so that no shiny objects give away your position.

Test Fire Weapons - avoid the test firing of weapons and unnecessary movement or do this in a way that will not prematurely disclose the forthcoming attack.

Night Vision - ensure that the night vision of the members of the attacking force is not destroyed prior to the attack. Ensure that you inform members to hit the ground when a flare goes off, close one eye and leave one open in order to see the enemy if they decide to attack. Do not look directly into the light of the flare.

Conduct Phase - this phase begins when the attacking unit crosses the LOD and is over when the unit hits the LOA.

Movement to Probable Line of Departure

- Security is sent out to destroy the enemy's listening post and security patrols. This will enable the attacking unit to move undetected to the objective.
- Platoons move in column formation from the assembly area to the platoon release point where they meet their guides from security patrols and move to squad release points.
- Once the unit crosses the LOD, movement to the PLD is continuous and slow enough to permit silent movement.
- If a flare goes off during the movement forward all hands hit the ground. If the flare goes off during the attack, attacking units ignores the flare and continues the attack.
- On arrival at the squad release point, the rifle squads are released from the platoon column formation to deploy online at the PLD.
- On command, the squad moves forward silently from the PLD maintaining the squad line formation and guiding on the base squad.
- Once the enemy has discovered the attack and begins to fire, then, and only then is the assault commenced. You assault through the enemy objective, short of the LOA.

Consolidation and Reorganization Phase (same as daylight attack)

Consolidation - a rapid organization of a hasty defense to hold the objective just seized during enemy counter attack. Things to be done in this phase include:

- Re-distribute ammunition
- Place firepower to defend objective
- Treat casualties
- EPWs are disarmed, searched, and guarded

Re-organization - when immediate threat no longer exists, re-organization commences. Reorganization is given special emphasis upon seizure of the objective.

- Make spot assignments for casualties
- Re-distribute ammunition
- Remove casualties
- EPWs are delivered to platoon commanders

REFERENCE

Marine Rifle Squad, MCRP 3-11.2, Ch 4

Squad Size Attacks Review

1. Identify the disadvantages of a daylight attack.

2. List the three phases of offensive combat.

3. List the characteristics of a night attack.

4. When does the conduct phase begin and end in a night attack?

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

Antipersonnel Devices

TERMINAL LEARNING OBJECTIVE

1. Given a tactical scenario in a combat environment and individual combat equipment**, react to antipersonnel devices**, to meet mission requirements per the reference. (FMST-FP-1206)
2. Given a tactical scenario in a combat environment, individual combat equipment, hand grenades, and a target, **engage targets with hand grenades** to detonate within five meters of the target per the reference. (FMST-FP-1207)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or title, **identify the antipersonnel mines**, per FM 20-32 Mines, Ch. 1, 10 (FMST-FP-1206a)

2. Without the aid of references, given a list, **identify the immediate actions to be taken for antipersonnel devices**, per FM 20-32 Mines, Ch. 1, 10 (FMST-FP-1206b)

3. Without the aid of references, given a list, **identify the parts of a hand grenade**, per FM 3-23.30 Types of Hand Grenades, Ch. 1, Appendix B (FMST-FP-1206c)

4. Without the aid of references, given a description or title, **identify the purpose of various types of antipersonnel devices**, per FM 20-32 Mines, Ch. 1, 10 (FMST-FP-1206d)

5. Without the aid of references, given a description or title, **identify the types of hand grenades**, per FM 3-23.30 Types of Hand Grenades, Ch. 1, Appendix B (FMST-FP-1206e)

6. Without the aid of references, given a training hand grenade in a field environment, **throw a training hand grenade**, per FM 3-23.30 Types of Hand Grenades, Ch. 1, Appendix B (FMST-FP-1207a)

1. **MINES**

- Definition - A mine is an explosive or material, normally encased, designed to destroy or damage ground vehicles, boats, or aircraft, or designed to wound, kill, or otherwise incapacitate personnel. It may be detonated by the action of its victim, by the passage of time, or by controlled means. There are two types of land-based mines: anti-tank and anti-personnel.

- Components of a Typical Mine (see figure 1)
    - Fuse-Firing mechanism
    - Detonator
    - Booster
    - Main charge (forms body)
        - Explosive
        - Toxic chemical agent
    - Casing (contains all parts)

- Initiating Actions (see figure 2)
    - Pressure
    - Pull
    - Pressure release
    - Tension release
    - Vibration
    - Radio signal (frequency induction)
    - Magnetic influence
    - Audio frequency
    - Timer run down
    - Electrical

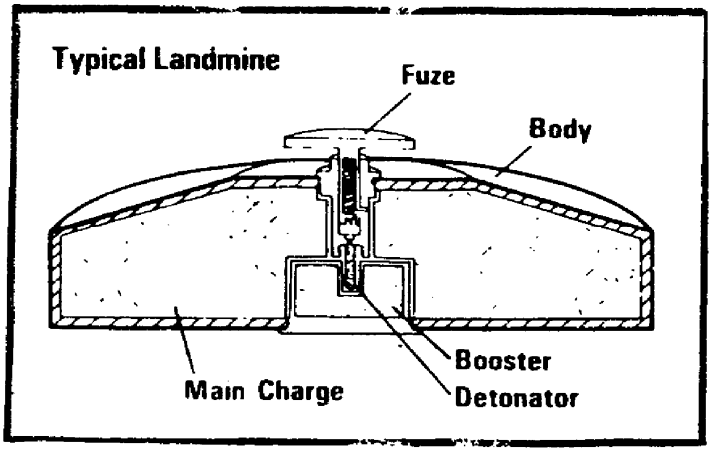


Figure 1. Components of a Typical Mine

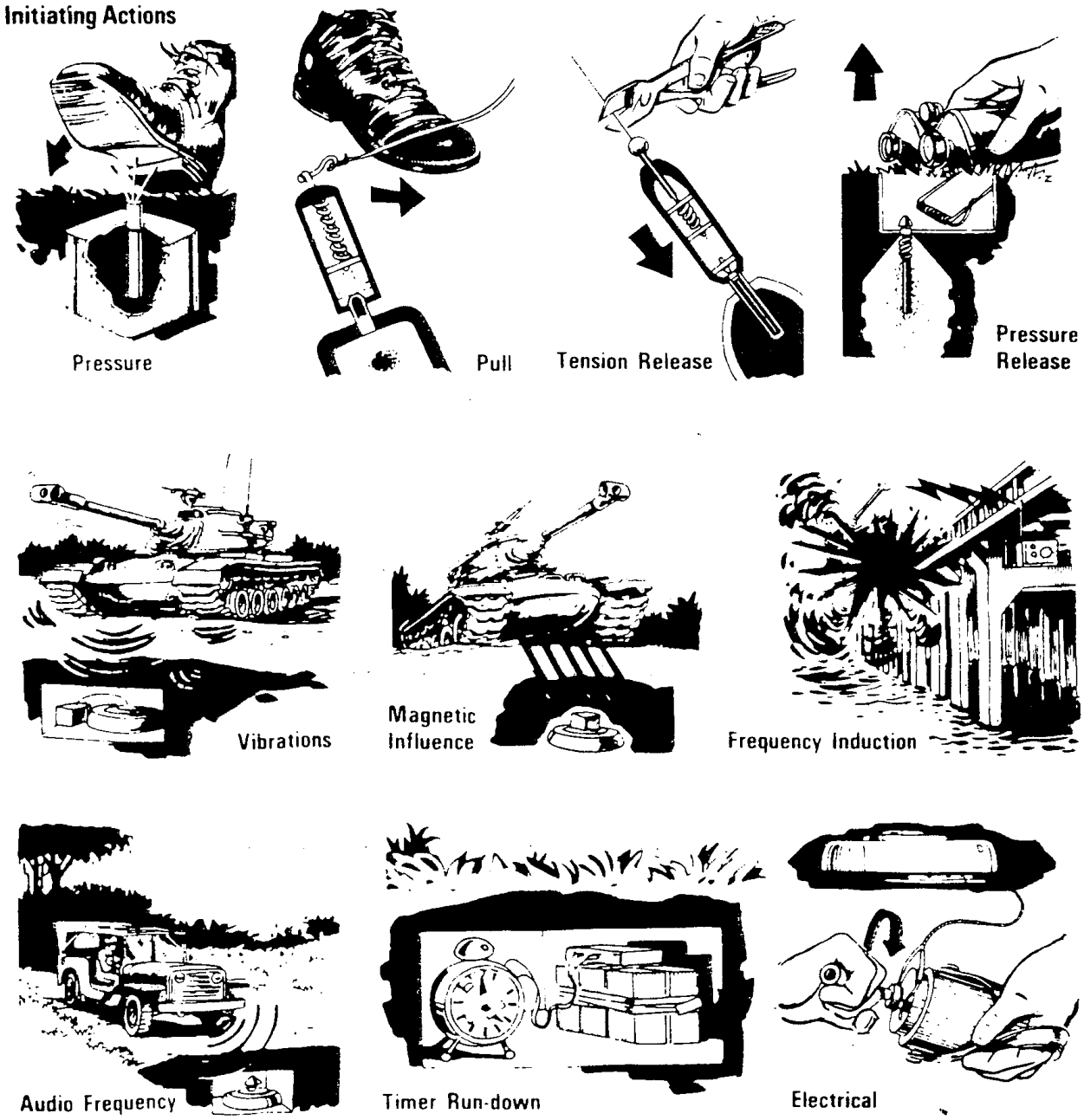


Figure 2. Initiating Action

- The Firing Chain – The series of events that sets off a mine (see figure 3).
  - The chain begins with the initiating action.
  - The initiating action acts on the fuse and causes it to fire.
  - The fuse produces flames or concussion that sets off the detonator.
  - The detonator sets off the booster or main charge.

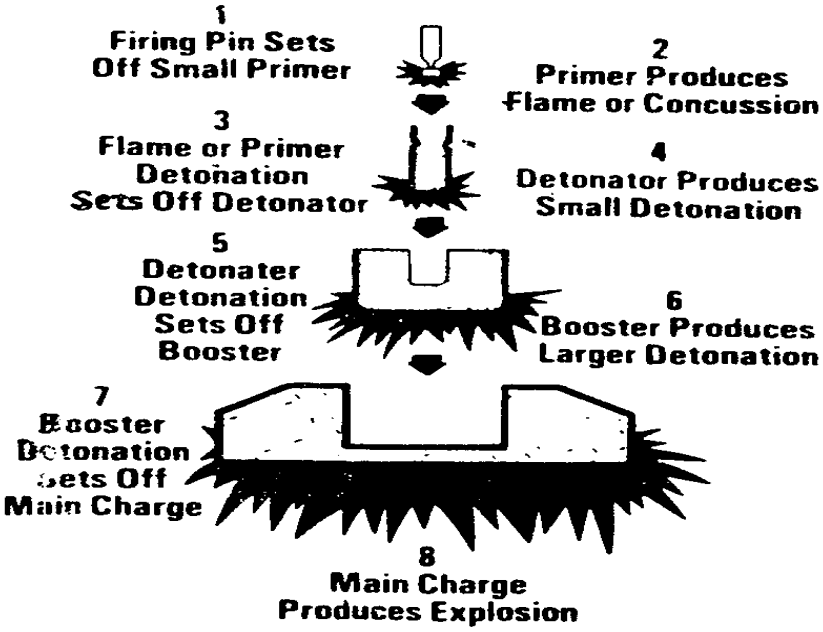


Figure 3. Firing Chain

2. **ANTI-PERSONNEL MINES**

- Definition - Mines used primarily to inflict casualties on foot troops. They are usually used with anti-tank mines to prevent enemy troops from freely entering the area and removing the anti-tank mines. Because of their explosive charges, anti-personnel mines are usually not effective against armored vehicles. Some types may break or damage the track on armored vehicles.

- Purpose
  - Kill or incapacitate enemy.
  - Commit medical resources.
  - Degrade unit morale.
  - Damage non-armored vehicles.

- Types Of Anti-Personnel Devices
  - *M16A1 Anti-Personnel Mine ("Bouncing Betty")* (see figure 4).
    Purpose - Designed to inflict injuries on foot troops.
    Initiating Action - A bounding device, detonated by either pull or pressure.
    Kill Range - 30 meters.
    Casualty Range - 150 meters.

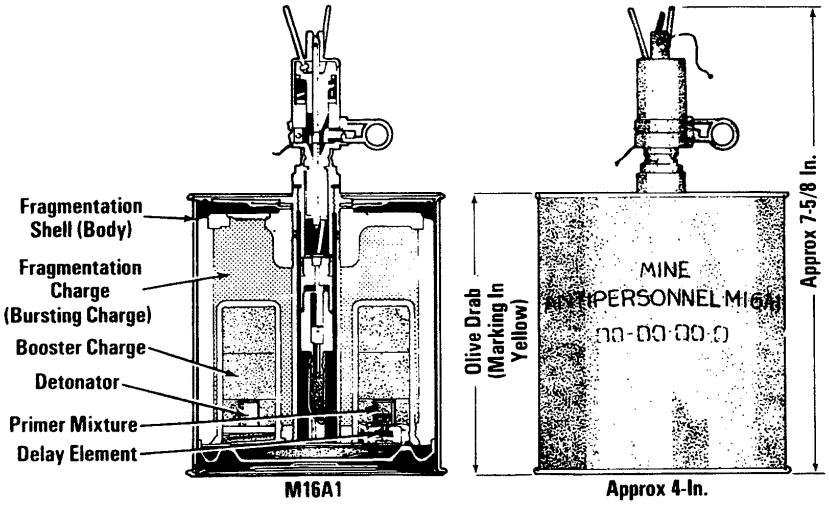


Figure 4. M16A1 Anti-Personnel Mine

- *M18A1 Anti-Personnel Mine ("Claymore")* (see figure 5)

Purpose - Directional fixed fragmentation device; primarily used in the defense against massed infantry attacks. Penetrates thin-skinned vehicles (Jeeps, automobiles & trucks) killing or injuring the occupants. Fragments can puncture tires, gas tanks, crankcases, etc. When detonated, a fan shaped sheath of spherical steel fragments is projected in a 60-degree horizontal arc over an area of 50 meters and a height of 2 meters.

Initiating Action - Manually

Kill Range - 50 meters

Casualty Range - 250 meters

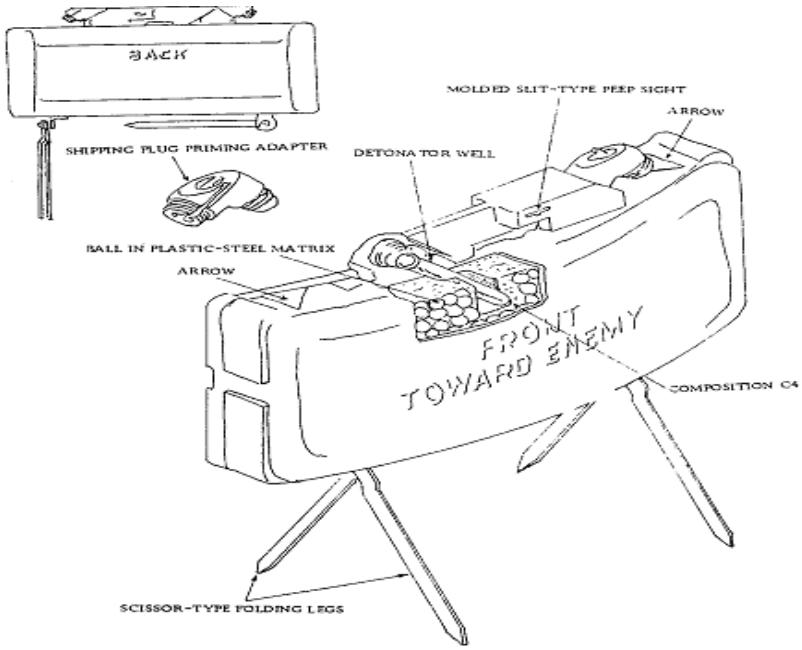


Figure 5. M18A1 Anti-Personnel Mine

- *M-14 Anti-Personnel Mine* (see figure 6)
  Purpose - To affect non-lethal casualties to enemy foot troops.
  Initiating Action - Initiated by pull.
  Kill Range - None, it is a casualty mine.
  Casualty range - Immediate area of detonation.

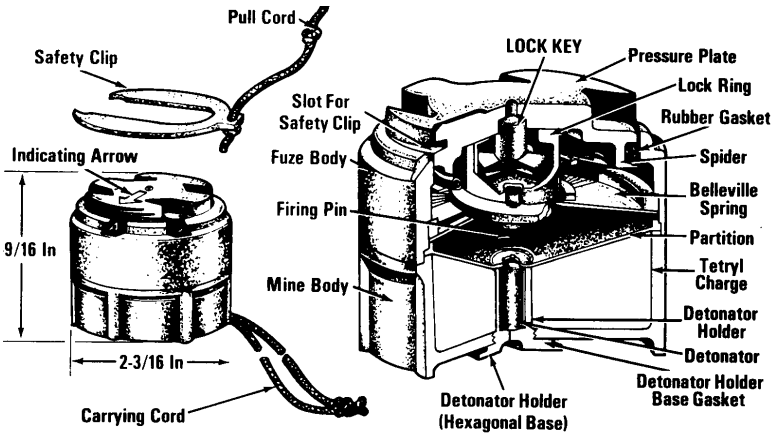


Figure 6. M-14 Anti-Personnel Mine

- *M26 Anti-personnel Mine* (see figure 7)
  Purpose - Rapid employment by easily laying, arming and camouflaging.
  Initiating Action - It is a blast type mine detonated by pressure or trip wire activation.
  Kill Range - None, it is a casualty mine.
  Casualty Range - Immediate area of detonation.

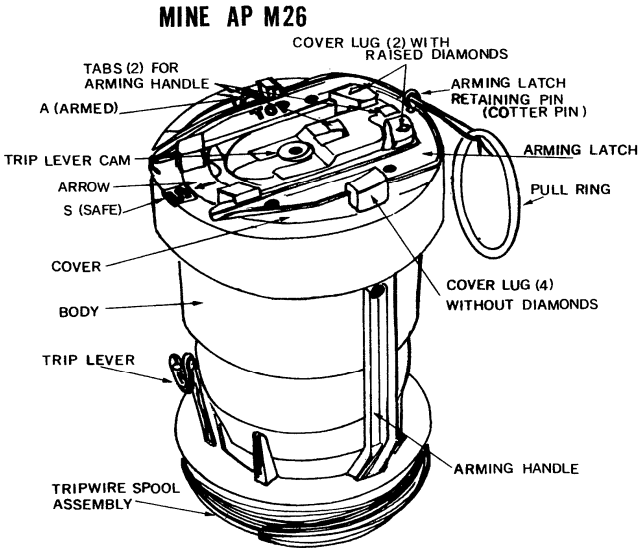


Figure 7. M-26 Anti-Personnel Mine

- Precautionary Measures To Reduce Effectiveness Of Enemy Mines
    - *Visual*
        - Be alert for tripwires.
        - Indications.
    - *Physical*
        - Wear body armor and helmet.
        - Use sandbags on vehicle flooring.
        - Maintain dispersion of personnel.
        - Do not pick up souvenirs.
        - Approach casualties with caution, they may be booby trapped.
        - Travel where local inhabitants travel.
    - Be alert for tripwires in the following places
        - Across trails
        - Routes through dense plant growth
        - In villages and on roads or paths into them
        - In approaches to enemy positions
    - Indications of mine and booby trap placement
        - Signs of road repair (paving, road patches, ditching)
        - Disturbed tire marks, ruts, or skid marks
        - Dead animals or damaged vehicles
        - Enemy markings, the enemy will mark most mine/booby traps in some way to protect their own forces

Treat all mines as enemy mines!

- Immediate Action For Anti-Personnel Devices
    - If you hear a *"pop"* of a tripwire or detonating cap:
        - Hit the deck with your feet in the direction of the blast, cover all exposed skin areas.
        - Yell *"Mine!!"* to warn other Marines.
        - Do NOT attempt to outrun explosion.
        - NEVER run in a minefield. If an explosion occurs, probe to the casualty and treat them.
    - If you are in a minefield and have not stepped on a mine, regress the way you entered by crawling or walking.

3. **HAND GRENADES** - An explosive device that is self-contained.

- Three Main Parts of a Hand Grenade (see figure 8)
  - Fuse-Timed detonator
  - Body-Filled with filler
  - Filler-Determines the type of grenade (smoke, riot, illumination, fragmentation)

- Types of Hand Grenades

- Practice grenades	- Riot control	- Rifle grenades
- Fragmentation	- Smoke	- Incendiary
- Illumination	- Offensive	

- Functions of a Grenade (see figure 8)

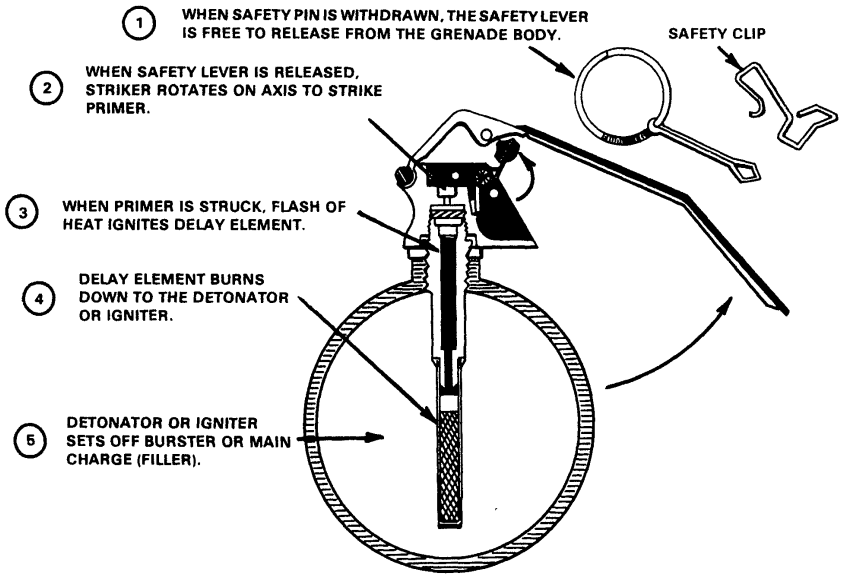


Figure 8. Parts and functions of a grenade

- Characteristics Of Three Types Of Grenades

  - *M-69 Practice Grenades* (see figure 9)

Purpose - Training and practice, but it can be dangerous because of the metal fragments blowing out of the bottom.
Body – Steel.
Color – Blue.
Shape – Baseball.
Weight - 14 ounces.
Capabilities - This grenade can be thrown 40 meters by the average Marine and will have a small explosion to simulate a blast.

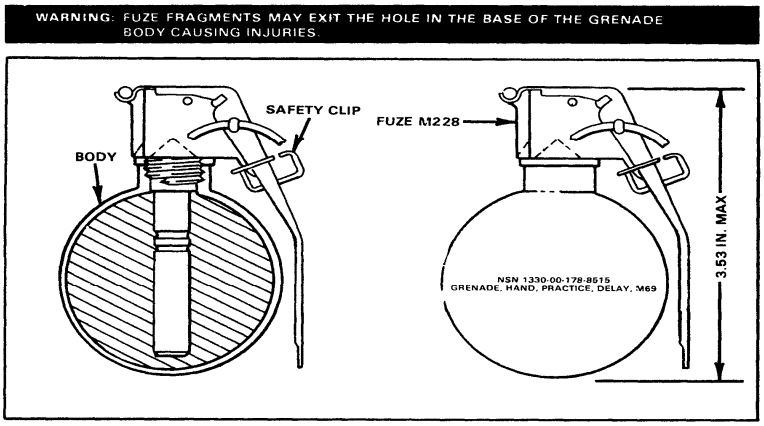


Figure 9. M-69

- *M-67 Fragmentation Grenade* (see figure 10)

Purpose - To supplement small arms fire against the enemy in close combat. This grenade can be thrown 40 meters by the average Marine.
Body – Steel.
Color - Olive drab green.
Shape – Baseball.
Weight - 14 ounces.
Killing Range - 5 meters (15 feet).
Casualty Range - 15 meters (45 feet).

WARNING: ALTHOUGH THE KILLING RADIUS IS 5 METERS AND THE CASUALTY-PRODUCING RADIUS OF THIS GRENADE IS 15 METERS, FRAGMENTS CAN DISPERSE AS FAR AWAY AS 230 METERS.

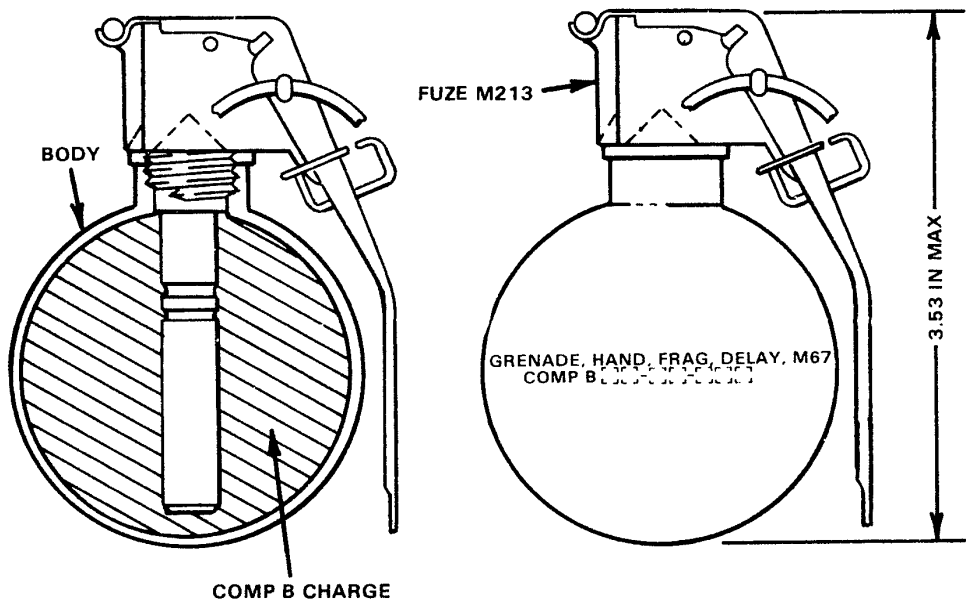
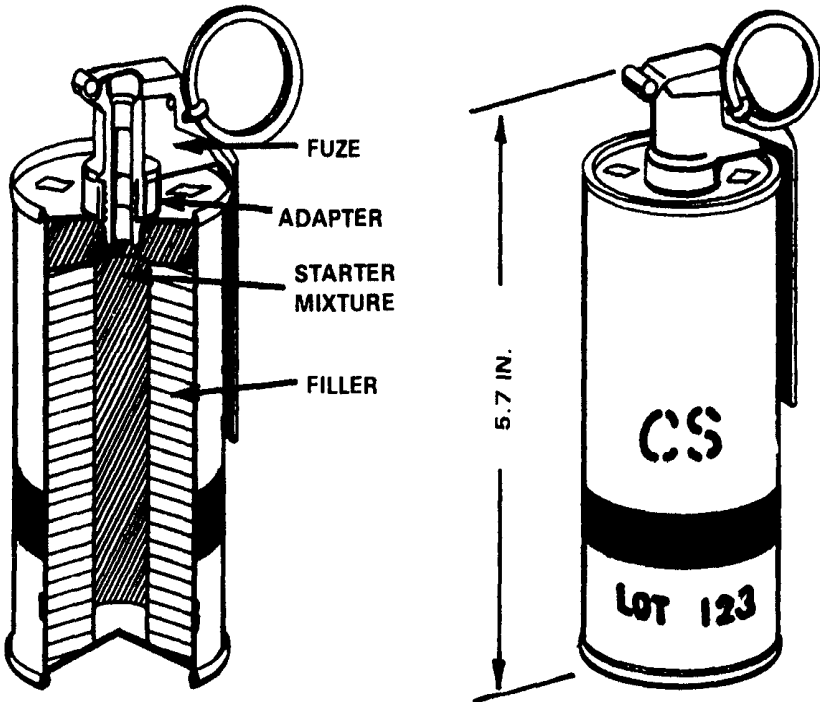


Figure 10. M-67

- *M7A2 & A3 Riot Control Grenade* (see figure 11)

Purpose - To aid in settling civil disturbances, POW riots or similar disorders, which require the use of non-lethal agents to restore order. It can also be used to assist in clearing buildings.
Body - Sheet metal.
Color - Gray body with a red band and red markings.
Shape – Cylindrical.
Weight - 15.5 ounces.
Filler - CS liquid and jelly combination.
Capability - This grenade can be thrown 40 meters by the average Marine. It will then emit a dense cloud of irritant agent for approximately 15 to 35 seconds.



Be aware that grenades can be thrown back at you!!!

Figure 11. M7 Riot Control

4. **THROWING THE HAND GRENADE**

- Safety Tips
  - Always remain calm.
  - Always keep a firm grip.
  - Never milk (squeeze and release over and over) the grenade.
  - Always follow through when throwing a grenade.

- Techniques

  Right Handed (see figure 12)
  - Grasp grenade with the right hand ensuring that the safety lever (or spoon) is in the web portion of the hand. (This is where the thumb and the index finger meet). Making sure you maintain a firm grip on the grenade.
  - Keeping the grenade in front of your body close to your chest, remove the safety clip with the left thumb.
  - Insert the left index finger into the pull ring, rotating at the same time, pulling the pull ring with the safety pin out of the grenade.
  - Extend the left arm in the direction in which you intend to throw the grenade. Using the left arm as an aiming device, bring the other hand with the grenade back to a cocked position and prepare to throw the grenade.
  - Throw the grenade as if throwing a baseball with a follow through method and hit the deck, at the same time putting your hands under your body and your face into the deck. This is all done in one motion.

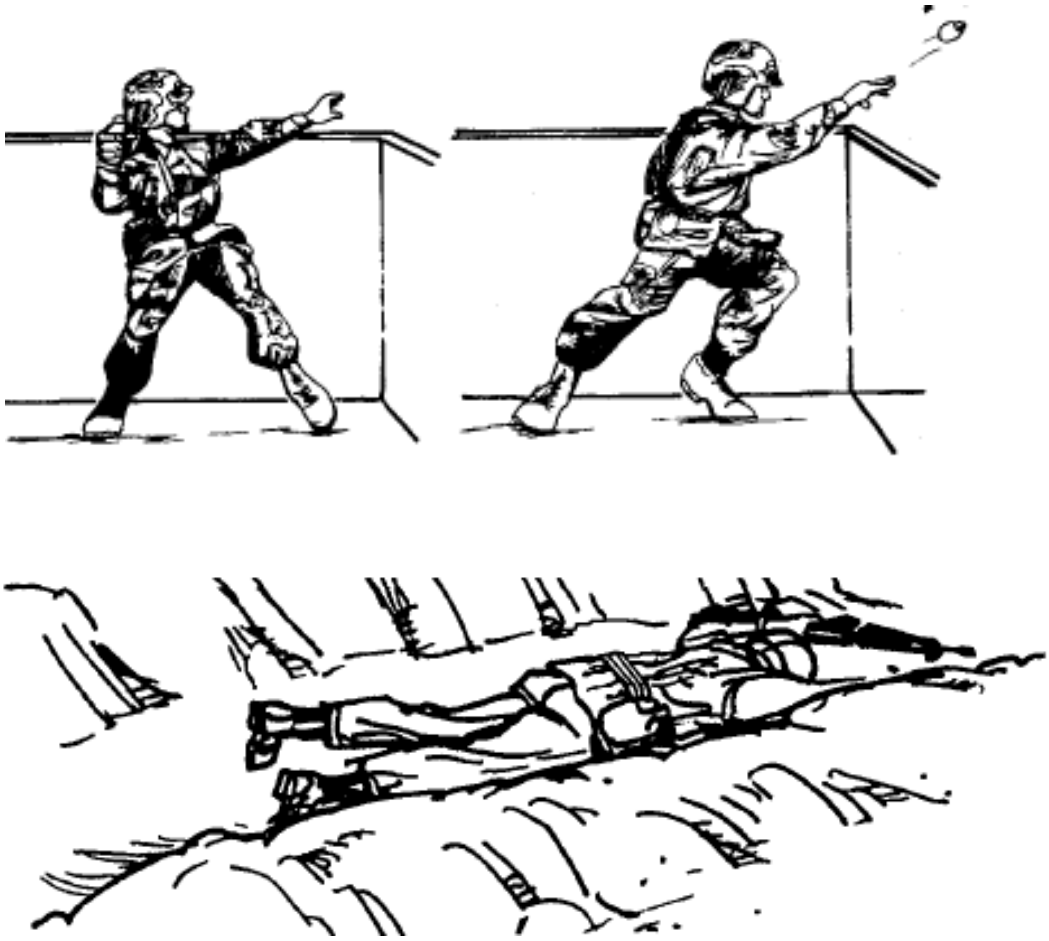


Figure 12.

Left Handed

- Left-handed throwers must hold the grenade upside down in their throwing hand in order to remove the safety devices and properly throw the grenade.
- Grasp grenade with the left hand ensuring that the safety lever (or spoon) is in the web portion of the hand. (This is where the thumb and the index finger meet). Making sure you maintain a firm grip on the grenade.
- Keeping the grenade in front of your body close to your chest, remove the safety clip with the right thumb.
- Insert the right index finger into the pull ring, rotating at the same time, pulling the pull ring with the safety pin out of the grenade.
- Extend the right arm in the direction in which you intend to throw the grenade. Using the right arm as an aiming device bring the other hand with the grenade back to a cocked position (bent at the elbow), and prepare to throw the grenade.
- Throw the grenade as if throwing a baseball with a follow through method and hit the deck, at the same time putting your hands under your body and your face into the deck. This is all done in one motion.

REFERENCE

FM 3-23.30 Types of Hand Grenades, Ch. 1, Appendix B
FM 20-32 Mines, Ch. 1, 10

UNITED STATES MARINE CORPS

FIELD MEDICAL TRAINING BATTALION
CAMP PENDLETON, CA

Improvised Explosive Device (IED)

TERMINAL LEARNING OBJECTIVES

1. Given a tactical scenario with an Improvised Explosive Device (IED) threat training aids and an IED lane, **visually identify IEDs to ensure identification of ground emplaced IEDs, Suicide Vehicle-borne IEDs (SVIEDs), and Suicide Bomber attack IEDs are confirmed** in accordance with the references. (MCCS-IED-1001)

2. Given a tactical scenario with an IED threat training aids and an IED lane, **conduct immediate actions in response to an IED to ensure the tactical effects of IED(s) on mission accomplishment are mitigated, in order to meet the concept of operations and the commander's intent**, in accordance with the mission order and the references. (MCCS-IED-1002)

ENABLING LEARNING OBJECTIVES

1. Given a list of choices, **select the definition of an IED** in accordance with the reference. (MCCS-IED-1001a)
2. Given a list of choices, **identify primary indicators of an IED** in accordance with the reference. (MCCS-IED-1001b)
3. Given a list of choices, **identify likely locations of an IED** in accordance with the reference. (MCCS-IED-1001c)
4. Given a list of choices, **identify common employment techniques of IEDs**, in accordance with the JIEDDTF 05-23. (MCCS-IED-1002a)
5. Given a list of choices, **identify mitigating tactics that can be employed in an IED environment**, in accordance with JIEDDTF 05-23. (MCCS-IED-1002b)
6. Given a list of choices, **identify non-lethal deterrents that can be employed in an IED environment**, in accordance with JIEDDTF 05-23. (MCCS-IED-1002c)
7. Given a list of choices**, identify the procedures for conducting 5 to 25 meter checks**, in accordance with JIEDDTF 05-23. (MCCS-IED-1002d)
8. Given a list of choices, **identify the 5 C's and their definitions**, in accordance with the JIEDDTF 05-23. (MCCS-IED-1002e)
9. Given an operational environment containing IEDs, **react to an IED detonation**, in accordance with JIEDDTF 05-23. (MCCS-IED-1002f)

INTRODUCTION

Improvised explosive devices (IEDs) account for the majority of wounded and killed military personnel in combat situations. As an emergency provider you are one thousand times more likely to encounter injury from conventional explosives than from a chemical, biological, or nuclear attack. It is important to consider some basic tactics, techniques, and procedures (TTPs). Understanding the TTPs will allow you to survive in an IED environment.

Knowing what to look for and where to look is a starting point. Understanding how to move, as part of a patrol or resupply element, for example, will give you an edge on the battlefield. It is important to remember IEDs are not the enemy; the people using the IEDs are the enemy. They can be defeated by being observant and looking for IED indicators. IEDs can be produced in varying sizes and can have different types of containers, function, and delivery methods. IEDs become more difficult to detect and protect against as the enemy becomes more sophisticated.

1. IED TERMINOLOGY AND COMPONENTS

Terminology

Improvised Explosive Devices are those devices that are placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic, or incendiary chemicals and designed to destroy, incapacitate, harass, or distract. They may incorporate military weapons, but are normally devised from non-military components.

Booby Traps are explosive or non-explosive devices or other materials, deliberately placed to cause casualties when an apparently harmless object is disturbed or a normally safe act is performed.

Mines are explosives or materials, normally encased, designed to destroy or damage ground vehicles, boats, or aircraft, or designed to wound, kill, or otherwise incapacitate personnel. They may be detonated by the actions of its victims, by the passage of time, or by controlled means.

Components - IEDs can vary widely in shape and form. IEDs share a common set of components that consist of the casing, initiating system, and main charge.

Casings can range in size from a cigarette pack to a large truck or airplane. The container is used to help hide the IED and to possibly provide fragmentation. Countless containers have been used as casings including soda cans, animal carcasses, plastic bags, and vests or satchels for suicide bombers.

Initiating systems cause the main charge to function. It can be a simple hard wire (for command detonation), or a radio frequency (RF) device such as a cell phone or a toy car remote control. The initiator almost always includes a blasting cap and batteries as a power source for the detonator. Any type of battery can be used (9-volt, AA, or car batteries). Initiating systems are triggered in three ways – over time, on command, and by the victim.

Time - timed IEDs are designed to function after a preset delay, allowing the enemy to make his escape or to target military forces which have created a pattern.

Command - command-initiated IEDs are a common method of employment and allow the enemy to choose the optimal moment of initiation. They are normally used

against targets that are in transit, or where a routine pattern has been established. The most common types of command-initiated methods are with command wires or radio-controlled devices, such as cordless telephones and remote car openers.

Victim - victim-actuated IEDs are initiated by the actions of the victim(s). There are various types of initiation devices to include pull or trip, pressure, pressure release, movement-sensitive, light-sensitive, proximity, and electronic switches.

Main Charge

High Explosive main charges are the most common encountered in theater. Common explosives used are military munitions, usually 122mm or greater. These items are the easiest to use and provide a ready-made fragmentation effect and multiple main charges together over long or short distances for simultaneous detonation. Common hardware, such as ball bearings, bolts, nuts, or nails can be used to enhance the fragmentation. Propane tanks, fuel cans, and battery acid can, and have been added to IEDs to propagate their blast and thermal effects.

Artillery shells have become a common form of improvised explosive devices used by insurgents.

Chemical - a chemical IED is a main charge with a chemical payload in conjunction with an explosive payload. Chemical IEDs are fabricated to kill or incapacitate victims with a chemical, rather than explosive, effect. Some indicators for chemical IEDs are smaller blasts, odor, gas cloud, and liquid on or near the suspected IED.

2. PRIMARY INDICATORS

There are many ways to detect IEDs. The best means of detection is your situational awareness. The primary indication of an IED will be a change in the baseline (something new on the route that was not there the previous day). Vigilant observation for these subtle indicators can increase the likelihood of IED detection. Some examples of possible roadside IED indicators may include:

- Unusual behavior patterns or changes in community patterns, such as noticeably fewer people or vehicles in a normally busy area, open windows, or the absence of women or children.
- Vehicles following a convoy for a long distance and then pulling to the roadside.
- Personnel on overpasses.
- Signals from vehicles or bystanders (flashing headlights).
- People videotaping ordinary activities or military actions. Enemies using IEDs often document their activities for use as recruitment or training tools.
- Suspicious objects.

- Metallic objects, such as soda cans and cylinders.
- Markers by the side of the road, such as tires, rock piles, ribbon, or tape that may identify an IED location to the local population or serve as an aiming reference for the enemy triggering the IED (such as light poles, fronts or ends of guardrails, and road intersections).
- New or out of place objects in an environment, such as dirt piles, construction, dead animals, or trash.
- Graffiti symbols or writing on buildings.
- Signs that are newly erected or seem out of place.
- Obstacles in the roadway to channel traffic.
- Exposed antennas, detonating cord, wires, or ordnance.
- Wires laid out in plain site; these may be part of an IED or designed to draw friendly force attention before detonation of the real IED.

3. **LOCATIONS OF IEDS**

IEDs may be placed anywhere enough space exists or can be created to hide or disguise the IED. Whenever possible, devices are located where they can exploit known US patterns, such as the use of a main supply route, or vulnerabilities, such as soft-skinned vehicles or chokepoints. Common areas of IED placement may include:

- Previous IED sites.
- Frequently traveled or predictable routes, such as roads leading to bases and along common patrol routes.
- Boundary turnaround points (pattern).
- Medians, by the roadside (usually within 10 feet), or buried under the surface of any type of road, often in potholes and covered with dirt or reheated asphalt.
- Trees, light posts, signs, overpasses, and bridge spans that are elevated.
- Unattended vehicles, carts, or motorcycles (attached or installed in them).
- Hidden inside guardrails or under any type of material or packaging.
- Potential incident control points (ICPs).
- Abandoned buildings or structures (sometimes partially demolished).
- Hidden behind cinder blocks or piles of sand to direct blast into the kill zone.
- Animal carcasses and deceased human bodies.
- Fake bodies or scarecrows in coalition uniforms.
- At the edge of town.

Vehicle Borne IED (VBIED)/Suicide VBIED (SVBIED) – a VBIED is a parked vehicle in a high traffic area with the intent of causing the most damage. An SVBIED is when the driver is willing to give their own life in the process of detonating his explosives. These are very successful because the enemy is mobile and is able to choose a time and place with great flexibility. This unpredictability makes them difficult to identify.

Driver Indicators:

- A lone male driver is the historical standard for VBIED operations; however, there could be any number of people in the vehicle if an unsuspecting person is driving the VBIED. Some VBIEDs have two to three people and females are sometimes used as a distraction.
- Ignoring orders to stop, attempting to circumvent a security checkpoint, or attempting to maneuver too close to coalition assets.
- Unusual appearance. The enemy may be uncharacteristically clean-shaven and have very short haircuts. Cutting the hair is part of the purifying ritual that many follow prior to an attack.
- Age in mid-twenties. The average Middle Eastern suicide terrorist is about 24-25 years old, but this may vary in each unique situation.
- Driving erratically; driving too slow or too fast.
- Wearing inappropriate dress for the environment.

Vehicle Indicators:

- Noticeable sagging of the vehicle.
- An additional antenna for radio-controlled devices.
- Darkened or covered windows to conceal either the vehicle's contents or actions of the driver.
- Recent painting of vehicle to cover body alterations.
- Crudely covered holes made in the vehicle to hide explosives.
- New welding marks.
- No license plates.
- Escorted by unusual security detail for type of vehicle.
- New tires on an old vehicle.
- Anything unusual in factory-build compartments.
- New or shiny bolts and/or screws.
- Unusual scratches, possibly made by screwdrivers, wrenches, or similar tools.
- Signs of tampering, such as broken parts or bent sheet metal.
- Areas and components cleaner or dirtier than surrounding areas.
- Wire and tape stored in the vehicle.

Situation Indicators:

- Camera crew in the area.
- Observing the same vehicle more than once.
- Absence of normal routine for the Area of Operation (AO).
- Odd traffic patterns.
- Person(s) observed conducting reconnaissance.
- Vehicle testing local defenses (i.e., drives at a high speed towards traffic control point and then breaks off).

Suicide Bombers (Personal Borne IED (PBIED)) – most suicide attacks involve SVBIEDs, and include casualty rates from tens to hundreds. There has been an increasing trend for suicide bombers to attack with an explosive vest, belt, or baggage. U.S. and Coalition Forces have been attacked within the perimeter of a base; civilians have been attacked at polling stations and police recruitment drives. With better

techniques being used to reduce the effectiveness of VBIEDs, the potential for the enemy to adapt to using suicide bombers increases.

PBIED Design (see figure 1) – if the charges used by bombers are effectively packaged and concealed, a suicide bomber could carry up to 45 pounds of explosives; however, most suicide belts are designed to hold smaller amounts, up to 12 pounds. It should be noted that fragment producing materials are often incorporated into the design of these belts/vests.

Indicators of a potential PBIED attack include individuals who deliberately ignore orders to stop or attempt to circumvent a security checkpoint, those wearing too much clothing for the prevailing weather conditions, one with suspicious bulges in his/her clothing, carrying packages/bags or wearing satchels/backpacks, and an individual handling wires, switches, an actuator, or a "dead man's" switch.

Figure 1. PBIED Design

4. EMPLOYMENT TECHNIQUES

IEDs can be used in a variety of ways. There are some TTPs that the enemy has used in order to hinder the mobility efforts of coalition forces, though enemy TTPs constantly change and adapt in an effort to stay ahead of coalition TTPs. The enemy also incorporates the use of small arms fire in conjunction with the IED attack to harass forces and increase the lethality of attacks.

Disguised static IEDs have been concealed with a variety of things (trash, boxes, tires, etc.) and placed in, on, above, or under where potential targets appear. Multiple IEDs have also been daisy chained, or linked together with detonation cord or electrical wire so that all charges detonate simultaneously, in order to achieve simultaneous explosions.

Thrown or projected IEDs (improvised grenades or mortars) have also been used against coalition forces. One TTP targets convoys as they drive under an overpass, attempting to drop IEDs in the back of vehicles as the pass under. Convoys must be aware of the 360-degree threat while traveling. Changing speeds and dispersion will help mitigate the threat to some extent.

Another example of how IEDs have been used is the hoax IED. These include something that resembles an actual IED, but has no charge or fully functioning initiator device. A fake IED along a given route and seen by the lead vehicle in a convoy will cause the convoy to come to a stop. Stopping for the hoax IED may leave the convoy in the kill zone of the real thing. Hoax IEDs are also used to learn coalition procedures, monitor time, delay or harass activities in support of the mission.

Other techniques used that are less specific include:

The Basic IED Attack - in the basic attack, the enemy will place IEDs along routes on either side of the road awaiting foot patrols or convoys to approach in order to cause the most damage to personnel or vehicles.

The "Broken-down" Vehicle Attack - this attack uses a simulated broken down vehicle placed on the side of the road to cause convoys to change their intended route. The broken down vehicle is staged along either side of the road, blocking one or all of the trafficable lanes. This causes the convoy to be directed between the broken down vehicle and an emplaced IED.

Coordinated Attack - numerous enemies work together to emplace an IED along a route, usually in an urban area. The enemy is usually located where they have the best escape route to not be seen or caught. Once the IEDs have been detonated, the enemy breaks contact and blends in with the population.

Ramming Convoys - the enemy has been known to ram their vehicle (possibly an SVBIED) in the rear of a convoy or to the side as they pass in order to get the convoy to slow or come to a complete stop.

Motorcycles - motorcycles are used by the enemy in areas of decreased mobility in order to harass convoys and possibly throw IEDs or grenades in the rear of vehicles.

5. OPERATIONS IN AN IED ENVIRONMENT

In order to counter the effects of an IED, there are several things that can be done. Wearing all personal protective gear available, to include ballistic eye protection, Kevlar helmets, body armor with plates, and hearing protection is the most basic. Other simple, but critical, force protective measures include wearing seatbelts when moving and ensuring all personnel have as much of their body inside the vehicle as possible to reduce the possibility of being struck by shrapnel or being exposed to the initial blast.

Pre-movement Rehearsals - operating units must be prepared to react quickly and efficiently to any attack. Study updated maps, as a significant number of IEDs are set up in the exact same location of previous attacks. Remember that IED attacks may be just one part of a complex attack. The unit must be prepared to react to any threat after the IED detonates and move out of the kill zone as quickly as possible.

Patrolling - one of the most important things you can do to protect yourself and your unit is to limit your predictability. Vary routes, movement techniques, and your TTPs for dealing with different situations. Never forget that the enemy is always watching. Patrols should change direction and speed at seemingly random intervals, especially in areas of previous IED attacks.

6. **MITIGATING TACTICS TO COUNTER ATTACKS**

There are certain things every member of the unit can do to counter specific attacks. Every member of the patrol should be alert and constantly aware of the situation around them. They should also know the authorized Escalation of Force (EOF) and Rules of Engagement (ROE). The actions listed below will help limit your vulnerability in specific situations:

Counter VBIED/SVBIED Techniques - the key to surviving a VBIED/SVBIED attack is standoff and cover. Know that an SVBIED can come from any direction. Units have been attacked by vehicles turning into a patrol from oncoming traffic, moving in a convoy, or in firm base attacks. Maintain an aggressive security posture and have a plan for dealing with civilian traffic. When dealing with VBIED/SVBIED attacks, it is important to:

- Have a plan to deal with approaching vehicles. Decide if they will be allowed to pass or not and have a plan for the EOF.
- Be aware of danger areas/choke points such as turnoffs that force patrol to slow down.
- Watch merging traffic as VBIEDs have been used near on and off ramps to get close to coalition vehicles.

Counter Suicide Bomber Techniques

- Evacuate the area immediately. Safe distances will depend on the mass of explosives carried by the bomber and the amount and type of fragmentation used.
- "Close and negotiate" tactics **should not be attempted**, as suicide bombers are usually trained to avoid surrender at all costs.
- A "fail safe" cell phone or radio-controlled initiator could be used in the event that the bomber is incapacitated or hesitates. This tactic would normally involve a second suspect with a line-of-sight view of the bomber and should always be considered.
- If a "deadly force" response is taken, bullet impact may initiate/detonate the explosive charge(s). Firing on the suspect should only be undertaken from protective cover.
- If the suspect is neutralized and there is no explosion, **do not administer first aid**. Wait for EOD to render safe the explosive charge.

7. **ACTIONS AT HALTS**

If a patrol or convoy must stop during movement avoid clustering vehicles and vary the vehicle interval between elements; establish your own local security and employ techniques to create standoff. Most importantly, do not remain at one site too long and conduct 5 to 25 meter checks as described below.

5 to 25 meter checks – depending on the length of time of the halt, the area to clear varies from 5 to 25 meters. **At every halt, no matter how short, the crew must clear 5 meters around the vehicle while still inside the vehicle**. For extended halts, teams must clear 25 meters around the patrol or convoy.

5 meter checks:

- Identify a position to halt.
- Visually check the area 5 meters around your vehicles.
- Look for disturbed earth and suspicious objects, loose bricks in walls, and security ties on streetlights or anything out of the ordinary.
- Start your search at ground level and continue up above head height. Then conduct a physical check for a radius of 5 meters around your position. Be systematic, take

your time, and show curiosity. If the tactical situation permits, use a white light or infrared (IR) light at night.
- If in an armored vehicle, remain mounted during your 5 meter check to take advantage of the vehicle's protection.

25 meter checks:
- Add to the 5 meter check when the patrol or convoy leader decides to occupy an area for any length of time.
- Once 5 meter checks are done, continue visually scanning out to 25 meters.
- Conduct a physical search for a radius of 25 meters around your position.
- Look for IED indicators and anything out of the ordinary.

8. **ACTIONS ON CONTACT**

Should you be part of a patrol or convoy that finds an IED, the five "Cs" will help to ensure that the situation can be dealt with quickly and safely. Remember, an IED that is found is still an IED attack. By finding the IED, you have just disrupted the enemy's attack. Do not forget about the enemy's other forms of attack, RPGs, small arms fire, mortars, and secondary IED. **Enemy IED site = Enemy ambush site. You are in the kill zone!**

IED's Found Before Detonation - a simple set of guidelines that you should use when you encounter a suspected IED are the five "Cs":

Confirm - you should always assume the device will explode at any moment. From a safe distance, look for IED indicators while attempting to confirm the suspected IED. Use all tools at your disposal, to include moving to a better vantage point and using optics to look for tell-tale signs of an IED. Never ask civilians to remove an IED and do not attempt to do the job of Explosive Ordnance Disposal (EOD) or engineers.

Clear - evacuate the area to a safe distance (terrain will dictate) but do not set a pattern. Keep in mind some threats require more standoff than others. Assess whether your distance and cover is adequate and direct people out of the danger area. Sweep the area for any secondary devise or trigger person. Once scene is safe, question, search, and detain as needed. Do not allow anyone to enter your cordon other than those responsible for rendering the IED safe (EOD).

Call/Check - let your higher headquarters know what you have found. When you move to a new location, all personnel should conduct 5 and 25 meter checks for secondary IEDs. Always assume a found IED is bait and the real IED is near your "secure" location.

Cordon - establish blocking positions to prevent vehicle and foot traffic from approaching the IED. Establish 360 degree inner and outer cordon to secure and dominate the area. Most likely, the enemy is watching and waiting to make his move.

Control - control the area until EOD arrives. Clear and set up an entry control point (ECP) for first responders. Do not let others go forward to "inspect" the IED. Make contingency plans for coordinated attacks.

IED Detonation - immediate actions differ when an IED is actually detonated. The enemy may often combine the IED attack with a direct fire ambush to increase the lethality of the attack. If an ambush does accompany an IED attack, the priority shifts to address the direct

fire and then conducting the 5 “Cs”. It is important to keep several things in mind when dealing with IED detonation:

- Respond quickly and aggressively in accordance with ROE
- Immediately scan outward. The biggest mistake Marines can make is focusing inwards toward the site of the IED detonation and forgetting about the enemy.
- Move out of kill zone
- Search for additional IED’s
- Treat/Evacuate casualties
- Report situation
- Expect follow-on attacks

Chemical IED - coalition forces have had several encounters with IEDs also having chemical filler in conjunction with the explosive. Due to the complexity of manufacturing exact payloads, the chemical effect is difficult to achieve. Units must be aware of the capabilities and know what to do in the event of a chemical attack. Specifically:

- Move upwind, to high ground at least 240 meters away from release point.
- Normal combat uniform provides some protection; individual protective suits, masks and gloves will provide additional protection.

Detectors will alarm, but best warning comes from your sense of sight and smell.

What NOT to do with Suspected IEDs

- **Never approach a suspected IED**. Establish standoff by using binoculars and spotting scopes from multiple angles to confirm the presence of an IED. When in doubt, back off and call EOD.
- **Do not pick up detonation cord**. Detonation cord is an **explosive** and the presence of it alone is enough to call EOD. Do not trace or pull on det cord.
- **Do not directly trace command wire (CW**). The enemy has placed trip wires and other IEDs under/in the vicinity of command wires. When a CW is located, rather than walking parallel to or over the wire to locate the initiation point, work in an “S” pattern, crossing the CW until the initiation point is located.
- **Do not focus on the “found” IED.** An IED, once found, is not going to move. Conduct secondary sweeps (5 to 25) and set in cordons. Always think a couple steps ahead and have a plan for any possible encounters that may arise. Again, once positive IED indicators are found, move to safe distances and call EOD.

REFERENCES

MCIP 3-17.01 Improvised Explosive Device Defeat
JIEDDTF 05-23 Joint IED Defeat Task Force Counter IED TTP
GTA 90-01-001 IED and Vehicular Borne IED Smart Card
MCWP 3-11.2 Marine Rifle Squad

IED Defeat Review

1. List the three types of initiating systems found on IEDs.

2. What is the primary indication of an IED?

3. What is a 5 meter check? When is it performed?

4. List the five Cs relating to IED defeat.

Marine Corps Fundamentals
Review Questions

NOTE: The following questions are offered for review purposes. <u>This is NOT intended as a sole source of test preparation</u>. Remember all test questions are based on an ELO and any ELO can be used to create a test question.

1. What is the definition of a patrol?
2. What are the two types of patrols?
3. What information is contained in a warning order?
4. What are the components of the manpack configuration (AN/PRC-119A)?
5. What are the parts of the compass?
6. What are the purposes of defensive combat?
7. What are the four safety rules of any weapon?
8. What is the purpose of Offensive combat?
9. What are the characteristics of weapon condition one for the M16/ M4 service rifle?
10. What is the purpose of a warning order?
11. What are the components of an IED?
12. What are the organizational elements of a patrol?
13. What is the purpose of Defensive fighting positions?
14. What are the characteristics of weapon condition four of the M16/ M4 service rifle?
15. What is the maximum effective rate of fire for a semiautomatic service rifle?
16. What are the missions of a combat patrol?
17. What are the advantages and disadvantages of defensive combat?
18. What are the two settings of the COMSEC switch of the receiver-transmitter?
19. Under what conditions is a rifle considered clear and safe?
20. What information is contained in an operation order?
21. What are the advantages and disadvantages of daylight attacks?
22. What information is contained in a fragmentation order?
23. What are the two basic types of fighting positions?
24. What are the appropriate actions at halts to check for IEDs?
25. What are the missions of a reconnaissance patrol?
26. What is the purpose of a fragmentation order?
27. In defensive operations, what are the types of defense?
28. In the phonetic alphabet, how is the letter J expressed?
29. What is the purpose of a map?

30. What are the phases of daylight offensive combat?
31. What is the purpose of the 5 paragraph order?
32. What are the advantages of the two man fighting position?
33. What do you NOT want to do with suspected IEDs?
34. What are the colors used on a map?
35. What are the three defensive positions?
36. What security considerations are used for day patrols?
37. What are the common parts of fighting positions?
38. What is the purpose of a night attack?
39. What is the purpose of contour lines on a map?
40. What is the acronym used for the five-paragraph order format?
41. In the phonetic alphabet, how is the letter W expressed?
42. What security considerations are used for night patrols?
43. What is the definition of an IED?
44. What are the characteristics of weapon condition three for the M16/ M4 service rifle?
45. What are the fundamentals of defense?
46. What are the advantages and disadvantages of a night attack?
47. What are the four types of fire team formations?
48. What are the disadvantages of the two man fighting position?
49. What are the characteristics of the M16/ M4 service rifle?
50. What are the five types of combat squad formations?
51. What are the three types of special patrolling signals?
52. What are the phases of a night attack?
53. What is the maximum effective range of individual/point targets of the M16 service rifle?
54. What is the maximum effective range of individual/point targets of the M4 service rifle?

COMBAT MEDICINE

COMBAT MEDICINE

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INTRODUCTION

1. PRINCIPLES OF TACTICAL COMBAT CASUALTY CARE (TCCC)

Chances are you've heard of Tactical Combat Casualty Care (TCCC). If not, it is the pre-hospital care rendered to a casualty in a tactical, combat environment. The principles of TCCC are fundamentally different from those of traditional civilian trauma care, where most medical providers and medics train. These differences are based on both the unique patterns and types of wounds that are suffered in combat and the tactical conditions medical personnel face in combat. Unique combat wounds and tactical conditions make it difficult to determine which intervention to perform at what time. Besides addressing a casualty's medical condition, responding medical personnel must also address the tactical problems faced while providing care in combat. A medically correct intervention at the wrong time may lead to further casualties. Put another way, "good medicine may be a bad tactical decision" which can get the rescuer and the casualty killed. To successfully navigate these issues, medical providers must have skills and training oriented to combat trauma care, as opposed to civilian trauma care.

The Committee on Tactical Combat Casualty Care (CoTCCC) is a standing multi-service committee charged with monitoring medical developments in regards to practice, technology, pharmacology and doctrine. New concepts in hemorrhage control, airway management, fluid resuscitation, analgesia, antibiotics and other lifesaving techniques are important steps in providing the best possible care for our Marines and Sailors in combat. TCCC was developed to emphasize the need for continued improvement in combat pre-hospital care.

TCCC has one basic principle: perform the correct intervention at the correct time.

2. PHASES OF TCCC

In thinking about the management of combat casualties, it is helpful to divide care into three distinct phases, each with its own characteristics and limitations:

Care Under Fire - care rendered at the scene while both the Corpsman and the casualty are still under effective hostile fire. The risk of additional injuries from hostile fire at any moment is extremely high for both the casualty and the Corpsman. Available medical equipment is limited to that carried by the Corpsman and casualty. The only medical condition treated during this phase is life-threatening hemorrhage. Research has shown if a casualty has an airway problem during this phase they will, more than likely, die of their wounds with or without treatment so the risk in exposing the care giver to injury is not worth taking. The only medical equipment needed during this phase is a CoTCCC recommended tourniquet.

Tactical Field Care - care rendered once the Corpsman and casualties are no longer under effective hostile fire. This also applies to situations in which an injury has occurred on a mission, but there has been no hostile fire. Available medical equipment is still limited to that carried into the field by mission personnel but now there is more time to fully assess the casualty and reassess any treatment provided in the Care Under Fire Phase. Time to evacuation may vary from minutes to hours.

Tactical Evacuation (TACEVAC) Care - care rendered while the casualty is being transported to a higher capability of care. Tactical evacuation care encompasses both medical evacuation (MEDEVAC) and casualty evacuation (CASEVAC). Additional

personnel and equipment may be available depending on the type of vehicle being used (helicopter, ground ambulance, boat, etc.).

Throughout block 2, each lesson will reinforce the principles of TCCC. At the end of each lesson you will find a gray box that will highlight the critical task that you will be expected to perform during your Casualty Assessment Performance Evaluation.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1410
Hemorrhage Control

TERMINAL LEARNING OBJECTIVE

1. Given a casualty with life-threatening hemorrhage in a tactical environment and standard field medical equipment and supplies, identify hemorrhage control techniques, to prevent further injury or death, per the references. (FMST-HSS-1410)

ENABLING LEARNING OBJECTIVE

1. Without the aid of references, given a description or list, **identify the types of hemorrhage**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7. (FMST-HSS-1410a)
2. Without the aid of references, given a description or list, **identify the signs and symptoms of internal hemorrhage**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7. (FMST-HSS-1410b)
3. Without the aid of references, given a description or list, **estimate the amount of blood loss**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7. (FMST-HSS-1410c)
4. Without the aid of references, given a description or list, **identify the methods of hemorrhage control**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7. (FMST-HSS-1410d)
5. Without the aid of references, given a description or list, **identify the principles of bandaging**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7. (FMST-HSS-1410e)
6. Without the aid of references, given a description or list, **state the purpose of hemostatic agents**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7. (FMST-HSS-1410f)
7. Without the aid of references, given a description or list, **identify the indications for use of hemostatic agents**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7. (FMST-HSS-1410g)
8. Without the aid of references, given a description or list, **identify the precautions for use of the CoTCCC approved hemostatic agent(s)**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7. (FMST-HSS-1410h)
9. Without the aid of references, given a description or list, **identify the components of the individual first aid kit (IFAK)**, within 80% accuracy, per the MCRP 3-02G and the User's Instructions for the IFAK. (FMST-HSS-1410i)
10. Without the aid of reference materials, given a casualty with life-threatening hemorrhage and standard field medical equipment and supplies, **manage hemorrhage**, to prevent further injury or death, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7. (FMST-HSS-1410j)

OVERVIEW

Historically, 20% of all injured combatants die on the battlefield. Of that 20%, approximately 65% will die of massive, multiple trauma and are probably not salvageable. Based on the data from the Vietnam conflict, over 60% of battlefield casualties died of exsanguination (bleeding out) within 3 to 5 minutes and could have been saved with timely intervention. In order to continue to decrease these statistics, you must be able to rapidly identify and manage internal and external hemorrhage. You must also recognize the type of bleeding, apply the appropriate hemorrhage control techniques, understand the varying degrees of risk associated with types of hemorrhage, and how to estimate blood loss.

1. TYPES OF HEMORRHAGE

Hemorrhage is defined as blood escaping from arteries, veins or capillaries.

Arterial - if an artery near the surface is damaged, **bright red blood** will gush out in spurts that are synchronized with the heartbeat.
Venous - blood from the veins is **dark red**. Venous bleeding is characterized by a steady, even flow.
Capillary - capillary blood is usually **brick red** in color. If capillaries bleed, the blood oozes out slowly.

External Hemorrhage - loss of blood from wounds that damage the large vessels of the extremities are a common source of massive external hemorrhage in combat. The cause of external hemorrhage can be varied depending on the setting in which the injury has taken place. Some of these causes include, but are not limited to, gunshots, stabbings, shrapnel, vehicle accidents and blasts. The importance for you lies in the identification of life threatening hemorrhage versus non-life threatening hemorrhage. The difference between life threatening and non-life threatening exists in the amount of blood loss and the class of shock of the patient.

Signs and Symptoms
- Massive blood loss
- Obvious sign and symptoms of shock
- Class III or IV shock

Internal Hemorrhage - blood loss into the chest or abdomen cannot be controlled in the field. Despite aggressive treatment and fluid resuscitation, casualties with major internal vascular injuries frequently die in the field. The patient with severe internal hemorrhage may develop hypovolemic shock before the extent of the blood loss is realized. Internal hemorrhage requires immediate surgical intervention at a higher capability of care. Bleeding, however slight, from any body orifice is serious, as it usually indicates an internal source of hemorrhage that may not be readily evident. Signs that may indicate serious internal injury (or disease) would include bleeding from the mouth, rectum or blood in the urine. Nonmenstrual bleeding from the vagina is always significant. Internal hemorrhage can be caused by the following examples of injuries: blunt trauma, concussion injuries from blasts, vehicle accidents, falling from heights, collapsing buildings and closed fractures (bones or bone fragments lacerate arteries or large veins).

Signs and symptoms – Bleeding, however slight, from any body orifice is serious as it usually indicates an internal source of hemorrhage that may not be readily evident. The

FMST may see:
- Hematemesis (vomiting of bright red blood)
- Hemoptysis (coughing up of bright red blood)
- Melena (black tarry stools)
- Hematochezia (bright red blood from the rectum)
- Hematuria (blood in the urine)
- Ecchymosis (bruising)
- Rapidly forming hematoma and edema
- Rigidity with or without rebound tenderness upon palpation in abdomen
- Signs of shock

2. **SIGNS AND SYMPTOMS OF EXTERNAL AND INTERNAL HEMORRHAGE**

External hemorrhage
- Massive blood loss
- Obvious signs and symptoms of shock (Class III or IV shock)

Internal hemorrhage
- Hematemesis (vomiting bright red blood)
- Hemoptysis (coughing up bright red blood)
- Melena (black tarry stools)
- Hematuria (blood in the urine)
- Ecchymosis (bruising)
- Rapidly forming hematoma and edema
- Rigidity with or without rebound tenderness upon palpation in the abdomen
- Signs of shock

3. **ESTIMATING BLOOD LOSS (EBL)** (see figure 1)

Gather a quick estimation of blood loss based on the following factors:
- Look for blood surrounding the patient.
- Inspect clothing for blood saturation.
- Inspect bandage saturation for associated blood loss. See figure 1 for amount of blood each dressing will hold when fully saturated.
- Determine level of shock

	Small Battle Dressing	Medium Battle Dressing	Large Battle Dressing	Abdominal Battle Dressing
Amount of estimated blood	300 ml	750 ml	1000 ml	2500 ml
*EBL	About 6%	About 15%	About 20%	About 50%
*Amounts are based on the average adult blood volume of about 5 liters.				

Figure 1. Estimating Blood Loss Based On Saturation of Dressings

Massive hemorrhage may be fatal within 60 – 120 seconds. Treatment should not be delayed and controlling major hemorrhage should be the first priority over securing the airway.

4. METHODS OF HEMORRHAGE CONTROL

Direct Pressure

Direct pressure, applied over a bleeding site, is the initial technique used to control external hemorrhage for non life-threatening bleeding. Most external hemorrhage is readily controlled by direct pressure at the bleeding site, even carotid and femoral bleeding! To perform direct pressure correctly requires two hands pushing against the casualty's wound laying on a flat and hard surface. You must lean into delivery of direct pressure and never let up on it to check the wound. If you need to perform other procedures, a pressure dressing can be made using bandages and ace wraps. If direct pressure fails to control extremity hemorrhage, the next step is to use a tourniquet. The only time a tourniquet will be the first step in controlling hemorrhage is in the Care Under Fire phase.

5. BANDAGES AND DRESSINGS

A bandage is any material used to hold a dressing in place. It can be applied to wrap or bind a body part or dressing. The bandage also provides additional pressure to the dressing or splint and protects and covers the dressing completely.

Things to keep in mind about bandages/dressings

- Ensure the dressing is tight enough.
- Provide pressure over the entire wound.
- Dressings must cover the entire wound, bandages must cover entire dressing.
- Leave the fingers and toes exposed
- Assess circulation and neurological status using **PMS:**
  - **P**ulse (check pulses in extremities)
  - **M**otor (movement)
  - **S**ensation (can the patient feel you touching them?)
- If hemorrhage continues:
  - **DO NOT** remove the first pressure dressing; apply a second one over the first

The following provides brief information regarding the types of bandages and dressings that you may encounter:

Kerlix gauze

Advantages:
- Extremely absorbent
- Weave of material makes roll stretchable
- Sterile
- Good for packing cavities

Disadvantages:
- Looses bulk when wet
- Catches debris and snags very easily

Ace wrap

Advantages:
- Can be applied quickly
- Gives pressure to the entire affected area
- Provides excellent support for sprains and strains

Disadvantages:
- Can decrease peripheral circulation

Aspirin use on the battlefield?

The use of aspirin or any other blood thinner while in a combat setting can lead to increased blood loss not only during surgical procedures, but also when injured on the battlefield. Aspirin is not sold over the counter at exchange outlets while deployed, nor should it be given to Marines or Sailors without a doctor's order. Be sure to educate your Marines and other Sailors on this topic.

Cravats or Triangular Bandages (37”x37”x52”)

Advantages:

- Versatile
- Come in small packages with safety pins
- Can be used as a tourniquet

Disadvantages:

- Has very little absorbency

Combination Dressing/bandage (see figure 2 & 3)

Cinch Tight, Sterile Compression Bandage (8” x 10”)

These pressure dressings are four-inch wide elastic wraps with an 8”x10” absorbent cotton pad attached close to the end of one side of the elastic wrap. On the other side of the absorbent pad, in the middle on the elastic wrap side, is a steel S-hook that allows for self-application of the dressing and gives it the ability to be applied tightly. Finally, at both ends of the elastic wrap are velcro strips that allow for ease of securing the dressing.

Figure 2. Cinch tight dressing

Instructions for use

- Open and remove bandage.
- Unroll the bandage and place absorbent pad on wound with hook on top.
- Anchor elastic wrap onto Velcro strip at bandages edge.
- Feed elastic bandage through hook and pull to secure absorbent pad in place.
- Wrap the elastic bandage tightly in the direction through which it was pulled.
- Press the velcro strip at the very end onto the bandage to secure it.

“H” Bandage Combat Dressing

These pressure dressing bandages are 4” wide elastic wraps with 8” x 10” absorbent cotton pad attached close to the end of one side of the elastic wrap. On the other side of the absorbent pad, in the middle on the elastic wrap side is a hard plastic H-anchor that allows for wrapping the dressing around the anchor to apply pressure directly over wound. It also gives it the ability for self-application. Pressure dressings can be applied to extremity, chest, abdominal, and head wounds.

Figure 3. “H” Bandage

Instructions for use

- Open and remove pressure dressing.
- Place pressure dressing over injury with steady pressure, isolating velcro end.
- Pull draped elastic end and secure to velcro end.
- Feed wrap through lower leg of H anchor, pulling firmly.
- Wind wrap back around injury site and feed wrap through upper leg of H – anchor, pulling firmly.
- Continue wrapping elastic wrap around injury site, keeping the wrap tight.
- Firmly attach velcro end of wrap and secure with plastic hooks on sides of wrap.

- For fractures of the arm, the elastic wrap can be used as a sling or swathe.

Expedient (Improvised) Dressing and Bandages

- Patients clothing.
- Patients equipment.
- Your only limitation is YOUR imagination!!!!

Tourniquets: (for more information see the PHTLS, 6th Ed, pages 501-513).

In civilian trauma care the use of a tourniquet is reserved for when direct pressure fails, **this is not the case in Care Under Fire**. The initial treatment for an extremity hemorrhage in a tactical setting is a tourniquet. A pressure dressing can be used later in the care process of a combat casualty.

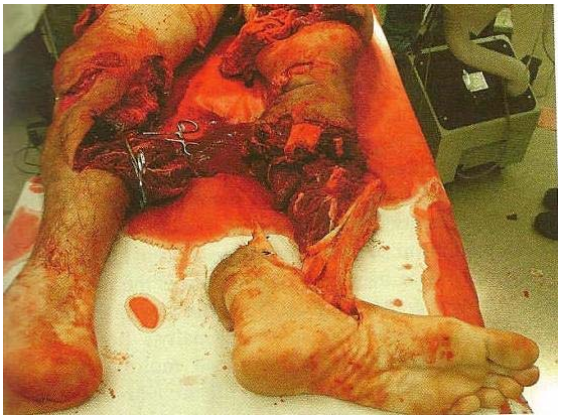


Figure 4. Casualty who was saved using a tourniquet

The standard "web belt through the buckle" tourniquet issued by the military during Vietnam was not highly regarded by the combat medic community. The U.S. Army Institute of Surgical Research identified the Combat Application Tourniquet (CAT) as the one best suited for battlefield use and is the CoTCCC recommended tourniquet. This tourniquet can be rapidly applied with one hand to one's own or another's extremities. This tourniquet is issued throughout all U.S. combatant forces. If the CAT is not available the provider should be able to make a "field expedient" tourniquet. The use of the tourniquet in a combat setting is not limited to solely the CAT, there may be other brands of tourniquets. While it may have a different name, the principles of use are similar. The goal is to stop arterial bleeding in an extremity to prevent loss of life. Imagine trying to control the bleeding of the casualty in figure 4 without a tourniquet!

Characteristics of the CAT (see figure 5)

- US Army Institute of Surgical Research and CoTCCC recommended
- Lightweight
- Easy to apply and use

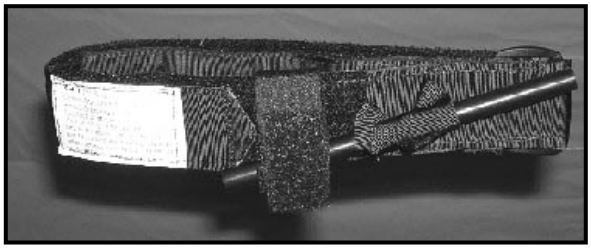


Figure 5. CAT Tourniquet

Field Expedient Tourniquet (see figure 6)

- If CAT is unavailable, choose a material about two inches (2") wide.
- Material such as rope, wire and string should **NOT** be used because they can cut into flesh.
- Tie a strong windlass (stick) to a cravat or other strong material.
- Slide one or two rings on each side of the cravat.
- Tie the cravat around the affected limb, two to four inches above the wound, loosely. (This will allow the windlass to turn, creating

Figure 6. Improvised Tourniquets

circumferential pressure to stop the bleed.)
- Twist the windlass until the hemorrhage is controlled.
- Slide the ring to the windlass and secure windlass to the ring(s).

Tourniquet Application

Application site - a tourniquet should be applied approximately 2-3 inches above the hemorrhaging wound. During the Care Under Fire phase, there is no need to expose the site before tourniquet application, it can be applied over the uniform. However, once out of the Care Under Fire Phase, reassess tourniquet application by exposing site. Do NOT place a tourniquet below the knee or elbow or over a joint due to there being two bones, i.e., Tibia/Fibula below the knee, and Radius/Ulna below the elbow, which can splint the hemorrhaging vessel and make it impossible to control the bleed.

What about those Rings???
Examples of good rings to use:
- Key chain rings
- Sport drink rings
- Boot laces tied into a ring
- Anything that is in a ring shape with the approximate diameter of 1-2 inches

Application tightness - apply tourniquet tight enough to block arterial flow. Generally, the bigger the limb, the tighter the tourniquet. So a leg will require more pressure to control bleeding than an arm will. If injured limb is still present, check distal pulse to ensure it is occluded.

Other considerations - it may be necessary to use more than one tourniquet to control severe bleeding. A second tourniquet should be applied just proximal to the first, if needed. Another thing to remember is that a tourniquet will be painful for the conscious casualty to tolerate but don't stop tightening until the hemorrhage is controlled. Pain management should be considered provided the casualty does not have signs of Class III or IV shock. You must document placement of a tourniquet by placing a "T" and the time of application on the casualty's forehead or other conspicuous spot. After application, do not cover a tourniquet under any condition, leave it exposed to ease monitoring for continued hemorrhage.

Converting a Trouniquet to a Dressing

Tourniquet use is the first line of hemorrhage control while in the Care Under Fire Phase. Only when in the Tactical Field Care Phase should you even consider converting a tourniquet to a pressure dressing. Do **NOT** convert a tourniquet to a pressure dressing under the following conditions:
- The casualty is in Class III or IV shock (you will learn what this is in the Shock lesson).
- There has been a complete amputation below the tourniquet.
- There is no one to monitor the casualty for rebleeding.
- Tourniquet has been in place for more than 6 hours.
- Short transport time to surgical intervention.

6. **HEMOSTATIC AGENTS**

The only hemostatic agent approved by the CoTCCC is QuikClot Combat Gauze (see figure 7). A hemostatic agent causes the wound to develop a clot that stops the flow of blood and will remain within the wound until removed by medical personnel. It is applied to wounds with moderate to severe bleeding (venous or arterial). Hemostatic agents have strengths and liabilities and carry with them the requirement for specific training for all members of the

combat team. QuikClot Combat Gauze is the first line treatment of uncontrolled hemorrhage in a tactical setting.

Figure 7. Combat Gauze

QuikClot Combat Gauze

Combat Gauze is tailored to the needs of combat and tactical medical personnel. It combines surgical gauze with an inorganic material that stops arterial and venous bleeding in seconds. It creates no heat, is inert and non-allergenic. It can be fit to any size or shape wound, including penetrating wounds. Combat Gauze comes in rolls four yards long by three inches wide. Remember, hemostatic agents are only to be used when in the Tactical Field Care Phase of TCCC.

Application Procedures: (see figure 8)

- Expose injury by opening or cutting away clothing.
- Remove excess blood from wound while preserving any clots that may have formed, if possible.
- Locate the source of the most active bleeding.
- Remove Combat Gauze from package and pack it tightly into the wound directly over the site of the most active bleeding. (More than one roll of Combat Gauze may be required to control the hemorrhage.)
- Combat Gauze may be re-packed or adjusted in the wound to ensure proper placement.
- Apply direct pressure quickly with enough force to stop the bleeding.
- Hold direct pressure for a minimum of 3 minutes.
- Reassess for bleeding control.
- Once applied, Combat Gauze is not to be removed (except by proper medical authority). If bleeding continues, reinforce would with another roll of Combat Gauze and hold pressure.
- Leave Combat gauze in place and secure with a pressure dressing.
- Document, place empty package near wound, and transport patient.

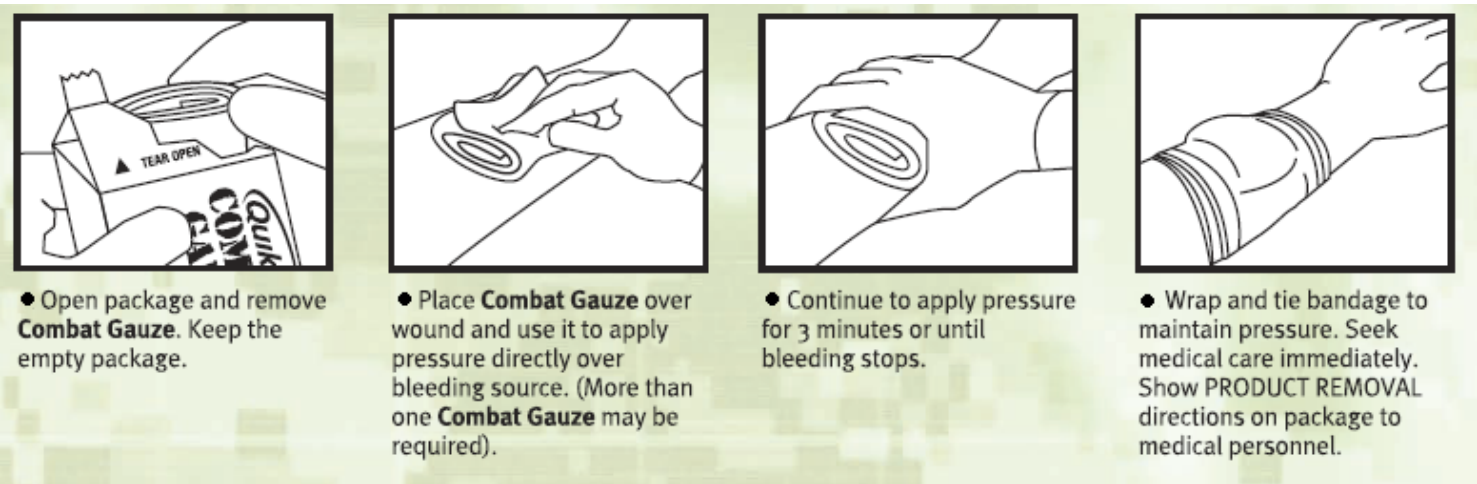


Figure 8. Application Procedures

7. **COMPONENTS OF THE INDIVIDUAL FIRST AID KIT (IFAK)**

The IFAK is designed to be more compact and have greater life saving capability than its predecessors. The IFAK is issued to every Marine and Sailor. Your Corpsmen Assault Pack will have more medical gear than the IFAK but this section is designed to introduce its contents and characteristics so you may better educate your Marine Corps personnel.

Bleeding to death is the leading cause of preventable death on the battlefield. As such, each Marine's IFAK contains many of the items discussed in this chapter. It is essential that all Marines are properly trained in their use. Training is one of the many responsibilities of the FMST.

Contents

- Adhesive Bandages (10)
- CAT – Control life-threatening hemorrhage
- Combat Gauze - Hemostatic agent for hemorrhage
- H-bandage (2) – Wound treatment
- Water-Jel (1) - Burn Dressing
- Triangular Bandage (2) – Sling/Swathe, secure splint
- Pack of Alcohol Pads (1) – Clean site
- Gloves (2) – Body Substance Isolation
- Iodine (1) – Cleaning sites, water purification
- Band Aids (10) – Treating minor wounds (10)
- Kerlix (2) – Pack wounds, secure splint
- Tape (1) – Securing items

In summary, there is one important factor in hemorrhage control: There is no single, best method to control hemorrhage. Each situation is different. Factors such as the amount of blood lost, proximity to surgical care, number of other casualties, and resources available(medical and transport) will affect your decision.

CASUALTY ASSESSMENT AND HEMORRHAGE CONTROL

Care Under Fire Phase: Hemorrhage control is the only intervention performed during this phase! You must be able to recognize “life-threatening” hemorrhage. For extremity hemorrhage, use a tourniquet. For non-extremity hemorrhage, use direct pressure. NO HEMOSTATE AGENT USED DURING THIS PHASE!

Tactical Field Care Phase: During this phase, reassess your treatment performed during Care Under Fire Phase to control the hemorrhage. Don BSI. Assess the airway and intervene if necessary. Complete a head to toe assessment using DCAP-BTLS (deformities, contusions, abrasions, punctures, burns, tenderness, lacerations, and swelling) noting and treating additional injuries. Determine if vascular access is required (see Tactical Fluid Resuscitation lesson) and give fluids if necessary. If the casualty is able to drink fluids, they should be encouraged to do so. Consider pain medications and give antibiotics if warranted. Reassess all care provided. Document care given, prevent hypothermia, and CASEVAC.

References:
Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 7
Committee on Tactical Combat Casualty Care Meeting Minutes, 22-24 July 2008
MCRP 3-02G
User's Instructions for the IFAK

Hemorrhage Review

1. List four signs or symptoms of internal hemorrhage.

2. Identify the appropriate treatment for life threatening hemorrhage during "Care Under Fire".

3. Where on the extremities should a tourniquet **NOT** be placed?

4. During which phase of TCCC is the use of hemostatic agents authorized?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1409

Manage Respiratory Trauma

TERMINAL LEARNING OBJECTIVES

1. Given a casualty with respiratory trauma in a tactical environment and standard field medical equipment and supplies, **manage respiratory trauma** to prevent further injury or death. (FMST-HSS-1409)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify standard medical terminology related to the respiratory system**, within 80% accuracy, per the Taber's Cyclopedic Medical Dictionary, current edition. (FMST-HSS-1409a)
2. Without the aid of references, given a description or title, **identify the anatomy of the respiratory system**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6 and 10. (FMST-HSS-1409b)
3. Without the aid of references, given a description or list, **identify signs and symptoms of respiratory trauma**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6 and 10. (FMST-HSS-1409c)
4. Without the aid of references, given a description or list, **identify treatments for open chest injuries**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6 and 10. (FMST-HSS-1409d)
5. Without the aid of references, given a description or list, **identify treatments for closed chest injuries**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6 and 10. (FMST-HSS-1409e)
6. Without the aid of references, given a simulated casualty with an open respiratory injury and standard field medical equipment and supplies, **manage the casualty,** per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6 and 10. (FMST-HSS-1409f)

1. **RESPIRATORY SYSTEM TERMINOLOGY**

Dyspnea - difficult or labored breathing
Wheeze - a form of rhonchus, characterized by a whistling respiratory sound. It is caused by the movement of air through a narrowed airway.
Stridor - a harsh shrill respiratory sound
Hyperventilation - an increase in the rate and depth of normal respirations. Responsible for increasing oxygen levels and decreasing carbon dioxide levels.
Tachypnea - abnormally rapid rate of respiration
Bradypnea - an abnormally slow rate of respiration, usually less than 8 breaths per minute
Hypoxia - an insufficient concentration of oxygen in the tissue in spite of an adequate blood supply.
Apnea - total cessation of breathing, also known as respiratory arrest
Subcutaneous Emphysema - the presence of free air or gas in the subcutaneous tissues. The face, neck, or chest may appear swollen with painful skin and produce a crackling sound ("rice crispies").
Trachea - also called the windpipe, it is the main trunk of the system of tubes by which air passes to and from the lungs. It is located in the front of the neck, descending from the lower larynx and is continuous with the bronchus.
Larynx - a structure superior to the trachea that encompasses the vocal cords also known as "voice box."
Epiglottis - lid like structure overhanging the larynx that prevents food from entering the respiratory tract.

2. **ANATOMY OF THE RESPIRATORY SYSTEM**

Thorax (Chest Cavity) (see figure 1)

Definition - skeletal portion of the thorax is a bony cage formed by the sternum, costal cartilages, ribs and the bodies of the thoracic vertebrae.

Ribs
- Joined in the posterior with the thoracic spine and anterior with the sternum via the costal cartilage.
- A nerve, an artery and a vein are located along the underside of each rib.
- Intercostal muscles connect each rib with the one above.

Diaphragm - The primary muscle of respiration.

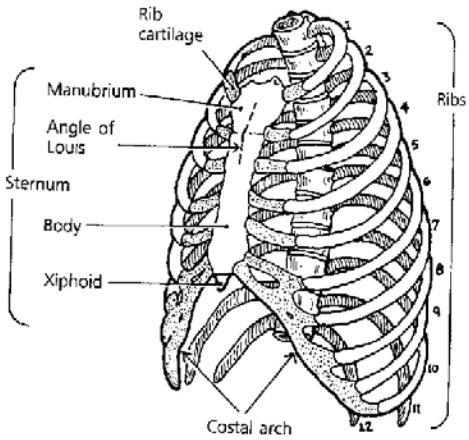


Figure 1. Thorax

Pleura (see figure 2)

Definition - thin membranes separated by a small amount of fluid, which creates surface tension and causes them to cling together, counteracting the lung's natural tendency to collapse.

Parietal pleura - a thin membrane that lines the inner side of the thoracic cavity
Visceral pleura - a thin membrane that covers the outer surface of each lung

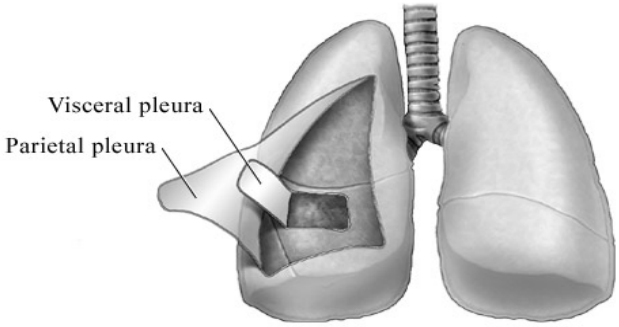


Figure 2. Pleura

Lungs (see figure 3)

- Occupy the right and left halves of the thoracic cavity
- The left lung is divided into two lobes
- The right lung is larger than the left lung and is divided into three lobes
- Alveoli- the smallest components of the lungs. They are small saclike structures through which the exchange of carbon dioxide and oxygen take place.

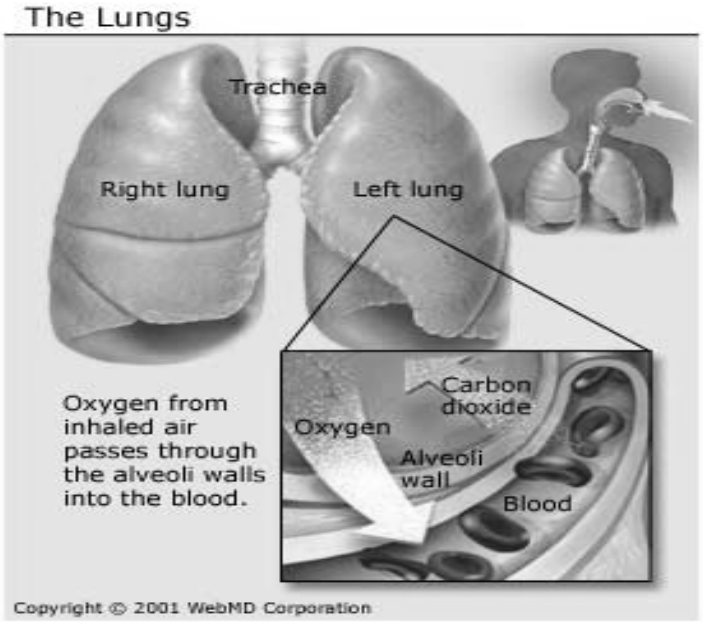


Figure 3. Lungs

Mediastinum

Definition - area in the middle of the thoracic cavity in which all the other organs and structures of the chest cavity lie. It encases the:

- Heart
- Great vessels (aorta, superior/inferior vena cava)
- Trachea (windpipe)
- Mainstem bronchi (there are two bronchi- a right and left)

- Esophagus (lies directly behind the trachea)

3. **RESPIRATORY TRAUMA**

Chest injuries are the second leading cause of trauma deaths each year, although the vast majority of all thoracic injuries (90% of blunt trauma and 70 to 85% of penetrating trauma) can be managed without surgery. Traumatic chest injuries can be caused by a variety of mechanisms; however, these injuries are usually classified as either blunt or penetrating.

Penetrating Injuries - caused by forces distributed over a small area (i.e., gunshot wounds or stabbings). Most often, the organs injured are those that lie along the path of the penetrating object.

Blunt Trauma - caused by forces distributed over a larger area, and many injuries occur from deceleration, bursting, or shearing forces. Conditions such as pneumothorax, pericardial tamponade, flail chest, pulmonary contusion and aortic rupture should be suspected when the mechanism of injury involves rapid deceleration, including motor vehicle collisions, falls, sport injuries and crush injuries.

Management of Specific Injuries

Rib fracture - occurs when pressure is applied with enough force to exceed the strength of the rib. Remember that any fractured rib can cause associated injuries to nearby structures.

Causes - blunt trauma, crushing injuries to the chest.

Signs and Symptoms

- Pain at the site with inhalation/exhalation
- Shortness of breath
- Deformity
- Crepitus
- Bruising to area

Treatment

- Anticipate potential complications such as tension pnuemothorax, pericarditis, or cardiac tamponade.
- Simple rib fractures usually require no treatment other than analgesics.
- Multiple rib fractures may require immobilization of the arm on affected side to protect the ribs.
- Encourage coughing and deep breathing despite associated pain. This is to prevent the collapse of the lung tissue and preventing the exchange of CO2 and O2 (atelectasis).
- Avoid any taping or bandaging that encircles the chest.
- Monitor and CASEVAC as necessary.

Flail chest - a condition of the chest wall due to two or more adjacent ribs being fractured in at least two or more places. The flail segment moves paradoxically in with inspiration and out during expiration (see figure 4)

Causes - blunt trauma to the chest wall, especially an impact into the sternum or the lateral side of the thoracic wall.

Signs and Symptoms

- Localized chest pain, aggravated by breathing or coughing
- Rapid shallow respirations
- Tenderness and/or bony crepitus with palpation
- Subcutaneous emphysema

Treatment

- Immobilize flail segments upon inhalation using strips of tape.
- If you suspect respiratory failure, give positive pressure ventilation using a bag valve mask.
- Administer analgesics (small doses of morphine can be given, see medication appendix at end of book).
- Administer oxygen if available.
- CASEVAC to the next capability of care.

Paradoxical chest wall movement during inspiration, the flail segment of the rib cage moves inward (instead of outward), which results in reduced air intake.

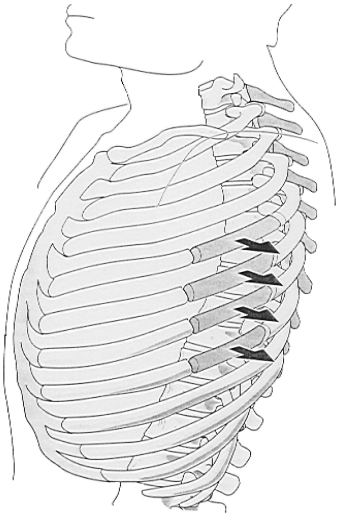


Figure 4. Flail Chest

Pneumothorax - a simple pneumothorax is caused by the presence of air in the pleural space. The air separates the two pleural surfaces, causing the lung on the involved side to collapse as the separation expands. As air continues to build up and pressure in the space increases, the size of the lung on the affected side continues to decrease. Eventually, the lung may partially or totally collapse.

Causes

- Penetrating trauma from either chest wall injury or abdominal injuries that cross the diaphragm.
- Blunt trauma
- Spontaneous (with no apparent cause)

Signs and Symptoms

- Pleuritic chest pain
- Tachypnea/dyspnea
- Decreased or absent breath sounds on the injured side
- Decreased chest wall motion

Treatment

- Place patient in sitting up or Semi-Fowlers position

- Administer oxygen if available
- Bag-valve-mask assisted breathing may be necessary if RR is less than 8 BPM, greater than 20 BPM, or signs of hypoxia
- If caused by a wound, apply an occlusive dressing to the site
- Monitor for signs and symptoms of a tension pneumothorax
- CASEVAC ASAP

Tension Pneumothorax (see figure 5) - a type of pneumothorax in which air can enter the pleural space but cannot escape via the route of entry. This is the **second** leading cause of preventable death on the battlefield. This leads to an increase of pressure in the pleural space and eventual collapse of the lung. This pressure forces the mediastinum to the opposite side, which results in two serious consequences: (1) breathing becomes increasingly difficult and (2) cardiac blood flow is severely decreased.

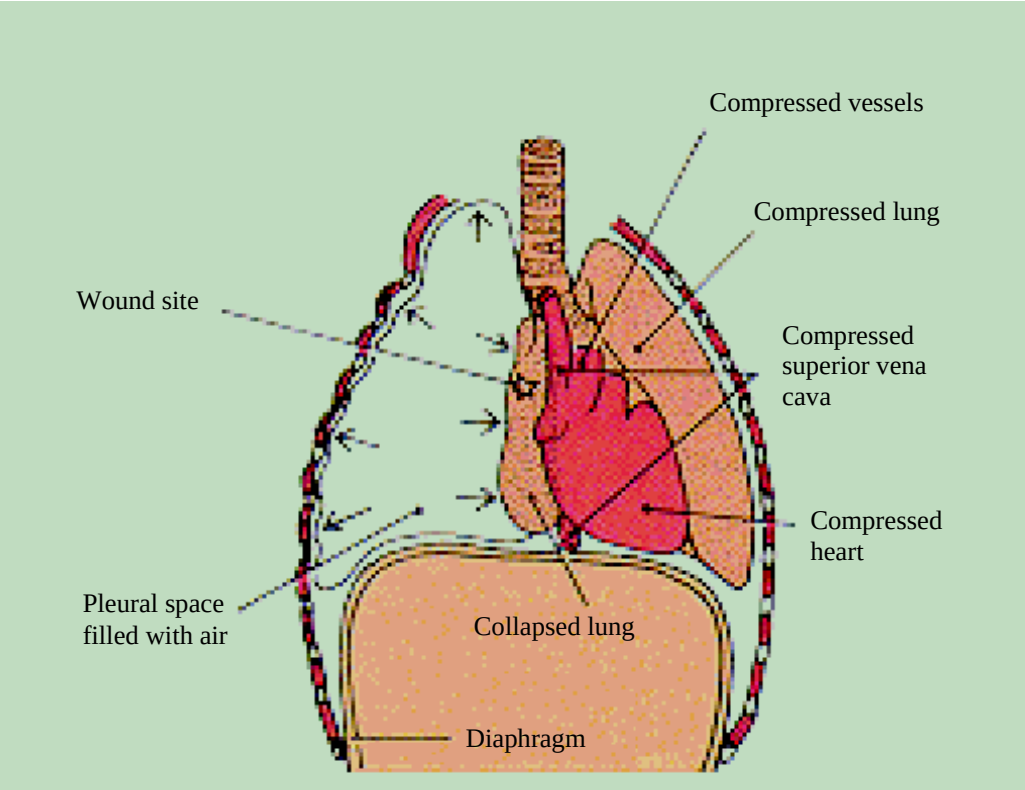


Figure 5. Tension Pneumothorax

Cause - chest injuries.

Signs and Symptoms

Early signs
- Unilateral (one sided) decreased or absent breath sounds
- Dyspnea
- Tachypnea

Progressive signs
- Increased dyspnea

In some cases, the only signs of a developing tension pneumothorax are compromised oxygenation, tachycardia, tachypnea, and unilateral decreased or absent breath sounds.

- Increased tachypnea
- Increased difficulty ventilating

Late signs

- Jugular vein distention (JVD)
- Tracheal deviation
- Signs of acute hypoxia
- Narrowing pulse pressures
- Signs of uncompensated shock

Treatment

- Treat all chest injuries
- Perform needle thoracentesis
- Administer oxygen therapy if available
- Pain management
- Monitor and CASEVAC to next capability of care

Open Pneumothorax (Sucking Chest Wound) - a collection of air or gas in the pleural space causing the lung to collapse. An open wound allows air to enter when the intrathoracic pressure is negative and blocks the air's release when the intrathoracic pressure is positive; creating a "sucking chest wound," that has the potential to cause a tension pneumothorax.

Causes - most often the result of gunshot wounds, but they can also occur from impaled objects.

Signs and Symptoms

- Pain at the injury site
- Chest wall trauma
- Shortness of breath
- Tachypnea
- Subcutaneous emphysema
- Decreased chest wall motion
- May hear a moist sucking or bubbling sound as air moves in and out of the chest wall defect.

Treatment

- Cover the wound with an occlusive dressing. Tape entrance wound on four sides to allow trapped air to exit pleural space while stopping air from entering. If an exit wound is present tape it on all four sides.
- Assess both anterior and posterior torso for penetrating trauma.
- Monitor for signs and symptoms of tension pneumothorax. If signs of increasing respiratory distress develop, the dressing over the wound should be removed to allow for decompression of any accumulating tension. If this is ineffective, needle decompression and positive pressure ventilation (if available) should be considered if not already employed.
- Administer oxygen if available
- Place patient on affected side
- Pain management
- Monitor and CASEVAC

Hemothorax - the accumulation of blood in the pleural space caused by a laceration of the great vessels within the chest that can significantly compromise respiratory efforts by compressing the lung and preventing adequate ventilation.

Causes - Penetrating or blunt trauma

Signs and Symptoms
- Shortness of breath
- Chest pain
- Tachypnea
- Signs of shock (pallor, confusion, tachycardia, hypotension)
- Decreased breath sounds on affected side
- Hemoptysis (coughing up blood)
- Decreased chest wall motion

Treatment
- Place patient in the Fowler's position
- Treat any chest injuries
- Treat for shock
- Administer O2, if available
- Pain management
- Monitor and CASEVAC

Hemopneumothorax - often with penetrating trauma, a pneumothorax is associated with a hemothorax, and an accumulation of air, blood, and fluid within the pleural cavity.

Causes - penetrating trauma to the chest wall, the great vessels, or the lung.

Signs and Symptoms
- Tachypnea
- Decreased breath sounds
- Signs of shock

Treatment
- Place patient in Fowler's position
- Perform needle thoracentesis to relieve pressure. If blood is withdrawn, immediately remove needle and catheter.
- Administer oxygen, if available
- Treat for shock
- Monitor and CASEVAC

4. **AIRWAY ADJUNCTS**

Nasopharyngeal Airway (see figure 6) – the nasopharyngeal airway (NPA) is a soft, rubberlike device that is inserted through one nostril along the curvature of the posterior wall of the nasopharynx and oropharynx. The NPA is used on casualties who are unable to maintain their own airways. It should **NOT** be used if there is no need for an airway adjunct. Use of an NPA can potentially cause bleeding during insertion.

Figure 6. Inserting a Nasopharyngeal Airway

Oropharyngeal Airway (see figure 7) – the oropharyngeal airway (OPA) is the most frequently used artificial airway. It is inserted in either a direct or an inverted manner. The OPA is used on casualties who are unable to maintain their own airways, as well as to prevent intubated casualties from biting ET tubes. The OPA should **NOT** be used on casualties who are conscious or semiconscious as it's use may lead to gagging, vomiting, or laryngospasms in conscious casualties because of its stimulation of the gag reflex.

Figure 7. Oropharyngeal Airway

King LT

Figure 8. King LT

The King LT (see figure 8) is a reusable airway created as an alternative to tracheal intubation or mask ventilation. Allowing maximum versatility as an airway management tool, the King LT is designed for positive pressure ventilation as well as for spontaneously breathing patients. It is easily inserted and results in minimal airway trauma. The King LT is latex-free and can be autoclaved up to 50 cycles.

CASUALTY ASSESSMENT AND RESPIRATORY TRAUMA

Care Under Fire Phase: In the absence of life-threatening hemorrhage from the respiratory system, the material in this section is unlikely to be addressed in the Care Under Fire Phase.

Tactical Field Care Phase: During this phase, you will be required to assess the quality of breathing, which will require you to expose the casualty's chest. Consider needle thoracentesis if warranted. Don BSI. Note and treat all respiratory injuries. Complete a head to toe assessment using DCAP-BTLS noting and treating additional injuries. Determine if vascular access is required (see Tactical Fluid Resuscitation lesson) and give fluids if necessary. If the casualty is able to drink fluids, they should be encouraged to do so. Consider pain medications and give antibiotics if warranted. Reassess all care provided. Document care given, prevent hypothermia, and CASEVAC.

REFERENCE

Pre-Hospital Trauma Life Support, Military Edition, 7th Ed, Chapter 6 and 10

Respiratory Trauma Review

1. Identify five structures found in the mediastinum.

2. Identify the appropriate treatment for a simple rib fracture.

3. Identify the two serious consequences of a tension pneumothorax.

4. Identify the treatment for a sucking chest wound.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1418
Perform Emergency Cricothyroidotomy

TERMINAL LEARNING OBJECTIVES

1. Given a casualty that meets the needs for an emergency Cricothyroidotomy in a combat environment and standard field medical equipment and supplies, **perform an emergency Cricothyroidotomy** to prevent further injury or death. (FMST-HSS-1418)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify important anatomical landmarks for an emergency cricothyroidotomy**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6. (FMST-HSS-1418a)
2. Without the aid of references, given a description or list, **identify the indications for performing an emergency cricothyroidotomy**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6. (FMST-HSS-1418b)
3. Without the aid of references, given a description or list, **identify the proper equipment for performing an emergency cricothyroidotomy**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6. (FMST-HSS-1418c)
4. Without the aid of references, given a description or list, **identify the procedural sequence for emergency cricothyroidotomy**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6. (FMST-HSS-1418d)
5. Without the aid of references, given a description or list, **identify potential complications of emergency cricothyroidotomy**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6. (FMST-HSS-1418e)
6. Without the aid of references, given a simulated casualty and standard field medical equipment and supplies, **perform an emergency cricothyroidotomy**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6. (FMST -HSS-1418f)

1. **ANATOMICAL LANDMARKS** (see figure 1)

Emergency cricothyroidotomy is a surgical procedure where an incision is made through the skin and cricothyroid membrane. This allows for the placement of a tracheal tube into the trachea when control of the airway is not possible by other methods.

Trachea - also known as the windpipe. It is the cartilaginous and membranous tube descending from, and continuous with, the lower part of the larynx to the bronchi.

Thyroid Cartilage - also known as the "Adam's Apple." The thyroid cartilage is located in the upper part of the throat. The thyroid cartilage tends to be more prominent in men than women.

Cricoid Cartilage - located approximately ¾-inch inferior to the thyroid cartilage. The cricoid and thyroid cartilage form the framework of the larynx.

Cricothyroid Membrane - soft tissue depression between the thyroid and cricoid cartilage. This membrane connects the two cartilages and is only covered by skin.

Carotid Arteries - two principal arteries of the neck.

Jugular Veins - two principal veins of the neck.

Esophagus - musculo-membranous tube extending downward from the pharynx to the stomach. The esophagus lies posterior to the trachea.

Thyroid Gland - largest endocrine gland, the thyroid gland is situated in front of the lower part of the neck. Consists of a right and left lobe on either side of the trachea.

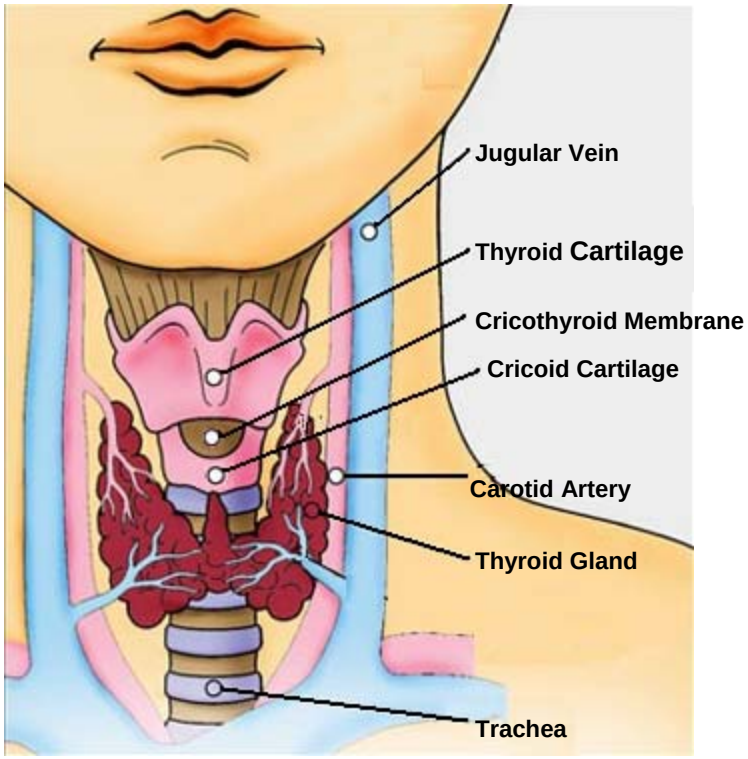


Figure 1. Anatomical Landmarks

2. **INDICATIONS**

There are many reasons an emergency cricothyroidotomy may be required. Listed below are a few of the most common reasons:

Obstructed airway - obstructed airway and/or swelling of tissues will usually prevent the passage of an endotracheal tube through the airway. Therefore, a surgical airway distal to the obstruction is required. Causes of an obstructed airway include:

- Facial and oropharyngeal edema from burns
- Foreign objects (food or teeth)

Congenital deformities of the oropharynx or nasopharynx will inhibit or prevent nasotracheal or orotracheal intubation.

Trauma to the head and neck would preclude the use of an ambu-bag, oropharyngeal airway, nasopharyngeal airway and endotracheal tube insertion.

Examples include:

- Facial and oropharyngeal edema from severe trauma
- Facial fractures (mandible fracture)
- Nasal bone fractures
- Cribiform fractures

Cervical spine fractures in a patient who needs an airway but whose intubation is unsuccessful or contraindicated.

Last resort - healthcare provider is unable to establish an airway by any other means.

3. **PROPER EQUIPMENT**

- Personal Protective Equipment
- Scalpel with no. 10 (preferred) or no. 11 blade
- 6-mm endotracheal tube
- Tape to secure endotracheal tube
- Bag-valve-mask (BVM) and oxygen source

Most of this equipment is included in the cricothyroidotomy set in the Corpsman Assault Pack (CAP). However, be aware there is no BVM in the CAP, so either supplement your CAP or be prepared to perform mouth to neck ventilations.

4. **PROCEDURAL STEPS**

Step 1 - prepare and position patient. The patient should be placed in a supine position, with the neck placed in the midline. If time permits, quickly cleanse the site with alcohol or betadine swabs.

Step 2 - stand to one side of the patient at the neck. If you are right handed, stand to the right side of the patient; left handed, the left.

Step 3 - locate the cricothyroid membrane by palpating the thyroid and cricoid cartilage for orientation. The cricothyroid membrane is in the hollow between the two cartilages.

Step 4 - Make incision (see figure 2).

- Stabilize the thyroid cartilage using the thumb and middle finger of your non-dominant hand.
- Using the scalpel, make a **vertical** incision through the skin approximately 2.5 cm (1 inch) long over the cricothyroid membrane.
- Visualize the cricothyroid membrane.
- Enter cricothyroid membrane by making a **horizontal** incision through the cricothyroid membrane.
- **DO NOT** make the incision more than **½ inch** deep or you may perforate the esophagus.

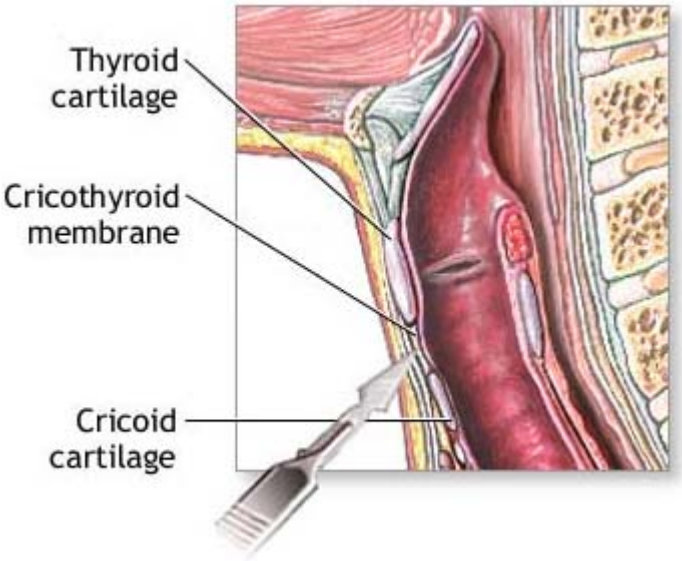


Figure 2. Incision over the Cricothyroid Membrane

Step 5 - Open Incision

- Place the back end of the scalpel handle into the incision to widen the opening.

Step 6 - Insert Tube

- Insert the endotracheal tube into the opening.

Step 7 - Secure Dressing

- Suture the tube with ribbon and/or tape.
- Ensure the tube is inserted no more than 2 to 3 inches so the tube does not slip down the right main-stem bronchus with any movement.

Step 8 – Connect to Oxygen Supply (if available).

- Connect a bag-valve-mask device for ventilation.
- Check for breath sounds. If no ventilation is heard bilaterally, pull the tube out and reinsert it.
- Constantly recheck for breath sounds to ensure tube is positioned correctly.
- If breath sounds are absent on the **left** side only, the tube has been inserted down the right main-stem bronchus and should be pulled back a few centimeters. This typically occurs with the use of the endotracheal tube.

5. **ASSOCIATED COMPLICATIONS**

Hemorrhage - **The most common complication**

Causes

- Minor bleeding may be caused by lacerating superficial capillaries in the skin.
- Significant bleeding may be caused by the laceration of major vessels (carotid arteries and the jugular veins) within the neck.

Treatment

- Minor bleeding is treated with direct pressure and the application of a simple pressure dressing.
- Significant bleeding - treated same as minor. However, if unable to control the bleeding, the vessel may need to be ligated (tied off).

Esophageal Perforation or Tracheoesophageal Fistula - the creation of a hole between the esophagus and trachea.

Causes

- Creating an incision too deep through the cricothyroid membrane.
- Forcing the ET tube through the cricothyroid membrane and into the esophagus.

Treatment - requires surgical repair at higher echelon of care.

Subcutaneous emphysema - the presence of free air or gas within the subcutaneous tissues. Upon palpation, a crackling sensation may be felt as the air is pushed through the tissue.

Causes

- Creating too wide of an incision will allow air entrapment under the skin.
- Air leaking out of the insertion site may get trapped under the skin.

Treatment

- No treatment is necessary. The subcutaneous emphysema will resolve spontaneously within a few days.
- The placement of petroleum gauze dressing around the incision/insertion site will help reduce the incidence of subcutaneous emphysema.

Why Don't We Learn How to Intubate?

1. No studies have examined the ability of well-trained but relatively inexperienced military medics to accomplish endotracheal intubation.
2. Many Corpsmen and Medics have never performed an intubation on a live casualty or even a cadaver.
3. Standard endotracheal intubation techniques entail the use of a tactically compromising white light in the laryngoscope.
4. Endotracheal intubation can be extremely difficult in a casualty with maxillofacial injuries.

CASUALTY ASSESSMENT AND EMERGENCY CRICOTHYROIDOTOMY

Care Under Fire Phase: In the absence of life-threatening hemorrhage, there is no care given for a casualty who needs a surgical cricothyroidotomy in this phase.

Tactical Field Care Phase: Cricothyroidotomy is a skill you may use during Tactical Field Care Phase. The need to perform an emergency cricothyroidotomy is made after you have attempted to control the airway with other, less invasive methods (i.e., NPA). Remember, once the patient has received a cricothyroidotomy, they are now totally dependent upon you and now become much more difficult to manage in a tactical environment. Don BSI. Complete a head to toe assessment using DCAP-BTLS noting and treating additional injuries. Determine if vascular access is required (see Tactical Fluid Resuscitation lesson) and give fluids if necessary. It is unlikely the casualty will be able to drink fluids. Consider pain medications and give antibiotics if warranted. Reassess all care provided. Document care given, prevent hypothermia, and CASEVAC.

REFERENCES

Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 6
Emergency Medicine, 6th Ed, Chapter 20

STUDENT (Last Name, First Name, MI.)	**PLT**

PROCEDURAL STEPS FOR PERFORMING AN EMERGENCY CRICOTHYROIDOTOMY	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
State the indications for an emergency cricothyroidotomy (obstructed airway, congenital deformities, trauma to head/neck, cervical spine fracture, last resort)						
State the contraindications for an emergency cricothyroidotomy (massive trauma the larynx or cricoid cartilage)						
Assess patient and make decision to perform emergency cricothyroidotomy. (ABC's, LLF, Failed attempts at all other airway management)						
Assemble and check equipment (Gather #11 blade and handle, ET tube, 10 cc syringe, lubricant, stethoscope, Curved Kelly Hemostat, Petroleum and Sterile gauze, Betadine, Gloves, Suture Materials, Scissors, Tape-Check tube)						
Prepare patient (Place patient in supine or semi-recumbent position and place neck in neutral position)						
Locate landmarks & cleanse incision site (palpate thyroid and cricoid cartilages, locate cricothyroid membrane, stabilize the thyroid cartilage using your non-dominant hand, cleanse with betadine)						
Make 1 inch, vertical incision over the cricothyroid membrane using "tenting" technique						
Visualize cricothyroid membrane						
Make ½ inch, horizontal incision to cut through the cricothyroid membrane						
Open incision with blunt dissection						
Insert endotracheal tube into the incision, directing the tube distally down the Trachea (no more than 3 - 4 inches)						
Inflate balloon with 10cc's of air						
Ventilate patient with two breaths & check for proper placement (Auscultate epigastric area, If PT has epigastric sounds, remove and retry ,observe for bilateral rise/fall of chest, misting or fogging in E.T tube, auscultate for breath sounds bilaterally)						
Lung sounds on Right side only (deflate cuff, pull back ¼- ½ inch, reinflate cuff, recheck placement						
Secure tube						
Apply dressing (petroleum gauze on insertion site, dry sterile dressing over petroleum gauze)						
Reassess & monitor patient (if not breathing on own, 1 breath every 5 seconds, suction as necessary)						
State complications of cricothyroidotomy (hemorrhage, esophageal perforation subcutaneous emphysema)						

1st Evaluator:	2nd Evaluator:	3rd Evaluator:
PASS / FAIL	PASS / FAIL	PASS / FAIL
Student signature:	Student signature:	Student signature:
Notes:	Notes:	Notes:

Cricothyroidotomy Review

1. List the five indications for an emergency cricothyroidotomy.

2. List the eight steps in performing an emergency cricothyroidotomy.

3. Identify the most common complication from performing an emergency cricothyroidotomy.

4. What equipment is necessary to perform an emergency cricothyroidotomy?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1419

Perform Needle Thoracentesis

TERMINAL LEARNING OBJECTIVE

1. Given a casualty with a tension pneumothorax in a combat environment and standard field medical equipment and supplies, **perform Needle Thoracentesis**, to prevent further injury or death per the references. (FMST-HSS-1419)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify important anatomical landmarks of the chest for Needle Thoracentesis**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 10. (FMST-HSS-1419a)
2. Without the aid of references, given a description or list, **identify the indications for Needle Thoracentesis**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 10. (FMST-HSS-1419b)
3. Without the aid of references, given a description or list, **identify the proper equipment for performing Needle Thoracentesis**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 10. (FMST-HSS-1419c)
4. Without the aid of references, given a description or list, **identify the procedural sequence for Needle Thoracentesis**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 10. (FMST-HSS-1419d)
5. Without the aid of references, given a description or list, **identify potential complications of Needle Thoracentesis**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 10. (FMST-HSS-1419e)
6. Without the aid of references, given a simulated casualty and standard field medical equipment and supplies, **perform a Needle Thoracentesis**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 10. (FMST-HSS-1419f)

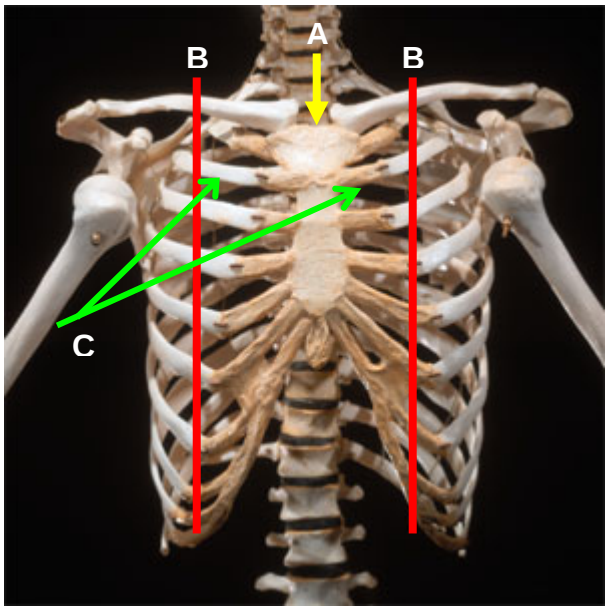
DEFINITION AND PURPOSE

Needle thoracentesis is a procedure where a needle and catheter are inserted through the chest wall into the pleural space. The catheter provides a pathway for the release of accumulated pressure within the pleural space. This procedure helps reduce pressure on the heart, lungs and major vessels within the chest cavity that have compromised the patient's breathing and circulation.

1. **ANATOMICAL LANDMARKS** (See figure 1)

   - Jugular Notch
   - Mid-Clavicular Line
   - 2nd or 3rd Intercostal Space - the 2nd intercostal space is found by dividing the clavicle in half. From that halfway point, palpate down one rib, and feel the first space below that rib. This is the 2nd intercostal space (the space immediately after the clavicle is the 1st intercostal space). The 3rd space is directly under the 2nd.

> FYI!! The 2nd or 3rd intercostal space is chosen because of ease of access while transporting the casualty. The lung on the affected side is collapsed and shifted to the other side, thus it is unlikely to be injured during the procedure.



A – Jugular Notch **B** – Mid-Clavicular Lines **C** – 2nd Intercostal Space

Figure 1. Needle Thoracentesis Anatomical Landmarks

2. **INDICATIONS**

   Any casualty with thoracic injury is at risk for developing a tension pneumothorax. Casualties at particular risk are those who have a penetrating wound to the chest and those with signs of rib fracture. **NOTE:** There are no significant contraindications for needle thoracentesis with penetrating chest trauma.

3. **PROPER EQUIPMENT**

   - Three and one quarter inch (3 ¼") over-the-needle 14 gauge catheter (10 to 14 gauge catheter can be used but the CoTCCC recommends 14 gauge)
   - Antiseptic solution (betadine or alcohol prep pads)
   - Gloves

4. **PROCEDURAL STEPS**

   Make your Decision - based on mechanism of injury (MOI) and a noted increase in difficulty breathing.

   - Inspect - look for bilateral rise and fall of the chest during respirations.

- Auscultate - listen to the lung fields at the mid-clavicular and mid-axillary lines bilaterally if tactical situation allows (it may be hard to hear in a combat setting).
- Palpate - feel for flail segments or crepitus.

Assemble and Check Gear
- 3 ¼" over-the-needle 14 gauge catheter
- Antiseptic solution
- Gloves
- Inspect for packaging integrity

Prepare Patient
- Position the patient in upright position (if possible)
- Explain the procedure to the patient, if conscious
- Expose the anterior chest

Identify Landmarks (on the affected side)

Locate:
- Jugular notch
- Midclavicular line - never insert the needle medial to the nipple line and ensure the tip of the catheter is NOT pointed toward the heart.
- 2nd or 3rd Intercostal space

Perform the Procedure
- Cleanse the area with betadine or alcohol
- Insert catheter into the 2nd intercostal space just superior to the 3rd rib, at a 90-degree angle into the skin and through the intercostal space. Ensure needle is not inserted medial to the nipple line and tip of needle is NOT pointed toward heart.
- Puncture the parietal pleura - the pressure may be so great that a rush of air may be encountered.
- Remove needle and catheter after pressure is released.

Reassess the Patient
- Inspect, Ausculate, and Palpate (IAP) Chest
- Visually inspect the neck
- Monitor the patient's response to the needle thoracentesis
  - Respiratory rate
  - Lung sounds
  - Skin color
- Continue to monitor the patient and reassess as necessary. Be ready to insert a 2nd catheter if the patient does not improve.

5. COMPLICATIONS

Hemothorax (blood within the pleural space) - caused when the needle punctures any vessels within the chest wall. The presence of blood in the pleural space does not necessarily mean it was caused by the catheter insertion. The initial trauma that caused the original pneumothorax may have caused it as well. Regardless, treatment remains the same.

Subcutaneous emphysema - released air becomes trapped within the subcutaneous tissue. Feels like "rice crispies" underneath the skin.

Air embolism - caused when the needle enters a great vessel within the chest wall and air is accidentally introduced into the central circulation.

Misdiagnosis - the additional trauma caused by the needle would not be expected to significantly worsen the casualty's condition should they not actually have a tension pneumothorax.

CASUALTY ASSESSMENT AND NEEDLE THORACENTESIS

Care Under Fire Phase: In the absence of life-threatening hemorrhage, there is no care given to a casualty in need of a needle throacentesis in this phase.

Tactical Field Care Phase: Needle thoracentesis is a skill that is used during the Tactical Field Care Phase in the treatment of respiratory trauma. Don BSI. If a casualty has a torso injury and difficulty breathing, you should perform a needle thoracentesis. Remember, a tension pneumothorax can develop at any time after an injury, not just immediately after, so continuous assessment of the casualty is necessary. Complete a head to toe assessment using DCAP-BTLS noting and treating additional injuries. Determine if vascular access is required (see Tactical Fluid Resuscitation lesson) and give fluids if necessary. If the casualty is able to drink fluids, they should be encouraged to do so. Consider pain medications and give antibiotics if warranted. Reassess all care provided. Document care given, prevent hypothermia and CASEVAC.

REFERENCE

Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 10

STUDENT (Last Name, First Name, MI.)	**PLT**

PROCEDURAL STEPS FOR PERFORMING A NEEDLE THORACENTESIS	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
State the indication for a needle thoracentesis (tension pneumothorax)						
Assess patient and make decision to decompress (ABC's, LLF, S/SX of pnuemothorax)						
Assemble and check equipment (alcohol, three and a quarter inch (3.25") over the needle catheter {10 to 14 gauge})						
Prepare patient (position of comfort)						
Identify landmarks (jugular notch, midclavicular line, 2nd intercostal space						
Cleanse the area						
Insert catheter at 90-degree angle and puncture the parietal pleura to release pressure						
Remove needle/catheter and rub site						
Reassess & monitor patient for improvement (decrease in respiratory difficulty)						
State the possible complications of a needle thoracentesis (hemothorax, subcutaneous emphysema, air embolism)						

1st Evaluator:	**2nd Evaluator:**	**3rd Evaluator:**
PASS / FAIL	**PASS / FAIL**	**PASS / FAIL**
Student signature:	**Student signature:**	**Student signature:**
Notes:	**Notes:**	**Notes:**

Needle Thoracentesis Review

1. Identify the three major landmarks used in performing a needle thoracentesis.

2. Identify the appropriate size over-the-needle catheter required for a needle thoracentesis.

3. Define the acronym IAP. Which step is the most difficult to perform in a tactical setting?

4. List in order, the six steps on the performance checklist.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1401

Manage Shock Casualties

TERMINAL LEARNING OBJECTIVES

1. Given a shock casualty in a combat environment and standard field medical equipment and supplies, **manage shock casualties**, to prevent further injury or death. (FMST-HSS-1401)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, **define standard medical terminology related to the cardiovascular system**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapters 7 & 21. (FMST-HSS-1401a)
2. Without the aid of references, given a description or title, **identify the anatomy of the cardiovascular system**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapters 7 & 21. (FMST-HSS-1401b)
3. Without the aid of references, given a description or list, **identify the different types of shock**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapters 7 & 21. (FMST-HSS-1401c)
4. Without the aid of references, given a list of symptoms, **list the signs and symptoms of each type of shock**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapters 7 & 21. (FMST-HSS-1401d)
5. Without the aid of references, given a list of symptoms of shock, **identify the appropriate treatment of each type of shock**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapters 7 & 21. (FMST-HSS-1401e)
6. Without the aid of references, given a shock casualty and a fully stocked corpsman assault pack and supplies, **manage shock casualties**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapters 7 & 21. (FMST-HSS-1401f)

OVERVIEW

Shock is regarded as a state of generalized cellular hypoperfusion in which delivery of oxygen to the cells is inadequate to meet metabolic needs. There is no laboratory test to diagnose shock. The initial step for managing shock in the injured patient is to recognize its presence. By far, the most common cause of shock in the trauma casualty is hemorrhage and the safest approach in managing the trauma casualty in shock is to consider the cause of it as being hemorrhagic until proven otherwise.

1. CARDIOVASCULAR SYSTEM TERMINOLOGY

Systolic Blood Pressure (SBP) - the force of the blood against blood vessels produced by ventricular contraction. (Normal systolic B/P = 120-140 mmHg)

Diastolic Blood Pressure (DBP) - the pressure remaining in the blood vessels while the heart is refilling. (Normal diastolic B/P = 60-80 mmHg)

Preload - the amount of blood returning into the heart from the systemic circulatory system (venous return).

Afterload - the resistance to blood flow that the heart must overcome to pump blood out to the arterial system.

Stroke Volume - amount of blood pumped by the heart with each contraction.

Capillary Refill Test - quick test performed on the nail beds as an indicator of tissue perfusion (normal = less than 3 seconds).

Nervous System - autonomic nervous system is divided into two components:

Sympathetic nervous system (controls the fight-or-flight response): The goal of this system is to maintain sufficient amounts of oxygenated blood to critical areas while shunting blood away from nonessential areas. Response includes:

- Heart beats faster and stronger
- Increases ventilations
- Constricts blood vessels of nonessential organs
- Dilates blood vessels of muscles

Parasympathetic nervous system (rest and digest): Division of the nervous system that maintains normal body functions. Response includes:

- Heart beats slower
- Decreases ventilations
- Increases dilation of blood vessels to nonessential organs

2. ANATOMY OF THE CARDIOVASCULAR SYSTEM

The cardiovascular system consists of the heart (a pump), the blood (circulating fluid), and the vascular system (the container that holds the blood).

Pump - the heart is a muscle composed of four chambers, the right side receives blood from the body and the left side pumps blood to the body (see figure 1). For the heart to work effectively, an adequate amount of blood must be present in the ventricles

(preload). When the preload is decreased, the heart muscles are not stretched enough and the stroke volume is reduced. Too much blood in the heart creates a state of increased afterload, also reducing the stroke volume.

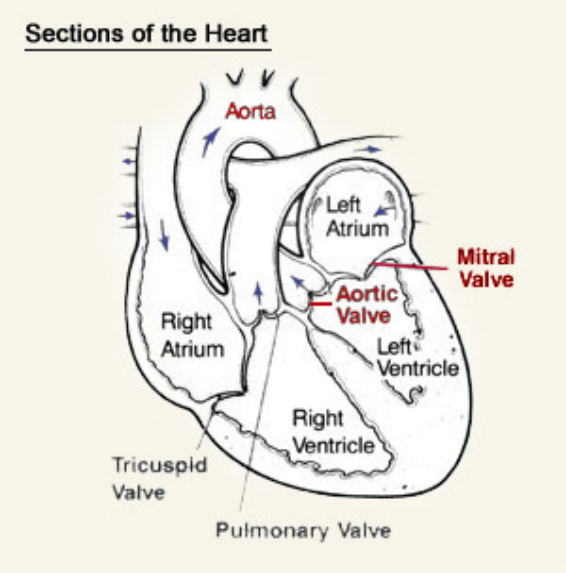


Figure 1. Flow of blood

Fluid - blood is composed of many substances. Red blood cells (RBC) contain hemoglobin and carry oxygen. White blood cells (WBC) are used by the body to fight infection. Platelets in the blood are essential for clotting. The volume of fluid within the container must equal the capacity of the vascular system in order to properly perfuse the tissues of the body.

Container - arteries, veins, and capillaries are the highways that take the blood throughout the body. The aorta is the largest artery in the body. At the smallest level, the capillaries may be no bigger than a single cell wide. The size of the entire "container" is controlled by muscles in the walls of the arteries and veins. These muscles are under the control of the brain via the sympathetic nervous system. By expanding and contracting the vessels, the size of the container is altered.

3. TYPES AND CAUSES OF SHOCK

Shock is classified by its cause. Shock can occur in three ways that are associated with failure of some component of the cardiovascular system, the pump, volume, and container. The major types of shock are: **Hypovolemic**, **Distributive**, and **Cardiogenic** (see figure 2).

The Three Types of Shock						
		Hypovolemic	**Distributive**			**Cardiogenic**
			Neurogenic	**Septic**	**Psychogenic**	
Vital Sign	**Skin Temp**	Cool, Clammy	Warm, Dry	Cool, Clammy	Cool, Clammy	Cool, Clammy
	Skin Color	Pale, cyanotic	Pink	Pale, Mottled	Pale	Pale, Cyanotic
	Blood Pressure	Drops	Drops	Drops	Drops (briefly)	Drops
	LOC	Altered	Lucid	Altered	Altered (briefly)	Altered
	Cap Refill	Slowed	Normal	Slowed	Slowed (briefly)	Slowed

Figure 2. Signs Associated with Types of Shock

Hypovolemic Shock - a state of shock caused by any loss of fluid volume either by blood loss, dehydration, burns, etc. The container has retained its normal size but the fluid volume has decreased, creating an imbalance. The most common cause of hypovolemic shock on the battlefield is due to massive hemorrhage which causes hemorrhagic shock.

The amount of blood that can be lost before death occurs will vary from individual to individual. The average adult blood volume is 5 to 6 liters. Normally, a loss of 25-40% of the person's total blood volume will create a life-threatening condition. Massive hemorrhage

may be fatal within 60-120 seconds. In a tactical environment, treatment should not be delayed. **Controlling major hemorrhage should be the first priority over securing an airway.**

> ***What happened to ABC's????***
> The brain can go four to six minutes without oxygen before permanent damage or death. Death from massive hemorrhage may occur within two minutes.

Signs and symptoms seen with hemorrhagic shock are usually linked with the amount of blood lost and the casualty's internal reaction to this blood loss. DO NOT rely on BP as the main indicator of shock! More attention should be paid to the casualty's mental status, quality of distal pulses, and tachycardia. Hemorrhagic shock, which is hypovolemic shock resulting from blood loss, can be categorized into four classes, depending on the severity of hemorrhage. Remember these parameters are only guidelines and should not be taken as absolute amounts of associated blood loss (see figure 3).

CLASSIFICATIONS OF HEMORRHAGIC SHOCK				
	Class I	**Class II**	**Class III**	**Class IV**
Amount of Blood Loss (% total blood volume)	<750ml (<15%)	750-1500ml (15%- 30%)	1500-2000ml (30%- 40%)	>2000ml (>40%)
Heart rate	Normal or minimally increased	>100	>120	>140
Pulse (quality)	Normal	Thready	Thready/ very weak	No Radial/ thready Carotid
Capillary Refill	Normal	Delayed (3-5 seconds)	Delayed (>5 seconds)	Delayed (>5 seconds)
Respiratory Rate	Normal	20-30	30-40	>35
SBP	Normal	Normal	Decreased (<80 mmHg)	Greatly Decreased (approx. 60 mmHg)
Skin Color	Pink	Pale	White extremities/ Ashen Gray	White extremities/ Ashen Gray/ Cyanotic
Skin Temperature	Cool	Cool, Moist	Cool Extremities	Cold Extremities
Mental Status	Normal	Anxiety Fright	Severe Anxiety Confused	Lethargic Unconscious

Figure 3. Classes of Hemorrhagic Shock

Class I Shock - this stage has few clinical manifestations. The casualty's body is able to compensate to maintain homeostasis.

Class II Shock - although the circulating blood volume is reduced, compensatory mechanisms such as the sympathetic nervous system are able to maintain blood pressure and tissue perfusion at a level sufficient to prevent cellular damage.

Class III Shock - at this point, unfavorable signs begin to appear. The body's compensatory systems can no longer maintain adequate perfusion. The classic signs of shock (tachycardia, tachypnea, and confusion) become obvious. You can see the importance of catching the casualty in the early stages of shock because by the time the casualty gets to this stage, he or she is in significant trouble.

> A tactically relevant definition of shock in a combat trauma casualty is an abnormal radial pulse (weak or absent) and an abnormal mentation (LOC) not attributed to drug therapy or brain injuries."
>
> PHTLS 6th Ed. P. 520

Class IV Shock - this is a severe stage of shock! These casualties truly have only minutes to live. Survival depends on immediate control of hemorrhage (surgery for internal hemorrhage) and aggressive resuscitation.

Signs and Symptoms
See figure 2.

Treatment
As stated in the Manage Hemorrhage lesson, you must stop the bleeding. Depending on which phase of field care you are in; Care Under Fire phase use a tourniquet for life-threatening extremity hemorrhage and Tactical Field Care phase use direct pressure and/or a hemostatic dressing. Once the bleeding is stopped, obtain vascular access; give resuscitative fluids, and CASEVAC (see Combat Fluid Resuscitation lesson).

Distributive (Vasogenic) Shock - shock that occurs when the vascular container (blood vessels) dilate (enlarge) without a proportional increase in fluid volume. As a result, the hearts preload decreases, and cardiac output falls. There is still the same amount of blood in the blood vessels but they are dilated too much and not enough blood is returning to the heart. Causes can be from spinal cord trauma, simple fainting, severe infections, or allergic reactions.

> **3 Types of Distributive Shock**
>
> **Septic**
> **Neurogenic**

Septic Shock - life threatening infections occurring primarily in a hospital setting. Toxins are released into the bloodstream and cause blood vessels to dilate. Septic shock and hypovolemic shock have many similar signs and symptoms. Septic shock is virtually never encountered within minutes of an injury. You should focus on prevention of septic shock. The Committee on Tactical Combat Casualty Care recommends administering the oral antibiotic *moxifloxacin* and the parental (injectable) antibiotic *ertapenum* at the time of injury to prevent wound infections. You will learn more about medications during the lesson on Casualty Assessment.

Signs and Symptoms
See figure 2.

Treatment
It usually takes between 5-7 days for septic shock to develop. However, you may be called on to care for a casualty who sustained an injury and did not promptly seek medical attention. If so, your primary focus should be to CASEVAC the

casualty to a higher echelon of care. Additionally, the casualty will require IV antibiotic therapy with a broad spectrum antibiotic.

Neurogenic Shock - shock caused by an injury that interrupts the spinal cord's sympathetic nervous system pathway, resulting in significant dilation of peripheral arteries. Because of the loss of sympathetic control of the vascular system which controls the smooth muscle in the walls of the blood vessels, the peripheral vessels dilate below the level of injury.

Signs and Symptoms (see figure 2 and below)

- Injuries consistent with spinal injury
- Bradycardia with hypotension (low heart rate with low blood pressure should be a red flag, start suspecting neurogenic shock)
- The casualty with neurogenic shock, in the absence of traumatic brain injury, is alert, orientated, and lucid (clear in the mind) when in the supine (laying down on back) position

Treatment

- Maintain ABC's
- Spinal Immobilization (if mechanism of injury causes a high suspicion of spinal injury)
- Oxygen therapy to keep oxygen saturation >92% (if available)
- Obtain IV access and give fluids, if necessary
- Trendelenburg position (head down, feet elevated)
- Keep patient warm
- CASEVAC

Psychogenic (Vasovagal) Shock - also known as vasovagal syncope or fainting, this occurs when there is stimulation of the tenth cranial nerve (vagus nerve) which produces bradycardia and hypotension. If the bradycardia and hypotension are severe enough, cardiac output falls, resulting in insufficient blood flow to the brain and the casualty loses consciousness. Usually, normal blood pressure is quickly restored before systemic impairment of perfusion occurs. Common causes are fear, receiving unexpected bad news, or the sight of blood.

Signs and Symptoms (see figure 2 and below)

The periods of bradycardia and vasodilation are generally limited to minutes.

Treatment

Because it is a self-limited condition, a vasovagal episode is unlikely to result in true "shock" and normal blood pressure is quickly restored when the casualty is placed in a horizontal position.

Cardiogenic Shock - failure of the heart to adequately pump blood throughout the body, resulting from causes that can be categorized as either intrinsic (a result of direct damage to the heart itself, a heart attack, for instance) or extrinsic (related to a problem outside the heart, a tension pneumothorax, for example). In this scenario, the container is the correct size and is filled with the right amount of fluid, it's the pump that is not functioning properly.

Intrinsic Causes: Any injury that weakens the cardiac muscle will affect its output. The damage may result from a myocardial infarction or from a direct bruise to the heart muscle from a blunt cardiac injury that prevents the heart from pumping properly.

Signs and Symptoms (see figure 2 and below)

- Abnormal pulse (irregular rate and rhythm)
- Chest pain
- Shortness of breath
- Nausea and vomiting

Treatment

- Maintain ABC's
- Obtain IV access
- Oxygen therapy to keep oxygen saturation >92% (if available)
- CASEVAC

Extrinsic Causes: External factors that cause the heart not to work properly (i.e., tension pneumothorax and cardiac tamponade)

Signs and Symptoms

Tension Pneumothorax:

- Chest trauma
- Shortness of breath/dyspnea
- Tachycardia
- Cyanosis
- Decreased/absent lung sounds on affected side
- Jugular vein distention/tracheal deviation

Cardiac Tamponade:

- Chest Trauma
- Shortness of breath/dyspnea
- Tachycardia
- Cyanosis
- Distant heart tones
- Narrowing pulse pressure

Why do we learn something that we can't treat?

Answer: Use these signs and symptoms of cardiac tamponade as a way for ruling out tension pneumothorax.

Treatment

- Maintain ABC's
- Oxygen therapy to keep oxygen saturation >92% (if available)
- CASEVAC
- Specific treatment for a tension pneumothorax is needle decompression, which will be discussed in a future lesson.

Volume Resuscitation

Although volume resuscitation of a trauma casualty in shock makes sense, no research has demonstrated improved survival of critically injured trauma casualties when IV fluid therapy has been administered in the field. In fact, one researcher found that IV fluids administered in the field were beneficial only when three conditions existed:

a. the casualty is bleeding at a rate of 25 to 100 mL/min
b. the IV fluid administration rate is equal to the bleeding rate
c. the scene time and transport time exceed 30 minutes

Transport of the trauma casualty should never be delayed to start an IV.

You will receive training on the type of vascular access (PO, IV, or IO) to start and the type of fluids to give in the lesson on Tactical Fluid Resuscitation.

CASUALTY ASSESSMENT AND SHOCK CASUALTIES

Care Under Fire Phase: There are many things that cause shock, the most common is uncontrolled hemorrhage. If the casualty has life-threatening extremity hemorrhage, use a tourniquet. For non-extremity hemorrhage, use direct pressure with a hemostatic dressing like HemCon or QuikClot.

Tactical Field Care Phase: Shock is very difficult to treat in a hospital setting let alone in a field or combat environment. Don BSI. Reassess treatment started during Care Under Fire Phase to control the hemorrhage. Assess airway and intervene if necessary. Complete a head to toe assessment using DCAP-BTLS noting and treating additional injuries. Determine if vascular access is required (see Tactical Fluid Resuscitation lesson) and give fluids if necessary. If the casualty is able to drink fluids, they should be encouraged to do so. Consider pain medications and give antibiotics if warranted. Reassess all care provided. Document care given, prevent hypothermia, and CASEVAC.

REFERENCES

Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapters 7 & 21
Emergency War Surgery Handbook, NATO, 2004

Shock Review

1. List the three major types of shock.

2. Describe the signs or symptoms associated with Class III Shock.

3. List the two medications administered to prevent a casualty from developing septic shock.

4. Which is more important for a casualty in shock, IV fluid or rapid transport? Why?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1416

Tactical Fluid Resuscitation

TERMINAL LEARNING OBJECTIVES

1. Given a casualty in a combat environment and a fully stocked corpsman assault pack and supplies, **perform appropriate tactical fluid resuscitation as indicated by the patient's condition and the tactical situation,** to prevent further injury or death. (FMST-HSS-1416)

2. Given a casualty in a combat environment and a fully stocked corpsman assault pack and supplies, **insert an Intraosseous Device to administer fluids and medications,** to prevent further injury or death. (FMST-HSS-1417)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **correctly define medical terminology associated with fluid resuscitation**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21. (FMST-HSS-1416a)

2. Without the aid of references, given a description or list, **list the indications of giving fluids by mouth**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21. (FMST-HSS-1416b)

3. Without the aid of references, given a description or list, **identify the indications/ contraindications of giving fluids though an IV,** within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21. (FMST-HSS-1416c)

4. Without the aid of references, given a description or list, **identify the four types of IV fluids**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21. (FMST-HSS-1416d)

5. Without the aid of references, given a description or list, **select the correct equipment required to initiate a peripheral IV**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21. (FMST-HSS-1416e)

6. Without the aid of references, given a description or list, **identify potential complications of IV therapy**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21. (FMST-HSS-1416f)

7. Without the aid of references, **identify two indications for initiating Intraosseous access vice a peripheral IV,** within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21. (FMST-HSS-1417a)

8. Without the aid of references and given standard field medical equipment and supplies to include the FAST1, **identify the supplies required to initiate Intraosseous access**, within 80% accuracy, per the FAST1 User's Manual and the PHTLS Manual, 6th Edition. (FMST-HSS-1417b)

9. Without the aid of references, **list the procedural sequence for initiating the FAST1 Intraosseous Device**, within 80% accuracy, per the FAST1 User's Manual and the PHTLS Manual, 6th Edition. (FMST-HSS-1417c)

10. Without the aid of references and given a description or list, **identify the potential complications when initiating the FAST1 Intraosseous Device**, within 80% accuracy, per the FAST1 User's Manual. (FMST-HSS-1417d)

11. Without the aid of references, **list the procedural sequence for removing the FAST1 Intraosseous Device**, within 80% accuracy, per the FAST1 User's Manual and the PHTLS Manual, 6th Edition. (FMST-HSS-1417e)

12. Without the aid of references, given a description or list, **identify the proper IV/IO fluid treatment**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21. (FMST-HSS-1417f)

13. Without the aid of references, given a casualty and previously selected IV equipment and supplies, **initiate a peripheral IV and infuse 1 cc of fluid**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21. (FMST-HSS-1416g)

14. Without the aid of references and given a casualty and a fully stocked corpsman assault pack, **initiate an IO infusion with the FAST1 Intraosseous Device**, per the FAST1 User's Manual and the PHTLS Manual, 6th Edition. (FMST-HSS-1417g)

15. Without the aid of references and given a casualty and a fully stocked corpsman assault pack, **remove the FAST1 Intraosseous Device**, per the FAST1 User's Manual. (FMST-HSS-1417h)

INTRODUCTION

In civilian trauma situations, it is standard for the prehospital care provider to place two large bore intravenous (IV) catheters and start fluid resuscitation with 2 liters of crystalloid fluid. However, as stated in the lesson on Shock, no research has demonstrated improved survival of critically injured trauma casualties when IV fluid therapy has been administered in the field prior to the casualties' arrival in a treatment facility. In fact, multiple studies using uncontrolled hemorrhagic shock have found that aggressive fluid resuscitation before surgical repair of a vascular injury is associated with either no improvement in survival or increased mortality when compared to no resuscitation or minimal resuscitation.

In this lesson, we will discuss the principles of fluid resuscitation in a tactical situation and the decision making process of when to give fluids by mouth, through an IV, or through the intraosseous (IO) route. Since the IO is a relatively new concept for most people, we will discuss this topic in depth. Finally, we will discuss what types of fluids and how much fluid to give to a casualty on the battlefield.

1. **TERMINOLOGY** - the following terms and their definitions are essential to understand IV fluids and the basics of electrolyte imbalances.

   Homeostasis - a state of physiological equilibrium produced by a balance of functions and chemical composition within the body. Homeostasis is usually maintained as long as the fluid volume and chemical composition of the fluid compartments stay within narrow limits or within a state of equilibrium.

   Electrolyte - an element or compound that, when melted or dissolved in water or another solvent, disassociates into ions and is able to carry an electric current. Fluids containing these electrolytes and water are called crystalloids.

   Crystalloids - IV fluid, consisting mostly of sodium chloride and other electrolytes, that serves as a volume expander. This solution does not have oxygen carrying or blood clotting capabilities. The two most common types are Normal Saline (NS) and Lactated Ringers (LR).

   Colloids - large molecules, such as proteins. When in an IV solution, the solution is called a colloid solution or volume expander. Blood plasma, serum albumin, and plasma substitutes (Hextend) are the most common solutions. These solutions are all hypertonic in nature.

   Body Fluid Compartments - spaces into which body fluids are distributed. Movement of water and electrolytes between these compartments are regulated by various body systems, so that distributions of substances within the body remain within fairly narrow limits. This helps maintain homeostasis.

   Isotonic - a solution that triggers the least amount of water movement from the vascular system into or out of the cells or surrounding tissue (i.e., NS or LR).

   Hypotonic - a solution that causes water to leave the vascular system and enter the cells or surrounding tissue compartments (i.e., D5W or solutions containing only water and dextrose).

Hypertonic - a solution that draws water from the surrounding cells and tissue compartments back into the vascular system. Out of the three types of fluids listed, hypertonic saline (HTS) shows the most promise for use in trauma and tactical situations.

2. **INDICATIONS/CONTRAINDICATIONS FOR PO (BY MOUTH) FLUIDS**

Trauma surgeons attached to forward-deployed Medical Treatment Facilities (MTFs) have noted that many casualties are kept on nothing by mouth (NPO) status for prolonged periods in anticipation for eventual surgery. Patients in a combat environment often operate in a state of mild dehydration. Once injured, they can easily develop greater levels of dehydration. The combination of dehydration and hemorrhage greatly increases the risk of mortality. There is very little evidence of emesis during surgery of patients that received oral hydration following injury. Therefore, oral fluids are recommended for all casualties with a normal level of consciousness and the ability to swallow, including those with penetrating torso trauma (see figure 1). If the casualty does not have a normal level of consciousness, the care provider may start fluid resuscitation by the IV or IO method.

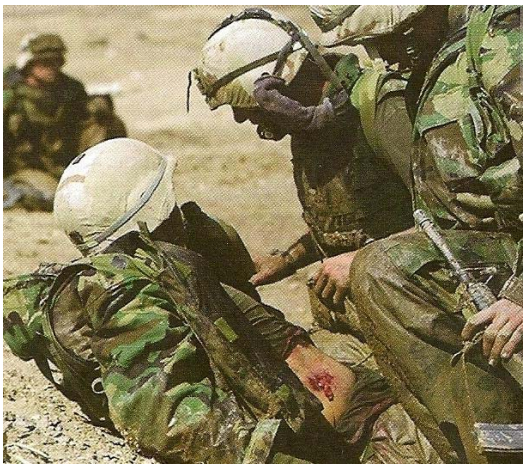


Figure 1. Casualty with abdominal wound drinking water

Indications
Injured casualty with normal level of consciousness and ability to swallow

Contraindications
Decreased level of consciousness

3. **INDICATIONS/CONTRAINDICATIONS FOR IV THERAPY**

Indications
- Uncontrolled hemorrhage
- Diarrhea or vomiting
- Burns
- Unable to tolerate fluids by mouth (to maintain hydration and/or nutrition when the patient is NPO)
- To give IV medications

Contraindications
- Absence of signs and symptoms of the above indications

4. **TYPES OF INTRAVENOUS SOLUTIONS**

IV solutions fall into four basic groups:
- Crystalloids (water and electrolytes)
- D5W (water and glucose)
- Colloids (water and protein or protein substitutes)
- Whole blood or blood products

Crystalloids - solutions that are isotonic are effective for volume replacement for a short period of time. These solutions do not have any oxygen carrying capacity and contain no proteins. One hour after administration of a cyrstalloid solution, only one-third remains in the vascular system, the rest shifts into the surrounding tissue causing edema. The two most common crystalloids used are NS and LR solution, these fluids are commonly used in the treatment of shock.

Indications
- NS and LR can be safely used in most situations.
- Acceptable alternate to Hextend if not available.

Contraindications/precautions
- The risk of fluid volume overload must always be considered.
- Excessive infusion of electrolytes may cause electrolyte imbalances.

Water and glucose solutions - dextrose and water solutions come in different concentrations of dextrose. The most common concentrations are D5W and D50W. These solutions are considered hypotonic solutions.

Indications
D5W - for fluid replacement and caloric supplementation in patients who cannot maintain adequate oral intake. D5W is **NOT** the first fluid of choice to treat dehydration in the field.
D50W - for adults with hypoglycemic (low blood sugar) emergencies. Usually given as a 50ml bolus. D50W is **NOT** indicated for trauma patients in combat situations.

Contraindications and precautions
- Do not use in head injuries or massive tissue injuries. Dextrose solutions become hypotonic in the body and will cause cellular swelling.

Colloids and plasma substitutes - blood plasma, serum albumin, and plasma substitutes are the most common solutions. These solutions are all hypertonic in nature. **The plasma substitute Hextend is the IV fluid of choice for volume replacement due to trauma in a tactical situation.** It stays in the vascular system longer than crystalloid solutions.

Indications
- To increase the B/P more rapidly than other solutions.

Contraindications/precautions
- Some complications are associated with increased bleeding time (due to lack of clotting factors in solution) and anaphylactic reactions.
- Do not use more than 1,000 cc's.

Whole Blood - only available in combat in rear areas (echelon two is the first place blood is available, i.e., Medical Battalion). Must be **ordered by a medical officer**. In combat, type O-negative (universal donor) is supplied and can be given without prior cross-typing.

Indications
- Used to treat acute, massive blood loss requiring the oxygen carrying properties of red blood cells along with the volume expansion provided by plasma.

5. EQUIPMENT REQUIRED TO INITIATE A PERIPHERAL IV

- Needle/catheter (18 gauge)
- IV Solution
- Administration set
- Tape
- Tourniquet
- Alcohol or betadine prep pads
- 2x2's, bandaid and/or tegaderm
- IV pole

Initiating a Peripheral IV

You have all started IV's in the past. Below is a review of what steps to take when inserting an IV. You will all have a chance to start an IV in the performance application stage of the lesson.

- Make decision
- Assemble and check gear
- Prepare the administration set
- Prepare patient
- Select a vein
- Insert IV
- Connect the tubing
- Secure the IV and start administering fluid

6. POTENTIAL COMPLICATIONS OF IV THERAPY

No medical treatment is without risk. As a care provider, your first priority is to do no harm. With that said, there are times when your best treatment will result in outcomes that were not desired. Listed below are the most common complications of IV therapy and their treatment.

Infiltration (local) (see figure 2) - escape of fluid from the vein into the tissue when the needle/catheter dislodges from the vein.

Symptoms

- Edema
- Localized pain or discomfort
- Coolness to touch at the site of cannulation
- Blanching of the site
- IV flow slows or stops

Treatment

- Discontinue IV
- Select an alternate site
- Apply a warm compress to the affected area
- Elevate the limb

Prevention

- Secure the catheter properly

Figure 2. Infiltration

- Limit movement of the limb

Phlebitis (local) (see figure 3) - inflammation of a vein due to bacterial, chemical, or mechanical irritation.

Symptoms
- Pain along the course of the vein
- Redness appears as a streak above vein and above the IV site
- Warm to touch
- Vein feels hard or cordlike

Treatment
- Discontinue IV
- Warm compress to the affected area
- Antibiotics

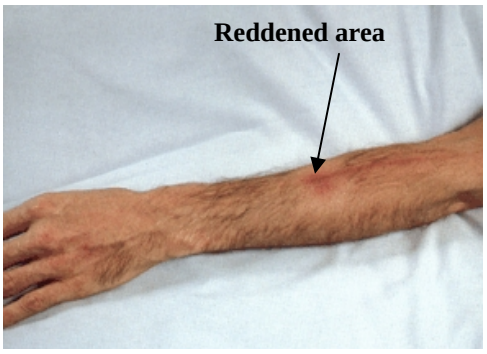


Figure 3. Phlebitis

Prevention
- Ensure aseptic technique when starting IV
- Place date/time when catheter was inserted on the tape
- Rotate infusion sites based on local policies (usually every 72 hours)

Nerve Damage (local) - usually results when the arm is secured too tightly to the arm board, compressing nerves.

Symptoms
- Numbness of fingers and hand

Treatment
- Reposition and loosen arm board

Prevention
- Ensure tape is not applied too tightly

Circulatory Overload (systemic) - an effect of increased fluid volume which can lead to heart failure and pulmonary edema as a result of infusing too much IV fluid or too rapidly.

Symptoms
- Headache
- Venous distention
- Dyspnea
- Increased blood pressure
- Cyanosis
- Anxiety
- Pulmonary edema

Treatment
- Slow down the flow rate
- Place patient in high Fowlers position (sitting position)

Prevention
- Monitor and control flow rate

Air Embolism - air circulating in the blood when introduced through IV tubing.

Symptoms
- Cyanosis
- Hypotension
- Weak and rapid pulse
- Shortness of breath
- Tachypnea

Treatment
- Place patient on left side in Trendelenburg (head down) position, so that air in the right ventricle floats away from the pulmonary air flow tract.
- Administer oxygen
- Notify Medical Officer
- Monitor vital signs

Prevention
- Flush IV line thoroughly to remove air prior to insertion
- Monitor tubing during therapy
- Avoid introducing air through any syringe or extension tubing

Systemic Infection (see figure 4) - due to poor aseptic technique or contamination of equipment.

Symptoms
- Sudden rise in temperature and pulse
- Chills and shaking
- Blood pressure changes

Treatment
- Look for other sources of infection
- DC IV and restart in other limb
- Notify MO and anticipate antibiotic treatment

Figure 4. Infection caused by IV

Prevention
- Ensure aseptic technique when starting IV
- Place date/time when catheter was inserted on the tape
- Rotate infusion sites based on local policies (usually every 72 hours)

7. IO INFUSION OVERVIEW

Fluid resuscitation for hemorrhagic shock is a clear indication for IV access in a tactical situation, but the peripheral vasoconstriction that accompanies shock makes IV access difficult. Previously used measures to obtain IV access, such as venous cutdown procedures, are time-consuming and not well suited for the battlefield. Also, the average time to initiate IV access has been found to be between 3 and 12 minutes and the failure rate is between 10 and 40 percent. Additionally, battlefield casualties may have a traumatic amputation precluding IV access in an extremity. An IO device offers an alternate route for the administration of fluids in these types of casualties. This device is not meant to replace IV infusion; it is to be used when IV access cannot be obtained. IO infusion devices provide a

quick (can be placed in 60 seconds), reliable intravascular access when peripheral IVs cannot be started. IO infusion is the medical process of getting fluids, emergency drugs, and even blood into a patient's circulatory system by delivering them into the marrow space inside a bone (see figure 5) . The IO space is a specialized area of the vascular system where blood flow is rapid and continues even during shock. Drugs and fluids infused via the IO route reach the central circulation as quickly as those administered through standard IV access.

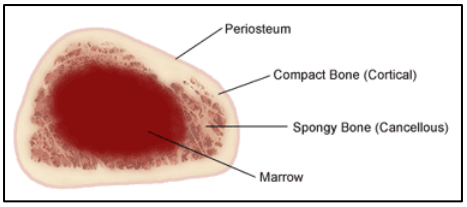


Figure 5. Cross Section of Bone

Anatomy

The sternum consists of the manubrium, the body, and the xiphoid process (see figure 6). At the top of the manubrium is the jugular notch, which is used as a reference point for intraosseous placement. The sternum makes an ideal IO site for several reasons:

- It is very easy to locate and readily accessible
- It is protected from trauma by flak vest
- It is thinner and easier to penetrate than other bones.
- Most importantly, fluids infused into the sternum reach the circulatory system more rapidly.

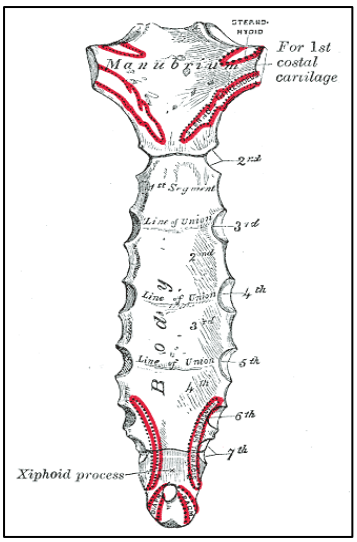


Figure 6. Sternum

8. REQUIRED IO SUPPLIES (FAST1™ KIT)

There are several different manufactures of IO devices. After a review of available commercial devices, the Committee on Tactical Combat Casualty Care (COTCCC) concluded that the First Access for Shock and Trauma (FAST1) is the IO device best suited for trauma care on the battlefield. Features such as speedy access, a protected infusion site, and a depth-control mechanism make the FAST1 ideal for emergency use.

- Components of the FAST1

Figure 7. Target/Strain-Relief Patch

Target/Strain-Relief Patch (see figure 7)

The Target/Strain-Relief Patch is a foam patch with an adhesive back. The key features of the patch are the locating notch, a hole indicating the target zone, a band of velcro fastening, and a connector tube with a female luer on each end. The patch is placed on the patient with the locating notch matching the patient's jugular notch and the target zone over the patient's midline. The adhesive backing prevents the patch from becoming displaced. The target zone, a circular hole, indicates the location of the designated insertion site.

Introducer (see figure 8)

Figure 8. The Introducer

The introducer is a hand-held tool. The bone probe cluster, stylet, infusion tube, and depth control mechanism are mounted inside the introducer handle. The bone probe needles are covered by a plastic sharps cap that is removed before use. The introducer allows the operator to push the flexible infusion tube through the skin, tissue, and anterior cortical bone of the manubrium. The force required to penetrate the bone is provided entirely by the operator, it is not spring loaded or battery operated. The depth control mechanism automatically separates the infusion tube from the Introducer body at a pre-set depth, preventing the operator from over or under penetrating the patient's bone.

Infusion Tube (see figure 9)

Figure 9. Infusion Tube

The Infusion Tube is the primary component of the FAST1 System. It consists of a steel portal (the sharp tip which penetrates the bone), a length of flexible infusion tubing, and luer connector. When the tube is inserted by the Introducer, the steel portal penetrates the anterior cortical bone of the manubrium. After insertion, the fluid delivery port is within the marrow space of the bone. The entire steel portal is subcutaneous. The tubing delivers drugs or fluids into the manubrial marrow space. The flexibility of the tubing allows it to move with the patient's skin. The Infusion Tube is connected to the fluid source via the connector tube on the patch.

Protector Dome (see figure 10)

Figure 10. Protector Dome

The Protector Dome is a clear plastic cover with velcro fastening, which mates with the ring on the Target/Relief Patch. After drugs or fluids have begun to flow into the patient, the Dome is placed over the patch. The velcro secures the dome in position over the site. This is the final step in placing the FAST1 system. The dome covers and protects the infusion site.

Sharps Protection (see figure 11)

Figure 11. Sharps Protection

Before use, the bone probe cluster and stylet are covered by a clear plastic Sharps Cap. After use, the retracted bone probe needles and stylet tip are pushed into the foam-filled Sharps Plug. This reduces the risk of accidental needle stick injury. For additional protection, the pre-use cap should be placed over the post-use plug once the needles have been fully inserted into the plug.

Remover (see figure 12)

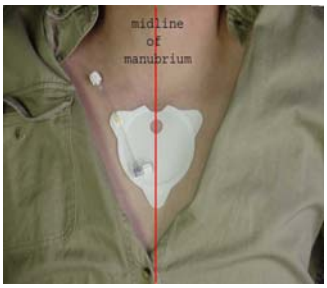
Figure 12. Remover

This component of the system enables the Infusion Tube to be removed when the decision to discontinue intraosseous infusion is made. The Remover slides inside the Infusion Tube and threads into the inside of the metal portal tip. By pulling straight back on the Remover, the portal and Infusion Tube are removed from the patient.

9. **SEQUENCE FOR INITIATING THE FAST1**

a. Cleanse insertion site using aseptic technique.

b. Align finger with jugular notch and place patch, verifying patch is midline.



c. Place Introducer in target on patch. Hold with a firm grasp.

d. Insert Introducer perpendicular to the manubrium. Use continuous increasing pressure to insert.

e. Remove Introducer. Pull straight back.

f. Connect Infusion Tube to Target Patch Tube.

g. Cap introducer using post-use cap supplied.

h. Connect to I.V. tubing.

i. Place Dome once all items are connected.

j. Attach Remover package to patient for transport.

Points to remember when inserting the FAST1

1. Don't pull back and re-push.
2. Don't use extreme force.
3. Insert Introducer perpendicular to sternum.
4. Attach Remover package for transport.

10. **POTENTIAL COMPLICATIONS OF THE FAST1 INSERTION**

a. The sternal notch cannot be located.
Probable Cause: Extreme obesity or abnormal sternal anatomy.
Recommended Action: Abort the procedure. Proper targeting requires accurate location of the patient's sternal notch. Employ an alternative method of vascular access.

b. The patch has been incorrectly placed.
Probable Cause: Operator error during application, movement of the skin over the manubrium during application, or patient movement after placement.
Recommended Action: Return the patient to his/her original position. If the patch is still incorrectly positioned, remove it and reposition. During placement, ensure that the skin over the sternum is not stretched away from its normal position.

c. The patch will not adhere to the skin.
Probable cause: Wet skin or thick body hair.
Recommended Action: Shave or dry skin and clean using aseptic technique. The patch can also be taped down using the extended tabs. If the Patch becomes detached during use, it should be taped to the skin.

d. The Bone Probe Cluster is fully pushed in, but the Introducer does not release.
Probable Cause: Excessively thick tissue, extreme misplacement, or irregular anatomy.
Recommended Action:
a) Pull Introducer back; the Infusion Tube may be in place, although the Introducer could not release due to tissue thickness. Verify by withdrawing marrow, and proceed.
b) Re-attempt with a new FAST1. If second attempt fails, seek alternative method of vascular access.

e. Introducer does not release with high applied force.
Probable Cause: Extreme bone hardness or technique error.
Recommended Action: Without pulling back on the Introducer, check that the Introducer is perpendicular to the manubrium surface and that force is being applied directly along the Introducer axis. Some patients may have a very hard bone; if control of the Introducer cannot be maintained, find alternate method of vascular access.

f. The Introducer releases but the Infusion Tube falls out of the patient.
Probable Cause: The Infusion Tube did not adequately penetrate the anterior cortical bone of the manubrium due to excessive tissue thickness or very hard bone.
Recommended Action: Re-attempt with a new FAST1 device.

g. Low or no flow through Infusion Tube.
Probable Cause: There is a severe kink in the tubing, there is a line blockage, or the portal failed to penetrate the manubrium.
Recommended Action: Check for kinked tubing. If no kink can be found, attempt to clear the line by pushing in 10 cc's of fluid. If this fails to improve the flow rate, use an alternative method of vascular access.

h. Leakage at the insertion site.
Probable Cause: Fluids are leaking from inside the manubrium past the tip of the Infusion Tube.
Recommended Action: A small amount of leakage sometimes occurs and is commonly acceptable in IO infusion. The operator must judge whether the patient is receiving an adequate amount of drugs or fluids. If leakage is excessive, an alternative method of vascular access should be used.

11. HOW MUCH AND WHAT TYPE OF FLUID TO GIVE

As stated earlier, giving a fluid bolus to individuals who are not in shock is not necessarily helpful to the casualty and may be harmful if it delays treatment of other serious injuries, causes a delay in the unit's tactical flow, or causes fluids to not be available to individuals who truly need fluid resuscitation. The Institute of Medicine recommended that 7.5% hypertonic saline (HTS) be used for fluid resuscitation. There were many reasons the institute recommended HTS, but the main reason was its logistical advantage. It comes in smaller, lighter, and easier to carry packages than a one liter bag of NS or LR. The main problem is HTS is not widely available. Therefore, the committee recommended using a colloid solution such as Hextend until HTS is more readily available. **Hextend is the fluid of choice in a tactical situation.** It is recommended over crystalloid solution because of its much longer presence in the vascular system after administration, preventing both extravascular fluid overload and preventing the need for additional fluid administration in

cases of delayed evacuation. For example, if you give a casualty 500mL of LR or NS, one hour later over 300mL of that fluid has shifted out of the vascular system and into the surrounding tissue. However, if you gave 500mL of Hextend, almost all of it will stay in the circulating system. Therefore, the current recommendation for casualties in shock during the Tactical Field Care Phase is an initial infusion of 500mL of Hextend, followed by 30 minutes of observation. If an unsatisfactory clinical improvement is noted, an additional 500mL of Hextend is given. No casualty should be given more than 1000mL of Hextend.

But what if you do not have a colloid solution like Hextend? You must use the fluid that you have access to. Regardless of what type of fluid you have, a technique called "minimal fluid resuscitation" is used. Minimal fluid resuscitation means instead of administering enough fluid to return the casualties blood pressure back to normal, you only administer enough fluid to maintain their blood pressure high enough to preserve life, or high enough that you can feel a radial pulse. In the absence of a head injury, a blood pressure high enough to cause a radial pulse should provide the casualty with normal mentation. Use the chart below as guidance when considering how much fluid to administer.

Not in Shock (Normal peripheral pulse and mentation)	In Shock (Altered mental status and weak or absent peripheral pulse)	Traumatic Brain Injury (TBI) and weak or absent pulse
- IV Fluids are not needed. - If the casualty is conscious, he can drink fluids.	- Administer a 500mL IV bolus of Hextend. - If after 30 minutes the casualty is still in shock (mental status and peripheral pulse not improved), administer another 500mL IV bolus of Hextend. * Do not administer more than 1000mL of Hextend. - If shock continues, decide whether to continue resuscitation depending on the logistical and tactical situation.	- Altered mental status cannot be used as clinical guideline for shock. - Resuscitate to restore the radial pulse.

12. **REMOVAL OF THE FAST1**

In a tactical situation, you will be concerned with obtaining IO access in order to give fluids or medications. It is unlikely that you will need to remove the device. However, if you should find yourself in a situation where the device is not working properly, use the steps listed below to remove it.

a. Stabilize target patch with one hand and remove Dome with the other hand.

b. Terminate IV fluid flow and disconnect Infusion Tube.

c. Hold Infusion Tube perpendicular to manubrium with slight traction on infusion tube.

d. Insert Remover while continuing to hold Infusion Tube with slight traction.

e. Advance Remover. This is a threaded device.

f. Gentle counterclockwise movement at first may help in seating Remover.

g. Make sure you feel the threads seat.

h. Turn it clockwise until Remover no longer turns. This firmly engages Remover into metal (proximal) end of the infusion tube.

i. Remove infusion tube. ***Use only the T shaped knob and pull perpendicular to manubrium***.

j. Hold Target Patch during removal. Do not pull on the Leur fitting or the tube itself.

k. Remove Target Patch.

l. Dress infusion site using aseptic technique.

m. Dispose of remover and tube using contaminated sharps procedures.

CASUALTY ASSESSMENT AND FLUID RESUSCITATION

Care Under Fire Phase: No care given in this phase.

Tactical Field Care Phase: Knowing when it is necessary to start an IV or IO is critical in the Casualty Assessment process. Using the PO route when available saves you time by not starting unnecessary IVs on casualties that do not need it and saves valuable resources for casualties who do. Using the "minimal fluid resuscitation" technique also increases the casualty's chances of survival by not overloading them with unnecessary fluid. Remember to don proper BSI when performing fluid resuscitation.

REFERENCES

FAST1 Intraosseous Infusion System for adult patients User's Manual, Pyng Medical Corp
Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 21
Military Medicine, Volume 172, 11:1, 2007

	IV INSERTION STEPS
1	Make decision
2	Assemble and check gear: IV bag, IV tubing, IV catheter, tourniquet, alcohol/betadine prep pads, 2x2 gauze pads, gloves, tape, bandaid
3	Prepare patient
4	Select vein: Work distal to proximal (no hand sticks allowed. During the partner stick, the antecubital region will be used for live stick); place tourniquet above the tricep/bicep; prepare site with alcohol or betadine prep pad; don gloves
5	Insert IV: Insert needle bevel up; check for blood return; advance catheter and remove needle (must maintain positive catheter control)
6	Connecting tube: Remove tourniquet; connect tubing to catheter; open IV line and check for placement
7	Secure IV: Secure the catheter with tape; regulate IV flow rate
	IV REMOVAL STEPS
1	Discontinue IV: Verbalize when to discontinue IV and change IV bags, peel back taping, prepare 2x2 gauze pad, with 2x2 in one hand, over the IV site, remove the catheter with open hand and apply pressure with 2x2's to stop bleeding, apply bandaid

	FAST1 INSERTION STEPS
1	Cleanse insertion site with aseptic technique
2	Align finger with jugular notch and place patch. *Verify patch is midline*.
3	Place Introducer in target on patch. *Hold with a firm grasp*
4	**Insert Introducer perpendicular to the manubrium.** **Use continuous increasing pressure to insert.**
5	Remove Introducer by pulling straight back.
6	Connect Infusion Tube to Target Patch Tube.
7	Connect to IV tubing.
8	Place Dome.
9	Attach Remover package to patient for transport.

	FAST1 REMOVAL STEPS
1	Remove Dome while holding patch against the patient's skin
2	Disconnect Infusion Tube; ensure IV flow is turned off.
3	Insert Remover in Tubing while holding Infusion Tube perpendicular to patient.
4	Advance the Remover, turn it clockwise until the Remover stops, this engages the thread into the metal (proximal) tip of the Infusion Tube.
5	Remove the Infusion Tube, **DO NOT PULL on Leur or Tubing**. Hold Remover using "T-Shaped" knob, pull straight out (perpendicular to infusion site) while holding the Target Patch down.
6	Remove Target Patch.
7	Dress Infusion Site using aseptic technique.
8	Dispose of Remover and Infusion Tube using contaminated sharps protocol.

STUDENT (Last Name, First Name, MI.)	**PLT**

PROCEDURAL STEPS FOR PERFORMING AN IV STICK	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
Determine the need for fluid replacement						
Assemble and check equipment						
Prepare patient & select site						
Cleanse site						
Insert IV						
Connect fluid administrative set						
Remove constriction band						
Open flow regulator and monitor flow						
Secure IV						
Discontinue IV						

1st Evaluator:	2nd Evaluator:	3rd Evaluator:
PASS / FAIL	PASS / FAIL	PASS / FAIL
Student signature:	Student signature:	Student signature:
Notes:	Notes:	Notes:

FMST:	**PERFORMANCE TEST**
TASK:	COMBAT FLUID RESUSCITATION **(Intraosseous Device)**
DIRECTIONS:	Without the aid of references and given a simulated casualty and standard field medical equipment and supplies, **perform procedures for initiating the FAST1 Intraosseous Device**, per the FAST1 User's Manual and the PHTLS Manual, 6th Edition. Without the aid of references and given a simulated casualty and standard field medical equipment and supplies, **perform procedures for removing the FAST1 Intraosseous Device**, per the FAST1 User's Manual.

This test evaluates your ability to demonstrate the skills you were taught in Combat Fluid Resuscitation (intraosseous device). You will be required to perform the task on a mannequin. You will be expected to answer oral questions with regard to the procedure as well as indications/contraindications for the procedure.
Safety considerations for this test include you demonstrating or verbalizing universal precautions and maintain proper "sharps" handling procedures, as you would be required to do in any patient care situation.
There is no time limit.
Should you fail this evolution, you will be remediated and retested until you master the skill. You will be given three opportunities to complete this test.
Any student placing anything in their mouth, e.g. administration set, will automatically fail this performance test.

Item Number	Your performance will be evaluated on the following:	YES	NO
1.	***INSERTION***		
	Cleanse insertion site using aseptic technique.	□	□
2.	***PLACE PATCH***		
	Align finger with jugular notch and place patch. Verify patch is midline.	□	□
3.	***PLACE INTRODUCER***		
	Place Introducer in target area on patch. Hold with a firm grasp.	□	□
4.	***INSERT INTRODUCER***		
	Insert Introducer perpendicular to manubrium. Use continuous increasing pressure to insert.	□	□
5.	***REMOVE INTRODUCER***		
	Remove Introducer. (Pull straight back)	□	□
6.	***CONNECT INFUSION TUBE***		
	Connect Infusion Tube to target patch tube. Connect to IV tubing.	□ □	□ □
7.	***PLACE DOME***		
	Place Dome. Attach Remover package to patient for transport.	□ □	□ □

Item Number	Your performance will be evaluated on the following:	YES	NO
8.	***REMOVAL OF FAST 1***		
	Remove Dome while holding patch against patient's skin	☐	☐
	Disconnect Infusion Tube		
	Insert Remover in tubing	☐	☐
	Advance the Remover, turn it clockwise until the it stops	☐	☐
	Remove the Infusion Tube	☐	☐
	Remove Target Patch		
	Dress infusion site	☐	☐
		☐	☐
		☐	☐

STUDENTS NAME AND PLATOON	DATE	ATTEMPT #	INSTRUCTOR SIGNATURE

INSTRUCTOR'S COMMENTS:

Tactical Fluid Resuscitation Review

1. Identify two examples of crystalloid fluids.

2. Identify the fluid of choice in a tactical environment.

3. List two reasons for using the intraosseous route of fluid administration as opposed to the intravenous method.

4. Define minimal fluid resuscitation.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1406

Manage Head, Neck, and Face Injuries

TERMINAL LEARNING OBJECTIVES

1. Given a casualty with either head, neck or face injuries in a combat environment and standard field medical equipment and supplies, **manage head, neck and facial injuries,** to prevent further injury or death. (FMST-HSS-1406)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify the anatomy of the head**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406a)
2. Without the aid of references, given a description or list, **identify the types of head injuries**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406b)
3. Without the aid of references, given a description, **select the appropriate treatment for a head injury**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406c)
4. Without the aid of references, given a description or list, **select information pertaining to Traumatic Brain Injuries**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406d)
5. Without the aid of references, given a description or list, **identify the anatomy of the neck**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406e)
6. Without the aid of reference, given a description or list, **identify the types of neck injuries**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406f)
7. Without the aid of references, given a description or list, **select the appropriate treatment for a neck injury**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406g)
8. Without the aid of references, given a description or list, **identify the anatomy of the face**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406h)
9. Without the aid of references, given a description or list, **identify the types of facial injuries**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406i)

10. Without the aid of references, given a description or list, **select the appropriate treatment for a facial injury**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406j)
11. Without the aid of references, given a casualty with head, face, and/or neck injuries and standard field medical equipment and supplies, **manage casualties**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8. (FMST-HSS-1406k)

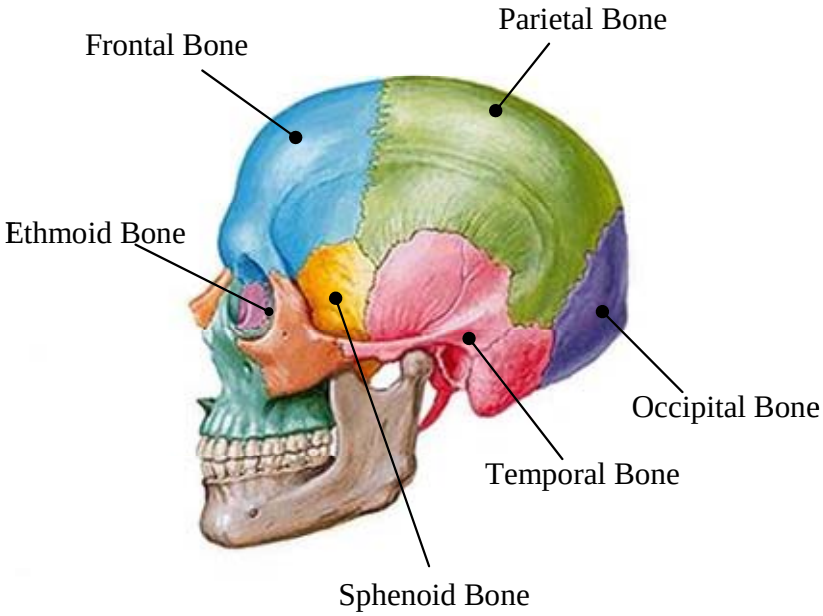


Figure 1. Anatomy of the Head

1. **ANATOMY OF THE HEAD**

Head (see figure 1)

Cranial Vault - the part of the skull that contains the brain and is divided into six sections:

Occipital - the posterior lobe of each cerebral hemisphere that bears the visual cortex and has the form of a 3-sided pyramid
Temporal - a large lobe of each cerebral hemisphere that is situated in front of the occipital lobe and contains a sensory area associated with the organ of hearing
Parietal - forming the upper posterior wall of the head
Frontal - the anterior division of each cerebral hemisphere
Sphenoid - a winged compound bone of the base of the cranium
Ethmoid - a light spongy cubical bone forming much of the walls of the nasal cavity and part of those of the orbits

Brain - divided into three major areas:

Cerebrum - The largest of the three subdivisions of the brain, superiorly situated and sometimes called the "gray matter". It controls willful movement, sensory information such as hearing, speech, visual perception, emotions and personality.

The brain is protected and cushioned by aprroximately 75 ml of an internal fluid called Cerebral Spinal Fluid (CSF). The CSF also combats infection and cleanses the brain and spinal cord.

Cerebellum - Situated posterior to the brain stem and is sometimes called the "little brain" or "white matter." It coordinates the various activities of the brain, particularly movement, coordination and balance.

Brain Stem - broken down into four parts which connect the spinal cord to the brain and cranial nerves:

Medulla - the most inferior part of the stem which contains the center that regulates respiratory rate, blood pressure, heart rate, breathing, swallowing and vomiting.
Pons - sleep center and respiratory center.
Midbrain - regulates muscle tone.
Reticular Activating System - scattered throughout the brain stem and is important in arousing and maintaining consciousness.

2. **TYPES OF HEAD INJURIES**

Soft Tissue Injuries

Definition - injury to the overlying skin of the scalp, which may be in combination with injury to the skull, brain and/or face. (See figure 2)

Causes
- Penetrating trauma (rifle, impaled objects, missile wounds)
- Blunt trauma (MVA, blast)

Signs and Symptoms
- Profuse bleeding no matter how minor the injury
- Lacerations
- Avulsions
- Pain
- Anxiety
- Edema
- Ecchymosis
- Signs/symptoms of hypovolemic shock

Figure 2. Injury to scalp

Skull Injuries

Open Skull Injuries

Definition - injury where cerebral substance is visable through a scalp laceration. Open head injuries usually combine lacerations of the scalp, fragmentation of the skull from fractures, and lacerations of the membranes that cover the brain. The brain may be relatively untouched, or it may be extensively bruised or lacerated.

Causes
- Penetrating trauma
- Blunt trauma

Signs and Symptoms

- Profuse bleeding no matter how minor the injury
- Crepitus
- Edema
- Depressions
- Deformities
- Visualize skull or bony fragments

Closed Skull Injuries

Definition - in closed head injuries there may or may not be lacerations of the scalp, but the skull is intact, and there is no opening to the brain. Injury to the brain itself may be far more extensive in a closed head injury because more of the injuring force is transmitted deeper into the brain due to pressure build-up (see figure 3).

Causes

- Coup-Contrecoup - also known as a deceleration injury. It occurs when the brain strikes the frontal lobe of the skull, then is thrown back against the occipital lobe of the skull (or in the reverse order), causing the brain to bounce off both sides of the cranial vault, resulting in soft tissue damage.
- Blunt Trauma - rising intracranial pressure (ICP) produces complications because the brain is enclosed and pressure cannot be relieved.

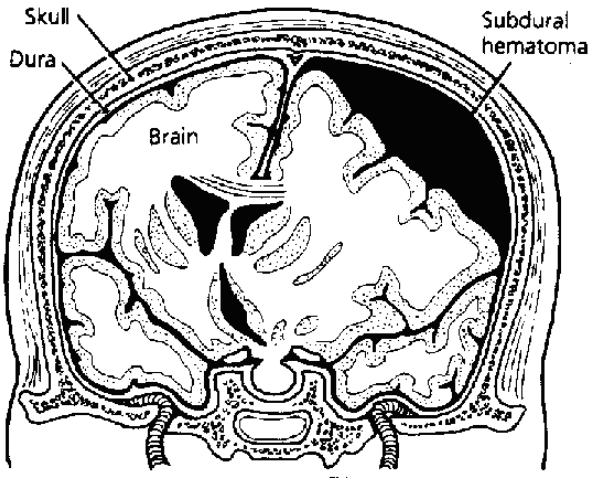


Figure 3. Closed Head Injury

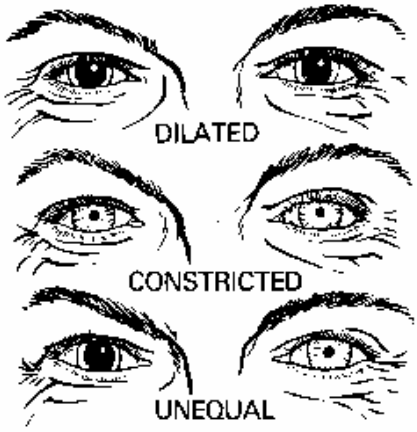


Figure 4. Pupils

Signs and Symptoms

- Crepitus around injury site
- Headache
- Neurological symptoms:
  - Altered LOC
  - Restlessness
  - Unequal pupils (see figure 4)

- Bruising, such as:

Raccoon Eyes (see figure 5) - discoloration of the soft tissue under the eyes indicates basilar skull fracture.

Battle's sign (see figure 6) - discoloration of the soft tissue behind the ear indicates temporal bone fracture. This is a late sign and may not be readily seen.

- Drainage - drainage of cerebral spinal fluid from the ears, nose, or eyes. Blood or fluid (CSF) in the ears or nose may indicate a skull fracture.
- Bradycardia
- Increased systolic blood pressure
- Nausea/vomiting
- Decreased Respirations/Cheyne Stokes breathing pattern
- Deformity of the skull (see figure 7).

Figure 5. Raccoon Eyes

Figure 6. Battle's Sign

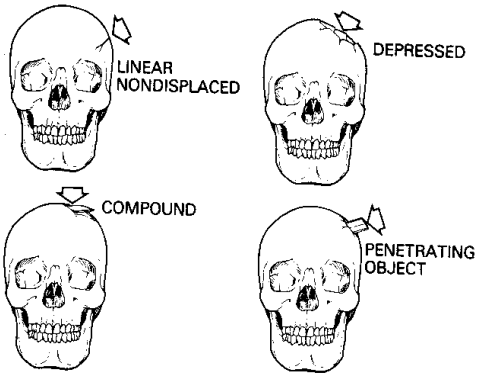


Figure 7. Skull Injuries

Brain Injuries

Definition - results from contusion, hemorrhage and/or edema. Damage to the brain and associated intracranial hemorrhage may occur with or without scalp lacertions or skull fractures. If the cranial vault is intact, the resultant swelling or bleeding produces more brain injury by increasing the intracranial pressure.

Causes

- Blunt trauma
- Penetrating trauma
- Coup-Contrecoup injuries

Signs and Symptoms – in addition to the signs and symptoms for closed skull injuries, the following signs and symptoms may also indicate a brain injury:

- Unusual behavior patterns. You must be careful not to misinterpret these symptoms for a psychiatric casualty. (This is the number one indicator of an injury.)
- Altered level of consciousness
- Paralysis
- Convulsions/seizures
- Hyperthermia

Determining Level of Consciousness - The Glasgow Coma Scale (GCS) (see figure 8 below) is a quick and easy method for determining level of consciousness. It is a simple method for determining cerebral function and is predictive of casualty outcome. The GCS score is divided into three sections – eye opening, best verbal response, and best motor response. A score of less than 8 indicates a major injury, 9 to 12 indicates a moderate injury, and 13 to 15 indicates a minor injury. A score of 8 or below is an indication the casualty should be intubated. In the case of operating in a tactical setting, a GCS of less than 8 means to provide some means of an artificial airway (i.e. oral airway, nasal airway, or emergency cricothyroidotomy).

Eye Opening
Spontaneous eye opening
Eye opening on command
Eye opening to painful stimulus
No Eye opening

Best Verbal Response
Answers appropriately (oriented)
Gives confused answers
Inappropriate responses
Makes unintelligible noises
Makes no verbal response

Best Motor Response
Follows command
Localizes painful stimuli
Withdrawal to pain
Responds with abnormal flexion to painful stimuli (decorticate)
Responds with abnormal extension to pain (decerebrate)
Gives no motor response

Figure 8. Glasgow Coma Scale (GCS)

3. **TREATMENT OF HEAD INJURIES**

- Provide and maintain patent airway
- Apply c-spine precautions
- Hemorrhage control. Cover open wounds securely enough to aid in the clotting process without pressing skull fragments or impaled objects inward by using donut o-ring.
- Fluid resusciatate to maintain a palpable radial pulse (Do not want to raise intracranial pressure)
- Do not remove foreign bodies or impaled objects
- Check for drainage of CSF from the wound, nose, or ears. Do not pack or suction nose and/or ears if CSF leakage is suspected. Do not let patient clear their nose by blowing. If the casualty has draining from their nose, check to see if it is CSF by:
  - Use the Halo, or Target Test to check for CSF. Dip a 4 x 4 in the drainage then lay it flat and wait a few minutes. If there is CSF in the blood, the blood will collect in the center, while the CSF remains to the outside creating a halo around the blood.
- Give nothing by mouth (NPO)
- CASEVAC in the high Fowlers position
- Do **NOT** give pain medications

NO PAIN MEDICATIONS!
NO PAIN MEDICATIONS!
NO PAIN MEDICATIONS!

NOTE: There is a high mortality rate associated with head trauma. All head trauma patients are assumed to have a cervical spine injury until proven otherwise.

4. **TRAUMATIC BRAIN INJURY (TBI)**

Mild Traumatic Brain Injury (m TBI) and concussion are interchangeable terms that describe an injury to the brain that results in a disruption of brain function. The term "concussion" is preferred when speaking about TBI with patients due to the term, Traumatic Brain Injury, having a negative connotation associated with it as some associate it with brain damage.

CONCUSSION

Concussion - an injury from a hit, blow, or jolt to the head that briefly knocks you out (loss of consciousness), makes you confused or "see stars." This is one of the most frequent head injuries. Loss of consciousness is **NOT** required to diagnose a concussion.

Statistics

- Concussions affect 10 to 20 percent of service members returning from a combat deployment.
- Over 90 percent of service members with TBI have concussions and recover quickly. Most note improvement in the first week.
- Recovery is usually quick, but the recovery time greatly depends on the individual and nature of the injury.
- Post traumatic amnesia is the hallmark sign of a concussion.

TYPES OF TBI's

Penetrating – anytime there's a head injury with something penetrating the skull.
Non- penetrating – there is an injury to the head but nothing penetrates the skull.
TBI from blast – injuries that are brought on by result of a blast.

SCREENING FOR TBI

There are three situations when you are required to screen a casualty for a TBI.

- Mounted personnel – everyone inside a vehicle involved in a vehicle rollover or explosion of a vehicle.
- Dismounted personnel – anyone within roughly 50 meters of a blast.
- Personnel in a building – everyone inside or near a building involved in a blast.

Screen anyone who has sustained injuries that would indicate a possible concussion.

THE MACE EXAM

The Military Acute Concussion Evaluation (MACE) is a simple evaluation tool available to you to help determine if a casualty may have a concussion. This evaluation is most accurate when performed within 12 hours of an injury. A normal score for the MACE is 25-30 points. The MACE **DOES NOT** diagnose a concussion.

If the casualty displays any of the "red flag" warning signs of a concussion, **DO NOT** use the MACE, refer them to a provider immediately. These red flags warning signs are as follows:

- Loss of consciousness
- Memory loss
- Confusion
- Unusual behavior/ combative behavior
- Unequal pupils or seizures
- Repeated vomiting
- Double vision
- Worsening headache
- Weakness
- Disoriented to place
- Unsteady on feet
- Abnormal speech

MANAGING CONCUSSIONS

Management of concussions is mostly supportive in nature. Mandatory minimum rest times after concussive events are as follows:

- First diagnosed concussion: Mandatory minimum 24 hour recovery period unless clinical evaluation directs longer.
- Recurrent concussion (within a 12 month period): requires longer mandatory recovery period than the initial concussive event depending on number of incidents.
- If two documented concussions have occurred within the past 12 months, return to duty is delayed for an additional 7 days following symptom resolution.
- If three or more documented concussions have occurred within the past 12 months, return to duty is delayed until a recurrent concussion evaluation has been completed.
- No sports or other activities with risk of concussion will be assumed by service member until cleared by Medical Officer.

MARINE CORPS COMPRENSIVE APPROACH TO MILD TBI

Commanders, or their representatives, following a blast or other concussive event will evaluate their Marines for potential brain injury using the Injury/Evaluation/Distance from Blast (IED) checklist. A "yes" finding for any of the IED questions requires referral to a Medical Officer for evaluation.

***I**njury – Physical damage to the body or body part of the Service member? Yes or No?*

***E**valuation – Referral for a medical evaluation based on involvement in a mandatory event or demonstration of any of the "HEADS" symptoms at any point,*

- ***H** – Headache and/or vomitting? Yes or No?*
- ***E** – Ears ringing? Yes or No?*
- ***A** – Amnesia and/or altered consciousness and/or loss of consciousness? Yes or No?*
- ***D** – Double vision and/or dizziness? Yes or No?*
- ***S** – Something feels wrong or is not right? Yes or No?*

***D**istance or proximity to blast or damage – Was the service member within 50 meters of blast? Yes or No? Record the distance from the blast.*

Commanders can and should direct their Marines to a medical evaluation in any other concerning circumstance such as repeated exposures to possible brain injurious events or complaints that could be related to a brain injury like.

5. **ANATOMY OF THE NECK**

Structures

Esophagus - passage from the mouth to the stomach
Trachea (windpipe) - air passage from the larynx to the lungs made of connective tissue and reinforced with 15-20 C-shaped cartilaginous rings
Thyroid gland - stimulates the metabolism of all cells
Larynx (voice box) - the first part of the trachea which contains the vocal cords
Pharynx - area that extends from the soft palate to the esophagus/trachea
Epiglottis - leaf shaped structure that acts like a gate, directing air to the trachea and solids and liquids into the esophagus

Vasculature

Arteries - left/right common carotid (carry blood to brain)
Veins - left/right internal and external jugular (carry blood away from brain to heart)

Cervical Spine

Vertebrae - seven cervical vertabrae
Spinal Cord - protected by the cervical vertebrae

6. **TYPES OF NECK INJURIES**

Trauma of any kind to the neck is signifigant because of the risk of associated injuries to the respiratory tract, the alimentary tract (especially the esophagus), the major vascular structures, major nerves and the cervical spine.

Structures

Definition - injury to associated anatomy of the neck most commonly the trachea and esophagus.

Causes
- Blunt trauma
- Penetrating trauma

Signs and Symtpoms
- Subcutaneous emphysema
- Hematemesis
- Hemoptysis
- Dysphagia (difficulty swallowing)
- Dyspnea
- Hoarseness
- Deformity

Vasculature

Definition - injury to the carotid arteries and/or the jugular veins. These are the most commonly injured structures of the neck.

Causes
- Blunt trauma
- Penetrating trauma

Signs and Symptoms
- Hemorrhage
- Hemoptysis
- Hematemesis

Cervical Spine

Definition - fractures of the cervical vertebrae which are very susceptible to injury because of the relation and position of the skull. These fractures may result in irreversible spinal cord injury.

Causes
- Compression injury (see figure 9).
- Flexion, hyperextension and hyperrotation
- Lateral bending

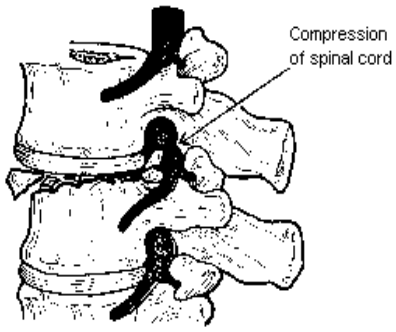


Figure 9. Compression Injury

Signs and Symptoms
- Deformity
- Head fixed in an abnormal position
- Muscle spasms
- Parasthesia in the arms
- Pain
- Paralysis or other neural deficits

The only definitive diagnosis for C-spine injury is x-ray. Patient should remain in C-collar until x-rays are read!

7. **TREATMENT FOR NECK INJURIES**

- Consider C-spine
- Control hemorrhage with occlusive dressing. Apply pressure only to the affected vessels
- Consider cricothyroidotomy if airway is compromised
- Administer fluids (*see Combat Fluid Resucitation lesson*)
- **NO PAIN MEDICATIONS!**
- CASEVAC

FYI!
Cricothyroidotomy may be necessary if neck trauma causes blood to be present on the vocal cords, thus causing laryngo-spasms.

8. **ANATOMY OF THE FACE** (see figure 10)

The facial bones form the stucture of the face in the anterior skull but do not contribute to the cranial vault.

The major facial bones are:
- Nasal
- Zygomatic - a bone of the face below the eye that in mammals forms part of the zygomatic arch and part of the orbit
- Right/left Maxilla - bones that lie on each side of the upper jaw
- Mandible (jawbone) - the lower jaw.

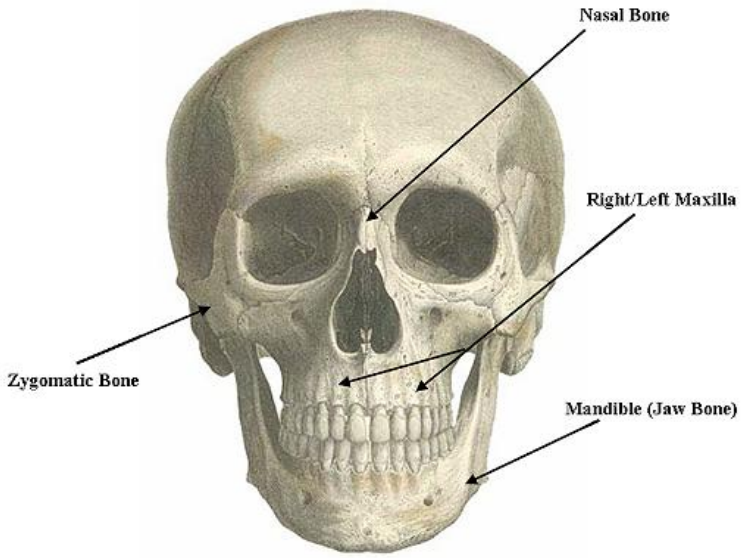


Figure 10. Major Facial Bones

9. **TYPES OF FACIAL INJURIES**

Generally serious because of the danger of hemorrhage due to the vast blood supply of the area and obstruction of the respiratory passages.

Soft Tissue Injuries

Definition - damage to the soft tissues of the face without bone injuries

Causes
- Blunt trauma
- Penetrating trauma

Signs and Symptoms
- Massive hemmorhage even with minor wounds
- Edema
- Laceration
- Ecchymosis
- Avulsion

Bone Injuries (Maxillofacial and Mandibular)

Definition - fracture of the major bones of the face (maxillofacial and mandibular). These fractures require great force and may be open or closed.

Causes
- Blunt trauma
- Penetrating trauma

Signs and Symptoms
- Lacerated gums may indicate an underlying fracture
- Casualty cannot open mouth without pain
- Misaligned teeth
- Difficulty swallowing
- Pain at fracture site
- Edema
- Facial asymmetry
- Epistaxis (Nose bleed)
- Ecchymosis
- Lacerations
- Visual disturbances
- Limited ocular movements
- Crepitus

Eye Injuries

Definition - injuries to the eyes that may be associated with other forms of head injury.

Causes
- Blunt trauma
- Penetrating trauma
- Burns
- Foreign objects-debris

Signs and Symptoms

- Loss of vision
- Pain
- Anxiety
- Hemorrhage
- Subconjunctival hemmorrhage
- Orbital bony deformity
- Intraorbital deformity

Fractured Nose - prior to control of bleeding, you must determine that there is no cerebral spinal fluid escaping. If fluid is escaping, treat as a skull fracture. Signs and symptoms will include blood or CSF from the nose and bruising.

10. **TREATMENT OF FACIAL INJURIES**

Soft tissue injuries

- Consider C-spine
- Assess and secure airway
- Hemorrhage control
- Fluid resuscitation protocol for associated shock

Bone injuries

- Maintain open airway. Consider use of Nasopharyngeal Airway (NPA) (see figure 11)
- Control hemorrhage
- **NO PAIN MEDICATIONS!**
- Cold pack
- Modified Barton bandage for mandibular fracture (see figure 12)
- CASEVAC

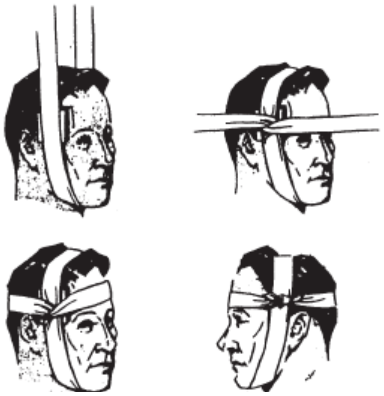


Figure 12. Modified Barton Bandage

Figure 11. Nasophryngeal Airway (NPA)

Eye injuries

- In combat, only patch the affected eye. Member can function effectively with one eye. Member becomes a litter patient if both eyes are covered.
- If the injury to the eye is clearly a minor one, the best advice is to REFRAIN FROM INTERFERENCE. A minor eye injury improperly cared for can easily become a major eye injury.

Treatment of penetrating eye injuries

- Check casualties vision
- Cover eye immediately with a rigid eye shield – NOT a pressure patch
- Have casualty take 400 mg moxifloxacin in his/her Combat Pill Pack
- Give IV/IM antibiotics if unable to take PO meds

Treatment for chemical burns of the eye

- Hold the face under running water with eyes open (see figure 13)
- Flush eyes 5-10 minutes for acid burns
- Flush eyes 20 minutes for alkali
- CASEVAC

Figure 13. Irrigating The Eye

Treatment for thermal burns of the eye

- Cover eye with loose dry dressing

Treatment for light injuries

- Cover eye with loose dressing (see figure 14).

Treatment for impaled object

- Make thick dressing and cut hole in center the size of eye opening
- Pass dressing over impaled object (see figure 15)
- Position crushed cup over dressing and bandage in place
- Elevate head to decrease intraocular pressure

Figure 14. Simple Cravat Bandage For The Eye

Treatment for lacerations involving the eye

- If only eyelid is lacerated, direct pressure or a pressure dressing will stop bleeding.
- If the eyeball itself is lacerated, do not use pressure, but cover with a loose dressing.

Treatment for protruding globe

- DO NOT attempt to place eye back in socket
- Apply bulky dressing around eye, moist gauze over the globe and cover with a cup secured in place.

Figure 15. Dressing Over Impaled Object

Treatment of nose injuries

- Hemorrhage Control

- Pinching nostrils. (Do not tilt patient head back due to postnasal drainage)
- Apply ice to bridge of nose
- Splint by padding
- Monitor and CASEVAC

CASUALTY ASSESSMENT AND THE HEAD, NECK, AND FACE

Care Under Fire Phase: In the absense of life-threatening hemorrhage from the Head, Neck, or Face, the material in this section is unlikely to be performed in Care Under Fire Phase.

Tactical Field Care Phase: During Tactical Field Care you will be required to inspect the head, neck, and face for any signs of injury. This includes looking for bone deformity and soft tissue injuries, signs of closed head trauma, and also consider the possibility of Traumatic Brain Injury (TBI). Don BSI. You must visually inspect the eyes, ears, nose, and throat. Assess the airway and intervene if necessary. Complete a head to toe assessment using DCAP-BTLS noting and treating additional injuries. Determine if vascular access is required (see Tactical Fluid Resuscitation lesson) and give fluids if necessary. If a head injury is suspected, it is NOT recommended to give casualty fluids by mouth. Consider pain medications and give antibiotics, if warranted. Reassess all care provided. Document care given, prevent hypothermia, and CASEVAC.

REFERENCE

Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 8
Head, Neck, and Face Review

1. Identify the function of the Cerebellum.

2. List the six key points for treatment of a neck wound.

3. List the appropriate treatment for a single eye injury in a combat situation.

4. What is the hallmark sign of a concussion.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1402

Manage Burn Casualties

TERMINAL LEARNING OBJECTIVES

1. Given a burn casualty in a combat environment and standard medical equipment and supplies, **manage burn casualties**, to prevent further injury or death. (FMST-HSS-1402)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify the three layers of skin**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 13. (FMST-HSS-1402a)
2. Without the aid of references, given a description or list, **identify the different types of burns**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 13. (FMST-HSS-1402b)
3. Without the aid of references, given a description or list, **identify the degree of burns**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 13 . (FMST-HSS-1402c)
4. Without the aid of references, given a description, using the "Rule of Nines," **determine the percent of body surface area burned**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 13. (FMST-HSS-1402d)
5. Without the aid of references, given a description or list, **identify the appropriate treatment for burns**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 13. (FMST-HSS-1402e)
6. Without the aid of references, given a simulated burn casualty and standard field medical equipment and supplies, **manage the casualty**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 13. (FMST-HSS-1402f)

1. **ANATOMY OF THE SKIN**

The most important function of the skin is to be a protective barrier against the outside environment. The skin also prevents fluid loss and helps regulate body temperature. Skin is composed of three layers: the epidermis, dermis, and subcutaneous tissue (see figure 1).

Epidermis - the outermost layer, is made up entirely of epithelial cells with no blood vessels
Dermis - a framework of connective tissues containing blood vessels, nerve endings, sebaceous glands, and sweat glands
Subcutaneous Tissue - is a combination of elastic and fibrous tissue as well as fat deposits

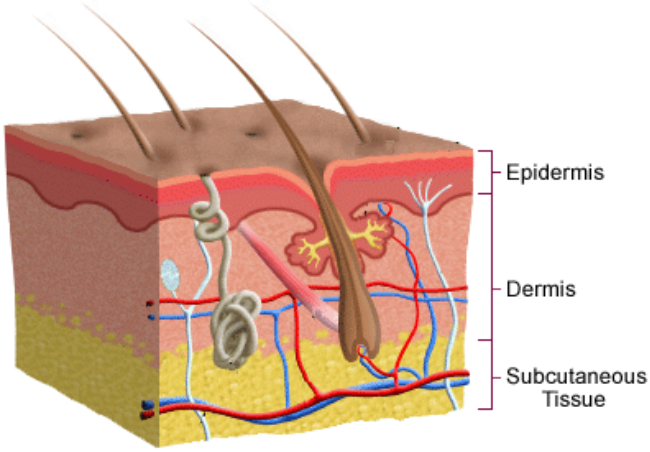


Figure 1. Anatomy of the Skin

2. **TYPES OF BURNS**

Burn injuries have many causes on and off the battlefield. Burns are generated by exposure to extreme heat, a biologic reaction from chemicals, or energy transfer through cells from electrocution or radiation. Many weapons and munitions cause burn injuries. Some, such as incendiary and flame munitions, are designed to cause high heat and burning. Others, such as high explosives, bombs, and mines cause burns secondarily to their primary effect.

Thermal (see figure 2) - thermal burns are the most common type of burn on the modern battlefield. They can result from exposure to flame weapons, incendiary weapons, munitions or from explosions from fuel sources (gasoline, diesel, and jet fuel). These weapons are designed to burn at very high temperatures and incorporate napalm, thermite, magnesium, and white phosphorous.

- The primary effect of incendiary and flame munitions against personnel are to cause severe burns.
- Burns to the airway are also possible, particularly if the casualty is in an enclosed space (bunker, ship compartment, or armored vehicle). Airway burns may result in rapid, life-threatening swelling and obstruction of the upper airway. Monitor the casualty for the following signs and symptoms:
  - Stridor
  - Oropharyngeal swelling
  - Hoarseness
  - Difficulty swallowing
  - Carbonaceous sputum (blackened sputum)
  - Singed nasal or facial hair
  - Dyspnea

Figure 2. Thermal burn to legs

Electrical Burns (see figure 3) - electrical injuries are devastating injuries that can easily be underappreciated. In many cases the extent of tissue damage does not accurately reflect the magnitude of the injury. Tissue destruction and necrosis are excessive compared with the apparent trauma because most of the destruction occurs internally as the electricity is conducted through the casualty. The casualty will have external burns at the points of contact with the electrical source as well as grounding point. As the electricity courses through the casualty's body, deep layers of tissue are destroyed despite seemingly minor injuries on the surface. Electrical and crush injuries share many similarities. In both injuries there is massive destruction of large muscle groups with resultant release of both potassium and myoglobin. The release of potassium from large muscles causes a significant increase in the serum level, which often results in cardiac arrhythmias. All electrical burns are considered a cardiac emergency and the casualty should be CASEVAC'ed to a higher echelon of care. Also, when myoglobin is released into the bloodstream in consderable amounts, it can be toxic to the kidneys and can cause kidney failure. Other signs and symtoms include:

Figure 3. Electrical burn to foot

- Tympanic membranes may rupture causing hearing loss.
- Intense muscle contractions (tetany) can result in fractures at multiple levels of the spine. Casualties with electrical injuries should have their spine immobilized.
- Intercranial bleeds and long bone fractures may also occur.

Circumferential Burns (see figure 4) - a circumferential burn is a burn that encircles the trunk of the body (chest) or an extremity (arm or leg). **Circumferential burns are capable of producing a life or limb threatening condition. They can create a tourniquet-like effect that can render an arm or leg pulse-less.** Circumferential burns of the chest can constrict the chest wall to such a degree that the casualty suffocates from inability to breath. Therefore, all circumferential burns should be handled as an emergency and casualties CASEVAC'ed immediately. Escharotomies are surgical incisions made through the burn eschar to allow expansion of the deeper tissue and decompression of previously compressed and often occluded vascular structures.

Figure 4. Circumferential burn to foot

Radiation Burns - burns associated with nuclear blasts. Radiation is a hazardous material. The initial priorities are to remove the casualty from the source of contamination, remove contaminated clothing, and irrigate the casualty with water.

- Skin that is exposed to an explosion is burned by the infrared rays emitted at detonation.
- Clothing or shelter can offer some protection.

- Secondary injuries will include first and second degree burns.
- The majority of burns are caused by contact with the secondary sources that ignited such as buildings and clothing.
- If the doses of ionizing radiation are high enough to cause burns to the skin, systemic effects may overshadow the burn itself.

Chemical - injuries from chemicals are often the result of prolonged exposure to the offending agent. This is contrasted with thermal injuries, where the duration of exposure is usually very brief. You may encounter casualties who have suffered chemical burns caused by weapons, chemicals used to fuel or maintain equipment, or chemical spills following damage to civilian installations. The severity of a chemical injury is determined by four factors: nature of the chemical, concentration of the chemical, duration of contact, and MOI of the chemical. Chemical agents are classified as:

Acids:
- chemicals with a pH between 7 (neutral) and 0 (strong)
- Found in cleaners and swimming pool acidifiers

Bases (alkali):
- chemical with a pH between 7 and 14
- found in fertilizer, industrial cleaners, the structual bonds of cement/concrete, and the most common cause of alkali burns in garrison are the batteries used in our radios
- Alkali burns are usually more serious than acid burns, because alkalis penetrate deeper and burn longer

Organic:
- Contains carbon
- Phenols, creosote and petroleum products such as gasoline

3. DEGREE OF BURNS

The severity of a burn is determined by the depth of the burn and the extent of the total body surface area (TBSA) burned. The severity of all burns will vary depending on the source of the burn, duration of exposure, and location of the burn.

Depth: The depth of the burn is related to how deeply the skin is damaged (see figure 5). Estimation of burn depth can be deceptively difficult. Often, a burn that appears to be a partial-thickness burn (second degree) will prove to be third degree burn in 24 to 48 hours. Therefore it is often wise to withhold final judgment of burn depth for up to 48 hours after injury.

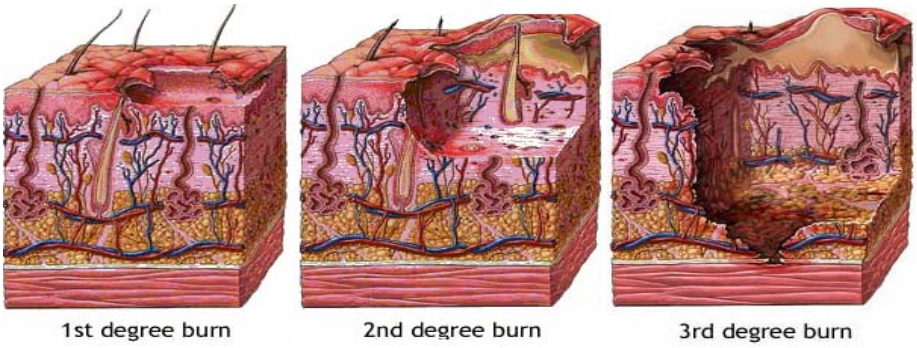


Figure 5. Depth of Burns

Superficial Burn/First-Degree Burn (see figure 6) - first-degree burns involve only the epidermis and are characterized as being red and painful. These wounds heal typically within a week and the casualty will not scar.

Signs and Symptoms:

- Dry, red and inflamed skin
- Painful to touch
- The burned area blanches with pressure
- Minimal swelling (if present)

Figure 6. First Degree burn on hand

Figure 7. Second Degree Burn

Partial Thickness Burns/Second-Degree Burn (see figure 7) - burns that involve the epidermis and varying portions of the underlying dermis. Second-degree burns will appear as blisters or as denuded, burned areas with a glistening or wet appearing base. These wounds will be painful. Because remnants of the dermis survive, these burns are often capable of healing in 2 to 3 weeks.

Signs and Symptoms:

- Skin is moist, with reddened areas
- Blisters or open weeping wounds
- Deep, intense pain
- Edema will be moderate
- Fluid loss may be significant depending on the extent of the burn

Full Thickness Burn/Third-Degree Burn (see figure 8) - third-degree burns involve all three layers of skin and may have several appearances. Most casualties will have pain because areas of third-degree burn are usually surrounded by second-degree burns.

- Signs ans Symptoms:
  - Skin has a dry, leathery appearance
  - The skin can range in color from white, yellow, cherry red, brown, or charred
  - Severe pain around periphery of burn, but little to no pain near center of burn.
  - No capillary refill at affected area

Figure 8. Third Degree burn of lower leg

Fourth-Degree/Complete Burn (see figure 9) - fourth-degree burns are those that not only burn all layers of the skin, but also burn underlying fat, muscles, bone or internal organs.

Figure 9. Fourth Degree burn on arm

4. BURN SIZE ESTIMATION

Estimation of burn size is necessary to begin to resuscitate the casualty appropriately and prevent the complications associated with hypovolemic shock. The most widely applied method is known as the "Rule of Nines."

Rule of Nines: This method applies the principles that major regions of the body in adults are considered to be 9% of the total body surface area (TBSA) (see figure 10). The genital area and palms of the hand (not including the digits) represent 1%.

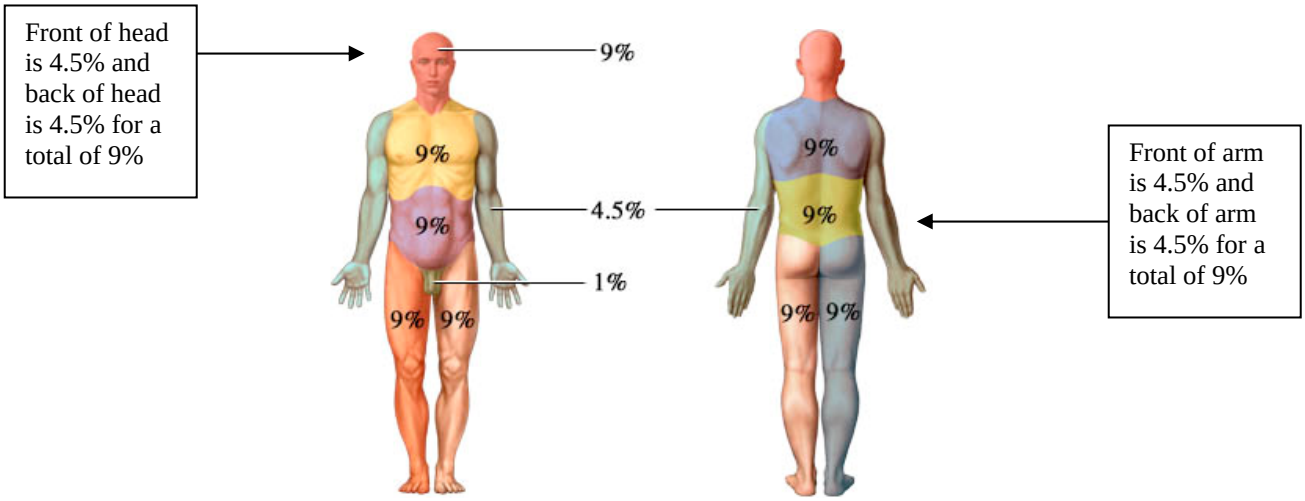


Figure 10. Rule of Nines

Rule of Palms: This method assumes that the palm size of the patient represents approximately 1% of the TBSA. TBSA is estimated by counting the number of the patient's "palms" it takes to completely cover the burn area. The Rule of Palms is helpful for estimating the TBSA of small or irregular shaped burns and small children.

5. FLUID RESUSCITATION

Administration of large amounts of IV fluids is needed to prevent a burn casualty from going into hypovolemic shock. After a burn, the casualty loses a substantial amount of intravascular fluid from the edema which results as well as the evaporative losses at the site of the burn. Massive fluid shifts will occur and evaporative losses can be enormous. The resuscitation of burn shock is aimed at not only restoring the lost volume but also replacement of anticipated losses. When treating a burn casualty, the objective is to calculate

and replace the fluids that it is anticipated the casualty will lose over the first 24 hours after the burn injury.

The use of LR solution is the best way to initially manage a burn casualty. The most frequently used formula for calculating fluid replacement is the "Parkland formula." The Parkland formula delivers 4 ml/kg/% TBSA burned. Half this fluid will be administered in the first 8 hours after injury and the remaining half of the volume over the next 16 hours. It is important to remember the first half is administered with 8 hours from the time the casualty was injured, not from the point the provider started to resuscitate the casualty. This is especially important in the tactical situation where there may be an initial delay in treatment. If the casualty presents for emergency care 3 hours after the injury with no or little fluids administered, the first half of the calculated total needs to be administered over 5 hours. For example:

Parkland formula example = 4 mL X weight in kg X % TBSA burned

Parkland formula: 4 ml X 76 kg X 36%

76 kg casualty has sustained partial thickness burns to his anterior chest (9%) and abdomen (9%), entire right arm (9%), and anterior right leg (9%). The injury occurred 30 minutes ago.

In this case, the casualty who weighs 76 kg has sustained burns over 36% of his body. So, doing the math:

4 X 76 = 304; 304 X 36 = 10,944 mL (which can be rounded up to 11 liters)

Remember, half of this total should be administered in the first 8 hours following the burn, so, the casualty will need 5 ½ liters in the first 8 hours. Keep in mind, the injury occurred 30 minutes ago, so the entire 5 ½ liters should be administered over a period of 7 ½ hours.

The remainder is administered over the remaining 16 hours:

5,500 mL divided by 16 (time remaining in one day) equals 343 ml per hour for the next 16 hours.

To Pop or Not to Pop, that is the Question?

The blister on a burn does not provide protection to the skin and limits the ability to apply topical antibiotics. So why don't we pop them? Blisters should only be popped when you have the capabilities to debride the wound, provide pain medications, and apply antibiotic ointments. Do not open the blisters unless the above capabilities are available.

While you may not be completely responsible for the care of severely burned patients for 24 hours, this example illustrates the need for burn patients to receive quick attention and prompt evacuation to definitive care.

6. **TREATMENT OF BURNS**

The initial step in the care of a burn casualty is to stop the burning process. The most effective and appropriate method of terminating the burning is irrigation with large volumes of room-temperature water. In the tactical environment however, access to large volumes of water is not always practical. You can also smother any flames with a jacket, blanket, or any other available material. Rolling the casualty on the ground is also effective. Remove all

clothing and jewelry; these items retain residual heat and will continue to burn the casualty. However, DO NOT pull away clothing that is stuck to the wound.

Airway - the heat from the fire can cause edema of the airway above the level of the vocal cords and can occlude the airway, so be prepared for a possible surgical airway. Careful and continuous evaluation of the airway is required. O2 should be given, if available.

Breathing - as with any trauma casualty, breathing can be adversely affected by such problems as broken ribs, pneumothoraces (collapsed lung), and open chest wounds. In the event of circumferential chest wall burns, pulmonary compliance may decrease to such an extent that it inhibits the casualty's ability to inhale. In such cases, prompt CASEVAC of casualty to higher level of care in order to perform escharotomies of the chest wall is critical.

Circulation - evaluation of circulation includes the determination of blood pressure, evaluation of circumferential burns, and establisment of intravenous access. Accurate measurement of blood pressure becomes difficult or impossible with burns to the extremities. Blood pressure can be estimated by palpating for distal pulses. Even if the casualty has adequate blood pressure, distal limb perfusion may be critically reduced because of circumferential injuries. Burned extremities should be elevated, when tactically prudent, during transport to reduce the degree of swelling in the affected limb.

Two large-caliber IV catheters are required for burns that cover more than 20% of the TBSA. Ideally, the IV should not be placed through or adjacent to burned tissue; however, placement through the burn is appropriate if no alternative sites are available or consider the intraosseous (IO) route.

Detailed Assessment - perform your assessment, keeping in mind that burns themselves are not immediately fatal and can wait until other priorities are addressed. Therefore, assess for additional injuries, such as associated blast, missile or fragment wounds and treat appropriately.

Hypothermia - burn casualties are not able to retain body heat and are extremely susceptible to hypothermia. Make every effort to preserve body temperature. Apply several layers of blankets. Keep passenger compartment of the CASEVAC vehicle or fuselage of the aircraft warm, regardless of the time of year. As a general rule, if you as the provider treating the burn casualty are not uncomforable, the ambient temperature is not warm enough.

Estimate the Depth and Extent of the Burn - use the "Rule of Nines" or the "Rule of Palms" noted above.

Dressing the burn - before CASEVAC, the wounds should be dressed. The goal of the dressing is to prevent ongoing contamination and prevent airflow over the wounds. Water-jel dressings, if available, are preferred as they help to cool the burn. If not, dry sterile dressings covering the entire burn are sufficient before CASEVAC of the casualty. Several layers of blankets are then placed over the casualty to prevent hypothermia.

Burns to the Eyes (see figure 11)

Signs and Symptoms:
- Blurry vision
- Vision loss
- Pain
- Tearing
- Conjunctival erythema

Treatment:
- Thermal burn - irrigate with large amounts of water.
- Chemical burn:
  - *Acids* - irrigate for 5 - 10 minutes
  - *Alkalis* - irrigate for 20 minutes
- Cover eyes with a dry sterile dressing. In a tactical situation, if the patient can partially see out of the affected eye and can otherwise ambulate, defer dressing the eye. Avoid dressing both eyes if only one eye is injured.

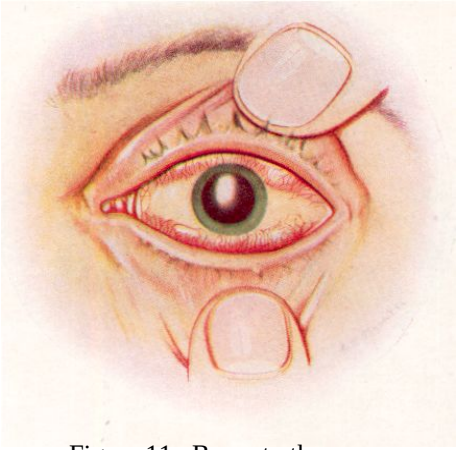


Figure 11. Burns to the eyes

If evacuation is delayed
- Clean the burn area with diluted (1:10) betadine solution and then rinse with saline.
- Remove loose nonviable tissue during cleaning process (this is very painful, especially at the periphery of the burn so pain management should be considered).
- Apply Silvadene (or other bacteriostatic ointment) and cover with dry, loose, sterile dressing, if available
- Gently clean and reapply Silvadene and a fresh dressing every 24 hours.

Critical Burns Requiring Special Care - The American College of Surgeons Committee on Trauma developed a list of burn injuries that are considered critical regardless of depth or TBSA affected. Treatment in a specialized burn unit will improve the chances of survival and reduce complications or disabilities for casualties with any of the following injuries:
- Inhalation injuries.
- Partial-thickness burns over greater than 10% of the TBSA.
- Full thickness burns in any age group.
- Any burn involving the face, hands, feet, genitalia, perineum, or major joints.
- Electrical burns, including lightning injury.
- Chemical burns.
- All burns complicated by injuries of the respiratory tract, other soft tissue injuries, and musculoskeletal injuries.

Pain Management should be provided to burn victims, and small doses of narcotics should be titrated intravenously (see the medication appendix at the end of Block 2 for more information regarding pain medications). Vital signs and respiratory effort are monitored for potential adverse effects. (Note: The use of narcotics is contraindicated in head and spinal trauma.) Water immersion may be applied for 10-15 minutes for pain relief, however, caution should be used as it may intensify shock.

CASUALTY ASSESSMENT AND BURNS

Care Under Fire Phase: Unless casualty also has life-threatening hemorrhage along with a burn, there is no care given for burns in this phase.

Tactical Field Care Phase: During this phase, you will be required to inspect the burned area. A burn can cause significant problems with the airway. If a casualty's airway is jeopardized, securing an airway is vital before edema sets in. Consider a surgical airway, if needed. Don BSI. Complete a head to toe assessment using DCAP-BTLS noting and treating additional injuries. Determine if vascular access is required (see Tactical Fluid Resuscitation lesson) and give fluids if necessary. If the casualty is able to drink fluids, they should be encouraged to do so. Consider pain medications and give antibiotics if warranted. Reassess all care provided. Document care given, prevent hypothermia, and CASEVAC.

REFERENCE

Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 13

Burns Review

1. Identify three charicteristics of a second degree burn.

2. Using the Rule of Nines, estimate the body surface area affected for a patient with burns to the upper and lower back.

3. Using the Rule of Nines estimate the body surface area affected for a patient with burns to the chest, abdomen and right front arm.

4. Describe the appropriate treatment for burns, assuming no delay in casulty evacuation.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1408

Manage Abdominal Injuries

TERMINAL LEARNING OBJECTIVES

1. Given a casualty with an abdominal injury in a combat environment and standard field medical equipment and supplies, **manage abdominal injuries** to prevent further injury or death per the references. (FMST-HSS-1408)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or title, **identify the major abdominal organs**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 11. (FMST-HSS-1408a)
2. Without the aid of references, given a description or title, **identify the location of the abdominal organs**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 11. (FMST-HSS-1408b)
3. Without the aid of references, given a description or list, **identify the significance of solid organs in abdominal injuries**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 11. (FMST-HSS-1408c)
4. Without the aid of references, given a description or list, **identify the signifigance of hollow organs in abdominal injuries**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 11. (FMST-HSS-1408d)
5. Without the aid of references, given a description or list, **identify the signs and symptoms of abdominal injuries**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 11. (FMST-HSS-1408e)
6. Without the aid of references, given a description or list, **identify proper treatment for abdominal injuries,** within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 11. (FMST-HSS-1408f)
7. Without the aid of references, given a simulated casualty with abdominal injuries and standard Field Medical Service Technician equipment and supplies, **manage abdominal injuries**, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 11. (FMST-HSS-1408g)

OVERVIEW

Unrecognized abdominal injury is one of the major causes of death in the trauma casualty. Early deaths from severe abdominal trauma typically result from massive blood loss caused by either penetrating or blunt injuries. The abdomen contains the major organs of digestion and excretion. The abdominal cavity is located below the diaphragm; its boundaries include the anterior abdominal wall, the pelvic bones, the vertebral column, and the muscles of the abdomen and flanks. Many organs lie in both the abdomen and the pelvis. The simplest and most common method of describing the portions of the abdomen is by quadrants. In this system, the abdomen is divided into four equal parts by two imaginary lines that intersect at right angles at the umbilicus. The abdomen can further be divided to more specifically identify a region of the abdomen (see figure 1).

1. MAJOR ABDOMINAL ORGANS AND THEIR LOCATIONS

Right Upper Quadrant (RUQ)

Colon - the part of the large intestine that extends from the cecum to the rectum.
Right Kidney - one of a pair of organs situated in the body cavity near the spinal column that excrete waste products. The kidneys are bean-shaped organs that consist chiefly of nephrons by which urine is secreted, collected, and discharged through the ureter to the bladder.
Pancreas - a large lobulated gland that secretes digestive enzymes and the hormones insulin and glucagon. Only a small portion of the pancreas is located in the RUQ.
Liver - a large, very vascular, glandular organ that secretes bile and causes important changes in many of the substances contained in the blood.
Gallbladder - a membranous muscular sac in which bile from the liver is stored.

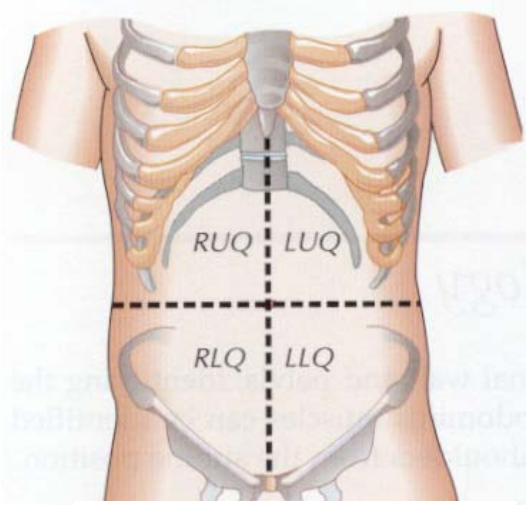


Figure 1. Areas of the Abdomen

Left Upper Quadrant (LUQ)

Colon - see above.
Left Kidney - see above.
Pancreas - see above for function. Most of the pancreas is located in the LUQ.
Spleen - a highly vascular, ductless organ that is located in the left abdominal region near the stomach or intestine and is concerned with final destruction of red blood cells, filtration and storage of blood, and production of lymphocytes.
Stomach - muscular, distensible, saclike portion of the alimentary tube between the esophagus and the colon.

Right Lower Quadrant (RLQ)

Ascending Colon - see above. Ascending means to move upwards.
Small Intestine - the part of the intestine that lies between the stomach and colon; it consists of duodenum, jejunum, and ileum. It secretes digestive enzymes, and is the chief site for the absorption of digested nutrients.
Major artery and vein for right leg - iliac artery and vein.
Appendix - a small sac extending from the large intestine.

Left Lower Quadrant (LLQ)

Descending Colon - see above. Descending means to move downwards.
Small Intestine - see above.
Major artery and vein for left leg - iliac artery and vein.

2. SIGNIFICANCE OF ABDOMINAL ORGANS

The abdominal organs can be classified as either "hollow" or "solid" organs, depending on their function.

Solid Organs - solid masses of tissue (liver, spleen, pancreas and kidneys)
Significance - highly vascular organs which injury to them may cause severe bleeding.

Hollow Organs - gastrointestinal/urinary tract through which materials pass. The stomach, intestines, and bladder are hollow organs.
Significance - injury to these organs may cause septicemia and toxicity.

3. SIGNS AND SYMPTOMS

The assessment of abdominal injuries can be difficult, especially with the limited diagnostic capabilities of the field setting. An index of suspicion for abdominal injuries should develop from a variety of sources of information, including mechanism of injury (MOI), findings from the exam, and input from the casualty or bystanders. Some signs that raise the index of suspicion are:

- MOI consistent with rapid deceleration or significant compression forces
- Soft tissue injuries to the abdomen, flank, or back
- Shock without an obvious cause
- Level of shock greater than explained by other injuries
- Significant abdominal tenderness on palpation or with coughing
- Involuntary guarding
- Diminished or absent bowel sounds

FYI: Only about 15% of casualties with stab wounds to the abdomen will require surgical intervention, but 85% of casualties with gunshot wounds will need surgery for definitive management of their injuries.

Assessing the patient for abdominal injuries begins with knowledge of the MOI. Numerous mechanisms lead to the compression and shear forces that may damage abdominal organs. A casualty may experience considerable deceleration forces when involved in motor vehicle crashes, struck or run over by a vehicle, or after falling from a significant height. Any protective gear worn by the casualty should be noted.
Abdominal injuries can be caused by blunt or penetrating trauma.

Blunt Trauma - blunt trauma often poses a greater threat to life because potential injuries are more challenging to diagnose than those caused by penetrating trauma. The injuries to abdominal organs result from either compression or shear forces. In compression incidents, the organs of the abdomen are crushed between solid objects. Shear forces create rupture of the solid organs or rupture of blood vessels in the cavity because of the tearing forces exerted against their supporting ligaments. The liver and spleen can shear and bleed easily and blood loss can occur at a rapid rate. Increased intra-abdominal pressure produced by compression can rupture the diaphragm, causing the abdominal organs to move upward into the pleural cavity.

Penetrating Trauma - a foreign object enters the abdomen and opens the peritoneal cavity to the outside. Penetrating trauma, such as a gunshot or stab wound, is more readily visible than blunt trauma. Multiple organ damage can occur in penetrating trauma, although it is less likely with a stab wound than with a gunshot wound. A mental visualization of the potential trajectory of a missile, such as a bullet or the path of a knife blade, can help identify possible injured internal organs.

History of the injury can be obtained from the patient or from bystanders. If the injury is penetrating, questions should focus on the type of weapon, number of times shot or stabbed, and amount of blood at the scene.

Unless there are associated injuries, casualties with abdominal trauma generally present with a patent airway. When abnormalities are found in the assessment of the abdomen, it should be exposed and examined in greater detail. This involves inspection and palpation of the abdomen looking and feeling for soft tissue injuries and distention. Soft tissue injuries include contusions, abrasions, stab or gunshot wounds, obvious bleeding, and unusual findings such as evisceration or impaled objects. Palpation of the abdomen is undertaken to identify areas of tenderness. Ideally, palpation is begun in an area where the casualty does not complain of pain. Then, each of the abdominal quadrants is palpated. While palpating a tender area, the provider may note that the casualty "tenses up" the abdominal muscles in that area. This reaction, called voluntary guarding, serves to protect the patient from pain. Involuntary guarding represents rigidity or spasm of the abdominal wall muscles when the casualty is distracted. Deep or aggressive palpation of an obviously injured abdomen should be avoided because palpation may dislodge blood clots and promote existing hemorrhage and may increase spillage of contents of the GI tract if perforations are present. Great care during palpation should also be exercised if there is an impaled object. Casualties with altered mental status, such as those with a traumatic brain injury (TBI) may have unreliable examination.

"The most reliable indicator of intra-abdominal bleeding is the presence of shock from an unexplained source."

Auscultation of bowel sounds is generally not a helpful field assessment tool. Time should not be wasted trying to determine their presence or absence because this diagnostic sign will not alter the field management of the casualty.

4. **TREATMENT OF INJURIES**

The key aspects of field management of abdominal trauma is to recognize the presence of potential injury and initiate transport to a higher echelon of care.

Blunt Trauma

Treatment for blunt trauma to the abdomen includes maintaining the ABC's of the patient, collecting vital signs, gathering information for a history, treating for shock, and placing the patient in the supine position with the knees slightly flexed. Remember that with a patient with blunt trauma you need to keep them calm so that you can perform your duties and not to strongly palpate the abdomen because you do not know the extent of the internal injuries. The final step in treating blunt abdominal trauma is to CASEVAC the patient, the definitive treatment that that patient needs is beyond your scope of care.

Figure 2. Impaled knife in chest

Special Considerations

Impaled objects (see figure 2): Because removal of an impaled object may cause additional trauma and because the object's distal end may be actively controlling the bleeding, removal of it in the field environment is contraindicated. The impaled object should neither move nor be removed. If bleeding occurs around it, direct pressure should be applied around the object to the wound with a bulky dressing that stabilizes the object and prevents movement.

Evisceration (see figure 3): A section of intestine or other abdominal organ is displaced through an open wound and protrudes externally outside the abdominal cavity. Efforts should focus on protecting the protruding segment of intestine or other organ from damage. If the intestine or some of the other abdominal organs become dry, cell death will occur. Therefore the eviscerated abdominal contents should be covered with a sterile dressing that has been moistened with saline. These dressings should be periodically remoistened with saline to prevent them from drying out. Wet dressings may be covered with a large, dry dressing to keep the casualty warm.

FYI! Under normal circumstances, treatment of eviscerated bowel requires only a moist sterile dressing. Abdominal contents normally do not need to be reinserted into the abdominal cavity.

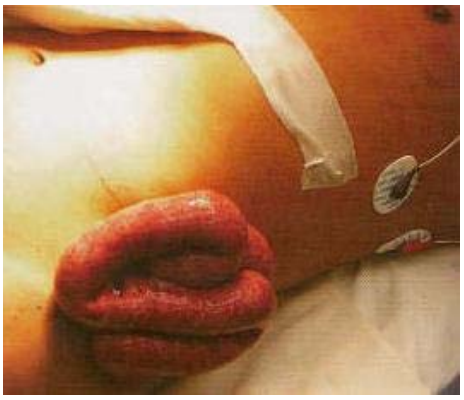


Figure 3. Evisceration of bowel

CASUALTY ASSESSMENT AND ABDOMINAL INJURIES

Care Under Fire Phase: In the absence of life-threatening hemorrhage from the abdomen, the material in this section is unlikely to be addressed in Care Under Fire. If the casualty does have life-threatening hemorrhage from the abdomen, Combat Gauze and direct pressure are the best options.

Tactical Field Care Phase: During this phase, you will be required to inspect the abdomen using DCAP-BTLS for any signs of injury. Don BSI. Note and treat all abdominal injuries. Complete a head to toe assessment using DCAP-BTLS noting and treating additional injuries. Determine if vascular access is required (see Tactical Fluid Resuscitation lesson) and give fluids if necessary. If the casualty is able to drink fluids, they should be encouraged to do so. Consider pain medications and give antibiotics if warranted. Reassess all care provided. Document care given, prevent hypothermia, and CASEVAC.

REFERENCE

Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 11

Abdominal Review

1. Which quadrant contains the appendix?

2. Identify the solid organs and explain their significance.

3. Describe the appropriate treatment for an impaled object.

4. Describe the appropriate treatment for an abdominal evisceration.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1407

MANAGE MUSCULOSKELETAL INJURIES

TERMINAL LEARNING OBJECTIVE. Given a casualty with musculoskeletal injuies in a combat environment and standard field medical equipment and supplies, manage musculoskeletal injuries, to prevent further injury or death. (FMST-HSS-1407)

ENABLING LEARNING OBJECTIVES

(1) Without the aid of references, given a description or list, identify the anatomy of the musculoskeletal system, per the student handout. (FMST-HSS-1407a)

(2) Without the aid of references, given a description or list, identify the type of musculoskeletal injuries, per the student handout. (FMST-HSS-1407c)

(3) Without the aid of references, given a description or list, identify the treatment for musculoskeletal injuries, per the student handout. (FMST-HSS-1407d)

(4) Without the aid of references, given a description or list, identify the types of splints, per the student handout. (FMST-HSS-1407e)

(5) Without the aid of references, given a description or list, identify the general rules for splinting, per the student handout. (FMST-HSS-1407f)

(6) Without the aid of references, given a description or list, identify techniques for splinting fractures, per the student handout. (FMST-HSS-1407)

(7) Without the aid of references, given a simulated casualty with musculoskeletal injuries and standard field medical equipment and supplies, manage the casualty, per the student handout. (FMST-HSS-1407g)

1. **ANATOMY OF THE MUSCULOSKELETAL SYSTEM**

a. **The skeletal system** – bony framework of the body composed of 206 bones.

(1) Classification- Long, Short, Irregular and Flat. (See Figure 1)

(2) Divisions:

Axial Skeleton – skull, cranial bones, facial bones, Vertebral column and the thorax. (See Figure 2)

Appendicular Skeleton - consists of the upper extremities to include the scapula and bones of the lower extremities to include the pelvic girdle. (See Figure 2)

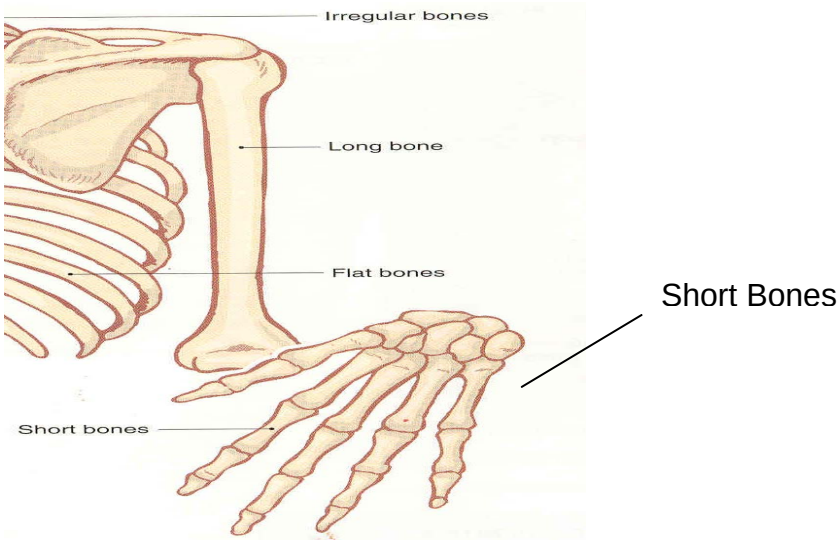


Figure 1. Bones Classified By Shape

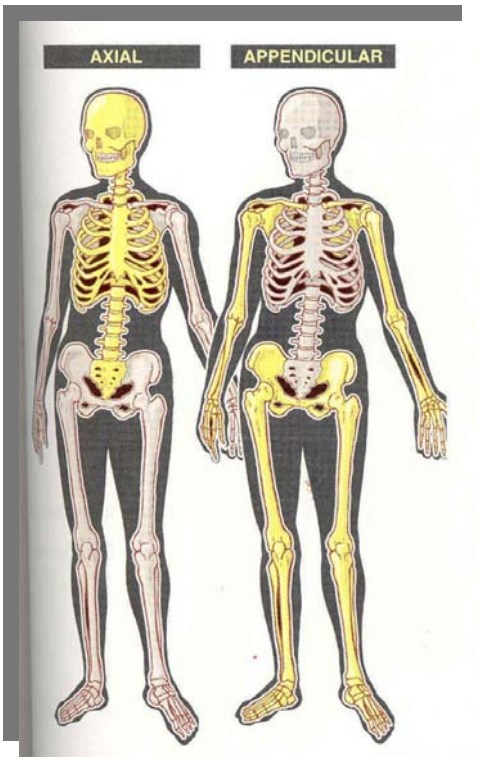


Figure 2. Divisions of the Skeleton

b. **<u>Muscular System</u>** – Consists of muscles which make up about one half of the total body weight as well as connective tissues such as cartilage, tendons and ligaments.

(1) <u>Functions:</u> Provide movement, maintain posture, provide heat and are involved in bodily functions such as respiration, digestion, speaking, etc.

(2) <u>Muscle Types:</u> (See Figure 3)

1. Skeletal (voluntary)
2. Smooth (involuntary)
3. Cardiac (myocardium)

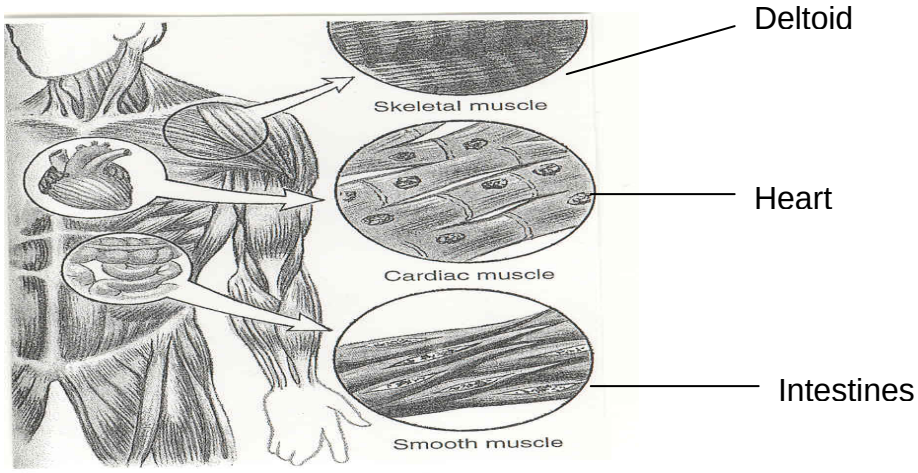


Figure 3. Three (3) Types Of Muscle

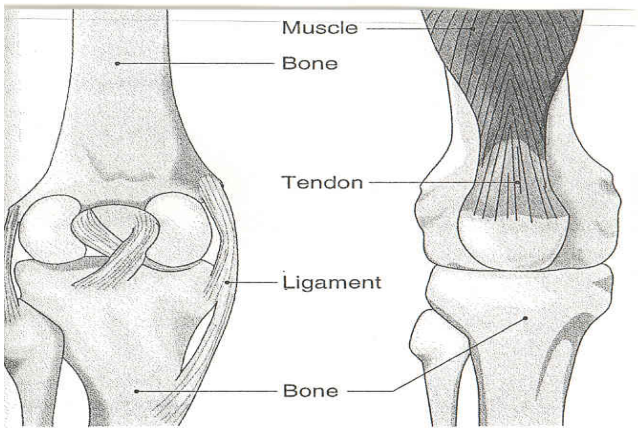


Figure 4. Tendons & Ligaments

2. TYPES OF MUSCULOSKELETAL INJURIES

a. **Soft Tissue injuries** - involve the skin and underlying musculature, commonly referred to as either a closed or open wound

(1) Open - an injury in which the skin is interrupted, or broken, exposing the tissues underneath.

(a) Open wounds include abrasions, lacerations, avulsions, and amputations.

(2) Closed - an injury where there is no open pathway from the outside to the injured site.

(b) Examples include sprains, strains and dislocations.

b. **Abrasions** – Occurs when skin is rubbed off or scrapped off. (See Figure 5)

Figure 5. Abrasion

(1) Treatment:

(a) Hemorrhage is usually so minimal that primary treatment may only require cleansing of the wound.

1. Small bandages may be applied, but tactical situations will usually preclude applying field dressings that are needed for more serious injuries.

2. A large amount of dirt may be ground into thewound, therefore secondary treatment measures should focus on preventing or stopping infections.

c. **Lacerations**- Torn skin with ragged irregular edges and masses of torn tissue underneath. (See Figure 6)

Figure 6. Laceration Of The Lower Arm

(1) Treatment: Treatment is generally the same as for abrasions.

(a) Control hemmorhage

(b) If major tendons and muscles are completely severed, immobilize limb to prevent further damage.

(c) Treat for shock

d. **Avulsion** - An injury in which flaps of skin are torn loose or completely pulled off. (See Figure 7)

Figure 7. Avulsion

(1) Treatment

(a) Control bleeding

(b) Apply field dressing to avulsed area. (For extremely large or deep avulsions, several pressure dressings may be necessary or an air splint and dressing)

(c) Prevent further contamination

(d) Ensure avulsed flap is lying flat and that it is aligned in its normal position.

(e) Make every effort to preserve the avulsed part (wrap the part in a saline or water soaked field dressing, pack wrapped part in ice, whenever possible. Be careful to avoid direct contact between the tissue and ice.)

(f) Transport the avulsed part to the BAS with the patient, but keep it well-rotected from further damage and out of view of the patient.

(g) Immobilize extremity or body part as indicated by the severity of the avulsion.

e. **Traumatic Amputations** - Non-surgical removal of a limb or other appendage of the body. Because blood vessels are elastic they tend to spasm and retract into surrounding tissue. With complete amputations there is less bleeding then with partial or degloving cases. (See Figure 8)

Figure 8. Traumatic Amputation Of The Lower Legs

(1) Treatment

(a) Hemorrhage Control

1. If life-threatening bleeding is present, apply a tourniquet immediately

2. If there is non life-threatening bleeding, a pressure dressing may be used. More than one may be necessary to gain control of bleeding.

(b) Make every effort to preserve the amputation.

1. Wrap amputated part in sterile dressing, place in ice and send with patient

(c) TACEVAC

f. **Strains, Sprains and Dislocations**

(1) Strain - Injury to a muscle or tendon resulting from over stretching or over exertion.

(2) Sprain - A joint injury resulting in partial tearing or stretching of supporting ligaments. (See Figure 9)

Figure 9. Ankle Ligament Sprain

(3) Dislocation - The displacement of bone ends at the joints resulting in an abnormal stretching of the ligaments around the joints. Sometimes causes tearing or complete ligament separation. (See Figure 10)

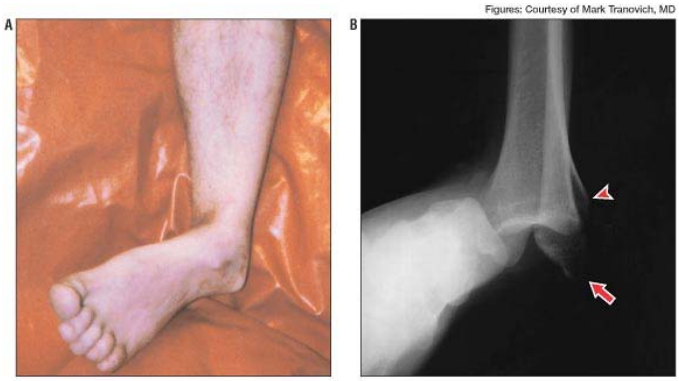


FIGURE 1. Photo (A) of the left ankle of a 33-year-old male recreational softball player shows tibiotalar dislocation of the ankle. The foot is displaced medially, and the skin is tented over the prominence of the lateral malleolus. Anterolateral radiograph of the same ankle (B) shows that the talus is completely disassociated from the ankle mortise (arrow), and a small avulsion of the fibula is evident (arrowhead).

Figure 10. Ankle Dislocation

(4) Signs and Symptoms

(a) Point tenderness or burning sensation

(b) Marked deformity of joint

(c) Pain and edema

(d) Complete or near complete loss of movement of joint

(5) Treatment

(a) Strains

1. Supportive strapping or bandaging

2. Immobilize by splinting so that affected muscle is in relaxed position, if injury is severe.

3. R.I.C.E. (Rest, Ice, Compression, Elevation)

(b) Sprains

1. Treat like a fracture

2. Supportive strapping or bandaging

3. R.I.C.E. (Rest, Ice, Compression, Elevation)

4. Pain management

5. TACEVAC

(c) Dislocations

1. Attempt to reduce only if no pulse is present in the extremity

2. Splint as found to immobilize injured part

3. Pain management

4. Treat for shock

5. TACEVAC

(6) Complications

(a) Hemorrhage- Caused by seperated bone ends tearing muscle tissue and laceration of blood vessels

(b) Nerve Damage - Due to the cutting or pinching of nerves by seperated bone ends or muscle injury

g. **TYPES OF FRACTURES**

Fractures will be classified as either open or closed and further classified according to position, number & shape of bone fragments.

(1) Open Fracture- A broken bone that breaks the overlying skin.

(a) The bone may protude through the skin. (See Figure 11)

(b) Penetrating object such as a bullet may go through the flesh and break the bone.

Figure 11. Open Fracture

(2) Closed Fracture - A broken bone with no skin penetration.

(c) The tissue beneath the skin may be damaged. (see Figure 12)

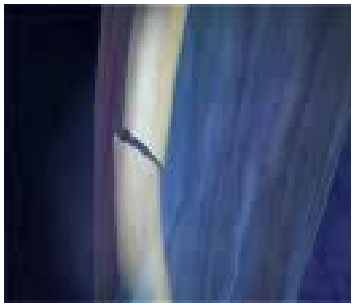


Figure 12. Closed Fracutre

(3) Signs and Symptoms of Fractures

(a) Inability to move the extremity
(b) Discoloration

(c) Deformity

(d) Edema

(e) Pain with or without movement

(f) Protruding bone

(g) Crepitus (crunching, grating sound/feeling)

(h) Any injury that may indicate fracture (gun shot wound).

h. **General Principles of Treatment for Fractures** – The following guidelines can be applied to any type of fracture, regardless of location.

(1) Treat associated injuries

(a) Control hemorrhage

(b) Treat for shock

(c) Check distal pulses before and after splinting

(d) Immobilize the fracture using splints

(e) Recheck PMS

(f) Relieve pain (whenever possible)

(g) Reductions of fractures are not done in the field, unless distal pulses are not present

(h) Document treatment on DD 1380

(i) Monitor and TACEVAC

3. **TYPES OF SPLINTS**

Splints are used to immobilize a portion of the body, prevent further damage and alleviate pain

a. **Rigid Splints –** cannot be changed in shape. The injured body part must be positioned to fit the splint. Examples include board splints made of wood, plastic, or metal.

b. **Formable Splints** - Formable splints can be molded into various shapes and combinations to accommodate the shape of the injured extremity. Examples include vacuum splints, pillows, blankets, cardboard splints, SAM splints and wire ladder splints. (See Figure 13)

Figure 13. Formable splint

c. **Improvised Splints –** Improvised splints are made from any available material that can be used to stabilize a fracture. Examples include sticks, branches and poles.

d. **Anatomical Splints -** Use of the casualty's body as a splint. Examples include securing the legs together, securing the arm to the body, and taping the fingers together. (See Figure 14)

Figure 14. Anatomical splint & bandage

(a) **Manufactured Splints** – Designed for specific injuries and specific applications. Examples include Thomas Half-Ring Telescopic Splint(See Figure 15) and Pneumatic "air" Splints (See Figure 16) are included in the AMAL 635.

Figure 15. Thomas Half-Ring Telescopic Splint

Figure 16. Pneumatic "air" Splint

f. **Bandages in splinting** - Bandages can be used to wrap or bind a body part. Bandages hold splints in place, apply additional pressure,& protect the casualty from further harm.

(1) **Sling** - a bandage suspended from the neck to support an upper extremity. When using a sling, position the hand higher then the elbow and never cover the fingers.

(2) **Swathe** - Any band or piece of cloth used to further immobilize a fracture.

4. GENERAL RULES FOR SPLINTING

Regardless of the type of splint you are using, certain guidelines must be followed:

a. Control hemorrhage and treat for shock.

b. Expose fracture site.

c. Establish distal pulse prior to splinting.

d. If bone is exposed, ensure to cover the ends with sterile dressing prior to splinting.

e. Splint fracture in position found.

f. Attempt to straighten a deformed limb only if it is a closed injury with no distal pulses.

g. Do not try to reposition or put back an exposed bone.

h. Move the fractured part as little as possible while applying the splint.

i. Immobilize the splint above and below the fracture.

j. Reassess distal pulses after splint is secured.

k.When in doubt, treat all injuries as a possible fracture.

l. TACEVAC as needed.

5. **TECHNIQUES FOR SPLINTING FRACTURES**

There are various ways and techniques to immobilize fractures. The FMST needs to be able to apply the basic splints for the most common fractures:

a. **Fractured Jaw**

(1) Apply a bandage to immobilize jaw (Modified Barton). (See Figure 17).

(2) The bandage should pull the lower jaw forward

(3) Support should be on the head, not behind neck.

(4) Do not lay casualties with lower jaw fractures on their back. Doing so may cause airway obstruction.

Figure 17. Immobilized Jaw

b. **Fractured Clavicle**

(1) Immobilize using figure eight bandage. (See Figure 18)

(2) Bend casualty's arm on injured side, forearm across chest.
(3) Palm should be turned in, thumb pointed up.

(4) Hand should be raised 4 inches above elbow.

(5) Support using a cravat to cradle the arm & tie around the body for immobilization (Sling and Swath). (See Figure 19)

Figure 18. Immobilized Clavicle

Figure 19. Sling & Swathe

c. **Fractured Humerus**

(1) Check for distal pulse

(2) If fracture is located on the upper arm near shoulder, place padding in the armpit, bandage arm securely to body (See Figure 20).

(3) If fracture is located in the middle of upper arm, use splint on outside of arm.

(4) Splint the injury to the body using a full arm wrap (Kerlex or cravat wrap). Support with sling (See Figure 21).

(5) If fracture is near elbow, splint in position found. Support with sling.

(6) Re-check distal pulse.

Figure 20. Upper arm splint 1

Figure 21. Upper arm splint 2

d. **Fractured Forearm**

(1) Check for distal pulse

(2) If only one bone in the forearm is broken, the other may be used as a splint.

(3) Apply two splints (rigid or formable), one on top and one on the bottom.

(4) Ensure that the splints cover from wrist to elbow (rigid or formable splint). (See Figure 22)

(5) Use bandages to hold splints in place.

(6) Re-check distal pulse

(7) Place casualty's forearm across the chest, palm turned in and thumb pointing up.

(8) Support with sling.

Figure 22. Forearm Splint

e. **Fracture Wrist/Hand**

(1) Check radial pulse

(2) Splint in position of function leaving fingers exposed (formable splint). (See Figure 23)

(3) Re-check radial pulse

(4) Support with sling.

Figure 23. Wrist/Hand Splint

f. **Fractured Ribs**

(1) Assess ABC's for possible complications

(2) Ordinarily, rib fractures are NOT bound, strapped or taped if the victim is reasonably uncomfortable.

(3) Immobilize by strapping the arm from the injured side to the chest to limit motion.

(4) Arm should be against the chest, palm flat, thumb up and forearm raised to a 45 degree angle. (See Figure 24)

(5) Secure arm to chest using swath bandage. (See Figure 24)

(6) For multiple fractures, you may attempt to immobilize flail segments using tape. (See Figure 25)

(7) NEVER encircle the chest with any type of constricting bandage. This will only make breathing more difficult!

Figure 24. Rib Splint

Figure 25. Immoblized Flail Segments

g. **Fractured Pelvis**

(1) Check distal pulse

(2) Place patient in position of comfort (legs straight or knees bent).

(3) Place pillow or padding between the legs to immobilize hip.

(4) Wrap sheet (or poncho) snuggly around pelvis for support

(5) Tie knees and ankles together for greater stability. (See Figure 26)

(6) Re-check distal pulse

Figure 26. Pelvis Splint

h. **Fractured Femur**

(1) Check distal pulse

(2) Using four (4) cravats to secure injured leg to the uninjured leg (anatomical splint). (See Figure 27)

(a) Secure thighs together

(b) Secure another cravat directly above and below the knees

(c) Using a figure 8 wrap, secure ankles & feet together

(3) Re-check distal pulse

(4) **NOTE: Consider traction splinting for midshaft fractures.

Figure 27. Femur Splint

i. **Fractured Patella**

(1) Check distal pulse

(2) Splint in position of comfort

(3) Place splint underneath the entire leg. Ensure you have padding at least under the knee and ankle.

(4) Secure splint in four places (See Figure 28):

(a) Just below knee

(b) Just above knee

(c) Around the ankle

(d) Around the thigh

(5) Re-check distal pulse

Figure 28. Patellar Splint

j. **<u>Fractured Tibia/Fibula</u>**

(1) Check distal pulses

(2) If only one bone is broken, the other can act as a splint.

(3) Utilize the stirrup method with the SAMS splint. (See Figure 29)

(4) Apply splint on both sides of tibia and fibula

(5) Use kerlex bandage to secure splint.

(6) Immobilize from knee to ankle.

(7) Re-check distal pulse

Figure 29. Stirrup Splint

k. **<u>Fractured Ankle/Foot</u>**

(1) Check pedal pulse

(2) Splint injury (See Figure 30)

(a) Wearing boots: use figure 8 with a cravat to secure ankles together.

(b) Without boots: Wrap ankle with a bandage (kerlex), then use a figure 8 wrap with a cravat to secure ankles and feet together.

(3) Re-check pedal pulse

Figure 30. Ankle/Foot Splint

l. **Spinal Injury** - The first priority is to ensure the casualty is in a safe location. Next the FMST may begin spinal immobilization procedures.

(1) **Indications for spinal immobilization:**

(a) High speed vehicle crash (>30mph)

(b) Falls from great heights (2-3x body height)

(c) Direct, blunt neck trauma

(d) Blast injury

(2) To be effective, the casualty must be immobilized from the head to the pelvis.

(3) Do not block the casualties airway

(4) Use a C-Collar to immobilize the neck

(5) If available secure casualty to a long spine board

(6) If full immobilization is not possible, prevent excessive, unnecessary movement of the casualty.

NOTE*:* Remember to treat all life-threatening injuries first prior to treating fractures. Not all casualties will require evacuation.

REFERENCE

Pre-Hospital Trauma Life Support, Military Edition, 6th Ed, Chapter 12Emergency Medicine: Concepts and Clinical Practice. Tintinalli, Judity E. ed.

CASUALTY ASSESSMENT AND MUSCULOSKELETAL INJURIES

Care Under Fire Phase: If the casualty has a life-threatening hemorrhage, use a tourniquet for extremity injury or direct pressure for non extremity injuries.

Tactical Field Care Phase: During this phase, you will be required to inspect the injury using DCAP-BTLS for any signs of injury. Don BSI. Note and treat all musculoskeletal injuries. Complete a head to toe assessment using DCAP-BTLS noting and treating additional injuries. Determine if vascular access is required (see Tactical Fluid Resuscitation lesson) and give fluids if necessary. If the casualty is able to drink fluids, they should be encouraged to do so. Consider pain medications and give antibiotics if warranted. Reassess all care provided. Document care given, prevent hypothermia, and CASEVAC.

Musculoskeletal Injuries Review

1. Define an open injury and list four examples.

1. Describe the differences between a complete amputation and a partial amputation.

2. List the first four general rules of splinting.

4. Identify the appropriate treatment for a fractured pelvis.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1420

Perform Casualty Assessment

TERMINAL LEARNING OBJECTIVE

1. Given a casualty in a combat environment and the standard field medical equipment and supplies, **perform casualty assessment to prioritize injuries for treatment**, per the references. (FMST-HSS-1420)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify the purpose of casualty assessment**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Medical Edition, 6th Ed, Chapter 21. (FMST-HSS-1420a)
2. Without the aid of references, given a description or list, **identify the three phases of combat casualty care**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Medical Edition, 6th Ed, Chapter 21. (FMST-HSS-1420b)
3. Without the aid of reference, given a list, **identify the sequence of steps for casualty assessment**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Medical Edition, 6th Ed, Chapter 21. (FMST-HSS-1420c)
4. Without the aid of references, given a casualty in a simulated combat environment, standard field medical equipment and supplies, and individual combat equipment, **perform casualty assessment**, per Pre-Hospital Trauma Life Support, Medical Edition, 6th Ed, Chapter 21. (FMST-HSS-1420d)

OVERVIEW

Casualty Assessment is a systematic process for assessment of the trauma casualty and is essential for recognizing life-threatening conditions, identifying injuries, and determining priorities of care based on assessment findings. Using this systematic approach you will be able to assess, prioritize, and treat each trauma casualty and ensure injuries are not missed.

This lesson will focus on the assessment of the trauma casualty within the first two phases of the Tactical Combat Casualty Care management plan. The third phase, Casualty Evacuation (CASEVAC) Care, is performed during transportation of the patient to the next level of care and is covered in a separate lesson.

1. PHASES OF TCCC

Phase 1 - Care Under Fire

During this phase, the Corpsman and casualty are still under hostile fire. **The first step in saving a casualty is usually to control the tactical situation**. Very limited medical care should be attempted while the casualty and the unit are under hostile fire. Suppression of hostile fire and moving the casualty to a safe position are major considerations at this point. Remember: "The best medicine on the battlefield is fire superiority." Casualties who have sustained injuries that are not life threatening and have the ability to help should continue to assist in suppressing the hostile fire. It may also be critical for you to help suppress hostile fire before attempting to provide care.

Casualties whose wounds do not prevent them from moving to cover should do so to avoid exposing other care givers to unnecessary hazard. If the casualty is unable to move and is unresponsive, the casualty is likely beyond help. Risking the lives of rescuers is not advised. If a casualty is responsive and unable to move, a rescue plan should be developed as follows:

- Determine the potential risk to the rescuers. Did the casualty trip a booby trap or mine? Where is fire coming from? Is it direct or indirect? Are there electrical, fire, chemical, water, mechanical, or other environmental hazards?
- Consider assets. What can rescuers provide in the way of covering fire, screening, shielding, and rescue equipment?
- Make sure all understand their role in the rescue and which movement techniques are to be used (i.e., drag, carry, rope, stretcher). The fastest method for moving a casualty in the Care Under Fire phase is the two person drag (see figure 1). This drag can be used in buildings, shallow water, snow, and down stairs.
- Management of an impaired airway is temporarily deferred until the casualty is safe, thereby minimizing the risk to the

Figure 1. Two person drag

rescuer and avoiding the difficulty of managing the airway while dragging the casualty. Early control of severe hemorrhage is vital. However, the tactical situation dictates that you must maintain firepower supremacy so **only life-threatening bleeding warrants any intervention during Care Under Fire**. (*Refer back to the lesson on Hemorrhage Control for a review of the importance of this topic*).

2. **PHASE 2 - TACTICAL FIELD CARE**

During this phase, the Corpsman and casualty are no longer under hostile fire. This also applies to situations in which an injury has occurred on a mission, but hostile fire has not been encountered. However, medical equipment is still limited. Medical care during this phase is directed towards more in-depth evaluation and treatment of the casualty, focusing on those conditions not addressed during the Care Under Fire phase of treatment. While the casualty and rescuer are now in a somewhat less hazardous situation, evaluation and treatment is still dictated by the tactical situation. **Casualties who show signs of an altered mental status should be disarmed immediately.**

Airway Assessment

Casualties that are conscious and can talk, scream, or yell can be presumed to have a patent airway. For unconscious casualties, initial attempts to open the airway should be done using the modified jaw thrust (for casualties whom you suspect C-spine injury) or Head Tilt-Chin Lift.

Once the airway is open, visually inspect for anything that may potentially cause obstruction. Examples include broken teeth, blood, vomit or tissue swelling. Remember the most common cause of airway obstruction in an unconscious casualty is the tongue.

Clear any obstructions with a finger sweep and **insert a nasopharyngeal airway (NPA) to keep the airway open.** Reassess your interventions to ensure the casualty has an open airway. The standard method of "Look, Listen and Feel" can be used to ensure the patient is breathing. If the previously mentioned methods fail to establish an airway, surgical cricothyroidotomy is indicated.

Remember to **reassess any intervention performed** to determine the effectiveness of the procedure performed. Regardless of the method used to establish an airway, you must also judge the quality and adequacy of the ventilations.

Breathing

The goal of this step is to rule out chest wounds that either have become, or could potentially develop into, a tension pneumothorax. **Needle thoracentesis is indicated if the casualty has difficulty breathing and penetrating trauma to the chest area.**

FYI!!! If a casualty is found to be in cardiopulmonary arrest on the battlefield as a result of combat trauma, CPR is NOT recommended.

The only way for you to identify penetrating trauma is to EXPOSE the area. This includes removing tactical gear such as flak jackets and uniform tops. Once exposed you may also discover larger wounds, such as sucking chest wounds, that will need to be treated with a three sided occlusive dressing before moving on to the next step in the

casualty assessment process. Inspecting the area includes looking at the posterior. Based upon the MOI this may need to be done by log rolling the casualty.

Remember to reassess any treatment performed. Needle decompression should provide immediate relief. An occlusive dressing should not make a sucking sound upon inspiration.

Bleeding

Check for the presence and quality of pulses. Determining the presence and quality (weak / strong) of a radial pulse will affect decisions made later during casualty assessment.

Perform a blood sweep of the casualties entire body by gently sliding your hands underneath the casualty and pulling them back, feeling for any bleeding that was not controlled during "Care Under Fire". Control it at this time.

Assess for the possibility of tourniquet conversion. Tourniquets that were placed due to the time constraints of "Care Under Fire" should be converted to a pressure dressing or HemCon as appropriate. (See Hemorrhage Control lesson if you need to review.)

Consider Fluid Resuscitation

Casualties that do not exhibit signs of shock do not require and should not be given IV or IO fluid. They should be encouraged to drink fluids by mouth.

All casualties who exhibit signs of tactically relevant shock (weak pulse and/or altered level of consciousness) should have IV access started using an 18-gauge catheter. Consider the IO route for casualties who require fluid resuscitation but IV access can not be obtained. Administer enough fluid to restore a radial pulse. If giving Hextend, give 500 cc's, wait 30 minutes, and then give another 500 cc's if needed. Do NOT give more than 1000 cc's of Hextend to any patient.

Prevent Hypothermia

The Blizzard Rescue Blanket (NSN 6352-01-524-6932) comes in many colors, including tactical green. It is lightweight and extremely effective in preventing hypothermia.

At this point all life threatening issues should have been identified and treated. You should begin to take precautions against hypothermia. Preventing hypothermia is for more than just patient comfort, it is an important life saving step. Hypothermia interferes with the body's blood clotting mechanism and increases mortality.

As soon as all life-threatening injuries are addressed, the patient should have all of their wet clothing removed and replaced with dry clothes or a Blizzard Rescue Blanket. Unless prohibited by wounds, cover the head, as it is a prime source of heat loss. Good hemorrhage control and fluid resuscitation will also help restore the casualty's ability to generate heat.

Monitor Vital Signs

Head to Toe Assessment (**DCAP-BTLS**)

Deformities	**C**ontusions	**A**brasions	**P**unctures
Burns	**T**enderness	**L**acerations	**S**welling

Again, all life threatening injuries should have been identified and treated by this time. The goal at this stage is to identify and address any additional wounds. You may also identify signs or symptoms that will affect the long term evacuation or treatment of the patient as well. It is important that you carefully inspect the entire casualty. Using the head to toe method described below ensures you do not miss anything.

Head

Check the skull, eyes, ears, nose and mouth for any potential findings. At this time you should also reassess any treatments that have been performed.

Neck

Check the neck to include the C-spine for any irregularities. Jugular vein distension and tracheal deviation are very late signs of tension pneumothorax (a condition you should have treated earlier). If, however, these are encountered at this stage, perform a needle decompression immediately.

Chest

In addition to checking for DCAP-BTLS, you should also attempt to auscultate the chest if the tactical situation permits. Simple rib fractures and flail chest segments should be treated at this time. Reassess any previous treatments, including needle decompression or occlusive dressings, which may have already been performed.

Abdomen

In addition to inspecting for DCAP-BTLS you should also palpate for Tenderness, Rigidity or Distension. Abdominal eviscerations should be treated appropriately. Signs of internal hemorrhage, while not treatable on the battlefield, may effect your decision during casualty evacuation (Triage and Casualty Evacuation are covered in Block 3)

Pelvis

If the patient's pelvic area is obviously deformed, DO NOT PALPATE IT, as you will likely cause further instability and damage.

Extremities

Since you are already at the pelvis, palpate the lower extremities first then the upper extremities using the same process (DCAP-BTLS)

Note and treat any minor injuries not already addressed. Reassess any major interventions already performed, especially tourniquets or pressure dressing.

Posterior (If not already done)

If the patient is unconscious or you suspect C-Spine injury (based on MOI) you should log roll the patient. Examining the posterior is not simply the back; remember that rectal bleeding is a sign of internal hemorrhage. This should be checked as well. **Reassess ALL interventions following a log roll!**

Pain Management

Conscious casualties who remain operationally engaged should be given Mobic (15mg PO qd) and Tylenol Bi-layer Caplet (650 mg 2 PO q8h).
Casualties who can not continue to remain operationally engaged but have no need for an IV should be given Oral Transmucosal Fentanyl Citrate (OTFC) provided as a "lozenge on a stick" taped to their finger. Reassess the patient every 15 minutes for respiratory depression.

Those who are out of the fight and require an IV should be administered morphine 5mg (IV or IO). This can be given every 10 minutes as necessary. The patient should be monitored for signs of respiratory depression. You should have Naloxone (Narcan) on hand before administering either OTFC or morphine.

Promethazine (Phenergan) 25 mg IV/IO/IM may be administered to counteract the nausea associated with Morphine or OTFC.

Immobilization

Splint any extremities that need it.

Antibiotics

If the patient can tolerate oral medications, administer Moxifloxacin 400mg, PO qd. If not, administer either cefotetan (2g IM/IV/IO) or ertapenum (1g IM/IV/IO). (For more information on giving medications, see the medication appendix at the end of this block.)

Patient Turnover

Document the patients initial wounds, treatments performed, and response to any treatments. Ensure this, along with the most recent set of vital signs, is transferred with the patient.

REFERENCE

Pre-Hospital Trauma Life Support, Medical Edition, 6th Ed, Chapter 21

Casualty Assessment Review

1. List and briefly describe the three phases of Tactical Combat Casualty Care (TCCC).

2. Management of a compromised airway would be taken care of during what phase of TCCC?

3. Briefly describe why prevention of hypothermia is so important for the casualty.

4. Describe why patients who can stay in the fight should not be given morphine.

Field Medical Training Battalion

CASUALTY ASSESSMENT - TRAUMA PERFORMANCE EXAM

STUDENT (Last Name, First Name, MI.)	**PLT**

START TIME:	**1ST**		**2ND**		**3RD**	
CARE UNDER FIRE	**P**	**F**	**P**	**F**	**P**	**F**
*** Determines tactical situation. Return fire to suppress hostile fire. Direct and expect the casualty to return fire if capable.**						
Determines the number of patients vs. supplies. Is there need for triage? Are there Marines or other HMs available?						
Verbally direct casualty and/or buddy to apply tourniquet if casualty and rescuer are separated						
Determines MOI if possible						
Mental Status – AVPU (A – Alert, V – Verbal commands, P – Painful stimuli, U – Unresponsive)						
Obtains Chief complaint from alert patient						
*** Identify and control external life threatening hemorrhage within *1 MINUTE***						
*** Apply tourniquet**						
* **Move patient, reassess tourniquet**						
TIME: (2 MINUTE MAX TIME LIMIT)	**1ST**		**2ND**		**3RD**	
TACTICAL FIELD CARE	**1ST**		**2ND**		**3RD**	
AIRWAY MANAGEMENT	**P**	**F**	**P**	**F**	**P**	**F**
Continually talks to patient to ensure airway						
*** Opens airway with modified jaw thrust or head tilt chin lift**						
*** Inspect mouth for potential obstructions and clears airway as required.**						
*** Look, listen, and feel (5- 10 Seconds)**						
*** Insert appropriate airway adjunct**						
*** Reassess airway - Look, listen, and feel (5- 10 Seconds)**						

Field Medical Training Battalion

CASUALTY ASSESSMENT - TRAUMA PERFORMANCE EXAM

BREATHING	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
*** Assess breathing (rate, rhythm, depth) - Normal: 12 – 20 bpm**						
*** Expose chest and Inspect for life threatening wounds (maintaining spinal integrity)**						
Auscultate (Listen to 4 lobes / mid-clavicular and mid-axillary)						
Palpate (Crepitus, fractured ribs, flail segments, subcutaneous emphysema)						
***Treat thoracic life threatening injuries**						
Log Roll (As needed)						
*** Log Roll and check for exit wounds**						
*** Treat posterior life threatening wounds**						
*** Ensures spinal integrity**						
Posterior assessment (DCAP-BTLS)						
Place patient on liter or spine board if available						
*** Reassess all prior interventions (if PT was moved)**						
CIRCULATION	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
Assess for presence of carotid pulse (May also be assessed while assessing airway for 5-10 seconds)						
*** Blood sweep (identify and treat major bleeding and/or reassesses prior interventions - head to toe)**						
*** Assess for bilateral radial pulses (rate and quality)**						
Estimate palpated blood pressure (Radial = systolic of 80 mmHg, femoral = systolic of 70 mmHg, carotid = systolic of 60 mmHg)						
Peripheral Perfusion (Skin color, temperature, condition, and <2-3 Sec capillary refill)						
IV fluid consideration (Based on vital signs, titrate to radial pulses)						
FULL BODY ASSESSMENT **D**eformities, **C**ontusions, **A**brasions, **P**unctures/**P**enetrations, **B**urns, **T**enderness, **L**acerations, & **S**welling **(DCAP-BTLS)**	**1ST**		**2ND**		**3RD**	
HEAD ASSESSMENT	**P**	**F**	**P**	**F**	**P**	**F**
Skull (Inspects and palpates the scalp, skull & facial bones, battle sign)						
Eyes (PERRL, injury, raccoon eyes)						

Field Medical Training Battalion

CASUALTY ASSESSMENT - TRAUMA PERFORMANCE EXAM

HEAD ASSESSMENT cont.	1ST		2ND		3RD	
	P	F	P	F	P	F
Ears (Blood, CSF, injury)						
Nose (Blood, CSF, injury)						
Mouth (Broken teeth, obstructions, odor)						
NECK ASSESSMENT	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
Posterior (Palpate for C-Spine deformity)						
*** Anterior (JVD, Tracheal deviation)**						
Place C-collar (As needed)						
CHEST ASSESSMENT	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
Inspect (Obvious injury, flail segments, and bruising)						
Auscultate (Listen to 4 lobes / mid-clavicular and mid-axillary)						
Palpate (Crepitus, fractured ribs, flail segments, subcutaneous emphysema)						
*** Reassess or apply occlusive dressing – if necessary**						
*** Needle thoracentesis within (2) minutes – if necessary**						
Splint rib fractures (i.e. Use arm)						
ABDOMEN ASSESSMENT	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
Inspect (Pulsating masses, bruising, distention, and eviscerations)						
Palpate – All (4) quadrants (Distension, rigidity, and facial grimace)						
Treat / Reassess abdominal injuries						
PELVIS ASSESSMENT	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
Inspect (Bruising, obvious injury, meatus / perineum for blood)						

Field Medical Training Battalion

CASUALTY ASSESSMENT - TRAUMA PERFORMANCE EXAM

PELVIS ASSESSMENT cont.	1ST		2ND		3RD	
	P	F	P	F	P	F
Palpate (Squeeze medially and roll down pelvis to check for potential fractures)						
Treat / Reassess pelvis injuries						
LOWER EXTREMITIES ASSESSMENT	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
Inspect (Obvious injuries)						
Palpate (Bone crepitus, assess PMS {Movement/sharp/dull test /distal pulse}, note facial grimace)						
Treat / Reassess lower extremity injuries / Split all fractures (Possible conversion of tourniquet to pressure dressing as indicated)						
UPPER EXTREMITIES ASSESSMENT	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
Inspect (Obvious injuries)						
Palpate (Bone crepitus, assess PMS {Movement/sharp/dull test /distal pulse}, note facial grimace)						
Treat / Reassess upper extremity injuries (Possible conversion of tourniquet to pressure dressing as indicated)						
POSTERIOR / SPINE ASSESSMENT	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
Log roll PT maintaining spinal integrity (If not previously done during assessment)						
Inspect (Bright red blood rectal, obvious injury)						
Palpate (Step-offs and deviations)						
Secure PT to spine board						
*** Reassess all prior interventions (If PT was moved)**						
REASSSES VITAL SIGNS	**1ST**		**2ND**		**3RD**	
	P	**F**	**P**	**F**	**P**	**F**
AVPU (A – Alert, V – Verbal commands, P – Painful stimuli, U – Unresponsive)						
Respiration (Rate, rhythm, depth)						

Field Medical Training Battalion

CASUALTY ASSESSMENT - TRAUMA PERFORMANCE EXAM

REASSESS VITAL SIGNS cont.	1ST		2ND		3RD	
	P	F	P	F	P	F
Pulse (Rate and quality)						
Blood Pressure						
S.A.M.P.L.E. Hx. (if PT is conscious)						
Consider pain medications PRN						
TACTICAL EVACUATION	1ST		2ND		3RD	
OVERALL GENERAL IMPRESSION	P	F	P	F	P	F
States general impression of the casualty based on injuries and vital signs (RR, HR, B/P, AVPU, EBL, Skin color/temp)						
Identify transport priority						
Reassess fluid intervention requirements						

TIME: (16 MINUTE MAX TIME LIMIT)	1ST	2ND	3RD
Scenario			
Total number of non-critical steps missed (Score greater than 10 constitutes a failure)			
Critical steps missed (Any critical step missed constitutes a failure)			

1st Evaluator:	2nd Evaluator:	3rd Evaluator:
PASS / FAIL	**PASS / FAIL**	**PASS / FAIL**
Student signature:	Student signature:	Student signature:
Notes:	Notes:	Notes:

MEDICATION APPENDIX

Medications Used During Tactical Combat Casualty Care (TCCC)

Pain Relief

The Committee on Tactical Combat Casualty Care (CoTCCC) recommends the following medications be used in providing pain relief to casualties. The choice of which medications to use is based on the patients ability to remain in the fight.

Mobic (meloxicam) is a Non Steroidal Anti-Inflammatory Drug (NSAID) given for pain relief. This drug is usually given as soon as possible following injury to casualties who are still able to fight. The CoTCCC recommends this drug be supplied to individual operators as part of a Combat Pill Pack. This drug was chosen because it has no documented platelet dysfunction, meaning that unlike other NSAID's such as Motrin, it does not interfere with the bodies natural blood clotting abilities. Although it takes up to five hours to reach its maximum level of effectiveness, it has a long duration time and is stable even at high temperatures.

Tylenol (acetaminophen) 8-Hour Bi-layer Caplets is an analgesic and antipyretic (fever lowering) medication intended to be given with at the same time Mobic is given. The outer layer of the caplet is designed to dissolve quickly to provide quick relief. The CoTCCC recommends this medication because it acts quickly and helps to bridge the gap until the Mobic takes effect. It also should be issued to operators as part of the Combat Pill Pack and should be given to casualties who need pain relief for their injuries but are still able to participate in combat operations.

Morphine is an Opiod (narcotic) and is considered the "gold standard" of analgesia. It should only be administered to a casualty out of the fight who already has IV access established. Dosage should be 5mg given every 10 minutes until pain relief is achieved. Because patients who receive narcotics often suffer from nausea and vomiting, Phenergan (promethazine) should also be administered. Narcan (naloxone) should also be *on hand* whenever narcotics are used in the event the patient suffers from respiratory depression.

Oral Transmucosal Fentanyl Citrate (OTFC) is an Opiod (narcotic) that provides a means of delivering effective, rapid onset pain relief without starting an IV. This medication is produced in a lozenge form. It should be given only to patients who can no longer participate in combat operations. It should be administered by taping the "lozenge-on-a-stick" to the patient's finger and placing the lozenge in the patient's mouth. Once analgesia is achieved the patient may pass out and the lozenge will fall out of his or her mouth. Similar to morphine, promethazine may be needed to reduce nausea and Narcan should be on hand.

Phenergan (promethazine) is given to reduce nausea. It is administered IV, IO, or IM in dosages of 25 mg or 50 mg.

Narcan (naloxone) is an Opiod reversal agent. It is designed to prevent or reverse the effects of narcotics such as morphine or OTFC. It should be administered in an initial dose of 0.2 mg IV, IO, or IM (up to 10 mg total).

Antibiotics

Infection is a late cause of morbidity (sickness) and mortality (death) in battlefield wounds. For this reason the CoTCCC has recommended casualties receive antibiotic treatment as soon as possible. The biggest challenge for you is the logistical requirements that prevent you from carrying a wide variety of items. The CoTCCC identified the antibiotics that provided the most "bang for the buck". The following medications were chosen for their, broad coverage, minimal side effects, resistance to heat or cold, simple dosage requirements, and minimal storage requirements.

Avelox (moxifloxacin) is the oral antibiotic of choice. The dosage is one 400 mg tablet by mouth, once a day. This should be administered to all casualties who can tolerate oral medications as soon after injury as possible.

Cefotan (cefotetan) is the parenteral (injectable) antibiotic drug of choice. The dosage is either 2 grams IV/IO delivered over the span of 3 to 5 minutes or 2 grams IM. This should be given to casualties who can not take oral medications. This includes casualties who are unconscious or those who have significant facial wounds. Patients in hypovolemic shock should not be given antibiotics orally because reduced blood flow to the stomach impairs the body's ability to process oral medications.

Invanz (ertapenum) is the recommended alternative to cefotetan in the event it is not available (as has been the case). The dosage is 1 gram administered IV, IO, or IM. This should be given to casualties who can not take oral medications. This includes casualties who are unconscious or those who have significant facial wounds. Patients in hypovolemic shock should not be given antibiotics orally because reduced blood flow to the stomach impairs the body's ability to process oral medications.

Combat Medicine
Review Questions

NOTE: The following questions are offered for review purposes. <u>This is NOT intended as a sole source of test preparation</u>. Remember all test questions are based on an ELO and any ELO can be used to create a test question.

1. What are the anatomical landmarks for a cricothyroidotomy?
2. What are the components of the cardiovascular system?
3. What are the four basic groups that IV solutions fall into?
4. What causes a Flail Chest?
5. What are the three types of muscles in the body?
6. What major abdominal organs are in the Right Upper Quadrant?
7. What is the initial treatment of a life threatening extremity wound?
8. The skeletal portion of the thorax formed by what?
9. What are the three types of head injuries?
10. What are the 9 procedural steps of performing an emergency cricothryoidotomy?
11. What are two serious consequences of Tension Pneumothroax?
12. What are the degrees of burns?
13. What plasma substitute is the IV fluid of choice for volume replacement due to trauma in a tactical situation?
14. What are the two Hemostatic agents used on the battlefield?
15. Which lung is larger than the other and is divided into three lobes?
16. What are the two methods used to estimate burn size?
17. What are the major types of facial injuries?
18. Treatment for strains and sprains includes R.I.C.E. What does R.I.C.E stand for?
19. What is the second leading cause of preventable death on the battlefield?
20. What is homeostasis?
21. Where should a tourniquet NEVER be placed?
22. What major abdominal organs are in the Right Lower Quadrant?
23. For which type of injury is a Modified Barton bandage used?
24. How much blood is in the average adult?
25. What is the difference between a strain, sprain, and dislocation?
26. What are the four classifications of hemorrhagic shock?
27. What major abdominal organs are in the Left Upper Quadrant?
28. What is the most common complication associated with emergency cricothyroidotomy?

29. What are the two types of bruising associated with closed skull injuries?
30. What anatomical landmarks are necessary in order to performing needle thoracentesis?
31. What are the classifications of abdominal organs?
32. What are the causes of cervical spine neck injuries?
33. What is Phlebitis?
34. What are the three phases of tactical combat casualty care?
35. What burn injuries are considered critical regardless of depth or TBSA affected?
36. What are the four types of bones in the body?
37. What is the definitive management of hemorrhagic shock?
38. Why might an electrical burn be underappreciated?
39. What are the three types of distributive shock?
40. What are signs and symptoms of intrinsic cardiogenic shock?
41. What is the most common type of burn on the modern battlefield?
42. What major abdominal organs are in the Left Lower Quadrant?
43. What are signs and symptoms of vasculature neck injuries?
44. What are the procedural steps for needle thoracentesis?
45. What is subcutaneous emphysema?
46. What causes an Open Pneumothorax (Sucking Chest Wound)?
47. What are the three types of hemorrhage, and what are their distinguishing traits?

FUNDAMENTALS OF CBRN

FIELD MEDICAL TRAINING BATTALION

CAMP PENDLETON CALIFORNIA

FUNDAMENTALS OF CBRN

M-40 Field Protective Mask 4-1
FMST 1221

Don Mission-Orientated Protective Posture (MOPP) Gear 4-10
FMST 1223

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Review Questions 4-40

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1221

Employ the M-40 Field Protective Mask

TERMINAL LEARNING OBJECTIVES

1. Given the current M-40 series field protective mask and carrier, spare parts, and cleaning materials, **maintain the M-40 Field Protective mask**, to ensure serviceability. (FMST-FP-1221)
2. Given a tactical scenario in any combat environment, the current M-40 series field protective mask in its carrier and an NBC alert or an order to mask, **don the M-40 field protective mask,** to provide timely NBC protection. (FMST-FP-1222)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references given a description or list, **identify the components of the M-40 field protective mask**, within 80% accuracy, per Unit Maintenance Manual for Chemical-Biological Mask M-40. (FMST-FP-1221a)
2. Without the aid of references, given a description or list, **identify the masking procedures of the M-40 Field Protective Mask**, within 80% accuracy, per Unit Maintenance Manual for Chemical-Biological Mask M-40. (FMST-FP-1222a)
3. Without the aid of references, given an M-40 field protective mask and exposure to irritant gas in a chamber or simulated combat environment, **don and clear the mask**, per Unit Maintenance Manual for Chemical-Biological Mask M-40. (FMST-FP-1222b)
4. Without the aid of references, given a description or list, **identify proper care techniques of the M-40 Field Protective Mask**, within 80% accuracy, per Unit Maintenance Manual for Chemical-Biological Mask M-40. (FMST-FP-1221b)

1. **M-40 FIELD PROTECTIVE MASK (FPM)**

Characteristics of the M-40 FPM

- The M-40 FPM is used to protect the individual's face, eyes and lungs against field concentration of chemical and biological (CB) agents, toxins and radioactive fallout particles.
- The M-40 FPM will not protect the wearer against industrial gases such as ammonia or carbon monoxide. It is not effective in confined spaces, where the oxygen content of the air is low.
- The M-40 FPM allows the wearer the capability of drinking water while worn.
- The M-40 FPM comes in three sizes: small, medium and large. The size mark is located on the top left portion of the mask.

Components of the M-40 FPM

When you receive a FPM you should inspect the following components for serviceability (see figure 1):

Face-piece Assembly - foundation of the protective mask. Everything else is attached to it. The face-piece fits closely against your face to form a seal. It is made of silicone rubber. Visually inspect interior and exterior surfaces of face-piece for dirt, mud and greasy or oily substances. Check face-piece for holes, tears and splits by holding it in front of a light source. Look closely at edges of face-piece. Check for soft or sticky spots. Check silicone rubber next to eye lenses to be sure they will not pull away from the face piece. Also check all face-piece housings to be sure silicone is not pulling away.

Head Harness - these adjustable straps are attached to the face-piece. When adjusted properly, they will secure the face-piece to your face creating an airtight seal. It consists of a head pad; forehead straps, temple straps, cheek straps and donning tab. Check the head harness for loss of elasticity and dirt. Check straps for cuts, tears, missing parts or deterioration such as mildewing or fraying. Look at the buckles for bends, cracks or corrosion. Check for missing or broken buckles. Make sure finish on buckles is not chipped or scratched exposing bare metal.

Eye-lenses, Eye-rings and Out-serts - made of clear plastic or ballistic glass and enable you to see clearly while wearing the mask. Check eye-lenses for cracks, scratches, or discoloration that affect vision. Check eye-rings for distortion or corrosion. Clear and neutral gray eye lenses out-serts are provided with the mask. The purpose of the out-sert is to protect the eye-lens from damage and to reduce fogging in cold weather, neutral gray out-serts reduce glare. There are separate out-serts for left and right eye-lenses. To install the out-sert, fold back the rubber apron, place it over the eye-lens and fold the apron back into place. Check both sets of out-serts for cracks, chips or discoloration that affects your vision. Check rubber aprons for tears, looseness, brittle spots, soft or sticky spots or cracked rims.

Canister - filters chemical and biological agents and other particles from contaminated air. It can be quickly and easily replaced and may be installed on either side of the face-piece to allow use by left-handed or right-handed shooters. Do not allow the inside of the

canister to become wet. A wet canister is useless. Check the canister, especially around the seams, for cracks, dents, or holes and damaged threads. Ensure the air intake is not clogged with dirt. Shake the canister and listen for any signs of loose absorbent particles. The canister is installed into the side port of the face piece, over the inlet valve. Tighten the canister hand tight by turning clockwise.

Outlet Valve Disk and Outlet Valve Cover - releases exhaled air and prevents unfiltered air from entering the face-piece. Do not use the mask if the outlet valve disk is missing or damaged because the face-piece will leak. The outlet valve cover protects the outlet valve disk and secures the external drinking tube. To check the outlet valve disk, grasp the tab on the bottom of the outlet valve cover and lift. Check to see if the outlet valve disk is present and is not curled or distorted. Place your thumb on the disk and rotate it to make sure it is not sticking. Do not remove the outlet valve disk from the outlet valve. Look at the disk for nicks, tears, or rips. Wipe off any moisture with a clean cloth. Check the outlet valve seat for dirt. Smooth the outlet valve disk so it lies flat on the outlet valve seat. Check the outlet valve cover for cuts, tears, or holes. Look at the inside of the outlet valve cover for dirt or moisture.

Internal/External Drink Tubes - the M-40 Field Protective Mask is equipped with a system which allows the wearer to drink while wearing the face-piece. The internal tube is grasped by the person's mouth. The external tube has a quick disconnect coupling which connects the face-piece to the NBC Canteen Cap. Check that both tubes are present and are free of cracks or cuts. Ensure the internal drink tube has proper alignment and the external drink tube has solid connections. Connect the coupling to the canteen cap and blow air through the system to ensure it is not clogged.

Airflow Deflector - located on the inside of the face-piece below either the left or right eye lens depending on the canister location. It directs inhaled air over the eye lenses to prevent fogging. Check that the airflow deflector is securely mounted inside the face-piece and that both flanges are in the mounting holes of the face- piece and are not broken. Check the mounting holes for cuts or tears.

Inlet Valve Disk - allows filtered air to enter the face-piece and prevents moist exhaled air from entering the canister. Do not use the mask if the valve body or inlet valve disk is missing. Check that the inlet valve disk and valve body are properly mounted on the airflow deflector post. Blow on the disk to make sure it is not stuck to the valve body. Ensure the disk is free of cuts, holes, tears or dirt.

Nose-cup Assembly - inside the face-piece is the nose-cup. It has one nose-cup valve disk on each side. The nose-cup allows filtered air to pass through the nose-cup valve disks and into your respiratory system from the upper part of the face-piece and directs exhaled air out through the outlet valve in the bottom of the face-piece. This ensures good airflow, which prevents moist exhaled air from fogging the eye lenses in cold weather. Check that the nose-cup and nose-cup valve seats are free of dirt, cracks, cuts, holes, or tears. Check that the nose-cup is securely attached to the back of the face-piece by gently pulling it away. Rotate the nose-cup valve disks to be sure they are not stuck

and check them for curling or tears. Smooth the nose-cup valve disks over the nose-cup valves.

Voicemitter - the face-piece is equipped with a front voice-mitter, which transmits the user's voice outside the face-piece and a side voicemitter, located opposite the inlet valve, which aids in the use of communications equipment. Check the retaining rings around both for corrosion, cracks, or nicks. Try to tighten the retaining rings by hand to check for looseness. Ensure both voicemitters are free of dents, cracks, punctures, or dirt and that the four beads in the center of each voicemitter are facing outward.

Carrier - provides for storage, protection, and carrying of the mask and additionally authorized items. Check carrier for dirt, sharp edges, torn straps, broken stitches on seams, or missing hardware. Make sure there are no pencil or pen markings on the carrier. Mildew, solvents, or abrasive materials on carrier may harm the face-piece. Check the Velcro for dirt or debris. Check metal hooks and D-rings for bends or breaks that make them unusable.

Waterproof Bag - keeps the mask dry when required by climate or mission. It includes rubber bands for sealing and instructions for use. Storage of the mask in waterproof bag can degrade the protective capabilities of the face-piece. You must remove the face-piece as soon as protection of the mask is no longer required. Check the waterproof bag for cracks, tears, holes, and brittleness. Food should not come in contact with the waterproof bag because of possible toxic effects. It is stowed in the left end pocket of the carrier.

Face form - maintains mask shape

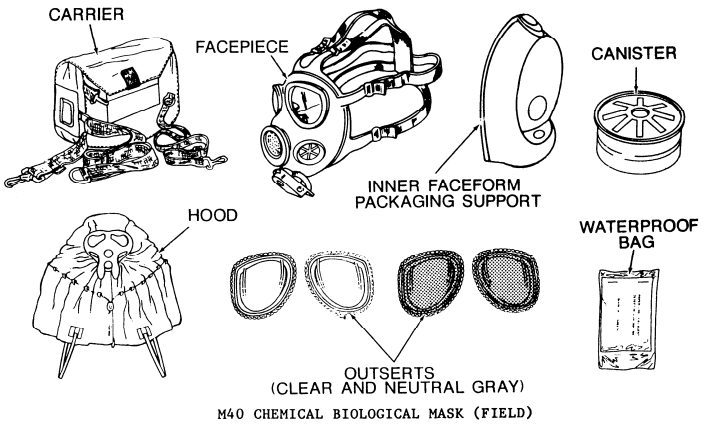

Figure 1. Components of the M-40 FPM

Accessories of the M-40 FPM

M1 canteen cap - contains a hole that allows the external drinking tube to be connected to the canteen. Always check that the surfaces are free of contamination before connecting the drinking system.

M291 decontaminating kit - used for personal decontamination. It will be discussed further during the lesson covering MOPP Gear (FMST 1223).

Optical inserts - available by medical prescription for personnel who must wear glasses. Do not wear eyeglasses or contact lenses with your mask. Check you inserts for broken lenses, frame, loose screws, or becoming disconnected from the face-piece.

2. USING THE DRINKING SYSTEM OF THE M-40 FPM

Prior to using the drinking system, use M8 chemical agent detector paper to check for contamination. If contamination is detected, decontaminate the drinking tube and the M1 canteen cap with the M291 decontamination kit. After decontamination, recheck the surfaces with M8 chemical agent detector paper.

- By pressing in on the top of the outlet valve, the internal drinking tube can be grasped between your teeth (See figure 2a)
- Pull the quick connect coupling out of the outlet valve cover (See figure 2b)

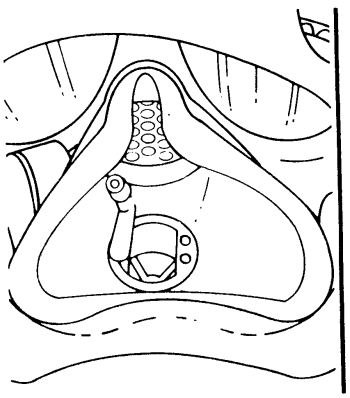

Figure 2a

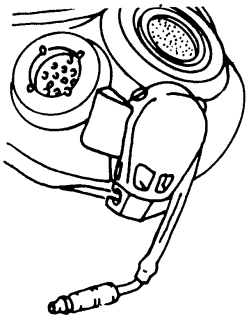

Figure 2b

- Remove the cap cover from the canteen cap (decontaminate if necessary)
- With the canteen right side up, insert the quick connect coupling into the M1 canteen cap and blow air into the drinking system to create positive pressure within the canteen (See figure 3)
- Raise and invert the canteen and begin drinking water

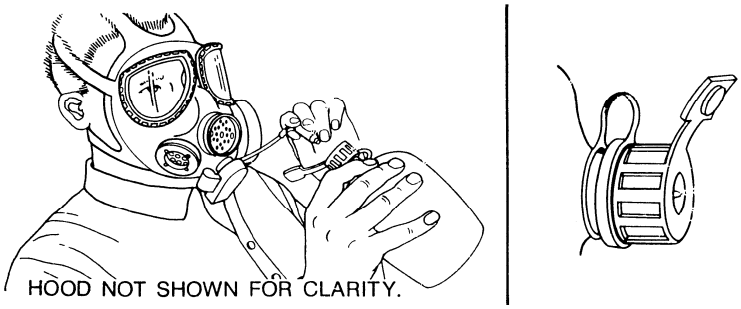

Figure 3

3. **FITTING THE M-40 FIELD PROTECTIVE MASK**

Before the mask can be donned and cleared, adjustments must be made to the head harness so that it fits properly. The adjustment steps are:

- Completely loosen all head harness straps and pull the head harness over the front of the face-piece.
- Put your chin in the pocket and hold the face-piece against your face.
- Grasp the donning tab and pull the head harness over your head. Be sure your ears are between the temple and cheek straps.
- Be sure that the head harness pad is centered at the back of your head. Straps should lie flat against your head.
- Tighten the straps with short-jerky pulls to the rear in the following sequence: forehead straps, cheek straps, and temple straps. Ensure the head harness pad stays centered at the back of your head.
- Cover openings at bottom of the outlet valve with palm of one hand. Breathe out hard so that air escapes around edges of face-piece.
- With the palm of your free hand, cover the inlet port of the canister and breathe in. The face-piece should collapse against your face, and remain so while you hold your breath. If it does, the face-piece is airtight. If the face-piece does not collapse, check for hair, clothing, or other matter between the face-piece and your face. Check that the head harness straps are not twisted or that the head pad is not centered.
- Clear your face-piece again and recheck for leaks.
- To remove your face-piece, loosen the cheek straps only. Place one hand on front of voicemitter to hold face-piece on face with the other hand grasp the donning tab and pull the head harness over the front of the face-piece and remove face-piece.

Masking Procedures - when the verbal "GAS! GAS! GAS!" or visual signal sign for an NBC attack has been given, you must follow these procedures in a time limit of **9 seconds without hood** or **15 seconds with hood** or risk becoming contaminated.

- Stop breathing and close your eyes.
- Open carrier and grab the face-piece. The mask is stored with the head harness pulled over the front of the mask.
- Place your chin in chin-pocket of the face-piece.
- Clear the field protective mask
    - Cover the outlet valve with the palm of one hand.
    - Exhale sharply so that the air escapes around the edges of the face-piece
    - Cover the air inlet port of the canister with the palm of your free hand, and breathe in. The face piece should collapse against your face and remain there while holding your breath. If the face piece collapses consider it airtight.
    - Grasp the tab and tighten straps and adjust. Make sure the square harness patch is centered in the rear of your head.
    - Resume breathing.
- After completing these steps the following actions should be taken:
    (1) Put on your helmet. Be sure not to upset the seal between your face-piece and the side of your face when putting on helmet.
    (2) Close the carrier.
    (3) Continue your mission.

Unmasking - remove your mask only when competent authority issues the "UNMASK" command. The following steps accomplish this:

- Hold your rifle between your legs; remove your helmet placing it on the ground next to you.
- Loosen cheek straps.
- Place one hand on the front of the voice-mitter-emitter to hold the face-piece on your face and with the other hand grasp the donning tab and pull the head harness over the front of the face-piece and remove the face piece. Put your helmet back on your head.
- Continue your mission.

4. **CARE OF THE GAS MASK**

Stowing the M-40 FPM - properly stowing the mask will ensure that it remains serviceable and easily accessible when your life depends on it. The following steps will be used when stowing the mask in the M-40 Carrier:

- Check that the eye-lens out-serts are installed on the face-piece. Abrasives, such as sand and grit, will scratch the eye lenses.
- Check that your face-piece is dry and free of oils and solvents before stowing.
- Check that the interior of the carrier is free of dirt and trash or other unauthorized items.
- Hold face-piece in a horizontal position.
- Pull head harness over front of face-piece.
- Hold the face-piece upright and put it in the carrier with the lenses facing away from your body.
- Stow your other out-serts, waterproof bag, and operator's manual in the inside pockets of the carrier.
- Close the carrier.
- Store your face-piece in its carrier and put it in a cool, dry, dark place, preferably hooking it on the short strap.

Wearing Your Carrier

There are three ways to carry the M-40 Field Protective Mask and Carrier:

- The shoulder carry.
- The leg carry. The following steps will be used:
    - Put waist strap D-ring around waist and attach to hook on carrier. Adjust strap.
    - Bring leg strap from back and around inside of leg.
    - Pass leg strap through round ring, hook to D-ring, and adjust strap.
- The pistol belt carry.

Cleaning the M-40 FPM

- Wash mask anytime it needs cleaning. A white or rust colored waxy film is not dirt; it is from the preservatives built in the rubber. It will bleed off as long as the face-piece is good.

- Required materials: soft cloths, soft bristle brushes, warm soapy water, and warm clear water.
- Procedural Steps:
    -Remove the canister by unscrewing it from mask.

- Dip clean, soft cloth in warm soapy water and wring it out. Wash mask inside and out. Wash voicemitter, outlet valve cover, and inlet valve assemblies. Be careful with rubber disks.
- Rinse cloth in clear, warm water and wring it out. Wipe all washed parts.
- Dry all parts and mask with dry, soft cloth. Use brush in hard to reach areas.
- Replace parts taken off. Make sure rubber disks are snug and flat. Clean the lenses using polish or warm, soapy water.

Canister Replacement

Replace the canister if:

- It has been immersed in water.
- Canister has splits, or cuts, a bent or split thread connector, or has been crushed.
- You feel excessive resistance to breathing and inspection shows that the canister is clogged with foreign matter.
- After removing the face-piece you see charcoal dust on your face.
- Your unit commander directs replacement of canister.
- The filter lot becomes unserviceable.
- Every 30 days after initiation to toxic chemical operations and after each confirmed blood agent attack.

REFERENCES

Unit Maintenance Manual for Chemical-Biological Mask M-40, TM 09204A/09205A-20&P/4

M-40 Review

1. Describe the problem with allowing water to get inside the canister.

2. List three accessory items associated with the M-40 Field Protective Mask.

3. Identify the first step in donning your gas mask once you have received word of possible contamination.

4. Once the order is given to don mask, how long do you have to don your gas mask without a hood. What about with a hood?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1223

Don Mission-Oriented Protective Posture (MOPP) Gear

TERMINAL LEARNING OBJECTIVE

1. Given a tactical scenario in any combat environment, **don Mission-Oriented Protective Posture (MOPP) Gear**, to provide timely NBC protection. (FMST-FP-1223)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or title, **select the definition of Mission-Oriented Protective Posture**, within 80% accuracy, per NBC Decontamination, FM 3-5. (FMST-FP-1223a)
2. Without the aid of references, given a list, **identify the limitations of Mission-Oriented Protective Posture,** within 80% accuracy, per NBC Decontamination, FM 3-5. (FMST-FP-1223b)
3. Without the aid of references, given a description or title, **identify the levels of Mission-Oriented Protective Posture**, within 80% accuracy, per NBC Decontamination, FM 3-5. (FMST-FP-1223c)
4. Without the aid of references, given a description or list, **identify the methods of chemical agents detection**, within 80% accuracy, per NBC Decontamination, FM 3-5. (FMST-FP-1223d)
5. Without the aid of references, given a description or list, **identify the methods of personal decontamination**, within 80% accuracy, per NBC Decontamination, FM 3-5. (FMST-FP-1223e)
6. Without the aid of references, given a simulated NBC contaminated environment and the necessary equipment, **employ NBC personal protective equipment and measures**, per NBC Decontamination, FM 3-5. (FMST-FP-1223f)

1. **MISSION-ORIENTED PROTECTIVE POSTURE (MOPP)**

Definition - MOPP is a flexible system of protection against chemical agents, which is used to facilitate mission accomplishment. Because of body heat buildup and basic human needs, the over garment cannot be worn forever. MOPP does give the commander a range of choices regarding the level of chemical protection. Choices range from no protection at all to full protection.

2. **LIMITATIONS OF MOPP**

Heat Exhaustion - individuals in protective gear working at a heavy rate may experience heat exhaustion at any time, especially during periods of high temperatures.
Work Rate - factors such as breathing resistance, an increase in body temperature, as well as psychological and physiological stress will reduce the total amount of work individuals can perform.
Five Senses - the senses and their related functions such as manual dexterity, visual acuity and voice communication will operate with less efficiency.
Personal Needs - individuals can not be in full chemical protection for indefinite periods and still attend to certain personal needs such as caring for wounds, personal hygiene, sleep and elimination of body waste.
Eating - it is impossible to eat with a gas mask on. The ability of troops to eat in an NBC environment depends on the type and extent of contamination.

3. **LEVELS OF MOPP**

There are four levels of MOPP.

MOPP Level 1 - this level of protection is established when the *general warning* is given and the threat of NBC warfare exists.

- Over garment is worn open or closed
- Over boots are carried
- Mask is carried
- Gloves are carried

MOPP Level 2 - this level of protection should be established during tactical situations that require units to cross terrain where the previous use of chemical agents is *unknown*.

- Over garment is worn open or closed
- Over boots are worn
- Mask is carried
- Gloves are carried

MOPP Level 3 - this level of protection should be established when units are on the move and a chemical *attack is possible*.

- Over garment is worn and closed
- Over boots are worn
- Mask is worn; hood is open or closed, based on temperature
- Gloves are carried

MOPP Level 4 - this level of protection should be established when a unit will be *operating within an area of contamination*, or if there is an *imminent threat* of attack.

- Over garment is worn and closed
- Over boots are worn
- Mask and hood are worn and closed
- Gloves are worn

4. **NBC DETECTION EQUIPMENT**

The chemical agent detection devices utilized by the armed forces include the following:

M8 Chemical Agent Detector Paper

Purpose - the purpose of M8 paper is to identify the type of chemical agent present in liquid form on the battlefield.
Supplied - the M8 detection paper is supplied in a booklet and carried within the M40 field protective mask carrier.
Instructions For Use

- When an unknown liquid, suspected of being a chemical agent is encountered, immediately don the M40 field protective mask and protective suit.
- When all protective clothing has been put on obtain the M8 paper booklet from the carrier.
- Remove a half sheet from the booklet, and if possible, affix the sheet to a stick (to use as a handle).
- Blot the paper onto the unknown liquid and wait for 30 seconds for a color reaction to occur. The resulting color may then be compared to the colors on the inside of the front cover of the booklet to identify the type of liquid agent encountered.

M9 Chemical Agent Detector Paper (See figure 1)

Purpose - used to detect the presence of liquid nerve and blister chemical agents. However, M9 chemical agent detector paper does not identify either the specific agent or the type of agent encountered.
Supplied - M9 detector paper comes in a thirty-foot-long (30') and two-inch (2") wide roll strip in the form of a tape.
Instructions For Use

Figure 1. M9 Chemical Agent Detector Paper

- The tape is placed around a sleeve and a trouser leg of the overgarments. (NOTE: The tape contains an indicator dye that is a potential carcinogen. Avoid contact with the skin. Gloves should be worn during application,.)
- The tape is a dull off-white or cream color in the absence of liquid agent. The indicator chemical, when dissolved in liquid agent turns a reddish color.
- When the service member sees the tape turn a reddish color, immediately don your protective mask and alert others.

- If there is a possibility of skin contamination, immediately decontaminate the suspected area.
- False positive results can occur if liquid insecticides are on the surface being tested. Antifreeze and petroleum products will also cause false positive reactions.

M256A1 Chemical Agent Detector Kit

Purpose - the M256A1 chemical agent detector kit is used to detect and identify chemical agents present, either as a liquid or as a vapor.
Supplies - the kit consists of a booklet of M8 paper to detect agents in liquid form and twelve (12) foil-wrapped detector tickets containing eel enzymes as reagents to detect even very low concentrations of chemical vapors.
Instructions For Use - instructions for the use of this kit appear on the outside of each foil package. There is also an instruction booklet in the kit. The kit detects the following agents: nerve, blister and blood agents.

- Following the accompanying instruction, the testing can be completed in approximately 20 minutes.
- During testing it is important to keep the ticket out of direct sunlight. Sunlight speeds up the evaporation of the reagents. The ticket, when testing, must be kept stationary during all parts of the test.

5. PERSONAL DECONTAMINATION

M291 Skin Decontaminating Kit (See figure 2)

Purpose - to absorb and then neutralize liquid chemical agents present on the skin.
Supplied - the kit comes with six identical packets each containing a mixture of activated resins in the form of applicator pads.
Instructions For Use

Figure 2. M291 Skin Decontaminating Kit

- Remove a packet from the kit.
- Remove the applicator pad and apply an even coating of resin powder while scrubbing the entire skin area suspected to be contaminated.
- One applicator pad will decontaminate both hands and the face if necessary.
- If the face must be decontaminated, then the neck (including the throat area) and the ears must also be decontaminated using a second applicator pad.
- The black resin powder residue will provide a visual confirmation of the thoroughness of application.
- The resin will not cause skin irritations, even after prolonged contact with skin.
- Care must be taken in keeping the resin out of the eyes, mouth, and open wounds.

REFERENCE

NBC Decontamination, FM 3-5, Pgs. 2-1 through 2-5

MOPP Review

1. List the five limitations of MOPP.

2. Are gloves worn or carried in MOPP Level 3?

3. Which types of agents can be detected by the M256A1 Kit?

4. Describe the relationship of the M256A1 kit and direct sunlight.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1412

Manage Chemical Agent Casualties

TERMINAL LEARNING OBJECTIVE

1. Given a chemical warfare agent casualty in a combat environment and standard field medical equipment and supplies, **manage chemical agent casualities** to prevent further injury or death. (FMST-HSS-1412)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or title, **identify the types of chemical agents**, within 80% accuracy, per Medical Management of Chemical Casualties, July 2000. (FMST-HSS-1412a)
2. Without the aid of references, given a description or list, **identify the signs and symptoms of various chemical agents**, within 80% accuracy, per Medical Management of Chemical Casualties, July 2000. (FMST-HSS-1412b)
3. Without the aid of references, given a description or list, **identify the appropriate treatments for chemical agent casualties**, within 80% accuracy, per Medical Management of Chemical Casualties, July 2000. (FMST-HSS-1412c)

HISTORY OF CHEMICAL WARFARE (CW)

The use of chemical weapons dates from at least 423 B.C. when allies of Sparta used sulfur fumes during the Peloponnesian War. In World War I, German units released Chlorine and Mustard Gas which caused several thousand casualties and deaths at Ypres, Belgium.

Chemical warfare in earnest: An aerial photograph of one of the first chlorine attacks on the Western Front in World War I. The photograph was taken from behind German lines and is from the US Chemical Warfare Service collection.

During World War II, Germany utilized cyanide gas and other chemical agents in its concentration camps. Widely publicized reports of Iraqi use of chemical agents against Iran during the 1980's led to a United Nations investigation that confirmed the use of Sulfur Mustard (HD) and Sarin (GB). During Operation Desert Storm, the United States destroyed several Iraqi chemical stockpiles both on air and land. Since Operation Desert Storm, Congress has passed a bill mandating the destruction of all U.S. chemical agents.

Chemical Warfare - the use of chemical agents in military operations to kill, seriously injure or incapacitate personnel through physiological effects. They can be dispersed by missiles, rockets, bombs, mines, spray tanks or artillery rounds.

1. **TYPES OF CHEMICAL WARFARE AGENTS**

Nerve Agents - nerve agents a primarily organophosphorus esters similar to those in insecticides. They inhibit the function of cholinesterase (the chemical that allows a message to travel from one nerve to another).

Examples

GA - Tabun
GB - Sarin
GD - Soman
VX

Descriptions of Nerve Agents

- Colorless to light brown liquid
- Nonpersistent
- Faint fruity odor
- May be inhaled, ingested and absorbed through the skin

Nerve Agents:

Colorless/ Light Brown
Fruity Odor

- Most toxic chemical agents

Signs/Symptoms of Nerve Agents

- Can appear in seconds to hours depending on the agent and amount of exposure
- Massive secretions (rhinorrhea, lacrimation, incontinence, diaphoresis, etc.)
- Chest tightness
- Headache above the eyes with blurred vision
- Localized muscle twitching (which can progress into convulsions)
- Constricted pupils
- Respiratory arrest
- Death will result if left untreated

Treatment of Nerve Agents

- Don protective mask
- Decontaminate exposed skin
- Intramuscularly, inject MARK I Kit:
  - The MARK 1 Kit includes two autoinjectors, one of 2mg Atropine Sulfate and the other of 600 mg 2 PAM-Chloride. The steps for administering the MARK 1 Kit are as follows:

Nerve Agent Treatment

MARK 1 Kit:

Atropine
2PAM-Chloride

Pretreatment:

Pyridiostigmine
30mg/PO/TID for 14 Days

a. Grasp the Atropine autoinjector like a pen. Remove yellow cap. Press green tip against the meaty portion of the thigh and hold in place for 10 seconds (See figure 1).

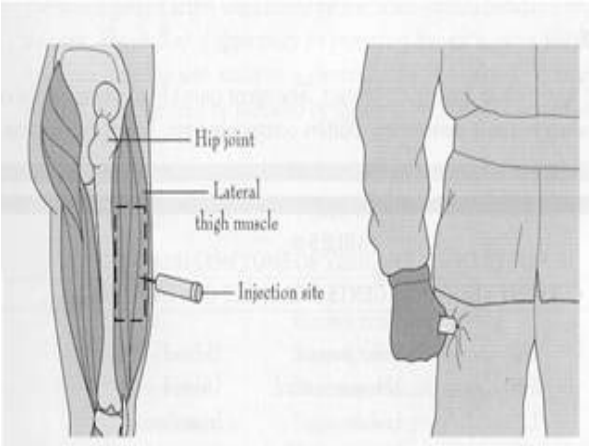

Figure 1. Injecting the MARK 1 Kit

b. Grasp the 2 PAM-Chloride autoinjector like a pen. Remove gray cap.
c. Press black tip against the meaty portion of the thigh and hold in place for 10 seconds.
d. If signs/symptoms are mild, member can administer their own kit.
e. One kit may be given every 10 minutes until improvement is seen or a total of three kits have been given.

f. If signs/symptoms are severe, (member is unable to inject themselve) give all three kits immediatley then inject 10mg Diazepam.
g. If symptoms continue after three kits have been administered, medical personnel may administer repeated Atropine (2mg) injections at three to five minute intervals and should be titrated to a reduction of secretions and to a reduction of ventilatory resistance (atropinization).

Prevention (Pretreatment) for Nerve Agents

- Pyridiostigmine is a drug that inhibits nerve agents from binding to 20-40% of the enzyme acetylcholinesterase. (See figure 2)
- Dosage -30 mg every eight hours not to exceed fourteen days. Comes in a blister pack with 21 tablets, each 30mg.

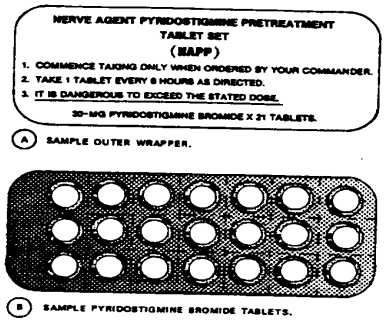

Figure 2. Pyridiostigmine Blister Pack

Vesicants (Blister Agents) - the exact mechanism by which they produces tissue injury is not known

Examples

HD - Distilled Mustard
HN - Nitrogen Mustard
Lewisite
Phosgene Oxide

Remember those "Fishy HNs"??? These memory tricks will help you! Be creative! Create your own!

Descriptions of Blister Agents

- Light yellow to brown oily liquid that becomes a vapor at high temperatures
- Persistent
- Odor:
  - Distilled Mustard (HD) - smells of garlic or horseradish
  - Nitrogen Mustard (HN) - smells fishy
  - Lewisite (L) - smells like geraniums
  - Phosgene Oxide - smells pepperish/ pungent odor
- Heavier than water
- May be absorbed through the skin (especially moist areas)

Signs/Symptoms of Blister agents

- Appear any where from 2 - 48 hours after contamination
- Erythemic skin with blisters, and necrosis where the agent touches
- Nausea and vomiting

- Edema of the eyes, eyelids, and corneal scarring
- If ingested or systemic, intense pain in the GI tract and diarrhea

Treatment for Blister Agents

- Don protective mask
- Decontaminate exposed skin
- Flush eyes with copious amounts of water to prevent scarring of the Cornea
- Apply Vasoline to the eyes to prevent adhesions
- Apply Calamine lotion to reduce burning and itching of skin
- Consider giving Morphine for pain if needed
- Use antibiotics and IV fluid replacement as required

Blood Agents - blood agents react with metal complexes of body to prevent intracellular oxygen utilization.

Examples

- AC - Hydrogen Cyanide
- CK - Cyanogen Chloride

Descriptions of Blood Agents

- Colorless liquids dispersed in gas form
- Smells like bitter almonds or peach pits
- Must be inhaled

Signs/Symptoms of Blood Agents

- Hyperpnea (Rapid Breathing)
- Anxiety, agitation, vertigo
- Weakness
- Nausea / Vomiting
- Cherry red skin, may be streaked
- Unconsciousness and seizures within 30 seconds of exposure
- Respiratory arrest and death within two to four minutes if treatment is delayed

Treatment of Blood Agents

- Don protective mask
- Decontaminate exposed skin. Move to fresh air
- Vigorously treat symptomatically
- Administer IV **Sodium Nitrite** (10ml) followed by IV **Sodium Thiosulfate** (50ml)
- Second treatment with each of the two antidotes may be given at up to half the original dose, if needed

Choking Agents - break down the alveolar capillary membranes resulting in pulmonary edema.

Examples

- CG - Phosgene
- DP - Diphosgene
- CL - Chlorine

Descriptions of Choking Agents

- Colorless liquid to white cloud which turns into a vapor
- Smells like freshly mown hay, grass, or corn
- Must be inhaled

- Contaminated food is of little consequence. Agent has no effect on body when ingested.
- Rapidly becomes nontoxic in water

Signs/Symptoms of Choking Agents

- Headache and eye irritation
- Coughing and choking / shortness of breath
- Substernal ache with sensation of pressure
- Two to six hours after exposure the following may appear:
  - Dyspnea
  - Cyanosis
  - Pneumonia - late sign
  - Pulmonary edema and frothy sputum may be observed
  - Hypoxia
  - Hypotention
  - Death

Treatment of Choking Agents

- Don protective mask
- Establish a patent airway
- Provide rest, warmth, and sedation
- No known antidote for choking agents
- Give oxygen, if available

Vomiting Agents

Examples

- DA - Diphenylchlorarsine
- DC - Diphenylcyanarsine
- DM - Adamsite

Descriptions of Vomiting Agents

- Color:
  - DA and DC have a white smoke color
  - DM has a canary yellow smoke color
- Odor of burning fireworks / shoepolish
- Crystalline solids, dispersed as a gas
- Must be inhaled

Signs/Symptoms of Vomiting Agents

- Appear 30 seconds to 2 minutes after exposure
- Severe headache
- Intense burning in the throat / salivation
- Chest tightness and pain
- Lacrimation / irritation
- Coughing, sneezing, nausea, and vomiting

Treatment of Vomiting Agents: Treatment is symptomatic.

- Don Protective Mask
- Get to fresh air as soon as possible
- Lift mask only to vomit

- Untreated symptoms usually subside within 30 minutes to 3 hours. - - Vigorous exercise will lessen and shorten the symptoms.

Lacrimators/Tear Agents

'CS' gas is what you will be exposed to in the Gas Chamber!

Examples
- CS - Ochlorobenzylmalonitrile
- CN - Chloracetophenone

Descriptions of Lacrimators
- Crystalline solids or liquids dispersed in the air as vapors or white smoke
- Strong pepper odor for CS and apple blossom odor for CN
- Absorbed through the eyes, nasal passages and skin pores

Signs/Sypmtoms of Lacrimators
- Pain and burning to the eyes
- Profuse tearing and photophobia
- Rhinorrhea (snotty nose), epistaxis (nose bleed)
- Chest tightness, coughing and dyspnea
- Blepharospasm (spasm around the eye)
- CS can cause severe burns starting with stinging sensation, erythema and then blister formation

Treatment of Lacrimators
- Don protective mask
- Get to fresh air as soon as possiable
- Heavy contaminants should be flushed from the eyes with copious amounts of water

Incapacitating Agents – These agents produce their effects mainly by altering or disrupting the higher regulatory activity of the peripheral nervous system and central nervous system

Examples
- BZ - Buzz Gas
- Agent 15

Descriptions of Incapacitating Agents
- Odorless and non-irritating
- Highly potent
- Rate of action – delayed by 30 minutes to 4 hours

Signs/Symptoms of Incapaciating Agents

Dry as a Bone, Hot as a Hare, Red as a Beet, Mad as a Hatter, Blind as a Bat

- Dry mouth and skin, "dry as a bone"
- Hyperthermia, "hot as a hare"
- Skin red from cutaneous vasodilation, "red as a beet"
- Slowing of mental activity with slurred speech. Disorientation and hallucinations, "mad as a hatter"
- Dilated pupils, "blind as a bat"

Treatment of Incapacitating Agents: treatment is supportive in nature
- Clear the airway as needed
- Treat for heat stroke
- Give fluids only if the victim can drink unassisted
- Approach with caution, the individual could become dangerous

- Remove all weapons
- Restrain as needed
- Physostigmine 45mcg / kg IM. After one hour, perform mental status exam and repeat dose as needed

NATO CHEMICAL WARNING MARKER - a triangular sign measuring 11"x 8" x 8" with yellow background, and red letters spelling " GAS". (See figure 3)

Figure 3. NATO Chemical Warning Marker

REFERENCE

Medical Management of Chemical Casualties, July 2000

Chemical Agent Review

1. List four Nerve agents.

2. Describe how Blood agents effect the body.

3. List three Vomiting agents.

4. Describe the signs and symptoms associated with a lacrimator agent.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1413

Manage Biological Agent Casualties

TERMINAL LEARNING OBJECTIVE

1. Given a biological warfare agent casualty in a combat environment and standard field medical equipment and supplies, **manage biological casualties** to prevent further injury or death. (FMST-HSS-1413)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or title, **identify the general groups of biological agents**, within 80% accuracy, per Medical Management of Biological Casualties, July 2000. (FMST-HSS-1413a)
2. Without the aid of reference, given a description or list, **identify the characteristics of various biological agents**, within 80% accuracy, per Medical Management of Biological Casualties, July 2000. (FMST-HSS-1413b)
3. Without the aid of references, given a description or list, **identify symptoms of exposure of various biological agents**, within 80% accuracy, per Medical Management of Biological Casualties, July 2000. (FMST-HSS-1413c)
4. Without the aid of references, given a description or list, **identify treatments for various biological agents**, within 80% accuracy, per Medical Management of Biological Casualties, July 2000. (FMST-HSS-1413d)
5. Without the aid of references, given a description or list, **identify the four (4) phases of defensive measures against biological agents**, within 80% accuracy, per Medical Management of Biological Casualties, July 2000. (FMST-HSS-1413e)

HISTORY OF BIOLOGICAL WARFARE

At the end of World War II, the Imperial Japanese army initiated an aggressive research effort to produce an effective biological agent. The goal was to learn the medical effects of such agents and determine the different methods of delivery. The most recent indication of offensive biological warfare capability comes from Team Seven of the United Nations Special Commission, which conducted inspections of Iraqi biological warfare research and development. The Iraqi government announced that prior to Operation Desert Storm, research had been conducted into the use of *Bacillus Anthracis*, Botulinum toxins, and *Clostridium perfringens*.

1. BIOLOGICAL WARFARE

Definition: The intentional use of living infectious microrganisms or toxins, derived from living organisms, to cause death or disease in humans, animals or plants.

Delivery may be in the form of sprays, explosive devices (i.e. cluster bombs, or warheads) and contaminated food /water supplies. The most common method is aerosolizing the agent in a spray (i.e crop dusting). Signs and symptoms of biological agents will initially mirror the signs and symptoms of naturally occurring diseases making exposure difficult to diagnose. Laboratory analysis is the only definate way to confirm biological agent exposure.

General Groups of Biological Agents

Bacteria - free living microorganisms that are naturally occurring or engineered. They work by overcoming the body's defense mechanism by invading cells. Most are killed by antibiotics.

Examples:
Anthrax
Plague
Brucellosis

Virus - an infectious agent, smaller than bacteria, that lacks independent metabolism and is able to replicate only within a host cell. Viruses produce diseases that do not respond to antibiotics. Supportive care is the only treatment.

Examples:
Smallpox
Venezuelan Equine Encephallitis (VEE)
Viral Hemorrhagic Fever (VHF)

Biological Toxins - toxins are poisons which are produced by functions of microorganisms, plants and animals. Toxins do not grow or replicate, but have been classified biological agents by the United States due to their ability to be biochemically engineered.

Examples:
Botulism
Ricin
Mycotoxins
Staphylococcal enterotoxin B

2. CHARACTERISTICS OF BIOLOGICAL AGENTS

Bacterial Agents

Anthrax (*Bacillus anthracis*) - an acute bacterial infection of the skin, lungs or gastrointestinal tract. Anthrax is endemic worldwide. Anthrax was weaponized in 1950.

Causes of Anthrax

- Primarily a disease of herbivorous animals. Cattle, sheep and horses are the most common domesticated animal hosts.
- Cutaneous infection occurs when handling infected animal tissue, contaminated hair, wool, hides or products made from infected slaughtered animals.
- Respiratory infection results from inhaling anthrax spores.
- Intestinal infection results from ingesting infected meat.

Signs and Symptoms of Anthrax: Signs usually present within 48 hours. The incubation period for anthrax is hours to 7 days.

Cutaneous: on the skin

- Begins as a papule followed by the formation of a fluid filled vesicle
- Normally appears on hands and forearms first
- The vesicle typically dries and forms a coal-black scab. This scab is usually surrounded by mild to moderate edema (sometimes with small secondary vesicles).
- Pain is unusual, and if present, is caused by secondary infection

Inhalation: in the lungs

- Gradual and nonspecific onset of fever, malase, fatigue, nonproductive cough and mild chest discomfort
- Initial symptoms are followed by a short period of improvement (hours to 2-3 days)
- Abrupt onset of severe repiratory distress with dyspnea, diaphoresis, stridor and cyanosis
- Septicemia, shock and death usually follow within 24-36 hours after onset of respiratory distress

Gastrointestinal: in the intestines

- Presents with severe sore throat or a local oral or tonsillar ulcer
- Nonspecific symptoms of nausea, vomiting and fever
- Followed by severe abdominal pain with hematemesis and diarrhea

Treatment for Anthrax:

- Ciprofloxacin 400mg IV every 8-12 hours or 500mg by mouth twice daily for four weeks
- Employ standard precautions for handling, treating, and moving all active cases

Prevention - Prophylactic vaccination series

Plague - caused by the bacterium ***Yersinia pestis*** which naturally infects rodents in certain parts of the world. There are three main types of plague: Bubonic, Pneumonic and Septicemic.

Causes of Plague

- The primary mode of transmission is flea bites
- A secondary source of infection is through aerosolized droplets of sputum from an infected person

Signs and Symptoms of Plague

Bubonic

- Acute onset fever, malaise, headache, nausea/vomiting
- Swollen lymph nodes in the groin or axilla region
- May have lesion at flea bite site
- Bubonic plague may progress spontaneously to the septicemic form with organisms spreading to the lungs and producing pneumonic disease

Pneumonic

Acute onset of fever, chills and malaise
Hemoptysis
Nausea/vomiting/diarrhea and abdominal pain
Dyspnea, stridor and cyanosis
Death is caused by respiratory failure and circulatory collapse
Almost always fatal if not treated within 24 hours

Septicemic Plague

- Fever, chills, malaise, nausea, vomiting and diarrhea
- Purpura (a rash from destroyed blood cells leaking into the skin)
- Acrocyanosis (discoloration of the extremities)
- Abdominal pain
- 25% of bubonic plaques progress septicemic plague

Treatment for Plague

- Quarantine the casualty for the first 48 hours
- Maintain standard precautions for bubonic plague patients and droplet precautions for pneumonic plague patients
- Streptomycin 30mg / kg / day IM in two divided doses for 10 -14 days
- Doxycycline 200mg IV then 100mg IV BID, until clinically improved then 100mg PO BID for a total of 10-14 days
- Vigorous fluid resuscitation

Prevention - prophylactic vaccination series

Viral Agents

Smallpox - a systemic viral disease caused by the *variola virus*. Endemic smallpox was declared globally eradicated in 1980 by the World Health Organization (WHO). The only WHO-approved repositories of the variola virus are in the Centers for Disease Control and Prevention (CDC) in Atlanta, GA and in the CDC's counterpart, Vector, in Koltsovo, Russia.

Causes of Smallpox

- Contact with infected respiratory discharge

- Contact with infectious bed linens or clothing of casualties
- Contact with drainage from wound

Signs and Symptoms of Smallpox

- Sudden onset of nonspecific symptoms:
  Fever
  Headache
  Backache that lasts 2-3 days
  Vomiting
  Malaise
- Two to three days after initial onset, a rash appears. It starts with face, hands and forearms, moves to the lower extremities and then to the trunk. Lesions will appear as minute macules, then papules, vesicles, pustules and finally scabs. Scabs form at 8 - 14 days and slough off at 14 - 28.
- Casualty is infectious throughout the entire term of the disease until the scab separates and falls off.
- All lesions occur simultaneously

Treatment for Smallpox

- Quarantine the casualty and maintain strict sterile procedures
- Supportive care

Prevention of Smallpox

- Prophylaxis: Vaccination of vaccinia virus. Revaccination should be carried out every 10 years for personnel who are at risk of infection.
- There are no routine immunizations of US forces for smallpox. When the threat indicates, senior leadership may direct vaccination of personnel.

Biological Toxins

Botulism - a biological toxin caused by the bacterium *Clostridium botulinum.* It is the most toxic substance to man. Due to its incredible potency and relative ease of manufacture, botulism toxin is considered a likely threat. Botulism acts as a neurotoxin.

Causes of Botulism
- Inhalation
- Ingestion

Signs and Symptoms of Botulism
- Blurred vision
- Dry mouth
- Dysphagia (difficulty swallowing)
- Diplopia (seeing double)
- Muscular weakness
- Symmetrical flaccid paralysis (Loss of tone and reflexes)
- Respiratory arrest

Treatment for Botulism
- Rest

- Oxygen, if available
- Cricothyroidotomy, if needed
- Mechanical ventilation
- IV and IM administration of trivalent botulinum antitoxin (ABE)

Ricin - a toxin made from the mash that is left over after processing Castor beans for oil. Castor bean processing is a worldwide activity; therefore, the raw materials for making ricin are readily available. The toxin may be either inhaled or ingested. Ricin acts directly on cells by inhibiting protein synthesis, which causes cellular death and tissue necrosis.

Signs and Symptoms of Ricin

Inhalation
- Acute onset of fever
- Respiratory Distress
- Hypoxia
- Cough
- Malaise (discomfort, weakness, fatigue)
- Myalgia (tenderness in the muscles)
- Pulmonary edema within 18-24 hours
- Death occurs within 36 to 72 hours

Ingestion
- Severe vomiting
- Abdominal cramping
- Diarrhea
- Shock
- Renal failure
- Circulatory collapse

Treatment for Ricin
- An antitoxin is NOT available.
- Give supportive care
- Isolation is not required

3. FOUR PHASES OF DEFENSIVE MEASURES AGAINST BW AGENTS

Pre-attack Phase of Biological Warfare

- Train and inform personnel of possible agents.
- Discourage rumors.
- Practice good sanitation and hygiene.
- Ensure immunizations are up to date.
- Protect supplies and equipment.

The key here is PRE, something you want to do BEFORE the attack!

Attack Phase of Biological Warfare

Signs of attack include:
- Aircraft spraying or dropping objects.
- Lobbing of low blast shells or bombs

The key here is ATTACK, things that you would expect to see during an attack or what to do during the attack!

smoke or mist of unknown origin
- Dead animals with no visible cause
- Rapid increase of patients at sick call

Defensive measures include:

- Stop breathing and don protective mask.
- Give the alarm.
- Remain under cover, and move outside only after cloud has passed or “ALL CLEAR” is sounded.
- Cover exposed skin.

Post-Attack Phase of Biological Warfare

CONTINUE to practice an increased level of good health, field sanitation and hygiene discipline. Keep wounds, cuts, and scratches clean by using soap, water and utilize available first aid. Don't consume local foods.
Eat and drink only approved food and water.
Do not bathe in lakes, ponds and streams.
Do not touch animals, especially dead ones.
Observe BW contamination markers.

The key here is POST, things to do AFTER the attack!

Decontamination Phase

Designate an area for the decontamination station.
Establish and operate the station.
Provide personnel for monitoring teams.
Post NATO Biological Warning Markers.
A triangular shaped marker measuring 11" x 8" x 8" with blue background and red letters spelling "BIO". (See figure 1.)

Figure 1. NATO Biological Warning Marker

REFERENCE

Medical Management of Biological Casualties, July 2000

Biological Agents Review

1. List the signs and symptoms of inhalation anthrax.

2. When and where does the smallpox rash develop?

3. Identify three facts about Botulism.

4. List three actions to avoid during the “Post-Attack” phase of biological warfare.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1414

Manage Radiological Warfare Casualties

TERMINAL LEARNING OBJECTIVE

1. Given a radiological warfare casualty in a combat environment and standard field medical equipment and supplies, **manage radiological warfare casualties,** to prevent further injury or death. (FMST-HSS-1414)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify the characteristics of nuclear blasts**, within 80% accuracy, per Medical Management of Radiological Casualties, December 1999. (FMST-HSS-1414a)
2. Without the aid of references, given a description or list, **identify the common types of injuries associated with nuclear blasts**, within 80% accuracy, per Medical Management of Radiological Casualties, December 1999. (FMST-HSS-1414b)
3. Without the aid of references, given a description or list, **determine the levels of exposure to ionizing radiation**, within 80% accuracy, per Medical Management of Radiological Casualties, December 1999. (FMST-HSS-1414c)
4. Without the aid of references, given a description or list, **identify the signs and symptoms of radiation exposure,** within 80% accuracy, per Medical Management of Radiological Casualties, December 1999. (FMST-HSS-1414d)
5. Without the aid of references, given a description or list, **identify treatments for radiation exposure**, within 80% accuracy, per Medical Management of Radiological Casualties, December 1999. (FMST-HSS-1414e)
6. Without the aid of references, given a description or list, **identify the personnel protective measures for radiological agents**, within 80% accuracy, per Medical Management of Radiological Casualties, December 1999. (FMST-HSS-1414f)
7. Without the aid of references, given a description or list, **identify the sequence of steps for radiological self-decontamination**, within 80% accuracy, per Medical Management of Radiological Casualties, December 1999. (FMST-HSS-1414g)

HISTORY OF NUCLEAR WARFARE:

At 0815 on August 6, 1945, a single American B-29 plane (the "Enola Gay") dropped the world's first nuclear weapon – the atomic bomb over Hiroshima, Japan. Hiroshima had an estimated population of 344,000. The bomb was detonated at an altitude of 2,000 feet. Immediately, almost 4 square miles or approximately 60% of the city was destroyed. Initial casualty reports were staggering: 78,150 immediate deaths, 13,983 missing, and 107,867 dying from secondary injuries. A total of 200,000 Japanese adults and children perished in that attack.

Since 1950, there have been **32** nuclear weapon accidents, known as "Broken Arrows." A Broken Arrow is defined as an unexpected event involving nuclear weapons that result in the accidental launching, firing, detonating, theft or loss of the weapon. To date, **six** nuclear weapons have been lost and ***never recovered!***

Definitions

Nuclear Reaction: A reaction that alters the energy, composition, or structure of an atomic nucleus.

Nuclear Bomb: An explosive weapon of great destructive power delivered form the rapid release of energy in fission of heavy atomic nuclei.

1. **FOUR TYPES OF NUCLEAR BLASTS** (See figure 1)

High Altitude Burst

Characteristics

- Detonation of a weapon at an altitude **above 100,000 ft.**
- Fireball is much larger and expands much more rapidly than a surface or subsurface burst.
- Ionizing radiation can travel for hundreds of miles before being absorbed.
- Causes severe disruption in communication and leads to an electromagnetic pulse (EMP), which can significantly degrade or destroy electronic and critical medical equipment.

Air Burst

Characteristics

- An explosion in which a weapon is detonated at an altitude **below 100,000 feet** but high enough that the fireball does not contact the surface of the earth.
- Airbursts may cause considerable damage; thermal burns to exposed skin may be produced many kilometers away from the burst.
- Eye injuries may be produced at even a much greater distance than that of thermal burns.
- Tactically, airbursts are the most likely to be used against ground forces.

Surface Burst

Characteristics

- An explosion in which a weapon is detonated **on or slightly above the surface of the earth** so that the fireball actually touches the land or water surface.
- The area affected by the blast, thermal radiation, and initial nuclear radiation will be less extensive than an air burst of similar yield.
- It produces the greatest amount of fallout over a much larger area than that which is affected by blast and thermal radiation.

Subsurface Burst

Characteristics

- An explosion in which the point of detonation is **beneath the surface of land or water.**
- Cratering of the ground will generally result:
  - If the subsurface burst does not penetrate the surface, the only other hazard will be from ground or water shock.
  - If the burst is shallow enough to penetrate the surface, blast, thermal and initial nuclear radiation effects will be present, but less than a surface burst of comparable yield.
  - If the burst penetrates the surface, fallout will be heavy.

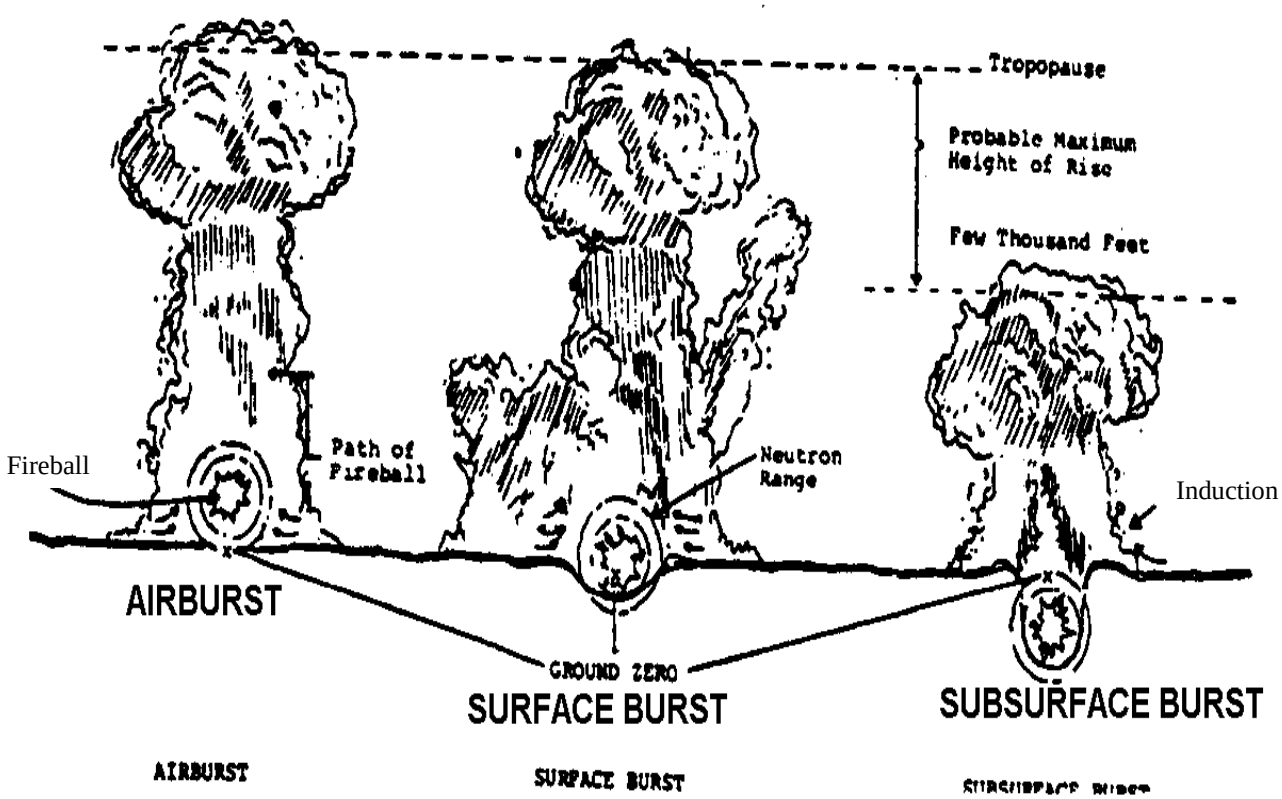

Figure 1. Types of Nuclear Blasts

2. COMMON TYPES OF NUCLEAR INJURIES

Two Types of Blast Injuries:

Although there are many effects of a standard blast (see block 4 "Blast Injuries") the following information divides the types of injuries that may result from a nuclear explosion into two types, primary and secondary.

Primary Blast Injury (Direct) - these types of injuries are caused by the direct action of the shock wave on the human body after the detonation of a nuclear device.

- Injuries occur immediately after detonation due to over pressure from rapid the expansion of air.
- If the patient is in close proximity to ground zero, the initial blast wave is usually lethal.
- Sub-lethal exposures to the initial blast wave can result in damage to bones, muscles, lungs, gastrointestinal system and ruptured eardrums.

Secondary Blast Injury (Indirect) - these injuries are caused by indirect wind forces greater than several kilometers per hour seconds after the primary detonation of a nuclear device.

- Injuries occur as a result of collapsing buildings, flying timber and other debris impacting the body or physical displacement of the body against objects or structures.
- More injuries are caused by indirect blast wind drag forces than by the shock wave.

Treatment of Blast Injuries from a Nuclear Attack:

Blunt trauma - blunt trauma with nuclear detonation will be anywhere from mild to severe. Injuries occur as a result of debris put into motion from blast and its following winds. Injuries such as fractures, spinal injury, head and torso blunt trauma, and penetrating injuries should be expected. Care for these injuries as you would in a non-contaminated environment.

> The five acknowledged nuclear powers possess about ***31,000 nuclear warheads***. India has not formally placed their nuclear arsenal on a delivery system. Pakistan has.

Pressure Trauma - the greatest concern with pressure trauma is injury to the lungs. Damage to the alveoli causes swelling, fluid accumulation, and possibly pulmonary emboli. Pulmonary embolism occurs as a result of air escaping the damaged lungs directly into the bloodstream. Treatment of suspected pressure trauma to the lungs includes:

- 100% oxygen, positive pressure if needed.
- If pulmonary embolus is suspected, place the patient on their left side to slow down the movement of the emboli.

Thermal Injuries from a Nuclear Attack - thermal radiation emitted by a nuclear detonation causes two types of burns:

Flash Burns (Direct)

Flash Burns results from thermal radiation (infrared) emanating from the fireball of a nuclear explosion. Exposed skin and extremities facing the explosion will be burned

Flame Burns (Indirect)

Flame burns are caused by exposure to fires from the environment, particularly from ignition of clothing. This could be the predominant cause of burns depending on the number of and characteristics of flammable objects in an environment.

Eye Injuries: the initial thermal pulse from nuclear detonation can cause eye injuries in the form of flash blindness and retinal scarring

Flash blindness

Flash blindness results from looking in the general direction but not directly at a brilliant flash of intense light energy. It is a condition in which a flash of light swamps the eyes and depletes the pigmentation from the retinal receptors. Flash blindness is a temporary condition that usually last for several seconds but not more than two minutes when exposure occurs during daylight. The blindness will be followed by a darkened after image that lasts for several minutes. If exposure occurs at nighttime, blindness can last from 15 to 30 minutes before full nighttime adaptation occurs.

Retinal Scarring

Retinal Scarring develops from a burn to the retina from looking directly at the fireball. It is a relatively uncommon injury, but can cause blind spots and permanent blindness.

3. DIAGNOSIS OF LEVELS OF EXPOSURE

Radiation Absorbed Dosage (RAD) - the method for measuring radiation dosage. Accurate and prompt diagnosis of a casualty is based primarily upon the clinical picture presented by the individual.

Mild - vomiting **does not occur by the end of the fourth** hour after exposure.

Severe - vomiting **within two** hours.

Deadly - vomiting **within the first** hour accompanied by **explosive diarrhea.**

4. SIGNS AND SYMPTOMS OF RADIATION EXPOSURE

90% of those exposed to a significant dose of ionizing radiation will exhibit the following symptom within **two to six** hours after exposure:

- Nausea
- Vomiting
- Diarrhea
- Fatigue
- Hyperthermia (rise in body temperature)
- Erythema (reddening of the skin)
- Hypotension
- Neurological Dysfunction

- Malaise (mental confusion, convulsion, coma)
- Anorexia (loss of appetite)

5. **TREATMENT FOR RADIATION EXPOSURE**

Treatment for radiation casualties with no physical injuries is **supportive in nature.**

Treatment for radiation exposure is based on managing life threatening injuries, burns, blunt trauma, controlling hemorrhage, pressure trauma, and the signs and symptoms displayed, **not on the amount of radiation received.**

Pain management - morphine is the drug of choice. It should be given in doses of 10mg (auto-injector) every 4-6 hours.

Infection - administer antibiotics to manage any infection after radiation exposure, such as penicillin and ampicillin. You will need to use 3 times the normal dosage of the antibiotics and oral antifungal agents. Normal recovery time is from 8 to 15 weeks.

6. **PERSONNEL PROTECTION MEASURES**

In a tactical environment, the following are immediate protective measures to observe during a surprise nuclear attack:

- Drop flat on the ground, face down, with **head toward blast if possible or to the bottom of your fighting hole.**
- Close your eyes and don't look at the explosion
- Protect or cover exposed skin by putting hands and arms under or near the body and keeping your helmet on
- Keep your head down
- While in fighting hole, cover head with arms, place face against legs and place fingers in ears
- Stay down for 90 seconds after the shock wave has passed
- Don your field protective mask
- If warned of imminent attack, proceed to shelter or foxhole

7. **DECONTAMINATION PROCEDURES** - decontamination of radiological particles should be done away from the scene and further away from radioactive fallout exposure at a decontamination station. It should be continually done until the radioactivity has been reduced to a safe level.

- Early removal of radioactive "contamination" will reduce radiation burns, radiation dosage and the chances of inhaling or ingesting radioactive material.

Steps for self decontamination include:

a. Spot clean first using a cotton swab or gauze for moist areas and tape for dry areas to remove radioactive "hot spots" (concentration of Radioactivity)
b. Carefully remove contaminated clothing and garments
c. Deposit contaminated clothing and garments in a garbage bag or disposable container for disposal by burial at sea or in deep pits or trenches
d. Carefully bathe or flush contaminated wounds with sterile water
e. Apply impermeable dressing over any uncontaminated cut, scratch, or wound

f. Shower thoroughly with soap and water. Scrub the entire body with a soft bristle brush giving special attention to hairy areas, nails, body orifices, and skin folds
g. If areas become tender from excessive washing, gently rub skin with a small amount of lanolin or ordinary hand or face cream
h. Repeat procedures again if any contamination remains

REFERENCES

Hospital Corpsman NAVEDTRA 14295, August 2002, Pgs. 8-16 through 8-18
Medical Management of Radiological Casualties, December 1999
Webster's II New Riverside Dictionary, pg 135, 806
Marine Corps MCRP 4 – 11.1B

Radiological Review

1. What type of burst is most likely to be used against ground forces? What types of injuries would it likely cause?

2. Describe “flash blindness”.

3. Describe the signs and symptoms of mild, severe, and deadly levels of radiation exposure.

4. Describe the recommended antibiotic therapy to be administered following radiation exposure.

Fundamentals of CBRN
Review Questions

NOTE: The following questions are offered for review purposes. <u>This is NOT intended as a sole source of test preparation</u>. Remember all test questions are based on an ELO and any ELO can be used to create a test question.

1. What are the components of the M-40 Field Protective Mask?
2. What are the four types of nuclear blasts?
3. What are the accessories of the M-40 Field Protective Mask?
4. What are the types of chemical warfare agents?
5. What is the definition of Mission-Oriented Protective Posture (MOPP)?
6. What are the general groups of biological agents?
7. What are the limitations of MOPP?
8. What are signs/symptoms of blister agents?
9. Which level of MOPP protection should be established during tactical situations that require units to cross terrain where the previous use of chemical agents is unknown?
10. Detonation of a weapon at an altitude above 100,000 feet is characterized as what type of nuclear blast?
11. How are choking agents treated?
12. Which level of MOPP protection should be established when a unit will be operating within an area of contamination, or if there is an imminent threat of attack?
13. What is anthrax?
14. How is severe radiation absorbed dosage (RAD) characterized?
15. What is the purpose of M8 Chemical Agent Detector Paper?
16. What are the signs/symptoms of lacrimators/tear agents?
17. An explosion in which a weapon is detonated on or slightly above the surface of the earth is considered what type of nuclear blast?
18. What are the signs/symptoms of smallpox?
19. What is the purpose of M9 Chemical Agent Detector Paper?
20. What are the signs and symptoms of radiation exposure?
21. What are the personnel protection measures of radiological warfare?
22. What is the treatment of smallpox?
23. What is the treatment of blood agents?
24. What is the purpose of the M291 Skin Decontaminating kit?
25. What is Botulism and what causes it?
26. How is Ricin treated?

27. What are the two types of nuclear blast injuries?

28. What is the second step for radiological self decontamination?

29. What is the drug of choice for pain management of radiation exposure?

30. What are the four phases of defense or protective measure against biological warfare agents?

COMPONENTS OF FIELD MEDICINE

COMPONENTS OF FIELD MEDICINE

Blast Related Injuries FMST 1424	5-1
Recognize Combat Stress Disorders FMST 1415	5-7
Conduct Triage FMST 1421	5-17
Coordinate Casualty Evacuation FMST 1423	5-25
Perform Aid Station Procedures FMST 1501	5-44
Medical Support for Military Operations in Urban Terrain (MOUT) FMST 1303	5-54
Perform Water Purification for Individual Use FMST 1602	5-59
Supervise Field Waste Disposal FMST 1603	5-64
Manage Envenomation Injuries FMST 1405	5-69
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UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1424

Blast Related Injuries

TERMINAL LEARNING OBJECTIVE

1. Given a description or list, in a tactical environment, **identify the medically related aspects of blast incidents in a tactical environment**, per the reference. (FMST-HSS-1424)

ENABLING LEARNING OBJECTIVES

1. Without the aid of reference, **identify the five categories of blast effects on the human body**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 25. (FMST-HSS-1424a)
2. Without the aid of reference, **identify the pattern of injuries from an explosive device**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 25. (FMST-HSS-1424b)
3. Without the aid of reference, **identify the wounding effects of fragmentation**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 25. (FMST-HSS-1424c)
4. Without the aid of reference, **identify the wounding effects of blast overpressure**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 25. (FMST-HSS-1424d)

OVERVIEW

Injuries from explosives are the predominant cause of combat injury and death. In the insurgency phase of the Iraq War, they account for about 60% of American injuries. So it is essential that medical personnel have a good understanding of the pathophysiology of injuries caused by explosive devices such as; letter bombs, shaped warheads from rocket-propelled grenades, antipersonnel land mines, aerial-delivered cluster bombs, enhanced blast weapons, and the improvised explosive devices so widely used in insurgency and terrorist settings.

1. FIVE CATEGORIES OF BLAST EFFECTS

The term "blast injuries" refers to the general injuries caused by an explosive force. The five categories of blast injury effects are listed below. It is important to understand the effects of each, as well as the mechanism of injury and injuries associated with all five.

Effect	**Impact**	**Mechanism of Injury**	**Injuries**
Primary	Direct blast effects (over- and under-pressurization)	Direct tissue damage from blast overpressure; Interaction of blast wave with body; Stress and sheer waves produce tissue organ injury	Pulmonary Tympanic Membrane rupture Hollow or Viscus Injuries
Secondary	Projectiles propelled by explosions	Fragments from the exploding weapon as well as from the environment (debris, vehicle metal, rocks etc)	Fragmentation Injuries Penetrating Trauma
Tertiary	Propulsion of body onto a hard surface or object	Displacement of body and structural collapse	Being thrown against hard surface causing penetrating, injuries, blunt trauma, and crush injuries
Quaternary	Heat and/or combustion Flames	Burns and toxic injuries from fuel, metals, septic syndromes from soil and environmental contamination	Burns Inhalation Injuries Asphyxiation
Quinary	Additives such as radiation or chemicals (e.g. dirty bombs)	Contamination of tissue from: Bacteria, Radiation, Chemical agents, Contaminated tissue from bystander or assailant	Variety of health effects, depending on the agent

2. PATTERN OF INJURIES

Casualties from explosions on the battlefield can be segregated into two categories; military and civilian. While military casualties are predominately young and otherwise healthy, civilian casualties may be very young or very old. A large percentage of those will be in relatively poor health. When compared to civilian casualties, military casualties are less likely to suffer injuries to their upper torso and head due to the protective gear they wear.

In a mass casualty incident resulting from an explosion there will generally be a large number of lightly wounded casualties as well as a significant amount of deaths. Those casualties who require immediate life saving measures will represent a small percentage of the actual casualties. Locating these individuals and treating them promptly is a definite challenge for medical responders.

3. WOUNDING EFFECTS OF FRAGMENTATION

Fragmentation injuries are the most common form of injury in a terrorist bombing (see figure 1). Fragments include debris from the munition itself, the environment surrounding the explosive (sticks, rocks, trash etc) and, in the case of suicide bombers, human body parts. Treatment of fragmentation wounds will be based on the area of the body involved and the extent of the injury.

Figure 1. Fragmentation injuries

Limbs are by far the most commonly affected body area, accounting for 70% of the injuries from explosive devices. Primary and secondary effects of the blast may require the patient to receive emergency treatment to prevent exsanguination. Casualties with traumatic amputations from conventional explosions are generally within three feet from the device when it explodes. These individuals account for a large portion of the immediate fatalities following suicide bombings. As with all combat wounds, extremity wounds following explosions will need antibiotics to prevent systemic infections.

Figure 2. Limb injury from explosion

While eyes are extremely resistant to primary effects of blasts, they are susceptible to secondary and tertiary effects. Explosions causing shattering glass have a high incidence of causing penetrating eye injuries. The majority of eye injuries can be prevented by simple eye protection, such as polycarbonate goggles.

4. WOUNDING EFFECTS OF BLAST OVERPRESSURE

Physics of Blast Waves - blasts produce two separate types of waves. Each wave does specific forms of damage to the human body.

Stress waves are supersonic, longitudinal pressure waves. These waves create high potential for injuries, especially in gas-filled organs such as the lungs, ears and intestines.

Sheer waves are lower velocity transverse waves with longer duration than stress waves. These waves cause tissue in the body to move back and forth.

Lung Injuries occur when the victim experiences overpressure of greater than 40 pounds per square inch (PSI). Increases in pressure of 200 PSI in an open-air environment are almost

universally fatal. Lung injuries are the most common cause of death related to the primary blast effect.

Signs and Symptoms may appear immediately or they may be delayed for up to 48 hours, depending on the severity of the wound. Internal hemorrhage in the pulmonary region, along with alveolar edema will lead to frothy, bloody secretions from the mouth. The casualty will also exhibit signs of labored breathing and appear hypoxic.

Treatment is difficult in a tactical environment. The patient should be monitored for the appearance of dyspnea and/or frothy sputum. Oxygen should be administered as soon as it is available. IV fluids should be used with extreme caution to avoid overloading the lungs with fluid.

Ear Injuries can occur from as little as 5-15 PSI of overpressure. It is imperative that all blast injury casualties be examined for possible tympanic membrane (TM) rupture. Since it takes a far greater amount of pressure to rupture lungs or abdominal organs, the absence of ruptured tympanic membranes can help rule out other injuries, provided the patient is not experiencing any other symptoms related to organ damage. Blast induced deafness may heighten the patients anxiety. The hearing loss may be permanent or resolve in a matter of hours.

Signs and Symptoms will be noticeable upon examination. The patient will have a noticeable loss of hearing, along with some bleeding from the ear(s). Visualizing the eardrum with an otoscope can positively identify a ruptured TM.

Treatment of a ruptured TM is relatively conservative and is not a priority on the battlefield. Although 50-80% of TM ruptures will heal on their own, patients should still be referred to a medical officer within 24 hours. Until then, avoid probing or irrigating the ear canal.

Gastrointestinal Injuries are more likely to occur in patients of blasts detonated inside a building than those exposed to explosions in an open-air environment. Of all abdominal blast injuries, intestinal perforation is the most common. While the blast may induce the intestinal perforation which is considered a closed injury, other aspects of the blast may produce open injuries as well.

Signs and Symptoms include pain in the abdomen, rectum, and testes and may be difficult to appreciate early in the care of the casualty.

Treatment of gastrointestinal injuries was covered in Block Three of this text and will be based on the extent of the injury.

Solid Organ injury is rare in open-air blasts but has been reported in underwater blasts. All abdominal injuries should be treated symptomatically as discussed in Block 2.

Central Nervous System Injuries, to include Traumatic Brain Injuries (TBI), are significant issues associated with blast injuries. Moderate to severe TBI accounts for 71% of the early deaths associated with explosions and 52% of later deaths. Mild TBI is associated with long term issues such as memory loss, irritability, and decreased cognitive functions. For this reason, ***all personnel involved in an explosive attack should be referred to a medical officer for documentation and evaluation***.

Mutitple-Etiology Injuries - Explosions create different injury patterns based on various factors. Among these are the size of the explosion, the location of the explosion, and the proximity of the casualty to the explosion. These events often lead to the casualty experiencing multi-etiology injuries. In this case the patient has injuries to more than one body part or system. To determine the correct intervention, you must be able to perform a systematic casualty assessment to identify and treat life threatening injuries first.

REFERENCE

Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 25

Blast Review

1. What types of injuries can you expect from the secondary effects of a blast.

2. Describe the pattern of injuries associated with military casualties.

3. Describe the wounding effects of fragmentation.

4. Define multi-etiology injuries.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1415

Recognize Combat Stress

TERMINAL LEARNING OBJECTIVE

1. Given a psychological casualty in a combat environment and standard field medical equipment and supplies, **manage combat stress disorders** to stabilize the casualty. (FMST-HSS-1415)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or title, **identify the definition of combat stress**, within 80% accuracy, per the Combat Stress FM 90-44. (FMST-HSS-1415a)
2. Without the aid of references, given a list, **identify factors that increase the risk of combat stress**, within 80% accuracy, per the Combat Stress FM 90-44. (FMST-HSS-1415b)
3. Without the aid of references, given a list, **identify the symptoms of combat stress disorder**, within 80% accuracy, per the Combat Stress FM 90-44. (FMST-HSS-1415c)
4. Without the aid of references, given a list, **identify treatment for combat stress disorder**, within 80% accuracy, per the Combat Stress FM 90-44. (FMST-HSS-1415d)
5. Without the aid of references, given a description or list, **identify preventative measures for combat stress disorder**, within 80% accuracy, per the Combat Stress FM 90-44. (FMST-HAA-1415e)
6. Without the aid of references, given a simulated combat stress casualty and standard field medical equipment, **manage a combat stress casualty**, per the Combat Stress FM 90-44. (FMST-HSS-1415f)

1. COMBAT STRESS

Shell shock, as combat stress was called during World War I, often was viewed as a coward's reaction to fighting. There was little or no selection process to filter out those with psychiatric illnesses before entering the military. Men were killed by firing squad that today would never have been admitted into the military. The few men who were diagnosed with combat fatigue were evacuated home often when it was too late for recovery. Many developed chronic psychiatric conditions. Put simply, combat stress is defined as the mental, emotional, or physical tension, strain, or distress that results from exposure to combat related conditions.

World War II changed a few things. In the US there was more pre-recruitment screening. The problem of combat stress was grudgingly accepted as part of warfare and by the end of WWII, psychiatrists were stationed within many units. Another major change was men were no longer moved away from the front to receive treatment, except for logistical reasons or in severe cases. In Korea there was even a mobile psychiatric unit conducting "stress control operations" near the front.

Male culture still had difficulty dealing with man's emotional response to war. Vietnam underlined this. Despite progress, there remained little acknowledgement of combat stress. Many men turned to drugs such as marijuana, heroin, and alcohol. The lack of engagement with such a central issue cost many men their lives on the battle field, in conflict zones, and with post traumatic disorders ending in suicide after the war ended.

2. IDENTIFY RISK FACTORS

Combat and combat-related military missions can impose combinations of heavy physical work, sleep loss, dehydration, poor nutrition, severe noise, vibration, blasts, exposure to heat, cold or wetness, poor hygiene facilities, and perhaps exposure to infectious diseases, toxic fumes or other substances. These, in combination with other influences such as concerns about problems back home, affect the ability to cope with the perception of danger and diminish the skills needed to accomplish the mission. Environmental stressors often play an important part in causing the adverse or disruptive combat stress reaction behaviors. Box 1 lists several risk factors that may lead to increased combat stress disorders.

Personal	Unit
Problems at home (financial, marital) Sleep deprivation Poor physical condition Malnutrition Substance abuse	Poor unit cohesion Poor leadership Intense and frequent exposure to high combat Improper or inadequate training

Box 1. Risk factors of Combat Stress

3. IDENTIFY PHYSICAL SYMPTOMS

Mild stress reactions may be signaled by changes in behavior and only noticeable by the person himself or by close friends. Leaders and medical personnel depend on information from the service member or their comrades for early recognition of combat stress reactions to provide prompt and appropriate help. Box 2 lists mild stress reactions and box 3 lists severe stress reactions that you may see.

Physical Reactions	Emotional Reactions
Trembling Jumpiness Cold sweats, dry mouth Insomnia Pounding heart Dizziness Nausea, vomiting, or diarrhea Fatigue "Thousand-yard" stare Difficulty thinking or speaking	Anxiety, indecisiveness Irritability, complaining Forgetfullness, inability to concentrate Nightmares Easily startled by noise, movement, and light Tears, crying Anger, loss of confidence in self and unit

Box 2. Mild Stress Reactions

Physical Reactions	Emotional Reactions
Constantly moving around Flinches or ducks at sudden sound/movement Shakes, trembles Cannot use part of body (hand, arm, leg) for no apparent physical reason Inability to see, hear, or feel Is physically exhausted; cries Freezes under fire or is totally immobile Stares vacantly, staggers or sways when standing Panics, runs away under fire	Talks rapidly and/or inappropriately Argumentative; acts recklessly Indifferent to danger Memory loss Stutters severly, mumbles or cannot speak at all Insomnia, severe nightmares Sees or hears things that do no exist Has rapid emotional shifts Socially withdrawn Apathetic Hysterical outbursts Frantic or strange behavior

Box 3. Severe Stress Reactions*

*The above listed warning signs do not necessarily mean that the person must be relieved from duty. They do, however, indicate an immediate need for evaluation.

Although most people suffering from combat stress usually improve when they are able to get warm food, rest, and an opportunity to share feelings with comrades, their unit leader, or you as their Corpsman, some do not. If the symptoms endanger the individual, others or the mission, or if they do not improve within a day or two or seem to worsen, you must refer them to the unit Chaplain or medical officer.

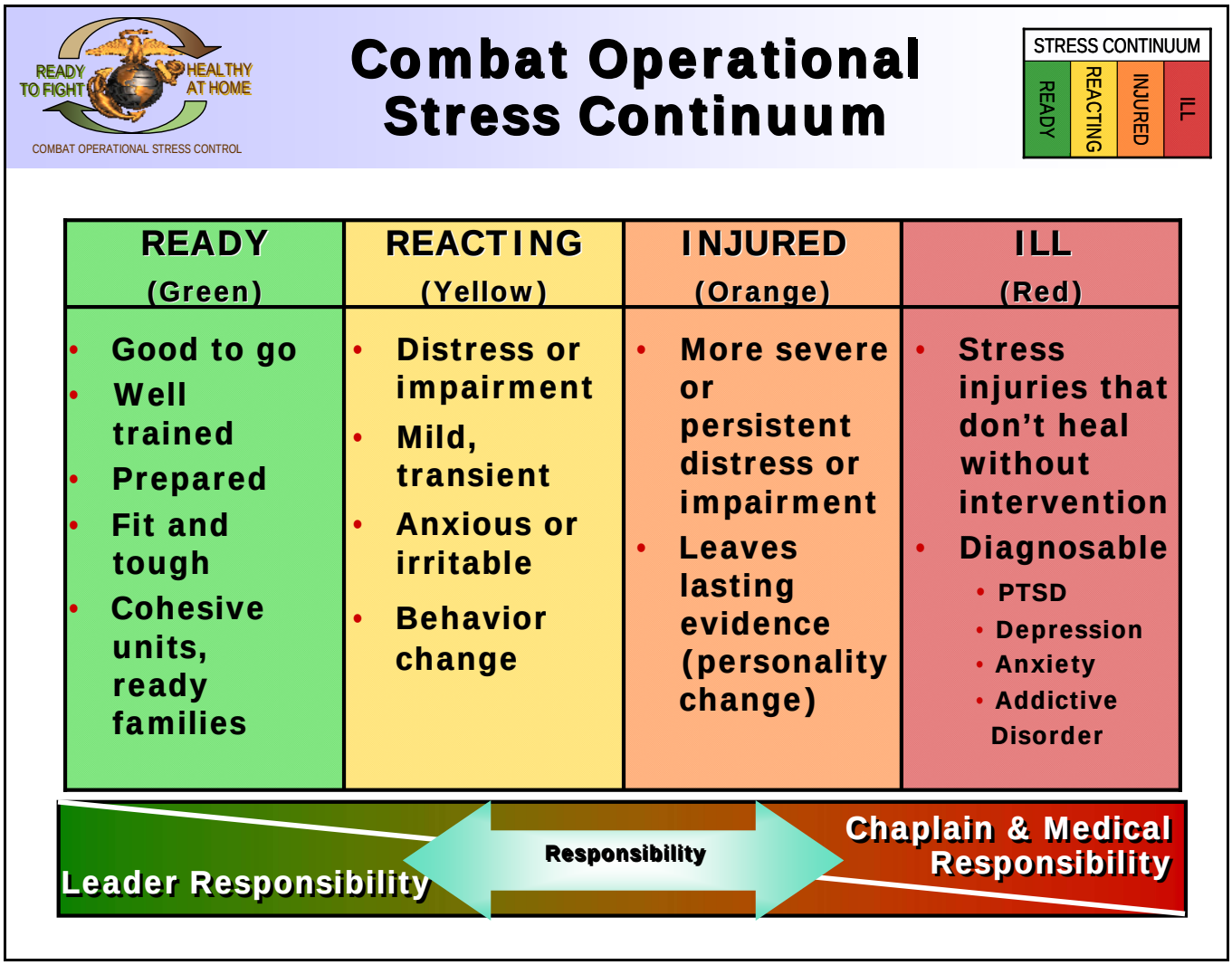


Figure 1. Combat Operational Stress Continuum

Figure 1 shows leadership and treatment responsibilities.

<u>Ready: the Green Zone</u>

- The Green Ready zone can be defined as encompassing adaptive coping, effective functioning in all spheres, and personal well-being. The ability to remain in the Green zone under stress, and to return quickly to it once impaired or injured by stress, are two crucial aspects of resiliency. Following are some of the attributes and behaviors characteristic of the Green Ready zone:

  - Remaining calm and steady
  - Being confident in self and others
  - Getting the job done
  - Remaining in control physically, mentally, and emotionally
  - Behaving ethically and morally
  - Retaining a sense of humor
  - Sleeping enough
  - Eating the right amount
  - Working out and staying fit

- Playing well and often
- Remaining active socially and spiritually

Reacting: The Yellow Zone

The Yellow Reacting zone can be defined as encompassing mild and temporary distress or loss of function due to stress. By definition, Yellow zone reacting is always temporary and reversible. When the stress is over, the marine goes back, eventually, to the Green zone. The following experiences, behaviors, and symptoms may be characteristic of the Yellow Reacting zone:

- Feeling anxious
- Worrying
- Cutting corners on the job
- Being short tempered or mean
- Being irritable or grouchy
- Having trouble falling asleep
- Eating too much or too little
- Feeling apathetic or losing energy or enthusiasm
- Not enjoying usual activities
- Keeping to oneself
- Being overly loud or hyperactive
- Being negative or pessimistic
- Having diminished capacity for mental focus

Injured: The Orange Zone

The Orange Injured zone can be defined as encompassing more severe and persistent forms of distress or loss of function that cannot be fully undone over time. Although stress injuries cannot be undone, as for physical injuries, their usual course is to heal over time. Since stress injuries are not clinical mental disorders, they do not require clinical mental health expertise to recognize them, although operational commanders and small unit leaders rely heavily on their chaplains and organic medical personnel to identify orange zone stress injuries. Common Orange zone stress injuries include:

- Losing control of one's body, emotions, or thinking
- Being frequently unable to fall or stay asleep
- Waking up from recurrent, vivid nightmares
- Feeling persistent, intense guilt or shame
- Feeling unusually remorseless
- Experiencing attacks of panic or blind rage
- Losing memory or the ability to think rationally
- Being unable to enjoy usually pleasurable activities
- Losing grounding in previously held moral values
- Displaying a significant and persistent change in behavior or appearance
- Harboring serious suicidal or homicidal thoughts

Ill: The Red Zone

The Red Ill zone can be defined as including all mental disorders arising in individuals exposed to combat or other operational stressors. Since Red zone illnesses are clinical mental disorders, they can only be diagnosed by health professionals. However, Marines can and should be aware of the characteristic symptoms of stress illnesses and be aware that professional mental health intervention is required to restore full function. Common Red zone illnesses include the following:

- Post-traumatic stress disorder (PTSD)
- Depressive disorders, especially major depression
- Anxiety disorders, including generalized anxiety and panic disorder
- Substance abuse or dependence

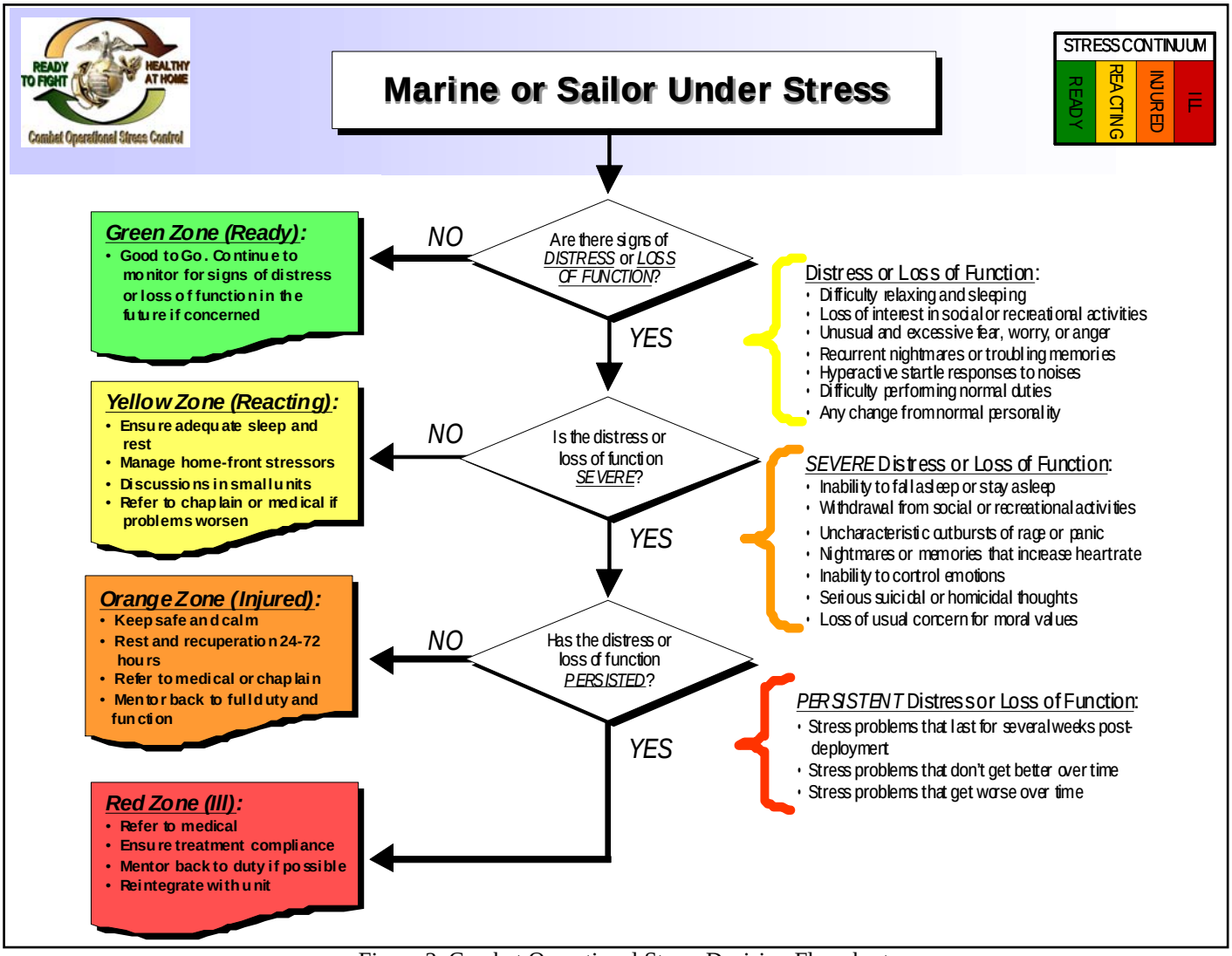


Figure 2. Combat Operational Stress Decision Flowchart

The COSC Decision Flowchart (see figure 2) is a simple tool for leaders to determine where a Marine falls on the stress continuum and shows what to do to mitigate or, if necessary, treat

the injury or illness. The Decision Flowchart is applicable at all stages of the deployment cycle. The lists of stress symptoms on the far right, highlighted by the Yellow, Orange and Red brackets, give the leader or Marine some indications of typical problems at each level of function. The diamonds in the middle specify decisions needed to determine the severity of the stress problem, and the boxes on the left indicate what action needs to be taken for each level of severity. It can also be used by individual Marines to evaluate themselves or their buddies who have symptoms of deployment-related stress. This is used by leaders, along with the Decision Matrix, to determine what actions should be taken with Marines experiencing combat stress problems

4. **TREATMENT**

Treatment is kept very simple. Most people experiencing combat stress do not need therapy or psychotherapy. The goal is to rapidly restore the person's coping skills so that he or she functions and returns to duty. Sleep, food, water, hygiene, encouragement, work details (to keep them busy), and confidence restoring talk are often all that is needed to restore the person back to full operational readiness.

This can be done while still attached to their unit (provided that the unit is not actively engaged in combat operations), in rear positions, or at medical companies. If they are sent to a medical unit, they should not be co-located with patients that have been injured or are sick. The person experiencing combat stress must be encouraged to continue to think of himself as a warfighter, rather than a “patient” or a “sick person”.

Every effort is made to reinforce the person's identity. They are required to wear their uniform, keep their normal protective equipment, and flak vests with them. When possible, they are allowed to keep their weapons after the weapons have been cleared. These are the biggest factors that aid in returning battle-fatigued members to effective duty.

Guidlelines for treating Marines showing signs of Combat Stress are summarized in the memory aid **BICEPS**. It stands for Brevity, Immediacy, Centrality, Expectancy, Proximity and Simplicity.

Brevity - treatment lasts no more than three days. Those requiring further treatment are moved to the rear.
Immediacy - provide care as soon as symptoms appear.
Centrality - combat stress cases are treated in one central location near, but separate from, the Battalion Aid Station (BAS) or field hospital if possible. In a mobile war requiring rapid and frequent movement, treating combat stress in a single area is impossible. In these cases, treatment may take place at the BAS or Regimantal Aid Stations.
Expectancy - it is made clear to the individual that once they are reacting normally to stress, they will be returned to full duty. This should only take a few days.
Proximity - care for the combat stress victim is held in close proximity with the unit and as an intricate part of the entire healing process. A visit from the members chain of command is very effective in keeping a bond with their organization.
Simplicity - treatment is kept simple. The goal is to rapidly restore the Marine’s coping skills so they may return to full duty.

5. **PREVENTION**

The old saying that the best offense is a great defense is true in preventing combat stress. You play a vital role in preventing severe combat related disorders. Education of your troops is vital. Use the resources available to you such as your Chain of Command, medical officer, and Religious Ministry Team.

Preparation to control stress starts long before you actually reach combat. The word control has been chosen deliberately. It is used to emphasize the active steps which leaders, supporting personnel, and the individual must take to keep stress within the acceptable range. Stress is a fact of life for everyone. It is controlled combat stress (when properly focused by training, unit cohesion, and leadership) that gives Marines and Sailors the necessary alertness, strength, and endurance to accomplish their mission. Controlled combat stress can call forth stress reactions of loyalty, selflessness, and heroism. See box 4 for a general list of preventative measures for each period.

<u>Pre-deployment</u>

- Be aware of commitments
- Prepare family and loved ones
- Get your personal affairs in order
- Educate your troops and yourself in the kinds of reactions to stress they can expect while in garrison, the field exercise, and actual combat. Help them understand the formation of a reaction to stress and the range of normal reaction that will help them develop more healthy adaptation responses.

<u>During deployment</u>

- Learn how much stress you can handle
- Recognize stress in yourself and others
- Maintain physical fitness (the #1 way to reduce stress!!!)
- Spend time alone (be aware of too much time alone, however)
- Establish support groups
- Stay out of set routines as this will lead to boredom
- Try to get at least four hours of sleep per day
- Get good sleep before going on sustained operations
- Catnap when you can, but allow time to wake up fully
- Catch up on sleep when you can

<u>Post Deployment</u>

- Just as predeployment and combat are stressful, the period after combat is also difficult. Today's rapid transportation enables Marines to travel from the battlefield to their hometown in 48 to 72 hours. This short time often does not give them time to sort out with their friends what happened in combat or what will happen afterward.
- Provide briefings that help recognize, prepare for and master the stressors of reunion with family

Box 4. Control of Combat Stress

History shows that it is important to treat combat stress casualties as close to the front as possible. Everyone is susceptible to the effects of combat stress, regardless of past performance, rank, or duty. Combat stress reactions are inevitable in combat, but high stress casualties are not.

History shows that highly trained and small cohesive units with good leadership have less problems.

REFERENCES

Combat Stress, FM 90-44
Leaders' Manual for Combat Stress Control, FM 22-51

Combat Stress Review

1. Identify five personal risk factors associated with combat stress.

2. List three examples of emotional reactions to mild combat stress.

3. What does the acronym BICEPS stand for?

4. Identify a major factor in combat stress following a deployment. What can be done to help prevent this?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1421

Conduct Triage

TERMINAL LEARNING OBJECTIVES

1. Given multiple casualties in a simulated combat environment, standard field medical equipment and supplies, **conduct triage to identify triage categories for medical treatment,** per the references. (FMST-HSS-1421)
2. Given multiple casualties in an operational environment, necessary medical equipment and supplies, **manage mass casualty incident**, per the references. (FMST-HSS-1422)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify the tactical principles of triage**, within 80% accuracy, per Pre-Hospital Trauma Life Support; Military Edition, 6th Ed, Chapter 23. (FMST-HSS-1421a)
2. Without the aid of references, given a descriptive list of injuries, **identify the appropriate triage categories for specific injuries**, within 80% accuracy, per Pre-Hospital Trauma Life Support; Military Edition, 6th Ed, Chapter 23. (FMST-HSS-1421b)
3. Given multiple casualties in an operational environment, necessary medical equipment and supplies, **coordinate a mass casualty incident**, per Pre-Hospital Trauma Life Support; Military Edition, 6th Ed, Chapter 23. (FMST-HSS-1422a)

TACTICAL TRIAGE

Triage is a French word meaning "to sort". Casualties are sorted into groups based on their immediate medical needs. Using a standardized approach to triage casualties helps combat medics correctly segregate, treat, and prioritize evacuation in the shortest time possible. The realities of combat dictate that battlefield triage must take place in an environment limited in resources for treatment and transport. Triaging casualties merely establishes order of treatment and movement (see box 1). Although all casualties require treatment, triage aids the Corpsman in deciding which casualties have the greatest probability of survival and helps weigh the casualties need for lifesaving interventions (LSIs), thus determining priority and urgency for treatment and evacuation.

Care Under Fire Phase

1. Move casualties who are not clearly dead to cover, if possible.

2. Treat any life-threatening hemorrhage.

3. Continue with the mission or fight.

Tactical Field Care Phase

1. Perform an initial rapid assessment of the casualty for triage purposes. This should take no more than 1 minute per patient.

2. If a casualty can walk, he or she will probably be all right.

3. Perform immediate lifesaving interventions (LSIs) as indicated. Move rapidly.

4. Reverse treatment from ABC to CBA (circulation, breathing, and airway). The majority of casualties will have injuries requiring hemorrhage control. It does no good to ensure a good airway when the casualty has lost too much blood to survive.

5. Talk to the casualty while checking the radial pulse. If the casualty obeys commands and has a normal radial pulse, he or she has a greater than 95% chance of living.

6. If the casualty obeys commands but has a weak or absent radial pulse, he or she is at increased risk of dying and may benefit from an immediate LSI. This casualty is in the immediate category.

7. If the casualty does not obey commands and has a weak or absent radial pulse, he or she has a greatly increased chance of dying (>92%) and may benefit from an immediate LSI.

8. Prepare casualties to move out of the area.

9. Prevent hypothermia.

TACEVAC Phase

1. Triage casualties again. Categories and treatment requirements can and will change.

2. Use any advanced diagnostic equipment available at this level to assist in triage.

3. Soft tissue injuries are common and may look serious, but these injuries do not kill unless associated with shock.

4. Bleeding from most extremity wounds should be controllable with a tourniquet or hemostatic dressing. CASEVAC delays should not increase mortality if bleeding is fully controlled.

5. Casualties who are in shock should be evacuated as soon as possible.

6. Casualties with penetrating wounds of the chest who have respiratory distress unrelieved by needle decompression of the chest should be evacuated as soon as possible.

7. Casualties with blunt or penetrating trauma of the face associated with difficulty breathing should immediately receive definitive airway control and be evacuated as soon as possible.

8. Casualties with blunt or penetrating wounds of the head associated with obvious massive brain damage and unconsciousness are unlikely to survive with or without emergent evacuation. Therefore, they would be in the expectant category.

9. Casualties with blunt or penetrating wounds to the head in which the skull has been penetrated but the casualty is conscious should be evacuated emergently.

10. Casualties with penetrating wounds of the chest or abdomen who are in shock at their 15 minute evaluation have a moderate risk of developing late shock from slowly bleeding internal injuries. They should be carefully monitored and evacuated as soon as feasible.

Box 1: Triage in Tactical Combat Casualty Care (TCCC)

Triage establishes the patients' category. Although the type and extent of the wound may offer clues as to the triage category a patient may fall into, it is their physiological state (how well there body is working) that is the critical factor. For instance, a patient with a weak radial pulse indicates an estimated systolic blood pressure of 80 mm/Hg. Studies of combat related injuries indicate that 32% of these individuals will die. The absence of a radial pulse indicates a systolic blood pressure of less than 50 mm/Hg. The same study reported that 92% of these individuals will die. On the other hand, a separate trauma study indicated that no casualty died if they presented during the first stages of triage with a palpable radial pulse and the ability to follow simple commands.

> **<u>Triage</u> ensures the greatest care for the greatest number of casualties and the maximum utilization of medical personnel, equipment and facilities, especially in a mass casualty incident (MCI).**
>
> **-PHTLS 6th Edition p. 548**

1. **<u>TACTICAL PRINCIPLES OF TRIAGE</u>**

   - Accomplish the greatest good for the greatest number of casualties
   - Employ the most efficient use of available resources
   - Return personnel to duty as soon as possible

2. **<u>THE FOUR CATEGORIES OF TACTICAL TRIAGE</u>**

   Categories are color coded and are recognized as follows:

   <u>Minimal (Green Tag)</u>

   Also known as the "walking wounded." Although these patients may appear to be in bad shape at first, remember, it is their physiological state that tells the true story.

   Examples include but are not limited to – small burns, lacerations, abrasions, and small fractures.

   These casualties have minor injuries and can usually care for themselves with self-aid or "buddy aid". These casualties should still be employed for mission requirements (e.g., scene security).

   <u>Delayed (Yellow Tag)</u>

   The delayed category includes wounded casualties who may need surgery, but whose general condition permits a delay in surgical treatment without unduly endangering life or limb. Medical treatment (splinting, pain control, etc.) will be required but it can wait.

   Examples include but are not limited to – casualties with no evidence of shock who have large soft tissue wounds, fractures of major bones, intra-abdominal or thoracic wounds, or burns to less than 20% of total body surface area.

   <u>Immediate (Red Tag)</u>

   The immediate category includes casualties who require immediate LSI and/or surgery. Put simply, if medical attention is not provided, the patient will die. **The key to successful triage is to locate these individuals as quickly as possible**. Casualties do not remain in this category for an extended period of time, they are either found, triaged and treated, or they will die!

Examples include but are not limited to – hemodynamically unstable casualties with airway obstruction, chest or abdominal injuries, massive external bleeding, or shock.

Expectant (Black Tag)

Casualties in this category have wounds that are so extensive that even if they were the sole casualty and had the benefit of optimal medical resources, their survival would be highly unlikely. Even so, expectant casualties should not be neglected. They should receive comfort measures, pain medications, if possible, and they deserve re-triage as appropriate.

Examples include but are not limited to – casualties with penetrating or blunt head wounds and those with absent radial pulses.

3. TCCC TRIAGE DECISION ALGORITHM

Because the tactical environment precludes an extensive array of monitoring equipment, optimal battlefield treatment and evacuation rely on simple triage tools. Based on research by the Committee on Tactical Combat Casualty Care, a triage decision algorithm has been developed (see figure 1). Using this method will enable the FMST to perform an initial triage of many individuals in a quick and systematic manner.

- Patients who can ambulate and follow instructions usually will fall into the minimal category. Statements such as "If you can hear my voice get up and move behind the building" (or any other place tactically correct) can triage a large portion of the casualties in a short time.
- Patients with obvious signs of death can be initially placed in the expectant category.
- Casualties who do not fit either of the above categories will need further evaluation.
- Massive bleeding is the most obvious sign of the need for a LSI. It may need a tourniquet, a hemostatic agent, or a pressure bandage.
- Once the LSI has been performed the patient is immediately re-triaged.
- According to the algorithm, patients are placed in the delayed category if they can obey simple commands, possess a normal radial pulse, and are not in respiratory distress.

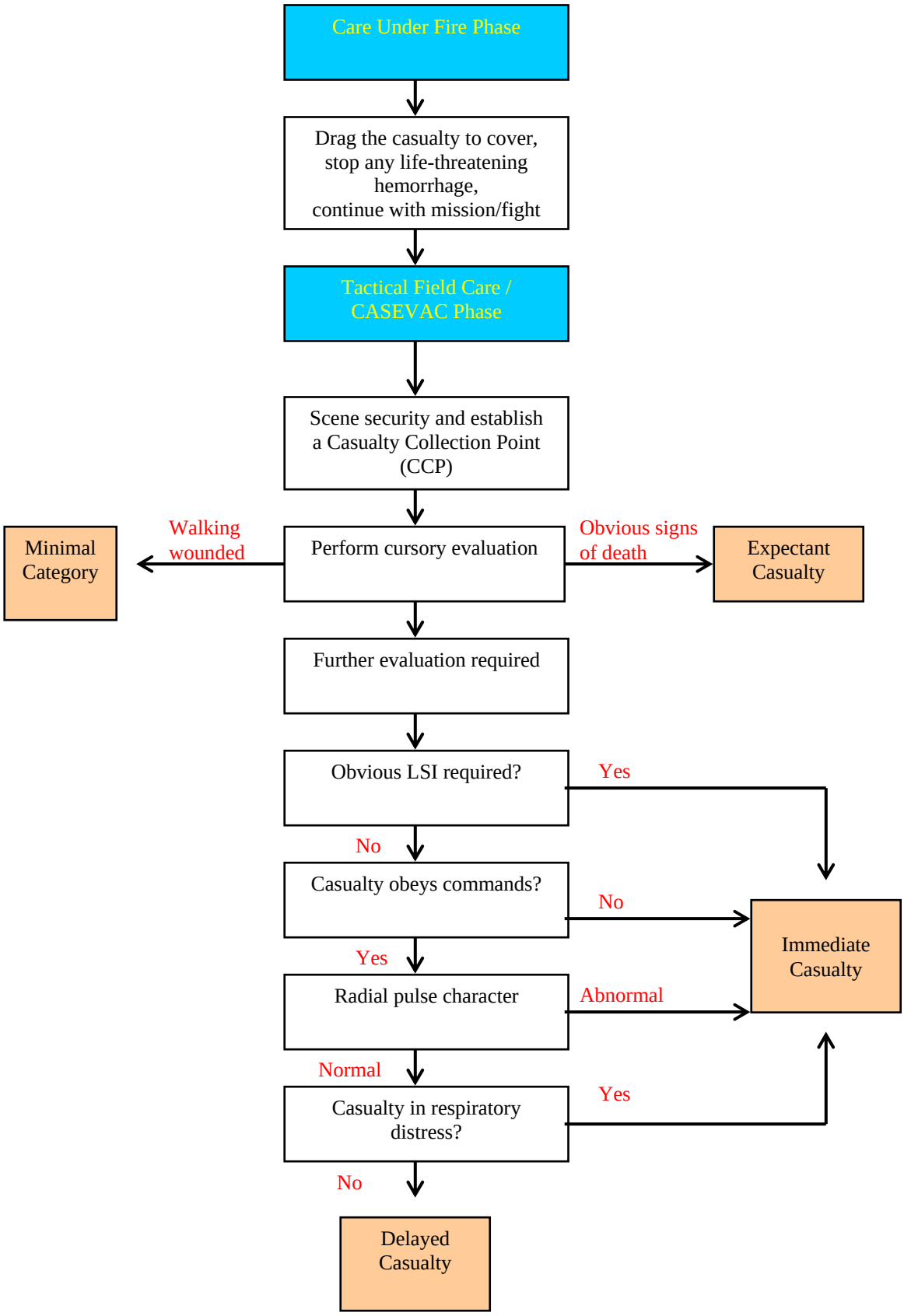


Figure 1. Triage Algorithm for Tactical Combat Casualty Care

4. MASS-CASUALTY TRIAGE

Corpsmen operating in a tactical environment must always be prepared to deal with a mass casualty incident. Units must establish and rehearse plans for dealing with such a situation. In a mass casualty situation those responsible for triage must remember that triage is not treatment and constant reassessment is needed to identify casualties who may have deteriorated or improved.

5. TRIAGE TAGS

Triage tags are designed to communicate the triage category, treatment rendered, and other medical information. By necessity, the information on the tag is brief. Triage tags are usually placed on the casualty by the triage officer although other members of the team may place or add information to the tags.

NATO Card (METTAG: Medical Emergency Triage Tag) (see figure 2)

Purpose

- To furnish the attending care provider during the evacuation of a casualty with essential information about the injury or disease and the treatment provided.
- The sole or initial medical record for the troops injured in combat.
- Each triage tag is coded with a unique sequential seven-character serial number used for identification and tracking of the casualty. The serial number is located on the top right and left diagonal tear-offs.

Routing

- The card stays with the patient at all times.
- The yellow corner with the ambulance picture and a serial number stays with the evacuating vehicle.
- The yellow corner with the first aid sign and serial number stays at the BAS.

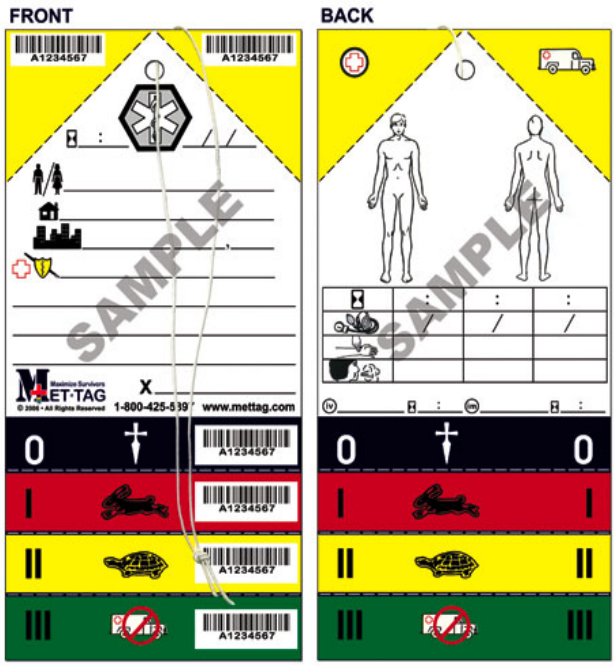
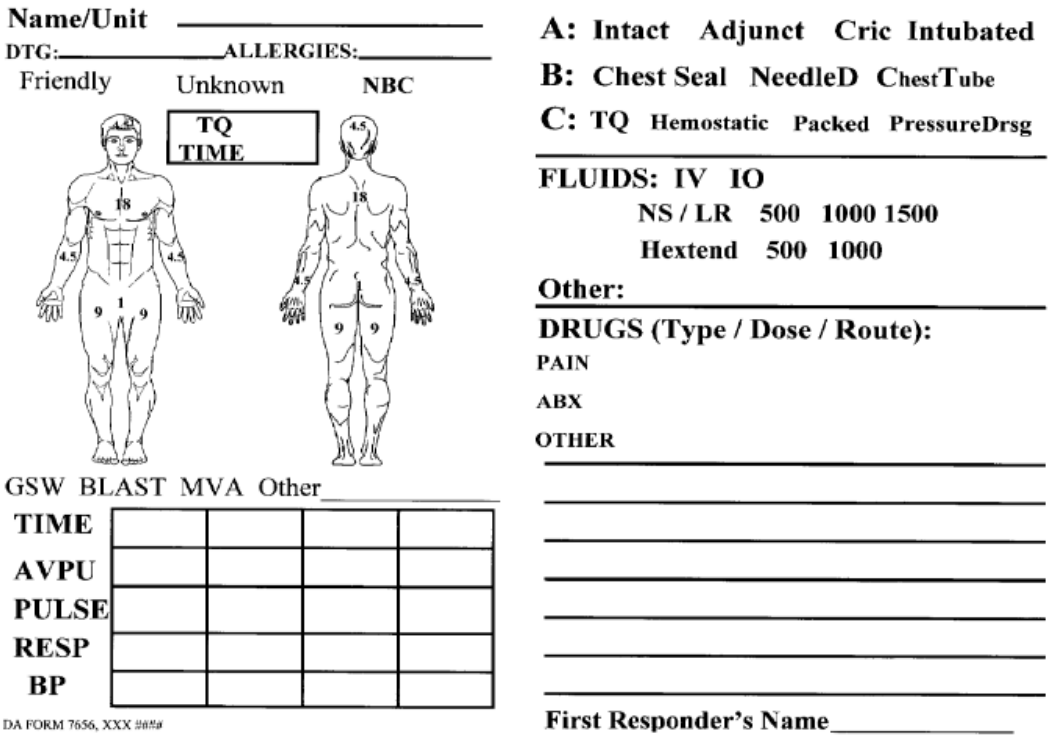


Figure 2. NATO Card (METTAG)

NATO CARD (METTAG) (FRONT) NATO CARD (METTAG) (BACK)



FRONT BACK

Proposed TCCC Casualty Card

REFERENCES

Tactical Emergency Care, Pgs. 230-245

Pre-Hospital Trauma Life Support; Military Edition, 6th Ed, Chapter 23

Triage Review

1. Describe the general condition of a patient in the “delayed category”.

2. What is the key to successful triage?

3. List two important things for the triage Corpsman to remember when dealing with a mass casualty scenario.

4. Using the triage algorithm, a patient that can obey simple commands, has a normal radial pulse, and is not in respiratory distress would be placed in which category?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1423

Coordinate Casualty Evacuation (CASEVAC)

TERMINAL LEARNING OBJECTIVE

1. Given multiple casualties in a tactical environment, communication equipment, nine-line evacuation format, and the standard field medical equipment and supplies, **coordinate casualty evacuation to transport casualties for medical treatment**, per the references. (FMST-EVAC-1423)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list of capabilities, **identify the capabilities of the taxonomy of care**, within 80% accuracy, per JP 4-02. (FMST-EVAC-1423a)
2. Without the aid of references, given a description or list, **identify common litters utilized as CASEVAC platforms**, within 80% accuracy, per FM 8-10-6 and the PHTLS Manual. (FMST-EVAC-1423b)
3. Without the aid of references, given a description or list**, identify ground vehicles utilized as CASEVAC platforms**, within 80% accuracy, per FM 8-10-6. (FMST-EVAC-1423c)
4. Without the aid of references, given a description or list, **identify aircraft utilized as CASEVAC platforms**, within 80% accuracy, per FM 8-10-6. (FMST-EVAC-1423d)
5. Without the aid of references, given a description or list, **identify casualty receiving treatment ships utilized as CASEVAC platforms,** within 80% accuracy, per FM 8-10-6. (FMST-EVAC-1423e)
6. Without the aid of references, given a description or list, **identify the casualty evacuation categories**, within 80% accuracy, per FM 8-10-6. (FMST-EVAC-1423f)
7. Without the aid of references, given a description or list, **identify the purpose of a Nine-Line evacuation communication**, within 80% accuracy, per FM 8-10-6. (FMST-EVAC-1423g)
8. With the aid of references, given the necessary equipment**, transmit a Nine-Line evacuation request**, within 80% accuracy, per FM 8-10-6. (FMST-EVAC-1423h)
9. Without the aid of references, given multiple simulated casualties in a tactical environment, standard field medical equipment and supplies, and individual combat equipment, **perform casualty evacuation**, per the student handout. (FMST-EVAC-1423i)

OVERVIEW

Tactical Evacuation Care (TACEVAC) is the third phase in the Tactical Combat Casualty Care process. Tactical evacuation encompasses both medical evacuation (MEDEVAC) and casualty evacuation (CASEVAC). The care delivered in the TACEVAC phase can more closely resemble advanced trauma life support guidelines than that in the first two phases. With either vehicular or air evacuation of wounded casualties from the battlefield, there is an opportunity for access to additional medical equipment not available to the Corpsman during the first two phases. One example is the use of pulse oximetry devices, which detect the percent of hemoglobin with oxygen bound to it and gives you an indication of how well the casualty is breathing. It also allows for early detection of pulmonary compromise or cardiovascular deterioration before physical signs are evident. They are highly reliable and can apply across all ages and races. This lesson will describe the taxonomy of care, different methods of casualty evacuation, and how to call for an evacuation.

1. TAXONOMY OF CARE

The taxonomy of care outlines distinctive and overlapping care capabilities that enhance performance in a military force. The level of care commences at the scene of the injury and continues until the member receives definitive care and is discharged or returned to full duty. While this course teaches you the skills needed to operate using the first responder, forward resuscitative, and en route care capabilities, there are five capabilities in the taxonomy continuum of healthcare capabilities which are used when evacuating the wounded from the battlefield (see figure 1).

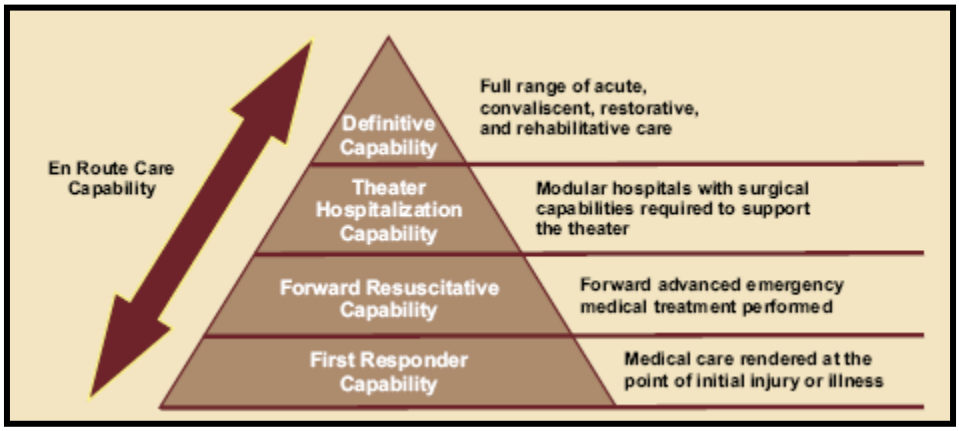


Figure 1. Taxonomy of Care

First Responder Capability - first aid and emergency care rendered at the point of initial injury are the primary objectives of care at this level. Defined by its time requirements, first responder care provides immediate medical care and stabilization to the patient in preparation for evacuation to the next capability in the continuum of care. Examples of First Responder Capabilities include:

- Self-aid/Buddy aid
- Battalion Aid Station (BAS)

Forward Resuscitative Capability - builds on the First Responder Capabilities. Characteristics include performing advance emergency medical treatment as close to the point of injury as possible, stabilizing the patient, and saving life and limb. Stabilization ensures the patient can tolerate evacuation. Examples of Forward Resuscitative Capabilities include:

Medical Battalion - provides surgical care for the MEF. Provides stabilizing surgical procedures. Capable of holding patients up to 72 hours.
Casualty Receiving & Treatment Ships (CRTS) - part of an Expeditionary Strike Group (ESG). They provide additional medical capabilities for receiving a mass casualty (up to 50 casualties).
Shock Trauma Platoon (STP) - small forward unit with one physician supporting the MEF specializing in patient stabilization and evacuation. No surgical capability.
Forward Resuscitation Surgical Suite (FRSS) - staffed with 8 to 10 personnel (two surgeons, one critical care nurse, one anesthesiologist and four to six corpsmen). It consists of a two tent surgical system that provides a fully powered, climate-controlled environment with enough space for one operating room and one pre- and post-operative care room. The shelter is equipped with cutting-edge surgical gear and takes less than one hour to set up or break down.

Theater Hospitalization Capability - services are delivered via modular hospital configurations and/or hospital ships required to sustain forces in theater. These capabilities deploy as modules or multiple individual capabilities that provide increasing medical services in a more robust theater. The care offered either returns the patient to duty or stabilizes the patient to ensure they can tolerate evacuation to a definitive care facility. Services encompass primary inpatient and outpatient care, emergent care, and enhanced medical, surgical, and ancillary capabilities, including:

Fleet hospitals - deployable ground asset but located away from enemy threat providing up to 500 hospital beds, 80 ICU beds, and 6 OR's.
Hospital ships (USNS Mercy and USNS Comfort) - deployable medical assets providing up to 1,000 beds, 100 ICU beds, and 12 OR's.

Definitive Capability - rendered to conclusively manage a patient's condition and is usually delivered from, or at, facilities in the homeland, but may be delivered in facilities outside the homeland. This capability generally leads to rehabilitation, return to duty, or discharge from the armed forces. Because this care is usually given outside the operational area, the most advanced health care can be made available and accessible to the patient. It includes:

CONUS Military, Veteran's and selected civilian hospitals - provide full convalescent, restorative, and rehabilitative care to all patients returned to the Continental United States (CONUS).
Overseas Medical Treatment Facilities - offers the surgical capability found in the theater hospitalization capability, along with further definitive therapy for those patients in the recovery phase who can be returned to duty within the theater evacuation policy. A patient who cannot be returned to duty will be evacuated through the en route care capability.

En Route Care Capability - en route care is the continuation of care during evacuation within the continuum without clinically compromising the patient's condition. This capability can take one of three forms – medical evacuation (MEDEVAC) in which dedicated special medical non-combatant platforms are used. The Air Force is the primary provider of MEDEVAC assets. Casualty evacuation (CASEVAC) are primarily non-medical evacuation platforms, however, some may have medical attendants such as a Hospital Corpsman or an Army Medic. This course deal specifically with CASEVAC, which involves the unregulated movement of casualties aboard ships, land vehicle, or aircraft.

2. METHODS OF EVACUATION

The level of urgency and the tactical situation dictates the method of evacuation. Depending upon which level of care you are in, Care Under Fire, Tactical Field Care, or Tactical Evacuation Care, will dictate how the casualty is transported. The most common forms of evacuation are: ambulatory, manual carries, litter evacuation, ground evacuation, air evacuation, or sea evacuation. Regardless, the casualty should be made as comfortable as possible and kept warm and dry. If an improvised litter is used, it should be padded and field-expedient material replaced with conventional splints, tourniquets, and dressings as soon as feasible. A patient with minimal injuries should be encouraged to stay in the fight if possible and to ambulate to an area where care can be safely provided.

Manual Carries

Fireman's Carry - Used for unconscious and conscious patients

1. Secure your arms around the patient's waist with their body lightly tilted backward to prevent their knees from buckling. Place your right foot between their feet and spread them six to eight inches apart.
2. With your left hand, grasp their right wrist and raise it over your head.
3. Bend at the waist and knees, pull the patient's arm over and down your left shoulder, bring their body across your shoulders. Pass your right arm between their legs.
4. Place the patient's right wrist in your right hand and your left hand on your left knee for support in rising.
5. Rise with the patient correctly positioned with your left hand free.

One-man Supporting Carry - Conscious patients only. The patient is able to walk using you as a crutch.

1. Raise the patient from the ground as in the Fireman's Carry.
2. With your left or right hand, grasp the patient's left or right wrist and draw it around your neck.
3. Place your left or right arm around their waste.

Saddle-back Carry - Conscious patients only.

1. Raise the patient to an upright position.
2. Support patient by waist and move to the front of the patient.
3. Have patient encircle arms around your neck.
4. Stoop, raise patient to your back and clasp hands beneath his thighs.

Pack-strap Carry – Good for unconscious patients, however do not use if patient has fractures.

1. Raise the patient from ground as in Fireman's Carry.

2. Support by wrist and move to front of patient.
3. Grasp patient's wrist and hoist onto your back until their armpits are over your shoulders.

Two-man Supporting Carry – Patient is conscious and has no suspected fractures.

1. Same as One-man Carry, but done with two individuals.

Two-man Carry – Used for placing patient on a litter or moving short distances (similar to performing a patient log roll).

1. Two corpsmen kneel at one side of patient.
2. One places one arm beneath the hips and the other beneath the knees.
3. The second bearer places one arm beneath the shoulder and one beneath the back.
4. Lift patient to knees, then stand up and carry at chest level to lessen fatigue.

Fore-aft Carry – Used to carry an unconscious patient for short distances.

1. With patient lying on their back, front bearer spreads legs of patient and steps between legs with back towards patient, grasps legs behind the knees.
2. Rear bearer kneels at the head of the patient, places arms under the armpits and clasps hands on their chest.
3. Bearers rise together.

Four Hand Carry – Patient must be conscious.

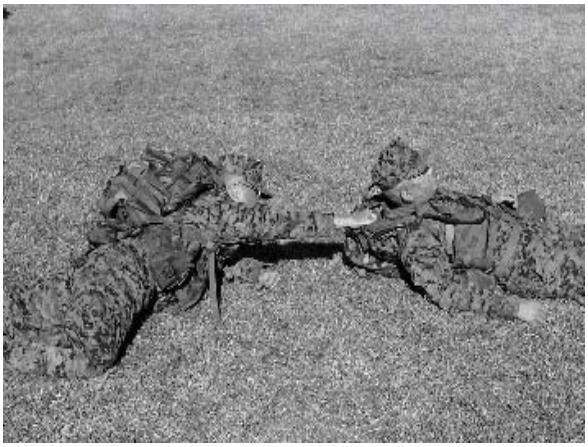
1. Each bearer grasps their left wrist with the right hand and then each other's right wrist with the left hand.
2. Patient sits on the interlocked hands supporting himself by putting one arm around each of the bearer's necks.

Two Handed Seat Carry – Used for conscious patients with no fractures.

1. With patient on their back, bearers on each side of the patient's hips.
2. Bearers interlock their wrists behind the patient's thighs and back.
3. Bearers rise together lifting patient.

Clothes Drag Carry – Used during “under fire” conditions.

4. Grasp the patient’s shirt collar or gear and drag to safety.



Types of litters - there are six commonly used litters within the FMF.

Talon Litter (see figure 2) - the Talon collapsible handle litter was developed to meet the US Army’s urgent requirement to provide casualty evacuation. The Talon litter allows a casualty to be transported in one vehicle then transitioned to a standard evacuation platform without the need to transfer a casualty from one litter to another. The Talon litter is the most commonly used litter.

Figure 2. Talon Litter

Standard Army Litter (see figure 3) - the standard collapsible litter folds along the long axis.

Stokes Litter (see figure 4) - affords maximum security for the patient when the litter is tilted.

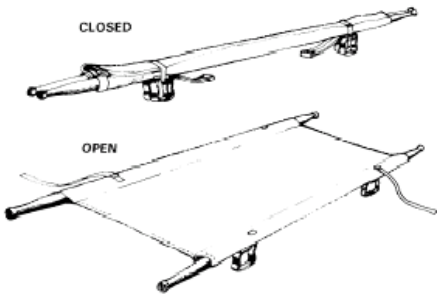


Figure 3. Standard Army Litter

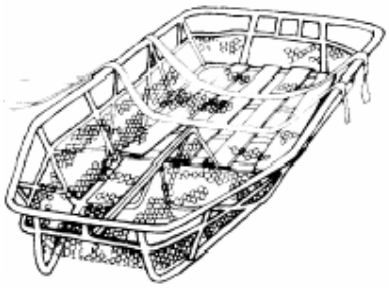
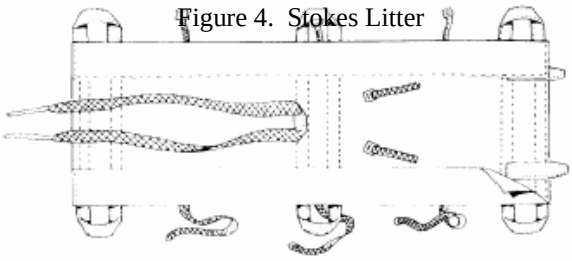


Figure 4. Stokes Litter

Pole-less Non-rigid Litter (see figure 5) - this litter can be folded and carried by



the Field Medical Service Technician. It has folds into which improvised poles can be inserted for evacuation over long distances.

Figure 5. Pole-less Non-rigid Litter

Miller (full body) Board (see figure 6) - the Miller Board is constructed of an outer plastic shell with an injected foam core. It is impervious to chemicals and the elements and can be used in virtually every confined-space rescue and vertical extrication. It fits in stokes stretcher and will float a 250-pound person.

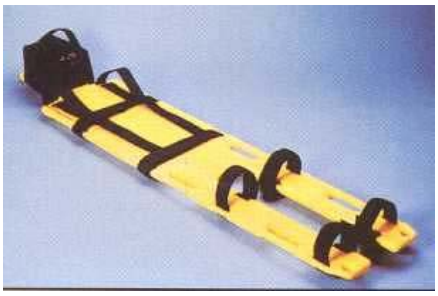
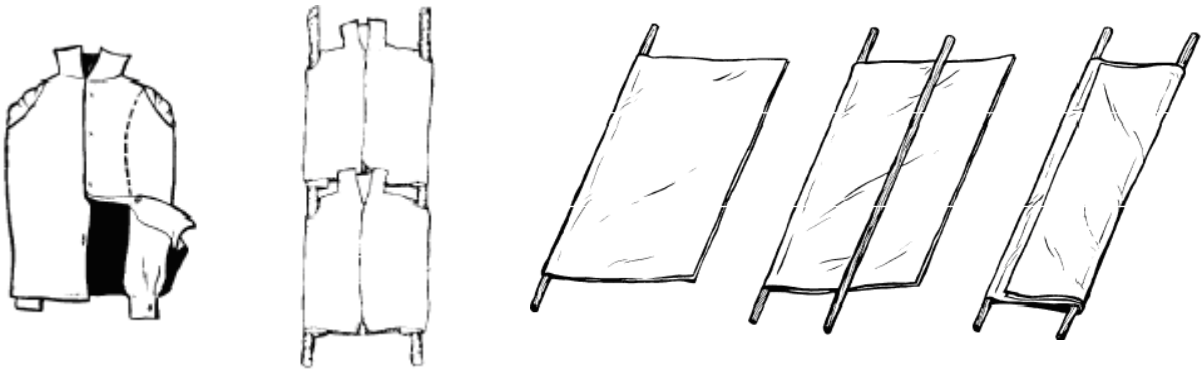


Figure 6. Miller (full body) Board

Improvised Litters (see figure 7) - used for moving a casualty when a standard litter is not available, the distance may be too great for manual carries, or the casualty may have an injury that would be aggravated by manual transportation. These litters are to be used in emergency situations only and must be replaced by standard litters at the first opportunity.



Blouse / Flak Jacket Litter

Rolled Blanket Litter

Figure 7. Improvised Litters

Procedures for Carrying Litters

1. When moving a patient, the litter bearers must make every movement deliberately and as gently as possible. The command “steady” should be used to prevent undue haste.
2. The rear bearers should watch the movements of the front bearers and time their movements accordingly to ensure a smooth and steady action.
3. The litter must be kept as level as possible at all times, particularly when crossing obstacles such as ditches.
4. Normally, the patient should be carried on the litter feet first, except when going uphill or up stairs

5. When the patient is loaded on a litter, his individual equipment is carried by two of the bearers or placed on the litter. When available, use Marines as your litter bearers.

3. **GROUND EVACUATION PLATFORMS**

M997 Ambulance - HMMWV frame with armor protection for crew and patients. It is capable of transporting up to 4 litter or 8 ambulatory patients. (See figure 8)

Figure 8. M997 Ambulance

M1035 Ambulance - HMMWV frame with removable soft-top. It is capable of transporting 2 litter and 3 ambulatory patients. (See figure 9)

Figure 9. M1035 Ambulance

MK 23 7 Ton - non-medical vehicle that may be utilized for casualty transportation when available. It is capable of transporting 10 litter or 20 ambulatory patients. (See figure 10)

Figure 10. MK 23 7 Ton Truck

4. **AIR EVACUATION PLATFORMS**

CH-46 Sea Knight

- Dual rotor medium lift helicopter used to transport personnel and cargo (being phased out by the MV-22 Osprey Tilt Rotor Aircraft).
- When configured for litter racks, able to carry 15 litters or 22 ambulatory patients.

Figure 11. CH-46 Sea Knight

<u>CH-53 Super Sea Stallion</u>

- Medium/Heavy lift helicopter used to transport personnel and cargo.
- When configured for litter racks, able to carry 24 litters or up to 37 ambulatory patients. When the centerline seating is added, up to 55 ambulatory patients can be carried.

Figure 12. CH-53 Super Sea Stallion

<u>UH-1 Huey</u>

- Light transport helicopter used to transport personnel and cargo.
- When configured for litter racks, able to carry 6 litters or up to 10 ambulatory patients.

Figure 13. UH-1 Huey

Figure 14. MV-22 Osprey

<u>MV-22 Osprey</u>

- Tilt-rotor aircraft that takes off and lands vertically but flies like a plane. This aircraft is designed to eventually replace the CH-46.
- When configured for litter racks, able to carry 12 litters or 24 ambulatory casualties.

<u>CH-47 Chinook</u>

- Dual rotor medium lift helicopter used to transport personnel and cargo for the US Army.
- When configured for litter racks can carry 24 litter patients or 31 ambulatory patients.

Figure 15. CH-47 Chinook

UH-60 Blackhawk
- Single rotor helicopter with multiple uses by not only the Army but the Navy as well.
- Can carry up to 6 litter patients if litter modification kit is installed.
- Can carry up to 7 ambulatory patients if litter modification kit is not installed.
- Patients can be loaded from either side.

Figure 16. UH-60 Blackhawk

wk

NOTE: The Marine Corps does not have dedicated CASEVAC aircraft. Any of its aircraft can be utilized as a "lift of opportunity" upon completion of its primary mission. The use of helicopter evacuation provides a major advantage because they greatly decrease the time between initial care and definitive treatment thereby increasing the casualty's chances of survival. Figure 17 below reflects USMC assets as well as those available through the Army and Air Force.

AIRCRAFT				
TYPE	**SERVICE**	**LITTER**	**AMBULATORY**	**ATTENDANTS**
UH-60 Blackhawk	USA	6	7	1 Medic
CH-47 Chinook	USA	24	31	2 Medics
UH-1 Huey	USMC	6	10	1 Corpsman

CH-46 Sea Knight	USMC	15	22	2 Corpsmen
CH-53 Super Sea Stallion	USMC	24	37	2 Corpsmen
MV-22 Osprey	USMC	12	24	2 Corpsmen
MEDICAL GROUND VEHICLES				
TYPE	**SERVICE**	**LITTER**	**AMBULATORY**	**ATTENDANTS**
M997 HMMWV	USA/ USMC/ USAF	4	8	1 Corpsman
M1035 HMMWV	USA/ USMC/ USAF	2	3	1 Corpsman
VEHICLES OF OPPORTUNITY (GROUND)				
TYPE	**SERVICE**	**LITTER**	**AMBULATORY**	**ATTENDANTS**
MK 23 (7-Ton Truck)	USMC	10	20	None

Figure 17. Ground/Air CASEVAC Platform Data Description

5. CASUALTY RECEIVING TREATMENT SHIPS

Specific ships within an Amphibious Task Force are designated as Casualty Receiving Treatment Ships (CRTS).

LHD/LHA - Amphibious Assault Ships with medical capabilities (see figure 18).

Mission

- Assault via helo, landing craft, and amphibious vehicle.
- Primary amphibious landing ships for MEF's, MEB's, and MEU's.
- Primary CRTS

Transport capabilities

- Flight deck with large internal hangar deck and well deck.
- May receive casualties via helicopter or waterborne craft.

Figure 18. LHA Tarawa Class

Medical Capabilities

Largest medical capability of amphibious ships. When fully staffed, capabilities include:

- 4 Operating Rooms
- 15 ICU Beds

- 45 Ward Beds

Hospital Ships (T-AH) - the COMFORT and the MERCY are operated by the Military Sealift Command and are designed to provide emergency, onsite care for US combatant forces deployed in war and other operations. The T-AHs provide a mobile, flexible, rapidly responsive afloat medical capability to acute medical and surgical care in support of ATF; Marine Corps, Army, and Air Force elements; forward-deployed Navy elements of the fleet; and fleet activities located in areas where hostilities may be imminent. The T-AHs also provide a full-service hospital asset for use by other government agencies involved in the support of disaster relief and humanitarian operations worldwide.

Transport Capabilities
- Flight deck capable of receiving rotary wing aircraft.

Medical Capabilities
- Operating Rooms (12)
- ICU Beds (100)
- Intermediate Care Beds (400)
- Ward Beds (500)
- Ancillary capabilities of lab, x-ray, pharmacy, computerized tomography scanner, and blood storage.

Figure 19. Hospital Ship

6. **CASEVAC CATEGORIES** (see figures 20-22)

Once a patient has been triaged and stabilized at the BAS, should that patient require further or additional medical treatment, he/she will be categorized for evacuation from the BAS to the next higher capability of care. While evacuating patients, ensure that they are kept warm to prevent hypothermia! The category levels are as follows:

Urgent Evacuation
- Evacuation to next higher capability of medical care is needed to save life or limb.
- Evacuation must occur within two hours.

Urgent Surgical Evacuation
- Same criteria as Urgent. The difference is that these patients need to be taken to a facility with surgical capabilities.

Priority Evacuation
- Evacuation to next higher capability of medical care is needed or the patient will deteriorate into the URGENT category.
- Evacuation must occur within four hours.

Routine Evacuation

- Evacuation to the next higher capability of medical care is needed to complete full treatment.
- Evacuation may occur within 24 hours.

Convenience

- Used for administrative patient movement.

URGENT/URGENT SURGICAL - 2 Hours or Less

Life threatening injuries such as temporarily corrected hemorrhage, temporarily controlled airway injuries, or temporarily controlled breathing issues.

Examples include (but not limited to) patients with:

Tourniquets	Needle Decompression
Cricothyroidotomy	Major Internal Bleeding

(Figure 20)

PRIORITY - 4 Hours or less

Potentially life threatening injuries such as compensated shock, fractures causing circulatory compromise, and uncomplicated but major burns.

Examples include (but not limited to) patients with:

Compensated Shock	Broken arm with loss of distal pulse

2nd degree burns to a large portion of the abdomen or extremities

(Figure 21)

ROUTINE - 24 Hours or less

Injuries so insignificant or extreme that chances of survival are not based on evacuation time.

Examples include (but not limited to) patients with:

Abrasions	Cardiac Arrest	Massive Head Trauma
Small Fractures	Frostbite	2nd /3rd degree burns >70% BSA

(Figure 22)

7. NINE LINE CASEVAC

A nine-line evacuation request is a standard format used by the Armed Forces for coordinating the evacuation of casualties. Evacuation request transmissions should be by the most direct communication means available to the medical unit controlling evacuation assets. The means and frequencies used will depend on the organization, availability, and location in the area of operations as well as the distance between units.

The information must be clear, concise, and easily transmitted. This is done by use of the authorized brevity code. The authorized brevity code is a series of phonetic letters, numbers, and basic descriptive terminology used to transmit casualty information. These codes indicate the standard information required for an evacuation commonly known as the “9 Line”. This message is verbally transmitted in numerical “line” sequence utilizing the following brevity codes:

Line 1 - Location - location of the Landing Zone (LZ) where the casualties are to be picked up. This information will be transmitted in the form of an eight digit grid coordinate.

Line 2 - Radio Frequency, Call Sign - radio frequency and call sign that will be used by the ground unit at the LZ. You should know this information before every operation.

Line 3 - Precedence (Urgent, Urgent Surgical, Priority, Routine) - number of casualties by precedence. Use the following codes:

Alpha - Urgent
Bravo - Urgent Surgical
Charlie - Priority
Delta - Routine
Echo - Convenience

Line 4 - Special Equipment - identifies any special equipment that will be needed, such as a hoist in the case where a helo cannot land. Use the following codes:

Alpha - none
Bravo - hoist
Charlie - extraction equipment
Delta - ventilator

Line 5 - Number of Patients by Type - number of patients who are ambulatory and the number of litter patients. This determines whether or not the helo should be configured to carry litters. Use the following codes:

Lima - litter patients
Alpha - ambulatory patients

Line 6 - Security of Pickup Site - whether or not the enemy is near the LZ. If all of your casualties are routine and the LZ is not secured, then you may not get your requested CASEVAC approved. Use the following codes:

November - no enemy troops in area
Papa - possible enemy troops (approach with caution)
Echo - enemy troops in area (approach with caution)
X-Ray - enemy troops in area (armed escort required)

Line 7 - Method of Marking Pickup Site - method that you will use to mark your LZ and then ask the pilot to identify. Use the following codes:

Alpha - panels
Bravo - pyrotechnic signal
Charlie - smoke signal
Delta - none
Echo - other

Line 8 - Patient's Nationality and Status - patients' nationality and status. Use the following codes:

Alpha - US military
Bravo - US civilian
Charlie - non US military
Delta - non US civilian

Echo - enemy prisoner of war

Line 9 - NBC Contamination - whether the LZ has been contaminated with NBC agents. Use the following codes:

November - nuclear
Bravo - biological
Charlie - chemical

Example: During a routine patrol your platoon takes two casualties. One receives a gunshot wound to his right arm. The other receives a gunshot wound to his abdomen and has signs and symptoms of shock associated with internal hemorrhage. While you perform initial treatment, members of your platoon determine that the closest potential landing zone for a helicopter is 300 feet to the West. Its grid location on the map is DH 1234 5678. Your call sign is Blue Thunder and your unit is operating on the frequency 99.65. Your unit commander informs you that the site is secure and will be marked with green smoke. The following would be your nine line radio CASEVAC Request transmission:

Line 1: DH 12345678

Line 2: 99.65 Blue Thunder

Line 3: 1 Bravo, 1 Charlie

Line 4: Alpha

Line 5: 1 Lima, 1 Alpha

Line 6: November

Line 7: Charlie

Line 8: 2 Alpha

Line 9: None

Figure 23. Nine-Line Tactical Evacuation Request Example

REFERENCES

Pre-hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 22
Medical Evacuation In A Theatre of Operations, FM 8-10-6, Chapters 5, 7-11
Health Service Support, JP 4-02, Chapter I

CASEVAC Review

1. Identify three different facilities that fall under the Forward Resuscitative Capability.

2. How many litter patients can be carried in an M-997 vehicle.

3. Describe the difference between the Urgent and Urgent Surgical categories.

4. In relation to the Nine Line evacuation request, what are “authorized brevity codes”?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1501

Perform Aid Station Procedures

TERMINAL LEARNING OBJECTIVES

1. Given a BAS environment and standard field medical equipment and supplies, **perform Battalion Aid Station (BAS) procedures,** to provide optimum Health Service Support per the references. (FMST-HSS-1501)
2. Given a mission in a field environment, T/E-designated tentage, and assistants, **employ T/E-designated tentage,** to provide shelter for Health Service Support operations per the references. (FMST-HSS-1502)
3. Given an aid station in a garrison setting and the standard medical equipment and supplies, **provide optimum Health Service Support**, per the references. (FMST-HSS-1503)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify the mission of the Battalion Aid Station**, per the student handout. (FMST-HSS-1501a)
2. Without the aid of references, given a description or title, **identify the areas of responsibility within the Battalion Aid Station**, per the student handout. (FMST-HSS-1501b)
3. Without the aid of references, given a description or list, **identify the medical support responsibilities of the Battalion Aid Station in a garrison environment**, per the student handout. (FMST-HSS-1501c)
4. Without the aid of references, given a description or list, **identify the medical support responsibilities of the Battalion Aid Station in a field environment**, per the student handout. (FMST-HSS-1501d)
5. Without the aid of references, given a description or list, **identify equipment used to establish a Battalion Aid Station**, per the student handout. (FMST-HSS-1501e)
6. Without the aid of references, given a tactical environment and the necessary Table of Equipment (T/E) and supplies, **employ tentage**, per the student handout. (FMST-HSS-1502a)
7. Without the aid of references, given a simulated combat environment, **utilize AMAL equipment**, per the student handout. (FMST-HSS-1502b)
8. Without the aid of references, given a description or list, **identify the mission of the Aid Station in garrison,** per the student handout. (FMST-HSS-1503a)
9. Without the aid of references, given a description or title, **identify the areas of responsibility within the Aid Station in garrison,** per the student handout. (FMST-HSS-1503b)
10. Without the aid of references, given a description or list, **identify the procedures for patient assessment during routine sick call**, per the student handout. (FMST-HSS-1503c)

OVERVIEW

Health Service Support (HSS) of today's Marine Corps Operational Forces emphasizes the provision of far-forward, mobile, medical support in the stabilization and evacuation of casualties. The Aid Station is the HSS unit that will deliver these services to our Marine Corps Forces (MARFOR) in sustaining the combat power of the force. Throughout this lesson, the term Battalion Aid Station (BAS) is used to describe various Aid Stations. A true BAS is a term used to describe an Infantry Battalion Aid Station. Know that there are many different Aid Stations, i.e. BAS, Group Aid Station (GAS), Regimental Aid Station (RAS), etc., each with different numbers of personnel assigned.

1. MISSION OF THE AID STATION

The Aid Station has a dual mission, one that will be fulfilled while in a field/combat environment, and the other fulfilled while in garrison. The mission of the aid station is to be the primary HSS source for a unit. While in a field/combat environment, the mission of the Aid Station is to minimize the effect wounds, injuries, and diseases have on a unit's effectiveness, readiness and morale. Treatments such as surgical airways, administration of IV fluids and antibiotics, as well as stabilization of wounds and fractures are common. The mission of the Aid Station while in garrison is to keep the Marines assigned ready for deployment. As such, responsibilities include conducting sick-call, providing medical support during training, and undergoing continued medical training.

2. ORGANIZATION

Aid stations throughout the Marine Corps are staffed based on the mission of the individual organization. Manpower requirements for each unit are listed on its Table of Organization (T/O). Large units, such as Infantry Battalions, may have up to two medical officers (MO) and 65 Corpsmen to support 1,000 Marines. Smaller units, such as Combat Engineer Battalion or a Tank Battalion may only have one or no MO and a few Corpsmen but receive additional support from a Headquarters Company. In the field, the BAS is co-located with the command post. Around-the-clock operating capability is required. The BAS is manned by Hospital Corpsmen of the battalion medical platoon under the direction of the battalion surgeon.

Aid Station Group (Infantry Battalion) - a section of H&S Company, the aid station group is headed by the Battalion Surgeon, and is capable of splitting into two sections to operate two separate aid stations when necessary; the Assistant Battalion Surgeon heads the second aid station.

Medical officer - there are two MOs within each medical battalion
- Battalion Surgeon
- Assistant Battalion Surgeon

Religious Ministry Team (RMT) - each BAS is assigned one RMT consisting of:
- Chaplain
- Religious Programs Specialist (RP)

Hospital Corpsmen - there are 21 corpsmen headed by a Leading Chief assigned to the Aid Station under the Assistant Battalion Surgeon

Line Company Corpsmen - there are 44 Corpsmen assigned to the line companies. They are divided into four groups of 11 Corpsmen.

3. **BAS RESPONSIBILITIES IN GARRISON (NOT IN THE FIELD)**

Maintain medical and dental readiness - One of the most important missions of the BAS while in garrison is to keep the unit medically and dentally prepared to deploy. Aid Stations use a web based data tracking system known as the Medical Readiness Reporting System (MRRS). Because it is web based, immunization information for Marines and Sailors can be transferred electronically when they check-in to a new unit. This system provides an overall readiness snapshot of the unit.

Conduct sick call - Aid stations act as the primary medical treatment facility for active duty Sailors and Marines for that particular unit. Sick call will normally be conducted under the direction of the MO or Independent Duty Corpsman (IDC). Responsibilities of the general duty Corpsman include identifying the chief complaint and performing a routine patient assessment to include vital signs. You may be expected to present the patient to the MO or IDC to complete the assessment and develop the treatment plan. It is also the responsibility of the sick call Corpsman to complete much of the official documentation.

Sick Call Procedures

Check in - Aid Stations generally have sick call hours each morning. Patients will sign in and receive their medical record from the records office. Vital signs are taken and documented on a Standard Form (SF) 600.

Patient encounter - is documented using the SOAP Note fashion (Subjective, Objective, Assessment and Plan). You may be expected to complete and document the first half of the note before presenting the patient to the IDC or MO at which time the assessment will be made and a treatment plan will be developed.

Discharge - basic treatments that can be performed at the BAS will be accomplished as required. Routine medications that are stocked in the BAS will be dispensed as needed. The patient is given instructions on the remainder of the plan of care and when they should report back for any follow up appointments.

Binnacle List - each morning a Binnacle List (Report of the Sick and Injured) is sent to the company office detailing individuals who had been seen that day. It also lists Marines who are Sick in Quarters or currently on Light Duty.

Disease Non Battle Injury - information from the Sick Call log is also transferred into a Disease Non Battle Injury (DNBI) Report. This report breaks down the categories of injuries and illness for the unit. It is forwarded up the chain and collected for the major unit. This information can be used to track the spread of disease or identify injury trends.

Administration - Aid Stations are the focal point of all medical administrative matters for the unit. These include everything from simple light duty chits to complicated Physical Exam Boards (Med Boards).

Supply - Aid Stations in garrison have limited amounts of consumable supplies. Unit funds are used to provide office supplies and medical supplies needed to provide basic care for unit personnel.

Provide medical coverage as needed for training - whenever Marines train, they will need Corpsmen. Examples of events requiring medical coverage include weapons ranges, obstacle courses, and physical fitness tests.

Provide training to non-medical personnel to enhance self/buddy aid and litter team responsibilities - training programs such as Combat Life Saver are taught while in garrison. A thorough training program for your Marines, to include sustainment training, will save lives on the battlefield.

4. BAS RESPONSIBILITIES IN THE FIELD/COMBAT ENVIRONMENT

While in the field or combat operations, some of the responsibilities the BAS performed while in garrison will continue. However, there are additional responsibilities the BAS and the corpsman assigned to the BAS will assume. For instance;

- Conduct sick call
- Conduct Triage
- Treat casualties to minimize mortality, prevent further injury, and stabilize for further evacuation.
- Record all casualties received and treated, and report them to the appropriate unit section for preparation of casualty reports.
- Provide temporary shelter in conjunction with emergency treatment.
- Return patients to duty when possible.
- Transfer evacuees from the BAS to ambulance, helicopter, or other evacuation transportation.
- Initiate treatment of combat stress casualties.
- Maintain deployment health records (DHR) of battalion personnel.
- Provide personnel replacement and medical re-supply for company level Hospital Corpsmen.

During combat operations, the BAS is structured to be able to split its personnel and supplies into two BAS's (Alpha and Bravo) and "leapfrog" ahead as the battlefield advances, (see figure 2). As Alpha BAS advances with the battalion, Bravo BAS will remain behind and continue to provide medical care/evacuations until all patients have been CASEVAC'ed, or until relieved by medical support elements such as Medical Battalion Shock Trauma Platoon (STP). This allows for continuity of care as the unit advances. Once the STP assumes all casualties, Bravo BAS, personnel and supplies will rejoin Alpha BAS to form the complete BAS (see figure 2).

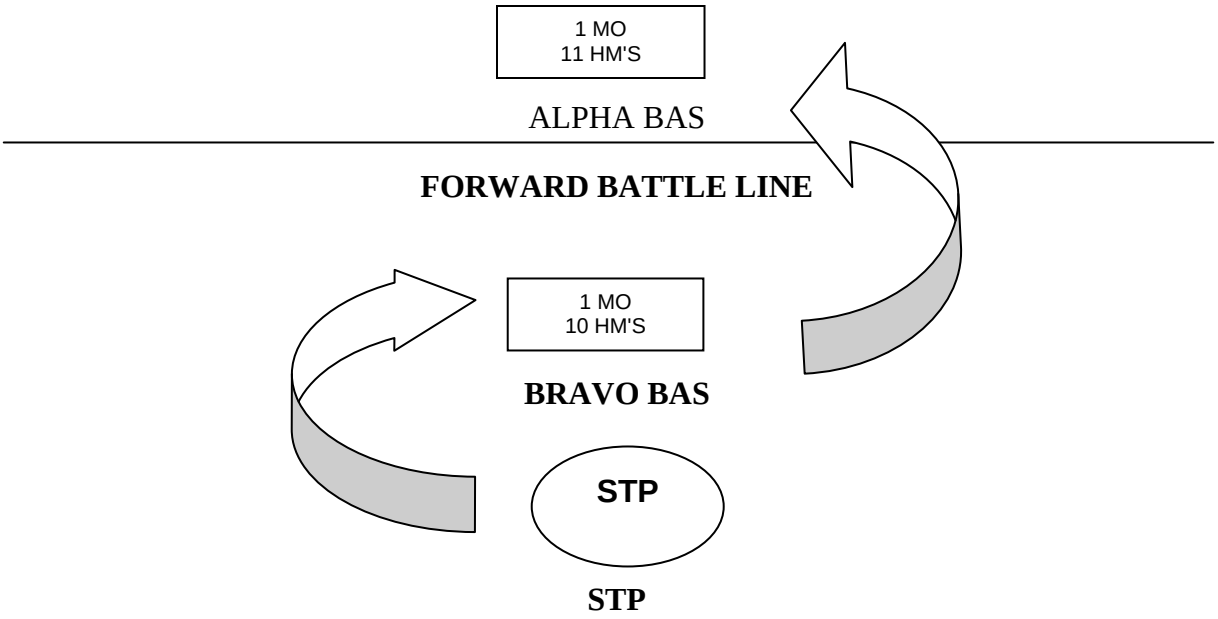


Figure 2. BAS Employment during combat operations

The BAS does not have a patient holding capability. It is similar to a crude emergency room. Depending on the tactical situation, the BAS can be assembled in a fully equipped General Purpose (GP) tent or employed in a mobile configuration from two M1035s and two 7-ton trucks. An individual's privacy is a main concern while they are being treated. Any and all practical measures necessary to provide patient privacy should be used. A Religious Ministry Team (RMT) may be assigned to the BAS. The RMT is made up of a Chaplain and a Religious Program Specialist (RP). Their job is to aid in the comfort of the sick and wounded and to perform religious rites, as needed. This team can provide emotional support for the wounded and can also assist the BAS personnel at the discretion of the Medical Officer.

Sections of the BAS - the BAS can be broken down into five internal sections, which operate as a whole in providing HSS to the Marine Infantry Battalion. (See figure 3)

Internal Security - provides perimeter security for the immediate BAS area, searches patients for weapons, munitions, and booby traps prior to being admitted to the triage area. **AT NO TIME will any weapon or ammunition be allowed into the medical treatment area.**

Triage - sorts and records all incoming patients prior to entry into treatment area. Limited emergency first aid and fluid replacement may be provided here while patients are waiting to enter treatment area. Initiate and/or continue patient documentation of treatment provided in this area. Also provides comfort/ease of pain to the dying.

Treatment Area - usually done in the GP tent, but could be any secure area assigned by the Battalion Surgeon to treat patients. It's where all the life saving treatment/procedures are performed as directed by the MO or Senior Medical Department Representative.

Evacuation Area - staging area for patients awaiting evacuation, those requiring continued monitoring or continued care. It is also the area where casualty reporting and CASEVAC requests are made.

Expectant Area - area used to hold personnel with very serious injuries who are not expected to survive. Supportive medical care is provided, i.e. pain medications, and ministry and sacrament for the dying are provided appropriate for the casualties' faith group.

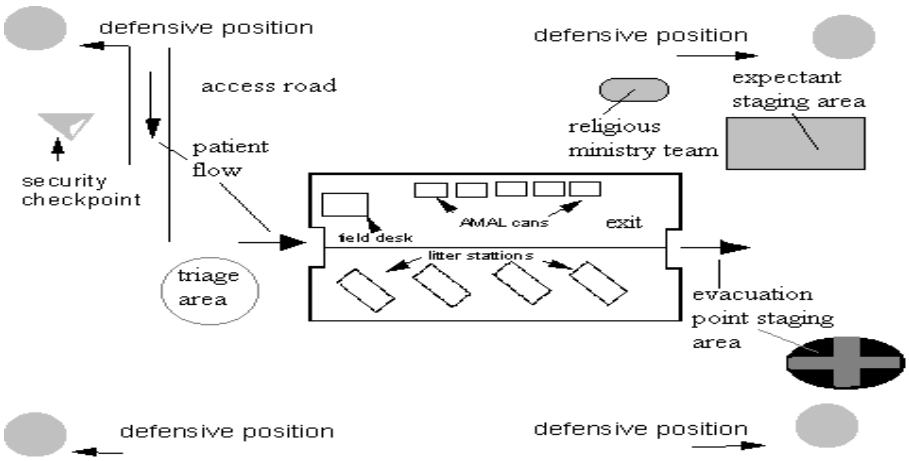


Figure 3. Typical Field BAS Setup

Responsibilities of Specific Personnel

Battalion Surgeon

One of the two medical officers in an infantry battalion is designated as the Battalion Surgeon. The Battalion Surgeon is a special staff officer who advises the battalion commander on matters pertaining to the health and medical care of battalion personnel. The duties of the Battalion Surgeon include:

- Supervising patient treatment, planning, and organization.
- Education of the battalion medical staff.
- Other duties as the battalion commander may direct.

Assistant Battalion Surgeon

The other medical officer in an infantry battalion is designated as the Assistant Battalion Surgeon. The primary job of the Assistant Battalion Surgeon is to:

- Direct, manage, and supervise the operation of the BAS.
- Perform such additional duties as may be assigned by the Battalion Surgeon.

Battalion Chief

Maintains the BAS to include:

- Administration, personnel, and logistical matters.
- Ensures that all battalion HSS commitments and operational requirements have the appropriate medical and logistical support.
- Advises the Battalion Surgeon on all matters relating to the BAS or battalion medical personnel.

Joint responsibilities of the Battalion Surgeon/Chief

- Organizing/Assignment of medical platoons personnel.
- Preparing HSS appendix to battalion's operational plan.
- Supervising and assisting in the collection, treatment, and evacuation of the sick and injured.

- Develop HSS Standing Operation Procedures (SOP) in accordance with guidance by higher authority.
- Conduct medical sanitation inspections.
- Maintaining and submitting appropriate records and reports.
- Train medical personnel in subjects relating to HSS.
- In the absence of a Preventive Medicine Technician, supervise instruction for non-medical personnel in personal hygiene, preventive medicine, and field sanitation.
- Ensuring medical supplies and equipment are properly managed, and that a responsive re-supply system is established to ensure adequate re-supply at garrison and combat levels.

5. **BAS LOGISTICS**

Logistics is the military specialty dealing with the procurement, storage, distribution, inventory, and maintenance of material. Supplies and equipment are divided into X classes for management purposes. Class VIII supplies are specifically medical related items. Careful consideration should be given to stock levels of Class VIII materials (consumable and equipment) so as not to overstock. The following information is crucial when medical planners develop HSS logistical support system:

- Concept of operation/scheme of maneuver
- Combat intensity
- Duration of the operation
- Casualty estimates

Supply Terminology

Table of Equipment (T/E) - a unit's T/E includes items necessary for basic support of the organization and include:

- Tentage
- Vehicles
- Tools
- Communication equipment
- Nuclear, biological and chemical (NBC) gear
- Office equipment and supplies

Authorized Medical Allowance List (AMAL) - a list of authorized allowances of equipment and consumable supplies required to perform operational HSS. There are many types of AMALs that can be requested based on the nature of the operation. Each AMAL is composed of equipment and consumable supplies. The T/E assigned AMALs for the BAS are designed to support one Infantry Battalion.

AMAL 635 (Equipment) - Aid Station equipment and reusable material supporting HSS of the BAS. Examples include:

- Litters
- Litter stands
- Blankets

AMAL 636 (Consumable Items) - Consumable supplies required to provide HSS to the BAS, to include, initial resuscitation, and stabilization of 50 casualties with major wounds prior to evacuation, and re-supplying to the company line Corpsmen. Examples include:

- Intravenous solutions
- Bandages
- Medications

Authorized Dental Allowance List (ADAL) - a list of authorized allowances of equipment and consumable supplies required to perform a dental function. As with the AMAL, there are various types of ADALs and they are also composed of equipment and supplies.

ADAL 662 Field Dental Items - equipment and reusable material required establishing a dental clinic in the field. Consumable supplies required providing emergency, diagnostic, and preventive maintenance of dental care for 400 patients.

DD-1348 (see figure 4) - form used to requisition materials. It is used primarily by the battalion corpsman in ordering supplies by line item only, e.g., IV fluids, bandages, splints, etc., to re-stock the equipment and consumable AMAL/ADAL.

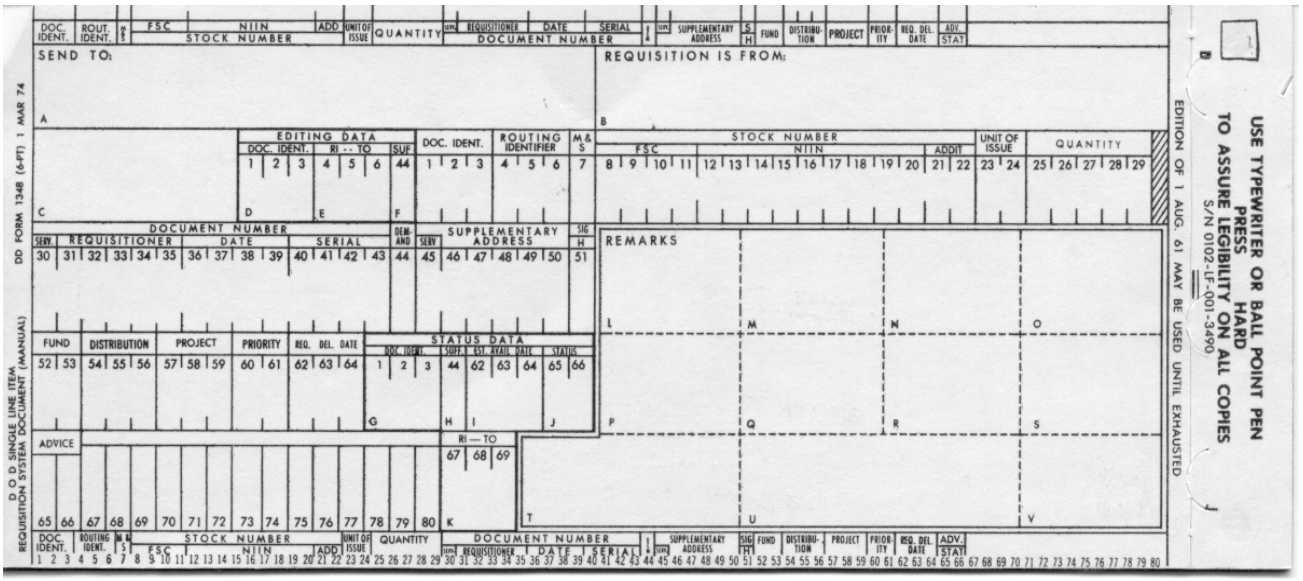


Figure 4. DD FORM 1348

Line items - an item having a National Stock Number (NSN)

Medical Logistics Company (MEDLOG), Supply BN - the only permanent medical/dental supply source in a Marine Expeditionary Force (MEF). It supports both the ground and air elements of a MEF. MEDLOG maintains all AMALs/ADALs while in garrison. They are also responsible for preventive maintenance, repair, and replacement of all medical equipment and replacement of supply items.

Naval Medical and Dental Material Bulletin (NMDMB) - monthly publication which provides information on medications, supplies, equipment and authorizes additions or deletions to the AMALs and ADALs. It also provides information on expiration dates, defective materials, and disposition instructions.

Medical Supply and Replenishment

Chain of re-supply under combat situations:

Unit Corpsman
BAS
Logistics Command Element
MEDLOG, Supply Battalion, MLG

REFERENCES

Marine Corps Warfighting Publication (MCWP), 4-22 MED 021-6
Combat Health Support in Specific Environments, FM 8-10-1
Class VIII Supplies, MCO 6700.2
Health Service Support Operations, MCWP 4-22
Hospital Corpsman, NAVEDTRA 14295
Emergency War Surgery Handbook NATO, 2004
Medical Evacuation in a Theater of Operations, FM 8-10-6

Aid Station Review

1. Describe the Disease Non Battle Injury Report (DNBI).

2. List five requirements of the BAS in combat.

3. What types of things are found on a Table of Equipment (T/E)?

4. Which AMAL contains consumable supplies? List three.

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1303

Medical Support for Military Operations in Urban Terrain (MOUT)

TERMINAL LEARNING OBJECTIVES

1. Given an urban combat environment, individual combat equipment, and standard field medical equipment and supplies, **provide medical support for Military Operations in Urban Terrain (MOUT)**, to meet mission requirements. (FMST-HSS-1303)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, **identify the definition of urban warfare**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 26. (FMST-HSS-1303a)
2. Without the aid of references, given a list, **identify the potential health threats of MOUT**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 26. (FMST-HSS-1303b)
3. Without the aid of references, given a list, **identify the special requirements of casualty evacuation (CASEVAC) in MOUT**, within 80% accuracy, per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 26. (FMST-HSS-1303c)
4. Without the aid of references, given the requirement in a simulated combat scenario, **operate in a MOUT environment**, to meet mission requirements per Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 26. (FMST-HSS-1303d)

1. **URBAN WARFARE**

Background - throughout history, battles have been fought on urbanized terrain. Recent examples are Beirut, Panama City, Mogadishu, and Iraq. It is impossible to develop one set of tactics, techniques and procedures that can be applied to every scenario. Combatants and medical providers are required to quickly adapt to each mission, terrain, and situation.

Definition - urban warfare, or Military Operations in Urban Terrain (MOUT), is best defined as those military actions planned and conducted on a terrain where man-made structures impact the tactical options available to the commander. This terrain is characterized as a four-dimensional (air, buildings, streets, and subways) battlefield with the following features:

- Considerable rubble.
- Ready-made fortified fighting positions.
- An isolating effect on all combatants.

2. **CONSIDERATIONS OF MOUT**

The military commander must take many factors into consideration when planning MOUT operations. Two of which, terrain and rules of engagement, are discussed here:

Terrain - four-dimensional battlefield.

- Enemy observation positions are likely in high, isolated structures such as steeples or lone high-rise buildings.
- Assaulting forces can become quickly isolated, confused and cut-off by a tangle of unfamiliar structures.
- Small assaulting units are at a great disadvantage due to multiple floors, rooms, stairways, and doors. The enemy may make great use of these obstacles to inflict serious losses.

FALLUJAH, Iraq - A vehicle gunner with 1st Battalion, 6th Marine Regiment, looks out on the city as his unit patrols the back alleyways of Fallujah. The unit typically patrols the city streets several times a day, maintaining a strong military presence and searching for insurgents and illegal arms.

Rules of Engagement (ROE) - "US Forces and allies operate with restrictive ROE, reflecting the morals and values considered proper for a civilized society. Unfortunately, the tactical advantage will often go to the belligerent, who disregards or actively endangers the safety of civilians" (PHTLS 6th ed. P 586). Therefore, it is important to remember that every action has consequences. ROE may change from day to day, or from situation to situation. ROE are designed to:

- Avoid alienation of the local population.
- Reduce the risk of adverse world opinion.
- Preserve structures and facilities for future use.
- Preserve vital cultural facilities and grounds.

3. **MEDICAL CONSIDERATIONS OF MOUT**

Casualty rates are generally higher than conventional battles. Explosions are the most frequent cause of injury in an urban setting. These explosions may be generated from tanks, mortars, or improvised explosive devices (IED). These explosions are likely to produce blast related injuries which are covered in a separate lesson. Small units may be spread out across a large area. Unit training in the practice of "self-aid" and "buddy-aid" is essential. Each combatant should be able to quickly and effectively apply a tourniquet, field dressing, and hemostatic agent.

Potential Health Threats of MOUT include:

Psychological Casualties
In addition to blast injuries, units are likely to experience an increase in psychological injuries. This is due to lengthy exposure to factors resulting from a constant threat of a hidden enemy. Prolonged fear of sniper fire and hidden IEDs along with the repeated sight of the dead and dying are predominant factors leading to combat stress casualties. Medical units should be prepared to treat these individuals.

AL TAQADDUM, Iraq– Servicemembers help triage injured Iraqi civilians outside of Taqaddum's medical facility after a suicide truck bomb exploded in northern Habbiniyah.

Civilian Casualties
Medical units must be prepared for the influx of large numbers of civilian casualties. Units should prepare for the possibility of geriatric and pediatric patients. Large numbers of civilians could overwhelm the capabilities of military medical units. Units should, therefore, establish a plan for this possibility prior to engaging.

Infectious Disease
Areas experiencing urban combat are likely to have many infectious diseases in the area. The problem will be worse due to poor general sanitation measures and limited amount of public health services.

Animals: Diseases can also be carried by the many animals in the area (rats, mice, dogs, etc.).

People: Interacting with the civilian populace or enemy prisoners of war can expose you or your Marines to such diseases as malaria, tuberculosis or leishmaniasis. Sexually transmitted diseases such as gonorrhea, syphilis, hepatitis, and HIV may also be prevalent.

Water: Potable water will be limited. Troops in urban conflict can consume up to 5 quarts per day on a normal occasion and 12 quarts of water per day in extreme

heat environments. If the demand for water is greater than the ability to re-supply, they may be tempted to drink water from local sources. This exposes them to hepatitis, intestinal parasites, and industrial toxins.

4. **CASUALTY EVACUATION**

Moving casualties in an urban environment can be difficult and time consuming. Moving a litter patient only a few hundred yards could take an hour or more. Ground evacuation vehicles will require heavy armor that can withstand small arms fire as well as rocket propelled grenades (RPG) and IEDs. Helicopter evacuation is difficult due to the tight operating environment. They too are susceptible to small arms fire and RPG's.

Special equipment requirements of CASEVAC
Simply finding casualties in an urban environment can be difficult. Explosions can cause buildings to crumble trapping patients inside. Vehicles can crash due to explosions, hostile fire or operator error. Events such as these may lead to complicated rescue efforts that require special equipment such as: axes, crowbars, jacks, ropes, collapsible litters and cutting tools.

Twentynine Palms, CA- Marines from 3rd Battalion, 5th Marine Regiment, carry a 'casualty' to safety in the urban assault lane of the training at Range 215. The MOUT facilities were built to replicate the actual environment that Marines will face when deployed.

REFERENCE

Pre-Hospital Trauma Life Support, Military Edition, 6th Edition, Chapter 26

MOUT Review

1. Describe the characteristics of the terrain associated with MOUT.

2. Identify the predominant factors that lead to combat stress casualties in a MOUT environment.

3. List three sources of infectious disease that are found in a MOUT environment.

4. Identify some events that may lead to complicated CASEVAC efforts in a MOUT environment.

UNITED STATES MARINE CORPS
Field Medical Training Battalion – West
Camp Pendleton

FMST 1602

Perform Water Purification for Individual Use

TERMINAL LEARNING OBJECTIVES

1. Given a source of water in a combat environment, and necessary field equipment, **perform water purification for individual use**, to provide potable water. (FMST-FP-1602)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify sources of water in a field environment**, per the student handout. (FMST-FP-1602a)
2. Without the aid of references, given a description or list, **identify factors affecting sources of water**, per the student handout. (FMST-FP-1602b)
3. Without the aid of references, given a description or title, **identify the preferred methods of water purification for individual use**, per the student handout. (FMST-FP-1602c)
4. Without the aid of references, given a list, **sequence the steps to disinfect a canteen of water**, per the student handout. (FMST-FP-1602d)

OVERVIEW

Safe water, in sufficient quantities, is essential to every living organism. Insufficient quantity or quality of water is not only debilitating to the individual but will have a significant impact on unit operational readiness. Water which is not properly treated and disinfected can spread bacterial diseases such as cholera, shigellosis, typhoid, and paratyphoid fever. Untreated water can also transmit viral hepatitis, gastroenteritis and parasitic diseases such as amoebic dysentery, giardiasis and schistosomiasis.

1. WATER SOURCES AND CHARACTERISTICS

Water may be obtained from various sources in the field including the following, in order of choice:

Salt Water is considered the best source of water, if accessible, due to the fact that it is generally less contaminated than other sources and there is an unlimited supply. When considering salt water, however, the water must be desalinated and disinfected before it is used. This requires the use of a reverse osmosis water purification unit (ROWPU). **Salt water cannot be purified for individual use.**

Ground Water is water procured from wells and springs. Ground water is generally less susceptible to chemical and biological pollution than other sources and is considered the best source of water during an NBC attack. The quantity and quality may be hard to determine without proper equipment. Adequate disinfectant is required. Ground water may or may not be used for individual use, depending on its accessibility.

Surface Water is water procured from lakes, rivers, streams, and ponds. Moving or large bodies of water are generally considered less contaminated due to the aeration which significantly decreases growth of bacteria, algae, and fungus. **Of the sources of water, surface water is the easiest to procure for individual use due to it being readily accessible.** Adequate disinfectant is required.

Rain Water is water procured from rain, snow, or ice. This source should only be used when other sources of water are not available. It is not considered a reliable source due to the fluctuation in annual rainfall which results in inadequate quantities. Adequate disinfectant is required.

2. FACTORS AFFECTING SOURCES OF WATER

Water Quantity - the source should provide an adequate supply of potable water for all personnel for the expected length of stay.

Water Quality - water source should be free of significant contamination such as sewage, naturally occurring toxic elements, and any NBC warfare agents. The water should not be objectionable due to turbidity, color, odor, or taste. Ensure source is protected from possible organic contamination by sewage fallout or runoff from latrines, showers, motor pools, etc.

FYI!! Dr. Mark Drapeau, an Army Doctor stationed in Kirkuk, Iraq, treated 2500 confirmed cases of Cholera. Cholera broke out in Kirkuk spread to over half of Iraq's 18 provinces. The use of chlorine trucks in VBIED attacks resulted in restrictions on the availability of chlorine which impacted water chlorination programs and increased the bacteria in water responsible for cholera. Increased emphasis on clean water programs and better waste management programs are the key to controlling the outbreak.

Accessibility - the water source should be accessible and able to be treated with available resources.

3. WATER DISINFECTION METHODS

Boiling - this method should only be used in **emergency** situations and only with small quantities of water, i.e. canteen cup. Bringing the water to a vigorous boil for two minutes will kill pathogens such as Giardia and E. coli. This method does not provide for residual disinfectant capabilities and should not be used to store large quantities of water.

Chemical disinfection - the three compounds used to chemically disinfect water are Iodine purification tablets for small amounts (individual), calcium hypochlorite 65-75% for large amount (unit level), and sodium hypochlorite, or regular household bleach in liquid form, can be used to disinfect large and small amounts.

4. PROCEDURES FOR WATER DISINFECTION IN CANTEENS

Iodine tablets

- Inspect tablets for signs of deterioration. Tablets which are completely yellow or brown, stick together, or crumble easily are no longer effective. Tablets should be steel-gray in appearance.
- Add two Iodine tablets per canteen of water regardless of water color.
- Replace cap loosely and wait 5 minutes for the tablets to dissolve.
- Shake well, allowing leakage around the threads of the cap of the canteen to disinfect the threads.
- Tighten cap and wait an additional 30 minutes before consuming (total of 35 minutes).
- Water will be golden brown in color.

Tincture of Iodine 2%

- Add 5 drops to a 1-quart canteen, or 10 drops if the water is cold or cloudy.
- Replace cap loosely and wait 5 minutes for the Iodine to dissolve.
- Shake well, allowing leakage around the threads of the cap of the canteen to disinfect the threads.
- Tighten cap and wait an additional 30 minutes before consuming (total of 35 minutes).

Household/common bleach 4-6%

- Add 2 drops to a 1-quart canteen, or 4 drops if the water is cold or cloudy.
- Replace cap loosely and wait 5 minutes for the bleach to dissolve.
- Shake well, allowing leakage around the threads of the cap of the canteen to disinfect the threads.
- Tighten cap and wait an additional 30 minutes before consuming (total of 35 minutes).

Sodium Chlorite

- Add 1 tablet to a 1-quart canteen.
- Shake well.
- Wait 30 minutes before consuming for clear water; 4 hours for cold or cloudy water.

5. TYPES OF WATER CONTAINERS

Canteen

- 1 or 2 quarts
- Individual use

Jerry Can
- 5 gallon
- Must be labeled “Potable Water Only” because some are used for gasoline

Lyster Bag
- 36 gallon
- Used for hand washing only

Water Bull
- 400 gallon
- Provides easily accessible water to troops

6. **WATER TESTING**

Frequency
- All bulk water supplied to personnel for drinking must be tested daily for FAC.
- Perform weekly bacteriological testing.

Procedure for daily testing
- Add 1 DPD #1 (Diethylphenyline Diamine) tablet to water sample.
- Shake gently until tablet is dissolved.
- Use color comparator to determine the FAC.

Range
- 2.0 -5.0 FAC

REFERENCES

Manual of Naval Preventive Medicine, NAVMED P-5010, Pgs 9-4 through 9-10

Water Purification Review

1. List the three factors associated with selecting a water source.

2. Of the four sources of water, which is best suited for individual use?

3. What are the drawbacks to using boiling as a method of decontamination?

4. What is the total time needed to disinfect one standard canteen of water using iodine tablets?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1603

Supervise Field Waste Disposal

TERMINAL LEARNING OBJECTIVES

1. Given the requirement in a tactical environment, necessary equipment and supplies, and the references, **supervise field waste disposal**, to reduce the incidence of disease per the reference. (FMST-FP-1603)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or title, **identify the types of field waste**, per the student handout. (FMST-FP-1603a)

2. Without the aid of references, given a description or list, **identify the guidelines for latrine placement**, per the student handout. (FMST-FP-1603b)

3. Without the aid of references, given a list, **identify the types of field sanitation devices used for human waste disposal**, per the student handout. (FMST-FP-1603c)

4. Without the aid of references, given a list, **identify the types of field sanitation devices used for liquid waste disposal**, per the student handout. (FMST-FP-1603d)

5. Without the aid of references, given a list, **identify the types of field sanitation devices used for garbage and rubbish disposal**, per the student handout. (FMST-FP-1603e)

6. Without the aid of references, given a list, **identify the guidelines for garbage pit disposal placement**, per the student handout. (FMST-FP-1603f)

OVERVIEW

Historically, in every conflict the US has been involved in, only 20% of all hospital admissions have been from combat injuries. The other 80% have been from diseases not related to battle, commonly referred to as Disease Non Battle Injury (DNBI). Excluded from these figures are vast numbers of service members with decreased combat effectiveness due to DNBI not serious enough for hospital admission. Preventive medicine measures are simple, common sense actions that any service member can perform and every leader must know. The application of preventive medicine measures can significantly reduce time lost due to DNBI. The intent of this lesson is not to make you preventive medicine experts. You will have access to them through the Environmental Preventive Medicine Units (EPMU) that deploy in times of war or conflict. This course is to give you knowledge of the basic skills necessary to employ safe preventive medicine practices for your Marines.

1. **WASTE**

Definition - all types of liquid and solid material excreted from the body as useless or unnecessary as a result of living activities of humans or animals.

Types of Waste

Human waste (black water): Liquid waste containing human urine and fecal matter.
Liquid Waste (Gray Water): Liquid waste containing water used for bathing or liquid waste from kitchen operation.
Garbage: Any kind of non-liquid organic materials resulting from food service operations.
Rubbish: Waste consisting of non-organic materials such as boxes, cans, paper, or plastics.

2. **GUIDELINES FOR LATRINE PLACEMENT**

When determining the location for latrines, give consideration to protecting food and water supplies from contamination as well as providing convenient accessibility. Place as far from food operations as possible (300 feet or more). Other considerations include:

- Downwind and down slope, if possible.
- Down slope from wells, springs, streams, and other water sources (100 feet or more).
- At least 50 feet from berthing areas.

3. **FIELD SANITATION DEVICES USED FOR HUMAN WASTE DISPOSAL**

The type of improvised waste disposal used will depend on the mission, length of stay in the area, terrain, and weather conditions. The primary means of human waste disposal in a bivouac area is a chemical toilet (see figure 1). When chemical toilets are not available, the burn-out latrine is the preferred improvised waste disposal device.

Chemical Toilets

- Latrines maintained by contracted services.
- One toilet can service up to 15 personnel.

Figure 1. Chemical Toilet

Burn Barrel Latrine (see figure 2) - the burn-barrel is a commonly used device for human waste disposal in the field. Best employed in areas where the water table is high or the ground does not permit digging. Personnel utilizing the Burn Barrel Latrine are encouraged to use urinals for urination instead of the Burn Barrel Latrine since additional fuel is needed to burn urine and feces.

Figure 2 Burn Barrel Latrine

Cat Hole - used for the disposal of individual human excrement in situations where other latrines are not available such as when on the march and at short halts.

- One ft wide by one ft deep
- Covered immediately after use to prevent flies from spreading germs from waste to your food.

Straddle Trench (see figure 3) – used in temporary bivouac sites for one to three days. Four trenches required for 100 people.

- 1ft wide x 2 ½ ft deep x 4ft long
- 2 ft apart
- Wooden planks on sides for traction

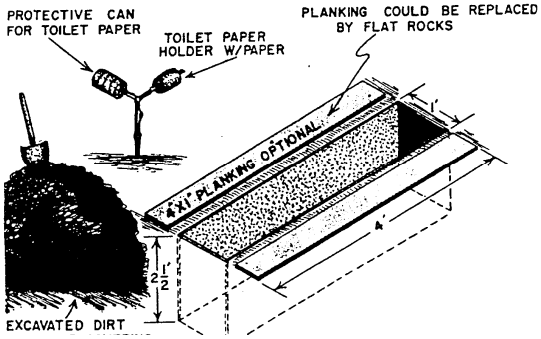


Figure 3 Straddle Trench

Urine Tubes (see fig 4)

- One pipe can accommodate 20 men
- Dig 4 ft x 4ft x 4ft pit filled with rocks and rubble
- Insert 6 pipes of one inch diameter at an angle
- Cover ends of each tube with mesh material

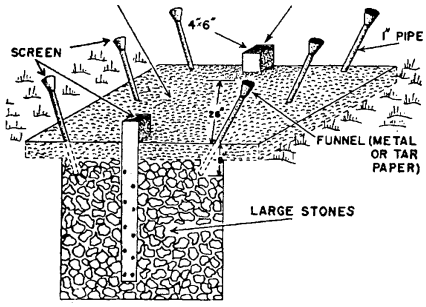


Figure 4 Urine Tubes

4. **FIELD SANITATION DEVICES USED FOR LIQUID WASTE DISPOSAL**

Liquid waste disposal methods are primarily designed to maximize the evaporation of the waste. Using items such as rocks increases the surface area and allows the waste to dissipate quickly. Liquid kitchen or bathing waste disposal methods include:

- Soakage pits.
- Evaporation beds.

5. **FIELD SANITATION DEVICES FOR GARBAGE AND RUBBISH DISPOSAL**

Every individual generates some type of garbage. The bigger the unit, the bigger the problem! It is important that you are able to make appropriate recommendations to the unit

commander regarding the disposal of solid waste. The preferred method of garbage disposal for short overnight stops is the garbage pit. A standard four feet by four feet pit will service 100 people per day. For longer stays, a garbage trench is used. The trench measures two feet wide by four feet deep and is extended as needed.

6. GUIDELINES FOR GARBAGE PIT DISPOSAL DEVICE PLACEMENT

- Recommend at least **100 feet** from mess area
- Recommend at least **100 feet** from water source
- Incinerators must also be at least **150 feet** downwind from camp

REFERENCES

Naval Preventive Medicine Manual, NAVMED P-5010, Pgs 9-17 through 9-30
Field Hygiene and Sanitation, FM 21-10, June 2000

Field Waste Review

1. Describe garbage.

2. What is the preferred method of fecal disposal when chemical toilets are not available?

3. Describe a “cat hole”

4. What is the preferred method of garbage disposal for a unit making an overnight halt?

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Pendleton, CA

FMST 1405

Manage Envenomation Injuries

TERMINAL LEARNING OBJECTIVES

1. Given an envenomation casualty in a combat environment, and standard field medical equipment and supplies, **manage envenomation injuries**, to prevent further injury or death. (FMST-HSS-1405)

ENABLING LEARNING OBJECTIVES

1. Without the aid of references, given a description or list, **identify envenomation terminology**, per the student handout. (FMST-HSS-1405a)
2. Without the aid of references, given a description or list, **identify the toxins found in snake venom**, per the student handout. (FMST-HSS-1405b)
3. Without the aid of references, given a description or list, **identify the types of venemous snakes**, per the student handout. (FMST-HSS-1405c)
4. Without the aid of references, given a description or list, **identify the proper treatement of a snake bite**, per the student handout. (FMST-HSS-1405d)
5. Without the aid of references, given a description or list, **identify the types of arhtropods**, per the student handout. (FMST-HSS-1405e)
6. Without the aid of references, given a description or list, **identify anaphylactic shock**, per the student handout. (FMST-HSS-1405f)

1. TERMINOLOGY

Envenomation - an injury or illness caused by the poisonous secretion of an animal, such as a snake, spider or scorpion, usually transmitted by a bite or sting.

Mortality rates - of all the deaths that occur annually due to envenomation injuries, the majority are caused by insects, followed by snakes, then spiders.

2. ACTIONS OF SNAKE VENOM

Snake venoms are complex chemical mixtures of proteins, which have mostly enzymatic properties. The quantity, lethality and composition vary with the species and the age of the snake, the geographic location and the time of the year. Venom is highly stable and is resistant to temperature changes, drying, and drugs.

Hemotoxins - toxins that destroy red blood cells, disrupt blood clotting and/or cause organ degeneration and generalized tissue damage. An injury due to a hemotoxic agent is often very painful and permanent damage, such as loss of an affected limb, is possible even with prompt treatment.

Neurotoxin - toxin that acts specifically on nerve cells, or neurons, usually by interacting with membrane proteins such as ion channels. The effect of these neurotoxins is a paralysis in the affected area.

Some snake venom may include elements that produce both of these effects.

3. CLASSIFICATIONS OF VENEMOUS SNAKES

Crotalidae Family (Pit Vipers)

These snakes take their name from the deep pit located between their eye and the nostril (see figure 1). The pit is a highly sensitive organ capable of picking up the slightest temperature variance. The Crotalids, or pit vipers, are usually much wider than their necks. Most pit vipers are nocturnal.

Examples of Pit Vipers

Rattlesnakes - found from the U.S. through Central and South America
Saw-Scaled Viper - found from Pakistan, throughout the Middle East to Africa
Cottonmouth (Water Moccasin, Pilot Snake) - Found throughout the southern and eastern US (see figure 2)
Copperhead (Upland Moccasin) - found in the eastern U. S.
Habu - found throughout Southeast Asia, including Okinawa

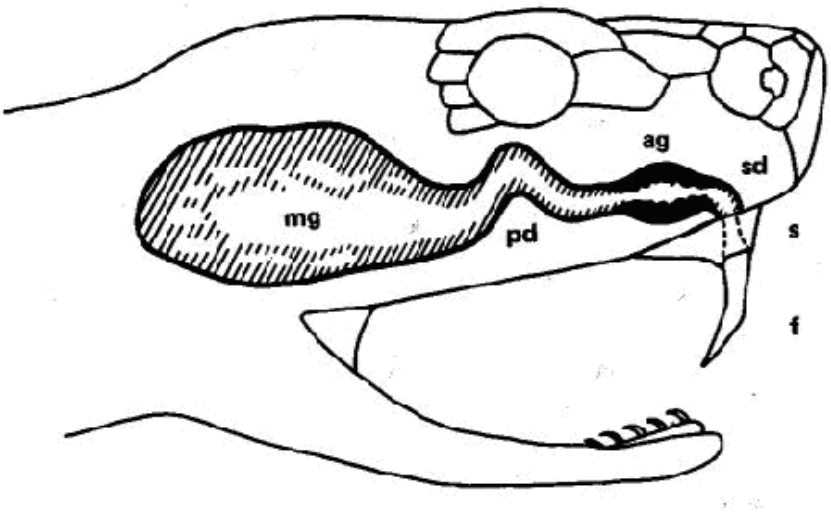


Figure 1. Schematic drawing of the venom apparatus of Crotalidae. Venom is synthesized and stored in the main venom gland (mg) and transported by the primary duct (pd) through the accessory gland (ag) and secondary duct (sd) which exits into the fang sheath pocket (s), diverting the venom into and through the fang (f).

Figure 2. Juvenile Cottonmouth

Venom - hemotoxic

Characteristics
- Retractable fangs
- Heat sensing pit located below the nostril
- Large triangular shaped head (in relation to their body)

Signs and Symptoms of Crotalidae Bite
- Symptoms vary depending on the type of snake and the amount of venom deposited, i.e., younger
  rattlesnakes tend to dispense all of their venom, as opposed to a larger, older rattlesnake dispensing either none or a small amount. Death may occur within 24-48 hours if left untreated. Even with treatment, there is the possibility of loss of affected extremity or a portion of it.
- Excruciating pain at the site of the bite
- Presence of fang marks
- Tissue swelling at the site of the bite. Swelling begins within 3 minutes and may continue for up to an hour with enough severity to break the skin
- Severe headache and thirst
- Bleeding from major organs that may appear as hematuria
- Destruction of blood cells and other tissue cells. Discoloration of surrounding tissue.
- Tingling or numbness of face and scalp
- Muscle twitching (fasciculation)

Colubridae

The largest group of snakes worldwide. Although there are many types of Colubridae, most are completely harmless to man. Their venom is effective on cold-blooded animals (such as frogs and lizards) but not considered a threat to human life. The Boomslang is the only one that has caused human deaths.

Examples of venomous Colubridae

Boomslang - found throughout the African Savannah (see figure 3)

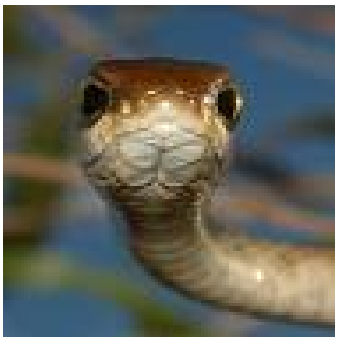


Figure 3. Boomslang Snake

Venom - hemotoxic

Characteristics
- Fixed fangs in rear of mouth
- Large eyes and small pointed head

Signs and Symptoms of Colubridae Bite
Since both Crotalidae and Colubridae secrete hemotoxins, their signs and symptoms are the same although the bite of the Colubridae is not as painful as that of the Crotalidae.

Elapidae Family

A group of highly dangerous snakes with powerful neurotoxic venom that affects the nervous system, causing respiratory paralysis.

Examples
- Coral Snakes - found in the southern US, through South America, and in parts of Asia (see figure 4)
- Cobra - found from South Asia through Middle East and North Africa (see figure 5)
- Krait - found throughout South Asia, including Pakistan (see figure 6)

Venom - neurotoxic

Characteristics
- Fixed fangs
- Round pupils
- Head width is proportionate to body size

Signs and Symptoms of Elapidae Bite
- Stiffness, muscle aches, and spasms
- Severe headache, blurred vision, and drowsiness
- Moderate to severe pain to the affected limb
- Nausea, vomiting, and diarrhea
- Chills with rapid onset of fever
- Respiratory paralysis and death

Figure 4. Coral Snake

Figure 5. Cobra Snake

Figure 6. Krait Snake

Hydrophidae (Sea Snakes) (see figure 7)

For medical purposes, size, location and species are irrelevant. Determination of species is too difficult and dangerous to matter. Sea snakes are found in all oceans except the Atlantic Ocean.

Figure 7. Hydrophidae Snake

Venom - neurotoxic

Characteristics
- Fixed fangs
- Flat tail (for swimming)
- Most are brightly colored (except the Olive Sea Snake)

Signs and Symptoms of Hydrophidae Bite
- Since both Elapidae and Hydrophidae secrete neurotoxins, their signs and symptoms are the same.
- Persistent myths about sea snakes include the mistaken idea that they cannot bite effectively. The truth is that although their teeth are small, about 1 inch, they are adequate to penetrate skin and they can open their mouths wide enough to bite a person's thigh. Envenomation from sea snakes is rare, due in most part to their temperament, but it does occur. Without treatment, death from sea snake envenomation can occur within 12-24 hours.

Diagnosing a Snake Bite

Fang Marks - fang marks may be present as one or more well defined punctures, or as a series of small lacerations or scratches, or there may not be any noticeable or obvious markings where the bite occurred. The absence of fang marks does not exclude the possibility of envenomation (especially if a juvenile snake is involved). However with rattlesnake envenomation, fang marks are invariably present and are generally seen on close examination. Bleeding may persist from the fang wounds. The presence of fang marks does not always indicate envenomation; rattlesnakes, when striking in defense, will frequently elect not to inject venom with the bite, resulting in a "dry bite."

Manifestations of signs and symptoms of envenomation are necessary to confirm diagnosis of a snake venom poisoning.

4. **TREATMENT OF A SNAKE BITE**

- Most definitive care for envenomation is anti-venom.
- Keep the victim calm and reassured. If possible, allow the limb to rest in a neutral position level with the victim's heart.
- Locate the bite site. If the bite is on the hands or feet, immediately remove any rings, bracelets, watches or any constricting items from the extremity.
- For bites on the extremities, wrap extremity with three to six inch Ace bandage past the knee or elbow joint to immobilize it. Leave the fang marks exposed.
- Apply a splint.
- Check distal pulses.
- Monitor and CASEVAC.
- **THINGS YOU SHOULD NOT DO:**
  - **DO NOT** cut or incise the bite site.
  - **DO NOT** apply ice or heat to the bite site.

- **DO NOT** apply oral (mouth) suction.
- **DO NOT** remove dressings/elastic wraps.
- **DO NOT** try to kill snake for identification as this may lead to others being bitten.
- **DO NOT** have the victim eat or drink anything.

Prevention of Snake Bites – **LEAVE THE SNAKE ALONE!! This is the best way to avoid a snakebite.** Most snakes will only bite if threatened. Most snake bites occur when the victim is attempting to catch, kill, or play with a snake. Keep hands out of areas that you cannot see (i.e. holes, under rocks, and under logs).

5. ARTHROPOD ENVENOMATION

Arthropods are the largest species of animals and include insects (bees wasps, ants), arachnids (spiders), crustaceans (crabs), and others (scorpions). Arthropods are characterized by the possession of a segmented body with appendages on each segment.

Bee, Wasp, and Ant Stings - primary effect is from the strong histamine reaction they cause.

Signs and Symptoms

Bee/Wasp stings - Honey bees only sting once and leave the stingers and venom sac embedded in the skin. Wasps, hornets, and bumble bees can sting multiple times.

- Pain
- Itching/burning sensation
- Wheal (raised, inflamed skin)
- If patient is allergic, monitor for anaphylactic reaction

Ant bite - some species of ants, especially the fire ant, can bite repeatedly (see figure 8).

- Pain
- Itching/burning sensation
- Vesicles on skin
- If patient is allergic, monitor for anaphylactic reaction
- Multiple bites can produce the following signs and symptoms:
  - Vomitting
  - Diarrhea
  - Generalized edema
  - Hypotension due to vasodilation

Figure 8. Fire Ant Bites

Treatment

- Stingers should be removed immediately to prevent more venom from entering the victim. Remove the stinger by scraping across the skin with a knife blade or similar

object. Do NOT use tweezers to grasp stinger, this only injects the remaining venom into the victim.
- Apply ice to the affected area
- Apply Hydrocortisone Cream 1% to affected area BID (twice a day)
- For anaphylaxis:
    - Benadryl injectable 50mg IM
    - Epinephrine 0.3-0.5mg 1:1000 SQ

Prevention
- Leave them alone
- Avoid nesting sites
- Personnel with known allergies should carry an Epi-pen or Ana-kit

Millipedes, Centipedes, and Caterpillars

Millipedes - some millipedes secrete a toxin on their skin, other large species can squirt secretions from distances up to 32 inches (see figure 9). They secrete their toxin as a defensive mechanism.

Figure 9. Millipede

Signs and symptoms
- Dermatitis (itching and burning) that begins with a brown stain on the skin.
- Secretions in the eye can cause immediate pain, lacrimation, and blurry vision.

Centipedes - any centipede whose fangs can penetrate human skin can cause local envenomation. Contrary to popular folklore, centipedes do not inject venom with their feet or head. Their injury is caused by a bite (see figure 10).

Figure 10. Centipede

Signs and symptoms
- Burning pain, tenderness
- Erythema (redness)
- Local swelling
- superficial necrosis and ulceration may sometimes occur

Caterpillars - venomous caterpillars have venom in hollow hairs all over their bodies (see figure 11). Their venom is purely defensive. There are too many different types of caterpillars to describe. Your best bet is to leave them alone!

Figure 11. Caterpillar

Signs and symptoms
- Dermatitis (severe burning, pain)
- Erythema and edema
- Conjunctivitis
- Necrosis

Treatment
- Symptomatic. Similar to that of a bee sting. Focus mainly on anaphylactic reaction.
- Infiltrate the bitten area with lidocaine or another anesthetic.

- Tetanus prophylaxis is routine.
- For millipedes, wash skin with soap and water to remove secretions. If toxin is secreted in the eyes, irrigate with water or saline; an ophthalmologic evaluation is mandatory.
- For caterpillars, use scotch tape to remove hairs from skin. Do not rub area.

Prevention
- Leave them alone
- Avoid known nesting sites and hives
- Shake out sleeping bags and clothing and check boots before putting them on.

Spiders and Scorpions

Black Widow Spider - glossy black with a red hourglass on the underside of the abdomen. All Black Widow Spider's can bite but only the female bite is poisonous and all have a red hourglass pattern on abdomen (see figure 12).

Figure 12. Black Widow Spider

Venom – neurotoxic

Signs and Symptoms
- Initial pain is not severe, but severe local pain rapidly develops
- Pain gradually spreads over the entire body and settles in the abdomen and legs
- Weakness
- Sweating
- Excessive salivation
- Rash may occur
- Tremors
- Nausea/vomiting
- Respiratory muscle weakness combined with pain may lead to respiratory arrest
- Anaphylactic reactions can occur but are rare
- Symptoms usually regress after several hours and are usually gone in a few days

Treatment
- Clean site with soap and water
- Intermittent ice for 30 minutes each hour
- Supportive care and antibiotics if needed

Brown Recluse Spider - they are small, light brown, and have a dark brown violin design on the top of their thorax (see figure 13).

Figure 13. Brown Recluse Spider

Venom – hemotoxic/cytotoxic

Signs and symptoms
- Painless bite. Most often, the victim does not know they have been bitten.

- A painful red area with a cyanotic center appears after a few hours. If prompt treatment is not initiated, and sometimes in spite of, tissue damage can occur. The following represents the aftermath of a Brown Recluse Spider bite (see figure 14).

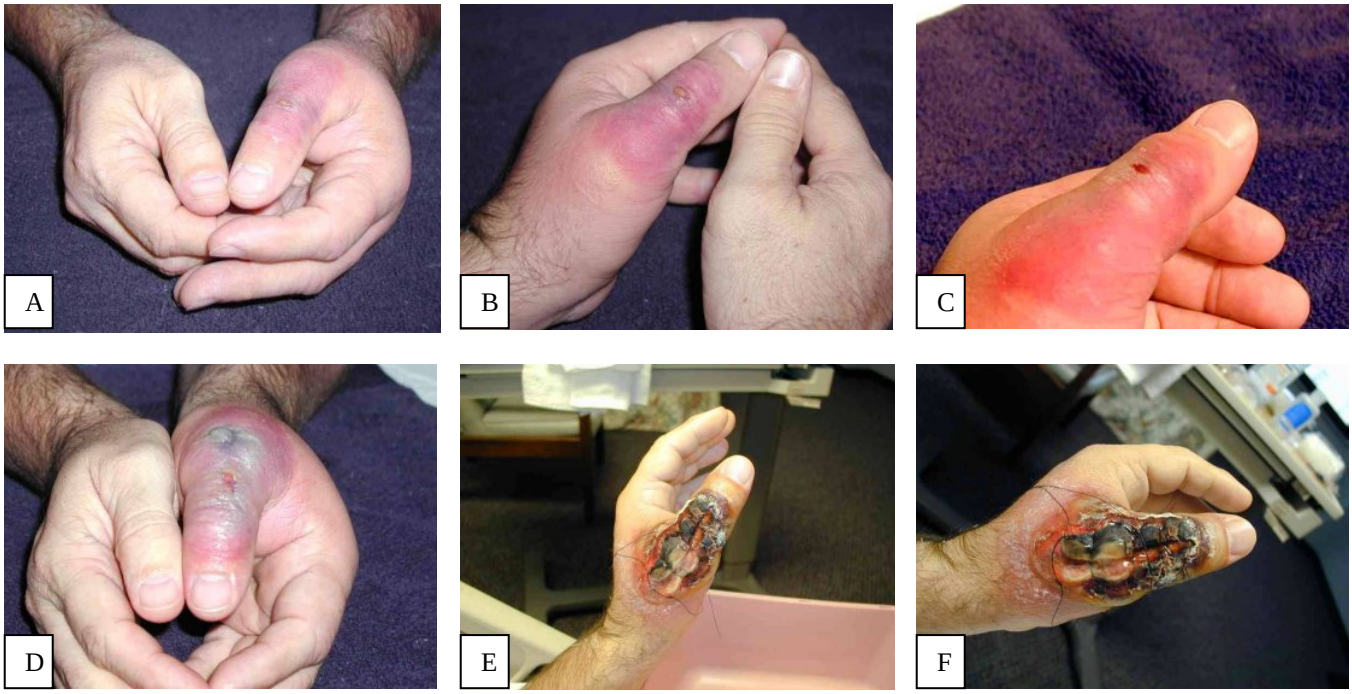


Figure 14. (From top left to right in order). A) Day three after initial spider bite. B) Notice swelling and erythemia indicating infection. C) Extreme erythemia and underlying tissue damage. D) Day 6, after antibiotic treatment. E) After I&D. F) Day 10, the wound looks as bad as it will look. Although it will be months before it is completely healed. Only time will tell if any permanent damage to the skin, muscles, or nerves.

Treatment
- Cold compresses intermittently
- Provide supportive care as necessary
- Refer to Medical Officer as it is necessary to excise all the indurated (hardened) skin and fascia before healing will begin
- Tetanus prophylaxis and antibiotics are necessary to control secondary infection
- Anaphylactic reactions may occur

Scorpion Envenomation - these arthropods inhabit warm climates around the world and number greater than 650 species. Fifty species can cause serious disease in humans (see figure 15). The most dangerous scorpions in the US inhabit Arizona and portions of California, Texas, and New Mexico. The size and shape of these arthropods can be both intimidating and frightening, but envenomation, although potentially painful, very rarely produces mortality in humans.

Figure 15. Scorpion

Venom - neurotoxic

Signs and Symptoms

- Erythema and edema
- Local pain and/or paresthesia (an abnormal touch sensation such as burning or prickling often in the absence of external stimulus) at site of sting.
- Cranial nerve dysfunction - blurred vision, wandering eye movements, hypersalivation, trouble swallowing, tongue twitching/spasms, problems with upper airway, and slurred speech.
- Somatic skeletal neuromuscular dysfunction - jerking of extremity(ies), restlessness, and severe involuntary shaking that may be mistaken for a siezure.

Diagnosis
- Positive "Tap Test" - excruciating pain when tapping on the affected area. This is the only true way to diagnose a scorpion sting.

Treatment
- Based on the level of envenomation
- Ice applied to the site for 30 minutes each hour until symptoms subside
- Oral analgesics

Prevention
- Wear shoes
- When in the field, bedclothes, sleeping bags, and shoes should be shaken out prior to use.
- Many scorpions inhabit brush and debris piles in search of prey. If you come in contact with this type of material, it is wise to wear gloves.
- Remove wood and rubbish piles around camp
- Cracks and recesses in rural desert dwellings should be filled

6. ANAPHYLACTIC SHOCK

Definition - life threatening reaction to an allergen. This reaction may have a rapid and severe onset. Without immediate emergency medical care, the patient may die.

POINT TO REMEMBER:
*Anaphylactic Shock is **NOT** just caused by insect stings. It may also be caused by the other reasons!*

Causes - exposure to an allergen that causes hypersensitivity reaction. Such exposure can be introduced to the body by the following:
- Injections (tetanus antitoxin, penicillin)
- Stings (honeybee, wasp, yellow jacket, hornet)
- Ingestion (medications and foods such as shellfish, chocolate, peanuts,etc.)
- Inhalation (dusts, pollen)
- Absorption (certain chemicals)

Signs and Symptoms
All signs & symptoms get progressively worse:
- Skin (Itching, redness, and hives)
- Respiratory depression
- Sense of fullness in the throat, anxiety, chest tightness, shortness of breath, and lightheadedness
- Decreased level of consciousness (LOC), respiratory distress, and circulatory collapse

- In general, signs and symptoms begin within 60 minutes of exposure to an allergen. One-half of anaphylactic deaths occur within the first hour. **The faster the onset of symptoms, the more severe the reaction.**

Treatment

- Maintain ABC's
- Diphenhydramine Hydrochloride *(Benadryl)*, which is an antihistamine drug with anticholinergic (drying) and sedative effects.

Indications

- Skin allergies or urticaria (rash)
- Anaphylactic reaction
- Food allergies

Contraindications

- Hypersensitivity to diphenhydramine hydrochloride and other antihistamines of similar chemical structure

Dosage and Administration

- A single injection of 25-50mg IM

- Epinephrine Injection *(Ana-Guard)* - the **most valuable drug** for the emergency treatment of severe allergic reactions.

Indications

- Allergic reactions that may be caused by exposure to pollen, food, insects or drugs.
- Severe, life-threatening asthma attacks characterized by wheezing, dyspnea, and inability to breathe.
- Other symptoms may include bronchoconstriction, wheezing, sneezing, hoarseness, urticaria, erythema, and pruritis.

Contraindications

- Must not be used if there is a hypersensivity to any of the components.
- Cardiogenic or hemorrhagic shock

Dosage and Administration

- Epinephrine Injection 1:1000 is contained in a sterile, 1mL syringe, designed to deliver two doses of 0.3 mL or (0.3-0.5ml) each.
- Epi-pen autoinjector
- Intended for subcutaneous or intramuscular use
- Repeat in five minutes if no improvement

- Fluid Resuscitation
- Documentation of the amount of medications and the times they were given is necessary in order to prevent an overdose of medication.
- CASEVAC

REFERENCES

Tropical Medicine (7th ed.), Pgs 877-888
Wilderness Medicine (3rd ed.), Ch 28, pgs 680-884, 704-705; Ch 31, pgs 743-768
Hospital Corpsman NAVEDTRA 14295, Pgs 5-12
Poisonous Snakes of the World, NAVMED P-5099 Pgs 83, 107, and 117

Envenomation Review

1. List 5 pit vipers.

2. List the signs and symptoms associated with the neurotoxin secreted by a coral snake.

3. List the appropriate treatment for secondary infections associated with a Brown Recluse bite.

4. What are the two medications required to treat anaphylaxis? Which is the most valuable?

Components of Field Medicine
Review Questions

NOTE: The following questions are offered for review purposes. <u>This is NOT intended as a sole source of test preparation</u>. Remember all test questions are based on an ELO and any ELO can be used to create a test question.

1. What is combat stress?
2. What are the characteristics and examples of the Crotalidae family of snakes?
3. What is the mission of the aid station?
4. What are the six most commonly used methods of evacuation?
5. What are the four categories of tactical triage?
6. On the nine-line CASEVAC request, what information is on line six?
7. What is the definition of urban warfare (MOUT)?
8. What are the characteristics and examples of the Elapidae family of snakes?
9. What are the four types of waste?
10. Who are the two medical officers in a large aid station?
11. What pre-deployment steps can be taken to prevent combat stress?
12. What are some of the potential health threats of MOUT?
13. What is the total time needed to disinfect a canteen using iodine tablets?
14. What are the five categories of blast effects?
15. What are the BAS responsibilities in the field/combat?
16. What factors decrease the risk of combat stress?
17. What are the characteristics and examples of the Colubridae family of snakes?
18. First aid and emergency care is the primary objective of which taxonomy of care level?
19. What is the primary device for human waste disposal in the field?
20. What are the four sources of water?
21. When treating snake bites, what are the common DON'Ts?
22. Restorative and rehabilitative care is the primary objective of which taxonomy of care level?
23. Why are military blast casualties less likely to suffer injuries to the upper torso and head?
24. What are the responsibilities of the aid station while in garrison?
25. What causes anaphylactic shock?
26. What does the acronym BICEPS stand for?
27. What steps can be taken during deployment to prevent combat stress?
28. What type of bee/wasp can only sting once and why?
29. What is the most common form of injury in a terrorist bombing?

30. When dealing with blast injuries, how can the absence of ruptured tympanic membranes help rule out other injuries?
31. What are the six commonly used litters within the FMF?
32. What are the five CASEVAC priority levels?
33. What are the five basic sections of the BAS?
34. What are the two types of blast waves?
35. What are the special requirements of casualty evacuation in MOUT?
36. What are the two methods of water disinfection?
37. What are the routine patient assessment procedures (sick call)?
38. What are the characteristics of the Hydrophidae family of snakes?
39. What personal factors increase the risk of combat stress?
40. When dealing with blast injuries, what is the most commonly affected body area?
41. What are the signs and symptoms of Black Widow spider bites?
42. Why are cat holes immediately covered after use?

WEAPONS CLASSES

Weapons Table of Contents

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UNITED STATES MARINE CORPS

(FIELD MEDICAL TRAINING BATTALION)
(TRAINING COMMAND)
(BOX 21010)
(CAMP PENDLETON, CA 92055-1010)

Weapons Handling

LEARNING OBJECTIVES

TERMINAL LEARNING OBJECTIVE

1) Given a range, individual combat equipment, a service carbine, a parade sling and a target, conduct a course of fire to a level of proficiency per MCO 3574.2K

ENABLING LEARNING OBJECTIVES

1) Without the aid of references, given a combat load, a service carbine, a parade sling and a range, demonstrate checking a weapons condition per MCO 3574.2k
2) Without the aid of references, given a combat load, service carbine, a parade sling and a range, perform weapons commands per MCO 3574.2k
3) Without the aid of references, given a combat load, service carbine, a parade sling and a range, perform weapons handling per MCO 3574.2k
4) Without the aid of references, identify the cycle of operations without error per MCO 3574.2k
5) Without the aid of references, given a service carbine, a parade sling, individual combat load and a scenario where the weapon is down, demonstrate performing immediate action per MCO 3574.2k
6) Without the aid of references, given a service carbine, a parade sling, individual combat load and a range, demonstrate performing remedial action per MCO 3574.2k
7) Without the aid of references, given a service carbine, a parade sling, individual combat load and a range demonstrate the different carries based on given scenario per MCO 3574.2k

1. DETERMINING THE CONDITION OF A RIFLE

You must know the condition of your weapon at all times. Any time you take possession of a weapon, you must determine its condition. Situations include taking charge of your own weapon after it has been unattended (e.g., from the armory, out of a rifle rack, left in a vehicle), coming across an unmanned rifle in combat, or taking charge of another person's weapon that is attended or unattended. The conditions are as follows:

Determine if a magazine is present

Ensure the weapon is on safe

Conduct a Chamber Check

A chamber check may be conducted at any time to determine if ammunition is present:

1. Pull the charging handle slightly to the rear and visually and physically inspect the chamber.
2. Right-handed Individuals: Insert one finger of your left hand into the ejection port and feel whether a round is present.
3. Left-handed Individuals: Insert the thumb of the right hand into the ejection port and feel whether a round is present.
4. Release the charging handle and observe the bolt going forward.
5. Tap the forward assist.
6. Close the ejection port cover (if time and the situation permit).

2. WEAPONS COMMANDS

a. **Commands** – weapons commands dictate the specific steps to load, make ready, and unload the M4 carbine. Six commands are used on the rifle range and in weapons handling:

1. "Load" is the command used to take a weapon from Condition 4 to Condition 3.

2. "Make Ready" is the command used to take a weapon from Condition 3 to Condition 1.
3. "Fire" is the command used to specify when you may engage targets.
4. "Cease Fire" is the command used to specify when you must stop target engagement.
5. "Unload" is the command used to take a weapon from any condition to Condition 4.
6. "Unload, Show Clear" is the command used to require a second person to check the weapon to verify that no ammunition is present before the rifle is put into Condition 4. To execute this command, you must remove the magazine, lock the bolt to the rear, inspect the chamber to ensure that it is empty. Then someone else must inspect and confirm that your weapon is completely unloaded.

3. **Weapons Handling Procedures**

The commands are executed as follows:

Unload

On the command "Unload," perform the following steps to take the rifle from any condition to Condition 4:

1. Ensure the rifle is on safe.
2. Remove the magazine from the rifle and retain it on your person.
3. Pull the charging handle to the rear to eject any ammunition in the chamber.
4. Lock the bolt to the rear.
5. Put the rifle on safe now if it would not go on safe earlier.
6. Ensure the chamber is empty and no ammunition is present.
7. Release the bolt catch and observe the bolt going forward on an empty chamber.
8. Close the ejection port cover
9. Return the ejected round to the magazine.
10. Return the magazine to the magazine pouch and fasten the pouch.

Load

On the command "Load," perform the following steps to take the rifle from Condition 4 to Condition 3:

1. Ensure the rifle is on safe.
2. Withdraw a magazine from the magazine pouch.
3. Fully insert the magazine into the magazine well until the magazine catch engages the magazine. The magazine catch will “click” as it engages which can be felt or heard by the shooter. Without releasing the magazine, tug downward on the magazine to ensure it is seated.
4. Fasten the magazine pouch.

Make Ready

On the command "Make Ready," perform the following steps to take the rifle from Condition 3 to Condition 1:

1. Pull the charging handle fully to the rear and release. Do not “ride” the bolt forward. Allow the bolt to “slam” forward.
2. To ensure ammunition has been chambered, conduct a chamber check.
3. Close the ejection port cover (if time and the situation permit).

Fire

On the command "Fire," perform the following steps:

1. Aim the rifle, take the rifle off safe, and squeeze the trigger.
2. After completion of firing, lower the rifle sights to just below eye level so a clear field of view is maintained until a new target has been identified or the threat has been eliminated.

Cease Fire

On the command "Cease Fire," perform the following:

1. Place your trigger finger straight and off the trigger.
2. Place the weapon on safe.

Unload

On the command “Unload” perform the following:

1. Remove the magazine from magazine weld
2. Pull charging handle to the rear, lock to rear.
3. Visually and physically inspect chamber
4. Watch bolt go home on a empty chamber
5. Ensure weapon is on safe

Unload, Show Clear

On the command "Unload, Show Clear", perform the following

steps to take the rifle from any condition to Condition 4:

1. Follow the procedures for unloading the weapon.
2. Have a second party inspect the rifle to ensure no ammunition is present.
3. After receiving acknowledgement that the rifle is clear, release the bolt catch and observe the bolt going forward on an empty chamber.
4. Close the ejection port cover.
5. Return the ejected round to the magazine.
6. Return the magazine to the magazine pouch and fasten the pouch.

3. WEAPONS TRANSFER PROCEDURES

a. Show Clear Transfer

When time and the tactical situation permit, the rifle should be transferred using the Show Clear Transfer. To properly pass a rifle between individuals, perform the following procedures:

The person handing off the rifle must

1. Ensure the rifle is on safe.
2. Remove the magazine if it is present.
3. Lock the bolt to the rear.
4. Visually and physically inspect the chamber to ensure there is no ammunition present.
5. Leave the bolt locked to the rear and hand the weapon to the other person, stock first with the muzzle elevated.

The person receiving the weapon must

Place the rifle in Condition 4 by performing the following procedures:

1. Ensure the rifle is on safe.
2. Visually and physically inspect the chamber to ensure there is no ammunition present.
3. Release the bolt catch and observe the bolt going forward on an empty chamber.
4. Close the ejection port cover.

b. Condition Unknown Transfer

To properly take charge of a rifle when its condition is unknown, you must perform the following procedures:

1. Ensure the rifle is on safe.

2. Conduct a chamber check to determine the condition of the weapon.
3. Remove the magazine and observe if ammunition is present in the magazine. If time permits, count the rounds.
4. Insert the magazine into the magazine well.

4. CYCLE OF OPERATION

There are eight steps in the cycle of operation for the service carbine:

1. **Firing** – the ignition of the propellant within the cartridge case forcing the projectile down and out the barrel.
2. **Unlocking** – the rotation of the bolt until the locking lugs no longer align with the lugs on the barrel extension.
3. **Extracting** – the withdrawal of the cartridge case from the chamber by the extractor claw and the rearward motion of the bolt.
4. **Ejecting** – the expulsion of the cartridge case by the ejector and spring.
5. **Cocking** – the resetting of the hammer on the sear as the bolt moves rearward over the hammer.
6. **Feeding** – the stripping of a round from the magazine by the bolt.
7. **Chambering** – the pushing of the round into the chamber by the bolt.
8. **Locking** – the alignment of the locking lugs on the bolt as it rotates into the chamber and lugs align with the lugs on the chamber.

5. IMMEDIATE ACTION

a. Stoppage:

A stoppage is an unintentional interruption in the cycle of operation. A stoppage is normally discovered when the rifle will not fire. Most stoppages can be prevented by proper care, cleaning,

and lubrication of the rifle and magazines.

b. Malfunction:

A malfunction is a failure of the rifle to fire satisfactorily or to perform as designed. A malfunction does not necessarily cause an interruption in the cycle of operation. An example of a malfunction is that the weapon fires on automatic (burst) rather than semiautomatic even though the selector lever is set on SEMI. The rifle will still fire, but it will not perform as designed. When a malfunction occurs, the weapon usually has to be repaired by an armorer.

The Bolt is Forward or Ejection Port Cover Closed – to return the weapon to operation:

1. Tap - Tap or strike upward on the bottom of the magazine to ensure it is fully seated.
2. Rack - Pull the charging handle all the way to the rear and release it to ensure a round is chambered.
3. Bang - Sight in and attempt to fire.

6. **REMEDIAL ACTION**

a. **Indicator – The Bolt is Locked to the Rear** – to return the weapon to operation: Conduct a speed reload.

1. Press the magazine release button and remove the empty magazine and retain it on your person if time permits.
2. Insert a filled magazine into the magazine well and tug downward on the magazine to ensure it is properly seated.
3. Depress the bolt catch to allow the bolt to move forward and chamber a round.
4. Sight in and attempt to fire.

b. **Indicator – Obstruction in the Chamber Area** – this usually indicates a failure to eject or extract. It is also the procedure for removing any foreign object

that may be impeding function of the weapon. To return the weapon to operation:

1. Remove the magazine.
2. Attempt to lock the bolt to the rear. If the bolt will not lock to the rear:
3. Rotate the rifle so the ejection port is facing down.
4. Hold the charging handle to the rear and shake the rifle to free the round(s).
5. If the rounds do not shake free, hold the charging handle to the rear and strike the butt of the rifle on the ground or manually clear the round.
6. Reload.
7. Sight in and attempt to fire.

c. **Indicator – Brass is Stuck Over and Behind the Bolt Face** This stoppage will prevent the bolt from moving and is caused by the weapon failing to feed or extract properly. To return the weapon to operation:

1. Attempt to place the weapon on Safe.
2. Remove the magazine and place the butt stock on the deck.
3. Hold the bolt face to the rear with a sturdy, slender object (e.g., stripper clip, knife, Multi-Tool). Maintain rearward pressure on the bolt and simultaneously push forward on the charging handle to remove the obstructing round.
4. Check the chamber area to ensure it is clear.
5. Conduct a speed reload.
6. Sight in and attempt to fire, if applicable.

d. **Audible Pop or Reduced Recoil** – an audible pop occurs when only a portion of the propellant is ignited, or only the primer is ignited. It is normally identifiable by reduced recoil and a lower report. This is sometimes accompanied by excessive smoke escaping from the chamber area.

7. **WEAPONS CARRIES**

a. **Tactical Carry** (see figure 1) The tactical carry is used when no immediate threat is present.

b. **<u>Alert Carry</u>** (see figure 2) The alert is used when enemy contact is likely (probable).(ALERT TO THE DIRT)

c. <u>Ready Carry</u> (see figure 3) The ready is employed when contact with the enemy is imminent.

TACTICAL CARRY
(Figure 1)

ALERT CARRY
(Figure 2)

READY CARRY
(Figure 3)

REFERENCES

MCO 3574.2K

NOTES

UNITED STATES MARINE CORPS
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SHOOTING POSITIONS

LEARNING OBJECTIVES

TERMINAL LEARNING OBJECTIVE

1) Given a range, individual combat equipment, a service carbine, a parade sling and a target, conduct a course of fire to a level of proficiency per MCO 3574.2K

ENABLING LEARNING OBJECTIVES

1) Without the aid of references, given a combat load, a service carbine, a parade sling and a range, demonstrate assuming the prone position per MCO 3574.2k
2) Without the aid of references, given a combat load, a service carbine, a parade sling and a range, demonstrate assuming the sitting position per MCO 3574.2k
3) Without the aid of references, given a combat load, a service carbine, a parade sling and a range, demonstrate assuming the kneeling position per MCO 3574.2k
4) Without the aid of references, given a combat load, a service carbine, a parade sling and a range, demonstrate assuming the standing position per MCO 3574.2k

1. ASSUMING THE PRONE POSITION

Description The prone position is the steadiest of the four shooting positions providing the shooter stability and control during firing. The prone position also provides the lowest profile however, mobility and observation are reduced.

Moving Forward into Position

1. Stand erect, face the target, and spread your feet a comfortable distance apart (approximately shoulder width).
2. Place your support (forward) hand on the handguard, your firing hand on the pistol grip.
3. Lower yourself into position by dropping to both knees.
4. Shift your weight forward to lower your upper body to the ground using your firing hand to break the forward motion.

Variations The prone position has two variations:

Straight Leg Position with the Sling (see figure 1)

1. To assume the straight leg prone position with the sling, either move forward or drop back into position.
2. Once on the ground, extend your support elbow in front of you. Stretch your legs out behind you. Spread your feet a comfortable distance apart with your toes pointing outboard and the inner portion of your feet in contact with the ground.
3. As much of your body mass should be aligned directly behind the rifle as possible.If your body alignment is correct, then your whole body will absorb the weapon's recoil and not just your shoulder.
4. Grasp the pistol grip with your firing hand and place the rifle butt in your firing shoulder pocket.
5. Lower your head and place your cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.

Figure 1. Straight Leg Position

6. Rotate your support hand up, slightly gripping the hand guard. The magazine must be on the inside of your support arm.
7. Adjust the position of your support hand on the handguard to allow the sling to support the weapon and the front sight to be centered in the rear sight aperture.
8. To adjust for a minor cant in the rifle, rotate the left or right by rotating the pistol grip left or right.

Cocked Leg Position with the Sling (see figure 2)

1. To assume the cocked leg prone position with the sling, either move forward or drop back into position.
2. Once on the ground, roll your body to the support side and extend your support elbow on the ground. Your support leg is stretched out behind you, almost in a straight line. This allows the mass of the body to be placed behind the rifle to aid in absorbing recoil.
3. Turn the toe of your support foot inboard so the outside of your support leg and foot are in contact with the ground. Bend your firing leg and draw it up toward your body to a comfortable position. Turn your firing leg and foot outboard so the inside of your firing boot is in contact with the ground. Cocking the leg will raise the diaphragm, making breathing easier.
4. Grasp the pistol grip with your firing hand and place the rifle butt in your firing shoulder pocket.
5. Lower your head and place your cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
6. Rotate your support hand up, slightly gripping the hand guard. The magazine must be on the inside of your support arm.
7. Roll your body to the firing while lowering your firing elbow to the ground. Slide both elbows outboard on the ground so there is outboard tension against the sling (moving the elbows out tightens the sling). The firing shoulder is higher than the support shoulder in the cocked leg position.
8. Adjust the position of your support hand on the handguard to allow the sling to support the weapon and the front sight to be centered in the rear sight aperture.
9. To adjust for a minor cant in the rifle, rotate the left or right by rotating the pistol grip left or right.

Figure 2. Cocked Leg Position

MCO 3574.2K states the following requirements for the rifle sitting position:

1. The buttocks and feet or ankles will support the body's weight. No other portion of the body will touch the ground.
2. Both hands, the sling, and one shoulder will support the rifle.
3. The arms may rest on the legs at any point above the ankles.
4. The magazine will be allowed to touch the clothing or the arm supporting the rifle, and may be gripped along the sides but the bottom of the magazine may not be used to support the weapon.

ASSUMING THE SITTING POSITION

Description – the sitting position provides an extremely stable base and provides good bone support. The sitting position provides better observation than the prone position while still maintaining a fairly low profile.

Variations – there are three variations of the sitting position that can be adapted to the individual shooter: crossed ankle, crossed leg, and open leg. Experiment with all the variations and select the position that is easiest to assume and provides the most stability for firing.

Crossed Ankle Sitting Position with the Loop Sling Apply the three elements and seven factors to this position. To assume crossed ankle sitting position with the loop sling: (see figure 1)

1. Position the body at approximately a 30-degree angle to the target.
2. Place the support hand under the hand guard.
3. Bend at knees and break the fall with the firing hand.
4. Push backward with the feet to extend the legs and place the buttocks on the ground.
5. Cross the support ankle over the firing ankle.
6. Bend forward at the waist and place the support elbow on the support leg below the knee.

Figure 1. Crossed Ankle Sitting Position

7. Grasp the rifle butt with the firing hand and place the rifle butt into the firing shoulder pocket.
8. Grasp the pistol grip with the firing hand.
9. Lower firing elbow to the inside of the firing knee.
10. Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
11. Move the support hand to a location under the handguard, which provides maximum bone support and stability of the weapon.

Crossed Leg Sitting Position with the Loop Sling Apply the three elements and seven factors to this position. To assume crossed leg sitting position with loop sling: (see figure 2)

Figure 2. Crossed Leg Sitting Position

1. Position body at a 45- to 60-degree angle to target.
2. Place the support hand under the hand guard.
3. Cross the support leg over the firing leg.
4. Bend at the knees while breaking the fall with the firing hand.
5. Place the buttocks on the ground as close to the crossed legs as you comfortably can.
6. Bend forward at the waist while placing the support elbow on the support leg into the bend of the knee.
7. Grasp the rifle butt with the firing hand and place the rifle butt into the firing shoulder pocket.
8. Grasp the pistol grip with the firing hand.
9. Lower firing elbow to the inside of the firing knee.
10. Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
11. Move the support hand to a location under the hand guard that provides maximum bone support and stability of the weapon.

Open Leg Sitting Position with the Loop Sling

Apply the three elements and seven factors to this position. To assume the open leg sitting position with the loop sling: (see figure 3)

Figure 3. Open Leg Sitting Position

1. Position the body at approximately a 30-degree angle to the target.
2. Place the feet approximately shoulder width apart.
3. Place the support hand under the handguard.
4. Bend at the knees while breaking the fall

with the firing hand.

5. Push backward with the feet to extend the legs and place the buttocks on the ground.
6. Place the support elbow on the inside of the support knee.
7. Grasp the rifle butt with the firing hand and place the rifle butt into the firing shoulder pocket.
8. Lower firing elbow to the inside of the firing knee.
9. Lower the head and place the cheek firmly against the stock to allow the aiming eye to look through the rear sight aperture.
10. Move the support hand to a location under the hand guard which provides maximum bone support and stability of the weapon.

3. **ASSUMING THE KNEELING POSITION**

Description – the kneeling position presents a medium silhouette, provides limited body contact with the ground, forms a stable firing position, and provides mobility for quick reaction. In the kneeling position a tripod of support is formed by the left foot, right foot, and right knee, providing a stable foundation for shooting. The kneeling position presents a higher profile to facilitate a better field of view as compared to the prone and sitting positions.

Variations – the kneeling position has three variations: high kneeling, medium kneeling, and low kneeling. Try each variation and choose a position that is natural and provides balance, stability, and control during firing.

Assuming the Kneeling Position – the kneeling position can be assumed by either moving forward or dropping back into position, depending on the combat situation. For example, it may be necessary to drop back into position to avoid crowding cover, or to avoid covering uncleared terrain.

Moving Forward into Position – to move forward into the kneeling position, step forward toward the target with your left foot and kneel down on your right knee.
Dropping Back into Position – to drop back into the kneeling position, leave your left foot in place and step backward with your right foot and kneel down on your right knee.

ASSUMING THE KNEELING POSITION WITH THE LOOP SLING

High Kneeling Position (see figure 1)

1. Stand with your feet approximately shoulder width apart and face the target approximately 45 degrees to the right of the line of fire.
2. Step forward with your left foot toward the target.
3. Place your left hand under the hand guard.
4. Kneel down on your right knee so your right lower leg is approximately parallel to the gun-target line.
5. Keep your right ankle straight, with the toe of your boot in contact with the ground and curled under by the weight of your body.
6. Place the right portion of your buttocks on your right heel, making solid contact.
7. Place your left foot forward to a point that allows your shin to be vertically straight. Your left foot should be flat on the ground since it will be supporting the majority of your weight.
8. Place the flat part of your upper left arm, just above the elbow, on your left knee so it is in firm contact with the flat surface formed on top of your bent knee. This means the point of your left elbow will extend just slightly past the left knee.
9. Lean slightly forward into the sling for support.
10. Grasp the rifle butt with your right hand and place the butt of the rifle into the pocket of your right shoulder.
11. Grasp the pistol grip with your right hand.
12. Bend your right elbow to provide the least muscular tension possible and lower it to a natural position.
13. Relax your weight forward and place your cheek firmly against the stock to obtain a correct stock weld.
14. Move your left hand to a location under the hand guard, which provides maximum bone support and stability for the weapon.

Figure 1. High Kneeling Position

Medium Kneeling Position – (see Figure 2) This is also referred to as the bootlace kneeling position. Assume the medium kneeling position in the same way as the high kneeling position

Figure 2. Medium Kneeling Position

with the exception of the right foot. The right ankle is straight and the foot is stretched out with the bootlaces in contact with the ground.

Low Kneeling Position – (see Figure 3) The low kneeling position is most commonly used when firing from a forward slope. Assume the low kneeling position in the same way as the high kneeling position with the exception of the placement of your right foot. Turn your right ankle so the outside of the foot is in contact with the ground and the buttocks are in contact with the inside of the foot.

Figure 3. Low Kneeling Position

ADJUSTING NATURAL POINT OF AIM

Natural point of aim can be achieved in the kneeling position by making minor body adjustments.

Adjusting Up or Down – if the natural point of aim is above or below the desired aiming point:

Vary the placement of the stock in the shoulder

1. Moving the stock higher in the shoulder lowers the muzzle of the weapon, causing the sights to settle lower on the target.
2. Moving the stock lower in the shoulder raises the muzzle of the weapon, causing the sights to settle higher on the target.

Vary the placement of the left hand in relation to the hand

guards

1. Moving the left hand forward on the hand guards lowers the muzzle of the weapon, causing the sights to settle lower on the target.
2. Moving the left hand back on the hand guards raises the muzzle of the weapon, causing the sights to settle higher on the target.

Vary the placement of the left elbow on the knee

1. Moving the left elbow forward on the knee lowers the muzzle of the weapon, causing the sights to settle lower on the target.
2. Moving the left elbow back on the knee raises the muzzle of the weapon, causing the sights to settle higher on the target.

Adjusting Right or Left – natural point of aim can be adjusted right or left in the kneeling position by adjusting body alignment in relation to the target.

ASSUMING THE STANDING POSITION

Description – the standing position is the quickest position to assume and the easiest to maneuver from. It allows greater mobility than other positions. The standing position is often used for immediate combat engagement. The standing position is supported by the shooter's legs and feet and provides a small area of contact with the ground. In addition the body's center of gravity is high above the ground. Therefore, maintaining balance is critical in this position. The standing position can be easily assumed and acquired quickly.

Assuming the Standing Position Using the Parade Sling (see figure 1)

1. Hold the rifle vertical with the barrel pointing upward.
2. Apply a parade sling with sling located on left side of the rifle.
3. Face the target approximately 90 degrees to the right of the line of fire preferably on a level piece of ground.
4. Spread your feet apart to a comfortable distance. Normally, this distance will not exceed the width of the shoulders.

Figure 1. Standing Position

Distribute your weight evenly over both feet and hips. Your legs should be straight but your knees should not be locked.

5. Place your left hand under the hand guard in a position to best support and steady the rifle. The left triceps may rest against the torso but may not rest or be supported by equipment mounted on the cartridge belt.
6. Grasp the pistol grip with your right hand.
7. Place the toe of the butt stock in your right shoulder.
8. Position your left elbow across your upper torso. Most of the rifle's weight is held with your left arm resting naturally against your upper torso and should be supported by bone structure, not muscle.
9. Hold your right elbow in a natural position.
10. Bring the rifle sights up to eye level instead of lowering your head to the sights. Ensure your head is erect. This allows you to look straight through the sights. Eye relief will normally be increased in the standing position due to the head being held more erect and depending on placement of the rifle butt.
11. Place the stock firmly against your cheek in the same place each time to ensure consistency from shot to shot.

Adjusting Natural Point of Aim – natural point of aim can be achieved in the standing position by making minor body adjustments.

If the natural point of aim is above or below the desired aiming point:

a. Vary the distance between the feet, either placing them wider apart or closer together.
   (1) Moving your feet further apart lowers the muzzle of the weapon, causing the sights to settle slightly lower on the target. Care should be taken not to move your feet too far apart because it may affect balance and bone support.
   (2) Moving your feet closer together raises the muzzle of the weapon, causing the sights to settle higher on the target. Care should be taken not to move your feet too close together because it may affect balance and bone support.
b. Vary the placement of the butt stock in the

shoulder.

(1) Moving the butt stock higher in the shoulder lowers the muzzle of the weapon, causing the sights to settle lower on the target.

(2) Moving the butt stock lower in the shoulder raises the muzzle of the weapon, causing the sights to settle higher on the target.

c. Vary the placement of the "V" formed by the left hand in relation to the hand guards.

(1) Moving the left hand forward on the hand guards raises the muzzle of the weapon, causing the sights to settle lower on the target.

(2) Moving the left hand back on the hand guards raises the muzzle of the weapon, causing the sights to settle higher on the target.

<u>If the natural point of aim is too far to the left or right of the desired aiming point:</u>

The natural point of aim can be adjusted right or left in the standing position by varying the placement of the feet in relation to the target.

REFERENCES

MCO 3574.2K

NOTES

UNITED STATES MARINE CORPS
(FIELD MEDICAL TRAINING BATTALION)
(TRAINING COMMAND)
(BOX 21010)
(CAMP PENDLETON, CA 92055-1010)

Fundamentals of Rifle Marksmanship

LEARNING OBJECTIVES.

a. **TERMINAL LEARNING OBJECTIVE.**

1) Given a range, supplies, equipment, a service carbine and a fighting load, conduct a stage of fire to achieve a level of proficiency IAW MCO 3574.2k

b. **ENABLING LEARNING OBJECTIVES.**

1) Without the aid of references, given a range, individual fighting load, a service carbine and a coach perform proper weapons fundamentals IAW MCO 3574.2k

2) Without the aid of references, given a range, individual fighting load, a service carbine and a coach apply the seven common factors to all shooting positions IAW MCO 3574.2k

1. FUNDAMENTALS

a. POSITION

1) Bone Support

The body's skeletal structure provides a stable foundation to support the rifle's weight and manage the recoil after a shot is fired. One of the principles of bone support involves hard and soft tissue. This provides maximum stability and recoil management.

2) Muscular Relaxation

Muscular relaxation helps to hold steady and increases the accuracy of aiming and provides maximum use of bone support.

3) Natural Point of Aim

Natural point of aim is the point at which the rifle sights settle when in a firing position. Move your body to settle the sights. "DO NOT MUSCLE THE WEAPON" if a shooter is doing this the shooter should stop and reevaluate their position to get their natural point of aim.

b. AIMING

1. **Sight Alignment and Sight Picture**

a. SIGHT ALIGNMENT

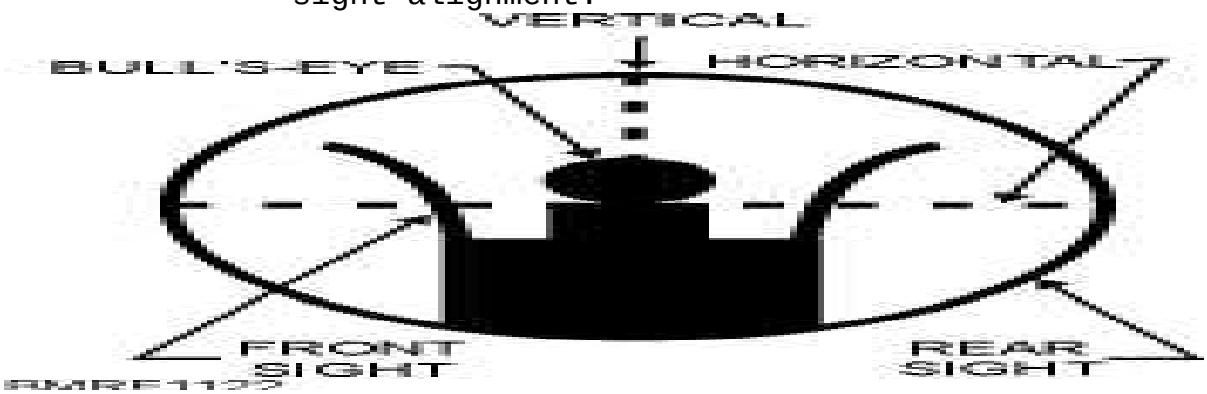
The relationship between the front sight post, rear sight aperture, and aiming eye. Must be consistent from shot to shot or could result in a misplaced shot. The steps to acquiring correct sight alignment are as follows:

1) Center the tip of the front sight post vertically and horizontally in the rear sight aperture.
2) Imagine a horizontal line drawn through the center of the rear sight aperture. The top of the front sight post will appear to touch this line. Imagine a vertical line drawn through the center of the rear sight aperture. The line will appear to bisect the front sight post. This method causes the least amount of inconsistency from shot to shot.

b. Sight Picture

The placement of the tip of the front sight post in relation to the target while maintaining sight alignment. Correct sight alignment but improper sight placement on the target will cause the bullet to impact the target incorrectly on the spot where the sights were aimed when the bullet left the muzzle.

1) The tip of the front sight post is placed at the center of the target while maintaining sight alignment.



Relationship Between the Eye and Sights

For accurate shooting, it is important to focus on the tip of the front sight post throughout the sighting and aiming process.

1. While exhaling and bringing the front sight to the target, your focus should be shifted repeatedly from the front sight post to the target until the correct sight picture is obtained. Once sight picture is obtained, your primary focus should be the tip of the front sight post. This enables the detection of minute errors in sight alignment.
2. During firing, your peripheral vision will include the rear sight and the target. The rear sight and the target will appear blurry.

NOTE: The final focus must be on the tip of the front sight post with the target appearing indistinct.

C. **TRIGGER CONTROL**

Definition- The skillful manipulation of the trigger that causes the rifle to fire, while maintaining sight alignment and sight picture.

UNINTERRUPTED TRIGGER CONTROL
When the trigger is moved straight to the rear with a single, smooth motion.

INTERRUPTED TRIGGER CONTROL
When the application of the trigger pressure is interrupted, when an error in the aiming process is detected. The applied pressure is kept on the trigger until the error is corrected.

Factors Affecting Trigger Control

a. Grip – failure to have a firm grip causes the trigger to feel inconsistent from shot to shot. As pressure is applied to the trigger, there is a tendency to tighten the grip on the pistol grip. If the grip is firmly established prior to applying trigger pressure, trigger control is consistent from shot to shot.
b. Trigger Finger Contact with the Trigger – you should keep the middle of the trigger finger clear of the pistol grip. If the finger touches the side of the pistol grip, it causes pressure to be applied at a slight angle rather than straight to the rear. Side pressure applied no matter how slight, tends to pull the sights off the aiming point.

D. **BREATHING**

Natural Respiratory Pause
A respiratory cycle (inhaling and exhaling) lasts about four or five seconds. Between respiratory cycles there is a natural pause of two to three seconds. This is the natural respiratory pause. During the respiratory pause, muscles are relaxed and the rifle sights settle at their natural point of aim. You should fire at this point.

E. FOLLOW-THROUGH

Follow-through is the continued application of the fundamentals until the round has exited the rifle barrel; your body has absorbed the recoil and has settled back on your natural point of aim. Care should be taken not to

shift your position, move your head, or let the muzzle of the rifle drop until the bullet has left the barrel. This is important so the direction of your shot will not be disturbed. Proper follow-through reduces the likelihood of errors. Once the follow through is completed, then put the weapon on safe and remove from your shoulder during slow fire, or continue with your next shot in the rapid fire.

2. **SEVEN COMMON FACTORS TO ALL SHOOTING POSISTIONS**

1) FORWARD HAND RELAXED AND ELBOW CLOSE TO WEAPON
   a. Wrist should be straight and locked this creates resistance on the sling close to the muzzle. This allows for the front sigh to be stabilized.
   b. Elbow should be inverted under weapon as much as possible to allow maximal bone support and a consistent resistance to recoil.
   c. Forward elbow should not be on the ball of the elbow.

2) BUTT OF THE WEAPON HIGH IN THE POCKET OF THE SHOULDER
   a. Outboard tension is applied on sling by the support elbow to drive the buttstock into the pocket of the shoulder.
   b. Placed high in the shoulder to achieve proper stock weld. This ensures that the shooters neck remains erect so that the shooter is looking straight through the sights to acquire sight picture.

3) HIGH FIRM PISTOL GRIP
   This should be consistent throughout course of fire and can be accomplished by doing the following:
   a. Place the "V" formed between the thumb and index finger high on the pistol grip directly behind the trigger.
   b. Place the fingers and thumb around the pistol grip in a location that allows the trigger finger to rest naturally on the trigger.
   c. The shooter should also pull the weapon slightly to the rear into the pocket of the shoulder.

4) PLACEMENT OF THE REAR ELBOW

a. Should be positioned naturally to provide balance and to create pocket in the shoulder for the rifle butt.

b. Consistent shoulder placement will ensures that resistance to recoil will remain the constant.

5) STOCK WELD AND EYE RELIEF

This consist of proper placement of the shooters cheek against the stock. It should remain firm and consistent from shot to shot, and can be accomplished by doing the following:

a. Place the stock so it’s anchored under the shooters cheek bone.

b. Ensure that shooter has proper eye relief which the distance of aiming eye in relation to the rear sight aperture (2 to 6 inches).

c. Head will remain erect to allow aiming eye to look straight through the rear sight aperture.

6) BREATHING

a. NATURAL RESPIRATORY PAUSE Inhale-Exhale-Pause-Shoot

b. Technique for Breath Control During Slow Fire

Assume a firing position.

1. Stop breathing at your natural respiratory pause and make final adjustments to your natural point of aim.
2. Breathe naturally, until your sight picture begins to settle.
3. Take a slightly deeper breath.
4. Exhale and stop breathing at the natural respiratory pause.
5. Fire the shot, during the natural respiratory pause.

C. Techniques for Breath Control During Rapid Fire

There are two methods that can be used.

1. Breathing Between Shots

Assume a firing position.

a. Stop breathing at your natural respiratory pause.

b. Fire the shot during the natural respiratory

pause.

c. Repeat until all five shots have been fired.

2. Holding the Breath

Assume a firing position.

a. Take a deep breath filling the lungs with oxygen.

b. Hold your breath and apply pressure to the trigger.

c. Fire the shots.

7) CONTROLLED MUSCULAR TENSION

With the loop sling donned muscular tension is used to stabilize the rifle. However, excessive muscular tension will result in trembling, shaking, and fatigue. Muscular tension should only be applied to the point at which it allows the sights to settle.

REFERENCES

MCO 3574.2k

NOTES

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COMBAT MARKSMANSHIP FUNDAMENTALS

LEARNING OBJECTIVES.

a. **TERMINAL LEARNING OBJECTIVE.**

1) Given a range, supplies, equipment, a service carbine and a fighting load, conduct a stage of fire to achieve a level of proficiency per range regulations.

b. **ENABLING LEARNING OBJECTIVES**

1) Without the aid of references, given a range, individual combat load, and a service carbine engage targets using compressed fundamentals.
2) Without the aid of references, given a range, individual combat load, a service carbine, apply the fundamentals of marksmanship as they apply to combat.

1. **COMPRESSING THE FUNDAMENTALS**

While the fundamentals of marksmanship are applied in all shooting scenarios, the speed of their application is increased in combat to quickly and effectively engage targets from various locations and distances. In combat, the fundamentals of marksmanship must be applied in the shortest period of time possible while still achieving accurate target engagement. There is no room for error or hesitation. The time required is unique to each individual and his own capabilities.

a. The ultimate goal in quick engagement is to achieve sight alignment and sight picture simultaneously, and to fire the shot at the moment sight alignment and sight picture are acquired.

b. Executing your shots at a rapid but effective rate can be achieved only through practice and experience. Eventually, you can become so skilled that you are not even conscious of the separate steps you take to fire your shot.

c. You must know your abilities. Fire only as quickly as you are capable of firing accurately. Do not exceed your shooting skills in an effort to get rounds quickly on target. Chances are those rounds will be ineffective. In combat, you might not have a second chance. NEVER fire with the weapon on Burst. There is no way to manage the recoil to maintain accuracy beyond the first of the three rounds. Using Burst is a waste of ammunition.

2. **APPLICATION OF MARKSMANSHIP FUNDAMENTALS IN COMBAT**

A. Aiming

Sight Alignment/Sight Picture – in combat, the fundamentals are applied simultaneously in a compressed time so sight alignment and sight picture are achieved as the shot is fired. Although the target must be quickly engaged in combat, sight alignment is still the first priority.

Sight Alignment and Distance to the Target – during combat, the fundamentals of marksmanship must be applied in a time frame consistent with the size and distance to the target. As the distance to the target increases, sight alignment becomes more critical for accurate target engagement.

Long-range Engagements – at greater distances (i.e., over 100 yards), correct sight alignment and sight picture are essential for accurate target engagement and should not be

compromised.

1. As the distance to the target increases, the front sight post covers more of the target. Since you must see the target to engage it, there is a tendency to lower the tip of the front sight post to acquire the target because it is natural to aim at what you can see. This will cause your rounds to impact low on the target or even to miss the target.
2. You must make a conscious effort to aim center mass.

Short-range Engagements – proper sight alignment is always your goal. However, as the distance to the target decreases (i.e., 100 yards or less), perfect sight alignment is not as critical to delivering effective shots on the target.

1. At very short ranges, a deviation in sight alignment can still produce accurate results as long as the tip of the front sight post is in the rear sight aperture and on the target.
2. A mental adjustment must be made to place the aligned sights on the target, creating an acceptable sight picture as the trigger is pulled. Time, distance to the target, and personal ability will dictate what this acceptable sight picture is. Each individual must define an acceptable sight picture within his own capability. As you become more proficient, your sight picture will become more precise to center mass.

Weapons Presentation as an Aid to Achieving Sight Alignment/Sight Picture

1. Presentation should help you achieve proper and consistent stock weld and eye relief. This will aid in getting sight alignment quickly. Do not move your head down to meet the stock of the weapon. Hold your head as erect as possible to allow the aiming eye to see directly through the sights.

2. If the butt of the rifle is placed correctly and stock weld is correct, you should be looking through the rear sight as your rifle is presented. As the

rifle levels, pick up the front sight and establish sight alignment and sight picture. With practice, this becomes so automatic that it requires minimal effort to align the sights.

3. In combat, you will be looking at the target as you are presenting your rifle. As the rifle settles, shift your focus back to the sights to place the tip of the front sight post on the target and obtain sight picture. As you become more skilled through practice, sight alignment and sight picture will appear to come together simultaneously.

'0-2' Rear Sight Aperture – the '0-2' rear sight aperture is designed for close range engagements under 200 meters and at night.

1. The '0-2' sight has a larger aperture for rapid acquisition of targets because it allows for a wider field of view. Therefore, the aperture can make aligning the sights more difficult due to its larger size. However, at very close ranges, sight alignment is not as critical to accuracy.
2. Flipping the larger '0-2' aperture up will automatically give a zero at 200 yards when the elevation knob is set on the 300-yard setting (8/3).

B. **Breath Control** – in combat, your breathing and heart rate will often be increased due to physical exertion (e.g., running) or the stress of battle. Therefore, you must interrupt your breathing cycle to create a pause (i.e., hold the breath) that is long enough to fire a shot.

C. **Trigger Control** – when a combat target appears, it must be engaged as quickly as you can accurately fire. You must stay within your capabilities and strike a balance between speed and accuracy to deliver well-aimed shots on target. Firing quickly but inaccurately is ineffective and will give the enemy time to respond with his own fire. The goal in combat is uninterrupted trigger control. You must be aggressive in applying uninterrupted trigger control. Trigger control in combat is achieved by the following:

1. Maintain a firm grip on the weapon to increase stability and counter the effects of recoil. Even with a tighter grip, the trigger finger must be able

to operate independently from the gripping hand so the trigger can be moved straight to the rear without disturbing sight alignment.

2. As presentation of the weapon begins, the safety is disengaged and the trigger finger begins moving toward the trigger.
3. When the trigger finger contacts the trigger, slight pressure may be applied.
4. As soon as the sight picture is achieved, the trigger is moved to the rear in one continuous movement, taking care not to disturb sight alignment.

D. **Follow-Through/Recovery** – in fundamental marksmanship training, you practiced follow-through to avoid altering the direction of the round by keeping your rifle as still as possible until the round exited the barrel. In combat, recovery is important to get the rifle sights back on the target for another shot. Recovery starts immediately after the round leaves the barrel. Applying a consistent amount of muscular tension within the position throughout the shot process will allow you to automatically recover the sights back on target. Applying recovery techniques ensures the sights are on target as quickly as possible to fire another shot.

REFERENCES

MCO 3574.2K

NOTES

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DATA BOOK ANALYSIS

LEARNING OBJECTIVES. The Terminal Learning Objective and Enabling Learning Objective pertaining to this lesson are as follows:

a. TERMINAL LEARNING OBJECTIVE. Given a prepared shooter, range supplies and equipment, and a range, without the aid of references, coach battle sight zeroing with the M4 service carbine to ensure personnel achieve a proficiency level IAW MCO 3574.2k.

b. ENABLING LEARNING OBJECTIVE.

1. Given a shooter, a data book, and a target, without the aid of references, record shots for tri fire to ensure the data book is maintained IAW MCRP 3-01A
2. Given a shooter, a data book, and a target, without the aid of references, record shots for slow fire to ensure the data book is maintained IAW MCRP 3-01A.
3. Given a shooter, a data book, and a target, without the aid of references, record shots for rapid fire to ensure the data book is maintained IAW MCRP 3-01A
4. Given a shooter, a data book, and a target, without the aid of references, compare true zeros to ensure the data book is maintained IAW MCRP 3-01A

Purpose of Data Book Analysis. Data book analysis is a careful shot by shot, group by group, page by page review of the firing conducted during the day. Sizes, shapes, and locations of shot groups are examined to provide clues in aiding the coach to confirm and refine a shooter's true zeros. Data book analysis provides clues into specific shooting problems a shooter may be having, allowing the coach to identify weaknesses and correct performance.

1. RECORDING DATA FOR 200-YARD TRI-FIRE

a. Recording Data Before Firing. Recording information in the data book prior to firing saves valuable time on the firing line that should be used to prepare for firing. Some information can be recorded before going to the firing line. In the BEFORE FIRING section of the data book, record the following:

1) Initial Sight Setting or Known BZO

a) Initial Sight Setting: Front Elev. Enter the front sight post setting by recording the number of clicks up (↑) or down (↓) under FRONT ELEV. We will start with a 0 initial sight setting on our front sight post and carry this example throughout instruction.

b) Initial Sight Setting: Rear Elev. Circle the 200-yard setting for the rear sight elevation knob, 8/3-2, under REAR ELEV.

c) Initial Sight Setting: Wind. Under the WIND column, the R represents clicks right on the rifle from the initial sight setting and the L represents clicks left on the rifle. Enter the rear sight windage knob setting by recording the number of clicks right (clockwise) or left (counterclockwise) under WIND. In our example, we will start with a 0 initial sight setting for our windage knob setting.

2) Wind. Prior to firing, check the wind. If wind conditions are present, a sight adjustment will have to be made prior to firing to ensure shots group at the center of the target.

a) Direction. Determine the direction of the wind and draw an arrow through the clock indicating the direction the wind is blowing. In our example, there is a wind blowing from 4:30 to 10:30.

b) Value. Look at the clock to determine if the wind is full, half, or no value wind. Under VALUE, circle FULL or HALF to indicate the wind value. In our example, we will circle HALF to indicate a half value wind.

c) Speed. Observe the flag on the range and circle the appropriate flag indicating the wind's velocity (SPEED). In our example, the wind is blowing at 10 MPH so we will circle the flag blowing from right to left (4:30 to 10:30) above 10 MPH.

d) Determine any Windage Adjustment. The chart beneath the flag indicates the number of clicks on the rear sight windage knob to offset the effects of the wind at 200 yards. Circle the number of clicks where the wind value and wind speed intersect. In our example, we will circle 1 because the wind is HALF value, blowing 10 MPH.

3) Zero. Determine the zero you will place on your rifle to accommodate wind conditions to begin firing at 200 yards. This ZERO will be the Initial Sight Setting or Known BZO plus the rear sight windage setting to compensate for the effects of wind.

a) Front Elev and Rear Elev. Elevation adjustments are not affected by wind so the same settings will be carried over from the Initial Sight Setting or Known BZO column.

b) Wind. Wind will affect the strike of the round right or left on the target. Therefore, if wind is a factor, the rear sight windage knob must be adjusted to compensate for the effects of wind.

(1) If the wind is blowing from the right, add the number of clicks circled by moving the windage knob to the right. For example, our WIND setting from Initial Sight Setting is 0, and the number of windage clicks circled is 1 for a 10 MPH right wind, so we will move the windage knob 1 click right for a 1 R windage setting for our ZERO.

(2) Once the windage setting is determined, it is recorded in the WIND column and the rear sight windage knob is adjusted to this setting to begin firing.

b. Recording Data During Firing

1) Fire the First String. Fire the first 3-shot string. While firing the string, make a mental note of any shots called out of the group. Then immediately check the wind flag to see if the speed or direction of the wind changed.

2) After the String is Fired. After firing the string, and when the target is marked, plot all 3 shots with a dot precisely where they appear on the large target diagram in the block marked PLOT (1ST 3-SHOT GROUP). In our example, we will plot our shot group outside the right shoulder.

3) Sight Setting for 2d String. Make a sight adjustment if required. Triangulate the shot group by drawing a line to form a triangle connecting all 3 shots. Locate the center of the triangle. If the shots form a group, make the necessary sight adjustments off of the center of the triangle. If shots do not form a group (i.e., a group that fits inside the center scoring ring) and do not contain a poor shot, do not make a sight adjustment.

We will determine the sight adjustment by locating the center of the shot group and using the grid lines on the "D"-MOD target in the data book. These grid lines represent the number of inches to bring a shot group center. Looking at the shot group:

a) Front Elev. Locate the closest horizontal grid line to the center of the plotted shot group. Follow the line across to the numbered vertical scale to determine the number of inches of elevation the shot group is off of target center. Calculate the number of clicks on your front sight post to bring your shot group center. At 200 yards, 1 click adjustment on the front sight post will move the strike of the round 2 1/2 inches.

(1) To move your shot group up, rotate the post clockwise (in the direction of the arrow marked UP) or to the right.

(2) To move your shot group down, rotate the post counterclockwise or to the left.

(3) For example, our ZERO front sight post setting was 0, and the center of our 3-shot group is approximately 7 inches or 3 clicks above target center. So we will rotate our front sight post 3 clicks counterclockwise for a new setting of 3 ↓ and record this under SIGHT SETTING FOR 2ND STRING.

b) Wind. Locate the closest vertical grid line to the center of the plotted shot group. Follow the line down to the numbered horizontal scale to determine the number of inches of windage the shot group is off of target center. Calculate the number of clicks on your rear sight windage knob to bring your shot group center. At 200 yards, 1 click adjustment on the rear sight windage knob will move the strike of the round 1 inch.

(1) To move your shot group to the right, rotate the rear sight windage knob clockwise (in the direction of the arrow).

(2) To move your shot group to the left, rotate the rear sight windage knob counterclockwise.

(3) For example, our ZERO windage setting was 1 R, and the center of our 3-shot group was approximately 9 inches or 9 clicks to the right of target center, so we will rotate our rear sight windage knob 9 clicks counterclockwise for a new windage setting of 8 L and record this under SIGHT SETTING FOR 2ND STRING.

4) Repeat steps 1 – 3 and fire the second 3-shot string. We will plot this group center.

5) Additional, Helpful Data. After firing a stage, record any data or information that can be helpful in improving shooting in the future.

c. Recording Data After Firing. In the AFTER FIRING section of the data book, record the following:

1) Zero. Upon completion of firing, determine the elevation and windage to center the shot group, if necessary, and record this sight setting in the ZERO block of the AFTER FIRING section. In our example, because our 2nd 3-shot string was centered on the target, it will not be necessary to make an additional sight adjustment. Enter the final

elevation and windage adjustment setting in the data book:

a) Front Elev. Under the column FRONT ELEV, record the final elevation setting made on the front sight post. In our example, we will record 3 ↓ because our shot group was centered vertically on the target.

b) Rear Elev. Under the column REAR ELEV, record 8/3-2.

c) Wind. Under the column WIND, record the final windage setting made on the rear sight windage knob. In our example, we will record 8 L because our shot group was centered horizontally on the target.

2) Wind. Calculate the prevailing wind.

a) Direction. In our example, the wind was fairly steady, blowing from 4:30 to 10:30.

b) Value. We will circle HALF to indicate a half value wind.

c) Speed. In our example, the wind was blowing at 10 MPH so we will circle the flag blowing from right to left (4:30 to 10:30) above 10 MPH.

d) Determine any Windage Adjustment. We will circle 1 because the wind is HALF value, blowing 10 MPH.

3) True Zero. A true zero is the established zero without the windage adjustments to compensate for the effects of the wind. A true zero is calculated because, the next time you fire, the wind conditions will probably be different. Therefore, the rear sight windage knob adjustments made to compensate for a string of fire's wind will not be the correct setting for wind conditions during other strings or on other days.

a) Front Elev and Rear Elev. Because elevation adjustments are not affected by wind, the same settings will be carried over from ZERO: 3 ↓ and 8/3-2.

b) Wind. Calculate the windage adjustment to compensate for today's wind conditions the same way it was calculated in the BEFORE FIRING information of the data book. The only exception is now windage adjustments are being removed from the rifle rather than added to the

rifle.

(1) Because the windage setting is being removed from the rifle, the number of clicks of windage are subtracted right or left from the ZERO windage setting.

(2) If the wind is blowing from the right, subtract the number of clicks circled by moving the windage knob to the left. For example, our WIND setting from our ZERO is 8 L, and the number of windage clicks circled is 1, so we will move the windage knob 1 click left for a 9 L TRUE ZERO windage setting.

2. RECORDING DATA FOR SLOW FIRE STAGES

a. Recording Data Before Firing

1) True Zero. Record the sight settings determined from 200-yard tri-fire under TRUE ZERO in the AFTER FIRING portion of the data book page.

2) Wind. Prior to firing, check the wind. In our example, the wind is blowing directly at the shooter's back so it is of no value. We will not have to fill out the rest of this block.

3) Zero. Because wind is not a factor, record the same settings as recorded in the TRUE ZERO block.

b. Recording Data During Firing. The method for calling and plotting slow fire shots in the data book is called "the shot behind method." It allows the Marine to spend less time recording data and more time firing on the target. This is because all the calling and plotting is done while the target is in the pits being marked. This information is recorded in the DURING FIRING portion of the data book page. The proper and most efficient method for recording data during KD slow fire stages is as follows:

1) Fire the First Shot. Fire the first shot. Then immediately check the wind flag to see if the speed or direction of the wind changed.

2) Call the Shot Accurately. As soon as the shot is fired and the target is pulled into the pits, record the exact location where the tip of the front sight post was on the target at the exact instant the shot was fired. Record this on the target provided under number 1 in the block marked CALL.

3) Prepare to Fire the Second Shot. As soon as you have recorded the call for the first shot, prepare to fire the second shot.

4) Look at Where the First Shot Hit. As the target reappears out of the pits, look where the first shot hit the target. Remember this location so it can be plotted after firing the second shot.

5) Fire the Second Shot. Fire the second shot. Then check the wind flag to see if the wind changed speed or direction.

6) Call the Second Shot and Plot the First Shot. As soon as the second shot is fired and the target is pulled into the pits, record the call of the second shot. Now plot the precise location of the first shot by writing the numeral 1 on the large target diagram provided in the block marked PLOT.

7) Prepare to Fire the Third Shot. Repeat steps 1 through 6 until three shots have been fired. Indicate each slow fire shot with the appropriate number (e.g., 1, 2, 3).

8) Make a Sight Adjustment if Required. Sight adjustments should be made off of a shot group, not a single shot. Determine if a sight adjustment is necessary off of the first three shots fired. If the shots form a group (i.e, a group that fits inside the center scoring ring), but are not where they were called, make the necessary sight adjustment.

a) Elevation. If an elevation setting change is required, record it under Elevation under CALL 3.

b) Wind. If a windage setting change is required, record it under Wind under CALL 3.

c) In our example, shots #1, #2, and #3 were on call. No windage or front sight elevation adjustments will be made.

9) Prepare to Fire the Fourth Shot. Repeat steps 1 through 8 until the final two shots have been fired. Indicate each slow fire shot with the appropriate number (e.g., 4, 5).

a) In our example, we will plot shots #4, and #5 on call.

b) No sight adjustments will be made.

c. Recording Data After Firing

1) Zero. Since no additional sight adjustments were made, record the sight settings from the ZERO block under BEFORE FIRING.

2) Wind. In our example, wind was not a factor.

3) True Zero. Because wind is not a factor, record the same settings as the ZERO block.

d. Coaches Analysis Slow Fire. See Slide 25

e. 500 yrd line Slow Fire Example. See Slide 26

3. RECORDING DATA FOR RAPID FIRE STAGES

The following procedure should be used for recording data in the data book for KD rapid fire stages:

a. Recording Data Before Firing. In the BEFORE FIRING section of the data book, record the following:

1) True Zero. The sight setting determined during 200-yard slow fire sitting is entered in this block.

a) Front Elev. In our example, we will record a 3 ↓ setting on our front sight post.

b) Rear Elev. Because we are firing from 300 yards, we will enter 8/3 on our rear sight elevation knob.

c) Wind. We finished 200-yard slow fire sitting with a 9 L setting on our rear sight windage knob.

2) Wind. Prior to firing, check the wind. If wind conditions are present, a sight adjustment will have to be made prior to firing to ensure shots group at the center of the target.

a) Direction. In our example, the wind is blowing from 3 o'clock to 9 o'clock.

b) Value. In our example, we will circle FULL to indicate a full value wind.

c) Speed. In our example, the wind is blowing at 10 MPH so we will circle the flag blowing from right to left (3 o'clock to 9 o'clock) above 10 MPH.

d) Determine any Windage Adjustment. In our example, we will circle 6 because the wind is FULL value, blowing 10 MPH.

3) Zero

a) Front Elev and Rear Elev. Since wind does not

affect elevation, these settings are the same as for TRUE ZERO.

b) Wind

(1) If the wind is blowing from the right, add the number of clicks circled by moving the windage knob to the right; if the wind is blowing from the left, move the windage knob to the left.

(2) For example, our WIND setting from TRUE ZERO is 9 L, and the number of windage clicks circled is 6 for a 10 MPH right wind, so we will move the windage knob 6 clicks right for a 3 L windage setting for our ZERO.

b. Recording Data During Firing. In the DURING FIRING section of the data book, record the following:

1) Mentally Call Shots While Firing. While firing the rapid fire string, make a mental note of any shots called out of the group.

2) After the String is Fired. After firing the rapid fire string, and when the target is marked, plot all visible hits with a dot precisely where they appear on the large target diagram in the block marked PLOT. In our example, we will plot our shot group centered on the target.

c. Recording Data After Firing. In the AFTER FIRING section of the data book, record the following:

1) Zero. In our example, because our shot group was centered on the target and on call, it will not be necessary to make a sight adjustment.

a) Front Elev. In our example, we made no elevation change so we will record 3 ↓.

b) Rear Elev. The rear sight elevation knob is never moved off of 8/3 when firing at 300 yards so we will circle 8/3.

c) Wind. In our example, we made no windage change so we will record 3 L.

2) Wind. Calculate the prevailing wind.

a) Direction. In our example, the wind remained steady, blowing from 3 o’clock to 9 o’clock, so we will draw this direction on the clock.

b) Value. We will circle FULL to indicate a full value wind.

c) Speed. In our example, the wind is blowing at 10 MPH so we will circle the flag blowing from right to left (3 o'clock to 9 o'clock) above 10 MPH.

d) Determine any Windage Adjustment. We will circle 6 because the wind is FULL value, blowing 10 MPH.

3) True Zero

a) Front Elev and Rear Elev. Since wind does not affect elevation, these settings are the same as for ZERO.

b) Wind

(1) Because the windage setting is being removed from the rifle, the number of clicks of windage are subtracted right or left from the ZERO windage setting.

(2) If the wind is blowing from the right, subtract the number of clicks circled by moving the windage knob to the left. For example, our WIND setting from our ZERO is 3 L, and the number of windage clicks circled is 6 for a 10 MPH right wind, so we will move the windage knob 6 clicks left for a 9 L windage setting for our TRUE ZERO.

4. COMPARING TRUE ZEROS ACROSS DATA BOOK PAGES

a. Purpose. For a shooter to have consistency in sight settings across positions, he must be applying the fundamentals correctly and assuming stable firing positions incorporating the seven factors. By comparing true zeros across positions and days of firing, the coach can determine two things:

1) The coach can identify those shooters who need assistance in assuming solid positions and applying the fundamentals.

2) For shooters who have a good grasp of the fundamentals and firing positions, the coach can identify a needed sight adjustment change to center a shot group.

b. Compare TRUE ZEROs Across Positions. The coach analyzes the data book to look for consistency in applying the fundamentals across positions and yard lines.

1) Troubleshoot Elevation Adjustments Between Positions. It is possible that minor elevation adjustments will be required from position to position; these adjustments should be made to the rear sight elevation knob (once a BZO has been firmly established). Because the standing

position is the least stable of the positions, the shooter has less stability of hold, which can cause shots to impact higher on the target. In this case, the shooter may need to come down 1 click of elevation when he shoots standing.

2) Troubleshoot Windage Adjustments Between Positions. The shooter's windage setting for each position should be within 1 or 2 clicks of each other. A shooter with differences of 4 or more clicks between positions may have problems incorporating the seven factors. The coach should concentrate on the shooter's performance during the next day's firing. The coach should analyze the shooter's application of the fundamentals and his position through the seven factors to determine if there is a problem with a particular position.

b. Compare TRUE ZEROs Across Days. The shooter should review each shooter's true zeros at the end of each day's firing to identify and correct any shooting weaknesses.

1) A shooter with a good grasp of the fundamentals and consistent shooting positions will have minimal sight adjustments (not more than 1-2 clicks of elevation and windage change, usually in the same direction) from position to position and yard line to yard line. On the other hand, the shooter with a poor grasp of the fundamentals and a weak shooting position may find himself with rear sight elevation and windage settings from one side of the scale to the other.

2) The shooter should identify and correct a zero change as training progresses. As a shooter gets more comfortable and used to assuming positions and applying the fundamentals across a couple of days of training, shooting positions often settle, muscles limber up, etc. A slight change in zero from Day One to Qualification Day may be normal due to these factors and should be made to move the shot group to center.

REFERENCES

MCRP 3-01A

NOTES

UNITED STATES MARINE CORPS
(FIELD MEDICAL TRAINING BATTALION)
(TRAINING COMMAND)
(BOX 21010)
(CAMP PENDLETON, CA 92055-1010)

RIFLE RANGE OPERATIONS

LEARNING OBJECTIVES.

a. **TERMINAL LEARNING OBJECTIVE.**

1) Given a range, supplies, equipment, a service carbine and a fighting load, conduct a stage of fire to achieve a level of proficiency per range regulations.

b. **ENABLING LEARNING OBJECTIVES**

1) Without the aid of references, given a range, individual combat load, and a service carbine demonstrate performing range commands per range regulations.
2) Without the aid of references, given a range, individual combat load, a service carbine and a target in the butts score targets per range regulations.

1. **RANGE PERSONNEL**

Coaches

Coaches are the individuals on the range who instruct marksmanship. This is their primary responsibility. Coaches are assigned to each firing point to assist the shooter. If you have a problem, either on or off the firing line, seek assistance from your coach. If you are in position on the firing line and raise your hand, a coach will come to your assistance.

Block NCO

The block NCO assists the coach in determining alibis. The block NCO will assist the coach when a shooter needs extra assistance.

Line SNCO

The line SNCO assists the range safety officer in operation of the range. He enforces range safety regulations and monitors the conduct of fire.

Tower NCO

The tower NCO assists the line SNCO during range operations. The tower NCO gives all line and firing commands. The tower NCO is located at the center of the firing line where he can observe all firing positions. Commands to move on or off the firing line, load your rifle, fire your rifle, etc., are given by the tower NCO.

Range Safety Officer (RSO)

The RSO is responsible for the safe and efficient operation of the range. The RSO has the final determination on alibis, should there be any question.

Pit NCO

The pit NCO is responsible to the RSO for pit operations. He oversees and controls all pit operations and enforces pit regulations. The pit NCO gives commands and directs the pit operators during firing operations.

Pit Operator

During live fire training, shooters are assigned to relays. When not firing, shooters pull targets in the pits and function as pit operators. The pit operator raises and lowers the target on command from the pit NCO. He must work quickly but effectively to pull and mark the targets. Responsibilities of the pit operator include:

1. Raising and lowering the target on command from the pit

NCO.

2. During slow fire, when a shot hole appears on the target, the pit operator lowers the target and places the appropriate spotter in the shot hole. White spotters are placed in shot holes in the black areas of the target and black spotters are placed in shot holes in the white areas of the target. When the spotter is moved to the next shot hole, the pit operator pastes the previous shot hole with the appropriately colored paster.

3. Following a string of rapid fire, the pit operator raises and lowers the target at the pit NCO's command and places the appropriately colored spotters in the shot holes. At the pit NCO's command, the pit operator runs the target back to show the shooter his shot group. He also removes the spotters and covers the shot holes with the appropriately colored pasters when directed by the pit NCO.

2. **RANGE SAFETY**

Safety On The Firing Line

a. Range commands are given by the tower NCO, however, in the event of an emergency, anyone can call a "Cease Fire." Anyone observing a condition that makes firing dangerous will immediately call "Cease Fire." Report the unsafe condition to a coach, the tower NCO, the pit NCO, or the RSO.

b. Weapons will not be loaded except while on the firing line. Shooters will not load weapons until the command to load is given by the tower NCO.

c. Never shoot outside the right or left lateral limits of the range as indicated by markers or pit flags. Never shoot at your target while the scoring disk is in the air.

d. Weapons are always in Condition 4 except:

1. On the firing line when live fire is in progress.
2. When snapping-in. Snapping-in is allowed only in designated areas.

e. On the command "Cease Fire," immediately place your weapon on safe, your finger straight along the

receiver, and wait for instructions from the tower. Muzzles are pointed down range and shooters remain in position until the "Unload, Show Clear" command is given and the weapons safety inspection is complete. Upon completion of the weapons safety inspection, place the weapon in Condition 4 before moving off the firing line.

f. Hearing protection must be worn at all times while on the firing line and the ready line while firing is in progress.

Safety In The Pits

The pit NCO will enforce safety regulations and constantly remind pit operators about safety.

a. The noise level must be kept to a minimum so the pit NCO can maintain communications with the line and the pit operators.

b. Pit operators must move in a fast but safe and orderly manner.

c. Pit operators must not expose any part of their body above the red limiting line on the overhang above the catwalk.

d. Pit personnel must remain inside the limiting lines in the pits at all times. DO NOT CROSS ANY RED LINES IN THE PITS WHILE FIRING IS IN PROGRESS, OR WITHOUT THE CONSENT OF THE PIT NCO!!!!!

e. Pit operators will make no attempt to snap-in, adjust their sights, clean their weapons, or handle their weapons while working in the pits.

3. **SCORING PROCEDURES**

Shot Spotters Shot spotters have a black side and a white side and are used to mark the location of shot holes on the targets. They are placed on the target black on white or white on black for easy sighting at a distance.

a. 3" spotters are used for 200- and 300-yard rapid fire stages and triangulation fire.

b. 5" spotters are used for 200- and 300-yard slow fire stages. If the shot is in or near the center of the aiming black, the shooter may request the target be spotted with a 3" spotter

instead of the 5" spotter.

Pasters Pasters are black or white and are used to cover shot holes on the targets. Once the spotters are removed from the target, the shot holes are covered with the appropriate colored pasters. For economic purposes, each paster should be torn in half. Only use half a paster to cover each individual shot hole.

Scoring Disk – the scoring disk is a 10 inch shot spotter that has a red side and a black side and is used to indicate scoring on a target. This disk is used to indicate to the shooter on the firing line the point value of the last shot fired. The scoring disk is always displayed on the target with the red side facing the firing line.

a. To score a 5, place the disk in the lower left corner of the target.

b. To score a 4, place the disk in the lower right corner of the target.

c. To score a 3, place the disk in the upper right corner of the target.

d. To score a 2, place the disk in the upper right corner of the target.

e. To score a miss, place the disk at the 12 o’clock position on the target.

Rapid Fire

Count Shot Holes On Target
A command given by the pit NCO to a specific target pit to count the number of hits on the target.
Excessive Hits On Target
The pit operator indicates he has more than 10 shots on his target by signaling the pit NCO or the pit verifier. The target will be held in the pits until the pit verifier acknowledges the excessive hits. At this time the pit verifier will have all shot holes pasted up and the target raised to half-mast with the value disk placed in the appropriate spot for excessive hits.
Insufficient Hits On Target
The pit operator indicates he has fewer than 10 shots on his target by signaling the pit NCO or the pit verifier. If a target has 8 hits or less, the pit verifier will tell the pit operator to score for the number of rounds impacting the target and run the

target all the way up. If the target has 9 hits all in the “aiming black” with no excessive hits on two targets to either side, the shooter will be given the option of receiving an alibi or accepting the score for the 9 shots fired.

4. **PIT COMMANDS**

Slow Fire

Mark
The shooter on line has shot. Pull the target down and look for the shot hole.

Disregard
Disregard the value of the last shot. The pit operator will line through this value on his scorecard and initial it.

Re-disk
Re-disk the value of the last shot. The scoring disks must be held up at least three seconds to allow the shooter enough time to see it.

Put the Target Back in the Air
Raise the target.

Integrate Spotter
Spotters must be white on black and black on white.

Straighten Target
Align the target in the target carriage.

Slow Target
The pit operator has been labeled as a slow target and is told he needs to speed up his pit service. The pit operator should not take more than 20 seconds to pull and mark a target. There are times when a slow target cannot be helped, for instance, when a target goes down in the pits for repairs or verifiers are busy verifying other targets.

Target in Repair
The target or target carriage has been broken and an attempt to repair it is underway.

REFERENCES

MCO 3574.2k

NOTES

APPENDIX

	NAVY	ARMY	AIR FORCE	MARINE CORPS	COAST GUARD
E-1	Seaman Recruit	Private	Airman Basic	Private	Seaman Recruit
E-2	Seaman Apprentice	Private E-2	Airman	Private First Class	Seaman Apprentice
E-3	Seaman	Private First Class	Airman First Class	Lance Corporal	Seaman
E-4	Petty Officer Third Class	Corporal / Specialist	Senior Airman	Corporal	Petty Officer Third Class
E-5	Petty Officer Second Class	Sergeant	Staff Sergeant	Sergeant	Petty Officer Second Class
E-6	Petty Officer First Class	Staff Sergeant	Technical Sergeant	Staff Sergeant	Petty Officer First Class
E-7	Chief Petty Officer	Sergeant First Class	Master Sergeant / First Sergeant	Gunnery Sergeant	Chief Petty Officer
E-8	Senior Chief Petty Officer	Master Sergeant / First Sergeant	Senior Master Sergeant / First Sergeant	Master Sergeant / First Sergeant	Senior Chief Petty Officer
E-9	Master Chief Petty Officer	Sergeant Major	Chief Master Sergeant / First Sergeant	Sergeant Major	Master Chief Petty Officer
	Fleet/Command Master Chief Petty Officer	Command Sergeant Major	Command Chief Master Sergeant	Master Gunnery Sergeant	Command Master Chief Petty Officer
Special	Master Chief Petty Officer of the Navy	Sergeeant Major of the Army	Chief Master Sergeant of the Air Force	Sergeant Major of the Marine Corps	Master Chief Petty Officer of the Coast Guard

WARRANT

NAVY	MARINES	ARMY
W-1	WARRANT OFFICER	WARRANT OFFICER
W-2 CHIEF WARRANT OFFICER	CHIEF WARRANT OFFICER	CHIEF WARRANT OFFICER
W-3 CHIEF WARRANT OFFICER	CHIEF WARRANT OFFICER	CHIEF WARRANT OFFICER
W-4 CHIEF WARRANT OFFICER	CHIEF WARRANT OFFICER	CHIEF WARRANT OFFICER
W-5	CHIEF WARRANT OFFICER	CHIEF WARRANT OFFICER

Insignia of the United States Armed Forces – Officers

	O-1	O-2	O-3	O-4	O-5	O-6	O-7	O-8	O-9	O-10	SPECIAL
ARMY	Second Lieutenant (2LT)	First Lieutenant (1LT)	Captain (CPT)	Major (MAJ)	Lieutenant Colonel (LTC)	Colonel (COL)	Brigadier General (BG)	Major General (MG)	Lieutenant General (LTG)	General (GEN)	General of the Army (GA)
MARINES	Second Lieutenant (2ndLt)	First Lieutenant (1stLt)	Captain (Capt)	Major (Maj)	Lieutenant Colonel (LtCol)	Colonel (Col)	Brigadier General (BGen)	Major General (MajGen)	Lieutenant General (LtGen)	General (Gen)	
NAVY	Ensign (ENS)	Lieutenant Junior Grade (LTJG)	Lieutenant (LT)	Lieutenant Commander (LCDR)	Commander (CDR)	Captain (CAPT)	Rear Admiral Lower Half (RADM)(L)	Rear Admiral Upper Half (RADM)(U)	Vice Admiral (VADM)	Admiral (ADM)	Fleet Admiral (FADM)
AIR FORCE	Second Lieutenant (2d Lt)	First Lieutenant (1st Lt)	Captain (Capt)	Major (Maj)	Lieutenant Colonel (Lt Col)	Colonel (Col)	Brigadier General (Brig Gen)	Major General (Maj Gen)	Lieutenant General (Lt Gen)	General (Gen)	
COAST GUARD	Ensign (ENS)	Lieutenant Junior Grade (LTJG)	Lieutenant (LT)	Lieutenant Commander (LCDR)	Commander (CDR)	Captain (CAPT)	Rear Admiral Lower Half (RADM)(L)	Rear Admiral Upper Half (RADM)(U)	Vice Admiral (VADM)	Admiral (ADM)	

ACRONYMS AND GLOSSARY

A

AA BN	Assault Amphibious Battalion
AAV	Assault Amphibian Vehicle
ABCs	Airway, Breathing, Circulation
ACE	Aviation Combat Element
Acidosis	A disturbance in the acid base balance of the body in which there is an accumulation of acid; as in diabetic acidosis or renal disease
ACLS	Advanced Cardiac Life Support
Acute	Rapid onset, opposite of chronic
ADAL	Authorized Dental Allowance List
Aerobic	Requiring oxygen
Afterload	The pressure in which the heart must pump blood out with each beat
Alkalosis	Acid-base disturbance in which there is an accumulation of basic substances. pH is elevated
Alveoli	Small sacs extended from the lungs where 02 & C02 exchange takes place
AMAL	Authorized Medical Allowance List
A.M.P.L.E	A mnemonic used in taking a history meaning allergies, medications, past illnesses, last meal, & events preceding the injury
Anaerobic	Absence of oxygen
Analgesics	Pain medications
Anorexia	Loss of appetite
Antecubital	In front of elbow

Anteroposterior	Front to back
Anticoagulant	A substance which prevents blood clotting
Antiseptic	Inhibitor of bacterial growth or germ killing cleanser
Anuria	No urine output
Apathy	Without emotion, indifference or sluggish
Apex	The top, the end or the tip of a structure such as the apex of the heart
Apnea	Not breathing
Arrhythmia	Abnormal rhythm of the heart sometimes resulting in inadequate blood flow
Aseptically	Free from sepsis or infection
ASMRO	Armed Services Medical Regulating Office
ASP	Ammunition Supply Point
Asphyxia	An increase in carbon dioxide and or lack of oxygen in the blood
Aspirate	To remove or withdraw by suction
Ataxia	Muscular incoordination
ATLS	Advanced Trauma Life Support
Auscultate	Listening for sounds in body cavities
A.V.P.U.	A mnemonic meaning the patient is Alert, responds to Verbal stimuli by following simple commands i.e., patient can't talk but responds when you give a command to wiggle their fingers, Painful i.e., sternum chest rub, or totally Unresponsive
Avulsion	To pull; a wound caused by tearing away

B

BAMCIS	Begin the planning, Arrange recon, Make recon, Complete the plan, Issue the order and Supervise. 5 troop leading steps
BAS	Battalion Aid Station
BDE	Brigade
Bilateral	Pertaining to two sides of the body
Blanch	To turn white or remove color
Blunt Trauma	Trauma in which a force does not penetrate or break through the skin
BLT	Battalion Landing Team
BMU	Beach Master Unit
BN	Battalion
Bolus	A mass injection of medication given rapidly
Bradycardia	Decreased heart rate, usually less then 60 beats per minute
Bradypnea	Decreased respirations, usually less then 8 breathes per minute
BSA	Body Surface Area
Btry	Artillery Battery
BUMED	Bureau of Medicine and Surgery

C

Cardiac Tamponade	A collection of blood in the sac surrounding the heart interfering with efficient function of the heart
Cardiogenic	Originating in the heart
CASEVAC	Casualty Evacuation

CASREP	Casualty Report
CAT	Combat Action Tourniquet
CATF	Commander Amphibious Task Force
CAX	Combined Arms Exercise
CE	Command Element
CSF	Cerebral Spinal Fluid
CEB	Combat Engineer Battalion
Cerebellum	Responsible for coordinated body actions & movements such as, running and standing on your head. Plays an essential role in posture, balance & coordination. Also known as the “little brain”
Cerebral spinal fluid	Protects and cushions the brain & spinal cord. CSF also cleanses the brain and helps to fight infection
Cerebrum	The largest part of the brain, which controls consciousness, memory, sensations, emotions & voluntary movements. Also known as “Gray Matter”
CG	Commanding General
CHF	Congestive Heart Failure
Chilblains	Mild cold injury, prelude to frost bite
CINCNAVEUR	Commander in Chief, Naval Forces Europe
CINCPAC	Commander in Chief, Pacific
CINCPACFLT	Commander in Chief, U.S Pacific Fleet
CINCSOC	Commander in Chief, Special Operations Command
CINCUSNAVEUR	Commander in Chief, U.S Naval Forces Europe
CJTF	Commander, Joint Task Force
CLF	Commander, Landing Force

COMM	Communications
Comminuted	Broken into multiple pieces
COMNAVSURFLANT	Commander, Naval Surface Force, Atlantic
COMNAVSURFPAC	Commander, Naval Surface Force, Pacific
Conduction	The transfer of sound waves, heat, nervous impulses, or electricity through direct contact
Contraindication	Any condition that renders a particular treatment or medication improper
Contralateral	Opposite side
Contusion	Injury of tissue without breaking the skin
Convection	Transmission of heat in liquids or gases by a circulation carried on by the heated particles
Convulsion	Involuntary muscle movement
CP	Command Post
Crepitation	A crackling or grating sound
Cricoid	Lowermost cartilage of the larynx
Cricothyroidotomy	An incision through the cricoid and Thyroid cartilage to make an alternative airway
Crystalloid	A substance capable of forming crystals such as sodium chloride
CSSD	Combat Service Support Detachment
Cutaneous	Referring to the skin
Cyanosis	Bluish coloration of the skin resulting from lack of oxygen

D

D5W	An intravenous solution that consists of 5% dextrose in water, used for fluid replacement and caloric supplementation in patients who cannot maintain adequate oral intake. D5W is not the first fluid of choice to treat dehydration in the field
D50W	An intravenous solution of 50% dextrose in water used for adults with hypoglycemic (low blood sugar) emergencies, usually given as a 50 ml bolus
D-Day	The unnamed day on which a particular operation commences or is to commence
Debridement	The removal of foreign objects or dead tissue in a wound
Demarcated	Outlines, clearly defines
Diarrhea	Frequent passage of watery bowel movements
Diastolic Blood Pressure	The pressure remaining in the blood vessels while the heart is at rest
Dilated	Open or enlarged
Displacement	The movement of supporting weapons from one firing position to another
Dissipation	Dispersion, break up
Distal	Far away, opposite of proximal or close
Diuretic	A substance which increases the excretion of urine
DIV	Division
Dorsum	The upper portion of an appendage or part
Draw-D	Used in a defensive position. Meaning Defend, Reinforce, Attack, & withdraw
DSO	Division Surgeons Office
DTG	Date, Time, Group
Dyspnea	Difficulty breathing

Dysuria	Difficult or painful urination

E

EBL	Estimated Blood Loss
Ecchymosis	Bruising, hemorrhagic spot often due to blunt trauma
Echelon formation	One of the four types of fire team formations, similar to skirmisher right and left except that one flank is angled to the rear
Edema	Accumulation of fluid
Emphysema	Distension of tissue due to presence of gas
Enteric	Within or pertaining to the intestines
Envelopment	An attack made on one or both of the enemy's flanks or rear, usually accompanied by an attack to his front
EOD	Explosive Ordinance Disposal
Erythema	Redness of the skin caused by grouping capillaries
ESB	Engineering Support Battalion
Eschar	Mass dead tissue mostly associated with burns
Etiologic	Cause or origin
Exsanguination	Loss of blood – implying total blood loss
Exudate	Excretion of puss, fluid or matter through vessel walls into adjoining tissue

F

Fascia	Connective Tissue
FEBA	Forward Edge of the Battle Area
FEX	Field Exercise

Fistula	An abnormal tube-like passage from a normal cavity or tube to a free surface or to another cavity
Flaccid	Relaxed or absent muscle tone
Flail	Excessive mobility such as an unstable chest wall fracture
Flank	Area on the side between the ribs and pelvic bone (ileum)
Fleet Marine Force (FMF)	A balanced force of combined arms comprising of land, air, and sea service elements of the U.S Marine Corps
FO	Forward Observer
FDA	Food and Drug Administration
FOD	Foreign Object Damage
FPM	Field Protective Mask
Frag	Fragmentation
FREQ	Frequency

G

GAS	Group Aid Station
Gavage	Force feeding into the stomach with a tube
GCE	Ground Combat Element
Gingivitis	Inflammation of the gingival tissue may be surrounding one tooth or groups of teeth
Glottis	The sound producing apparatus of the larynx including vocal cords and is protected by the epiglottis
GMO	General Medical Officer
GP	General Purpose
Grimace	A painful expression

GSW	Gunshot Wound

H

Harassing Fire	Fire designed to disturb the enemy troops to curtail movement and promote threat of losses to lower morale
HE	High Explosive
Hematoma	A tumor or swelling containing blood
Hematuria	Discharge of blood in urine
Hemodynamic	Refers to circulation
Hemoptysis	Refers to coughing up blood
Hemorrhage	Bleeding from a ruptured vessel either internal or external
Hemothorax	Blood in the chest cavity
Hespan	A hypertonic plasma substitute
H-Hour	The specific hour on D-day that an operation commences
Hyper	Excessive or elevated
Hyperemic	An excess of blood in a part; engorgement
Hyperresonance	Increased resonance when an area is percussed
Hyperventilation	An increase in the rate and depth of normal respirations. Responsible for increased oxygen levels & decreased carbon dioxide levels
Hypo	Decrease
Hypoesthesia	Decreased sensation or feeling
Hyponatremia	Low sodium level in the blood

Hypothalamus	Portion of the brain that regulates the body's core temperature
Hypovolemic	Too low volume
Hypoxia	An insufficient concentration of oxygen in the tissue in spite of an adequate blood supply

I

IFAK	Individual First Aid Kit
IM	Intramuscular
Immersion	The submersion of a person in water
Incontinence	The inability to control excretory functions
Infusion	Therapeutic introduction of fluid into a vein
Interstitial Spaces	The space between organs or tissue
Intra	Within
Intubation	The insertion of a tube into a hollow space, i.e. larynx
Ischemic	Local & temporary decreased circulation
Involuntary muscle	Also known as smooth muscle, produces slow long-term contractions of which the individual is unaware. Smooth muscle occurs in hollow organs, such as the stomach, intestine, blood vessels, and bladder.
Ionizing Radiation	Radiations that has sufficient energy to remove electrons from atoms
ITA	Initial Trauma Assessment

J

JJDIDTIEBUCKLE	Acronym for the fourteen leadership traits: Justice, Judgment, Dependability, Initiative, Decisiveness, Tact, Integrity, Enthusiasm, Bearing, Unselfishness, Courage, Knowledge, Loyalty, Endurance
JVD	Jugular Vein Distention

K

Kilogram	2.2 lbs; metric weight
KOCOA	Key Terrain, Observation and Fields of Fire, Cover & Concealment, Obstacles, and Avenues of Approach
KVO	Keep Vein Open. Used when administering an I.V

L

LAR BN	Light Armored Reconnaissance Battalion
Larynx	The enlarged upper end of the trachea; the organ of voice or the “voice box”
Latent	Quite or not active
Lavage	Irrigation of an organ or cavity
LCE	Logistics Combat Element
LOC	Level of Consciousness
Lysis	Destruction or decomposition, as of a chemical or cell
Lucent	Able to readily pass through, the opposite of opaque
Lucid	Conscious

M

MACG	Marine Air Control Group
MAGTF	Marine Air Ground Task Force

MAG	Marine Air Group
Malposition	In the wrong place or alignment
Malaise	Feeling of weakness or uneasiness
Malposition	Poor positioning
Mandible	Lower jawbone
MARDIV	Marine Division
MARFOR	Marine Forces
MARFORLANT	Marine Forces-Atlantic
MARFORPAC	Marine Forces-Pacific
MARFORORES	Marine Corps Reserve
Mastoid	Process of temporal bone behind the ear
MAW	Marine Aircraft Wing
Maxilla	The upper jaw bone
MCO	Marine Corps Order
MCSF	Marine Corps Security Forces
MEB	Marine Expeditionary Brigade
Mediastinum	Midline structure that divides the thoracic cavity into two portions. It includes the trachea, esophagus, thymus, heart and great vessels. The lungs are located on either side of this midline structure
Medulla	The most inferior part of the “brain stem” which contains the center that regulates respiratory rate, blood pressure, heart rate, breathing, swallowing and vomiting
MEF	Marine Expeditionary Force

Messentery	A peritoneal fold covering the greater part of the small intestine and connecting the intestine to the posterior abdominal wall
METTAG	Medical Emergency Triage Tag (NATO Card METTAG 137), provides a quick reliable method of assessing casualties and assigning them with an appropriate triage/evacuation priority
Metatarsal	Bone located on the top of the foot
Midbrain	One of the four parts of the brain stem. The midbrain regulates muscle tone.
MEU	Marine Expeditionary Unit
MLG	Marine Logistics Group
MMART	Mobile Medical Augmentation Readiness Team
MOI	Mechanism Of Injury
MOLLE	Modular Lightweight Load-Carrying Equipment
MOPP	Mission-Oriented Protective Posture- MOPP is a flexible system of protection against chemical agents
Morbidity	The rate at which an illness or abnormality occurs in a particular area or within a population
Mortality	Death rate or condition of being deceased
Myocardium	Heart muscle
MWHS	Marine Wing Headquarters Squadron
MWSG	Marine Wing Support Group

N

NCA	National Command Authorities
NCO	Non-Commissioned Officer
NBC	Nuclear, Biological, Chemical

Necrosis	Death to areas of tissue or bone surrounded by healthy tissue
Neuralgia	Nerve pain
Neuritis	Nerve inflammation
Neurogenic	Originating in nerve tissue
Neuropathy	Any disease of the nerves
NPA	Nasopharyngeal Airway
NPO	Nothing by mouth

O

Oblique	At an angle, slanted or diagonal
Occlusive dressing	A dressing that closes or seals a wound so that it is air tight
OP	Observation Post
OPA	Oropharyngeal Airway
Open Fracture	Fracture in which the bone has pierced through the skin
Oropharynx	The portion of the pharynx between the soft palate and the epiglottis
Orthostatic	Refers to an erect position
OSMEAC	Acronym for the five-paragraph order format: Orientation, Situation, Mission, Execution, Administration and Logistics, and Command and Signal

P

Pallor	Paleness of the skin
Palpate	To examine by touching

Paradoxical Movement	Commonly seen in flail chest when one section of the ribs goes in the opposite direction of the majority with respirations
Paresis	Partial or incomplete paralysis
Paresthesia	Abnormal sensation such as numbness or tingling
Parietal	Of or pertaining to the outer wall of a cavity or organ
Patency	Refers to being open
Patrol	A detachment of ground, sea or air forces sent by a larger unit for the purpose of gathering information or carrying out a destructive, harassing, mopping-up or security mission
Percussion	Examination by tapping
Percutaneous	Through the skin
Perfusion	Supplying an organ or tissue with nutrients by fluid
Periapical Abscess	Results from infection of pulpal tissue causing pulp to become necrotic
Pericardium	The membrane sac surrounding the heart
Perineum	The external region between the anus and the scrotum (male) or vaginal opening (female)
Peritoneum	The membrane lining the abdominal cavity and covering the abdominal organs
PERRLA	Pupils Equal, Round, Reactive to Light, Accommodation
Phlebitis	Inflammation of a vein or veins
Pleural	A delicate serous membrane enclosing the lung
PMS	Pulse Motor Sensation
Pneumothorax	A collection of air or gas in the pleural space causing one or both lungs to collapse

Pons	One of the four parts of the brain stem, the sleep center and respiratory center
Preload	The volume & pressure of blood coming into the heart
Prolapse	Falling or dropping down
Proximal	Close or near, opposite of distal
Pulmonary Edema	Effusion of serous fluid around the lungs
Pulse Pressure	The difference between the systolic & diastolic blood pressure
Purpura	A small hemorrhage in the skin, mucous membrane, or serosal surface, which may be caused by various factors, including blood disorders, vascular abnormalities and trauma
Purulent	Drainage that contains pus
Pyrotechnics	Devices used to transmit command or information, such as flares and smoke grenades

R

RAD	Radiation Absorbed Dosage, the method for measuring radiation exposure dosage
RAS	Regimental Aid Station
Resilient	Bounce or spring back, durable
Reticular Activating System	One of the four parts of the brain stem, the reticular activating system is scattered throughout the brain stem and is important in arousing and maintaining consciousness
R.I.C.E.	Acronym for treatment consisting of Rest, Ice, Compression, and Elevation
Rupture	To break apart

RDD	Radioactive Dispersive Device
Radioactivity	The property possessed by some elements or isotopes of spontaneously emitting energetic particles such as alpha or beta particles, often accompanied by gamma rays, by the disintegration of their atomic nuclei
RT	Receiver-Transmitter, the common item of all SINCGARS, the actual SINCGARS radio itself
RTA	Rapid Trauma Assessment

S

Sagittal Plane	A plane dividing the body into right And left sides
SALUTE	Used as an intelligence report when calling in an enemy sighting. Meaning Size, Activity, Location, Unit, Time, and Equipment
S.A.M.P.L.E	Acronym used for obtaining medical history during emergency care, consist of: Signs and symptoms, Allergies, Medications, Pertinent past history, Last oral intake, and Events leading to problem
Saphenous veins	Two veins, one short, one long, in lower leg, which join near the knee
Scapula	Shoulder blade
Sector of Fire	An area, limited by boundaries, assigned to a unit or to a weapon to cover by fire
Septicemia	Widespread destruction of tissues due to absorption of disease-causing bacteria or their toxins from the bloodstream
Shock	An abnormality of the circulatory system that Results in inadequate organ perfusion
SINCGARS	Single Channel Ground & Airborne Radio Systems
Skin Wheals	Localized edema of the body surface
Spicule	Sharp point

Splenomegaly	Enlargement of the spleen
SPMAGTF	Special Purpose Marine Air Ground Task Force
Stenosis	A constriction or narrowing
Sternomastoid	Muscle from sternum to clavicle to mastoid bone
Stridor	A harsh or shrill repertory sound audible from a distance
Stupor	A state of dullness; mind and senses are slowed
Stylet	A slender wire used for guiding or clearing a tube Or needle
Subclavian	A large vein below the collar bone (clavicle)
Subcostal	Below the rib
Subcutaneous	Under the layers of the skin
Systemic	Refers to the whole body as opposed to a part
Systolic Blood Pressure	The force of blood against blood vessels produced by ventricular contraction.
S1	Personnel Office (Regimental / Battalion level)
S2	Intelligence section (Regimental / Battalion level)
S3	Training and Operations (Regimental / Battalion level)
S4	Supply and Logistics (Regimental / Battalion level)
S6	Communications

T

Tachycardia	Increased heart rate, usually greater then 100 beats per minute
Tachypnea	Increased respirations, usually more then 25 breaths per minute

TBSA	Total Body Surface Area
TCCC	Tactical Combat Casualty Care (broken into 3 phases: care under fire, tactical field care, and combat casualty evacuation care)
T / E	Table of Equipment
T / O	Table of Organization
Thoracentesis	Surgical perforation of the thorax
Tibia	Small bone of lower leg
Thorax	Also known as the Thoracic cage is the part of the body between the base of the neck and the diaphragm. Divided into 3 parts; the manubrium, the body & the xiphoid process
Thrombosis	Formation of a blood clot
Tibia	Large bone in lower leg
Trachea	Tube-like structure from larynx to the bronchial tubes, conveys air to the lungs
Translucent	Clear, transparent
Triage	To group or treat by order of severity
Turbidity	Cloudy or the inability to see through something such as a liquid
Turgor	The state of normal swelling and tension in living cells

U

Ulceration	The formation of a crater like lesion on the skin or mucus membranes
Unilateral	Refers to one side
Ureter	One of a pair of tubes that carry urine from the kidney to the bladder

V

Vee Formation	Squad Vee, an inverted squad wedge, facilitates movement into a squad line and provides excellent firepower to the front and to the flank
VEE	Venezuelan Equine Encephalitis – An acute viral disease transmitted from horsed to humans by a variety of mosquito vectors, has potential for use as a biological warfare agent
Vein	A vessel carrying blood to the heart.
Ventricle	A small cavity
Vertigo	A sensation of faintness or inability to maintain balance in a standing or seated position
VHF	Viral Hemorrhagic Fever, caused by several viruses typically found in animals and infecting humans, some types cause a severe, usually fatal infection characterized by fever, widespread bleeding, and organ failure (has potential for use as a biological warfare agent)
VHF (radio)	Very High Frequency (SINCGARS are VHF-FM radios that operate in the VHF range from 30.000 to 87.975 MHz)
Voluntary muscle	Also called striated muscle or skeletal muscle tissue, it is attached to the skeleton and responsible for the voluntary movement of bones

W

Wedge formation	A diamond shaped fire team formation which provides all around security and flexibility
WBGT	Wet Bulb Globe Temperature

12 CRANIAL NERVES

I	OLFACTORY	Smell
II	OPTIC	Vision
III	OCULOMOTOR	Eyelid & eyeball movement, pupil constriction
IV	TROCHLEAR	Downward & lateral eye movements
V	TRIGEMINAL	Sensations of face, scalp & teeth also chewing movements
VI	ABDUCENS	Turns eyes outward
VII	FACIAL	Facial expressions, sense of taste
VIII	ACOUSTIC	Hearing & sense of balance
IX	GLOSSOPHARYNGEAL	Sensation of throat, taste, swallowing movements and secretions of saliva.
X	VAGUS	Sensations of the throat, larynx, thoracic & abdominal organs. (gag reflex)
XI	ACCESSORY	Shoulder movements & movements of the head
XII	HYPOGLOSSAL	Tongue movements

COMMON MEDICAL PREFIXES

A, an-	Without, not, lack of, or absence of
Anti-	Against
Brady-	Slow
Cardi-	Heart
Cephalo-	Head
Cerebr-	Cerebrum

Chol-	Bile
Contra-	Against, opposed of
Cyst-	Bladder
Colo-	Colon
Derm-	Skin
Dys-	Difficult or painful
Endo-	Inner, inside
Enter-	Intestine
Epi-	upon, outside
Gastr or Gastro-	Stomach
Genito-	Reproduction organs
Glyco-	Sugar
Gyno or GYN-	Female
Hem or Hemo-	Blood
Hemi-	Half
Hepat or Hepato-	Liver
Hydro-	Water
Hyper-	Above, high
Hypo-	Below
Inter-	Between
Leuko-	White
Macro-	Large
Mal-	Bad or abnormal

Micro-	Small
Mye-	Muscle
Naso-	Nasal
Nephro-	Kidney
Oligo-	Few or small
Opthalm-	Eye
Oro-	Mouth
Oste-	Bone
Oto-	Ear
Para-	Beside
Per-	Through
Peri-	Around
Pharyng-	Throat
Phleb-	Vein
Poly-	Many
Pneumo-	Relating to the lung, breath or air
Post-	After
Pre-	Before
Procto-	Anus
Pulmo-	Lung
Pyel-	Pelvis
Retro-	Backward, behind
Rhino-	Nose

Semi-	Half
Sub-	Under
Supra or Super-	Above
Tachy-	Rapid, swift
Thorac-	Chest or thorax
Thromb-	Clot or lump
Topo-	Surface
Trans-	Across
Uro-	Urine
Vaso-	Vessels

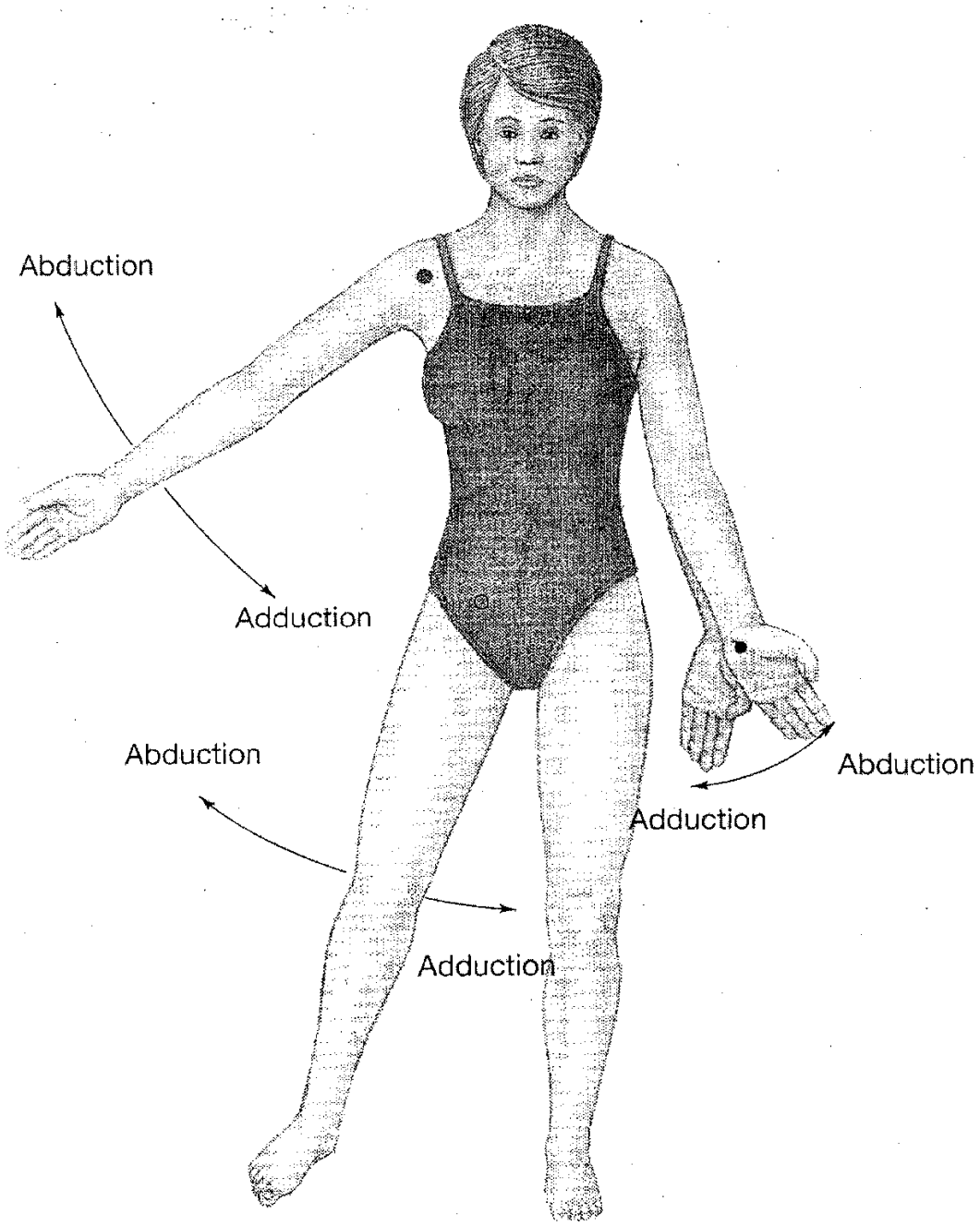
COMMON MEDICAL SUFFIXES

-algia	Pain
-astenia	Weakness
-cardia	Heart
-centesis	Puncturing
-cyte	Cell
-ectomy	Surgical removal of an organ or part
-emia	Blood
-emesis	Vomiting
-esthesia	Perceive, feel

-exia	Appetite
-genic	Causing
-graph or gram	Write or record
-iasis	A condition or process
-itis	Inflammation or swelling
-megally	Enlarge
-meter	Measure
-ology	The study of
-oma	Tumor
-osis	Disease, condition or abnormal increase
-ostio	Bone
-ostomy or stomy	Artificial opening
-paresis	Weakness
-pathy	Disease
-phasia	Speech
-phobia	Fear
-plasty	Surgical repair
-plegia	Paralysis or stroke
-pnea	Breathing
-ptosis	Falling
-rythmia	Rhythm
-rrhagia	Bursting forth
-scop	To look at or observe

-tomy	Surgical incision
-uria	Urine

Movements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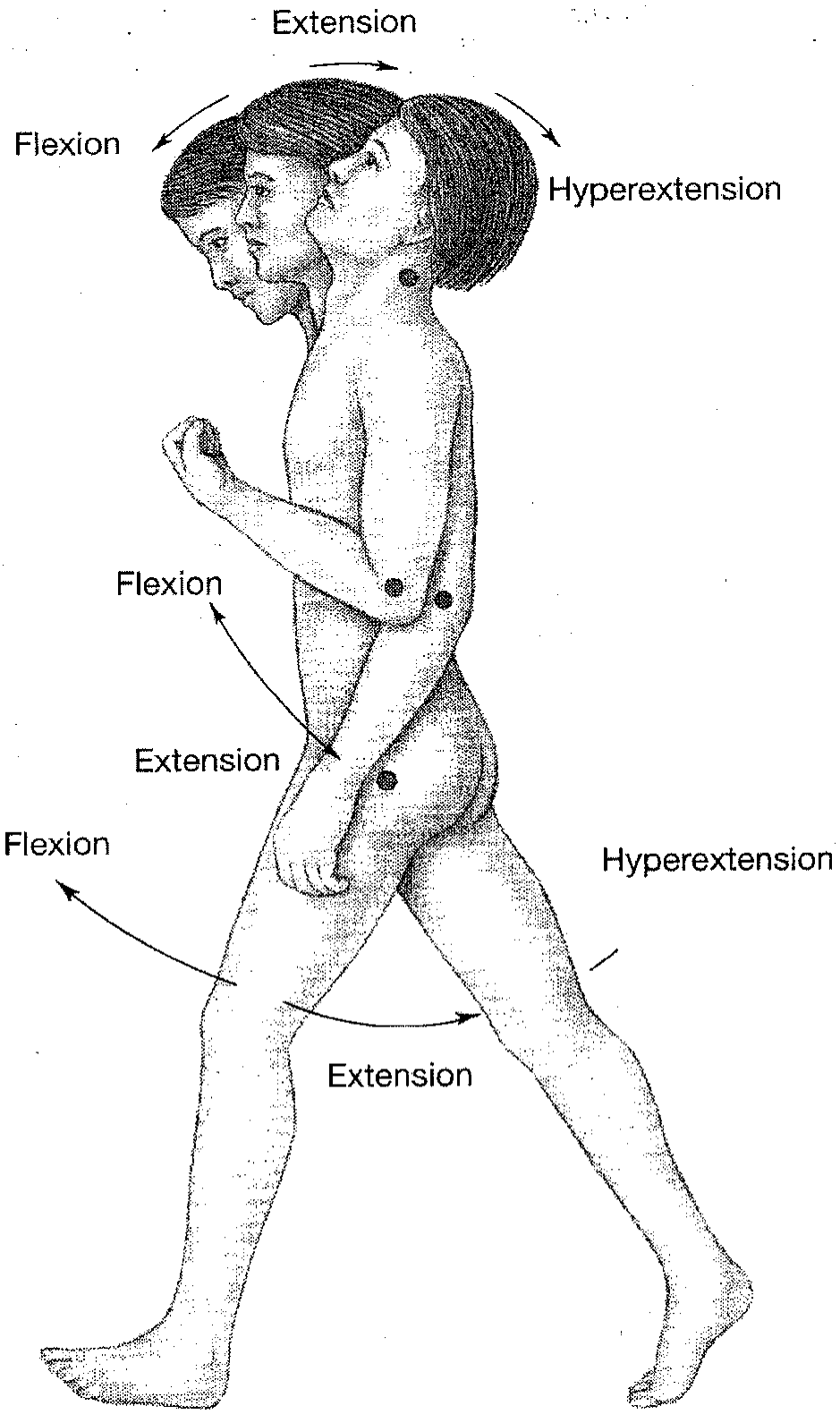
Movements


Extension
Flexion
Hyperextension
Flexion
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Flexion
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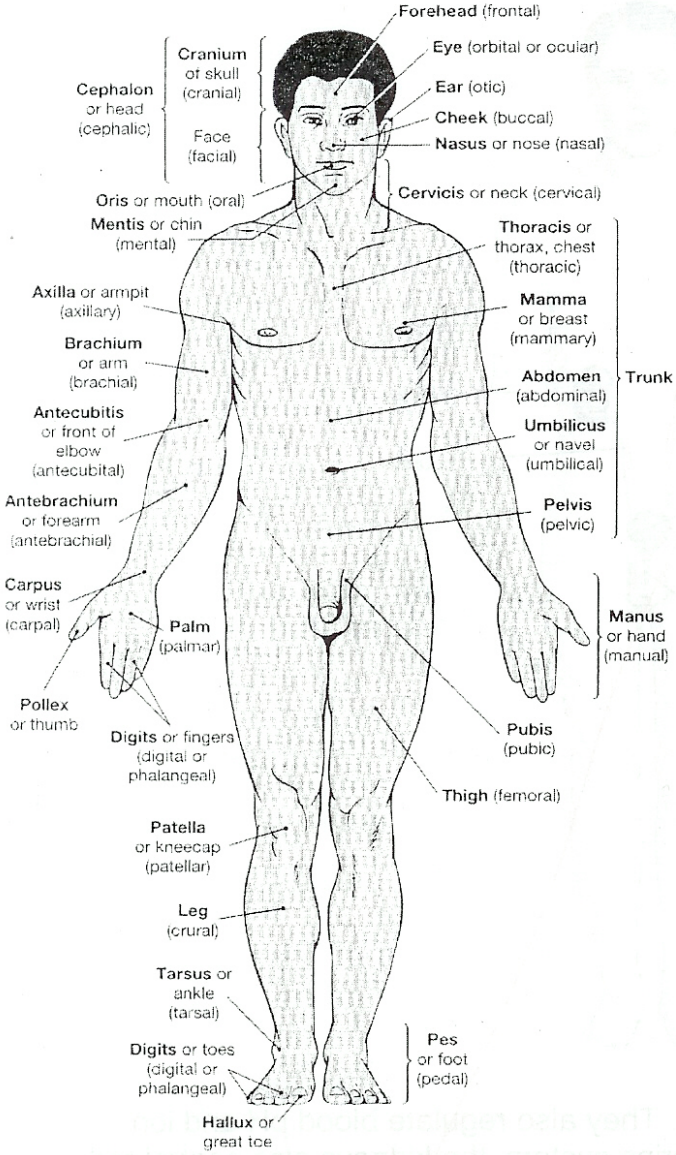
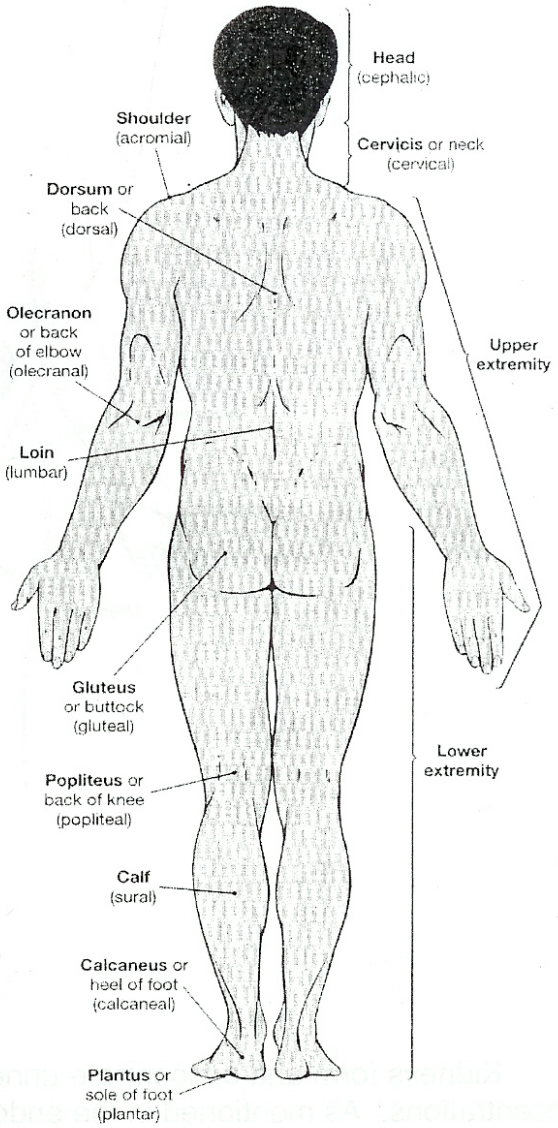
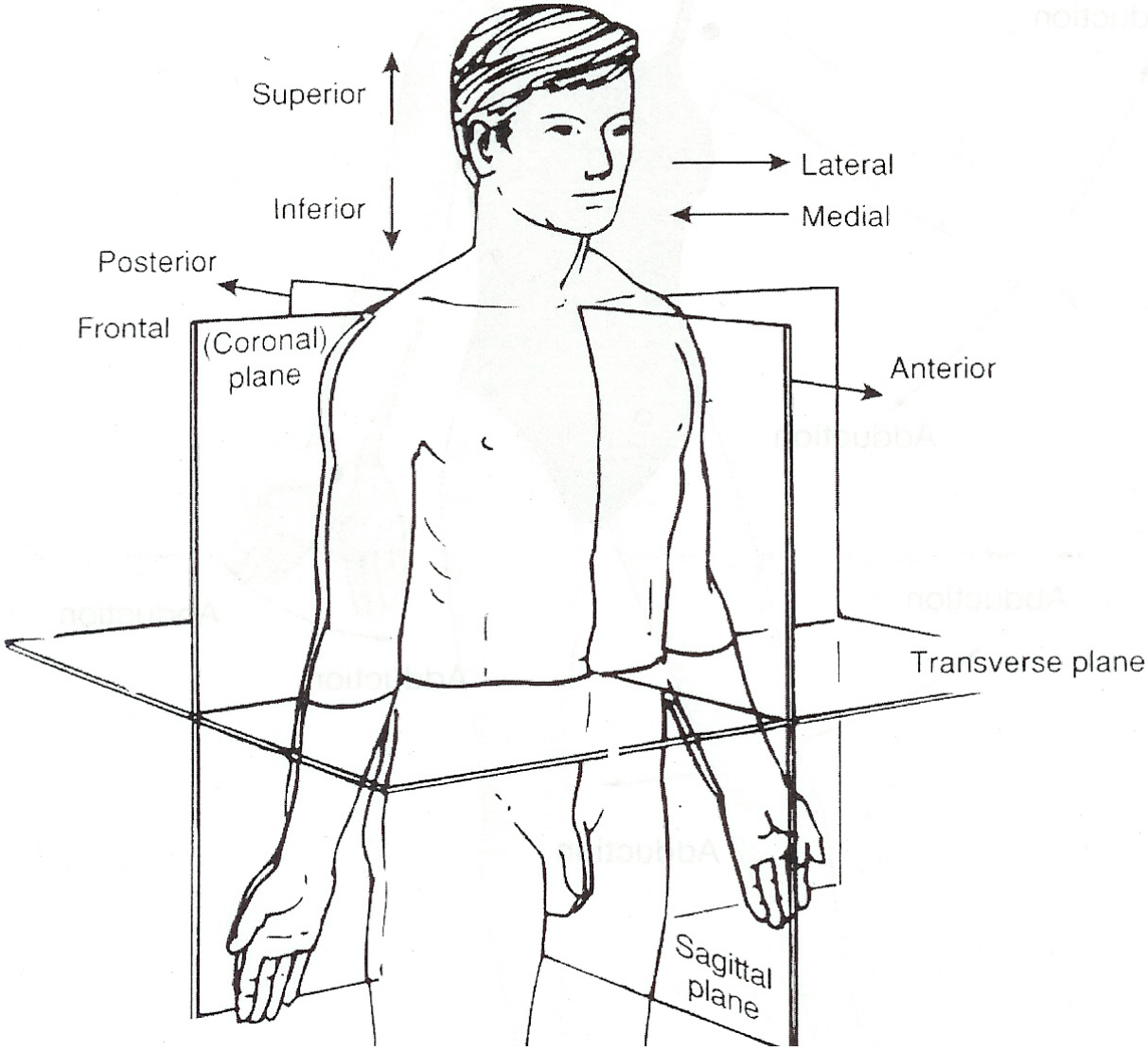
Extension

Anatomical Landmarks and Position.





Planes of the Body