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FINAL REPORT
SKYLAB IMSS CHECKLIST
APPLICATION STUDY
FOR
EMERGENCY MEDICAL CARE

AUGUST 15, 1975

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APPLICATION STUDY FOR EMERGENCY MEDICAL CARE
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HOUSTON OPERATIONS
HOUSTON, TEXAS

ABSTRACT

This report presents the findings and data products developed during the project to apply Skylab Inflight Medical Support System (IMSS) Checklist data concepts to Emergency Medical Care delivery functions. This project was performed by General Electric-Houston Operations for the NASA, Lyndon B. Johnson Space Center under Contract NAS 9-14442. The Technical Monitor for this study was Charles K. LaPinta, M.D., Bioengineering Systems Division-Life Sciences Directorate of NASA-JSC.

The principal product developed during this project was the:

- Portable Ambulance Module Operations and Emergency Care Manual.

This manual was developed in cooperation with the NASA-JSC Bioengineering Systems Division, the Houston Fire Department and the City of Houston Health Department Emergency Medical Services group. This document was developed after detailed review of recent documentation on Emergency Medical Care, State of Texas curriculum requirements in this area, Telecare Unit Operations Manual, and Houston Fire Department and the City of Houston Health Department operating procedures, practices and facilities.

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1.0 INTRODUCTION

This report presents the findings and the data products developed during the project to apply Skylab Inflight Medical Support Systems (IMSS) Checklist data concepts to Emergency Medical Care delivery functions. This project was performed by the General Electric Company, Space Division, Technical and Support Services Department-Houston Operations under Contract NAS 9-14442 to the NASA-Lyndon B. Johnson Space Center. The purpose of this study was to provide an Emergency Medical Care manual that would support the operations of the Portable Ambulance Module (PAM), developed jointly by NASA-JSC and Telecare Inc., and now being used by the Houston Fire Department in delivering Emergency Medical Care services. The project was performed for the Life Sciences Directorate (LSD), Bioengineering Systems Division. The Technical Monitor for the project was Charles K. LaPinta, M.D. He was assisted in this effort by Joe L. Day of the Systems Development Branch.

The project was also supported by:

Houston Fire Department Personnel

- Chief L. O. Martin
- Mr. C. L. Wilford

City of Houston Health Dept., Emergency Medical Services Personnel

- Lowel B. Baker, M.D.
- Mr. Randal Burtin
- Ms. Linda O'Grady

In addition, Mr. T. C. Simons of General Electric, who is presently an EMT instructor in the LaPorte/Bayshore Emergency Squad, supplied invaluable assistance in support of this project.

2.0 SUMMARY OF RESULTS

The results and the documentation product of the General Electric - Houston Operations project to apply Skylab IMSS Checklist Data concepts to Emergency Medical Care functions are presented in the following paragraphs of this and subsequent sections of this report.

The major purpose of this project was to publish a document that could be used by the Houston, Texas Fire Department Emergency Medical Technician group in their work with emergency victims in and around the City of Houston. In particular the manual was to provide medical and engineering documents to support those Emergency Medical Care operations that involved the use and operation of the Portable Ambulance Module (PAM) developed by NASA/JSC and Telecare, Inc. (a Company formed from SCI, Inc., the original developers).

The Telecare I Unit is carried on all ambulances of the Houston Fire Department as a Portable Ambulance Module and is designed to be used by Emergency Medical Technicians for emergency resuscitation and victim monitoring. The unit contains 2-way voice communications capability and can transmit EKG data simultaneously to the base station from a victim connected to the unit. The capability to defibrillate a cardiac victim also is provided as well as stowage space for resuscitation equipment (portable Aspirator, lightweight solid-state oxygen generator, Resusci-bag and airways.)

The PAM Operations and Emergency Care support manual developed in this project and presented in Appendix A of this report was designed to provide the basic technical documentation to support the operation and utilization of this unit in the field. After surveying the engineering information available on the unit and training courses being utilized by City Health and Fire Department training groups, it was established that the initial need was for accurate, yet simple definitions of the functions of all the controls, displays, and stowed equipment of the unit.

Section I of the manual was developed to provide a general description of the functions and capabilities of the PAM (Telecare I) Unit and identifying nomenclature and codes for all displays, controls, and stowed equipment. These unique equipment codes are then used throughout the manual when referring to a specific element of this equipment. These codes are used in the operating procedures, documentation as well as in discussions about the usage of these controls in delivering emergency medical care.

Of particular importance to the EMT is a thorough understanding of what occurs when controls and switches of the PAM unit are placed in the various operating positions. Specifically, a detailed knowledge of the various operating modes of the communications equipment and their relationship to the base station, dispatcher, ambulance, and walkie-talkie communications equipment is necessary. In addition the information transmitted in the various communication modes (e.g., EKG and voice) must also be understood along with the detailed operating sequences and tasks required to utilize the equipment in delivering emergency care.

All of the above noted equipment information required for operations of the PAM (Telecare I) unit is included in Section I of the manual (Pages 1-1 through 1-24 of Appendix A). The information in Section I is arranged for optimum convenience of the user of the manual and provides definitive operating procedures for all the PAM (Telecare I) equipment.

The EMT, in addition to the basic equipment operating information contained in Section I, also requires knowledge of basic physiological information and of step-by-step actions that are necessary in performing emergency care delivery. Sections II, III, and IV of the manual provide supportive medical and physiological data in those areas that are directly related to uses of the PAM (Telecare I) Unit.

Section II (Pages 2-1 through 2-6, Appendix A) of the manual was developed to provide background information on respiration and resuscitation methods. This section in conjunction with resuscitation equipment operating information from Section I should provide a basic orientation for the EMT to the major priority areas of Emergency Medical Care. Section III (Pages 3-1 through 3-22, Appendix A) of the manual is designed to provide an in-depth orientation of the cardiovascular system, the heart pump, and the monitoring of the heart activity through the use of the Electrocardiogram. A detailed discussion of heart arrhythmias is also included to provide a basis for understanding the recommended EMT pre-hospital treatment actions and protocols that are also defined. These procedures all recognize the requirement that the EMT must follow directions provided by the duty physician at the base hospital (Ben Taub in Houston, Texas). In providing emergency care for cardiac and shock victims, a major resource available to the advanced EMT is the capability to give intravenous (IV) fluids and selected drugs in compliance with directions of the base physician. Section IV of the manual provides the EMT with background information on those drugs presently carried and utilized by the Houston Fire Department in their delivery of emergency medical care. General procedures for establishing IV's and administering drugs are also provided to support the actions of the advanced EMT's in providing this care.

Sections V through VII of the manual provide supplementary information to assist the EMT in aspects of the emergency care delivery process other than those directly related to the usage of the PAM Unit. Section V contains information designed to assist the EMT in his approach to the emergency scene by providing an overview of the major types of emergencies that the EMT will be required to deal with in performing his duties as well as summary data on the victim's signs, symptoms, and their interpretation.

Section V also contains a unique approach to the problem of providing the EMT with the protocol he should follow in dealing with accident and medical emergency

situations and related criteria that will assist him in making the logical decisions required. Logic diagrams are provided for the sorting of multiple victims (triage) and for basic emergency care procedures.

Sections VI and VII contain more detailed EMT protocol and procedures that are recommended for emergency care associated with trauma/injury and medical emergencies.

Section VIII of the PAM Operations and Emergency Care manual is specifically related to the basic inventory of emergency medical care supplies that are maintained by the Houston Fire Department and a recommended location coding system for one type of ambulance (Modulance SA 138) utilized by the HFD. This coding system was devised to provide a simplified method for referring to equipment and of training EMT's in a recommended standard configuration to be maintained by EMT crews. Maintenance of a standard configuration for each type of ambulance, so that crews can shift from one type to another without lengthy orientation periods, is highly desirable. The present recommended system of location coding can be of assistance in this process.

3.0 RECOMMENDATIONS FOR FUTURE STUDIES

The project to develop the PAM Operations and Emergency Care Manual has resulted in a manual that should be of value to those EMT's and EMT instructors who must learn to operate and utilize the Portable Ambulance Module (Telecare I) in providing emergency care delivery. In addition, it provides general physiological and medical information that can be of assistance in training the EMT and Advanced EMT in their total responsibilities.

In developing this manual for NASA, GE-Houston Operations has applied data techniques utilized in the Skylab Inflight Medical Support System (IMSS) Checklist and has expanded these techniques with new forms of procedural logic and supporting training and operational data. During the course of this PAM manual project, a distinct need was expressed by a multiple-amputee victim for similar definitive procedural documentation to assist such victims in their rehabilitation training. It appears that this PAM type of operations documentation is especially suited to the need of such victims. This area of training data for multiple amputees should be considered by NASA as a candidate area for future applications projects of these Skylab IMSS Checklist and PAM Operations and Emergency Care data concepts.

The PAM manual is the first technical application study of the Skylab IMSS Checklist concepts in the Emergency Care area. It is closely associated with the Telecare I ambulance module. New models of this Unit are presently being marketed and are scheduled for usage by the Houston Fire Department and other emergency care groups throughout the nation. Updates, particularly of Section I, of the present manual will be necessary if this type documentation is to be utilized to support training and usage of these new units.

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PORTABLE
AMBULANCE MODULE
OPERATIONS
AND
EMERGENCY CARE
MANUAL





This manual was prepared under Contract NAS 9-14442
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National Aeronautics and Space Administration
Johnson Space Center
Houston, Texas

INTRODUCTION

This manual or handbook has been prepared for the National Aeronautics and Space Administration as a supporting document for the NASA-developed Portable Ambulance Module (PAM).

SECTION I CONTAINS:

A general verbal description of the systems of the PAM

- Graphic illustrations and coding of the PAM Controls/Displays and Stowed Equipment. All items contained in the unit are identified with alphabetical codes  which are used throughout the manual to refer to that particular equipment item. These illustrations are presented on fold-out pages such that they may be viewed simultaneously with the detailed discussion data that follows.
- General Operating Procedures for the PAM.
- Detailed Discussions of the Operations of each individual item of PAM Equipment. The discussions are arranged in alphabetical sequence of equipment reference codes,  ,  ,  , . . . , following the graphic illustrations such that each detailed discussion can be viewed simultaneously with the illustration of the equipment.

Sections II thru VII of the Manual contain background physiological and procedural information to support Emergency Health Care delivery training for the Houston, Texas Fire Department as follows:

- SECTION II - Respiration-Resuscitation (CPR)
- SECTION III - Emergency Cardiac Care
- SECTION IV - Drugs and IV's
- SECTION V - General Approach to Emergency Victims
- SECTION VI - Trauma/Injury
- SECTION VII - Medical Emergencies

The last section of the manual (Section VIII) shows a recommended system of location of equipment for one configuration of the Modulance Type SA-138 Ambulance used by the Houston Fire Department.

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PAM DESCRIPTION

The PAM is a compact, portable unit designed for use by Emergency Medical Technicians (EMT's) and paramedical personnel for emergency resuscitation and patient monitoring. It has been designed for use in an ambulance, where it is securely locked into a floor mount, or at the scene of an acute medical situation. The unit contains its own power supply in the form of two sets of rechargeable (nickel-cadmium) batteries - one set for unit power and one for power to a Defibrillator in the unit. Both sets of batteries are charged by a DC charger installed in the ambulance and are totally integrated into the Telecare unit.

The PAM contains the following components and is delivered with the supportive equipment identified below:

1. COMMUNICATIONS

The PAM contains capability for full duplex communication in order to provide continuous and simultaneous conversation between the Base Station physician and the EMT. The system essentially provides the physician an "at the scene" capability in order to provide decisions on treatment based on medical judgement.

The electrocardiogram data from the patient and the voice data from the EMT are combined and sent simultaneously over a single frequency by a process called multiplexing. This allows for continuous uninterrupted transmission of the electrocardiogram, with voice comments as necessary by the EMT, and full return capability of voice transmission by the physician without the operation of any switches. The unit is supplied with a headset in order to free the hands of the EMT.

In order to conserve weight, a lightweight, low-powered transmitter is used to send these voice and EKG signals to the ambulance where they are amplified and retransmitted by another radio called the "ambulance repeater." The use of a mobile repeater also allows the EMT to connect electrodes to the patient

one time and maintain full communication until the patient is delivered to the desired destination. Thus, the physician who has been trained in the special techniques of "in-the-field care of the patient" can provide the necessary judgement and direction of the EMT until the patient is delivered to the hospital emergency room.

2. EKG

The EKG circuit contains provisions for a three-wire differential input for maximum noise rejection. It accepts electrodes for three (3) clinical lead examinations (The "Limb Leads"). Standard electrodes of any commercially-available type may be used, or the EKG can be taken from the defibrillator paddles. EKG information is displayed on a small scope in the unit, transmitted to a strip recorder in the ambulance, and relayed to the Base Station. Electrodes and appropriate wiring are carried in the unit.

3. DEFIBRILLATOR

A self contained defibrillator with two paddle-type electrodes is contained in the unit. It is capable of delivering an adjustable energy level up to 400 watt-seconds for 10 milliseconds and may be recharged in less than 12 seconds. Approximately 50 defibrillation discharges are available from a defibrillator whose batteries are fully charged.

4. BLOOD PRESSURE

A semi-automatic indirect blood pressure system is available as part of the PAM. The blood pressure system utilizes a special microphone placed beneath a manually-inflated cuff. Electronic filters and frequency translation circuits are used to optimize the relationship of Korotkoff sound information and background noise. The blood pressure sound information is translated to a higher frequency tone that can be discriminated from ambient noise by the ear. The system is usable for the special situation that occurs in shock where the amplitude and frequency components of the blood pressure

sounds are diminished. Thus, the blood pressure system can frequently be used in many situations where there is high background noise and when the patient is severely hypotensive. For the situation in which the sounds are not discernible, due to extreme amounts of background noise, the palpatory method can be used, without revision of the basic system. The systolic and diastolic blood pressures are displayed digitally on the unit but are not transmitted to the Base Station. This information is transmitted by voice.

5. TELEPHONE COUPLER

A telephone acoustical coupler provides a backup means for transmitting the voice and EKG signal from the site of the emergency to the medical center over standard "dial-up" telephone circuits or by coupling to the handset of the ambulance relay transmitter.

6. STRIP CHART RECORDER

Telecare provides a compact strip chart recorder that is mounted in the ambulance to provide a permanent record which can be delivered with the patient on arrival at the hospital. This recorder is interfaced to the mobile repeater such that a pre-determined length of record is automatically recorded at the start of transmission for each patient.

7. FOLDING RESUSCITATION BAG, MASKS, AND AIRWAYS

A folding resuscitation bag with reuseable oropharyngeal airways and masks are within the storage area of the PAM.

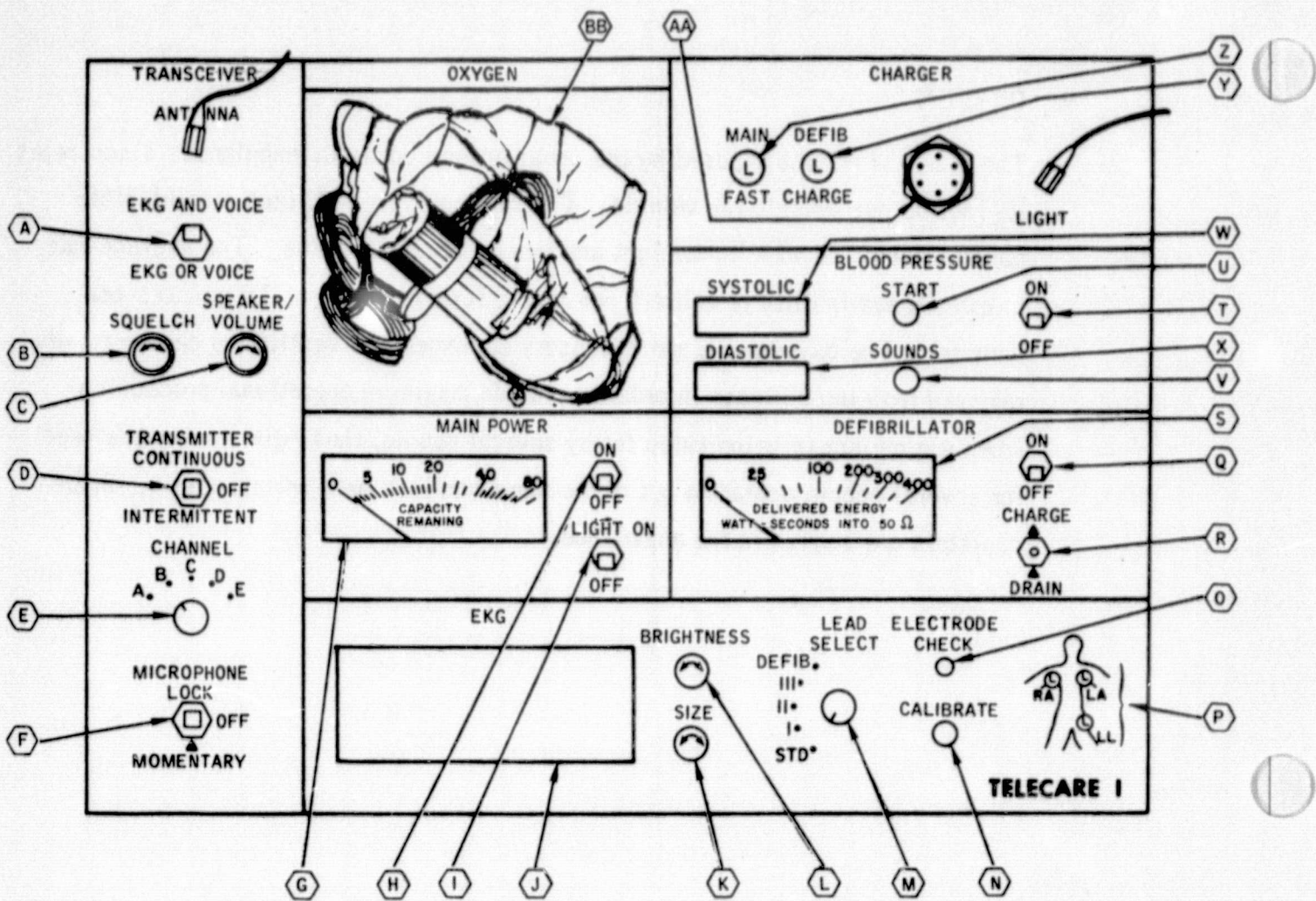
8. ASPIRATOR

A portable, lightweight, freon-powered aspirator is provided as an accessory. It uses a disposable, freon-filled canister to provide for the suction removal of fluids with all necessary tubing and collection reservoir. A vacuum effect in excess of 400 mm Hg is possible at normal room temperatures.

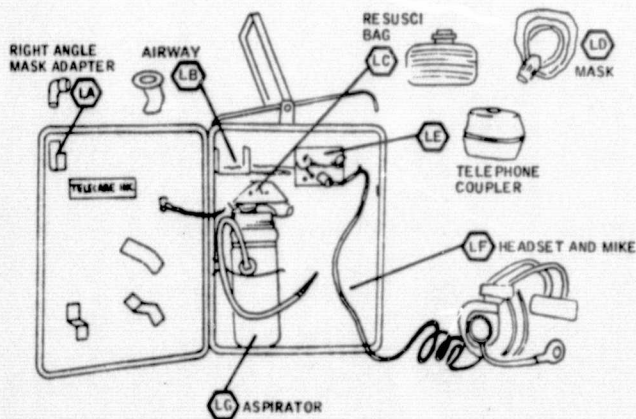
9. OXYGEN

The size and weight imposed by the usual oxygen bottle in ambulances discourages its routine use outside the vehicle. The oxygen system utilizes a solid-state canister which is both lightweight and independently portable. The average rate of oxygen availability is 6 liters per minute for a minimum of 15 minutes per canister. The oxygen unit and accessory equipment for ventilation can be totally removed from the suitcase in order to provide maximum operational procedures when the patient is being cared for by several people; thus, eliminating the need for several people operating out of the same confined area around a unit. Spare canisters are carried in the ambulance.

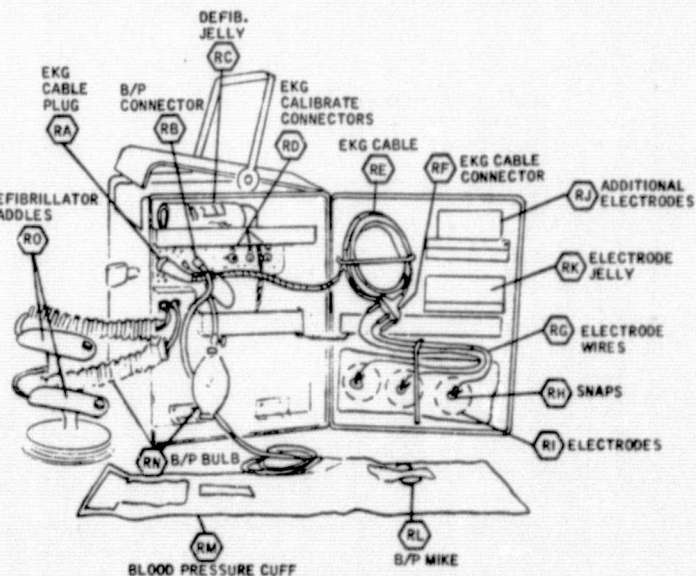
REFERENCE CODES FOR TELECARE CONTROLS, DISPLAYS AND STOWED EQUIPMENT



STOWED EQUIPMENT



LEFT BELL



RIGHT BELL

TELECARE UNIT OPERATIONAL PROCEDURES

ACTIVATION AND CHARGING		PATIENT EXAMINATION	
<p>1 PREPARATION</p> <p>① FOLD CARRYING HANDLE TOWARDS BACK OF UNIT.</p> <p>② UNFASTEN LOCKS AND OPEN TOP OF UNIT.</p> <p>③ UNFASTEN LOCKS AND OPEN LEFT AND RIGHT WELL DOORS.</p> <p>④ REMOVE HEADSET (LF) FROM LEFT WELL AND PUT ON.</p>	<p>3 TRANSCIVER (COMMUNICATIONS)</p> <p>① VERIFY MAIN POWER SWITCH (H) ON.</p> <p>② PUT ON HEADSET (LF).</p> <p>③ SET TRANSMITTER CHANNEL SELECTOR TO: A, B, C, D, OR E AS DIRECTED.</p> <p>④ ADJUST SQUELCH (B) - AS REQ'D</p> <p>⑤ ADJUST VOLUME (C) - AS REQ'D</p> <p>⑥ SET MICROPHONE (F) TO: - LOCK (NORMAL OPS.) OR - MOMENTARY (MUST HOLD)</p> <p>⑦ SET TRANSMITTER MODE SWITCH (A) TO: - EKG AND VOICE (NORMAL OPS.) OR - EKG OR VOICE</p> <p>⑧ SET TRANSMITTER DUTY CYCLE (D) TO: - CONTINUOUS (NORMAL OPS.) OR - INTERMITTENT</p>	<p>4 EKG</p> <p>① VERIFY MAIN POWER SWITCH (H) ON.</p> <p>② REMOVE ELECTRODES (RI) FROM RIGHT DOOR AND APPLY THEM AS SHOWN BELOW:</p> <div style="text-align: center;"> </div> <p>③ REMOVE ELECTRODE CABLE (RE) FROM RIGHT WELL AND CONNECT ELECTRODE LEADS TO ELECTRODES: - BLACK (LEFT ARM) TO "LEFT ARM" - WHITE (RIGHT ARM) TO "RIGHT ARM" - RED (LEFT LEG) TO "LEFT LEG"</p> <p>④ CHECK ELECTRODES BY: - DEPRESSING ELECTRODE CHECK PUSHBUTTON (O). - IF ELECTRODE LIGHT(S) (P) FLASH, THE ELECTRODE INDICATED AS BAD (FLASHING) SHOULD BE CHANGED AND RECHECKED.</p> <p>⑤ SET LEAD SELECTOR (M) AS DIRECTED BY BASE STATION.</p> <p>⑥ ADJUST BRIGHTNESS CONTROL (L) AS REQUIRED BY LOOKING AT DISPLAY (J).</p> <p>⑦ ADJUST SIZE CONTROL (K) TO SIZE AS DESIRED.</p> <p>⑧ MONITOR TRACE ON DISPLAY (J) AS REQUIRED.</p>	<p>5 DEFIBRILLATOR</p> <p>① IF NOT A TIME PERIOD, REMOVE EKG ELECTRODES FROM PATIENT.</p> <p>② AS PER AC, DETERMINE VICTIM'S WEIGHT AND DETERMINE DEFIBRILLATOR CHARGE LEVEL.</p> <p>③ REMOVE DEFIBRILLATOR FROM RIGHT WELL AND PLACE IN AREAS SHOWN.</p> <p>④ REMOVE DEFIBRILLATOR FROM RIGHT WELL AND PLACE IN AREAS SHOWN.</p> <p>⑤ DEFIBRILLATOR CHARGE LEVEL (R) TO CHARGE ENERGY (R) TO CHARGE LEVEL FOR VICTIM'S WEIGHT (NORMAL OPERATIONS).</p> <p>⑥ PUSH AND HOLD DEFIBRILLATOR CHARGE ENERGY (R) TO CHARGE LEVEL FOR VICTIM'S WEIGHT (NORMAL OPERATIONS).</p> <p>⑦ MAKE SURE VICTIM IS UNCONSCIOUS AND YOU ARE CLEAR OF VICTIM.</p> <p>⑧ PLACE PATIENT ON DEFIBRILLATOR CHARGE LEVEL SHOWN.</p> <p>⑨ DEPRESS DEFIBRILLATOR CHARGE ENERGY (R) SIMULTANEOUSLY WITH DEFIBRILLATOR CHARGE ENERGY (R).</p> <p>⑩ REMOVE PATIENT FROM DEFIBRILLATOR CHARGE ENERGY (R) MONITOR ENERGY (R) MONITOR ENERGY (R).</p> <p>⑪ FOR ADDITIONAL DEFIBRILLATIONS, REPEAT STEPS 1 THROUGH 10.</p> <p>⑫ IF DEFIBRILLATOR CHARGE ENERGY (R) COMPLETELY EXHAUSTED, HOLD CHARGE ENERGY (R) FOR 30 SECONDS, DRAIN UNIT, AND RECHARGE. READS ZERO.</p> <p>⑬ DEFIBRILLATOR CHARGE ENERGY (R) LAST DEFIBRILLATION.</p> <p>⑭ STOW DEFIBRILLATOR CHARGE ENERGY (R) PAD.</p>
<p>2 MAIN POWER</p> <p>① MAIN POWER SWITCH (H) TO ON. (THIS IS NECESSARY FOR ALL TELE-CARE UNIT SYSTEMS OPERATIONS EXCEPT DEFIBRILLATOR)</p> <p>② LIGHT SWITCH (I) TO ON (NIGHT OPS.) OR OFF</p> <p>③ VERIFY ON POWER DISPLAY (G) IF CAPACITY REMAINING IS BELOW _____%. THEN:</p>			
<p>2A CHARGER</p> <p>CONNECT CHARGER CABLE AT (AA).</p>			

○ PROCEDURE SEQUENCE #'S
 ◻ DISPLAY/CONTROL REFERENCE (LETTERS)

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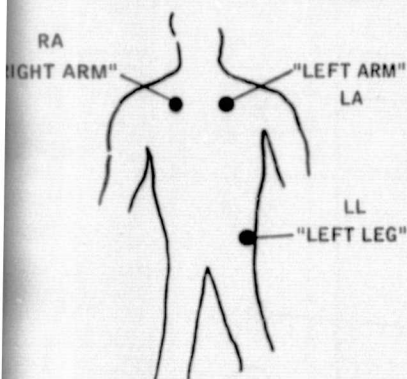
FOLDOUT FRAME

TELECARE UNIT OPERATIONAL PROCEDURES

PATIENT EXAMINATION AND EMERGENCY PROCEDURES

1 EKG

- 1 VERIFY MAIN POWER SWITCH (H) ON.
- 2 REMOVE ELECTRODES (RI) FROM RIGHT DOOR AND APPLY THEM AS SHOWN BELOW:



- 3 REMOVE ELECTRODE CABLE (RE) FROM RIGHT WELL AND CONNECT ELECTRODE LEADS TO ELECTRODES:

- BLACK (LEFT ARM) TO "LEFT ARM"
- WHITE (RIGHT ARM) TO "RIGHT ARM"
- RED (LEFT LEG) TO "LEFT LEG"

- 4 CHECK ELECTRODES BY:

- DEPRESSING ELECTRODE CHECK PUSHBUTTON (D).
- IF ELECTRODE LIGHT(S) (P) FLASH, THE ELECTRODE INDICATED AS BAD (FLASHING) SHOULD BE CHANGED AND RECHECKED.

- 5 SET LEAD SELECTOR (M) AS DIRECTED BY BASE STATION.

- 6 ADJUST BRIGHTNESS CONTROL (L) AS REQUIRED BY LOOKING AT DISPLAY (J).

- 7 ADJUST SIZE CONTROL (K) TO SIZE AS DESIRED.

- 8 MONITOR TRACE ON DISPLAY (J) AS REQUIRED.

5 DEFIBRILLATOR

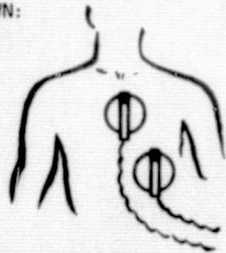
- 1 IF NOT ALREADY CONNECTED, AND IF TIME PERMITS, APPLY AND CONNECT EKG ELECTRODES TO VICTIM AS PER EKG PROCEDURES, (4).
- 2 AS PER ACCEPTED PROCEDURES, DETERMINE NEED FOR DEFIBRILLATION.
- 3 REMOVE DEFIBRILLATOR JELLY (RC) FROM RIGHT DOOR AND RUB ON VICTIM IN AREAS SHOWN IN STEP (8).
- 4 REMOVE DEFIBRILLATOR PADDLES (RO) FROM RIGHT WELL.

- 5 DEFIBRILLATOR SWITCH (Q) ON.

- 6 PUSH AND HOLD CHARGE/DRAIN SWITCH (R) TO CHARGE UNTIL DELIVERED ENERGY (S) REACHES REQUIRED ENERGY LEVEL FOR VICTIM DEFIBRILLATION. (NORMALLY DIRECTED BY BASE STATION.)

- 7 MAKE SURE ALL PERSONNEL ARE CLEAR AND YOU ARE NOT IN CONTACT WITH VICTIM.

- 8 PLACE PADDLES FIRMLY ON VICTIM AS SHOWN:



- 9 DEPRESS PADDLE PUSHBUTTONS SIMULTANEOUSLY.

- 10 REMOVE PADDLES FROM VICTIM AND MONITOR EKG (J) FOR CONVERSION.

- 11 FOR ADDITIONAL DEFIBRILLATIONS, REPEAT STEPS (6) THROUGH (10).

- 12 IF DEFIBRILLATOR IS CHARGED AFTER COMPLETING PROCEDURE, PUSH AND HOLD CHARGE/DRAIN SWITCH (R) TO DRAIN UNTIL DELIVERED ENERGY (S) READS ZERO.

- 13 DEFIBRILLATOR SWITCH (Q) OFF AFTER LAST DEFIBRILLATION.

- 14 STOW PADDLES IN RIGHT WELL.

6 BLOOD PRESSURE

- 1 VERIFY MAIN POWER SWITCH (H) ON.

- 2 REMOVE CUFF UNIT (RM) FROM RIGHT DOOR, AND PLUG MIKE AND AIR HOSE INTO RECEPTACLES IN RIGHT WELL. ((RB))

- 3 BLOOD PRESSURE SWITCH (T) ON. (TONE WILL BE HEARD IN HEADSET.)

- 4 INSTALL CUFF UNIT ON VICTIM'S ARM:
 - MIKE OVER BRACHIAL ARTERY
 - CUFF WRAPPED SNUGLY

- 5 CLOSE BULB AIR VALVE (V).

- 6 DEPRESS AND RELEASE START BUTTON (U).

- 7 PUMP CUFF UP TO 200 mm Hg.

- 8 OPEN BULB AIR VALVE (V) VERY SLIGHTLY TO GET A B/P DROP OF APPROXIMATELY 3 mm/sec..

- 9 DEPRESS SOUNDS BUTTON (V) WHEN FIRST "BEAT" SOUND IS HEARD, (THIS LOCKS SYSTOLIC B/P DISPLAY (W). THIS "BEAT" SOUND IS HIGHER THAN CONTINUOUS TONE.)

- 10 RELEASE SOUNDS BUTTON WHEN LAST BEAT SOUND IS HEARD. (THIS LOCKS DIASTOLIC DISPLAY (X) FOR READING OF DIASTOLIC PRESSURE.)

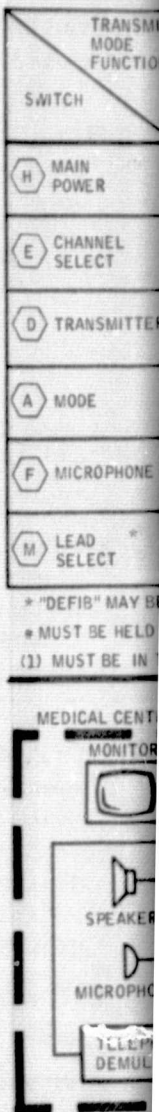
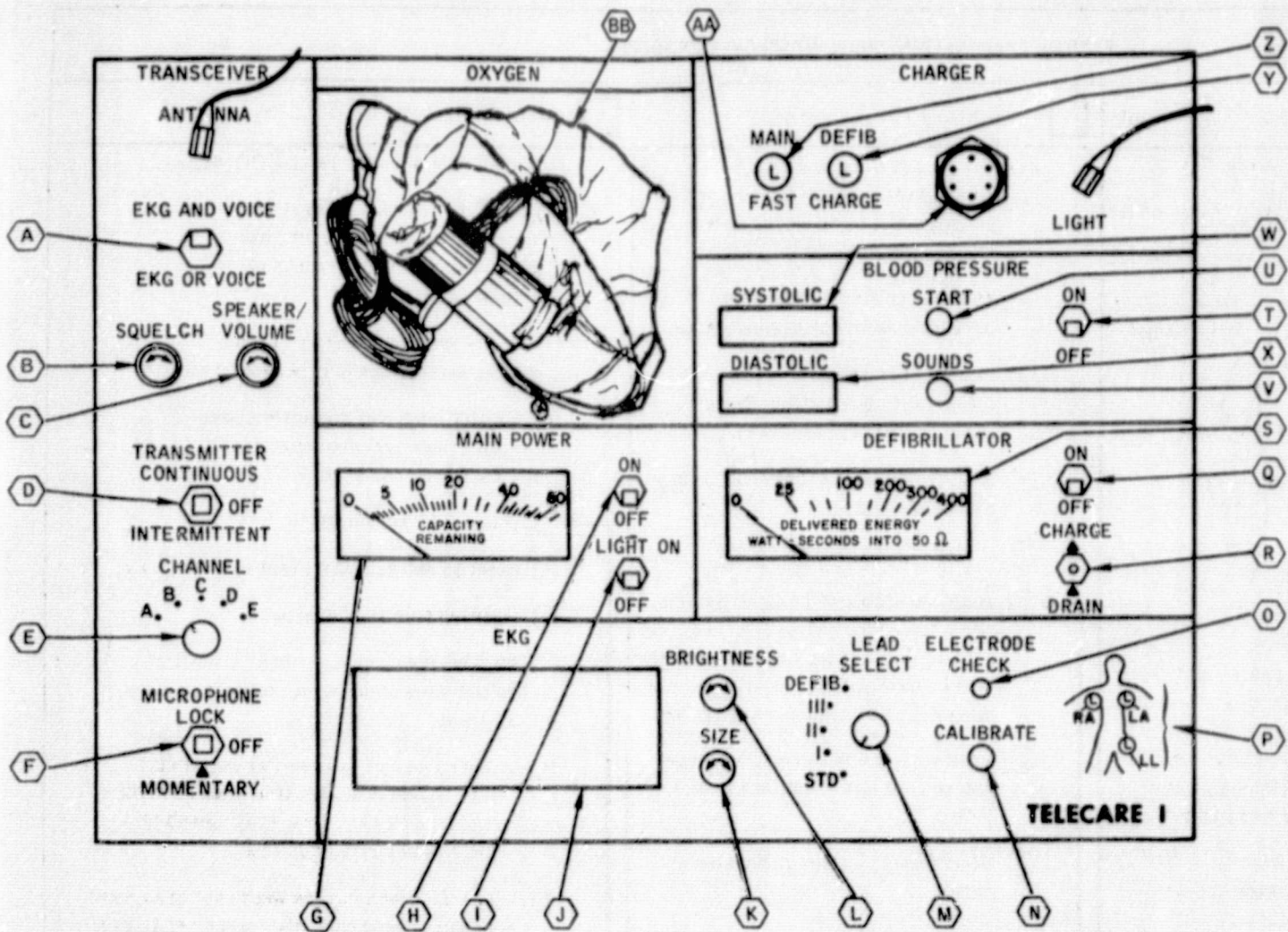
- 11 REPORT AND/OR RECORD B/P READINGS AS REQUIRED.

- 12 REPEAT STEPS (5) THROUGH (11) FOR ADDITIONAL READINGS. WAIT TWO MINUTES BETWEEN READINGS.

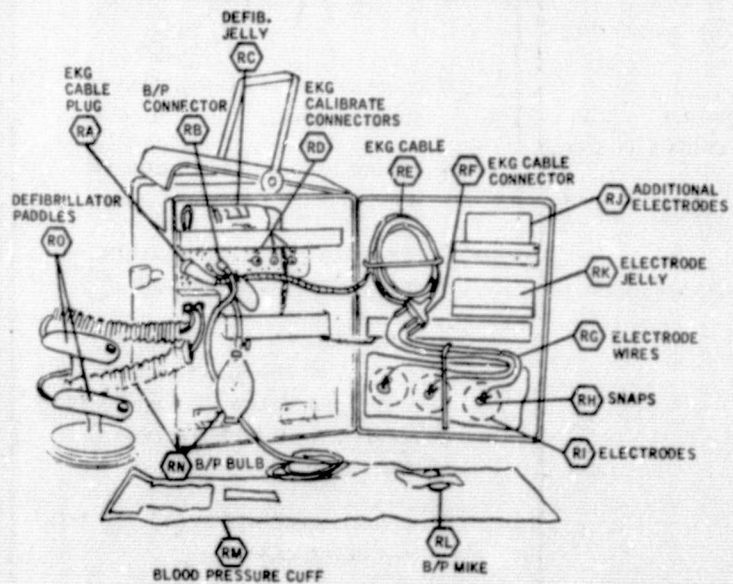
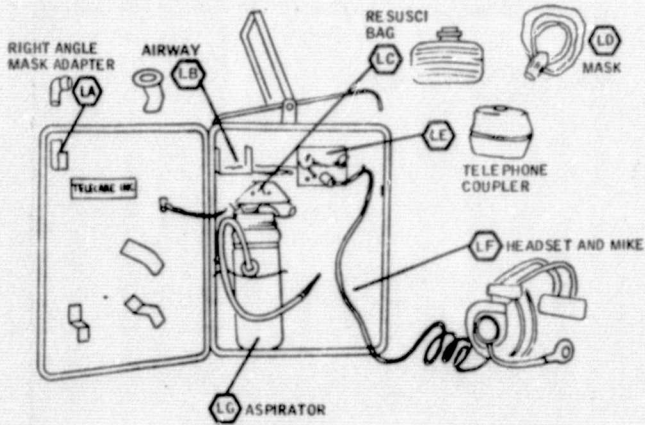
- 13 BLOOD PRESSURE SWITCH (T) OFF WHEN COMPLETED.

- 14 REMOVE CUFF (RM) AND STOW.

TELECARE CONTROLS, DISPLAYS AND STOWED EQUIPMENT



STOWED EQUIPMENT



LEFT BELL

RIGHT BELL

FOLDOUT FRAME

PHONE LINE (ONE DEDICATED TELEPHONE NO)

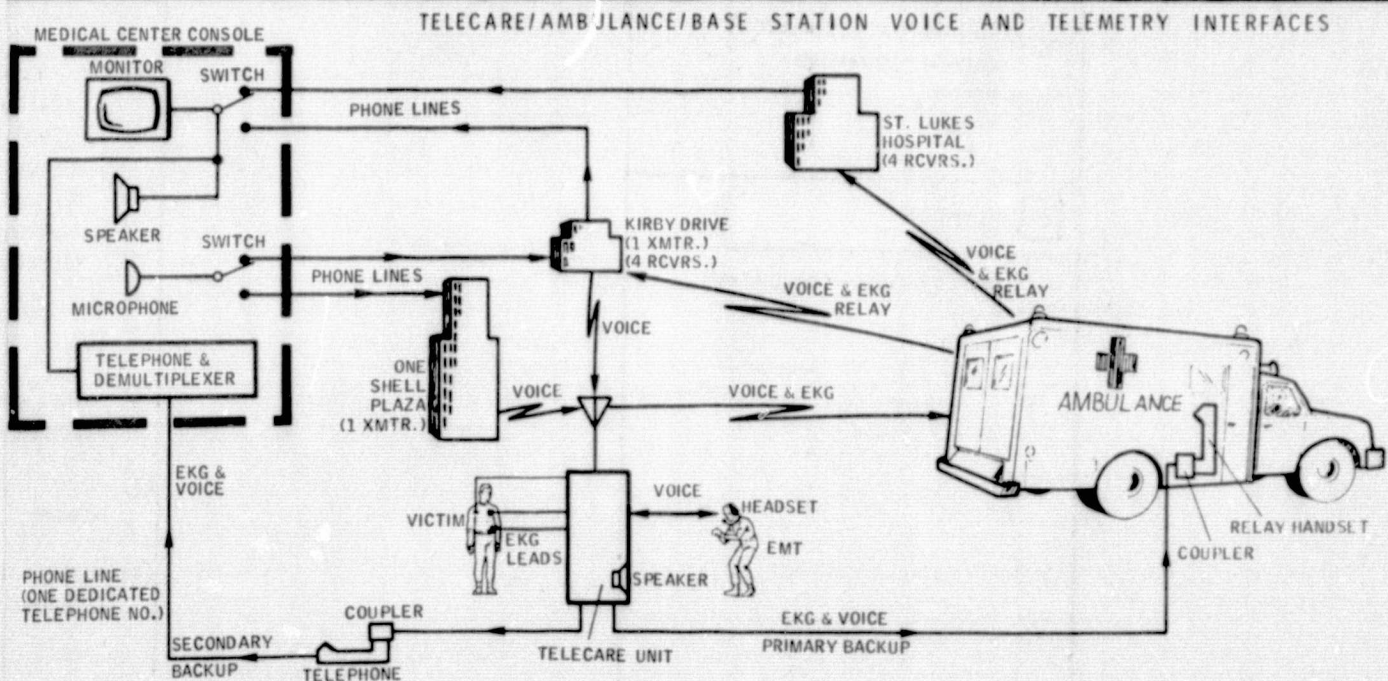
TELECARE I TRANSMIT MODE/SWITCH POSITION MATRIX

SWITCH \ TRANSMIT MODE FUNCTION	(1) VOICE AND EKG TRANSMITTED CONTINUOUSLY SIMULTANEOUSLY.	EKG TRANSMITTED WHEN VOICE NOT TRANSMITTED	EKG TRANSMITTED CONTINUOUSLY; VOICE ONLY WHEN ACTIVATED.	EKG TRANSMITTED ONLY WHEN MIKE SWITCH NOT ACTIVATED.	EKG TRANSMITTED CONTINUOUSLY;	EKG TRANSMITTED ONLY WHEN MIKE SWITCH ACTIVATED.	VOICE ONLY TRANSMITTED WHEN MIKE SWITCH ACTIVATED.	VOICE ONLY TRANSMITTED CONTINUOUSLY.
H MAIN POWER	ON	ON	ON	ON	ON	ON	ON	ON
E CHANNEL SELECT	A, B, C, D, or E AS DIRECTED	A, B, C, D, or E AS DIRECTED	A, B, C, D, or E AS DIRECTED	A, B, C, D, or E AS DIRECTED	A, B, C, D, or E AS DIRECTED	A, B, C, D, or E AS DIRECTED	A, B, C, D, or E AS DIRECTED	A, B, C, D, or E AS DIRECTED
D TRANSMITTER	CONTINUOUS	CONTINUOUS	CONTINUOUS	CONTINUOUS	CONTINUOUS	INTERMITTENT	INTERMITTENT	CONTINUOUS
A MODE	EKG OR VOICE	EKG OR VOICE	EKG OR VOICE	EKG OR VOICE	EKG AND VOICE OR EKG OR VOICE	EKG OR VOICE	EKG OR VOICE	EKG OR VOICE
F MICROPHONE	LOCK	OFF	MOMENTARY* OR LOCK	MOMENTARY* OR LOCK	OFF	MOMENTARY* OR LOCK	MOMENTARY*	LOCK
M LEAD SELECT *	I, II or III	I, II, or III	I, II, or III	I, II, or III	I, II, or III	I, II, or III	STD	STD

* "DEFIB" MAY BE SELECTED (PADDLES THEN ACT AS ELECTRODES) INSTEAD OF I, II, or III.

* MUST BE HELD IN THIS POSITION FOR ACTIVATION.

(1) MUST BE IN THIS MODE WHEN FIRST CALL IS MADE TO BASE STATION

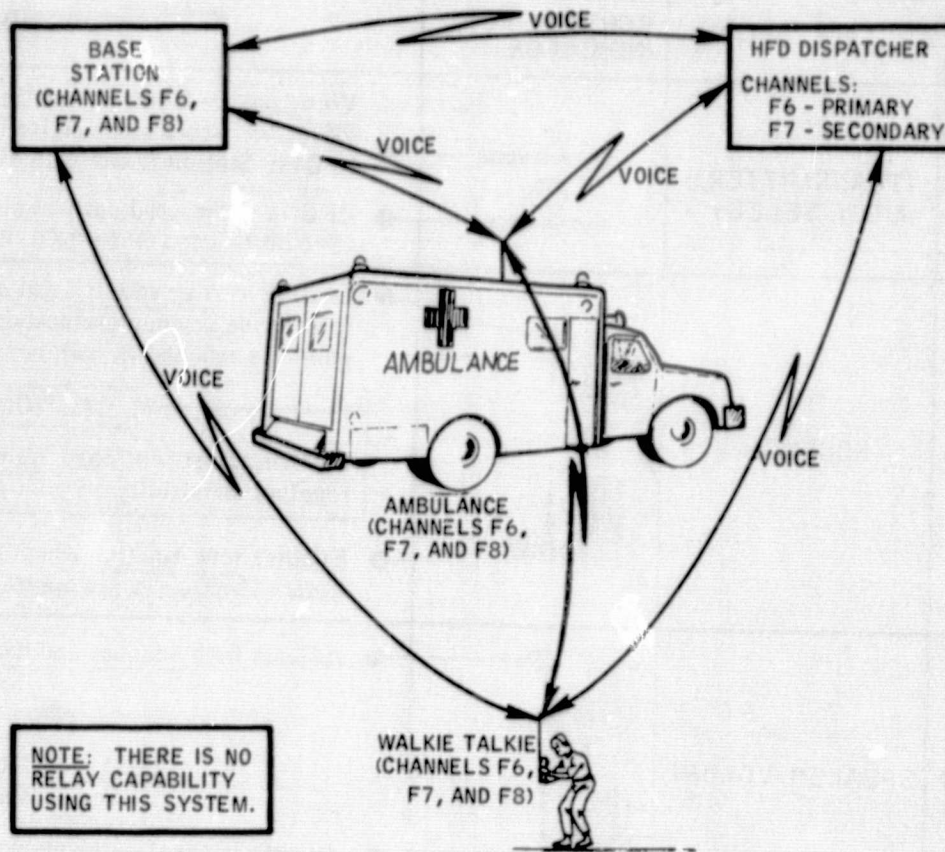


FOLDOUT FRAME 2

CODE	CONTROL/DISPLAY	CONTROL POS./INDICATOR	FUNCTION
C O M M U N I C A T I O N S	(A) (TRANSMITTER) MODE SELECT		<ul style="list-style-type: none"> Voice and EKG are transmitted simultaneously. (Must be in this position for first transmission to Base Station to activate alarm system) EKG is interrupted during voice transmissions. (Should be used when EKG not transmitted)
	(B) SQUELCH		<ul style="list-style-type: none"> Enables <u>carrier squelch</u> and allows adjustment (clockwise or counterclockwise until "quiet point" is reached in both <u>headset</u> and <u>speaker</u>.) <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">CAUTION</p> <p>Further adjustment past "quiet point" reduces receiver sensitivity.</p> </div> <ul style="list-style-type: none"> Enables <u>tone squelch</u> which requires no adjustment. Rotary function is <u>not</u> operative.
	(C) SPEAKER/VOLUME		<ul style="list-style-type: none"> Adjusts both <u>speaker</u> and <u>headset earphone</u> volume. <div style="text-align: center; margin: 5px 0;"> </div> <ul style="list-style-type: none"> Adjusts <u>headset earphone</u> volume only.
	(D) TRANSMITTER		<ul style="list-style-type: none"> Transmitter is "ON" continuously. Turns transmitter <u>OFF</u>. Transmitter is <u>ON</u> only when microphone switch is held in "MOMENTARY."
	(E) CHANNEL (XMTR. ONLY)		<ul style="list-style-type: none"> Selects transmitter channel A, B, C, D, or E.
	(F) MICROPHONE		<ul style="list-style-type: none"> Microphone is "hot" (<u>ON</u>) continuously. No transmissions may be made with headset mike. Voice transmissions occur only when switch is held in "MOMENTARY."

NOTE:
 See (LE) for Telephone Coupler function description
 (LF) for Headset function description

ADDITIONAL VOICE COMMUNICATIONS CAPABILITIES



LE TELEPHONE COUPLER

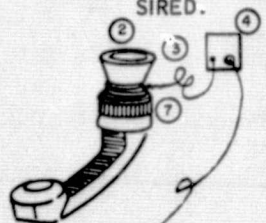
BACK-UP COMMUNICATIONS FROM TELECARE UNIT TO BASE STATION VIA REGULAR (HARD-LINE) TELEPHONE COMMUNICATIONS OR AMBULANCE RELAY TRANSMITTER.

TELECARE SWITCH POSITIONS FOR COMMUNICATIONS USING COUPLER:

- (a) MAIN POWER **H** "ON"
- (b) TRANSMITTER **D** "OFF"
- (c) MICROPHONE **F** ;
 - LOCK FOR CONTINUOUS EKG AND VOICE OR
 - OFF/MOMENTARY FOR CONTINUOUS EKG AND VOICE WHEN DESIRED.

AMBULANCE RELAY SWITCH POSITIONS USING COUPLER:

- (a) RELAY TRANSMITTER "ON"
- (b) LOCK HANDSET PUSH-TO-TALK BUTTON DOWN. (THIS ALLOWS CONTINUOUS TRANSMISSION)
- (c) VERIFY CORRECT CHANNEL



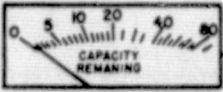


1. REMOVE COUPLER.
2. ROLL-UP RUBBER COVER.
3. UNROLL SOME LINE.
4. PLUG INTO TELECARE RECEPTACLE.
5. UNROLL ADDITIONAL LINE NECESSARY TO REACH NEAREST TELEPHONE OR AMBULANCE RELAY HANDSET.
6. DIAL BASE STATION OR SET RELAY SWITCHES TO POSITIONS NOTED ABOVE. (REPORT "COUPLER IN-USE")
7. SLIP COUPLER OVER TELEPHONE MOUTHPIECE (MIKE).
8. VERIFY COMMUNICATIONS ESTABLISHED.

LF HEADSET AND MIKE

ALLOWS COMMUNICATIONS WHILE BOTH HANDS ARE FREE TO DO OTHER ESSENTIAL MANUAL OPERATIONS.



9. DESTOW HEADSET CAREFULLY SO AS NOT TO PUT STRESS ON CONNECTION TO TELECARE UNIT.
10. POSITION ON HEAD IN A POSITION FOR:
 - COMFORT
 - GOOD EARPIECE POSITION OVER EAR FOR HEARING.
 - GOOD MIKE POSITION IN FRONT OF MOUTH FOR GOOD TRANSMISSION.

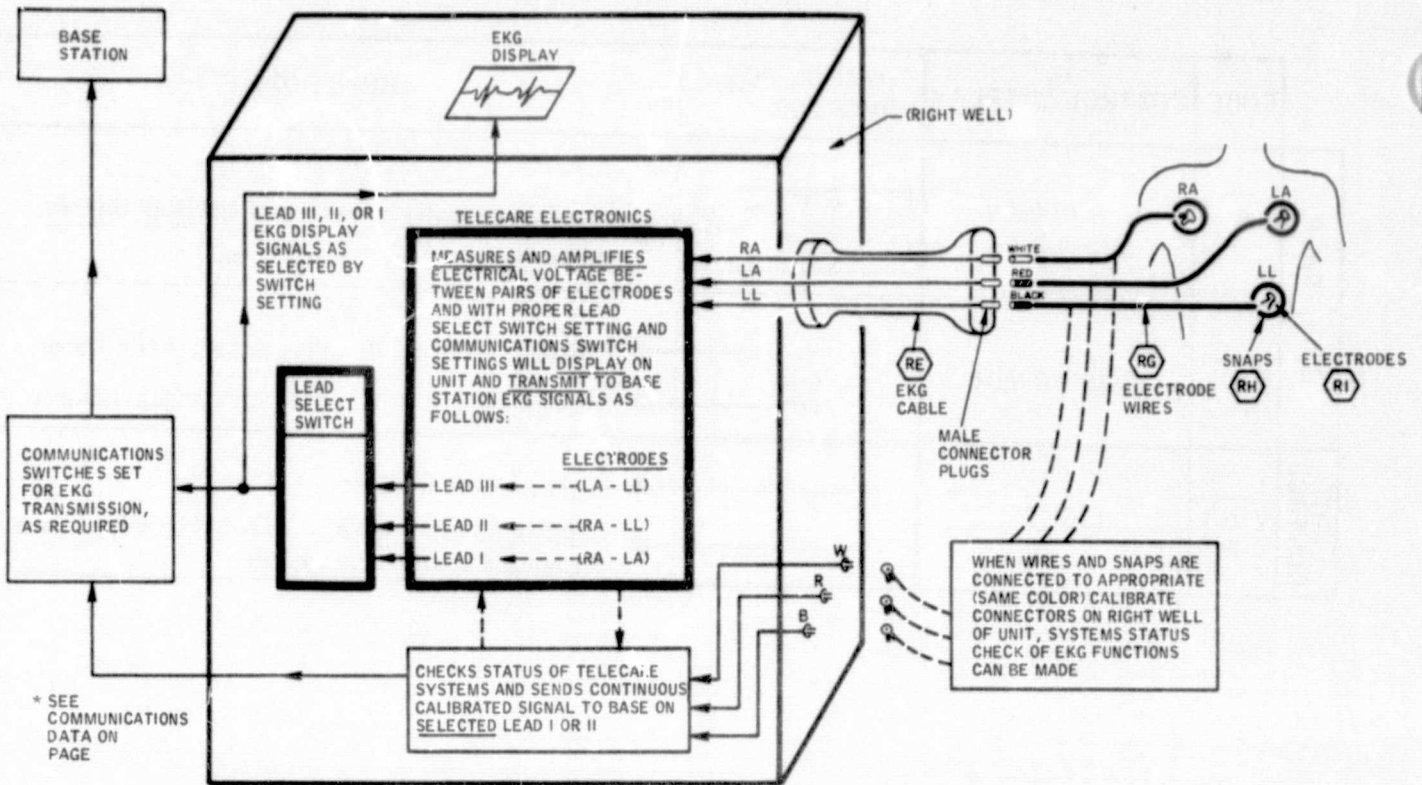
	CODE	CONTROL/DISPLAY	CONTROL POS./INDICATOR	FUNCTION
MAIN POWER	G	MAIN POWER DISPLAY		Displays capacity remaining of the <u>main battery</u> . (Main Power, H, must be on.)
	H	MAIN POWER		<ul style="list-style-type: none"> Provides power to all units, except defibrillator. Shuts off power to all units, except defibrillator.
LIGHT CONTROL	I	LIGHT		<ul style="list-style-type: none"> Light in lid is turned on. Light in lid is turned off. (Should be left off when not needed to conserve battery)

AA CHARGING TELECARE UNIT

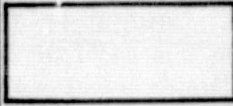
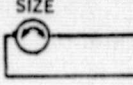

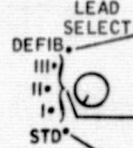
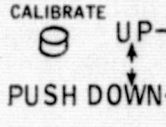

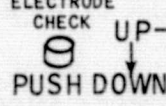

THE BATTERIES OF THE TELECARE UNIT ARE OF NICKLE/CADMIUM RECHARGEABLE TYPE AND IN ORDER THAT SUFFICIENT POWER IS AVAILABLE FOR ANY EMERGENCY USAGE, THE TELECARE SHOULD BE RECHARGED WHEN THE AMBULANCE ENGINE IS RUNNING. THEREFORE, WHEN THE TELECARE UNIT IS IN THE AMBULANCE:

- 1 CONNECT CHARGER CABLE FROM AMBULANCE CHARGING UNIT TO TELECARE RECEPTABLE AA .
- 2 VERIFY FAST CHARGE LIGHTS Y AND Z "ON" WHEN AMBULANCE ENGINE IS RUNNING.
(NOTE: IF BATTERIES ARE FULLY CHARGED, LIGHTS WILL NOT TURN ON)
- 3 IF LIGHTS DO NOT TURN ON AFTER TELECARE UNIT HAS BEEN USED AND YOU WOULD EXPECT FAST CHARGE TO TAKE PLACE; VERIFY CHARGER SWITCH BREAKER IS ENGAGED.

EKG HARDWARE FUNCTIONS



EKG OPERATING MODES	TELECARE UNIT CONTROL SETTINGS
<p>1 NORMAL OPS.</p>	
<p>2 ELECTRODE CHECK</p>	<p>PURPOSE OF THIS MODE: TO VERIFY CONTINUITY THRU ELECTRODES, WIRES, CABLE. LIGHT(S) FLASH TO INDICATE CIRCUIT DISCONTINUITY.</p>
<p>3 CALIBRATE</p>	<p>TRANSMITS 1 mv. CALIBRATE SIGNAL TO BASE STATION WHEN CALIB. BUTTON PUSHED AND RELEASED.</p>
<p>4 SNAPS (CALIBRATION AND SYSTEM VERIFICATION)</p>	<p>TRANSMITS CONTINUOUS CALIBRATE SIGNAL TO BASE STATION AND VERIFIES TELECARE UNIT EKG ELECTRONICS SYSTEM FUNCTIONS.</p>

CODE	CONTROL/DISPLAY	CONTROL POS./INDICATOR	FUNCTION
J	EKG DISPLAY		<ul style="list-style-type: none"> Displays EKG baseline when main power switch is ON. Displays EKG trace selected by lead select switch when patient is properly connected with electrodes and leads. (M)
K	EKG <u>SIZE</u>		<ul style="list-style-type: none"> Turning to right increases. Turning to left decreases <u>vertical size</u> of trace on EKG display (J) <p>NOTE: Has no effect on size of trace being received at hospital.</p>
L	EKG <u>BRIGHTNESS</u>		<ul style="list-style-type: none"> Turning to right increases. Turning to left decreases <u>brightness</u> of EKG display (J)
M	EKG <u>LEAD SELECTOR</u>		<ul style="list-style-type: none"> Takes EKG using Defibrillator paddles as electrodes and displays it on EKG display (J) Selects lead I, II or III input, respectively from electrodes and displays it on EKG display (J) Normal position when leads not in use. (Baseline appears on (J). Calibrate signal seen on (J) when (N) depressed)
N	EKG <u>CALIBRATE</u> BUTTON		<ul style="list-style-type: none"> No function. Generates 1 millivolt signal  that moves across EKG display (J). If communications are activated, this EKG signal is transmitted to base station and used there as a reference signal.
O	ELECTRODE CHECK BUTTON		<ul style="list-style-type: none"> No function. Checks for "open circuit" (no signal) in EKG cable and the three electrodes and displays results on electrode display (P)
P	ELECTRODE LIGHTS		<ul style="list-style-type: none"> Electrode light(s) "flash" when electrode check button (O) is depressed and RA, LA or LL electrode, lead or EKG cable signal is absent or not properly hooked up.

EKG

EKG OR ECG (ELECTROCARDIOGRAM)

THE TOTAL COLLECTIVE ELECTRICAL ACTIVITY ASSOCIATED WITH THE WAVES OF EXCITATION OF THE HEART'S NERVES AND MUSCLES CAN BE RECORDED BY ELECTRODES PLACED ON THE SKIN AND CONNECTED TO AN EKG MACHINE. THIS EQUIPMENT MEASURES, RECORDS AND DISPLAYS THIS ELECTRICAL ACTIVITY OF THE HEART ON STANDARD EKG GRAPH PAPER (SEE PAGE 3-9) THAT MOVES THRU THE EKG RECORDER AT A STANDARD RATE. THE RESULTANT RECORD IS REFERRED TO AS THE "PATIENT'S EKG." THE RECORD CAN BE SIMULTANEOUSLY DISPLAYED ON A CARDIOSCOPE (CATHODE RAY OR TV TYPE TUBE) AS A MOVING DISPLAY, THE EKG PATTERN IS WRITTEN ON THE LEFT OF THE DISPLAY AND IT THEN MOVES TO THE RIGHT AT THE SAME RATE AS A WRITTEN RECORD.

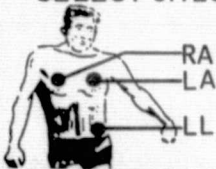
DIFFERENT TYPES OF EKG MEASUREMENTS CAN BE MADE WHICH ARE IN ESSENCE DIFFERENT "VIEWS" OF THE HEART'S ELECTRICAL ACTIVITY FROM DIFFERENT ANGLES AROUND THE BODY DEPENDENT UPON THE INSTALLATION AND CONNECTION OF ELECTRODES. THE TWO MAJOR TYPES OF EKG'S ARE:

- **THREE-LEAD EKG**
 - USED IN PRE-HOSPITAL EMERGENCY CARE.
 - INCLUDES:
 - 3 STANDARD BIPOLAR (BETWEEN TWO ELECTRODES) MEASURES:
 - LEAD I (RIGHT ARM-LEFT ARM) (RA-LA)
 - LEAD II (RIGHT ARM-LEFT LEG) (RA-LL)
 - LEAD III (LEFT ARM-LEFT LEG) (LA-LL)
 - MEASURES HEART ACTIVITY FROM FRONT OF BODY (FRONTAL PLANE)

TRANSMISSION OF GOOD QUALITY EKG'S IS ESSENTIAL FOR RAPID VICTIM ASSESSMENT AND RAPID DETERMINATION OF THE PROPER PRE-HOSPITAL TREATMENT REQUIRED. FACTORS IMPORTANT IN THIS PROCESS ARE:

- A. GOOD MAINTENANCE AND OPERATION OF THE EKG EQUIPMENT
 - PROPER HANDLING AND STOWAGE OF EKG EQUIPMENT
 - PROPER CLEANING
 - PROPER PRE-CALL
 - EKG EQUIPMENT CHECKS (SEE PAGE 1-11)
 - EKG BATTERY CHARGING OPERATIONS (SEE PAGE 1-10)
 - PROPER CONTROL OPERATIONS (SEE PAGES 1-11 AND 1-12)

- B. PROPER BODY SITE SELECTION FOR ELECTRODE INSTALLATION
SELECT SITES FOR ELECTRODE INSTALLATION AS ILLUSTRATED.



NOTE: WOMEN WITH PENDULOUS BREASTS MAY REQUIRE INSTALLATION OF "LL" ELECTRODE MORE TO THE SIDE AND BACK OF THE BODY OR UNDERNEATH THE BREAST. IF UNDERNEATH SITE IS SELECTED THEN ADDITIONAL CLEANING OF SITE MAY BE REQUIRED DUE TO EXCESSIVE OIL, POWDER AND MOISTURE THAT MAY BE IN THAT AREA.

- C. SITE PREPARATION
 - (1) CLEANSE ALL THREE SITES THOROUGHLY WITH ALCOHOL OR STERILE WIPES.
 - (2) RUB SITES WITH GAUZE PAD OR PAPER TOWEL - ABOUT 5 SECONDS EACH. (THIS ABRADING INCREASES ELECTRICAL CONDUCTIVITY OF SKIN.)

- D. ELECTRODE APPLICATION (ELECTRODE TYPE - PREGELLED)
 - (1) REMOVE ELECTRODES FROM PACKAGE (OPEN JUST PRIOR TO USE)
 - (2) APPLY TO SITE (START AT TOP EDGE AND ROLL DOWNWARD)
 - (3) THEN PAT ENTIRE SURFACE OF ELECTRODE



- E. CONNECTION OF ELECTRODE WIRES TO ELECTRODES AND EKG CABLE
(THESE CONNECTIONS MAY HAVE BEEN ACCOMPLISHED PREVIOUSLY BUT CHECKS SHOULD BE MADE FOR ACCURACY AND INTEGRITY.)

(1) CONNECT (OR VERIFY) WIRE SNAPS **(RH)** TO ELECTRODES

(RI) { BLACK TO LA ELECTRODE
WHITE TO RA ELECTRODE
RED TO LL ELECTRODE

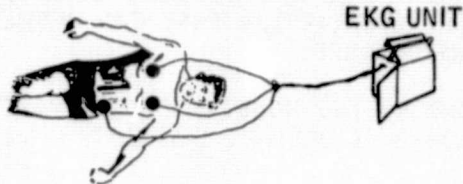
(2) CONNECT OR VERIFY EKG WIRES **(RG)** TO EKG CABLE

(RE) { BLACK TO BLACK
WHITE TO WHITE
RED TO RED

(3) MAKE SURE EKG CABLE **(RE)** IS CONNECTED TO UNIT

CAUTIONS

- DO NOT ALLOW TENSION TO BE PLACED ON ANY OF WIRING CONNECTIONS BETWEEN PATIENT AND EKG UNIT
 - CABLE AT UNIT
 - CABLE TO ELECTRODE WIRES
 - EKG SNAPS OR ELECTRODES
- STRING WIRES FROM PATIENT ELECTRODES TO UNIT IN A MANNER THAT MINIMIZES THE "OVER THE BODY" STRINGING OF THE LINES.



NOTE: ATTACH CLIP TO PATIENT'S CLOTHING OR STRETCHER TO PREVENT ELECTRODE DETACHMENT.

- KEEP LINES FROM PATIENT TO EKG UNIT AS FREE AS POSSIBLE FROM SUCH THINGS AS FEET, AND OTHER EQUIPMENT (PARTICULARLY METAL TYPE)

F. VERIFY EKG UNIT POWER AND COMMUNICATIONS SWITCH SETTINGS

- (1) MAIN POWER H ON
- (2) TRANSMITTER D CONTINUOUS
- (3) CHANNEL SELECT E AS DIRECTED BY BASE STATION
- (4) MODE SWITCH A EKG AND VOICE

G. CONDUCT ELECTRODE OPERATIONS CHECK

- (1) PRESS ELECTRODE CHECK BUTTON O
- (2) VERIFY NO LIGHTS P (RA, LA, LL)
- (3) SET LEAD SELECT SWITCH M TO I, II, OR III AS DIRECTED BY BASE STATION

SUMMARY OF POSSIBLE CAUSES OF POOR EKG'S

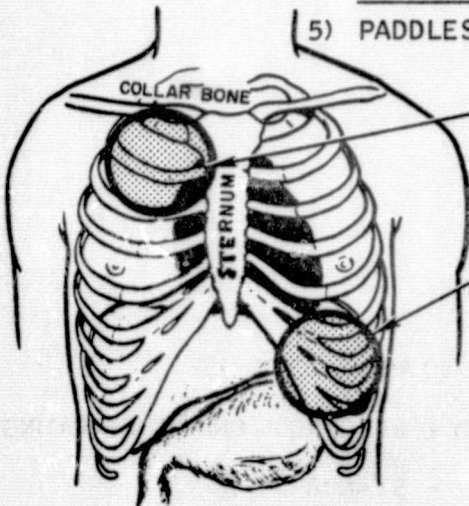
- IMPROPER APPLICATION OF ELECTRODES RI DUE TO:
 - EXCESSIVE HAIR
 - OILY, DIRTY, SCALY SKIN
 - EXCESSIVE PERSPIRATION
- BROKEN OR DEFECTIVE:
 - EKG CABLE RE
 - ELECTRODE WIRE CONNECTIONS RG
 - SNAP/ELECTRODE CONNECTIONS
 - ELECTRODE PASTE HAS DRIED OUT DUE TO EXPOSURE TO AIR PRIOR TO USE
- FAULTY ELECTRONICS IN EKG UNIT (CAN BE CHECKED BY - "ELECTRODE CHECK" OPERATING MODE
 - STANDARD
 - SNAPS)
- ELECTRICAL INTERFERENCE FROM NEARBY ELECTRICAL EQUIPMENT OR MAGNETIC FIELDS
- COMMUNICATION INTERFERENCES FROM NEARBY HIGH BUILDINGS/STRUCTURES.
- STATIC ELECTRICITY CAUSED BY SYNTHETIC CLOTHING
- PATIENT MOVEMENTS FROM:
 - BODY THRASHINGS
 - MUSCLE TREMORS
 - LARGE RESPIRATORY MOVEMENTS
 - BOUNCING AMBULANCES
- LARGE AMOUNTS OF FATTY TISSUE BENEATH ELECTRODES




DEFIBRILLATION

- ELECTRIC SHOCK DELIVERED ACROSS THE CHEST CAN TERMINATE SOME ABNORMAL HEART ARRHYTHMIAS BY SIMULTANEOUSLY DISCHARGING ALL THE MUSCLE FIBERS OF THE HEART. THIS CAN PRODUCE A SYNCHRONIZED VENTRICULAR CONTRACTION THAT CAN RESULT IN THE HEART "CONVERTING" TO A MORE NORMAL RHYTHMIC PERFORMANCE.
- THE TELECARE UNITS IN OPERATIONS BY THE HOUSTON FIRE DEPARTMENT CAN ONLY DELIVER UNSYNCHRONIZED COUNTERSHOCK WHICH IS USED TO CONVERT:
 - VENTRICULAR FIBRILLATION
 - VENTRICULAR TACHYCARDIA
 - PAROXYSMAL ATRIAL TACHYCARDIA (IF CAROTID MASSAGE IS UNSUCCESSFUL)



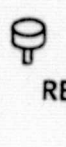
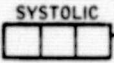
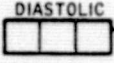
CAUTIONS

- 1) ELECTRIC SHOCK IS ADMINISTERED ONLY UPON SPECIFIC DIRECTIONS THAT ARE GIVEN BY THE BASE STATION DUTY PHYSICIAN.
- 2) CHEST BURNS TO THE VICTIM CAN RESULT FROM MULTIPLE HIGH-ENERGY DISCHARGES IF POOR CONTACT BETWEEN PADDLES AND SKIN OCCURS. POOR CONTACT CAN RESULT FROM:
 - CHEST DEFORMITIES
 - INADEQUATE DOWNWARD PRESSURE DURING DEFIBRILLATION
 - INSUFFICIENT AMOUNTS OF CONDUCTIVE SOLUTION OR JELLY PLACED BETWEEN PADDLES AND SKIN
- 3) EXCESSIVE AMOUNTS OF CONDUCTIVE JELLY CAN RESULT IN A SHORT CIRCUIT BETWEEN PADDLES AND A DROP IN CURRENT DELIVERED TO PATIENT.
- 4) HANDLE PADDLES CAREFULLY AND DO NOT TOUCH METAL SURFACE OF THE PADDLES OR THE PATIENT DURING DISCHARGE.
- 5) PADDLES SHOULD BE LOCATED OVER:
 - BASE OF HEART (BETWEEN PATIENT'S RIGHT COLLAR BONE AND STERNUM)
 - APEX OF HEART (BELOW LEFT NIPPLE AND UNDER BREASTS)



	CODE	CONTROL/DISPLAY	CONTROL POS. / INDICATOR	FUNCTION
DEFIBRILLATOR	Q	DEFIBRILLATOR POWER SWITCH		<ul style="list-style-type: none"> Provides power from <u>Defibrillator Battery</u> to defibrillator circuit. Drains Defibrillator circuit.
	R	DEFIBRILLATOR CHARGE/DRAIN		<ul style="list-style-type: none"> Defibrillator circuit is charged when switch is <u>held</u> in this position. Monitor charging on defibrillator display S. Defibrillator circuit is drained when <u>held</u> in this position until defibrillator display S reads <u>zero</u>.
	S	DEFIBRILLATOR ENERGY DELIVERABLE DISPLAY		<ul style="list-style-type: none"> Displays energy available in defibrillator circuit for delivery to victim.

NOTE: Also see R0 for Defibrillator Paddle usage discussion

CODE	CONTROL/DISPLAY	CONTROL POS./INDICATOR	FUNCTION
BLOOD PRESSURE	(T) BLOOD PRESSURE POWER SWITCH		<ul style="list-style-type: none"> ● Turns on power to blood pressure circuitry. (This activates steady tone in speaker/headset.) ● Turns off power to blood pressure circuitry. (This deactivates tone in speaker/headset.)
	(U) START BUTTON		<ul style="list-style-type: none"> ● Initiates display of cuff pressure in the systolic (W) and diastolic (X) displays. (Zero if no cuff pressure) ● No function.
	(V) SOUNDS BUTTON		<ul style="list-style-type: none"> ● Freezes systolic B/P display (W). ● After start button (U) depressed and sounds button pushed, freezes diastolic B/P display (X). (This is cuff pressure at time of release)
	(W) SYSTOLIC BLOOD PRESSURE DISPLAY		<ul style="list-style-type: none"> ● Digital display of cuff blood pressure. <ul style="list-style-type: none"> - Initiated by depressing start button (U). - Frozen by depressing sounds button (V) when operator hears <u>1st</u> heart beat sounds.
	(X) DIASTOLIC BLOOD PRESSURE DISPLAY		<ul style="list-style-type: none"> ● Digital display of cuff pressure. <ul style="list-style-type: none"> - Started by depressing start button (U). - Displays cuff pressure when sounds button (V) depressed. - Frozen by release of sounds button (V). - Releasing sounds button freezes diastolic pressure display (X). (This is cuff pressure at time of release) NOTE: When sounds button (V) released at time last heart beat sound is heard, diastolic pressure is displayed.

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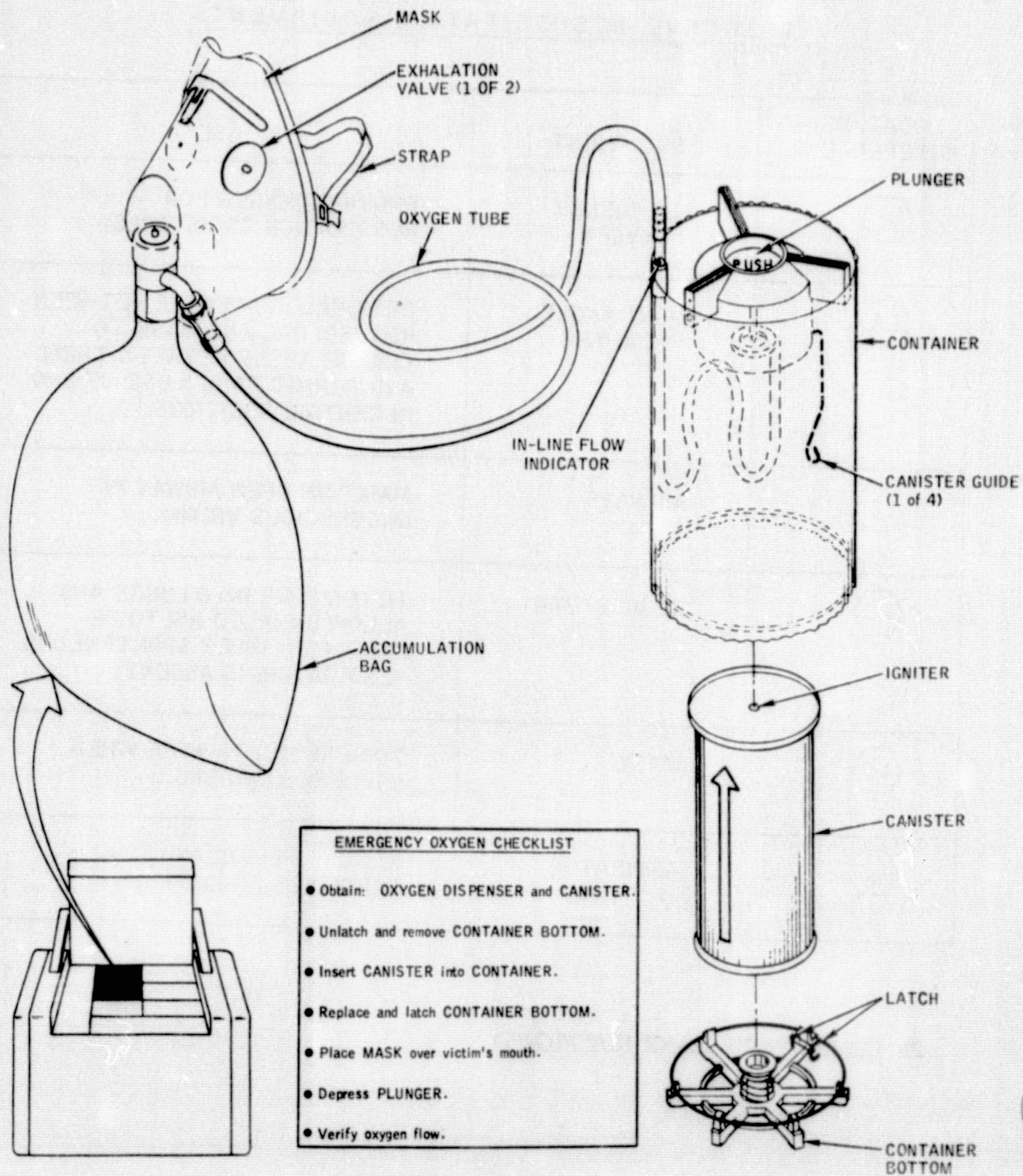
TELECARE RESUSCITATION EQUIPMENT

LOCATION REFERENCE	EQUIPMENT	USE
BB	EMERGENCY OXYGEN	PROVIDE OXYGEN FOR RESPIRATION ASSISTANCE
LA	RIGHT ANGLE ADAPTER	OPTIONAL CONNECTOR BETWEEN RESUSCI BAG AND MASK TO CHANGE ANGLE BETWEEN THEM AND PERMIT EASIER USE OF BAG IN CERTAIN POSITIONS.
LB	AIRWAYS	MAINTAIN OPEN AIRWAY IN UNCONSCIOUS VICTIM.
LC	RESUSCI BAG	TO PUMP AIR INTO LUNGS AND ALLOW EXHALED AIR TO BE EXPELLED, WHEN SPONTANEOUS RESPIRATION IS ABSENT.
LD	MASK	TO SEAL MOUTH/NOSE WHEN USING RESUSCI BAG.
LG	ASPIRATOR	REMOVE FLUIDS AND SMALL PARTICLES FROM THROAT.

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TELECARE EMERGENCY OXYGEN SYSTEM



- EMERGENCY OXYGEN CHECKLIST**
- Obtain: OXYGEN DISPENSER and CANISTER.
 - Unlatch and remove CONTAINER BOTTOM.
 - Insert CANISTER into CONTAINER.
 - Replace and latch CONTAINER BOTTOM.
 - Place MASK over victim's mouth.
 - Depress PLUNGER.
 - Verify oxygen flow.

EMERGENCY OXYGEN () PROCEDURES

1. Remove OXYGEN DISPENSER  from Telecare unit.
2. Obtain CANISTER.
NOTE: Keep the CANISTER and TUBING dry, as dampness tends to reduce the oxygen flow rate.
3. Squeeze container bottom LATCH and remove CONTAINER BOTTOM.
4. Slip CANISTER into CANISTER GUIDES, IGNITER toward PLUNGER.
5. Replace CONTAINER BOTTOM.
 - Squeeze container bottom LATCH.
 - Push CONTAINER BOTTOM against bottom of CANISTER until it is in lock ring.
 - Release LATCH and verify CANISTER BOTTOM locked.
6. Unfold preconnected MASK with TUBING and place over victim's mouth.
7. Depress PLUNGER to activate oxygen flow.
8. Confirm oxygen flow.
 - Check IN-LINE FLOW INDICATOR (it should move in direction of flow).

NOTE: Oxygen flow will continue for approximately 15 minutes. It cannot be stopped.

CAUTION

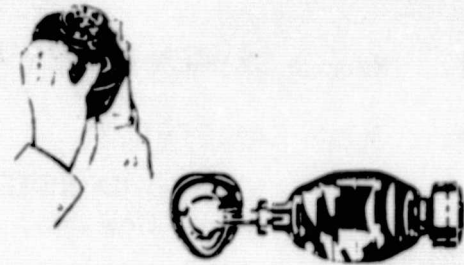
The canister generates much heat and is very hot when activated. Never handle the canister with bare hands after use. The container will also get hot, and therefore should be handled carefully.

WARNING

Pure oxygen is always a hazard. Avoid smoking and any other sources of fire or sparks when the emergency oxygen is activated.

LC
AIR BAG

1. UNSTOW RESUSCI BAG AND MASK.
2. UNFOLD RESUSCI BAG.
3. CONNECT RESUSCI BAG TO MASK.
4. HYPEREXTEND VICTIM'S NECK AS SHOWN.



CAUTION

WHEN NECK OR HEAD INJURY SUSPECTED,
STABILIZE NECK, AND USE AIRWAY IF
UNCONSCIOUS

5. MAINTAIN HEAD EXTENSION, PICK UP BAG/MASK AND CLAMP SNUGLY TO VICTIM'S FACE.



6. MAINTAIN UPWARD LIFT ON JAW AND FULL HEAD EXTENSION.
7. SQUEEZE BAG UNTIL VICTIM'S CHEST RISES. (IF CHEST DOES NOT RISE, CHECK FOR BLOCKED AIRWAY.)
8. RELEASE BAG AND LET VICTIM EXHALE PASSIVELY. (EACH EXHALATION SHOULD CLOUD MASK MOMENTARILY.)
9. REPEAT STEPS ⑦ AND ⑧ 15 TIMES PER MINUTE UNTIL SPONTANEOUS RESPIRATION RETURNS.

ASPIRATOR PROCEDURES



<p>1. Pull out CARTRIDGE HOLDER.</p>	
<p>2. Turn CARTRIDGE HOLDER upside down. (Knurled knob will be on top.)</p> <p>3. Push CARTRIDGE HOLDER <u>firmly</u> down into VACUUM BOTTLE.</p>	
<p>4. Hang assembly around neck with STRAP, or keep unit upright while in use.</p> <p>5. Turn knurled knob clockwise. (This controls amount of vacuum)</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%; text-align: center;"> <p>CAUTION</p> <p>If not in upright position, liquid freon may escape and cause blisters if allowed to drip on skin.</p> </div>	
<p>6. Insert SUCTION TIP into area to be aspirated.</p> <p>7. When through, turn knurled knob counterclockwise until it is tight.</p> <p>8. Pull out CARTRIDGE HOLDER.</p> <p>9. Dump contents into sample container.</p> <p>10. Return contents with victim to hospital.</p> <p>11. Temporarily stow CARTRIDGE HOLDER and VACUUM BOTTLE separately <u>prior to next use</u>.</p> <p>12. Flush with saline.</p> <p>13. Clean and sterilize VACUUM BOTTLE, TIP and SUCTION TUBE.</p> <p>14. Turn CARTRIDGE HOLDER up.</p> <p>15. Push CARTRIDGE HOLDER into VACUUM BOTTLE.</p> <p>16. Replace cartridge, if necessary.</p> <p>17. Stow ASPIRATOR in Telecare unit.</p>	

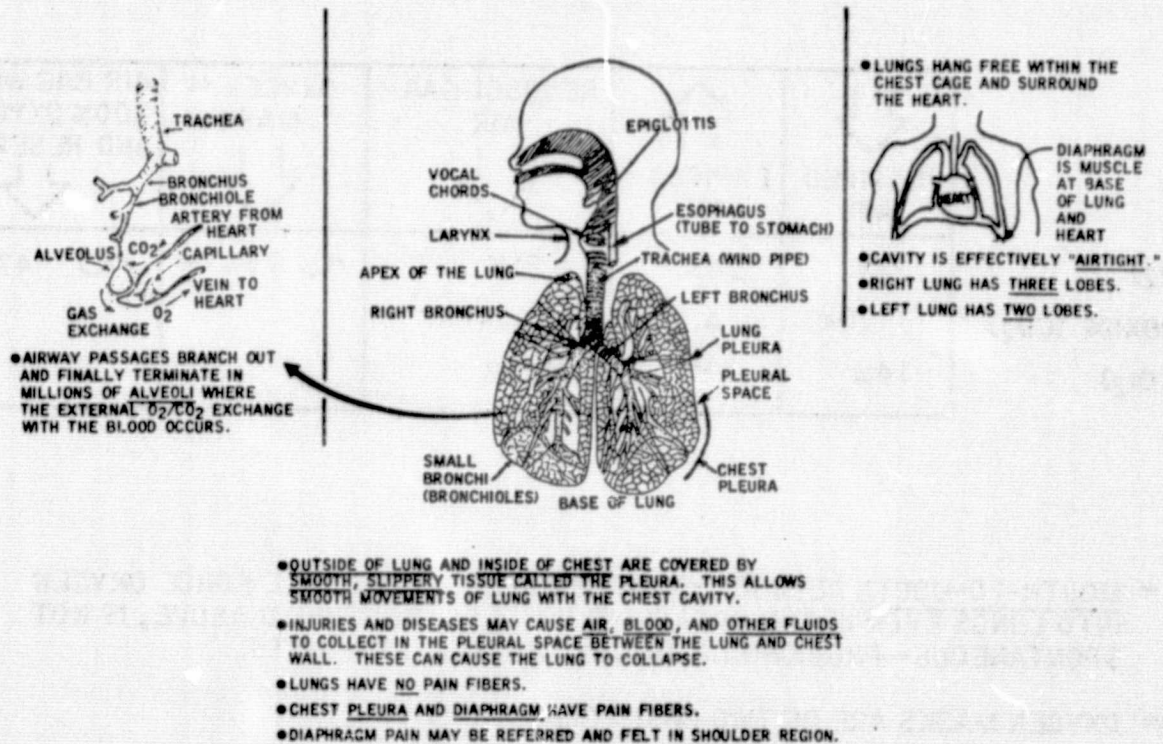
RESPIRATION-RESUSCITATION-CPR

LIFE IS SUSTAINED BY A CLOSE RELATIONSHIP BETWEEN THE HEART, LUNGS AND BRAIN. THE HEART PUMPS OXYGEN DEFICIENT BLOOD TO THE LUNGS WHERE IT PICKS-UP OXYGEN FROM THE FRESH INSPIRED AIR AND DUMPS WASTE CARBON DIOXIDE INTO EXPIRED AIR. THE OXYGEN-ENRICHED BLOOD IS THEN RETURNED TO THE HEART WHERE IT IS PUMPED TO THE BRAIN AND OTHER PARTS OF THE BODY. AS LONG AS THE BRAIN CELLS RECEIVE PROPER NOURISHMENT, THE BRAIN AND NERVOUS SYSTEM SEND SIGNALS TO THE HEART AND LUNGS THAT REGULATE THEIR ACTIVITY.

INTERRUPTION OF AIR OR OXYGEN SUPPLY TO THE LUNGS, REDUCING SUPPLY OF OXYGEN TO THE BRAIN, RESULTS IN A SLOWING DOWN AND STOPPING OF SIGNALS THAT REGULATE THE LUNGS AND HEART. COMPLETE BLOCKAGE OR DEPRIVATION OF AIR WILL CAUSE BRAIN CELLS TO DIE IN 4-6 MINUTES. PARTIAL OBSTRUCTION WILL TAKE LONGER.

AS A RESULT OF THIS VERY SHORT RESPONSE TIME, THE NUMBER ONE PRIORITY IN VICTIM CARE IS TO ESTABLISH AND MAINTAIN AN OPEN AIRWAY AND SPONTANEOUS RESPIRATION FOR THE TRANSPORT OF OXYGEN.

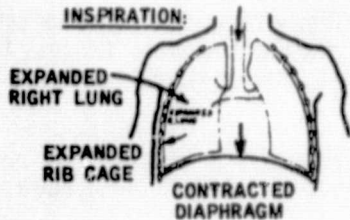
RESPIRATION (EXCHANGE OF O_2 AND CO_2) OCCURS IN THE LUNGS AS NOTED BELOW. THE THROAT DIVIDES INTO TWO TUBES, ONE TO THE STOMACH (ESOPHAGUS OR GULLET) AND ONE TO THE LUNGS (TRACHEA OR WINDPIPE). THE "VOICE BOX" OR LARYNX IS LOCATED AT THE ENTRANCE TO THE TRACHEA WHICH IS COVERED AND PROTECTED BY THE EPIGLOTTIS DURING SWALLOWING SO THAT FOOD IS DIRECTED TO THE ESOPHAGUS. IT IS THIS AREA OF THE THROAT WHERE AIRWAY OBSTRUCTION USUALLY OCCURS FROM FOREIGN MATERIAL.



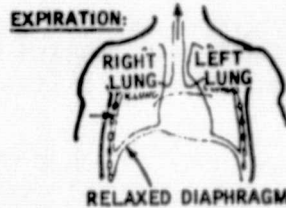
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RESPIRATION

- CONTROLLED AUTOMATICALLY BY NERVOUS SYSTEM IN RESPONSE TO SENSED BLOOD CHEMISTRY AND OTHER BODY NEEDS.
- NORMAL RESPIRATION RATE (14-20 BREATHS/MIN.) APPROXIMATELY 500CC OF AIR PER BREATH



- ① RIB MUSCLES CONTRACT TO RAISE AND EXPAND RIB CAGE.
- ② DIAPHRAGM MUSCLES CONTRACT AND PULL DIAPHRAGM DOWN.
- ③ THIS ENLARGES CAVITY AND SUCKS IN AIR.



- ① RIB MUSCLES AND DIAPHRAGM RELAX.
- ② ABDOMINAL MUSCLES PULL RIBS AND STERNUM DOWN.
- ③ ELASTIC TISSUE IN LUNGS THEN FORCE AIR OUT OF LUNGS.

OXYGEN (O₂)
CARBON DIOXIDE (CO₂)
NITROGEN (N₂)

	↓ INSPIRED AIR	↑ EXPIRED * AIR	RESUSCI-BAG * AIR ↓	OXYGEN ** MASK ↓	AIR BAG WITH 100% OXYGEN AND RESERVOIR ↓
OXYGEN (O ₂)	21%	16%	21%	~ 95% ***	~ 47%
CARBON DIOXIDE (CO ₂)	.04%	4.4%	.04%		
NITROGEN (N ₂)	74%	79%	74%		

* MOUTH-TO-MOUTH RESUSCITATION AND RESUSCI-BAG WILL FORCE OXYGEN INTO LUNGS EVEN IF THE BREATHING PROCESS, DESCRIBED ABOVE, IS NOT SPONTANEOUS--PROVIDED NO AIRWAY OBSTRUCTION EXISTS.

** OXYGEN MASKS ARE OF TWO BASIC TYPES:

- CONTINUOUS FLOW (LOW PRESSURE) WITH EXHALATION VALVES
- DEMAND/FORCED FLOW (RELATIVELY HIGH PRESSURE) WITH EXHALATION VALVES. OXYGEN IS PROVIDED UPON DEMAND BY VICTIM'S RESPIRATIONS. FORCED FLOW MUST BE MANUALLY ACTIVATED BY EMT.

*** % OF OXYGEN INSPIRED IS A FUNCTION OF THE SEAL OF THE MASK OVER VICTIM'S FACE. THIS SEAL IS MAINTAINED BY THE EMT OR THE MASK SECURING STRAP.

● **RESPIRATORY ARREST CAN RESULT FROM:**

- BLOCKAGE OF AIRWAY
- LOSS OF REGULATORY SIGNALS FROM BRAIN AND NERVOUS SYSTEM
- FAILURE OF HEART TO PUMP AND DISTRIBUTE OXYGENATED BLOOD THROUGHOUT THE BODY

● **CAUSES OF AIRWAY BLOCKAGE**

- ACCUMULATION OF FOREIGN MATTER (VOMIT, PHLEGM, FOOD, BROKEN TEETH OR DENTURES, SAND, DIRT OR FOREIGN OBJECT) THAT CANNOT BE ELIMINATED BY COUGHING OR SWALLOWING CAN CREATE AN OBSTRUCTION.
- WHEN UNCONSCIOUS, VICTIM'S LOWER JAW AND TONGUE RELAX, THIS USUALLY LEADS TO BLOCKAGE OF THE THROAT WHEN VICTIM'S NECK IS BENT FORWARD.
- SPASMS OF THE VOCAL CHORDS

● **RECOGNITION OF AIRWAY OBSTRUCTION/RESPIRATORY ARREST**

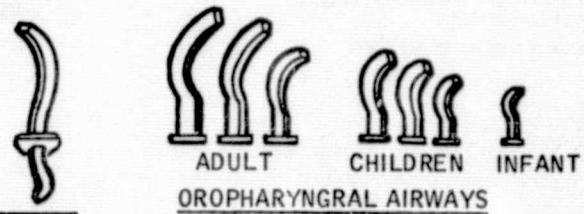
- LOOK FOR CHEST BREATHING MOVEMENTS
- LISTEN AND FEEL AIRFLOW THRU MOUTH AND NOSE
 - NO MOVEMENT OF AIR - COMPLETE OBSTRUCTION
 - NOISY BREATHING - PARTIAL OBSTRUCTION
 - "SNORING" - USUALLY INDICATES TONGUE BLOCKING AIR PASSAGE
 - "CROWING" - USUALLY INDICATES SPASMS AND CONSTRICTIONS OF LARYNX
 - GURGLING - FOREIGN MATTER IN WINDPIPE
- "CYANOSIS" - BLUE-GREY COLOR OF SKIN, TONGUE, LIPS AND NAIL BEDS (IN BLACKS OR OTHER DARK COMPLEXIONED VICTIMS)

BASIC LIFE SUPPORT

UNTIL PROVEN OTHERWISE, AN UNCONSCIOUS VICTIM (WHO DOES NOT RESPOND TO STIMULI) SHOULD BE CONSIDERED TO HAVE RESPIRATORY AND/OR CARDIAC ARREST (IF NOT BREATHING AND NO PULSE)

MOUTH-TO-MOUTH CARDIOPULMONARY RESUSCITATION (CPR), AS DESCRIBED ON THE FOLLOWING PAGES, SHOULD BE INSTITUTED IMMEDIATELY.

AIRWAYS INSTALLATION



S-TUBE AIRWAYS


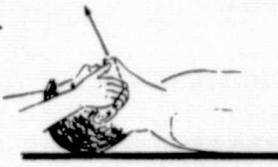
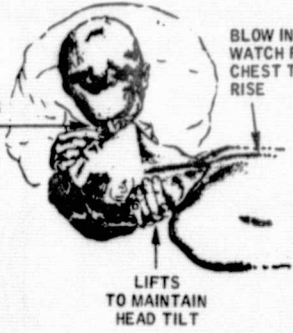

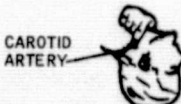
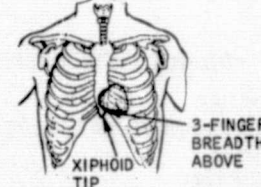
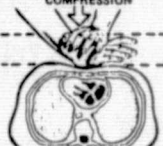
AIRWAYS ARE:

- TOOLS TO ASSIST IN KEEPING VICTIM'S AIRWAY OPEN
- TOOLS TO OVERCOME EMT OBJECTIONS TO DIRECT MOUTH-TO-MOUTH CONTACT DURING RESUSCITATION

IF VICTIM IS:

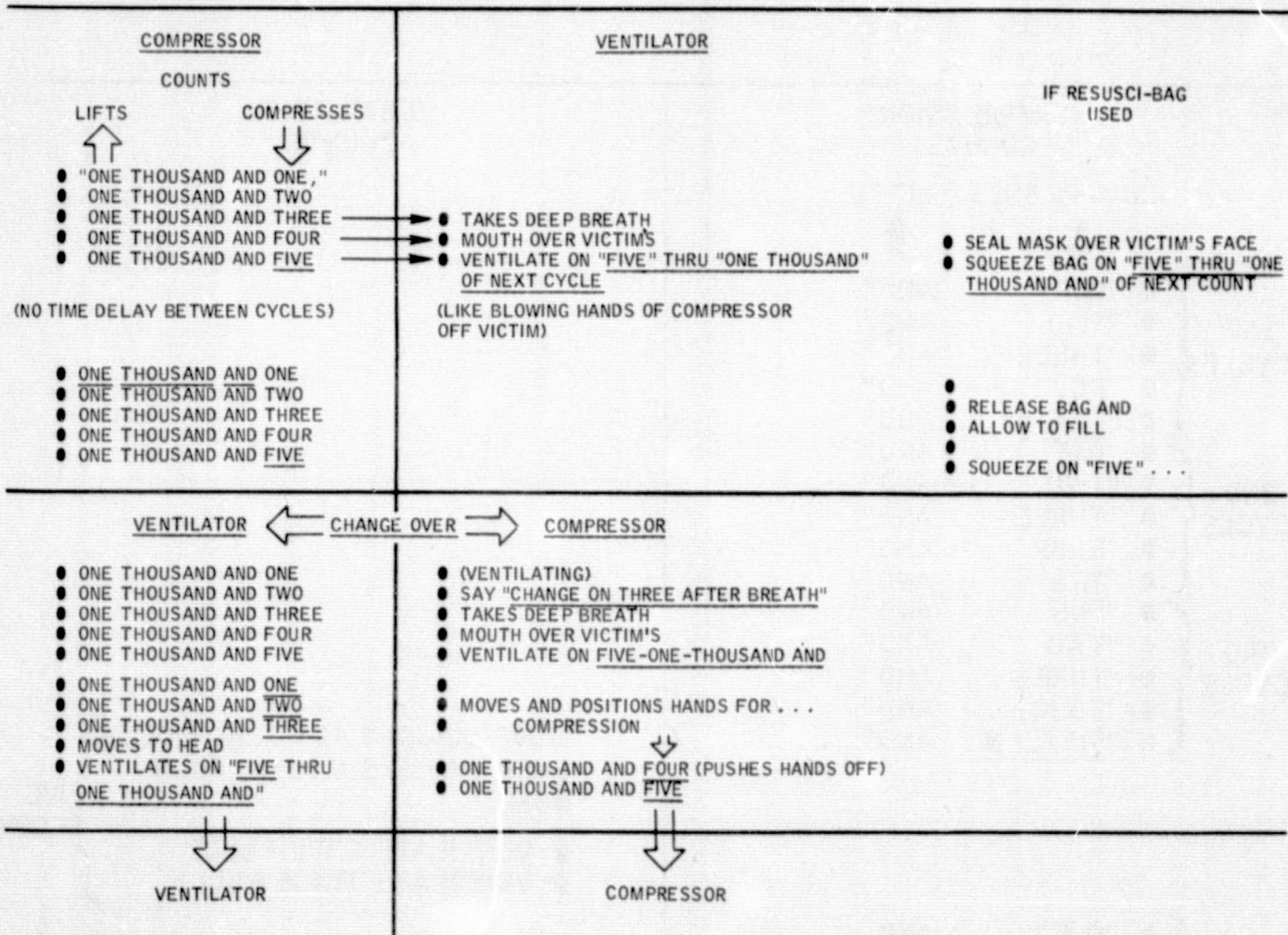
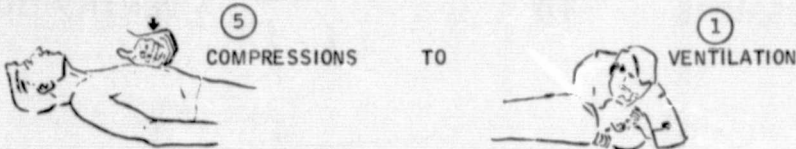
- CONSCIOUS AND BREATHING NORMALLY - DO NOT INSERT AIRWAY (WILL CAUSE VOMITING)
- UNCONSCIOUS WITH BREATHING OBSTRUCTED:
 - CLEAR AIRWAY OF DEBRIS (WITH FINGERS AND/OR ASPIRATOR).
 - IF DENTURES ARE LOOSE, REMOVE THEM.
 - SELECT CORRECT SIZE AIRWAY FOR VICTIM
 - USING ONE HAND WITH THUMB AND INDEX FINGER CROSSED, PRY PATIENTS TEETH APART AND HOLD MOUTH OPEN
 - INSERT AIRWAY (CURVE BACKWARD AT FIRST ①) THEN TURN TO PROPER POSITION ② OVER TONGUE AS AIRWAY IS PUSHED FURTHER BACK IN THROAT
- AFTER INSTALLATION PREVENT AIR LEAKAGE BY
 - PRESS FLANGE FIRMLY OVER MOUTH
 - PINCH NOSTRIL PRIOR TO MOUTH-TO-MOUTH AS INDICATED IN FOLLOWING PROCEDURES

BASIC CARDIOPULMONARY RESUSCITATION (CPR)

<p>1 AIRWAY CLEARANCE</p>	<ul style="list-style-type: none"> ● PLACE VICTIM ON FLAT/HARD SURFACE ● POSITION VICTIM'S HEAD TO PULL TONGUE UPWARD AWAY FROM BACK OF THROAT AND CLEAR AIRWAY. USE: <ul style="list-style-type: none"> - <u>HEAD-TILT</u>  <p>OR</p> <ul style="list-style-type: none"> - <u>JAW THRUST</u> (USED IF SUSPECTED NECK INJURY)  <ul style="list-style-type: none"> ● CLEAR MOUTH/AIRWAY . . . OF DEBRIS/FOREIGN OBJECTS <ul style="list-style-type: none"> - VOMITUS - FALSE TEETH - FORCE MOUTH OPEN - CLEAR DEBRIS OUT WITH FINGERS - USE ASPIRATOR (LG) IF NECESSARY - ROLL VICTIM ON SIDE, DELIVER BLOW WITH FIST IN MIDDLE OF BACK TO DISLODGE DEBRIS BLOCKING AIRWAY
<p>2 BREATHING</p>	<ul style="list-style-type: none"> ● MAINTAIN HEAD TILT ● TAKE DEEP BREATH ● PINCH NOSTRILS CLOSED ● SEAL MOUTH OVER VICTIM'S MOUTH (FOR INFANT MAYBE MOUTH AND NOSE) ● BLOW INTO VICTIM'S MOUTH ● WATCH FOR VICTIM'S CHEST TO RISE. (IF IT DOESN'T, AIRWAY IS BLOCKED, MUST BE CLEARED) ● QUICKLY GIVE 4 VENTILATIONS  <p>PINCH NOSTRILS BETWEEN THUMB AND FOREFINGER BEFORE BREATHING INTO VICTIM</p> <p>BLOW IN AND WATCH FOR CHEST TO RISE</p> <p>LIFTS TO MAINTAIN HEAD TILT</p> <p>IF RESUSCI-BAG USED</p> <ul style="list-style-type: none"> ● MAINTAIN HEAD TILT BY PULLING CHIN WHILE . . . ● SEALING MASK OVER VICTIM'S FACE COVERING NOSE AND MOUTH ● SQUEEZE BAG TO FORCE AIR INTO VICTIM'S LUNGS (WATCH FOR CHEST TO RISE) ● RELAX BAG PRESSURE AND ALLOW BAG TO INFLATE 
<p>3 CIRCULATION</p>	<ul style="list-style-type: none"> ● CHECK PULSE OVER CAROTID ARTERY (IF NO PULSE, THEN ● PLACE HEEL OF HAND IN POSITION, (3-FINGERS ABOVE XIPHOID PROCESS,) ● PLACE OTHER HAND ON TOP OF FIRST (MAY INTERLOCK FINGERS BUT DO NOT ALLOW FINGERS TO TOUCH CHEST WALL) ● POSITION SHOULDERS DIRECTLY OVER VICTIM'S STERNUM, ● KEEP ARM STIFF, ● COMPRESS CHEST WITH REGULAR PUSHES WITHOUT BOUNCING OR SNAPPING ● COUNT AND CIRCULATE AS PER 1-MIN. 2-MAN PROCEDURES ON NEXT PAGES  <p>CAROTID ARTERY</p>  <p>XIPHOID TIP</p> <p>3-FINGER BREADTH ABOVE</p>  <p>COMPRESSION</p> <p>COMPRESS:</p> <ul style="list-style-type: none"> 1.5-2" (ADULTS) 1-1.5" (CHILDREN) .75-1" (INFANT)

TWO-MAN CPR

- MUST AVERAGE 60 COMPRESSIONS/MIN. OR 1/SECOND
- COMPRESSOR AND VENTILATOR ON OPPOSITE SIDES OF VICTIM

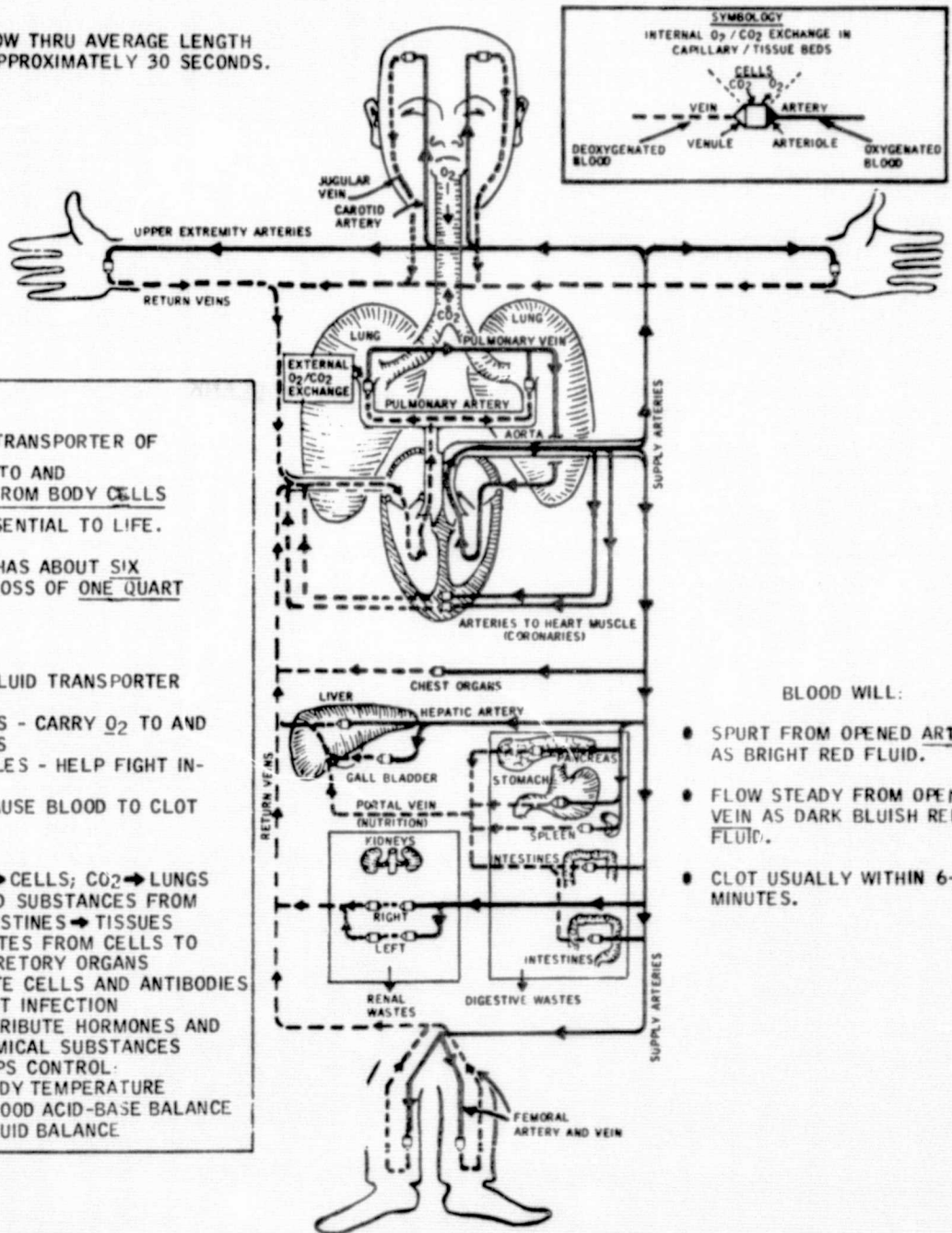


CARDIOVASCULAR SYSTEM (CIRCULATORY SYSTEM)

THIS BLOOD DISTRIBUTION SYSTEM OF THE BODY CONSISTS OF:

- A FOUR-CHAMBERED HEART PUMP THAT MOVES ...
- BLOOD THRU ...
- THE BLOOD VESSEL NETWORK OF BODY THAT INCLUDES:
 - SUPPLY ARTERIES, CARRYING O_2 RICH BLOOD FROM THE LEFT HEART TO ...
 - CAPILLARY BEDS, WHERE CELLS PICK UP O_2 AND DUMP CO_2 INTO THE
 - RETURN VEINS, THAT CARRY CO_2 BACK TO THE RIGHT HEART FOR PUMPING TO THE LUNGS WHERE CO_2 IS EXHALED AND NEW O_2 IS PICKED UP BY THE BLOOD. THE NETWORK ALSO INCLUDES ...
 - RETURN LYMPHATICS, DRAIN TISSUES OF FLUIDS AND WASTES, FILTER THESE WASTES, ADD ANTIBODIES TO FIGHT INFECTION AND DUMPS BACK INTO THE VENOUS RETURN FLOW.

ROUND TRIP BLOOD FLOW THRU AVERAGE LENGTH NETWORK CIRCUIT IS APPROXIMATELY 30 SECONDS.



BLOOD

- BLOOD IS THE FLUID TRANSPORTER OF
 - O_2 AND NUTRITION TO AND
 - CO_2 AND WASTES FROM BODY CELLS
 THEREFORE, IT IS ESSENTIAL TO LIFE.
- THE AVERAGE ADULT HAS ABOUT SIX QUARTS OF BLOOD. LOSS OF ONE QUART IS VERY SERIOUS.
- BLOOD CONTAINS:
 - LIQUID PLASMA - FLUID TRANSPORTER
 - SOLIDS:
 - RED CORPUSCLES - CARRY O_2 TO AND CO_2 FROM CELLS
 - WHITE CORPUSCLES - HELP FIGHT INFECTION
 - PLATELETS - CAUSE BLOOD TO CLOT
- BLOOD FUNCTIONS:
 - RESPIRATION - $O_2 \rightarrow$ CELLS; $CO_2 \rightarrow$ LUNGS
 - NUTRITION - FOOD SUBSTANCES FROM INTESTINES \rightarrow TISSUES
 - EXCRETION - WASTES FROM CELLS TO EXCRETORY ORGANS
 - PROTECTION - WHITE CELLS AND ANTIBODIES FIGHT INFECTION
 - REGULATION - DISTRIBUTE HORMONES AND CHEMICAL SUBSTANCES
 - HELPS CONTROL:
 - BODY TEMPERATURE
 - BLOOD ACID-BASE BALANCE
 - FLUID BALANCE

- BLOOD WILL:**
- SPURT FROM OPENED ARTERY AS BRIGHT RED FLUID.
 - FLOW STEADY FROM OPENED VEIN AS DARK BLUISH RED FLUID.
 - CLOT USUALLY WITHIN 6-7 MINUTES.

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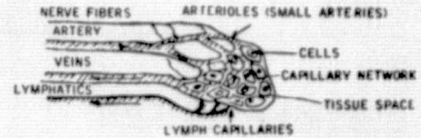


● **BASIC STRUCTURE OF THE BLOOD VESSEL NETWORK**

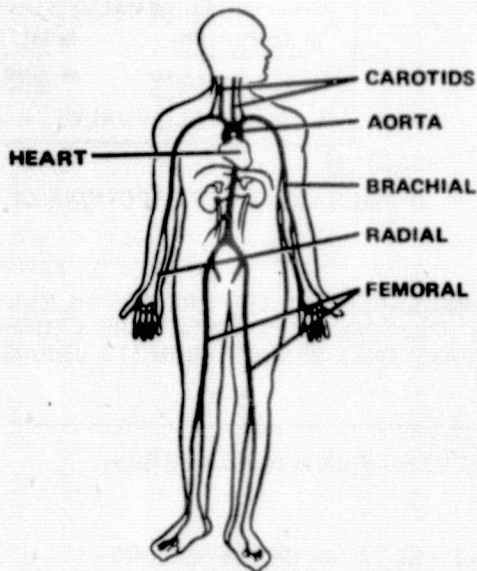
CIRCULATION TO A PARTICULAR BODY TISSUE AREA USUALLY WILL HAVE:

- ARTERIES, VEINS, AND NERVE FIBERS CONFIGURED IN "CABLE-BUNDLE FASHION" WITH THE ARTERIES LOCATED IN A DEEPER MORE PROTECTED LOCATION.
- THE LYMPHATICS ARE ALSO INCLUDED IN THESE VASCULAR BUNDLES AND FOLLOW CLOSELY THE CONFIGURATION OF THE VEINS.

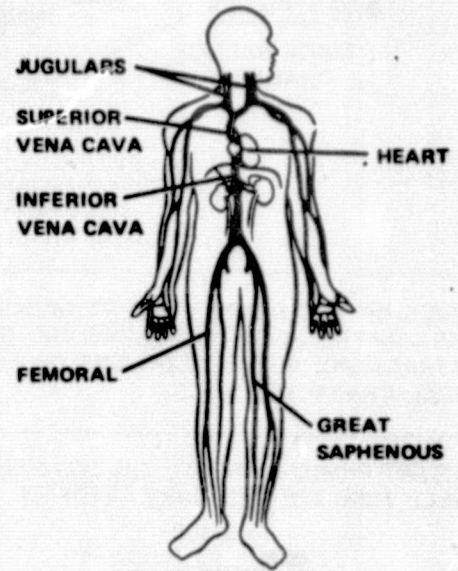
- CELLS OF THE BODY ARE MAINLY WITHIN TISSUE/CAPILLARY BEDS WHERE RESPIRATION (O₂ ABSORBED/CO₂ SECRETED) ON CELLULAR LEVEL OCCURS.
- SIZE OF ARTERIES IS CONTROLLED AUTOMATICALLY BY THE NERVOUS SYSTEM THAT SENDS SIGNALS TO "CONSTRICT" OR "RELAX" VESSELS TO CONTROL BLOOD PRESSURE AND FLOW.



BLOOD VESSEL NETWORK OF CIRCULATORY SYSTEM

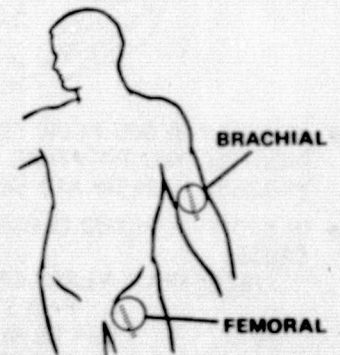
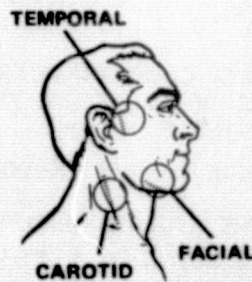


MAJOR ARTERIES



MAJOR VEINS

LOCATION OF MAJOR SITES FOR TAKING PULSE



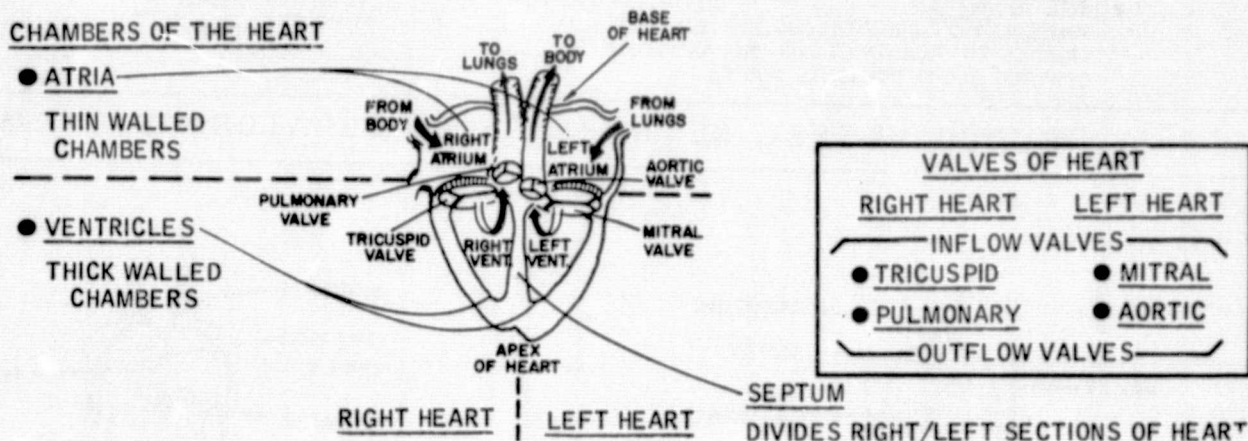
HEART ANATOMY AND PHYSIOLOGY

THE HEART IS THE MUSCULAR PUMP THAT CONTINUOUSLY MOVES BLOOD (THE TRANSPORT FLUID FOR OXYGEN, NOURISHMENT, CO₂ AND WASTES) THROUGHOUT THE BODY'S VASCULAR TREE OR NETWORK OF BLOOD VESSELS (ARTERIES, CAPILLARIES, AND VEINS).

THIS FOUR-CHAMBERED HEART PUMP UTILIZING ITS FOUR ONE-WAY FLOW VALVES MOVES:

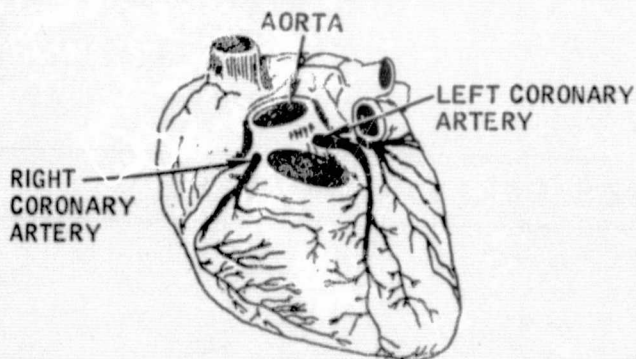
VENOUS RETURN BLOOD WITH CO₂ FROM BODY TISSUES BACK TO THE LUNGS THRU THE TWO RIGHT CHAMBERS OF THE HEART. IN THE LUNGS, CO₂ IS RELEASED AND OXYGEN IS PICKED UP BY THE BLOOD.

LIFE GIVING OXYGENATED BLOOD FROM THE LUNGS TO THE BODY TISSUES THRU THE TWO LEFT CHAMBERS OF THE HEART.



THE VALVES OF THE HEART PREVENT BACKFLOW AND ARE OPENED AND CLOSED BY DIFFERENCES IN BLOOD PRESSURES IN THE HEART CHAMBERS AND BLOOD VESSELS. THESE PRESSURE DIFFERENCES ARE CAUSED BY THE CONTRACTIONS AND RELAXATIONS OF THE CHAMBERS OF THE HEART THAT RESULT FROM ITS UNIQUE ELECTRICAL CHARACTERISTICS.

AS THE HEART PUMPS BLOOD TO THE BODY THRU THE AORTIC ARTERY IT ALSO PUMPS BLOOD TO SUSTAIN ITSELF THRU THE CORONARY ARTERIES.



- THE COMPLEX NETWORK OF THESE CORONARY VESSELS AS WELL AS THE CONSTANT BENDING AND TORSION THAT THEY ENCOUNTER MAKE THEM ESPECIALLY PRONE TO THE EFFECTS OF ARTERIOSCLEROSIS (HARDENING OF THE ARTERIES)
- THIS DISEASE CAUSES A GRADUAL THICKENING (HARDENING) AND LOSS OF ELASTICITY OF THE WALLS OF THE BLOOD VESSELS AND THUS A REDUCED BLOOD FLOW.

- REDUCED BLOOD FLOW TO AN AREA MAY BE COMPENSATED FOR BY INTERCONNECTING ARTERIES DILATING AND PROVIDING AN ALTERNATE OR COLLATERAL FLOW OF BLOOD TO THE AREA. THIS PROCESS IS SLOW AND OCCURS OVER A PERIOD OF TIME.
- IN ADDITION BLOOD CLOTS (THROMBUS) CAN SUDDENLY BLOCK FLOW IN A CORONARY ARTERY AND CAUSE:

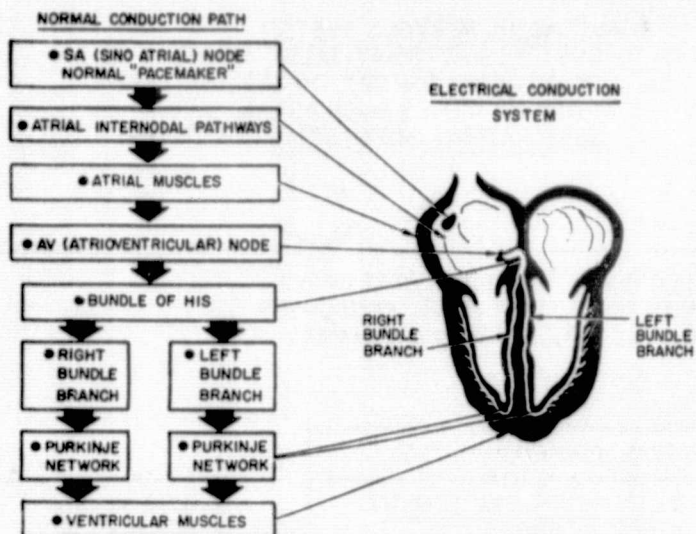
ISCHEMIA - A LACK OF OXYGEN IN THE MYOCARDIAL TISSUE. THIS CAN BE ACCOMPANIED BY PAIN SUCH AS ANGINA PECTORIS. IF OBSTRUCTION LASTS TOO LONG, IT CAN LEAD TO A ...

MYOCARDIAL INFARCTION - AN INJURY TO THE MYOCARDIUM WHICH CAN CAUSE:

- WEAKENED CAPABILITY OF THE HEART MUSCLE TO CONTRACT
- ABNORMAL CARDIAL ELECTRICAL IMPULSE FORMATION
- FAILURE TO CONDUCT IMPULSE PROPERLY THRU THE MYOCARDIAL TISSUE

ELECTRICAL ACTIVITY OF THE HEART

THE RHYTHMICAL MECHANICAL CONTRACTIONS AND RELAXATION OF THE HEART MUSCLES (MYOCARDIUM) ARE CAUSED BY ELECTRICAL IMPULSES THAT ARE AUTOMATICALLY GENERATED BY THE HEART AND ARE CONDUCTED BY THE HEART'S ELECTRICAL SYSTEM THROUGHOUT THE MYOCARDIUM.



THE SA NODE'S AUTOMATIC FIRING WILL PACE THE HEART'S RESPONSE THRU THE NORMAL CONDUCTION PATH AND WILL RESULT IN NORMAL HEART RATES OF 60-100 BEATS/MIN. THESE RATES ARE DETERMINED BY THE ELECTRICAL PROPERTIES OF THE HEART ITSELF BUT THEY CAN BE MODIFIED BY THE NERVOUS SYSTEM CONTROLS OF THE HEART.

ANY PART OF THIS CONDUCTION PATH CAN ACT AS A "BACK-UP PACEMAKER" WHEN THE SA NODE FIRING FAILS OR A CONDUCTION PROBLEM EXISTS. INHERENT FIRING RATES FOR OTHER HEART AREAS ARE:

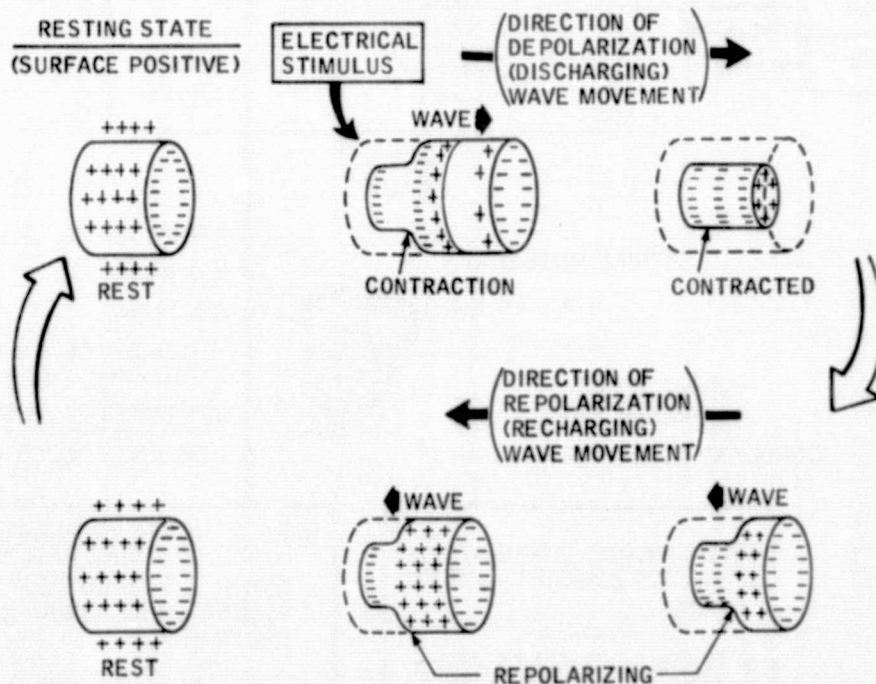
75/MINUTE (ATRIA)
60/MINUTE (AV NODE)
30-40/MINUTE (VENTRICLES)

ABNORMAL PATTERNS MAY OCCUR DUE TO HEART IRRITATION AND INJURIES THAT CAN RESULT IN AN "ECTOPIC" (OUT-OF-PLACE) FOCUS OR LOCATION OF THE PACEMAKER OTHER THAN THE SA NODE.

IN EMERGENCY OR PATHOLOGICAL SITUATIONS AN ECTOPIC FOCUS OR FOCI CAN FIRE AT VERY FAST RATES OF 150-250/MIN.

THESE ABNORMAL PATTERNS CAN RESULT IN TOO SLOW (BELOW 40) AND TOO FAST (ABOVE 150) VENTRICULAR BEATS/MIN. WHERE THE HEART CANNOT PUMP THE BLOOD EFFECTIVELY AND CARDIAC OUTPUT IS AFFECTED SUCH THAT TISSUES DO NOT GET ENOUGH OXYGEN.

THE MYOCARDIUM OF THE HEART IS COMPOSED OF A LATTICEWORK OF MUSCLE FIBERS (MYOFIBRIL) THAT RESPOND BY DEPOLARIZING, CONTRACTING AND REPOLARIZING IN A MANNER THAT PRODUCES A WAVE LIKE ACTION AS IT PASSES. EACH FIBER REACTS AS FOLLOWS:



EACH MUSCLE IS STIMULATED AND REACTS SEPARATELY BUT NORMALLY IN A SYNCHRONOUS MANNER WITH THE EXCITATION IMPULSE STARTING IN THE SA NODE AND PASSING THRU THE CONDUCTION PATHWAY CAUSING THE DEPOLARIZING OF THE MUSCLES OF THE ATRIA THEN THE VENTRICLES.

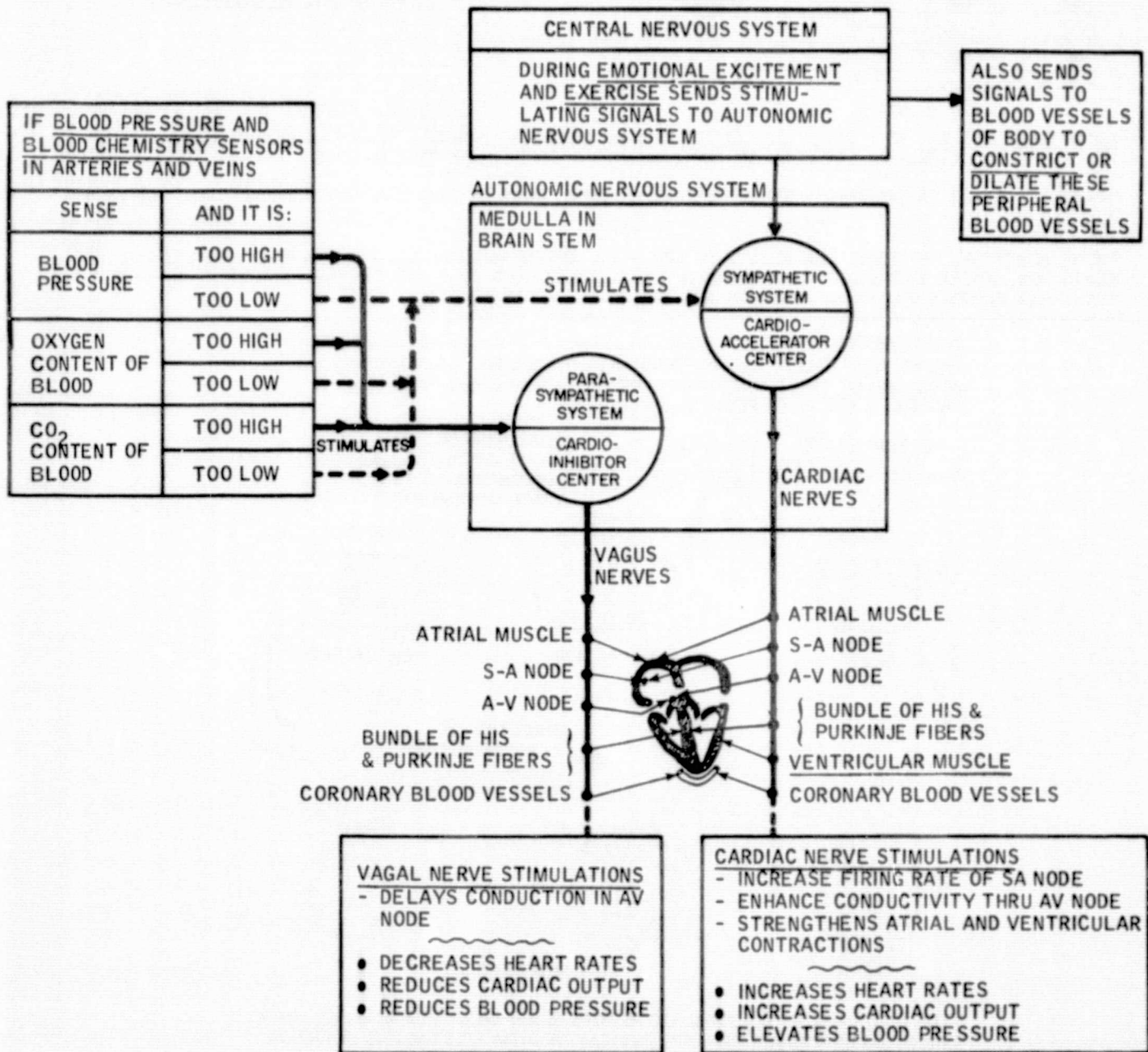
NERVOUS CONTROL OF THE HEART

NEURAL ACTIVITY OF THE BODY IS UNDER CONTROL OF THE NERVOUS SYSTEMS:

- **CENTRAL NERVOUS SYSTEM**
 - CONTROLS VOLUNTARY MUSCLE ACTIVITY LIKE WALKING, TALKING, ETC.
 - INCLUDES:
 - BRAIN
 - SPINAL CORD
 - PERIPHERAL NETWORK OF NERVES TO AND FROM MUSCLES AND SENSORS
- **AUTONOMIC NERVOUS SYSTEM**
 - CONTROLS AUTOMATICALLY WITHOUT "CONSCIOUS" EFFORT THE INVOLUNTARY BODY ACTIVITIES SUCH AS DIGESTION, RESPIRATION, AND CARDIAC FUNCTIONS.



ALTHOUGH THE HEART AUTOMATICALLY GENERATES ELECTRICAL IMPULSES THAT CAUSE THE MYOCARDIUM TO CONTRACT, THE HEART RATES AND STRENGTH OF HEART RESPONSES ARE REGULATED BY THE AUTONOMIC NERVOUS SYSTEM. THE FOLLOWING IS A SUMMARY OF THIS REGULATION PROCESS.



EKG OR ECG (ELECTROCARDIOGRAM)

THE TOTAL COLLECTIVE ELECTRICAL ACTIVITY ASSOCIATED WITH THE WAVES OF EXCITATION OF THE HEART'S NERVES AND MUSCLES CAN BE RECORDED BY ELECTRODES PLACED ON THE SKIN AND CONNECTED TO AN EKG MACHINE. THIS EQUIPMENT MEASURES, RECORDS AND DISPLAYS THIS ELECTRICAL ACTIVITY OF THE HEART ON STANDARD EKG GRAPH PAPER (SEE PAGE 3-9) THAT MOVES THRU THE EKG RECORDER AT A STANDARD RATE. THE RESULTANT RECORD IS REFERRED TO AS THE "PATIENT'S EKG." THE RECORD CAN BE SIMULTANEOUSLY DISPLAYED ON A CARDIOSCOPE (CATHODE RAY OR TV TYPE TUBE) AS A MOVING DISPLAY, THE EKG PATTERN IS WRITTEN ON THE LEFT OF THE DISPLAY AND IT THEN MOVES TO THE RIGHT AT THE SAME RATE AS A WRITTEN RECORD.

DIFFERENT TYPES OF EKG MEASUREMENTS CAN BE MADE WHICH ARE IN ESSENCE DIFFERENT "VIEWS" OF THE HEART'S ELECTRICAL ACTIVITY FROM DIFFERENT ANGLES AROUND THE BODY DEPENDENT UPON THE INSTALLATION AND CONNECTION OF ELECTRODES. THE TWO MAJOR TYPES OF EKG'S ARE:

● THREE-LEAD EKG

- USED IN PRE-HOSPITAL EMERGENCY CARE.
INCLUDES:

3 STANDARD BIPOLAR (BETWEEN TWO ELECTRODES) MEASURES:

- LEAD I (RIGHT ARM-LEFT ARM) (RA-LA)
- LEAD II (RIGHT ARM-LEFT LEG) (RA-LL)
- LEAD III (LEFT ARM-LEFT LEG) (LA-LL)

- MEASURES HEART ACTIVITY FROM FRONT OF BODY (FRONTAL PLANE)

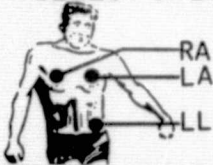
TRANSMISSION OF GOOD QUALITY EKG'S IS ESSENTIAL FOR RAPID VICTIM ASSESSMENT AND RAPID DETERMINATION OF THE PROPER PRE-HOSPITAL TREATMENT REQUIRED. FACTORS IMPORTANT IN THIS PROCESS ARE:

A. GOOD MAINTENANCE AND OPERATION OF THE EKG EQUIPMENT

- PROPER HANDLING AND STOWAGE OF EKG EQUIPMENT
- PROPER CLEANING
- PROPER PRE-CALL
 - EKG EQUIPMENT CHECKS (SEE PAGE 1-11)
 - EKG BATTERY CHARGING OPERATIONS (SEE PAGE 1-10)
- PROPER CONTROL OPERATIONS (SEE PAGES 1-11 AND 1-12)

B. PROPER BODY SITE SELECTION FOR ELECTRODE INSTALLATION

SELECT SITES FOR ELECTRODE INSTALLATION AS ILLUSTRATED.



NOTE: WOMEN WITH PENDULOUS BREASTS MAY REQUIRE INSTALLATION OF "LL" ELECTRODE MORE TO THE SIDE AND BACK OF THE BODY OR UNDERNEATH THE BREAST. IF UNDERNEATH SITE IS SELECTED THEN ADDITIONAL CLEANING OF SITE MAY BE REQUIRED DUE TO EXCESSIVE OIL, POWDER AND MOISTURE THAT MAY BE IN THAT AREA.

C. SITE PREPARATION

- (1) CLEANSE ALL THREE SITES THOROUGHLY WITH ALCOHOL OR STERILE WIPES.
- (2) RUB SITES WITH GAUZE PAD OR PAPER TOWEL - ABOUT 5 SECONDS EACH. (THIS ABRADING INCREASES ELECTRICAL CONDUCTIVITY OF SKIN.)

D. ELECTRODE APPLICATION (ELECTRODE TYPE - PREGELLED)

- (1) REMOVE ELECTRODES FROM PACKAGE (OPEN JUST PRIOR TO USE)
- (2) APPLY TO SITE (START AT TOP EDGE AND ROLL DOWNWARD)
- (3) THEN PAT ENTIRE SURFACE OF ELECTRODE



E. CONNECTION OF ELECTRODE WIRES TO ELECTRODES AND EKG CABLE

(THESE CONNECTIONS MAY HAVE BEEN ACCOMPLISHED PREVIOUSLY BUT CHECKS SHOULD BE MADE FOR ACCURACY AND INTEGRITY.)

(1) CONNECT (OR VERIFY) WIRE SNAPS (RH) TO ELECTRODES

(RH) { BLACK TO LA ELECTRODE
WHITE TO RA ELECTRODE
RED TO LL ELECTRODE

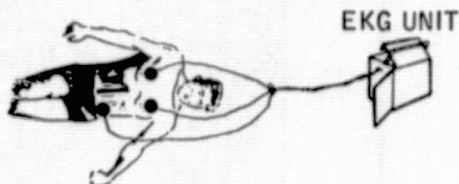
(2) CONNECT OR VERIFY EKG WIRES (RG) TO EKG CABLE

(RE) { BLACK TO BLACK
WHITE TO WHITE
RED TO RED

(3) MAKE SURE EKG CABLE (RE) IS CONNECTED TO UNIT

CAUTIONS

- DO NOT ALLOW TENSION TO BE PLACED ON ANY OF WIRING CONNECTIONS BETWEEN PATIENT AND EKG UNIT
 - CABLE AT UNIT
 - CABLE TO ELECTRODE WIRES
 - EKG SNAPS OR ELECTRODES
- STRING WIRES FROM PATIENT ELECTRODES TO UNIT IN A MANNER THAT MINIMIZES THE "OVER THE BODY" STRINGING OF THE LINES.



NOTE: ATTACH CLIP TO PATIENT'S CLOTHING OR STRETCHER TO PREVENT ELECTRODE DETACHMENT.

- KEEP LINES FROM PATIENT TO EKG UNIT AS FREE AS POSSIBLE FROM SUCH THINGS AS FEET, AND OTHER EQUIPMENT (PARTICULARLY METAL TYPE)

F. VERIFY EKG UNIT POWER AND COMMUNICATIONS SWITCH SETTINGS

- (1) MAIN POWER H ON
- (2) TRANSMITTER D CONTINUOUS
- (3) CHANNEL SELECT E AS DIRECTED BY BASE STATION
- (4) MODE SWITCH A EKG AND VOICE

G. CONDUCT ELECTRODE OPERATIONS CHECK

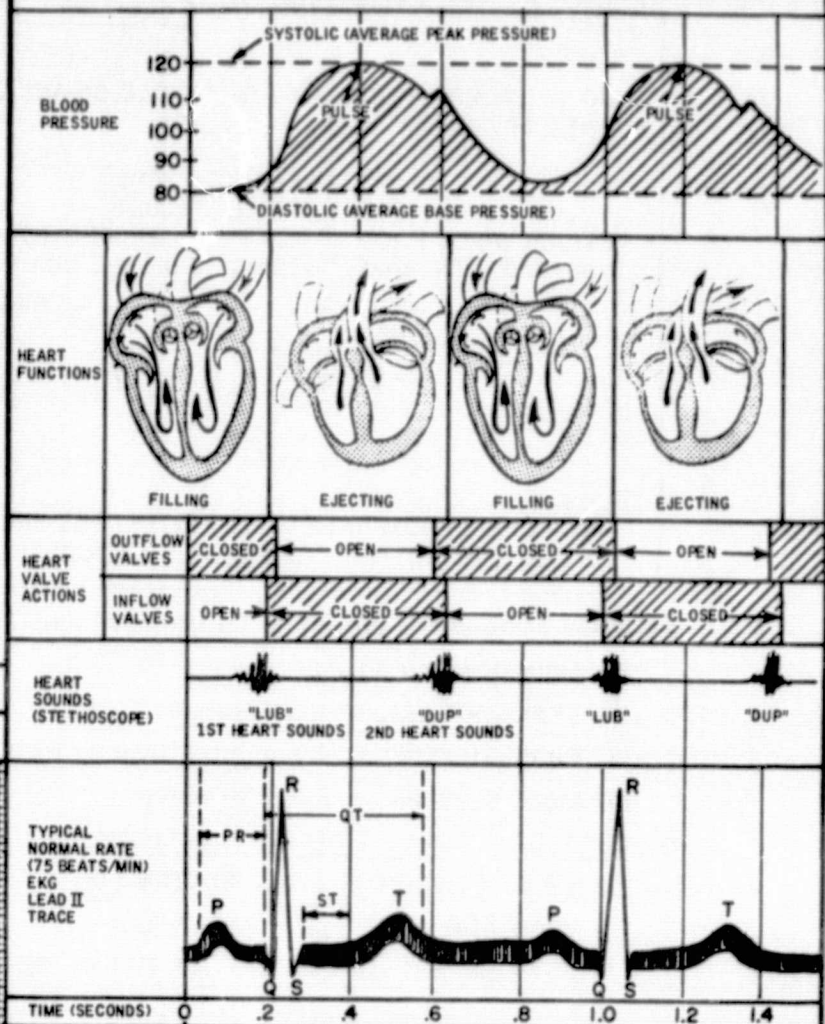
- (1) PRESS ELECTRODE CHECK BUTTON O
- (2) VERIFY NO LIGHTS P (RA, LA, LL)
- (3) SET LEAD SELECT SWITCH M TO I, II, OR III AS DIRECTED BY BASE STATION

SUMMARY OF POSSIBLE CAUSES OF POOR EKG'S

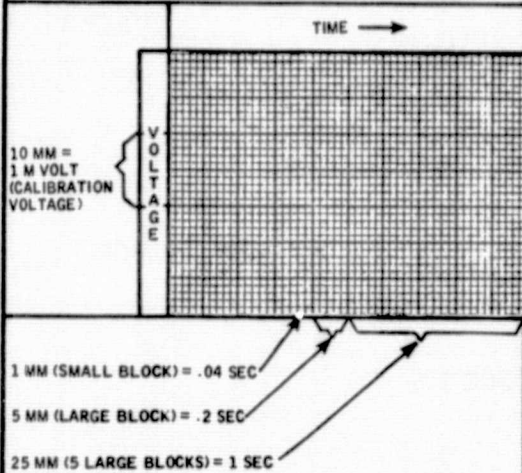
- IMPROPER APPLICATION OF ELECTRODES RI DUE TO:
 - EXCESSIVE HAIR
 - OILY, DIRTY, SCALY SKIN
 - EXCESSIVE PERSPIRATION
- BROKEN OR DEFECTIVE:
 - EKG CABLE RE
 - ELECTRODE WIRE CONNECTIONS RG
 - SNAP/ELECTRODE CONNECTIONS
 - ELECTRODE PASTE HAS DRIED OUT DUE TO EXPOSURE TO AIR PRIOR TO USE
- FAULTY ELECTRONICS IN EKG UNIT (CAN BE CHECKED BY - "ELECTRODE CHECK" OPERATING MODE
 - STANDARD
 - SNAPS)
- ELECTRICAL INTERFERENCE FROM NEARBY ELECTRICAL EQUIPMENT OR MAGNETIC FIELDS
- COMMUNICATION INTERFERENCES FROM NEARBY HIGH BUILDINGS/STRUCTURES.
- STATIC ELECTRICITY CAUSED BY SYNTHETIC CLOTHING
- PATIENT MOVEMENTS FROM:
 - BODY THRASHINGS
 - MUSCLE TREMORS
 - LARGE RESPIRATORY MOVEMENTS
 - BOUNCING AMBULANCES
- LARGE AMOUNTS OF FATTY TISSUE BENEATH ELECTRODES

- THE HEART IS A SYNCHRONOUS ELECTRO-CHEMICAL-MECHANICAL PUMP.
- CARDIAC CHEMICAL EVENTS RESULT IN ELECTRICAL ACTIVITY OF THE HEART WHICH IN TURN RESULTS IN MECHANICAL CONTRACTIONS AND VALVE MOVEMENTS THAT FORCE THE BLOOD THROUGHOUT THE LUNGS AND BODY.
- ALL OF THESE EVENTS MUST OCCUR IN A SYNCHRONIZED, INTEGRATED MANNER TO BE EFFICIENT.
- THE RELATIONSHIP OF THE MECHANICAL AND ELECTRICAL ACTIVITY IN A NORMAL HEART RATE IS ILLUSTRATED IN THE ADJACENT CHART.
- DUE TO THE CORRELATION OF CARDIAC EVENTS MUCH CAN BE INFERRED BY ANALYZING EKG WAVE FORMS AND INTERVALS.

CARDIAC EVENTS

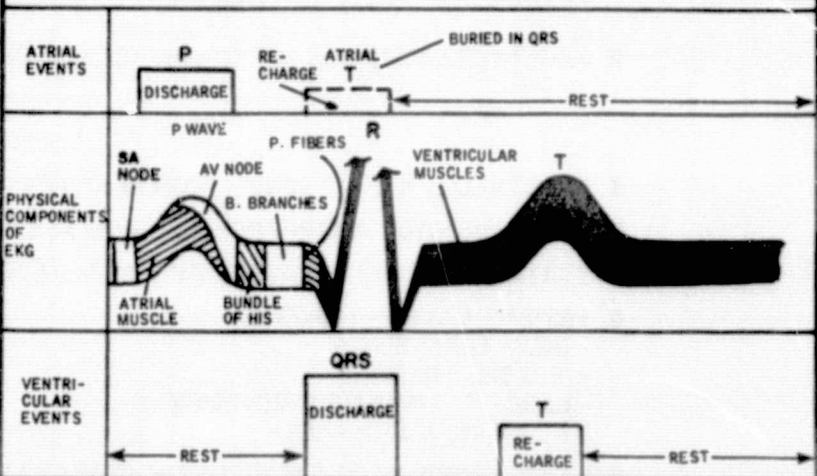




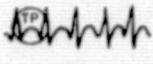
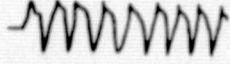
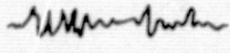
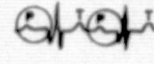

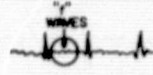

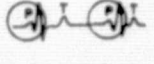
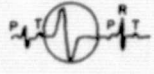
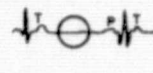
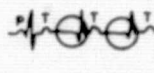
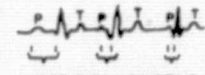
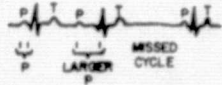
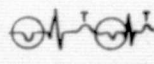

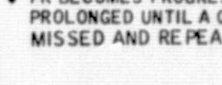
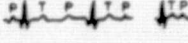
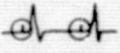
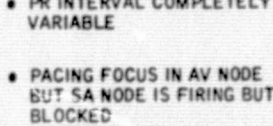
ELECTROCARDIOGRAPHIC GRID



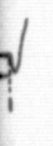
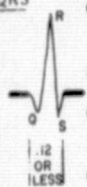



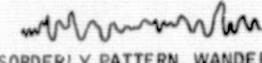



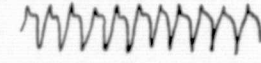
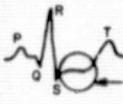
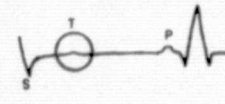
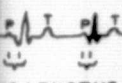
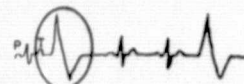
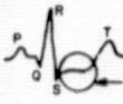
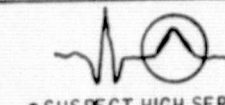
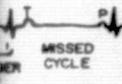
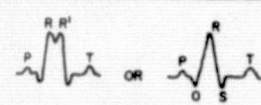

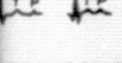

- NORMAL EKG CHARACTERISTICS**
- P, R, T WAVES ARE UPRIGHT (POSITIVE)
 - Q WAVE USUALLY INVERTED (NEGATIVE) BUT MAY BE ABSENT
 - S WAVE IS INVERTED (NEGATIVE)
 - ALL P WAVES TRIGGER QRS COMPLEXES
 - T WAVES FOLLOW QRS COMPLEXES
 - ST AND TP SEGMENTS ARE FLAT ON BASELINE SHOWING ZERO ELECTRICAL ACTIVITY
 - NUMBER OF P WAVES/MINUTE = ATRIAL RATE
 - NUMBER OF R WAVES/MINUTE = VENT. RATE
- ADULT NORMAL RANGE (SECONDS)**
- P-R INTERVAL .12 - .20 (ATRIOVENTRICULAR CONDUCTION TIME)
 - QRS INTERVAL .07 - .10 (VENTRICULAR DISCHARGE TIME)
 - S-T SEGMENT .11 - .16 (REST PRIOR TO VENTRICULAR RECHARGE TIME)
 - QT INTERVAL .27 - .43 (VENTRICULAR DISCHARGE AND RECHARGE TIME)

ELECTRICAL COMPONENTS OF NORMAL EKG (LEAD II)



<p>NORMAL EKG SEGMENT CHARACTERISTICS (LEAD II)</p>	<p>P-WAVE</p>  <ul style="list-style-type: none"> • UPWARD (+) SMOOTH SYMMETRICAL DEFLECTION • ONE P WAVE PRECEDES EACH QRS COMPLEX • EACH P WAVE FOLLOWS T WAVE OR LAST CYCLE • REPRESENTS ATRIAL DEPOLARIZATION 	<p>PR INTERVAL</p>  <ul style="list-style-type: none"> • .12-.2 SECOND • 3-5 EKG BLOCKS • REPRESENTS ELECTRICAL PASSAGE THRU CONDUCTION PATH 		
<p>ABNORMAL EKG SEGMENT VARIATIONS</p>	<p>UNRECOGNIZABLE "P" WAVES</p>		<p>PROLONGED PR INTERVAL</p>	
	 <ul style="list-style-type: none"> • P WAVE BURIED IN T WAVE • TOO FAST VENTRICULAR RATES CAUSE MIXING OF T AND P WAVES 	 <ul style="list-style-type: none"> • P WAVES BURIED IN DISTORTED SLURRED WAVES  <ul style="list-style-type: none"> • P WAVES BURIED IN CHAOTIC, BIZARRE WAVES 	 <ul style="list-style-type: none"> • PR INTERVAL GREATER THAN .2 SEC. • INDICATES DELAY IN CONDUCTION THRU THE AV NODE 	
	<p>MULTIPLE "P" WAVES FOR EACH QRS</p>		<p>SHORT PR INTERVAL</p>	
	 <ul style="list-style-type: none"> • ATRIAL FLUTTER (F) WAVES ARE SAWTOOTHED. • FAST FIRING ATRIAL ECTOPIC FOCUS 	 <ul style="list-style-type: none"> • ATRIA FIBRILLATION (f) WAVES (SMALL, IRREGULAR, RAPID P's) • MULTIPLE ATRIAL ECTOPIC FOCI 	 <ul style="list-style-type: none"> • OCCASIONAL NORMAL P's DO NOT TRIGGER QRS, MULTIPLE P's • INDICATES BLOCKAGE IN AV NODE 	 <ul style="list-style-type: none"> • PR INTERVAL IS SHORTENED • PACING ECTOPIC FOCUS IN ATRIA OR AV NODE
	<p>MISSING "P" WAVES</p>		<p>VARYING PR INTERVALS</p>	
	 <ul style="list-style-type: none"> • OCCASIONAL LARGE BIZARRE QRS WITHOUT P WAVE • INDICATES ECTOPIC FOCUS IN VENTRICLES 	 <ul style="list-style-type: none"> • OCCASIONAL CYCLE IS MISSED • SA NODE DOESN'T FIRE 	 <ul style="list-style-type: none"> • P's MISSING FOR QRS • PACING ECTOPIC FOCUS IN AV NODE 	 <ul style="list-style-type: none"> • VARYING LENGTHS OF PR • CHANGING PACEMAKER SITES IN ATRIA • P's PRECEDE QRS's
	<p>OTHER ODD-SHAPED "P" WAVES</p>		 <ul style="list-style-type: none"> • PR BECOMES PROGRESSIVELY PROLONGED UNTIL A QRS IS MISSED AND REPEATS CYCLE 	
	 <ul style="list-style-type: none"> • INVERTED "P" WAVE • PACING ECTOPIC FOCUS IN ATRIA 	 <ul style="list-style-type: none"> • TENTED P • NOTCHED P • LARGE TENTED P's OR NOTCHED "P" WAVES • ATRIAL ENLARGEMENT 	 <ul style="list-style-type: none"> • INDICATES DELAY AND BLOCKAGE OF CONDUCTION IN ATRIA OR AV NODE (WENCKEBACH PHENOMENON) 	
	<p>SPIKED WAVE PRECEDING QRS</p>		 <ul style="list-style-type: none"> • PR INTERVAL COMPLETELY VARIABLE 	
	 <ul style="list-style-type: none"> • NEEDLE-SHARP WAVE • INDICATES ARTIFICIAL PACEMAKER 	 <ul style="list-style-type: none"> • PACING FOCUS IN AV NODE BUT SA NODE IS FIRING BUT BLOCKED 		

EKG SEGMENT DISCUSSION

<p>PR INTERVAL</p> <ul style="list-style-type: none"> • .12-.2 SECOND • 3-5 EKG BLOCKS • REPRESENTS ELECTRICAL PASSAGE THRU CONDUCTION PATH 	<p>QRS</p> <ul style="list-style-type: none"> • CRISP, THIN, SPIKED WAVES • Q WAVE IS NEGATIVE OR MAY BE ABSENT (DUE TO HEART PLACEMENT) • R WAVE IS TALLEST EKG WAVE • S WAVE IS DOWNWARD WAVE FOLLOWING R WAVE • REPRESENTS VENTRICULAR DEPOLARIZATION 	<p>ST SEGMENT</p> <ul style="list-style-type: none"> • ZERO ELECTRIC PERIOD BETWEEN THE S AND T WAVES • FLAT AND ON BASELINE • REPRESENTS INITIAL SLOW PHASE OF VENTRICULAR REPOLARIZATION 	<p>T WAVE</p> <ul style="list-style-type: none"> • UPWARD (+) SMOOTH SYMMETRICAL DEFLECTION • ONE T WAVE FOLLOWS EACH QRS • REPRESENTS VENTRICULAR REPOLARIZATION 
<p>PROLONGED PR INTERVAL</p> <p>INTERVAL GREATER THAN .2 SEC.</p> <p>INDICATES DELAY IN CONDUCTION AT THE AV NODE</p> 	<p>BIZARRE AND CHAOTIC</p> <ul style="list-style-type: none"> • DISORDERLY PATTERN, WANDERING BASELINE, DIFFERENT SHAPED WAVES • FIBRILLATION OF VENTRICLES (RAPIDLY FATAL) 	<p>ELEVATED ST SEGMENT</p>  <ul style="list-style-type: none"> • ST SEGMENT ELEVATED ABOVE THE BASELINE SINCE S WAVE DOES NOT RETURN TO ZERO • SUSPECT RECENT MYOCARDIAL INFARCTION (CARDIAC MUSCLE INJURY) 	<p>INVERTED T WAVE</p>  <ul style="list-style-type: none"> • INVERTED (-) T WAVE • INDICATES INSUFFICIENT BLOOD SUPPLY (OXYGEN) TO CARDIAC MUSCLES (ISCHEMIA)
<p>SHORT PR INTERVAL</p> <p>PR INTERVAL IS SHORTENED</p> <p>INDICATING ECTOPIC FOCUS IN AV NODE</p> 	<p>SIMILAR DISTORTED, SLURRED, BIZZARE WAVES</p>  <ul style="list-style-type: none"> • SIMILAR, RAPID, WIDE AND ODD-SHAPED WAVES • ECTOPIC VENTRICULAR FOCUS IN HIS-PURKINJE SYSTEM 	<p>HORIZONTALLY DEPRESSED ST SEGMENT</p>  <ul style="list-style-type: none"> • ST SEGMENT DEPRESSED BELOW BASELINE • "DIGITALIS" DRUG EFFECT • INDICATES INSUFFICIENT BLOOD SUPPLY (OXYGEN) TO CARDIAC MUSCLES (ISCHEMIA) • MAY BE OLD MYOCARDIAL INFARCT. (HEART MUSCLE "INJURY") OR PULMONARY INFARCTION 	<p>FLAT T WAVE</p>  <ul style="list-style-type: none"> • FLAT T WAVE • INDICATES INSUFFICIENT BLOOD SUPPLY (OXYGEN) TO CARDIAC MUSCLES (ISCHEMIA) • INDICATES LOW SERUM POTASSIUM (K⁺)
<p>VARYING PR INTERVALS</p> <p>CHANGING LENGTHS OF PR</p> <p>INDICATING PACEMAKER S IN ATRIA PRECEDE QRS'S</p> 	<p>OCCASIONAL DISTORTED, SLURRED BIZARRE WAVE</p>  <ul style="list-style-type: none"> • BIZARRE, LARGE WAVE OCCURS OCCASIONALLY • ECTOPIC FOCUS IN HIS-PURKINJE SYSTEM • PREMATURE VENTRICULAR CONTRACTION (PVC) 	<p>HORIZONTALLY DEPRESSED ST SEGMENT</p>  <ul style="list-style-type: none"> • ST SEGMENT DEPRESSED BELOW BASELINE • "DIGITALIS" DRUG EFFECT • INDICATES INSUFFICIENT BLOOD SUPPLY (OXYGEN) TO CARDIAC MUSCLES (ISCHEMIA) • MAY BE OLD MYOCARDIAL INFARCT. (HEART MUSCLE "INJURY") OR PULMONARY INFARCTION 	<p>TALL PEAKED T-WAVE</p>  <ul style="list-style-type: none"> • SUSPECT HIGH SERUM POTASSIUM (K⁺)
<p>WIDENING QRS</p> <p>NOTCHED OR PROLONGED QRS</p> <p>INDICATES DELAY AND BLOCKAGE OF CONDUCTION AT ATRIA OR AV NODE (SICKLEBACH PHENOMENON)</p> 	<p>NOTCHED OR PROLONGED QRS</p>  <ul style="list-style-type: none"> • NOTCHED R WAVE OR PROLONGED R WAVE GREATER THAN 3 SMALL BLOCKS (.12 SEC.) • BLOCKAGE OR DELAY IN HIS-PURKINJE SYSTEM CALLED BUNDLE BRANCH BLOCK 	<p>SLURRED DEPRESSED ST SEGMENT</p>  <ul style="list-style-type: none"> • ST SEGMENT IS LARGE AND DEPRESSED • SUGGESTS DIGITALIS EFFECTS 	
<p>WIDENING QRS</p> <p>PR INTERVAL COMPLETELY ABSENT</p> <p>INDICATING ECTOPIC FOCUS IN AV NODE (SA NODE IS FIRING BUT BLOCKED)</p> 	<p>ENLARGED Q WAVE</p>  <ul style="list-style-type: none"> • Q WAVE IS 1/3 OR GREATER SIZE OF QRS • SUSPECT MYOCARDIAL INFARCTION (HEART INJURY) 		

EKG EMT EVALUATION ELEMENTS

I. HEART RATES

- HEART RATE = THE NUMBER OF VENTRICULAR CONTRACTIONS (PULSES) OR "R" WAVES THAT OCCUR IN ONE MINUTE
- ADULT HEART RATE CLASSIFICATIONS
 - NORMAL RATES = 60-100/MINUTE OR (3, 4 OR 5 "R" WAVES ON TELECARE SCOPE AT ONCE)
 - HIGH RATES (TACHYCARDIAS) = MORE THAN 100/MINUTE OR (MORE THAN 5 "R" WAVES/SCOPE)
 - LOW RATES (BRADYCARDIAS) = LESS THAN 60/MINUTE OR (LESS THAN 3 "R" WAVES/SCOPE)
- DETERMINING HEART RATES:
 - FROM EKG SCOPE:
 - 1) COUNT NUMBER OF "R" WAVES ON-SCOPE AT THE SAME TIME,
MULTIPLY X 20 = GROSS ESTIMATE OF HEART RATE
 - 2) COUNT NUMBER OF "R" WAVES AS THEY DISAPPEAR FROM SCOPE FOR 6 SECONDS,
MULTIPLY X 10 = REASONABLY ACCURATE HEART RATE ESTIMATE
 - FROM EKG STRIP:
 - 1) COUNT NUMBER OF 5 MM LINES (OR BLOCKS) BETWEEN ANY TWO "R" WAVES AND DIVIDE INTO 300,
ie, 1 BLOCK = 300
2 BLOCKS = 150
3 BLOCKS = 100
4 BLOCKS = 75
5 BLOCKS = 60

CAUTIONS

HEART RATES THAT ARE TOO SLOW OR TOO FAST USUALLY RESULT IN DECREASED CARDIAC OUTPUTS (AMOUNT OF BLOOD PUMPED PER MINUTE) THAT CAUSE LOWERED SYSTOLIC BLOOD PRESSURES WHICH CAN LEAD TO CIRCULATORY SHOCK AND INSUFFICIENT OXYGEN SUPPLY TO BODY TISSUES.

II. HEART RHYTHM

THE RHYTHM (OR REGULARITY) OF THE OCCURRENCE OF VENTRICULAR CONTRACTIONS (PULSES) OR "QRS" COMPLEXES DETERMINES HEART RHYTHM. IT CAN BE DETERMINED BY COMPARING THE DURATION OF THE R-R INTERVALS AS THEY OCCUR. IF INTERVALS ARE:

IRREGULAR RHYTHMS MAY BE CAUSED BY

- EQUAL = REGULAR RHYTHM
- UNEQUAL = IRREGULAR RHYTHM
- VARIATIONS IN PACING IMPULSE FORMATIONS
- APPEARANCE OF PREMATURE BEATS
- BLOCKAGE OR DELAYS IN THE CONDUCTION PATHWAYS OF HEART

III. ATRIAL-VENTRICULAR RATE RELATIONSHIPS

IN ANALYZING EKG'S, IT IS IMPORTANT TO DETERMINE IF ATRIAL (P WAVES) TRIGGER OR ARE FOLLOWED BY VENTRICULAR (QRS COMPLEXES) OR IF THE ATRIAL AND VENTRICULAR RATES ARE THE SAME.

VARIATIONS IN THESE RATES CAN RESULT FROM:

- ATRIAL IMPULSE FORMATION PROBLEMS (RATE VARIATIONS AND SITE LOCATIONS), AND
- CONDUCTION DELAYS OR BLOCKS THRU THE CONDUCTION PATHWAYS, WHICH IN TURN WILL CAUSE WAVE PATTERN ALTERATIONS AND MISPLACED LOCATIONS WITHIN THE EKG CYCLE OF P WAVES AND QRS COMPLEXES.

IV. P-WAVE EVALUATION (SEE PAGE 3-10, EKG CHARACTERISTIC'S DISCUSSION)

EXAMINE P WAVES TO DETERMINE IF THEY ARE:

- NORMAL P WAVES - UPRIGHT (POSITIVE), SMOOTHLY ROUNDED, AND PRECEDE QRS'S AT A NORMAL P-R INTERVAL AND ALL SAME SHAPE.
- ABNORMAL P WAVES CAN BE:
 - DEFORMED
 - MULTIPLE
 - NEGATIVE
 - PR INTERVAL TOO LONG OR TOO SHORT
 - ABSENT

V. QRS COMPLEX EVALUATION (SEE PAGE 3-10, EKG CHARACTERISTIC'S DISCUSSION)

EXAMINE QRS COMPLEX AND DETERMINE IF THEY ARE:

- NORMAL - SHARP, CRISP, SHARP POINTED
- ABNORMAL - BIZARRE APPEARANCES AND WIDE AND SLURRED

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CARDIAC VICTIM'S DIAGNOSTIC SIGNS AND SYMPTOMS

THE EKG IS A VALUABLE DIAGNOSTIC TOOL BUT IT MUST ALWAYS BE CORRELATED WITH THE VICTIM'S DIAGNOSTIC SIGNS AND SYMPTOMS. IT IS IMPORTANT THAT THE EMT MAINTAIN CLOSE SURVEILLANCE OF THE VICTIM'S CONDITION AND REPORT DISTINCTIVE CHANGES TO THE BASE STATION, PARTICULARLY IF THEY HAPPEN AT THE SAME TIME AS NOTICEABLE DIFFERENCES IN THE EKG.

A SUMMARY OF TYPICAL SIGNS AND SYMPTOMS THAT CAN BE ANTICIPATED WITH SOME MAJOR CORONARY PATHOLOGICAL CONDITIONS IS PRESENTED BELOW. IN ADDITION, A SUMMARY OF ABNORMAL EKG EFFECTS ASSOCIATED WITH PATHOLOGICAL CONDITIONS IS PRESENTED ON THE FOLLOWING PAGE.

SYMPTOMS AND SIGNS	PATHOLOGICAL CORONARY CONDITION						
	CARDIAC ARREST	MYOCARDIAL INFARCTION	ANGINA PECTORIS	CONGESTIVE HEART FAILURE		CARDIOGENIC SHOCK	
				LEFT	RIGHT	EARLY	LATE
BLOOD PRESSURE: ● SYSTOLIC ● DIASTOLIC ● PULSE PRESSURE	● UNOBTAINABLE	● DROPS (LATE-POSSIBLY) ● DROPS (LATE-POSSIBLY)	● ELEVATED (POSSIBLY) ● ELEVATED (POSSIBLY)			● DROPS	● DROPS ● REDUCED
RESPIRATION	● ABSENT	● LABORED (POSSIBLY)	● LABORED (POSSIBLY)	● DIFFICULT ● COUGHING (USUALLY)			● LABORED ● RAPID
PULSE	● UNOBTAINABLE	● WEAK, THREADY, AND RAPID (USUALLY)		● RAPID ● WEAK	● RAPID (POSSIBLY)		● SLOW
SKIN	TEMP	● COLD PERSPIRATION		● COLD, CLAMMY			● COLD, CLAMMY
	COLOR	● PALE TO BLUE	● BLUISH (POSSIBLY)	● BLUISH			● LIPS PALE
BEHAVIOR		● RESTLESS ● ANXIOUS ● FEELS WEAK		● APPREHENSIVE ● AGITATED		● ANXIOUS ● AGITATED ● RESTLESS ● CONFUSED	● APATHETIC
STATE OF CONSCIOUSNESS	● UNCONSCIOUS		● DIZZY (POSSIBLY) ● FEELS FAINT (POSSIBLY)	● DIZZY			● COMATOSE
EYES	● PUPILS DILATED						● GLASSY ● DULL STARE
NAUSEA		● POSSIBLY	● POSSIBLY				
VOMITING		● POSSIBLY					
EDEMA (SWELLING)					● NECK VEINS SWOLLEN ● BACK ● LEGS		
PAIN		● INTENSE SUBSTERNAL, NOT RELATED TO PHYSICAL ACTIVITY OR POSITION. MAY LAST FOR MORE THAN ONE HOUR. ● NONE (POSSIBLY)	● SUBSTERNAL, BROUGHT ABOUT BY PHYSICAL OR EMOTIONAL STRESS. CEASES WHEN STRESS REMOVED OR AFTER TAKING NITROGLYCERINE.		● LIVER PAIN		

GLOSSARY

- ANGINA PECTORIS** - SUDDEN PAIN IN THE SUBSTERNAL AREA RADIATING TO UNDERSIDE OF LEFT ARM FROM MYOCARDIAL ISCHEMIA (INADEQUATE BLOOD SUPPLY) CAUSED BY PHYSICAL EXERTION OR EMOTIONAL STRESS.
- CARDIAC ARREST** - A CONDITION WHERE THE HEART CEASES TO PUMP BLOOD EFFECTIVELY DUE TO IMPROPER ELECTRICAL OR ELECTROMECHANICAL ACTIVITY OF THE HEART. DEATH IS IMMINENT UNLESS IMMEDIATE CPR IS PROVIDED. THIS INCLUDES BOTH VENTRICULAR STANDSTILL AND VENTRICULAR FIBRILLATION.
- CARDIOGENIC SHOCK** - A CONDITION RESULTING FROM INADEQUATE PUMPING OF BLOOD INTO THE AORTA, THUS INADEQUATE FLOW OF BLOOD TO BODY CAPILLARIES OF TISSUES AND ORGANS.
- CONGESTIVE HEART FAILURE** - EXCESSIVE BLOOD OR TISSUE FLUID IN THE LUNGS OR BODY CAUSED BY THE FAILURE OF THE VENTRICLES TO PUMP BLOOD EFFECTIVELY. THIS CAN OCCUR FROM EITHER LEFT AND/OR RIGHT VENTRICULAR INADEQUACIES.
- MYOCARDIAL INFARCTION (MI)** - INJURY OR DEATH OF CARDIAC VENTRICULAR MUSCLES DUE TO OBSTRUCTION OF ONE OR MORE CORONARY ARTERIES RESULTING IN INADEQUATE SUPPLY OF OXYGEN TO THE HEART MUSCLE.
- PULMONARY EMPHYSEMA** - DISEASE OF LUNGS CHARACTERIZED BY ENLARGEMENT AND DESTRUCTIVE CHANGES IN THE ALVEOLAR AIR SPACES WHICH MAKES BREATHING DIFFICULT.
- PULMONARY INFARCTION** - OBSTRUCTION OF THE PULMONARY ARTERY FLOW BY CLOTS (EMBOLISMS) OR OTHER MATERIAL. THIS IS USUALLY ACCOMPANIED BY CHEST PAINS, SHORTNESS OF BREATH, COUGHING AND BLOODY SPUTUM.

**ORIGINAL PAGE IS
OF POOR QUALITY**

ABNORMAL EKG EFFECTS ASSOCIATED WITH PATHOLOGICAL CONDITIONS

ABNORMAL EKG PATTERN SEGMENTS (Lead II unless otherwise specified)	ABNORMAL PATHOLOGICAL CONDITION EKG SEGMENT APPEARANCE	MYOCARDIAL	DIGITALIS	QUINIDINE	PULMONARY	PULMONARY	MODERATELY HIGH	VERY HIGH	MODERATELY LOW	HIGH BLOOD CALCIUM	LOW BLOOD CALCIUM
		INFARCTION(M I)	EFFECTS	EFFECTS	EMPHYSEMA	INFARCTION	BLOOD POTASSIUM (K ⁺) CONCENTRATIONS	BLOOD POTASSIUM (K ⁺) CONCENTRATIONS	BLOOD POTASSIUM (K ⁺) CONCENTRATIONS	(CA ⁺⁺) CONCENTRATIONS	(CA ⁺⁺) CONCENTRATIONS
NO P								★			
WIDE FLAT P							★				
WIDE, NOTCHED P				★							
TALL SIGNIFICANT Q		★				★ IN LEAD II					
WIDE SIGNIFICANT Q		★									
WIDE QRS							★	★			
DEEP S						★ IN LEAD T					
ELEVATED S-T		★									
DEPRESSED S-T		★	●	★		★					
SLURRED S-T			★								
PEAKED T							★				
FLAT T									★		
DIPHASIC T			★								
INVERTED T		★	★			●					
SHORT Q-T			★							★	
LONG Q-T				★							★
U WAVE				●					★		
LOW VOLTAGE IN ALL LEADS					★						

LEGEND: ★ A PREDOMINANT EKG PATTERN ABNORMALITY USUALLY OBSERVED WITH THE PATHOLOGICAL CONDITION

● AN EKG PATTERN ABNORMALITY THAT MAY BE ASSOCIATED WITH THE PATHOLOGICAL CONDITION

ARRHYTHMIA'S

DISTURBANCES OF HEART FUNCTIONS SUCH AS MYOCARDIAL INFARCTION (MI) CAN AFFECT THE HEART BEAT AND RELATED EKG PATTERN. THESE DISTURBANCES OF THE HEART'S RATE, RHYTHM AND CONDUCTION FUNCTIONS ARE CALLED ARRHYTHMIA'S. THEY ARE CLASSIFIED AND NAMED ON THE BASIS OF:

1. DEFECT OR PACEMAKER SITE
 - SA NODE (SINUS)
 - ATRIA
 - AV NODE (AV JUNCTION)
 - VENTRICLES
2. ABNORMAL CONDITION
 - ARRHYTHMIA
 - TACHYCARDIA (FAST RATE > 100/MIN)
 - BRADYCARDIA (SLOW RATE < 60/MIN)
 - PREMATURE CONTRACTIONS OR BEATS
 - FLUTTER
 - FIBRILLATION
 - BLOCKS (CONDUCTION DEFECTS)
 - ARREST

IN ADDITION, THE ARRHYTHMIA'S ARE ALSO CLASSIFIED IN A GENERAL WAY ACCORDING TO THEIR SERIOUSNESS OR PROGNOSIS AS:

- MINOR - NOT OF IMMEDIATE CONCERN AND GENERALLY WILL NOT AFFECT CIRCULATION. HOWEVER, THEY ARE IMPORTANT BECAUSE THEY REFLECT THE IRRITABILITY OF THE HEART.
- MAJOR - THESE DISTURBANCES REDUCE THE EFFICIENCY OF THE HEART OR WARN OR IMPENDING DANGER AND REQUIRE PROMPT TREATMENT.
- DEATH PRODUCING - IMMEDIATE RESUSCITATION IS NECESSARY TO PREVENT DEATH.

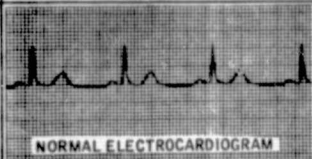

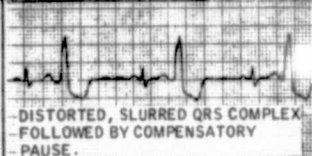

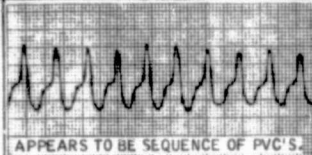

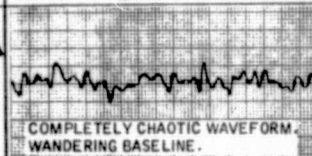

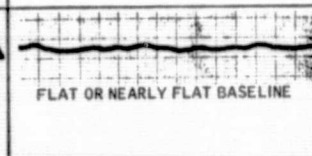

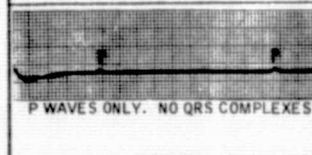

A DETAILED DISCUSSION OF EACH OF THE MAJOR ARRHYTHMIAS IS INCLUDED ON THE FOLLOWING PAGES IN A STANDARD FORMAT THAT PROVIDES THESE INFORMATION ELEMENTS:

- ARRHYTHMIA REFERENCE NUMBER INCLUDED WITHIN A CODED CIRCLE SYMBOL THAT DESIGNATES IT'S SERIOUSNESS.
 - △# = DEATH PRODUCING ARRHYTHMIA
 - # = MAJOR ARRHYTHMIA
 - # = MINOR ARRHYTHMIA
- VENTRICULAR RATE USUALLY ASSOCIATED WITH THE ARRHYTHMIA (SLOW, NORMAL OR RAPID)
- VENTRICULAR RHYTHM USUALLY ASSOCIATED WITH THE ARRHYTHMIA (REGULAR, IRREGULAR, SLIGHTLY IRREGULAR, OCCASIONALLY IRREGULAR, TOTALLY IRREGULAR)
- ATRIAL AND VENTRICULAR RATE RELATIONSHIPS USUALLY SEEN
- CONDUCTION PATH OF THE ARRHYTHMIA
- POSSIBLE CAUSES OF THE ARRHYTHMIA
- IDENTIFICATION ON THE ARRHYTHMIA AND IT'S CLINICAL SIGNIFICANCE
- SUMMARY OF THE COMMONLY FOLLOWED PRE-HOSPITAL TREATMENT PROTOCOLS
- TREATMENT REFERENCE NUMBER (#) THAT REFERS TO A DETAILED DISCUSSION OF THIS TREATMENT THAT IS PRESENTED ON SUBSEQUENT PAGES.

ARRHYTHMIA RECOGNITION, ETIOLOGY AND SUGGESTED PRE-HOSPITAL TREATMENT

REF. NO.	EKG APPEARANCE AND ANALYSIS	VENT. RATE VENT. RHYTHM ATRIAL/VENT. RATE RELATION	CONDUCTION PATH	POSSIBLE CAUSES	ARRHYTHMIA IDENTIFICATION AND CLINICAL SIGNIFICANCE	SUMMARY OF COMMONLY FOLLOWED PRE-HOSPITAL TREATMENT	TREAT. NO.
	 NORMAL ELECTROCARDIOGRAM	<ul style="list-style-type: none"> NORMAL REGULAR SAME 		<ul style="list-style-type: none"> Not applicable 	NORMAL SINUS RHYTHM <ul style="list-style-type: none"> This is a normal Electrocardiogram 	<ul style="list-style-type: none"> Not applicable 	
1	 ONLY ABNORMALITY IS IRREGULAR RHYTHM.	<ul style="list-style-type: none"> NORMAL IRREGULAR SAME 		<ul style="list-style-type: none"> Normal breathing causes heart rate changes during inspiration and expiration. 	SINUS ARRHYTHMIA <ul style="list-style-type: none"> Normal phenomenon. No clinical significance. 	<ul style="list-style-type: none"> None 	0
2	 ONLY ABNORMALITY IS SLOW RATE.	<ul style="list-style-type: none"> LOW REGULAR or Slightly IRREGULAR SAME 		<ul style="list-style-type: none"> Damage to SA Node Hypoxia Digitalis or Quinidine overdose 	SINUS BRADYCARDIA <ul style="list-style-type: none"> Cardiac output may be significantly reduced, causing marked drop in B/P. May precede more serious arrhythmias. 	<ul style="list-style-type: none"> 0.5 mg. Atropine IV push every 5 min. until heart rate above 70/min. (max. of 2 mg.). 2 mg. Isuprel IV drip to maintain heart rate of 70/min. (if necessary). 	6
3	 ONE COMPLETE P-QRS-T COMPLEX IS MISSING.	<ul style="list-style-type: none"> NORMAL or LOW IRREGULAR SAME 		<ul style="list-style-type: none"> Damage to SA Node Hypoxia Digitalis or Quinidine overdose 	SINUS ARREST <ul style="list-style-type: none"> Normally not significant. May precede more serious arrhythmias. 	<ul style="list-style-type: none"> 0.5 mg. Atropine IV push every 5 min. until heart rate above 70/min. (max. of 2 mg.). 2 mg. Isuprel IV drip to maintain heart rate of 70/min. (if necessary). 	6
4	 ONLY ABNORMALITY IS FAST RATE.	<ul style="list-style-type: none"> HIGH REGULAR SAME 		<ul style="list-style-type: none"> Pain Emotional or Physical Stress Congestive Heart Failure Hypoxia Infection Hypotension or Shock Atropine, Epinephrine or Isuprel overdose 	SINUS TACHYCARDIA <ul style="list-style-type: none"> Cardiac output may be significantly reduced, causing B/P drop. May cause ischemia, AMI or CHF. 	<ul style="list-style-type: none"> Treat cause if known. 	0
5	 P WAVES VARY IN SIZE, SHAPE AND DIRECTION.	<ul style="list-style-type: none"> NORMAL Slightly IRREGULAR SAME 		<ul style="list-style-type: none"> Digitalis overdose 	WANDERING PACE MAKER <ul style="list-style-type: none"> Usually not significant. May precede more serious atrial arrhythmias. 	<ul style="list-style-type: none"> None 	0
6	 EARLY ABNORMAL P WAVE FIRES QRS COMPLEX. COMPENSATORY PAUSE FOLLOWS.	<ul style="list-style-type: none"> NORMAL (Usually) IRREGULAR SAME 		<ul style="list-style-type: none"> Damage of Atrial Wall Digitalis overdose 	PREMATURE ATRIAL CONTRACTION (PAC) <ul style="list-style-type: none"> Usually not significant 	<ul style="list-style-type: none"> None 	0
7	 P AND T WAVES MAY MERGE.	<ul style="list-style-type: none"> HIGH REGULAR (Usually) SAME (P waves may be hidden in T waves) 		<ul style="list-style-type: none"> Damaged SA Node or Atria Hypoxia Digitalis overdose 	PAROXYSMAL ATRIAL TACHYCARDIA (PAT) <ul style="list-style-type: none"> Cardiac output may be significantly reduced causing B/P to fall to very low level. May cause shock, angina, AMI or CHF. 	<ul style="list-style-type: none"> Carotid Sinus Massage Low energy (50 w.s.) Electric Shock 	4
8	 SAWTOOTH FLUTTER (F) WAVES PRESENT BETWEEN EACH QRS COMPLEX.	<ul style="list-style-type: none"> HIGH REGULAR (Usually) Usually 2, 3, or 4 times as many P waves as QRS complexes 		<ul style="list-style-type: none"> Damaged SA Node or Atria Hypoxia Congestive Heart Failure 	ATRIAL FLUTTER <ul style="list-style-type: none"> Cardiac output may be significantly reduced causing B/P to fall to very low level. May cause shock, angina, AMI or CHF. 	<ul style="list-style-type: none"> None 	0
9	 P WAVES ABSENT. CHAOTIC BASELINE	<ul style="list-style-type: none"> HIGH, but may be normal IRREGULAR Atrial rate much higher than vent. rate 		<ul style="list-style-type: none"> Damaged SA Node or Atria Hypoxia Congestive Heart Failure 	ATRIAL FIBRILLATION <ul style="list-style-type: none"> Cardiac output may be significantly reduced causing B/P to fall to very low level. May cause shock, angina, AMI or CHF. 	<ul style="list-style-type: none"> None 	0

REF. NO.	EKG APPEARANCE AND ANALYSIS	VENT. RATE VENT. RHYTHM ATRIAL/VENT. RATE RELATION	CONDUCTION PATH	POSSIBLE CAUSES	ARRHYTHMIA IDENTIFICATION AND CLINICAL SIGNIFICANCE	SUMMARY OF COMMONLY FOLLOWED PRE-HOSPITAL TREATMENT	TREAT. NO.
	 NORMAL ELECTROCARDIOGRAM	<ul style="list-style-type: none"> NORMAL REGULAR SAME 		<ul style="list-style-type: none"> Not applicable 	<p>NORMAL SINUS RHYTHM</p> <ul style="list-style-type: none"> This is a normal Electrocardiogram 	<ul style="list-style-type: none"> Not applicable 	
10	 EARLY, ABNORMAL P WAVE FIRES QRS COMPLEXES, COMPENSATORY PAUSE FOLLOWS. P WAVE MAY BE ABSENT.	<ul style="list-style-type: none"> NORMAL IRREGULAR SAME (P waves may be absent before the PJC's) 		<ul style="list-style-type: none"> Damaged AV Junction Hypoxia Congestive Heart Failure Digitalis, Quinidine or Procainamide overdose 	<p>PREMATURE AV JUNCTIONAL CONTRACTION (PJC)</p> <ul style="list-style-type: none"> May precede more serious arrhythmias. 	<ul style="list-style-type: none"> None 	0
11	 P WAVES CAN BE ABSENT. IF PRESENT, IDENTICAL, ABNORMAL P WAVES FIRE EACH QRS COMPLEX.	<ul style="list-style-type: none"> LOW REGULAR or Slightly IRREGULAR SAME (Some P waves may be absent) 		<ul style="list-style-type: none"> Damage to SA Node Damage to AV Junction Hypoxia Digitalis overdose 	<p>AV NODAL RHYTHM</p> <ul style="list-style-type: none"> Cardiac output may be significantly reduced causing B/P to fall to very low level. May enhance electrical instability of ventricles. 	<ul style="list-style-type: none"> 0.5 mg. Atropine IV push every 5 min. to increase heart rate to 70. (Max. of 2 mg.) 2 mg. Isuprel IV mix to maintain heart rate of 70/min. 	6
12	 ABNORMAL P WAVES PRECEDE EACH QRS COMPLEX. FAST RATE.	<ul style="list-style-type: none"> HIGH REGULAR SAME (P waves may be absent) 		<ul style="list-style-type: none"> Damage to AV Junction Digitalis overdose Damage to SA Node 	<p>AV JUNCTIONAL TACHYCARDIA</p> <ul style="list-style-type: none"> Cardiac output may be significantly reduced causing B/P to fall to very low level. May enhance electrical instability of ventricles. 	<ul style="list-style-type: none"> Carotid Massage 	4
13	 PR INTERVAL PROLONGED OVER .21 SECOND.	<ul style="list-style-type: none"> NORMAL REGULAR SAME 		<ul style="list-style-type: none"> Damage to AV Junction Hypoxia Digitalis, Quinidine or Procainamide overdose 	<p>1st° AV BLOCK</p> <ul style="list-style-type: none"> May progress to 2nd° or 3rd° Heart Block. 	<ul style="list-style-type: none"> None 	0
14	 QRS COMPLEX ABSENT AFTER EVERY THIRD, FOURTH OR FIFTH P WAVE.	<ul style="list-style-type: none"> NORMAL IRREGULAR (PAUSES) SAME 		<ul style="list-style-type: none"> Damage to AV Junction Damage to Bundle of HIS or Bundle Branches Hypoxia Digitalis, Quinidine or Procainamide overdose 	<p>2nd° AV BLOCK (MOBITZ II)</p> <ul style="list-style-type: none"> Cardiac output may be significantly reduced causing B/P to fall to very low level. May enhance electrical instability of ventricles. May progress to 3rd° Heart Block. 	<ul style="list-style-type: none"> See below 	6
17	 QRS COMPLEXES PRESENT AFTER EVERY 2ND, 3RD, OR 4TH P WAVE IN A CONSTANT OR VARYING RATIO	<ul style="list-style-type: none"> LOW or NORMAL REGULAR or IRREGULAR Atrial rate higher than vent. rate by factor of 2, 3, or 4 		<ul style="list-style-type: none"> Damage to AV Junction Damage to Bundle of HIS or Bundle Branches Hypoxia Digitalis, Quinidine or Procainamide overdose 	<p>2nd° AV BLOCK (MOBITZ II)</p> <ul style="list-style-type: none"> Cardiac output may be significantly reduced causing B/P to fall to very low level. May enhance electrical instability of ventricles. May progress to 3rd° Heart Block. 	<ul style="list-style-type: none"> 0.5 mg. Atropine IV push every 5 min. to increase heart rate of 70. (Max. of 2 mg.) 2 mg. Isuprel IV mix to maintain heart rate of 70/min. 	6
16	 P WAVES AND QRS COMPLEXES COMPLETELY DISSOCIATED.	<ul style="list-style-type: none"> LOW REGULAR Completely Dissociated 		<ul style="list-style-type: none"> Damage to AV Junction, Bundle of HIS or Bundle Branches 	<p>3rd° AV BLOCK</p> <ul style="list-style-type: none"> Cardiac output may be significantly reduced causing B/P to fall to very low level. May enhance electrical instability of ventricles. May precede Ventricular Standstill. 	<ul style="list-style-type: none"> 0.5 mg. Atropine IV push every 5 min. to increase heart rate of 70. (Max. of 2 mg.) 2 mg. Isuprel IV mix to maintain heart rate of 70/min. 	6
17	 QRS COMPLEXES WIDENED AND POSSIBLY NOTCHED	<ul style="list-style-type: none"> NORMAL REGULAR SAME 		<ul style="list-style-type: none"> Damage to Bundle of HIS or Purkinje Fibers Digitalis overdose Antiarrhythmic drug overdose 	<p>BUNDLE BRANCH BLOCK</p> <ul style="list-style-type: none"> Not of immediate concern. 	<ul style="list-style-type: none"> None 	0

REF. NO.	EKG APPEARANCE AND ANALYSIS	● VENT. RATE ● VENT. RHYTHM ● ATRIAL/VENT. RATE RELATION	CONDUCTION PATH	POSSIBLE CAUSES	ARRHYTHMIA IDENTIFICATION AND CLINICAL SIGNIFICANCE	SUMMARY OF COMMONLY FOLLOWED PRE-HOSPITAL TREATMENT	TREAT. NO.
	 NORMAL ELECTROCARDIOGRAM	<ul style="list-style-type: none"> ● NORMAL ● REGULAR ● SAME 		<ul style="list-style-type: none"> ● Not applicable 	<p>NORMAL SINUS RHYTHM</p> <ul style="list-style-type: none"> ● This is a normal Electrocardiogram 	<ul style="list-style-type: none"> ● Not applicable 	
18	 DISTORTED, SLURRED QRS COMPLEX FOLLOWED BY COMPENSATORY PAUSE.	<ul style="list-style-type: none"> ● NORMAL ● IRREGULAR ● SAME, except no P waves precede PVC 		<ul style="list-style-type: none"> ● Damage to HIS-Purkinje system of ventricles ● Hypoxia ● Acidosis ● Congestive Heart Failure ● Low Blood Potassium ● Digitalis drug overdose ● Overdose of any drug used to increase heart rate 	<p>PREMATURE VENTRICULAR CONTRACTIONS (PVC's)</p> <ul style="list-style-type: none"> ● Isolated PVC's not significant. ● Bursts of PVC's can result in Ventricular Tachycardia or Fibrillation. 	<ul style="list-style-type: none"> ● 50 to 75 mg. Lidocaine IV push. ● Repeat every 5 min. as necessary (max. of 3 doses). 	6
19	 APPEARS TO BE SEQUENCE OF PVC'S.	<ul style="list-style-type: none"> ● HIGH ● REGULAR or Slightly IRREGULAR ● P waves usually unidentifiable 		<ul style="list-style-type: none"> ● Damage to HIS-Purkinje system or ventricles ● Hypoxia ● Acidosis ● Congestive Heart Failure ● Low Blood Potassium ● Digitalis overdose ● Overdose of any drug used to increase heart rate 	<p>VENTRICULAR TACHYCARDIA</p> <ul style="list-style-type: none"> ● Cardiac output may be significantly reduced causing B/P to fall to very low level. ● May cause ischemia, AMI, shock or CHF. ● Ominous and may precede Ventricular Fibrillation. 	<ul style="list-style-type: none"> ● 50 to 75 mg. Lidocaine IV push. ● Repeat every 5 min. as necessary (max. of 3 doses). ● If victim unresponsive, give one precordial thump. ● If still unresponsive, give low voltage DC shock (5-50 w.s.). 	4
20	 COMPLETELY CHAOTIC WAVEFORM. WANDERING BASELINE.	<ul style="list-style-type: none"> ● HIGH ● Totally IRREGULAR ● P waves unrecognizable 		<ul style="list-style-type: none"> ● Damage to HIS-Purkinje system or ventricles ● Hypoxia ● Acidosis ● Congestive Heart Failure ● Low Blood Potassium ● Digitalis overdose ● Overdose of any drug used to increase heart rate 	<p>VENTRICULAR FIBRILLATION</p> <ul style="list-style-type: none"> ● Death will occur if CPR and defibrillation are not administered. 	<p>If present less than 1 minute:</p> <ul style="list-style-type: none"> ● Defibrillate at 400 w.s. for up to 4 times if necessary. ● Perform CPR. <p>If unwitnessed or present over 1 minute:</p> <ul style="list-style-type: none"> ● CPR for several minutes. ● Defibrillate at 400 w.s. for up to 4 times if necessary. <p>In both cases:</p> <ul style="list-style-type: none"> ● 50 to 75 mg. Lidocaine IV push every 5 minutes. ● 50 ml. Sodium Bicarbonate IV push every 5 minutes. <p>If necessary:</p> <ul style="list-style-type: none"> ● 5 ml. Epinephrine IV push after third defibrillation attempt. 	1
21	 FLAT OR NEARLY FLAT BASELINE	<ul style="list-style-type: none"> ● Zero ● Not Obtainable ● No P waves or QRS complexes 		<ul style="list-style-type: none"> ● See below 	<p>VENTRICULAR STANDSTILL</p> <ul style="list-style-type: none"> ● This is the most dangerous arrhythmia and has the least chance of being converted. 	<ul style="list-style-type: none"> ● Give precordial thump. ● Begin CPR. ● 50 ml. Sodium Bicarbonate IV push every 5 minutes. ● 5 ml. Epinephrine IV push. ● Continue CPR as necessary. 	2
	 P WAVES ONLY. NO QRS COMPLEXES	<ul style="list-style-type: none"> ● Zero ● Not Obtainable ● Ventricular Rate zero. Atrial Rate low. 		<ul style="list-style-type: none"> ● Digitalis, Quinidine, Procainamide, Potassium drug overdose ● Acute emotional disturbance 			

ORIGINAL PAGE IS
OF POOR QUALITY

RECOMMENDED PRE-HOSPITAL TREATMENTS

NOTE: PRE-HOSPITAL TREATMENT IS PERFORMED IN ACCORDANCE WITH DIRECTIONS FROM THE BASE STATION DUTY PHYSICIAN. SPECIFICALLY ESTABLISHING IV'S, ADMINISTERING DRUGS AND DEFIBRILLATION WILL NOT BE PERFORMED UNLESS DIRECTED BY THE BASE STATION PHYSICIAN.

① UNWITNESSED CARDIAC ARREST (VENTRICULAR FIBRILLATION)	
EMT	PARAMEDIC
<ul style="list-style-type: none"> ● PATIENT EXAMINATION ESTABLISH - NO PULSE - PUPILS DILATING <li style="padding-left: 100px;">NO RESPIRATION - SKIN PALE TO BLUE 	
<ul style="list-style-type: none"> ● 1-MAN CPR <li style="text-align: center;">↓ ● STANDS CLEAR ● RESUME 1-MAN CPR ● STANDS CLEAR ● RESUMES 1-MAN CPR <li style="text-align: center;">↓ 	<ul style="list-style-type: none"> ● TELECARE UNIT PREPARATIONS (EKG & COMMUN.) ● INSTALL EKG ELECTRODES (DURING CPR VENTILATIONS) ● <u>VENTRICULAR FIBRILLATION IDENTIFIED</u> ● PREPARES DEFIBRILLATION EQUIPMENT ● ORDERS "STAND CLEAR" ● <u>DEFIBRILLATES (USUALLY @ 400 WATT-SECONDS)</u> ● INSTALL IV AND ATTACH (500 ml D5W) ● IF NECESSARY, REPEAT DEFIBRILLATION @ (400 WATT-SECONDS) UP TO A TOTAL OF 3 TIMES ● IF STILL UNSUCCESSFUL: ● PUSH 5 ml EPINEPHRINE ● PUSH 50 ml SODIUM BICARBONATE (EVERY 5 MINUTES AS REQUIRED)
<ul style="list-style-type: none"> ● BEGIN 2-MAN CPR UNTIL DIRECTED TO ... 	
<ul style="list-style-type: none"> ● TRANSPORT 	

①A WITNESSED CARDIAC ARREST (VENTRICULAR FIBRILLATION)	
ASSUMPTION: EKG INSTALLED AND MONITORING	
EMT	PARAMEDIC
<ul style="list-style-type: none"> ● STANDS CLEAR ● BEGINS 1-MAN CPR ● STANDS CLEAR ● RESUMES 1-MAN CPR <li style="text-align: center;">↓ 	<ul style="list-style-type: none"> ● PREPARES DEFIBRILLATION EQUIPMENT ● ORDERS "STAND CLEAR" ● <u>DEFIBRILLATES (USUALLY @ 400 WATT-SECONDS)</u> ● INSTALL IV AND ATTACH (500 ml D5W) ● IF NECESSARY, REPEAT DEFIBRILLATIONS @ 400 WATT-SECONDS) UP TO A TOTAL OF 3 TIMES ● IF STILL UNSUCCESSFUL: ● PUSH 5 ml EPINEPHRINE ● PUSH 50 ml SODIUM BICARBONATE (EVERY 5 MINUTES AS REQUIRED)
<ul style="list-style-type: none"> ● BEGIN 2-MAN CPR UNTIL DIRECTED TO ... 	
<ul style="list-style-type: none"> ● TRANSPORT 	

2 CARDIAC ARREST (VENTRICULAR STANDSTILL)	
EMT	PARAMEDIC
<ul style="list-style-type: none"> ● PATIENT EXAMINATION - NO PULSE - PUPILS DILATING <li style="padding-left: 150px;">- NO RESPIRATION - SKIN PALE TO BLUE 	
<ul style="list-style-type: none"> ● DELIVER PRECORDIAL THUMP(S) IF SUCCESSFUL BEGIN 1-MAN CPR <div style="text-align: center; margin-top: 10px;">↓</div>	<ul style="list-style-type: none"> ● TELECARE UNIT PREPARATIONS (EKG & COMMUN.) ● INSTALL EKG ELECTRODES (DURING CPR VENTILATIONS) ● <u>VENTRICULAR STANDSTILL IDENTIFIED</u> ● INSTALL IV LINE WITH <u>500 ml D5W</u> ● PUSH <u>50 ml SODIUM BICARBONATE</u> ● PUSH <u>5 ml EPINEPHRINE</u> ● REPEAT PUSH <u>50 ml SODIUM BICARBONATE</u> (EVERY 5 MINUTES, AS REQUIRED)
<ul style="list-style-type: none"> ● BEGIN 2-MAN CPR UNTIL DIRECTED TO ... 	
<ul style="list-style-type: none"> ● 1-MAN CPR 	<ul style="list-style-type: none"> ● ADMINISTER <u>IV DRIP ARAMINE</u> AS DIRECTED
<ul style="list-style-type: none"> ● RESUME 2-MAN CPR UNTIL DIRECTED TO ... 	
<ul style="list-style-type: none"> ● TRANSPORT 	

3 VENTRICULAR TACHYCARDIA	
EMT	PARAMEDIC
<ul style="list-style-type: none"> ● PATIENT EXAMINATION - RAPID PULSE - BLOOD PRESSURE FALLING (USUALLY) <li style="padding-left: 150px;">- SHORTNESS OF BREATH - APPREHENSION 	
<ul style="list-style-type: none"> ● TELECARE UNIT PREPARATIONS (EKG AND COMMUN.) 	
<ul style="list-style-type: none"> ● MONITORS PATIENT'S VITAL SIGNS <div style="margin-top: 100px;"> <ul style="list-style-type: none"> ● BEGINS 1-MAN CPR <div style="text-align: center; margin-top: 5px;">↓</div> <ul style="list-style-type: none"> ● STANDS CLEAR </div>	<ul style="list-style-type: none"> ● INSTALL EKG ELECTRODES ● <u>VENTRICULAR TACHYCARDIA IDENTIFIED</u> ● INSTALL IV LINE AND ATTACH <u>500 ml D5W</u> OVER 1 MINUTE PERIOD ● PUSH <u>50-75 mg LIDOCAINE</u> SLOWLY ● REPEAT <u>PUSH LIDOCAINE</u> AS DIRECTED ● IF UNRESPONSIVE AND LOSES CONSCIOUSNESS: ADMINISTER <u>PRECORDIAL THUMP</u> ● IF UNRESPONSIVE; PREPARES <u>DEFIBRILLATION EQUIPMENT</u> ● IF NOT COMPLETELY UNCONSCIOUS: PUSH <u>5-15 mg VALIUM</u> SLOWLY ● ORDER "STAND CLEAR" ● <u>DEFIBRILLATES @ MAX. 50 WATT-SECONDS</u> ● REPEAT PUSH LIDOCAINE
<ul style="list-style-type: none"> ● BEGIN 2-MAN CPR, IF REQUIRED UNTIL DIRECTED TO ... 	
<ul style="list-style-type: none"> ● TRANSPORT 	

4 PAROXYSMAL ATRIAL TACHYCARDIA (PAT OR AV NODAL TACHYCARDIA)

EMT

PARAMEDIC

- PATIENT EXAMINATION - RAPID PULSE - APPREHENSIVE
- ABRUPT ONSET NOTED - LOW BLOOD PRESSURE (POSSIBLY)

- MONITOR PATIENT SIGNS AND ASSIST, AS REQUIRED

- TELECARE UNIT PREPARATIONS
- INSTALL EKG ELECTRODES
- PAT OR AV NODAL TACHYCARDIA IDENTIFIED
- PERFORM CAROTID MASSAGE, AS DIRECTED

- TRANSPORT AS DIRECTED

5 PREMATURE VENTRICULAR CONTRACTIONS (PVC'S)

EMT

PARAMEDIC

- PATIENT EXAMINATION - PULSE (OCCASIONAL MISSING BEAT)

- ASSISTS, AS REQUIRED

- INSTALL IV AND ATTACH 500 ml D5W OVER 1 MINUTE PERIOD
- PUSH 50-75 mg XYLOCAINE (LIDOCAINE)
- REPEAT PUSH LIDOCAINE EVERY 3-5 MINUTES AS DIRECTED

- 6** - COMPLETE HEART BLOCK,
 - 2nd HEART BLOCK,
 - AV NODAL RHYTHM,
 - SINUS BRADYCARDIA, AND
 - SA BLOCK

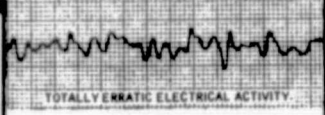
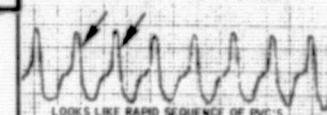

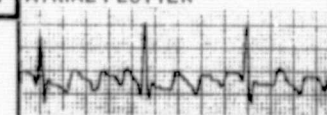

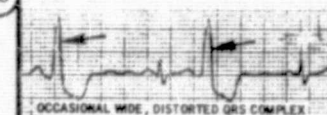
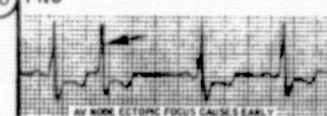
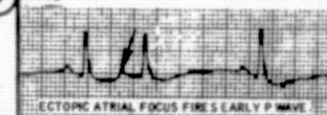

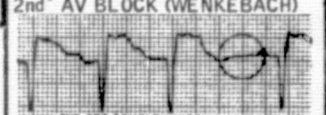
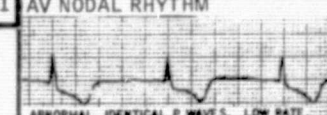
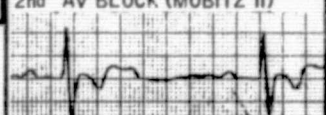
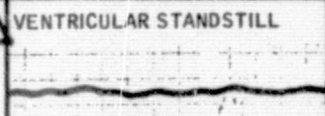

EMT

PARAMEDIC




- PATIENT EXAMINATION, IF; - SYSTOLIC B/P LESS THAN 80 mm Hg, OR
- PULSE WEAK OR ABSENT, OR
- SKIN PALE, COLD AND CLAMMY, OR
- VICTIM AGITATED, CONFUSED OR UNCONSCIOUS

- ASSIST AS REQUIRED

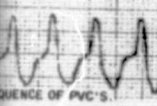
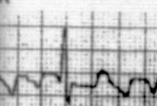
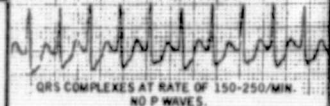
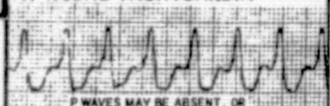

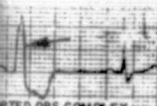
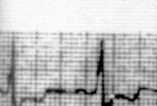

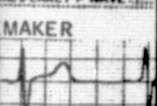
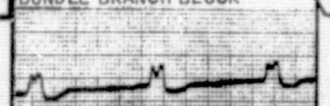
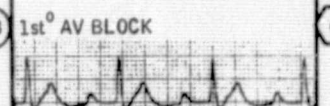
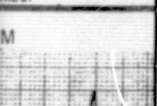
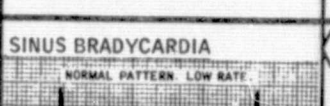
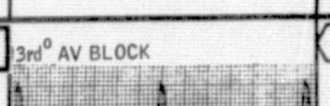
- INSTALL IV AND ATTACH 500 ml D5W
- ARRHYTHMIA IDENTIFIED
- PUSH 0.5 mg ATROPINE
- REPEAT PUSH ATROPINE UNTIL HEART RATE IS OVER 70/MIN. AS DIRECTED (MAX. 4 TIMES)
- IF ATROPINE INEFFECTIVE:
 IV DRIP 2 mg ISUPREL IN D5W AT FAST DRIP RATE UNTIL HEART RATE IS OVER 70/MIN., AS DIRECTED

VENT. RATE	IRREGULAR		VENTRICULAR RHYTHM OCCASIONALLY IRREGULAR OR SLIGHTLY IRREGULAR	
	DEFECT TYPE		DEFECT TYPE	
	IMPULSE FORMATION	CONDUCTION	IMPULSE FORMATION	CONDUCTION
HIGH	<p>20 VENTRICULAR FIBRILLATION 1</p>  <p>TOTALLY ERRATIC ELECTRICAL ACTIVITY.</p>		<p>19 VENTRICULAR TACHYCARDIA 3</p>  <p>LOOKS LIKE RAPID SEQUENCE OF PVC'S.</p>	
	<p>9 ATRIAL FIBRILLATION 0</p>  <p>NO P WAVES. ERRATIC BASELINE. QRS'S NORMAL.</p>		<p>8 ATRIAL FLUTTER 0</p>  <p>SAWTOOTH P WAVES BETWEEN QRS COMPLEXES.</p>	
NORMAL	<p>1 SINUS ARRHYTHMIA 0</p>  <p>R-R INTERVAL VARIES.</p>		<p>18 PVC 5</p>  <p>OCCASIONAL WIDE, DISTORTED QRS COMPLEX FOLLOWED BY A COMPENSATORY PAUSE.</p>	
			<p>10 PNC 0</p>  <p>AN EARLY ECTOPIC FOCUS CAUSES EARLY QRS COMPLEX WITHOUT P WAVE.</p>	
			<p>6 PAC 0</p>  <p>ECTOPIC ATRIAL FOCUS FIRES EARLY P WAVE.</p>	
LOW	<p>3 SINUS ARREST 6</p>  <p>ONE OR MORE COMPLETE CYCLES MISSING.</p>	<p>14 2nd AV BLOCK (WENCKEBACH) 6</p>  <p>ONE QRS COMPLEX MISSING AFTER EVERY THIRD, FOURTH OR FIFTH COMPLEX.</p>	<p>11 AV NODAL RHYTHM 6</p>  <p>ABNORMAL, IDENTICAL P WAVES. LOW RATE.</p>	
		<p>15 2nd AV BLOCK (MOBITZ II) 6</p>  <p>RATIO OF P WAVES TO QRS COMPLEXES 2 TO 1, 3 TO 1, ETC.</p>		
ZERO	<p>21 VENTRICULAR STANDSTILL 2</p>  <p>BASELINE ONLY.</p>	<p>21 PRIMARY VENT. STANDSTILL 2</p>  <p>BASELINE WITH P WAVES ONLY.</p>		

CRITICALITY CLASSIFICATION:

-  DEATH PRODUCING ARRHYTHMIA
-  MAJOR ARRHYTHMIA
-  MINOR ARRHYTHMIA

ARRHYTHMIA SUMMARY INDEX FOR EMT'S

VENTRICULAR RHYTHM		REGULAR	
OCCASIONALLY IRREGULAR OR SLIGHTLY IRREGULAR		DEFECT TYPE	
DEFECT TYPE	CONDUCTION	IMPULSE FORMATION	CONDUCTION
<p>TACHYCARDIA (3)</p>  <p>SEQUENCE OF PVC'S.</p> <p>BR (0)</p>  <p>TWEEN QRS COMPLEXES.</p>		<p>7 PAT (4)</p>  <p>QRS COMPLEXES AT RATE OF 150-250/MIN. NO P WAVES.</p> <p>12 AV NODAL TACHYCARDIA (4)</p>  <p>P WAVES MAY BE ABSENT, OR PR INTERVAL LESS THAN 12 SECONDS.</p> <p>4 SINUS TACHYCARDIA (0)</p>  <p>NORMAL PATTERN. HIGH RATES MAY MERGE T&P.</p>	
<p>5</p>  <p>ORTED QRS COMPLEX. COMPENSATORY PAUSE.</p> <p>0</p>  <p>QRS CAUSES EARLY P WAVE WITHOUT P WAVE.</p> <p>0</p>  <p>CAUSES EARLY P WAVE.</p> <p>0</p> <p>PEMAKER</p>  <p>AS PACEMAKER VARIES.</p>			<p>17 BUNDLE BRANCH BLOCK (0)</p>  <p>ALL QRS COMPLEXES SLIGHTLY WIDENED.</p> <p>13 1st° AV BLOCK (0)</p>  <p>LONG PR INTERVAL.</p>
<p>6</p>  <p>WAVES. LOW RATE.</p>		<p>2 SINUS BRADYCARDIA (6)</p>  <p>NORMAL PATTERN. LOW RATE.</p>	<p>16 3rd° AV BLOCK (6)</p>  <p>COMPLETELY INDEPENDENT ATRIAL AND VENTRICULAR RATES.</p>

CLASSIFICATION:

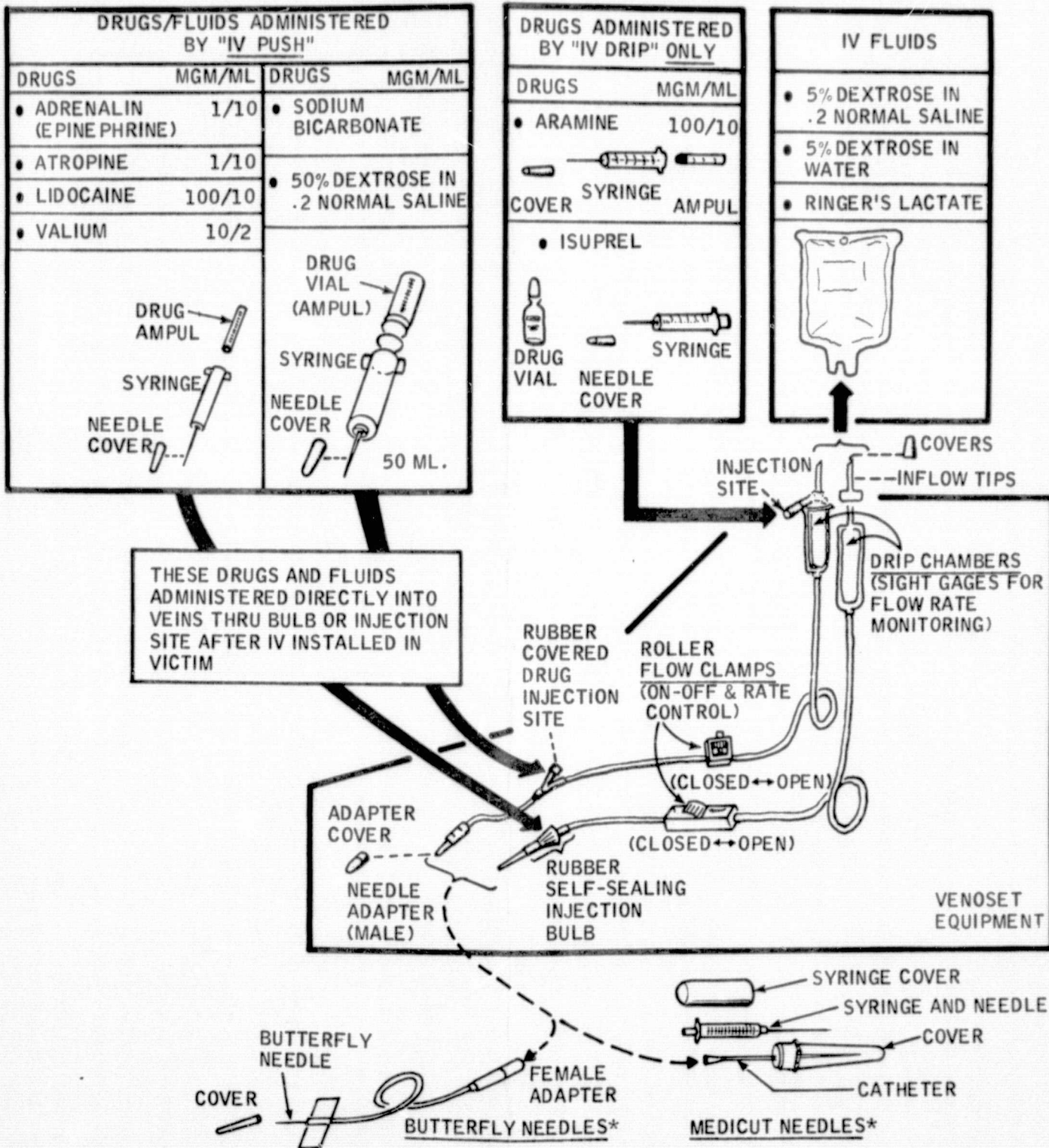
PRODUCING ARRHYTHMIA
 ARRHYTHMIA
 ARRHYTHMIA

ARRHYTHMIA NUMBER
 REFERS TO NUMBER OF THE
 DETAILED ARRHYTHMIA
 DISCUSSION PRESENTED ON
 PAGES TO

TREATMENT NUMBER
 REFERS TO NUMBER OF RECOMMENDED
 PRE-HOSPITAL TREATMENT PROTOCOL
 FOR THE ARRHYTHMIA. TREATMENT
 PROTOCOLS ARE PRESENTED ON PAGES
 TO

FOLDOUT FRAME 2

DRUGS/INTRAVENOUS (IV) FLUIDS EQUIPMENT AND ADMINISTRATION

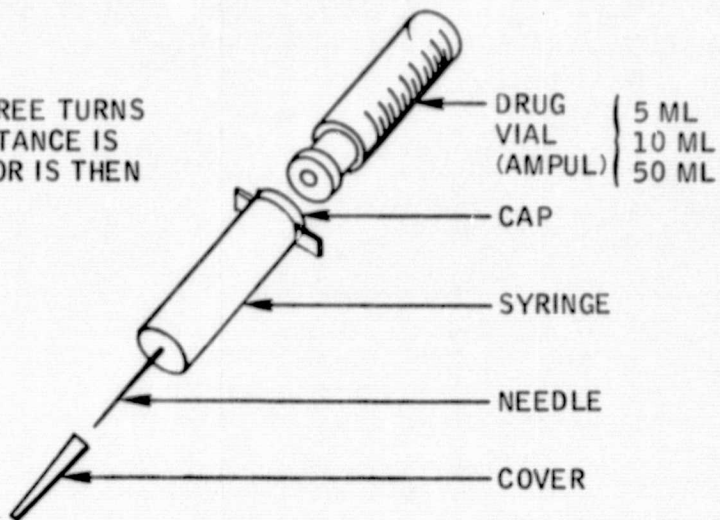


*(THE LARGER THE GAUGE NUMBER THE SMALLER THE NEEDLE DIAMETER)

SYRINGE PROCEDURES

PREPACKAGED TWO STERILE SECTIONS DRUGS

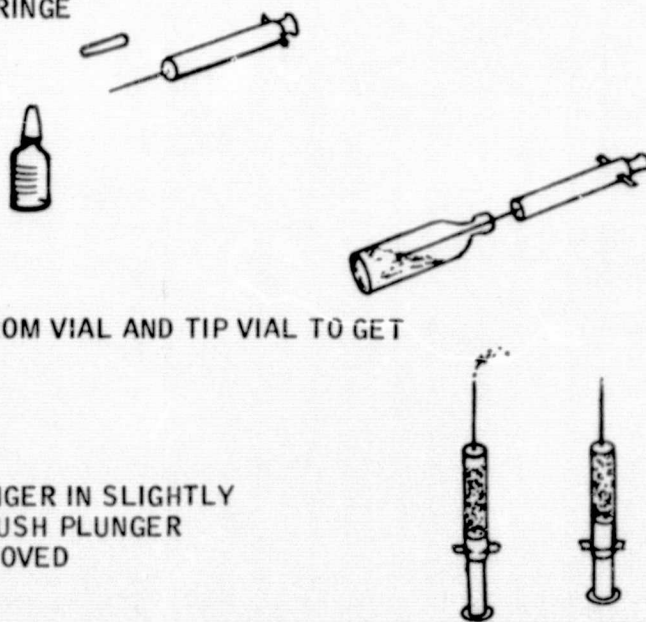
- 1 REMOVE SYRINGE CAP
- 2 ROTATE VIAL (AMPUL) THREE TURNS CLOCKWISE UNTIL RESISTANCE IS FELT. (SYRINGE INJECTOR IS THEN INTO DRUG SOLUTION)



- 3 REMOVE NEEDLE COVER
- 4 PUSH VIAL IN TO FLUSH AIR OUT OF SYRINGE
- 5 INJECT, AS REQUIRED.

PREPACKAGED STERILE ONE-SECTION SYRINGE

- 1 SELECT EMPTY, STERILE SYRINGE AND REMOVE NEEDLE COVER
- 2 COVER VIAL WITH STERILE GAUZE PAD AND BREAK VIAL GLASS NECK
- 3 ASPIRATE DRUG SOLUTION FROM VIAL AND TIP VIAL TO GET ALL SOLUTION
- 4 HOLD SYRINGE, NEEDLE UP
- 5 TAP SYRINGE AND PUSH PLUNGER IN SLIGHTLY TO REMOVE AIR BUBBLES. PUSH PLUNGER UNTIL ALL AIR SPACE IS REMOVED
- 6 INJECT, AS REQUIRED (REPLACE COVER IF IMMEDIATE INJECTION NOT REQUIRED)

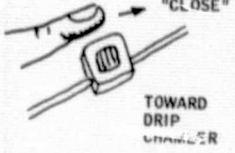
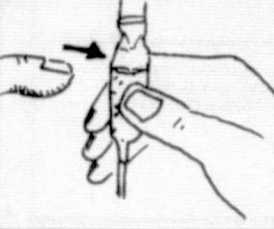
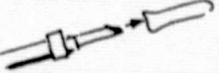
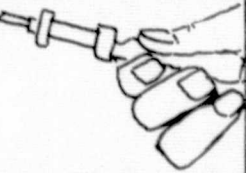
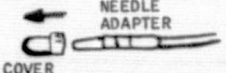
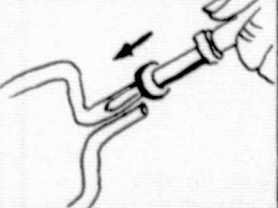
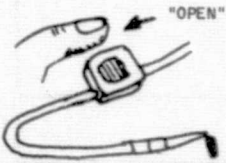
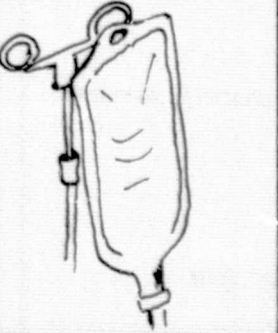
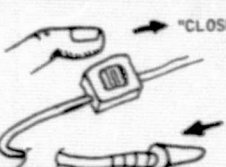


IV INSTALLATION - DRUG ADMINISTRATION - IV REMOVAL

CAUTION A major concern throughout IV and Drug Administration is to maintain sterile **NEEDLES, ADAPTERS** and **INJECTION SITES** (victim's and on IV equip.)

- OBTAIN:**
- IV Set
 - Butterfly Needle or Straight Needle and Catheter
 - Adhesive Tape (1/2" wide)
 - Arm Board (short)

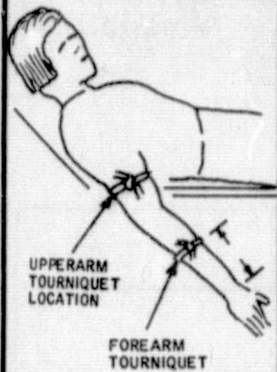
PREPARE IV ADMINISTRATION SET

A OPEN IV SET AND CONNECT TO IV FLUID BAG		B PRIME DRIP CHAMBER	
	<ol style="list-style-type: none"> 1 REMOVE <u>VENOSET</u> FROM PACKAGE. 2 CLOSE <u>FLOW CLAMP</u>. 		<ol style="list-style-type: none"> 1 SQUEEZE AND/OR TAP DRIP CHAMBER UNTIL 1/2 FULL AND AIR BUBBLES HAVE FLOATED TO SURFACE.
		<h3>C FLUSH AND PRIME IV TUBING</h3>	
	<ol style="list-style-type: none"> 3 REMOVE <u>COVER</u> FROM <u>INFLOW TIP</u>. 4 IF DRIP CHAMBER IS FLEXIBLE, SQUEEZE TO OPEN FOR USE. 		<ol style="list-style-type: none"> 1 REMOVE <u>COVER</u> FROM <u>NEEDLE ADAPTER</u>.
	<ol style="list-style-type: none"> 5 INSTALL <u>INFLOW TIP</u> IN SELECTED <u>IV FLUID BAG</u>. 		<ol style="list-style-type: none"> 2 OPEN <u>FLOW CLAMP</u> RAPIDLY TO FLUSH AIR BUBBLES OUT OF TUBING BELOW <u>FLOW CLAMP</u>.
	<ol style="list-style-type: none"> 6 INVERT IV BAG AND HANG ON ELEVATED SUPPORT. (THIS ALLOWS FLUID TO FLOW INTO IV TUBING UP TO THE <u>FLOW CLAMP</u>.) 		<ol style="list-style-type: none"> 3 CLOSE <u>FLOW CLAMP</u>. 4 REPLACE <u>NEEDLE ADAPTER COVER</u> TO PREVENT CONTAMINATION.

PREPARE INJECTION SITE

D

DISTEND VEINS AT INJECTION SITE



- 1 LET ARM HAND OFF-STRETCHER BELOW BODY LEVEL.
- 2 APPLY TOURNIQUET TO:
FOREARM - IF WRIST IV SITE
UPPER ARM - IF FOREARM IV SITE
(IT SHOULD BE TIGHT ENOUGH TO BLOCK VENOUS FLOW BUT NOT ARTERIAL FLOW. RADIAL PULSE SHOULD STILL BE FELT.)



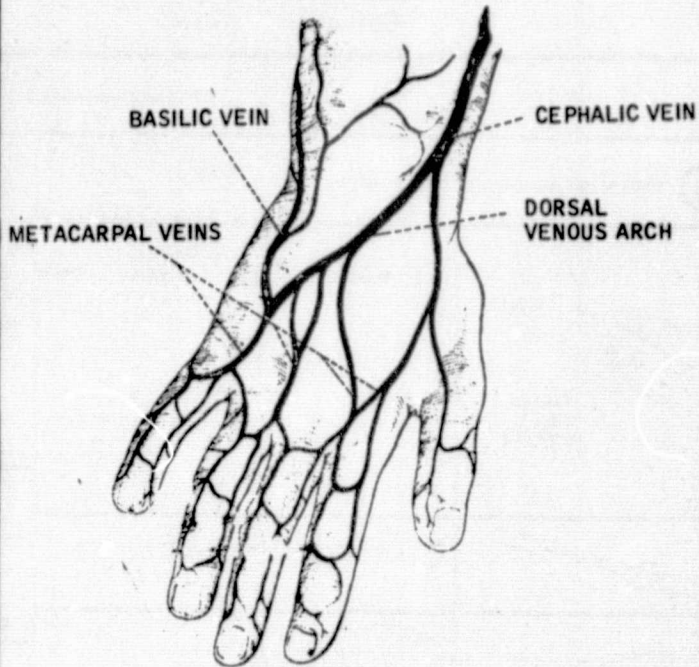
- 3 IF POSSIBLE, HAVE VICTIM MAKE FIST. (ALTERNATELY CLOSE-OPEN, THEN CLOSE UNTIL NEEDLE IN VEIN)



- 4 SLAP OR THUMP VEIN LIGHTLY OVER INJECTION SITE.

IV SITES

FIRST PREFERENCE:
WRIST OR BACK OF HAND SITES



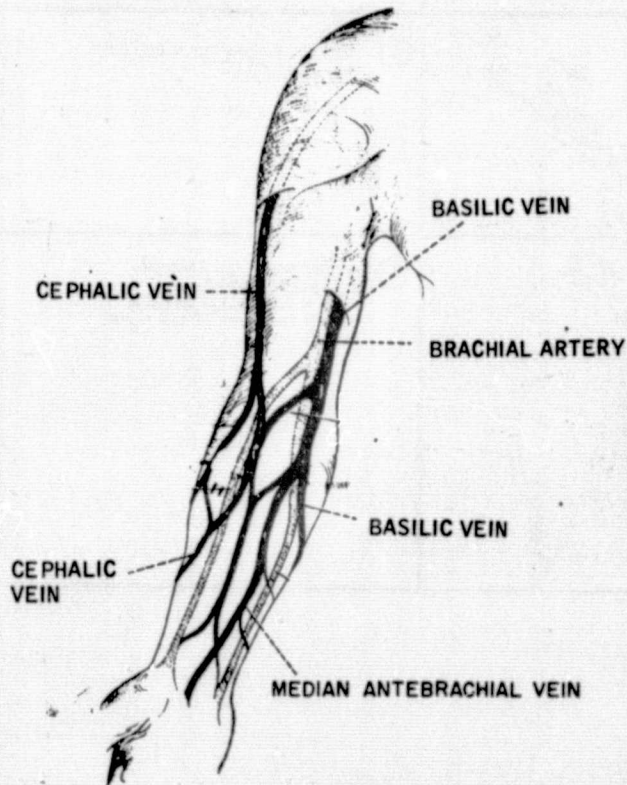
SECOND PREFERENCE:
FOREARM SITES

E

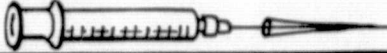

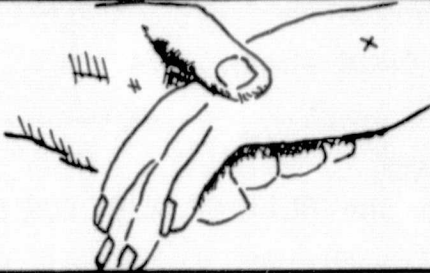
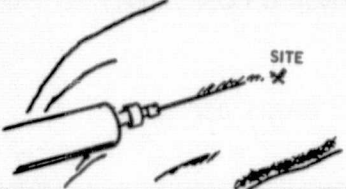
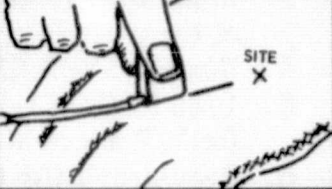
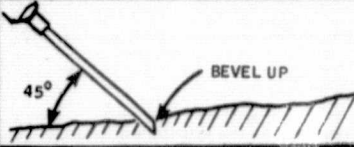
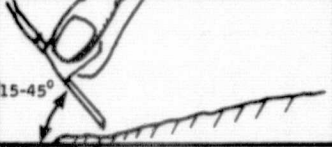
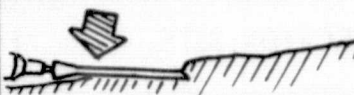



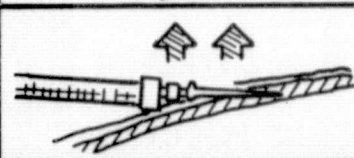

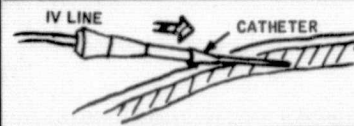
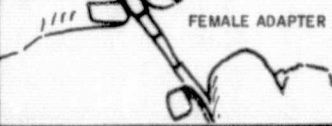
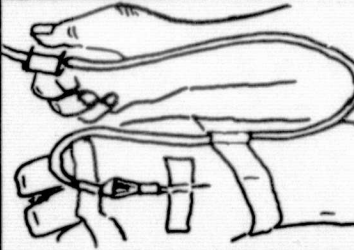
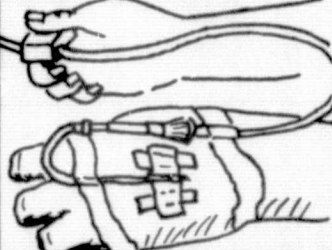
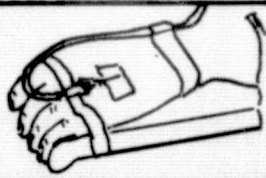
CLEANSE SITE



- 1 CLEANSE AND PREP THE SKIN WITH DISINFECTANT PAD. (APPLY IN A GRADUALLY WIDENING CIRCLE. BEGIN AT VENIPUNCTURE SITE AND CLEANSE OUT APPROX. INCHES IN DIAMETER.)



VENIPUNCTURE AND IV INSTALLATION

F1 USING SYRINGE, NEEDLE & CATHETER 	F2 USING BUTTERFLY NEEDLE 
1 SELECT MEDICUT ASSY (SYRINGE/NEEDLE/CATHETER) OF REQUIRED GAUGE, REMOVE COVERS	1 REMOVE BUTTERFLY NEEDLE COVER
2 STABILIZE VEIN: 	A GRASP PATIENT'S HAND WITH YOUR LEFT HAND (IF YOU ARE RIGHT HANDED) B POSITION YOUR THUMB BELOW INJECTION SITE C STRETCH SKIN SURFACE <u>TAUT</u> TO ANCHOR VEINS
	
3 POSITION NEEDLE BARELY TO ONE SIDE OF VEIN, 1/2" BELOW PUNCTURE SITE - BEVEL UP, IN DIRECTION OF SHOULDER	3 GRASP WINGS AND POSITION NEEDLE SAME AS INDICATED IN STRAIGHT NEEDLE PROCEDURE
	
4 PIERCE SKIN AND UNDERLYING TISSUE TO REACH BUT NOT PENETRATE SKIN	4 PIERCE SKIN AND UNDERLYING TISSUE TO REACH BUT NOT PENETRATE SKIN
	
5 LOWER NEEDLE UNTIL FLUSH WITH SKIN - MOVE NEEDLE TIP DIRECTLY OVER VEIN	5 LOWER NEEDLE UNTIL FLUSH WITH SKIN - MOVE NEEDLE TIP DIRECTLY OVER VEIN
	
6 PIERCE VEIN AND VERIFY ENTRY BY BLOOD IN SYRINGE WHEN IT IS ASPIRATED	6 PIERCE VEIN AND VERIFY ENTRY BY FLASHBACK THRU FEMALE ADAPTER
	
7 CAREFULLY ADVANCE NEEDLE INTO VEIN, APPLYING UPWARD PRESSURE TO PREVENT PIERCING OF OPPOSITE SIDE OF VEIN	7 CAREFULLY ADVANCE NEEDLE INTO VEIN, APPLYING UPWARD PRESSURE TO PREVENT PIERCING OF OPPOSITE SIDE OF VEIN
	
8 REMOVE SYRINGE AND CONNECT REPRIMED IV LINE ADAPTER TO CATHETER THAT REMAINS IN VEIN	8 CONNECT REPRIMED IV MALE NEEDLE ADAPTER TO FEMALE ADAPTER OF BUTTERFLY
	
9 RELEASE TOURNIQUET 10 TAPE BUTTERFLY NEEDLE IN PLACE 11 TAPE TUBING ABOVE ADAPTER TO PREVENT STRESS ON BUTTERFLY 12 SET IV FLOW RATE AS REQUIRED	9 RELEASE TOURNIQUET 10 TAPE CATHETER 11 TAPE TUBING TO PREVENT STRESS ON CATHETER 12 SET IV FLOW RATE, AS REQUIRED
	13 TAPE THE ARM FIRMLY TO THE ARM BOARD TO STABILIZE FOR TRANSPORT

IV DRUG ADMINISTRATION

Ⓒ

ADMINISTRATION
BY
"IV PUSH"
(Injection Directly into
IV Flow Line to Vein)

1. Close FLOW CLAMP.
2. Clean drug injection site (BULB OR INJECTOR SITE) with disinfectant pad.
3. Inject DRUG from SYRINGE into (BULB OR INJECTOR SITE) at the prescribed rate.
4. Remove SYRINGE after administration.
5. Open FLOW CLAMP and adjust flow rate to 2 drops per second for 1/2 minute (to flush medication).
6. Readjust FLOW CLAMP to previous rate.

Ⓓ

ADMINISTRATION
BY
"IV DRIP"
(Injection into IV Fluid
and Mixed Before
Infusion)

1. Close FLOW CLAMP.
2. Clean IV FLUID BAG INJECTION SITE with DISINFECTANT PAD.
3. Inject DRUG from SYRINGE into IV BAG INJECTION SITE.
4. Remove SYRINGE.
5. Shake IV FLUID BAG to mix drug with IV fluid.
6. Open and adjust FLOW CLAMP to prescribed flow rate.

Ⓔ

REMOVING
IV
LINE

1. Close FLOW CLAMP.
2. Remove TAPE attaching BUTTERFLY NEEDLE or CATHETER to skin.
3. Press a DRY STERILE GAUZE over NEEDLE AND INJECTION SITE.
4. Remove NEEDLE OR CATHETER rapidly from vein keeping shaft parallel to skin and vein.
5. Maintain pressure with GAUZE for several minutes until bleeding stops.
6. Cover injection site with a BAND-AID.

DRUG/IV FLUID DATA
(ARRANGED ALPHABETICALLY BY DRUG NAME)

NOTE: ADMINISTRATION SHALL BE ONLY AS DIRECTED BY DUTY PHYSICIAN

DRUG/IV FLUID		PURPOSE/TREATMENT	
NAME <u>ADRENALIN (EPINEPHRINE)</u> QTY/FORM <u>(2) Vial/Syringes</u> ITEM VOLUME/SIZE <u>10 ml.</u> STRENGTH/ITEM VOLUME <u>1 mg./10 ml.</u> STRENGTH/UNIT VOLUME <u>.1 mg./ml.</u>		<ul style="list-style-type: none"> ● To stimulate the heart to beat. 	
		<ul style="list-style-type: none"> ● Restore cardiac rhythm in cardiac arrest. ● Severe allergic reactions. ● Assist in defibrillation process. 	
USUAL DOSAGE:		POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:	
5 ml. IV push every 5 minutes during CPR.		<ul style="list-style-type: none"> ● Anxiety ● Headache ● Rapid, strong pulse ● Fear 	
		<ul style="list-style-type: none"> ● Administer with caution to elderly, hypertensives, diabetics, or victims with cardiovascular disease. ● Do not use if solution is brown. ● Protect from light until ready for use 	
DRUG/IV FLUID		PURPOSE/TREATMENT	
NAME <u>ARAMINE (METARAMINOL)</u> QTY/FORM <u>(2) Vial/Syringes</u> ITEM VOLUME/SIZE <u>10 ml.</u> STRENGTH/ITEM VOLUME <u>100 mg./10 ml.</u> STRENGTH/UNIT VOLUME <u>10 mg./ml.</u>		<ul style="list-style-type: none"> ● To increase blood pressure 	
		<ul style="list-style-type: none"> ● Acute hypotensive state ● Cardiogenic shock 	
USUAL DOSAGE:		POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:	
15 to 100 mg. diluted in 500 ml. of 5% Dextrose and water or saline solutions. Infuse mixture at rate to maintain systolic B/P between 100 and 120.		<ul style="list-style-type: none"> ● Hypertension ● Cardiac arrhythmias ● Cardiac arrest ● Headache ● Flushing ● Dizziness ● Nausea ● Apprehension ● Strong, rapid pulse 	
		<ul style="list-style-type: none"> ● Do not administer to victim in shock due to blood loss. 	
DRUG/IV FLUID		PURPOSE/TREATMENT	
NAME <u>ATROPINE</u> QTY/FORM <u>(2) Vial/Syringes</u> ITEM VOLUME/SIZE <u>10 ml.</u> STRENGTH/ITEM VOLUME <u>1 mg./10 ml.</u> STRENGTH/UNIT VOLUME <u>.1 mg./ml.</u>		<ul style="list-style-type: none"> ● To increase heart rate. 	
		<ul style="list-style-type: none"> ● Complete Heart Block. ● Slow ventricular rate with atrial flutter or fibrillation. 	
USUAL DOSAGE:		POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:	
.5 mg. IV push at 5 minute intervals until pulse rate is greater than 60. Total dose not to exceed 2 mg.		<ul style="list-style-type: none"> ● Dryness of mouth or nose ● Blurred vision ● Rapid, strong pulse ● Dizziness ● Drowsiness ● Nausea ● Hallucinations ● Rash ● Tachycardia 	
		<ul style="list-style-type: none"> ● Do not exceed recommended dosage. ● Atropine poisoning can be fatal. ● May cause ventricular arrhythmias. 	

DRUG/IV FLUID DATA

(ARRANGED ALPHABETICALLY BY DRUG NAME)

NOTE: ADMINISTRATION SHALL BE ONLY AS DIRECTED BY DUTY PHYSICIAN

DRUG/IV FLUID		PURPOSE/TREATMENT
NAME <u>DEXTROSE 50%</u> QTY/FORM <u>(2) Vial/Syringes</u> ITEM VOLUME/SIZE <u>50 ml.</u> STRENGTH/ITEM VOLUME <u>25 mg./50 ml.</u> STRENGTH/UNIT VOLUME <u>0.5 mg./ml.</u>		<ul style="list-style-type: none"> • Insulin shock
USUAL DOSAGE:	POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:	
DRUG/IV FLUID		PURPOSE/TREATMENT
NAME <u>DEXTROSE AND WATER (D5W)</u> QTY/FORM <u>(6) Bags 5% Dextrose in Distilled Water</u> ITEM VOLUME/SIZE <u>500 ml.</u> STRENGTH/ITEM VOLUME _____ STRENGTH/UNIT VOLUME _____		<ul style="list-style-type: none"> • Transport medium for IV drugs • Supplies nutrient to blood • Helps supply energy to tissues deficient in oxygen.
USUAL DOSAGE:	POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:	
DRUG/IV FLUID		PURPOSE/TREATMENT
NAME <u>DEXTROSE IN SALINE SOLUTION</u> QTY/FORM <u>(4) Bags 5%/.2N Saline Solution</u> ITEM VOLUME/SIZE _____ STRENGTH/ITEM VOLUME _____ STRENGTH/UNIT VOLUME _____		<ul style="list-style-type: none"> • Transport medium for IV drugs • Supplies nutrients to blood • Helps supply energy to tissues deficient in oxygen.
USUAL DOSAGE:	POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:	
Infuse slowly to keep vein open.	<ul style="list-style-type: none"> • Normally not used in cardiac cases. 	

DRUG/IV FLUID DATA

(ARRANGED ALPHABETICALLY BY DRUG NAME)

NOTE: ADMINISTRATION SHALL BE ONLY AS DIRECTED BY DUTY PHYSICIAN

DRUG/IV FLUID		PURPOSE/TREATMENT	
NAME <u>ISUPREL (ISOPROTERENOL)</u> QTY/FORM <u>(5) Ampules</u> ITEM VOLUME/SIZE <u>5 ml.</u> STRENGTH/ITEM VOLUME <u>1 mg./5 ml.</u> STRENGTH/UNIT VOLUME <u>.2 mg./ml.</u>		<ul style="list-style-type: none"> • To increase heart rate. 	
		<ul style="list-style-type: none"> • Cardiac Standstill • Shock • Bronchospasms • Bradycardia (caused by complete heart blocks or when atropine is ineffective) 	
USUAL DOSAGE:	POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:		
Dilute one full ampul in 500 ml. 5% Dextrose and water and infuse mixture at 1 ml./min.	<ul style="list-style-type: none"> <li style="width: 33%;">• Sweating <li style="width: 33%;">• Headache <li style="width: 33%;">• Tachycardia <li style="width: 33%;">• Flushed face <li style="width: 33%;">• Nervousness <li style="width: 33%;">• Strong, rapid pulse 		
	<ul style="list-style-type: none"> • Decrease infusion rate if pulse is above 110. • Use with extreme caution in victim with myocardial infarction. 		
NAME <u>NITROGLYCERINE (NITROSTAT)</u> QTY/FORM <u>(1) Bottle Tablets</u> ITEM VOLUME/SIZE _____ STRENGTH/ITEM VOLUME _____ STRENGTH/UNIT VOLUME <u>.4 mg./Tablet</u>		<ul style="list-style-type: none"> • Vasodilator 	
		<ul style="list-style-type: none"> • Angina 	
USUAL DOSAGE:	POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:		
.4 mg. taken orally.	<ul style="list-style-type: none"> <li style="width: 33%;">• Blurred vision <li style="width: 33%;">• Dizziness <li style="width: 33%;">• Drying of mouth <li style="width: 33%;">• Weakness 		
	<ul style="list-style-type: none"> • Excessive dosage may cause violent headache. 		
NAME <u>RINGERS LACTATE</u> QTY/FORM <u>(4) Bags</u> ITEM VOLUME/SIZE <u>1000 ml.</u> STRENGTH/ITEM VOLUME _____ STRENGTH/UNIT VOLUME _____		<ul style="list-style-type: none"> • Fluid volume builder • Replace lost electrolytes 	
		<ul style="list-style-type: none"> • Hypovolemic shock • Hemorrhage 	
USUAL DOSAGE:	POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:		
Infuse rapidly.	<ul style="list-style-type: none"> • Electrolyte imbalance • Do not use in cardiac cases. 		

DRUG/IV FLUID DATA
(ARRANGED ALPHABETICALLY BY DRUG NAME)

NOTE: ADMINISTRATION SHALL BE ONLY AS DIRECTED BY DUTY PHYSICIAN

DRUG/IV FLUID		PURPOSE/TREATMENT	
NAME <u>SODIUM BICARBONATE</u> QTY/FORM <u>(4) Vial/Syringes</u> ITEM VOLUME/SIZE <u>50 ml.</u> STRENGTH/ITEM VOLUME <u>3.75 gm/50 ml.</u> STRENGTH/UNIT VOLUME <u>75 mg./ml.</u>		<ul style="list-style-type: none"> ● To relieve acidosis caused by shock, particularly cardiogenic shock. 	
USUAL DOSAGE: 3.75 gm. for every 5 minutes of shock or cardiac arrest. Do not exceed 3 syringes	POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS: <ul style="list-style-type: none"> ● In cardiac arrest, sodium bicarbonate should be given in conjunction with epinephine - <u>never alone.</u> 		
DRUG/IV FLUID		PURPOSE/TREATMENT	
NAME <u>VALIUM (DIAZEPAM)</u> QTY/FORM <u>(2) Vial/Syringes</u> ITEM VOLUME/SIZE <u>2 ml.</u> STRENGTH/ITEM VOLUME <u>10 mg./2 ml.</u> STRENGTH/UNIT VOLUME <u>5 mg./ml.</u>		<ul style="list-style-type: none"> ● Stress Relief ● Anxiety ● Convulsions ● Pre-cardioversion ● Paroxysmal Atrial Tachycardia (PAT) 	
USUAL DOSAGE: 5 to 15 mg. @ 5 mg./min. IV push within 5 to 10 minutes prior to defibrillation. For anxiety or stress, 5 to 10 mg. @ 5 mg./min.	POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS: <ul style="list-style-type: none"> ● Hypotension ● Muscle weakness ● Hiccups ● Drowsiness ● Fatigue ● Nausea ● <u>Do not administer to victim in coma.</u> 		
DRUG/IV FLUID		PURPOSE/TREATMENT	
NAME <u>XYLOCAINE (LIDOCAINE)</u> QTY/FORM <u>(4) Vial/Syringes</u> ITEM VOLUME/SIZE <u>10 ml.</u> STRENGTH/ITEM VOLUME <u>100 mg./10 ml.</u> STRENGTH/UNIT VOLUME <u>10 mg./ml.</u>		<ul style="list-style-type: none"> ● To increase electrical stimulation of ventricles. ● Ventricular Tachycardia ● PVC's 	
USUAL DOSAGE: 50 to 100 mg. IV push in 1 to 2 minutes. Second dose may be repeated after 5 minutes.	POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS: <ul style="list-style-type: none"> ● Dizziness ● Apprehension ● Blurred Vision ● Convulsions ● Respiratory Depression ● Hypotension ● Bradycardia ● Constant monitoring of EKG required. ● Resuscitative equipment should be immediately available. 		

DRUGS THAT ALTER RATE OF HEARTBEAT

INCREASE ↑
 ARAMINE
 ATROPINE
 EPINEPHRINE
 ISUPREL

REDUCE ↓
 LIDOCAINE
 VALIUM (IF
 DUE TO ANXIETY)

INFLUENCES	LOCATIONS/RATE EFFECT	DRUG
CONDUCTION	THROUGH AV NODE ↑	ISUPREL
	THROUGH AV NODE ↑	ATROPINE
IMPULSE FORMATION	IN SA NODE ↑	ARAMINE
	IN SA OR AV NODE ↑	ATROPINE
	SA NODE, AV NODE OR HIS/PURKINJE SYSTEM ↑	EPINEPHRINE ISUPREL
	HIS/PURKINJE SYSTEM OR VENTRICLES ↓	LIDOCAINE

DRUGS THAT AFFECT BLOOD PRESSURE

EFFECT	DRUG
INCREASE ↑	ARAMINE ATROPINE (PRONE VICTIM ONLY) EPINEPHRINE (SYSTOLIC ONLY) IV FLUIDS (POSSIBLY) SODIUM BICARBONATE
DECREASE ↓	ISUPREL (POSSIBLY) LIDOCAINE (SLIGHTLY) VALIUM (POSSIBLY)

TYPES OF EMERGENCIES AND E

EMERGENCY TYPE	TRAUMA OR INJURY EMERGENCIES				
	IMPACT	BURNS	ELECTRIC SHOCK	DROWNING	SHOCK
TYPICAL CAUSES	<ul style="list-style-type: none"> ● MOTOR VEHICLE/BOATING ● GUNSHOT/STABBING/FIGHT ● EXPLOSION ● MACHINERY ● FALL 	<ul style="list-style-type: none"> ● FIRES ● EXPLOSIONS ● KITCHEN ACCIDENTS 	<ul style="list-style-type: none"> ● ELECTRICAL EQUIP. CONTACT ● LIGHTNING 	<ul style="list-style-type: none"> ● BOATING ● SWIMMING ● BATHTUB ACCIDENTS 	<ul style="list-style-type: none"> ● IMPACT ● BURNS ● ELECTRICAL ● CARDIAC
EXPECTED EMERGENCIES	<ul style="list-style-type: none"> ● SOFT TISSUE INJURIES ● FRACTURES/DISLOCATIONS ● RESPIRATION - AIRWAY BLOCKAGE - CHEST INJURIES ● CIRCULATION - BLEEDING (EXT. OR INTERNAL) - SHOCK - CARDIAC 	<ul style="list-style-type: none"> ● SOFT TISSUE INJURIES ● LUNG DAMAGE ● SHOCK ● FLUID LOSS 	<ul style="list-style-type: none"> ● SOFT TISSUE INJURIES (BURNS) ● RESPIRATION ● CARDIAC/CIRCULATION ● SHOCK 	<ul style="list-style-type: none"> ● CIRCULATION ● RESPIRATION 	<ul style="list-style-type: none"> ● CIRCULATION ● RESPIRATION
EMT EMERGENCY ACTIONS X = PROBABLY REQUIRED					
RESPIRATION SUPPORT					
1 MOUTH-TO-MOUTH	X	X	X	X	X
2 BAG	X	X	X	X	X
3 ORAL AIRWAY	X	X	X	X	X
4 OXYGEN	X	X	X	X	X
5 SUCTION	X	X	X	X	X
HEART/ CIRCULATION SUPPORT					
6 EXTERNAL MASSAGE	X		X	X	X
7 PRE-CORDIAL THUMP	X		X	X	X
8 IV-DRUGS	X	X	X	X	X
9 EKG	X		X	X	X
10 DEFIBRILLATE	X		X	X	X
TRAUMA/ INJURY SUPPORT					
11 CONTROL BLEEDING	X				
12 SPLINTING/BANDAGING	X	X			
13 BURN BANDAGING	X	X	X		
OTHER SUPPORT					
14 RESTRAINT					
15 EXTRICATION	X	X	X	X	
16 CHILDBIRTH ASSISTANCE					
17 SYRUP OF IPECAC					
18 GAG IN MOUTH					

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AGENCIES AND EMT ACTIONS

MEDICAL EMERGENCIES									
AGENCY	SHOCK	CARDIAC	STROKE	CONVULSIONS	PSYCHIATRIC	OBSTETRICS	POISONINGS AND DRUG O.D.	DIABETIC STATES	ACUTE ABDOMEN
BOATING SWIMMING WHTUB ACCIDENTS	<ul style="list-style-type: none"> ● IMPACT ● BURNS ● ELECTRICAL ● CARDIAC 	<ul style="list-style-type: none"> ● HEART ARREST ● CONGESTIVE HEART FAILURE ● ANGINA ● MYOCARDIAL INFARCTION 	<ul style="list-style-type: none"> ● CEREBRAL BLOOD CLOT OR HEMORRHAGE 	<ul style="list-style-type: none"> ● EPILEPTIC ● INJURY ● INFECTION 	<ul style="list-style-type: none"> ● MENTALLY DISTURBED VICTIMS 	<ul style="list-style-type: none"> ● CHILDBIRTH 	<ul style="list-style-type: none"> ● INGESTION ● INHALATION ● ABSORPTION ● INJECTION 	<ul style="list-style-type: none"> ● TOO LOW BLOOD INSULIN ● TOO HIGH BLOOD INSULIN 	<ul style="list-style-type: none"> ● APPENDICITIS ● ULCERS ● GALLBLADDER ● BOWEL OBSTRUCTION
CIRCULATION RESPIRATION	<ul style="list-style-type: none"> ● CIRCULATION ● RESPIRATION 	<ul style="list-style-type: none"> ● CIRCULATION ● RESPIRATION 	<ul style="list-style-type: none"> ● CIRCULATION ● RESPIRATION 	<ul style="list-style-type: none"> ● RESPIRATION ● RELATED "IMPACT" INJURIES DUE TO FALL 	<ul style="list-style-type: none"> ● VIOLENT VICTIM BEHAVIOR 	<ul style="list-style-type: none"> ● HEMORRHAGE ● ABNORMAL DELIVERY 	<ul style="list-style-type: none"> ● VIOLENT AND UNPREDICTABLE BEHAVIOR ● RESPIRATION ● CIRCULATION 	<ul style="list-style-type: none"> ● COMA ● CONVULSIONS ● CIRCULATION 	<ul style="list-style-type: none"> ● ABDOMINAL PAIN ● NAUSEA ● VOMITING
X	X	X	X				X	X	
X	X	X	X				X	X	
X	X	X	X				X	X	
X	X	X	X				X	X	
X	X	X	X				X	X-50% DEXTROSE	X
X				X DUE TO IMPACT INJURIES		X			
X				DO NOT RESTRAIN	X				
X				PROTECT VICTIM FROM ENVIRONMENT		X			DO NOT GIVE ANYTHING BY MOUTH
				X			X INDUCE VOMITING		

SKIN COLOR (PARTICULARLY OF LIPS, FINGERNAILS)

● DEPENDS ON PIGMENT AND AMOUNT OF CIRCULATING BLOOD IN TISSUES

COLOR:

● RED OR FLUSH

MAY BE INDICATIVE OF:

- HIGH BLOOD PRESSURE
- CARBON MONOXIDE POISONING
- HEAT STROKE

● PALE, ASHEN WHITE

- INSUFFICIENT CIRCULATION (AS IN EARLY STAGES OF "SHOCK" OR HEART FAILURE)
- IN CERTAIN STAGES OF FRIGHT

● BLuish (CYANOTIC)

- LACK OF OXYGEN IN BLOOD AND/OR
- INSUFFICIENT CIRCULATION (AS IN LATTER STAGES OF SHOCK AND HEART FAILURE)

● YELLOWISH

- A SIGN OF LIVER OR BILE DUCT DISEASE

RESPIRATION

(NORMAL RATE = 1 BREATH EVERY 3-4 SECONDS) (ADULTS)

- AUTOMATICALLY CONTROLLED BY NERVOUS SYSTEM IN RESPONSE TO - CO₂ CONTENT OF BLOOD - BODY O₂ REQUIREMENTS
- RATE AND DEPTH OF RESPIRATION ARE IMPORTANT
- RAPID/SHALLOW BREATHING - SEEN IN "SHOCK" AND HEAD INJURIES
- (INSPIRATION "CROWING" IS STRIDOR)
- DEEP/LABORED/WHEEZING - SEEN IN: - UPPER AIRWAY OBSTRUCTION AND - SEVERE ALLERGY SHOCK
- DEEP/GASPING/LABORED - SEEN IN HEART PROBLEMS
- COUGHING AND FROTHY BLOOD AT NOSE OR MOUTH - LUNG DAMAGE FROM FRACTURED RIBS OR FOREIGN BODIES PENETRATING CHEST

VITAL SIGN

BLOOD PRESSURE

NORMAL SYSTOLIC: - 110 - 140 (ADULTS)
DIASTOLIC: 60 - 80

- QUANTITATIVE MEASURE OF PRESSURE CIRCULATING BLOOD EXERTS AGAINST VESSEL WALLS
- CAN FALL MARKEDLY IN STATES OF "SHOCK," HEMORRHAGE, HEART ATTACKS OF SYSTOLIC PRESSURE IS LESS THAN 80 mm HG THEN ADDITIONAL BLOOD VOLUME MUST BE SUPPLIED IV FOR CIRCULATORY SYSTEM TO MAINTAIN ITSELF.)

VITAL SIGN

REACTION TO PAIN:

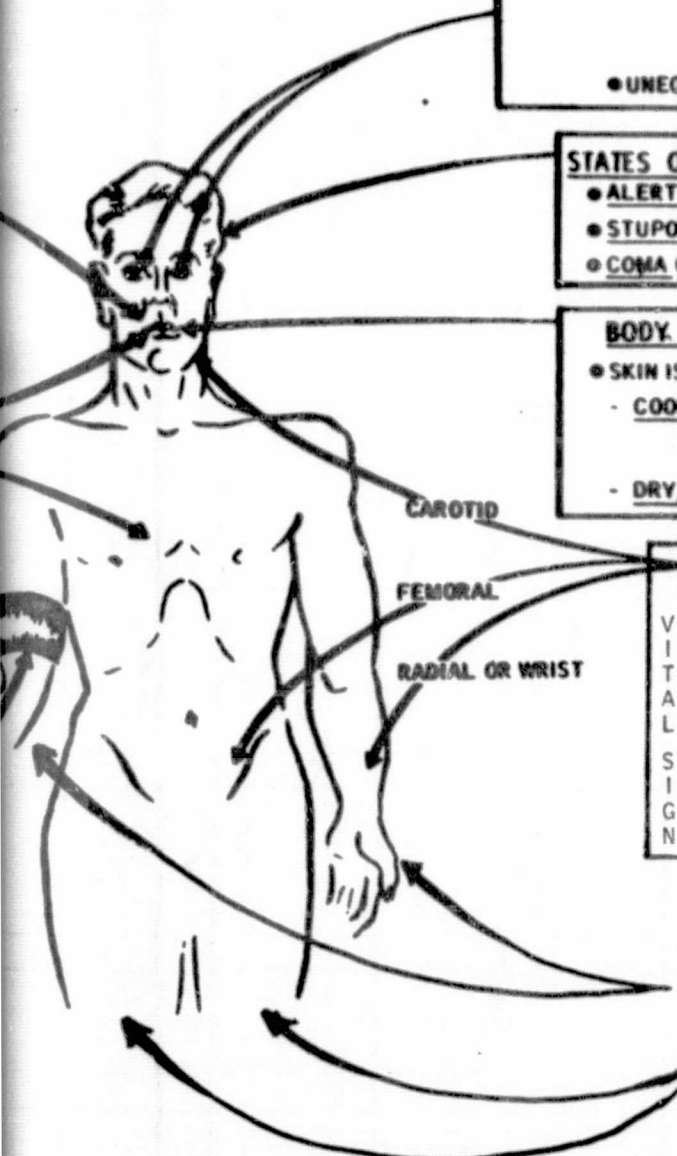
- AT INJURY SITE - PROBABLY NO DAMAGE TO SPINAL CORD
- NO PAIN BUT OBVIOUS SIGN OF INJURY - SPINAL CORD DAMAGE, - HYSTERIA, - SHOCK - EXCESSIVE DRUGS OR ALCOHOL

RESP. AIRFLOW
CHEST MOVEMENTS



FOLDOUT FRAME

INTERPRETATION FOR EMERGENCY CARE



PUPILS

- NORMALLY WILL CONTRACT FROM DIRECT LIGHT IN EYE
- DILATED OR ENLARGED PUPILS INDICATE AN UNCONSCIOUS OR RELAXED STATE.
- WHEN BLOOD TO BRAIN STOPS:
 - PUPILS START DILATING IN 30-45 SECONDS
 - PUPILS WILL BE FULLY DILATED/FIXED IN 1-1/2 - 2 MINUTES
 - BRAIN CELLS DIE AFTER 4-6 MINUTES
- UNEQUAL PUPIL SIZE IS SEEN IN BRAIN INJURIES, SPINAL CORD INJURIES, STROKES

STATES OF CONSCIOUSNESS

- ALERT - RESPONDS TO VOCAL OR PHYSICAL STIMULI.
- STUPOR - PARTLY ALERT, WILL REACT TO PAINFUL STIMULI, CONFUSED STATE OF MIND.
- COMA (UNCONSCIOUS) - STATE FROM WHICH PATIENT CANNOT BE AROUSED.

BODY TEMP NORMAL TEMP. = 98.6° F

- SKIN IS LARGELY RESPONSIBLE FOR BODY TEMP. REGULATION, IF SKIN IS:
 - COOL, CLAMMY - NERVOUS SYSTEM RESPONSE TO TRAUMA OR BLOOD LOSS
SWEAT GLANDS ARE HYPERACTIVE.
BLOOD VESSELS RESTRICT BLOOD FLOW.
 - DRY, HOT - MAY RESULT FROM FEVER OR ILLNESS OR EXPOSURE TO EXCESSIVE HEAT.

PULSE (NORMAL = 60 - 80 BEATS/MINUTE)

VITAL SIGN

- CAN BE FELT AT 3 MAJOR SITES (CAROTID, WRIST, FEMORAL)
- PULSE RATE - INDICATES PUMPING RATE OF HEART
- PULSE STRENGTH - QUALITATIVE INDICATION OF HEART STROKE STRENGTH OF PULSE PRESSURE (SYSTOLIC MINUS DIASTOLIC PRESSURE)
- RAPID/WEAK PULSE - SEEN IN STATES OF SHOCK
- RAPID/STRONG PULSE - SEEN IN STATES OF HYPERTENSION, FRIGHT
- BELOW 60/MINUTE - BRADY CARDIA (SLOW HEART RATE)
- ABOVE 100/MINUTE - TACHY CARDIA (RAPID HEART RATE)

PARALYSIS OR LOSS OF SENSATION IN:

- LOWER EXTREMITIES - SPINAL CORD INJURY IN LOWER BACK
- UPPER EXTREMITIES - SPINAL CORD INJURY IN NECK
- PARALYSIS LIMITED TO ONE SIDE - STROKE OR HEAD INJURY WITH BRAIN DAMAGE

FOLDOUT FRAME 2

BASIC EMERGENCY CARE PRIORITIES
FOR INDIVIDUAL VICTIM

IF "IMPACT" TYPE
OF EMERGENCY



SIMULTANEOUSLY
WITH OTHER
PRIORITIES:

- ASSUME
POSSIBILITY
OF NECK
AND/OR OF
- SPINAL
FRACTURES.

①

RESPIRATION
CARE

- AIRWAY
- BREATHING

- CLEAR AIRWAY
- VENTILATION
- SEAL OPEN CHEST WOUNDS
- STABILIZE FLAIL CHEST

②

CARDIAC
CIRCULATION CARE

- CIRCULATION/VENTILATION
(CPR)

③

BLEEDING CONTROL

④

IMMOBILIZE FRACTURES/DISLOCATIONS

⑤

DRESS AND BANDAGE WOUNDS

⑥

PREPARE FOR TRANSPORT WHILE
MAINTAINING SUPPORTIVE CARE

⑦

TRANSPORT WHILE
MAINTAINING SUPPORTIVE CARE

CRITERIA FOR "TRIAGE"
(SORTING OF VICTIMS ACCORDING TO SEVERITY OF INJURIES)

FIRST PRIORITY EMERGENCIES

RESPIRATION PROBLEMS

- | |
|---|
| <ul style="list-style-type: none">● AIRWAY BLOCKAGE● <u>B</u>REATHING PROBLEMS |
|---|

CIRCULATION PROBLEMS

- | | | |
|--|-----------------------|-------------------------|
| <ul style="list-style-type: none">● HEART ARREST● HEART ATTACK● UNCONTROLLED BLEEDING● SEVERE SHOCK (HYPOVOLEMIC) | } HEART PUMP PROBLEMS | } BLOOD SUPPLY PROBLEMS |
|--|-----------------------|-------------------------|

OTHER TRAUMA/MEDICAL PROBLEMS

- | |
|--|
| <ul style="list-style-type: none">● SEVERE HEAD OR NECK INJURIES● OPEN CHEST WOUNDS● OPEN ABDOMINAL WOUNDS● SEVERE MEDICAL PROBLEMS, SUCH AS POISONINGS, DIABETIC COMPLICATIONS, ETC. |
|--|

SECOND PRIORITY EMERGENCIES

- BURNS
- MAJOR MULTIPLE FRACTURES
- BACK INJURIES

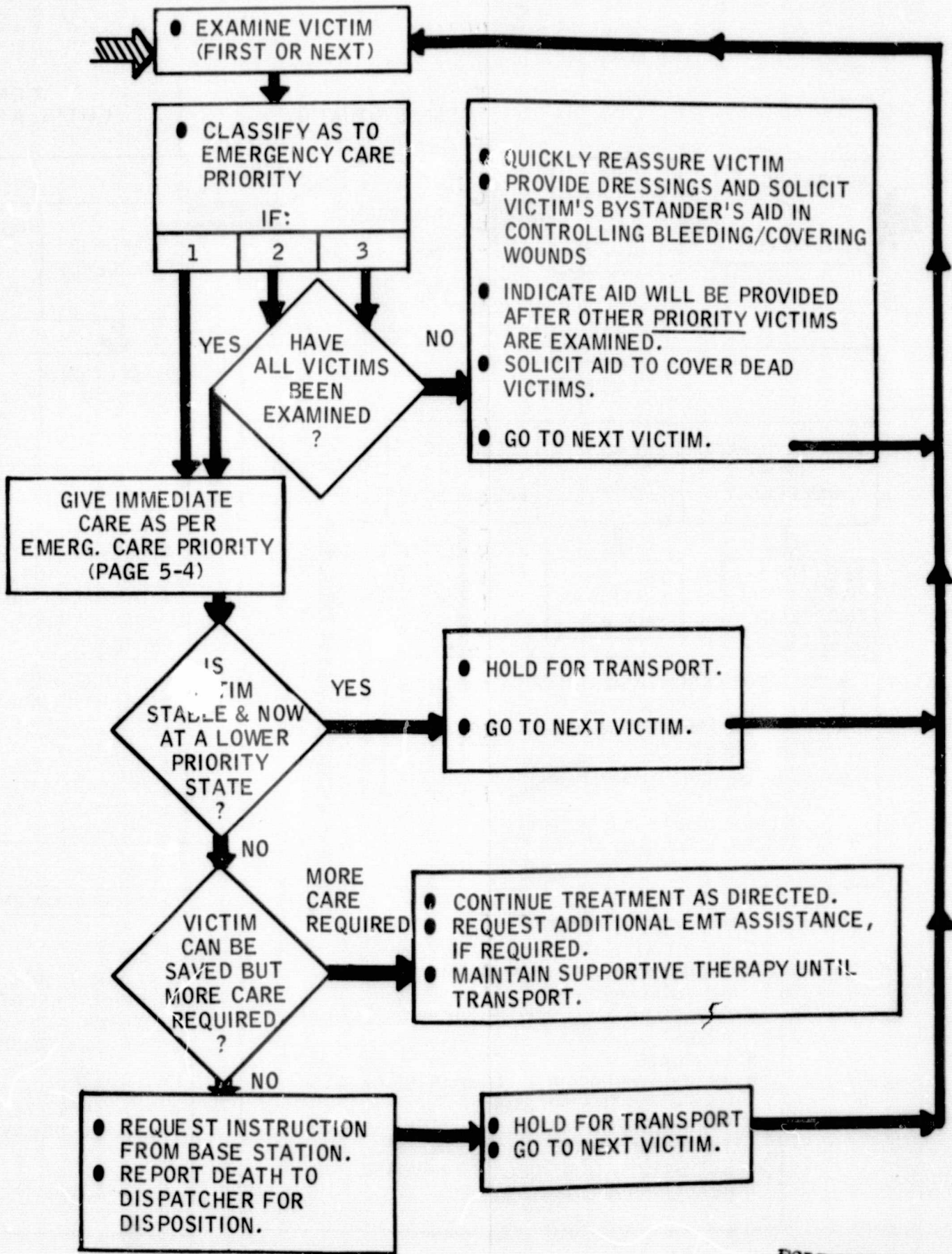
THIRD PRIORITY

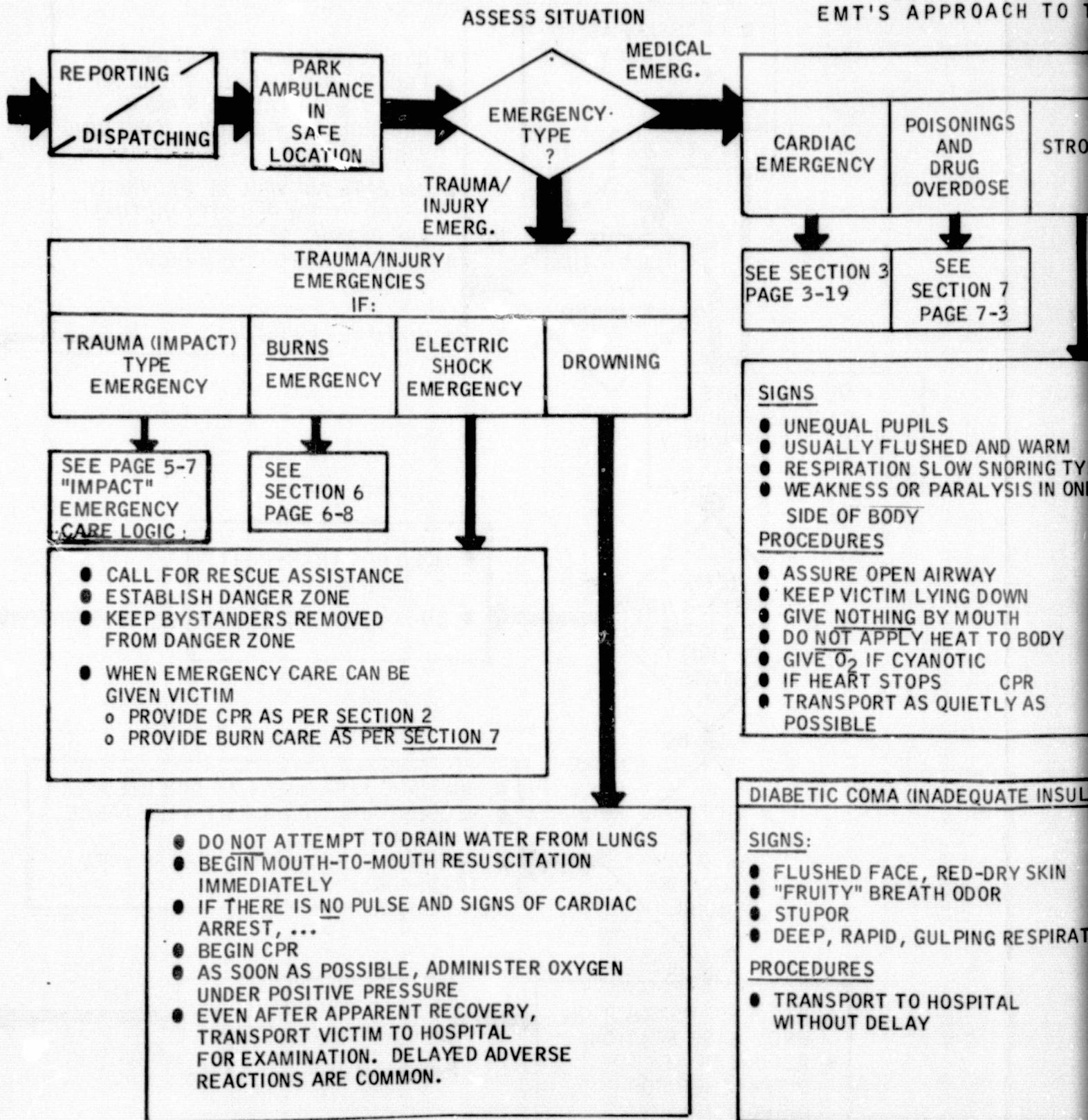
- MINOR FRACTURES
- MINOR INJURIES
- OBVIOUSLY DEAD OR DYING (MORTALLY WOUNDED) VICTIMS

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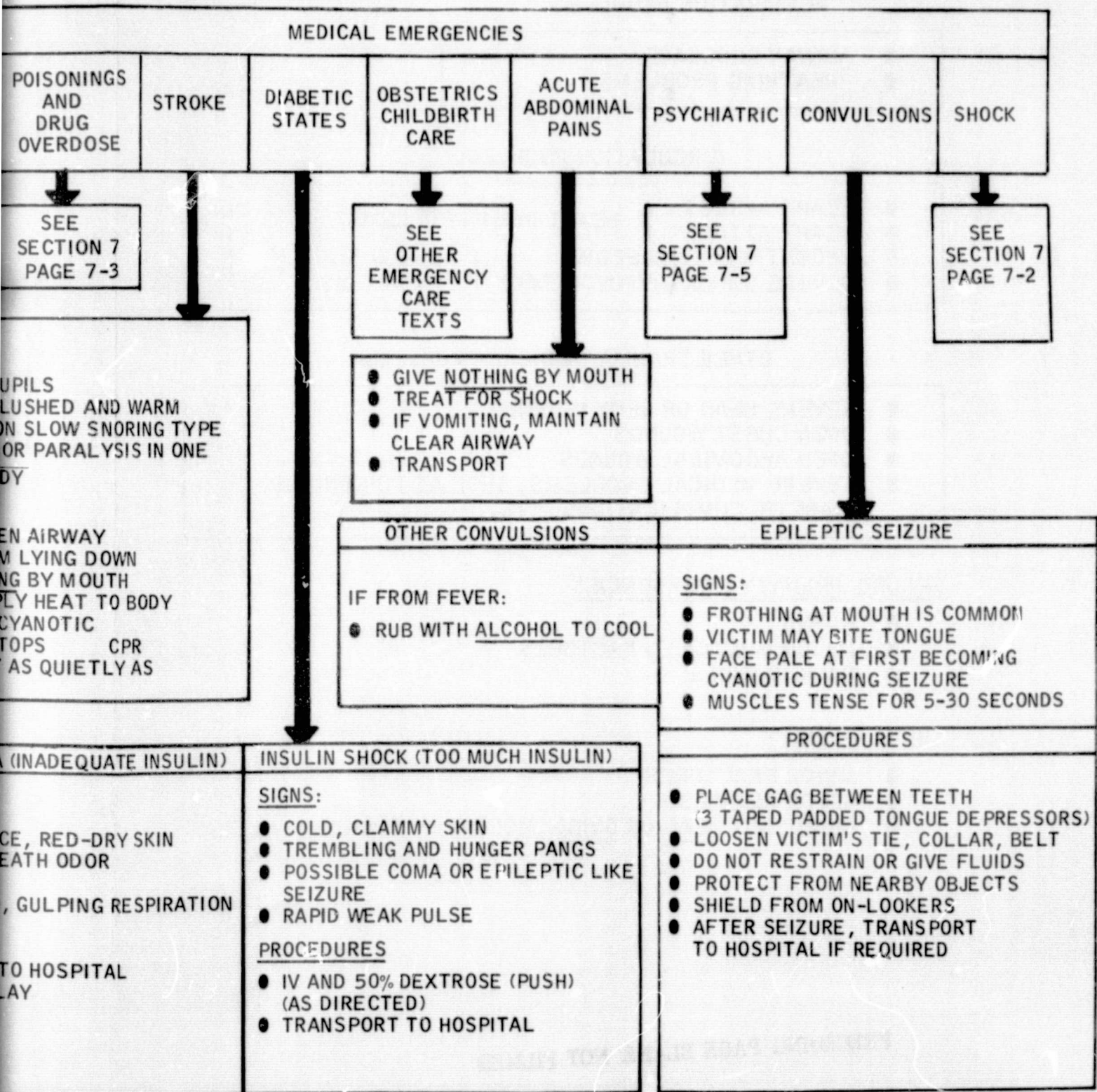
"TRIAGE" LOGIC

INJURIES)



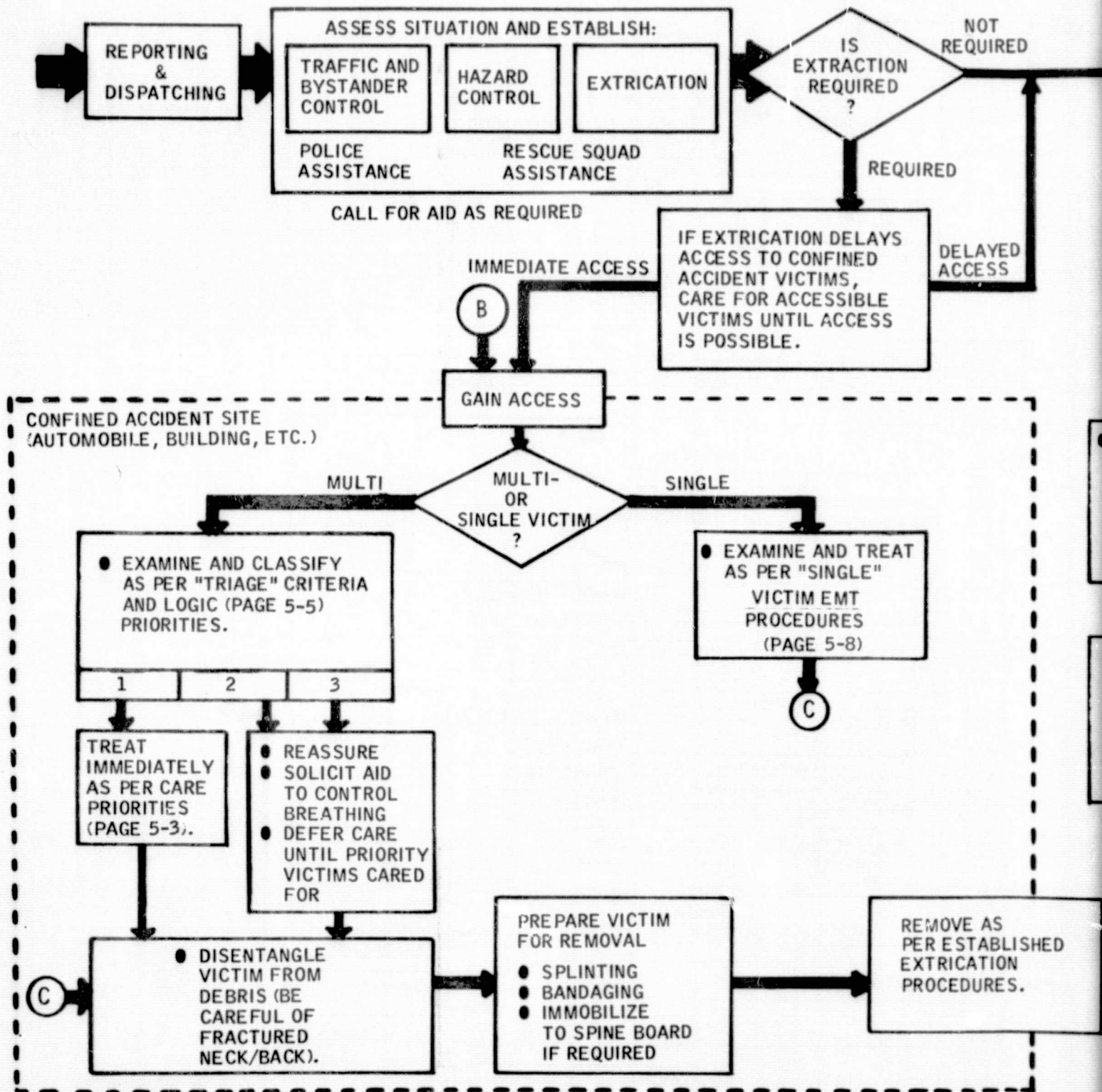


GENERAL PROCEDURAL LOGIC FOR
APPROACH TO THE EMERGENCY SCENE



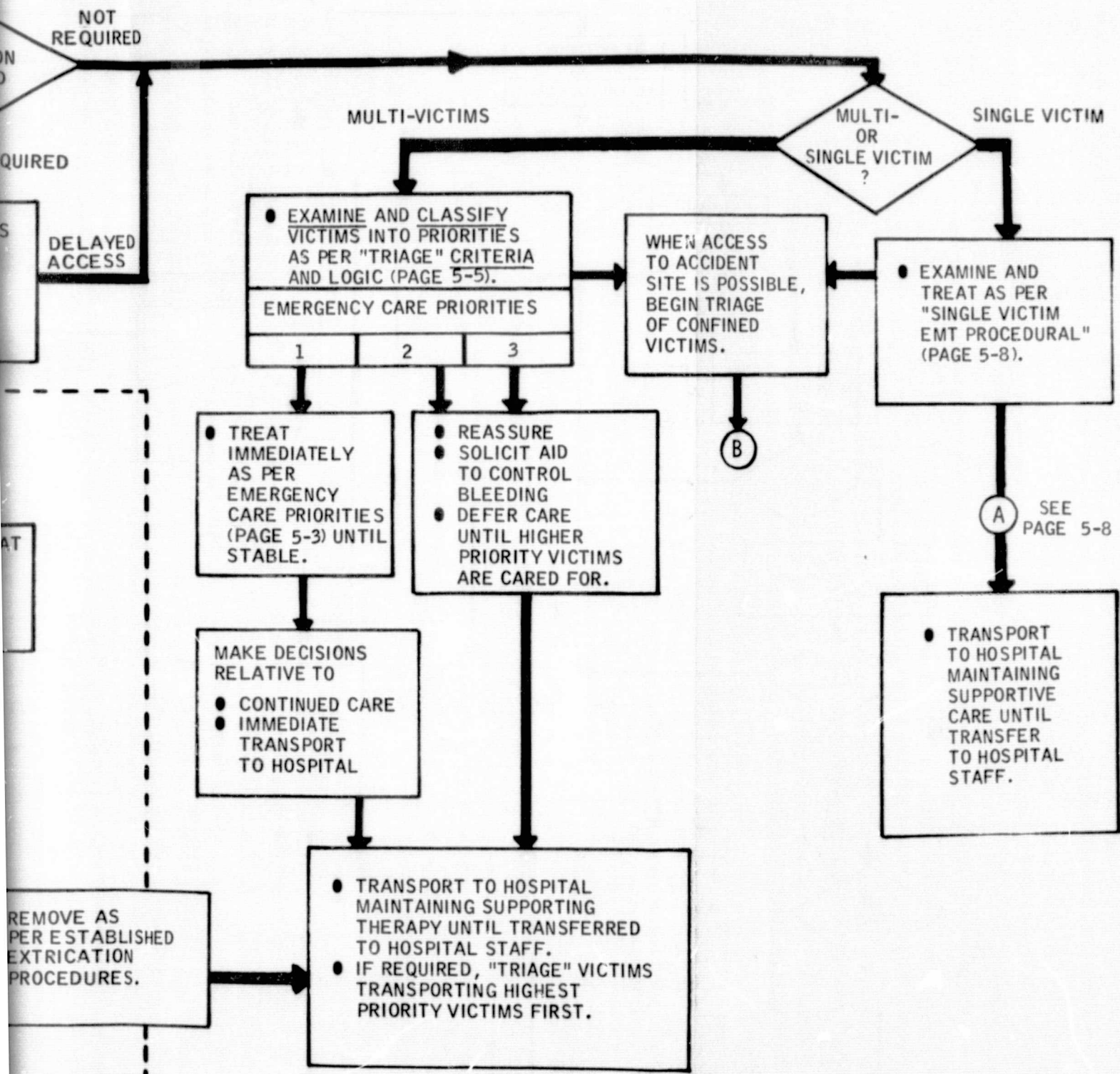
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"IMPACT" TYPE EMERGENCY CARE PROCEDURAL LOGIC

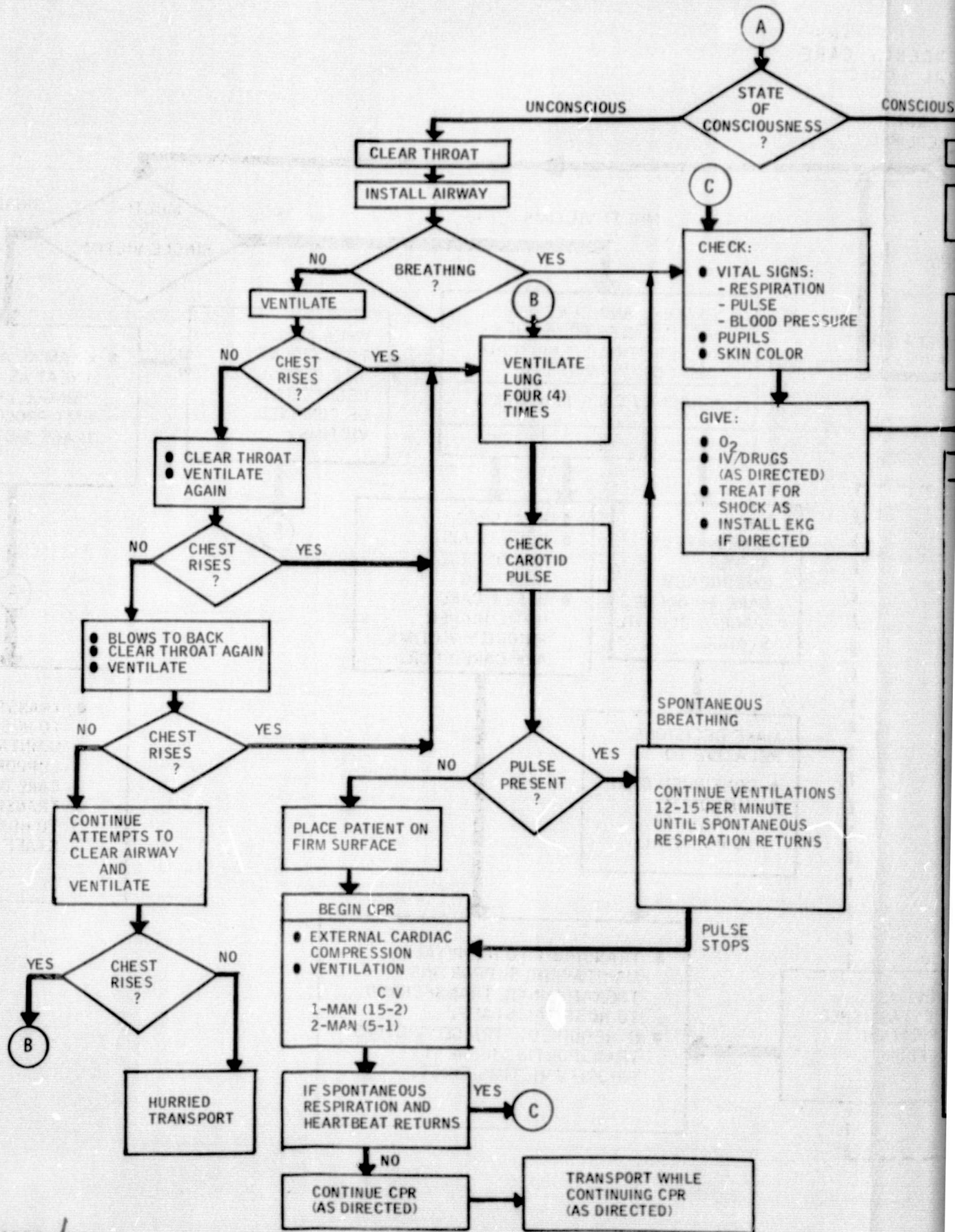


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EMERGENCY CARE
PROCEDURAL LOGIC

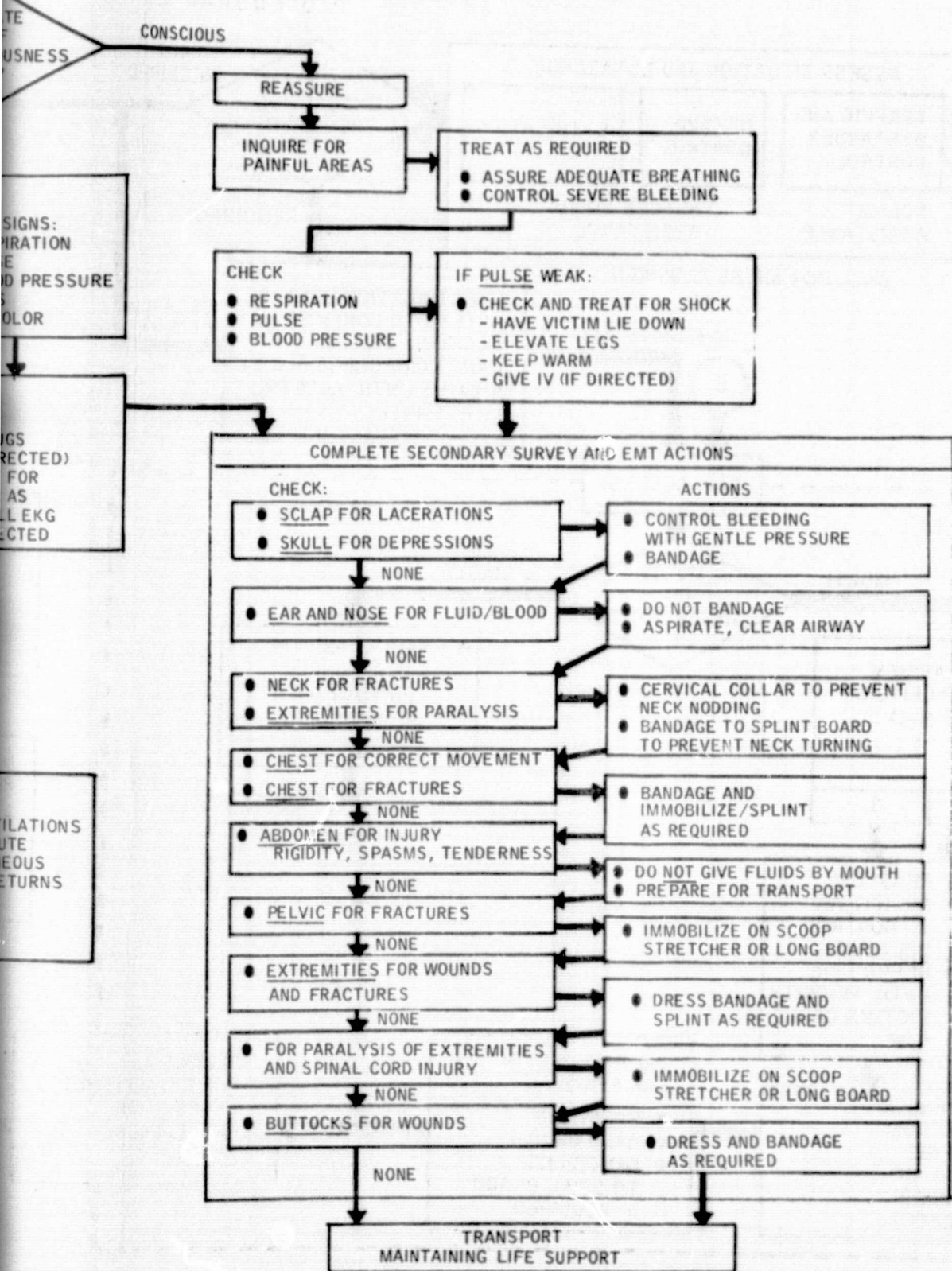


SINGLE VICTIM EMERGENCY CARE PROC



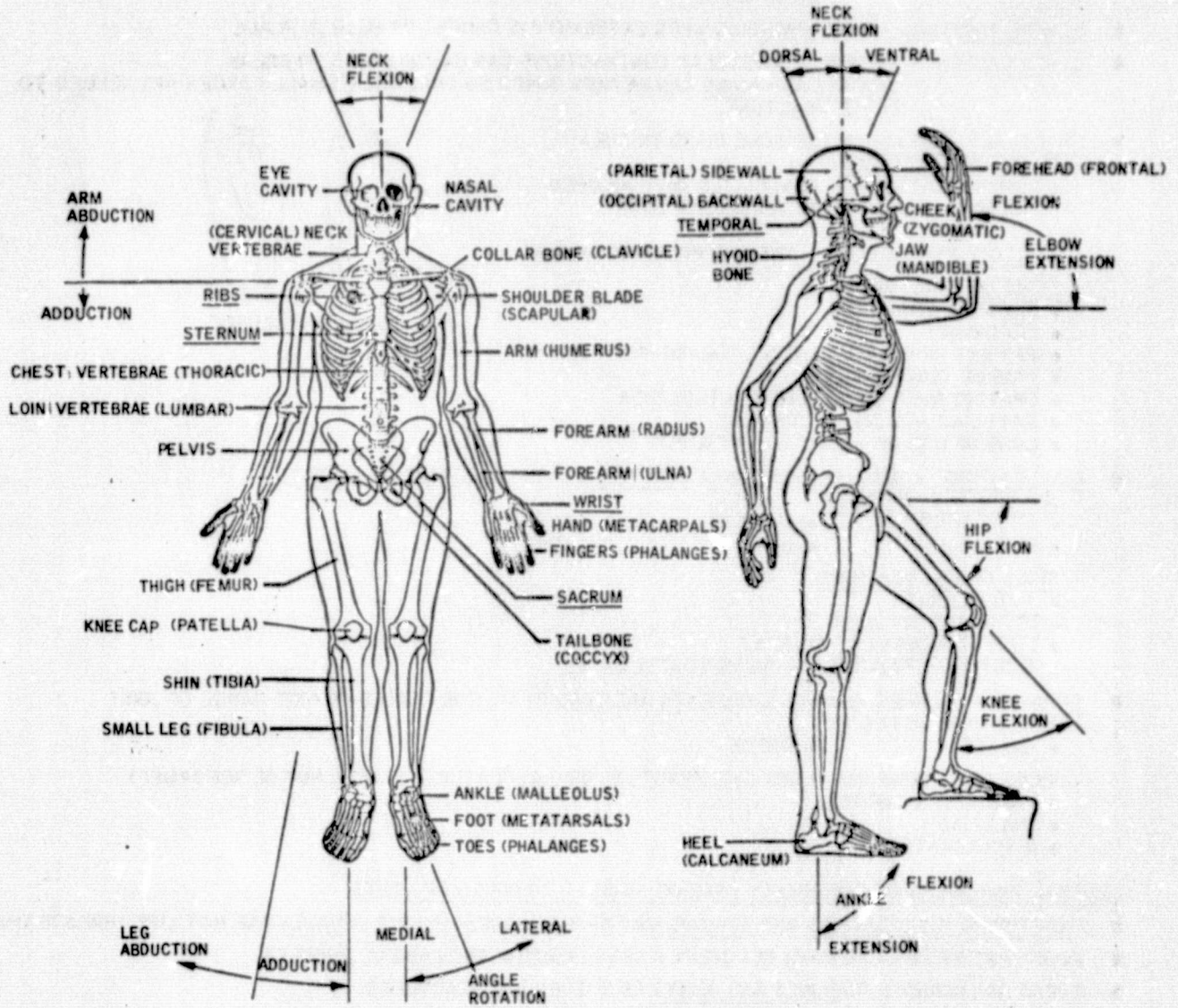
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EMT CARE PROCEDURAL LOGIC

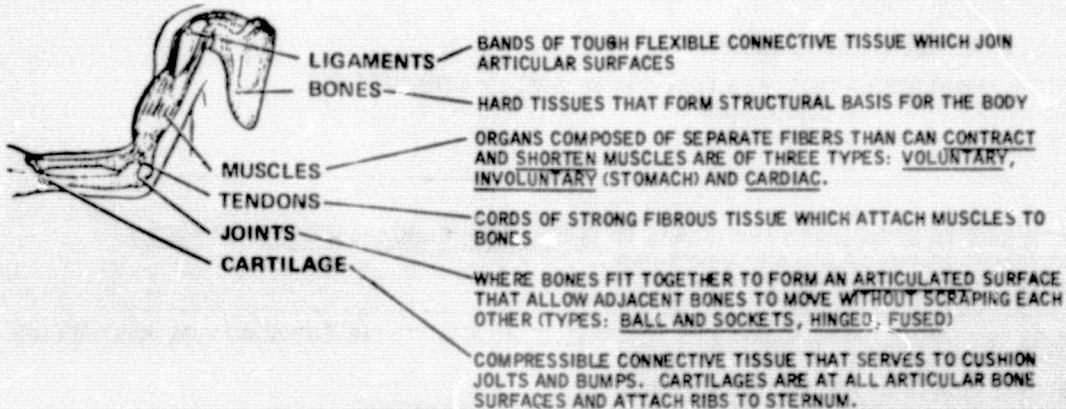


MUSCULO-SKELETAL SYSTEM

- FUNCTIONS:**
- BODY SHAPE AND SUPPORT
 - PROTECTION OF VITAL ORGANS (RIBS AND SKULL)
 - LOCOMOTION (LEGS)
 - MANIPULATION (ARMS)



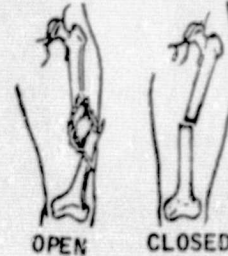
SYSTEM ELEMENTS



MUSCULOSKELETAL INJURIES
(**FRACTURES, DISLOCATIONS, SPRAINS**)

CAUSES:

- **DIRECT VIOLENCE** - BONE BROKEN AT POINT OF CONTACT WITH OBJECT
- **INDIRECT VIOLENCE** - BONE BROKEN BY FORCES TRANSMITTED ALONG THE LINE OF THE BONE FROM THE POINT OF IMPACT
- **SEVERE TWISTING** - BODY TWISTING WHEN EXTREMITY IS CAUGHT OR HELD IN PLACE
- **OTHER CAUSES** - POWERFUL MUSCULAR CONTRACTIONS CAN CAUSE BONES TO BREAK
- DISEASE AND AGING CAN WEAKEN BONES SO THAT ONLY SMALL FORCES ARE NEEDED TO CAUSE FRACTURE
- **FRACTURES - BREAKS IN THE BONE (HARD TISSUE)**
 - **TYPES OF FRACTURES:**
 - **"OPEN" FRACTURE** - ASSOCIATED WITH AN OPEN WOUND IN SKIN MADE BY TEARING OF BONE
 - **"CLOSED" FRACTURE** - WITH NO BREAKING OF SKIN
 - **SIGNS OF FRACTURES:**
 - **EXPOSED BONE ENDS**
 - **DEFORMITY**
 - **PATIENT INFORMATION (E.G., "HEARD BONE CRACK!")**
 - **PAIN OR TENDERNESS**
 - **GRATING WHEN BONE ENDS RUB TOGETHER**
 - **SWELLING AND DISCOLORATIONS**
 - **LOSS OF USE OF AFFECTED EXTREMITY**
- **DISLOCATIONS - DISPLACEMENT OF A BONE END THAT FORMS PART OF A JOINT.**
 - **JOINTS MOST AFFECTED:**
 - **SHOULDERS** ● **FINGERS** ● **ANKLES**
 - **ELBOWS** ● **HIPS** ● **KNEES**
 - **SIGNS OF DISLOCATIONS:**
 - **PAIN IN JOINT**
 - **DEFORMITY AT JOINT**
 - **LOSS OF MOVEMENT OF JOINT**
ADDITIONAL PAIN WHEN MOVEMENT ATTEMPTED
- **SPRAINS - INJURIES IN WHICH LIGAMENTS ARE TORN BY MOTION FORCED BEYOND RANGE OF JOINT**
 - **AREAS MOST AFFECTED:**
 - **ANKLES** ● **KNEES**
 - **SIGNS OF SPRAINS (MAY LOOK LIKE FRACTURE OR DISLOCATION BUT WILL NOT BE DEFORMED)**
 - **PAIN ON MOVEMENT**
 - **SWELLING**
 - **DISCOLORATION**



GENERAL PRINCIPLES OF EMERGENCY CARE OF INJURIES TO BONES OR JOINTS

- **FRACTURES, DISLOCATIONS AND SPRAINS** MAY APPEAR GRUESOME BUT USUALLY ARE NOT LIFE THREATENING.
- GOOD CARE BY EMT CAN MAKE RECOVERY A LESS LENGTHY AND PAINFUL PROCESS.
- TREAT ALL INJURIES TO **BONES AND JOINTS** AS IF THEY ARE FRACTURES.

GENERAL TREATMENT PROCEDURES

- ① **STABILIZE AND MONITOR WELL BEING OF VICTIM AS A WHOLE:**
 - ASSURE OPEN AIRWAY
 - STOP BLEEDING AND DRESS WOUNDS
 - PREVENT SHOCK

WHEN STABLE, CARE FOR SPECIFIC INJURY:

- ② **STRAIGHTEN ANGULATED FRACTURES THAT CAN BE SAFELY STRAIGHTENED.**
 - LOWER LEG - LOWER ARM
 - UPPER LEG - UPPER ARM

CAUTION

DO NOT ATTEMPT TO STRAIGHTEN FRACTURES OF **SHOULDERS, ELBOWS, WRISTS, OR KNEES**
DO **NOT** ATTEMPT TO PUSH BACK ANY BONES ENDS
DO **NOT** ATTEMPT TO REDUCE **DISLOCATIONS**

- ③ **IMMOBILIZE (BY SPLINTING OR BANDAGING TO PREVENT MOVEMENT) THE EXTREMITY OR JOINT BEFORE MOVING THE VICTIM.**
 - IMMOBILIZE JOINTS ABOVE AND BELOW FRACTURE
 - IMMOBILIZE DISLOCATED JOINTS IN PLACE - DO NOT STRAIGHTEN

SPLINTING

ACCIDENTS RESULTING IN FRACTURES TO THE BONES REQUIRE EMERGENCY CARE TO IMMOBILIZE THE AFFECTED BODY PART(S) AND PRECLUDE FURTHER INJURY TO THE BONES AND SURROUNDING TISSUE AND NERVES. THIS IS ACCOMPLISHED THROUGH USE OF:

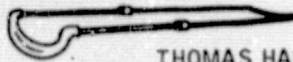
SPLINTS - ANY MATERIAL OR EQUIPMENT THAT CAN PROVIDE RIGID SUPPORT FOR INJURED BONES OR JOINTS.

• FUNCTION OF SPLINTS

- REDUCES CHANCES OF "CLOSED" FRACTURE BECOMING "OPEN"
- MINIMIZES THE DAMAGE TO NERVES, MUSCLES, OR BLOOD VESSELS
- PREVENTS BONE ENDS FROM CAUSING LACERATED TISSUES TO BLEED MORE
- LESSENS PAIN ASSOCIATED WITH BONE MOVEMENTS

• TYPES OF SPLINTS

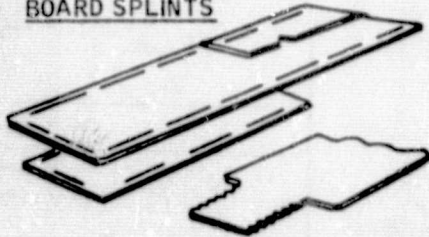
- TRACTION SPLINTS



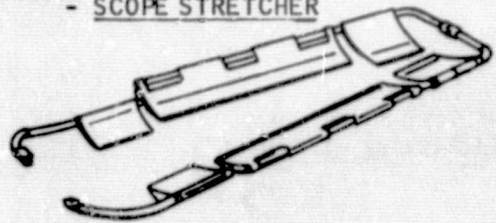
THOMAS HALF-RING

(FOR "CLOSED" FEMUR, UPPER LEG FRACTURES
AND LOWER FRACTURES)

- BOARD SPLINTS



- SCOPE STRETCHER



(FOR BACK AND NECK STABILIZATION)

- PADDLED BOARD SPLINTS



- PILLOW SPLINTS



- (LENGTH)
- LONG LEG (54") FOR UPPER/LOWER LEG
 - LONG ARM (30") FOR LOWER LEG/FULL ARM
 - SHORT ARM (15") FOREARM/LOWER LEG

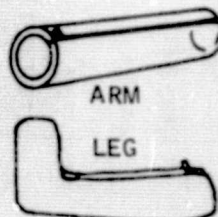
FOR KNEE
OR FOOT

- TONGUE DEPRESSOR SPLINTS



(FOR FINGER SPLINTING)

- AIR SPLINTS



FOR
EXTREMITY
SPLINTING

NECK FRACTURE SPLINTING



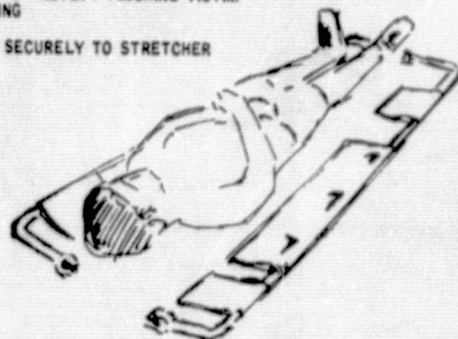
- (EMT 1) • APPLY GENTLE TRACTION
KEEP HEAD STRAIGHT
- (EMT 2) • APPLIES CERVICAL COLLAR
TO PREVENT HEAD FROM NODDING
- SLIP SPINE BOARD BEHIND OR
UNDERNEATH VICTIM
(STILL MAINTAIN TRACTION)
- PLACE PAD BETWEEN NECK AND
BOARD
- STABILIZE HEAD FROM TURNING
WITH CRAVATS UNDER CHIN AND
FOREHEAD AND TIED IN BACK OF
SPINE BOARD
- STRAP TORSO TO SPINE BOARD
WITH STRAPS OVER SHOULDER
AND AROUND LEGS (THIS KEEPS
LEGS FLEXED)

- SLIDE LONGBOARD UNDER
VICTIM AND LIFT ONTO
LEVEL GROUND
- LOOSEN LEGS TO
STRAIGHTEN ON
LONGBOARD
- SECURE VICTIM FOR
TRANSPORT TO LONGBOARD
AND SHORT SPINE BOARD



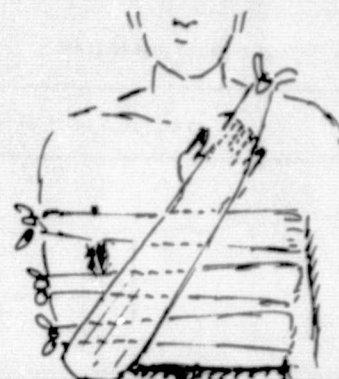
BACK FRACTURE SPLINTING

- KEEP VICTIM LYING DOWN
- SLIDE SCOOP STRETCHER UNDER VICTIM
FROM EITHER SIDE
- CAREFULLY LIFT VICTIM BY HIS CLOTHING
JUST ENOUGH TO PREVENT PINCHING VICTIM
OR HIS CLOTHING
- STRAP VICTIM SECURELY TO STRETCHER



RIB FRACTURE SPLINTING

- PLACE ARM OF INJURED
SIDE ACROSS CHEST
- BIND ARM TO CHEST
WITH 3 CRAVATS
- TIE FOURTH CRAVAT
AS SLING ALONG LENGTH
OF FOREARM



FLAIL CHEST SPLINTING

FLAIL CHEST - MANY BROKEN RIBS AROUND A SEGMENT OF THE CHEST, WHICH CAUSES IT NOT TO MOVE IN AND OUT WITH REST OF CHEST DURING RESPIRATION.

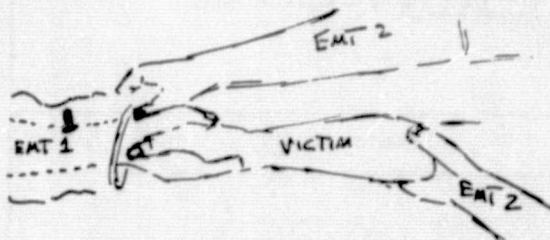
- PROVIDE RESPIRATION SUPPORT (OXYGEN,
BAG-MASK)
- STABILIZE FLAIL CHEST WITH:
 - SAND BAG OR LARGE PAD MADE
WITH MULTI-TRAUMA DRESSINGS.
 - TAPE WITH LARGE STRIPS EXTENDING AND
STUCK TO BOTH SIDES OF CHEST.



- TRANSPORT VICTIM LYING ON "TAPED" SIDE
TO SUPPORT BANDAGE AND ALLOW OTHER
SIDE TO BREATHE EASIER.

AIR SPLINTING OF EXTREMITIES

CAUTION:
DO NOT OVERINFLATE AND IMPAIR CIRCULATION.



- EMT 1 • GATHER SPLINT ON ARM
- EMT 1 • GRASP VICTIM'S HAND
- EMT 2 • GRASP LIMB ABOVE FRACTURE
- BOTH • APPLY TRACTION
- EMT 2 • WITH OTHER HAND PULL
AIR SPLINT ONTO LIMB
(BE SURE SPLINT IS
WRINKLE-FREE BEFORE...)
- EMT 2 • INFLATE SPLINT ONLY BY
MOUTH. CHECK TO SEE
THAT SPLINT CAN EASILY
BE INDENTED WITH YOUR
THUMB

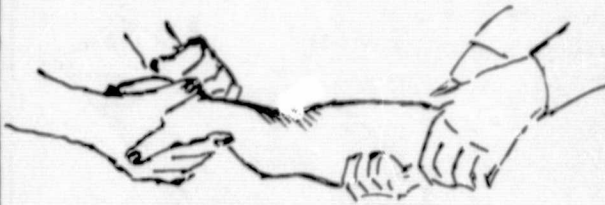
NOTE: IF AIR SPLINT IS ZIPPER TYPE -
LAY LIMB IN SPLINT THEN ZIP UP

FOLDOUT FRAME

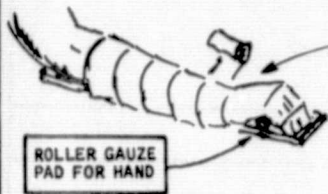
UPPER EXTREMITY FRACTURE SPLINTING

FRACTURES OF FOREARM

- IF ANGULATED, STRAIGHTEN CAREFULLY WITH MANUAL TRACTION



- SECURE FOREARM TO "1/2" PADDED BOARD SPLINT



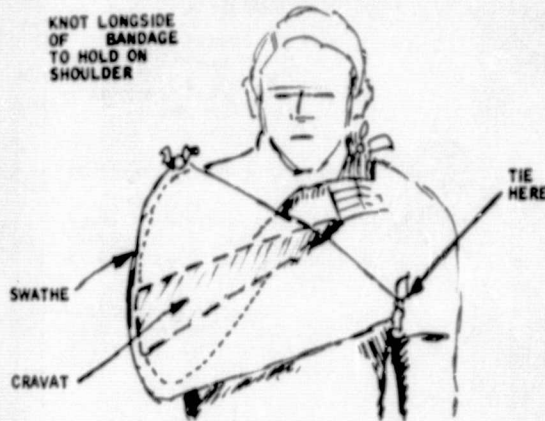
WRAP ENTIRE FOREARM AND HAND TO PRECLUDE MOVEMENT

ROLLER GAUZE PAD FOR HAND

- PLACE SPLINTED ARM IN SLING

FRACTURES OF CLAVICLE

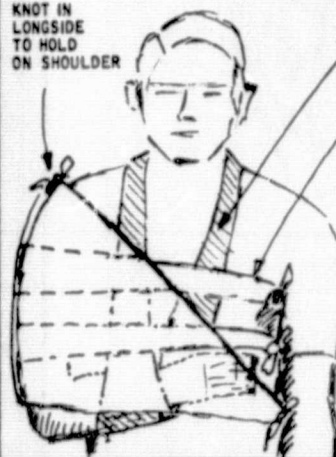
KNOT LONGSIDE OF BANDAGE TO HOLD ON SHOULDER



- POSITION ARM HIGH ACROSS CHEST
- SLING WITH CRAVAT ABOVE ELBOW AND UNDER WRIST
- SECURE ARM WITH KNOTTED TRIANGLE SWATHE TO SUPPORT DURING TRANSPORT

HUMERUS (UPPER ARM) FRACTURES AND DISLOCATED SHOULDER

KNOT IN LONGSIDE TO HOLD ON SHOULDER

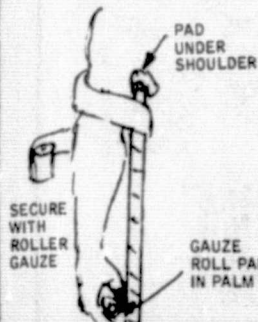


- SLING FOREARM WITH CRAVAT
- TIE CRAVAT SWATHES AROUND AFFECTED ARM AND CHEST
- CRADLE IN KNOTTED TRIANGULAR SWATHE

ELBOW FRACTURES

- DO NOT STRAIGHTEN
- IMMOBILIZE ELBOW IN POSITION FOUND

STRAIGHT POSITION



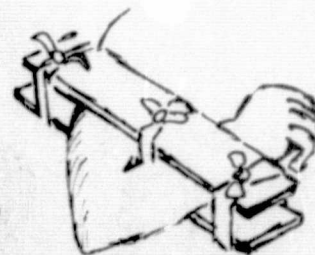
SECURE WITH ROLLER GAUZE

PAD UNDER SHOULDER

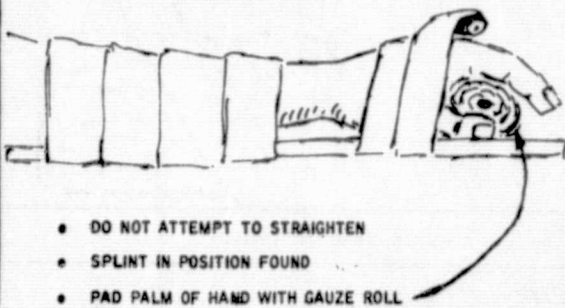
GAUZE ROLL PAD IN PALM

BENT POSITION

- TWO 30" PADDED BOARDS
- 3 CRAVATS

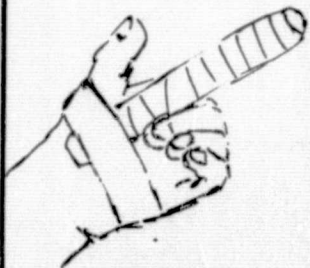


FRACTURED WRIST OR HAND



- DO NOT ATTEMPT TO STRAIGHTEN
- SPLINT IN POSITION FOUND
- PAD PALM OF HAND WITH GAUZE ROLL
- FIRMLY WRAP GAUZE AROUND FOREARM
- WRAP GAUZE AROUND HAND LEAVING ONLY FINGERS EXPOSED

FRACTURED FINGER



TAPE PADDED TONGUE DEPRESSOR TO FINGER

- DO NOT REMOVE SHOE
- PLACE PAD AROUND ANKLE
- APPLY CRAVAT ANKLE-HITCH AND TIE SNUG BUT NOT TIGHT
- EMT #1 APPLIES AND MAINTAINS JUST ENOUGH MANUAL TRACTION TO RELIEVE PAIN UNTIL SPLINTING IS COMPLETE (ONE HAND UNDER HEEL) (ONE HAND OVER INSTEP)

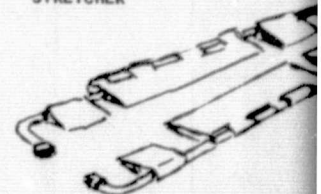
- EMT #2:
 - INSTALL 5 HALF-RING SPLINT
 - LONG SIDE TO OUTSIDE OF
 - HALF RING AGAINST BUTTOCK
 - APPLY LOCK HITCH (B) AROUND HALF-RING AND UNDER ANKLE
 - PULL DOWNWARD TO EQUAL TRACTION OF EMT #1
 - SECURE LOCK HITCH ENDS AROUND HALF-RING AND TIE BACK TO LOCK HITCH
 - TAPE THREE TONGUE DEPRESSORS TOGETHER, INSERT THRU MIDDLE OF LOCK HITCH AND TWIST TO JUST ENOUGH TRACTION TO RELIEVE PAIN
 - TIE CRAVATS AROUND LEG FOR SUPPORT

2 CRAVATS ABOVE KNEE
2 CRAVATS BELOW KNEE



- PROP S...
ON BLO...
BLANK...
DOESN'T...
GROUND

- SLIDE SCOOP STRETCHER* UNDER VICTIM FROM EITHER SIDE
- CAREFULLY LIFT VICTIM BY HIS CLOTHING TO PREVENT PINCHING VICTIM OR HIS CLOTHING
- STRAP VICTIM SECURELY TO STRETCHER



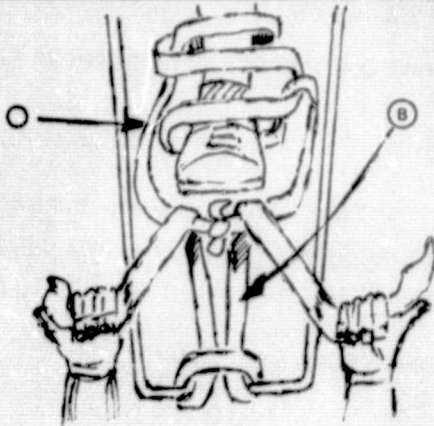
* REQUIRES ACCESS TO BOTH SIDES OF PATIENT

LOWER EXTREMITY FRACTURE SPLINTING

"CLOSED" FEMUR (THIGH) FRACTURES

DO NOT REMOVE SHOE
PLACE PAD AROUND ANKLE
APPLY CRAVAT ANKLE-HITCH
AND TIE SNUG BUT NOT TIGHT

EMT #1 APPLIES AND MAINTAINS
JUST ENOUGH MANUAL TRACTION
TO RELIEVE PAIN UNTIL SPLINTING
IS COMPLETE
(ONE HAND UNDER HEEL)
(ONE HAND OVER INSTEP)



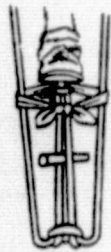
EMT #2:

- INSTALLS HALF-RING SPLINT
 - LONG SIDE TO OUTSIDE OF LEG
 - HALF RING AGAINST BUTTOCKS
- APPLY LOCK HITCH (B) AROUND HALF-RING AND UNDER ANKLE-HITCH (A)
- PULL DOWNWARD TO EQUAL TRACTION OF EMT #1
- SECURE LOCK HITCH ENDS AROUND HALF-RING AND TIE BACK TO LOCK HITCH
- TAPE THREE TONGUE DEPRESSORS TOGETHER, INSERT THRU MIDDLE OF LOCK HITCH AND TWIST TO APPLY JUST ENOUGH TRACTION TO RELIEVE PAIN
- TIE CRAVATS AROUND LEG FOR SUPPORT

2 CRAVATS ABOVE KNEE
2 CRAVATS BELOW KNEE

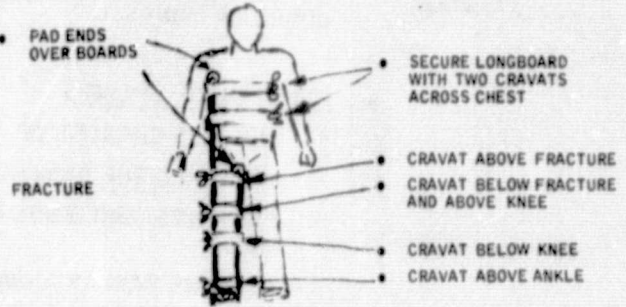


- PROP SPLINT UP ON BLOCK OR BLANKET SO HEEL DOESN'T TOUCH GROUND OR COT



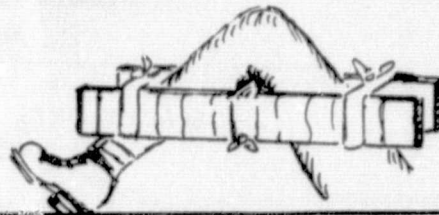
"OPEN" FEMUR (THIGH) FRACTURE SPLINTING

- DO NOT STRAIGHTEN FRACTURE
- 54" BOARD OUTSIDE OF FRACTURED LEG
- 30" BOARD INSIDE OF FRACTURED LEG



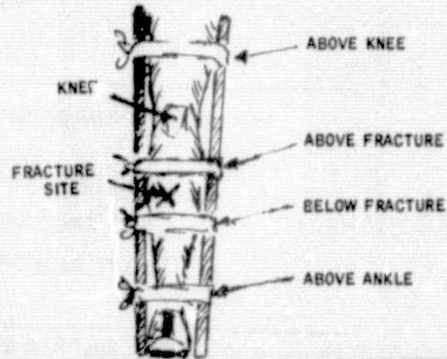
NECK FRACTURE SPLINTING

- DO NOT STRAIGHTEN
- IMMOBILIZE IN POSITION FOUND
- USE PILLOW SPLINT OR TWO 30" PADDED BOARDS TIED WITH CRAVATS AS BELOW



LOWER LEG FRACTURE SPLINTING

- 2 30" PADDED BOARDS
- SECURE WITH 4 CRAVATS



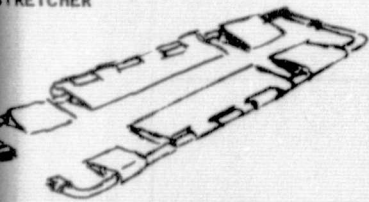
HIP FRACTURE SPLINTING

SLIDE SCOOP STRETCHER UNDER VICTIM FROM EITHER SIDE

CAREFULLY LIFT VICTIM BY HIS CLOTHING TO PREVENT PINCHING VICTIM OR HIS CLOTHING

STRAP VICTIM SECURELY TO STRETCHER

- SLIDE BACKBOARD UNDER VICTIM (CAREFULLY)
- PLACE FOLDED BLANKET BETWEEN LEGS
- BANDAGE LEGS TOGETHER AND TIE TO LONGBOARD
- FURTHER SECURE TO LONGBOARD WITH STRAPS



REQUIRES ACCESS TO BOTH SIDES OF PATIENT



ANKLE/FOOT OR KNEE FRACTURE SPLINTING

- DO NOT STRAIGHTEN
- LOOSEN OR CUT LACES OF SHOE IF ON FOOT
- DO NOT REMOVE SHOE
- MOLD PILLOW AROUND FOOT OR KNEE
- SECURE WITH CRAVAT BANDAGES



WOUNDS - DRESSINGS/BANDAGES

ASSOCIATED WITH ACCIDENTS WILL USUALLY BE:

WOUNDS - INJURIES TO SOFT TISSUES OF THE BODY

CLOSED: BRUISES OR CONTUSIONS WHERE SKIN NOT BROKEN
BUT TISSUE IS CRUSHED BELOW SITE CAUSED BY
BLUNT OBJECT IMPACT

OPEN: WHERE SKIN IS BROKEN:

- 1) ABRASIONS - SCRAPES
- 2) INCISIONS - CLEAN CUTS
- 3) LACERATIONS - JAGGED, IRREGULAR CUTS
- 4) PUNCTURES - HOLES CAUSED BY NAILS, STABS, GUNSHOT
- 5) AVULSIONS - SKIN TEARS (LOOSE OR HANGING)

EMERGENCY CARE REQUIRES BANDAGING TO:

- PREVENT CONTAMINATION
- CONTROL BLEEDING
- EASE PAIN
- PROVIDE SUPPORT AND PADDING TO INJURY

TYPES OF EMERGENCY CARE WOUND COVERING

- 1) DRESSING - STERILE COVERING FOR WOUNDS
- 2) BANDAGE - MATERIAL USED TO:
 - SECURE DRESSINGS
 - PUT PRESSURE ON WOUND FOR BLEEDING CONTROL
 - SECURE AND PAD SPLINTS
 - SUPPORT (SLING OR SWATH) INJURED PART
- 3) COMPRESS BANDAGE - COMBINATION DRESSING/BANDAGE
IN ONE BANDAGE UNIT

BASIC DRESSING/BANDAGING PROCEDURES

- APPLY DRESSING (KEEP STERILE)
(USE PRESSURE IF NECESSARY TO
STOP BLEEDING)
- ANCHOR BANDAGE BY WRAPPING
- WRAP BANDAGE OVER DRESSING
- FASTEN BANDAGE
TYING, TAPE OR SAFETY PINS

CAUTIONS

- DRESS AND BANDAGE ALL WOUNDS
- APPLY BANDAGES FIRMLY AND EVENLY, BUT NOT
TOO TIGHT TO IMPEDE CIRCULATION.
- DO NOT USE ELASTIC BANDAGES
- KEEP DRESSINGS CLEAN AND UNCONTAMINATED
BEFORE APPLICATION
- LEAVE FINGERS AND TOES EXPOSED SO CIRCULATION CAN BE
CHECKED BY OBSERVING SKIN AND NAIL COLOR

BLOOD LOSS AND CONTROL OF BLEEDING

- BLOOD WILL CLOT IN APPROXIMATELY 6-7 MINUTES.
- AVERAGE ADULT HAS APPROXIMATELY SIX QUARTS OF BLOOD.
- LOSS OF 15% (1 QUART) OF BLOOD (EXTERNALLY AND/OR INTERNALLY) IS VERY SERIOUS AND RESULTS IN A MODERATE STATE OF CARDIOVASCULAR "SHOCK."
- LOSS OF 30% (2 QUARTS) OR MORE RESULTS IN A SEVERE STATE OF SHOCK. BODY IS IN SEVERE DANGER.
- ABNORMAL LOSS OF BLOOD CAUSES:
 - SYSTEM TO SUFFER FROM OXYGEN LOSS
 - BLOOD PRESSURE TO DECREASE
 - HEART RATE INCREASES
 - FORCE OF HEARTBEAT IS REDUCED, PULSE WEAK
- EXTERNAL BLEEDING: SPURTS FROM ARTERIES (BRIGHT RED COLOR)
 FLOWS SLOWLY AND STEADILY FROM VEINS (DARK RED COLOR)
 OZZES FROM CAPILLARIES

METHODS OF CONTROLLING BLEEDING

IF BLEEDING IS RELATIVELY MILD ?

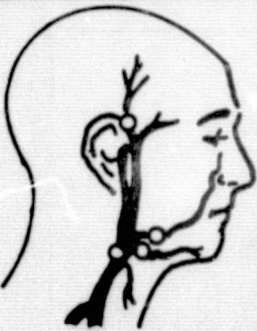
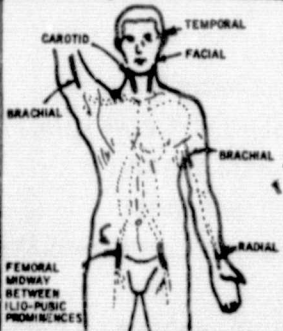
- APPLY DIRECT PRESSURE OVER THE WOUND WITH STERILE DRESSING.*
- MAINTAIN PRESSURE (10-30 MINUTES) BY BINDING THE DRESSING WITH BANDAGES (ADHESIVE TAPE AND GAUZE BANDAGE)
- IF BANDAGE GETS BLOOD SOAKED, COVER WITH NEW BANDAGE, DO NOT REMOVE OLD BANDAGE. (REPEAT AS REQUIRED)
- TREATMENT FOR "SHOCK" SHOULD BE INSTITUTED AS IS APPROPRIATE.

IF BLEEDING IS SEVERE ?

- QUICKLY, PLACE HAND OVER WOUND* AND EXERT PRESSURE. (DO NOT WAIT)
- IF BLEEDING PERSISTS, INSERT FINGERS INTO WOUND AND ATTEMPT TO COMPRESS ARTERY BETWEEN FINGERS AND BONE.
- AFTER BLEEDING IS CONTROLLED, PLACE PRESSURE DRESSINGS OVER WOUNDS AS IN OTHER PROCEDURE.
- IF BLEEDING PERSISTS, USE FINGER PRESSURE AT PRESSURE POINTS** BETWEEN WOUND AND HEART.
- TREATMENT FOR "SHOCK" SHOULD BE INSTITUTED AS IS APPROPRIATE.

CAUTION

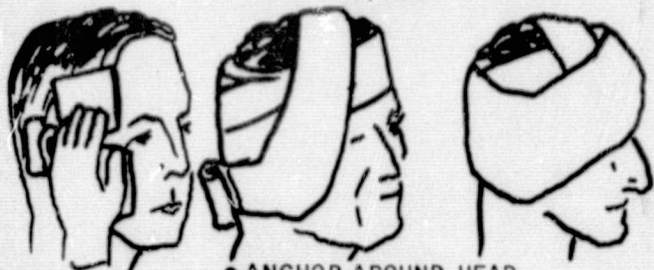
* DO NOT APPLY TOO MUCH PRESSURE TO SCALP IF BONE DAMAGE IS SUSPECTED

FACIAL PRESSURE POINTS **	BODY ARTIFICIAL PRESSURE POINTS **	NOTES:
		<ul style="list-style-type: none"> ● THE SCALP CONTAINS MANY ARTERIES AND BLOOD VESSELS. INJURIES HERE WILL USUALLY BLEED HEAVILY. ● SOFT TISSUE WOUNDS OF NECK MAY ALSO BLEED HEAVILY. ● IF A LARGE VEIN OF THE NECK HAS BEEN LACERATED, APPLY PRESSURE BOTH ABOVE AND BELOW WOUND ON THE AFFECTED SIDE TO PREVENT AIR FROM ENTERING CIRCULATORY SYSTEM.



ROLLER BANDAGING

FOR TEMPLES, JAWS



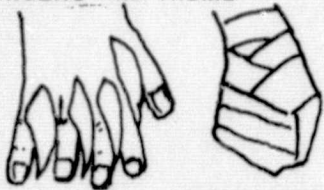
DRESSING FOLDED BEHIND EAR

- ANCHOR AROUND HEAD
- COVER DRESSINGS AND EAR (THIS LEAVES THROAT AND AIRWAY OPEN)

FOR HANDS

BURNED

- WET WOUND WITH STERILE SALINE
- 4 X 4 GAUZE PADS BETWEEN FINGERS AND THUMB



3" ROLL OF GAUZE IN PALM

DRAPE WITH GAUZE. DO NOT BIND.

INJURY

- DRESSING OVER WOUND
- BIND, LEAVING FINGERS EXPOSED



FOR ELBOWS

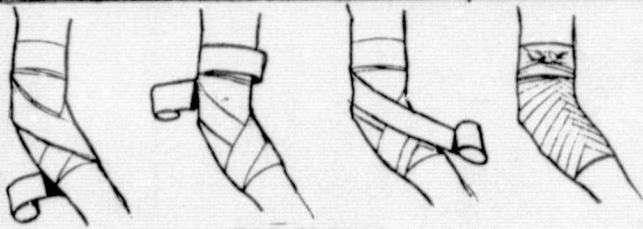
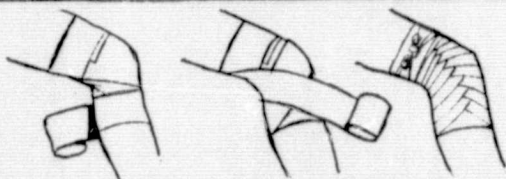
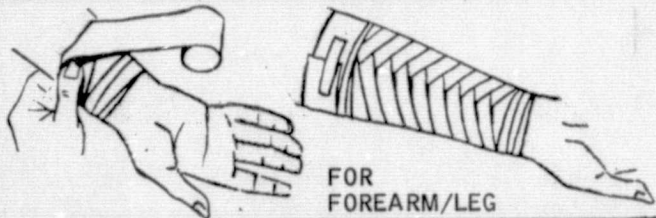


FIGURE "8" FOR KNEES



FOR FOREARM/LEG

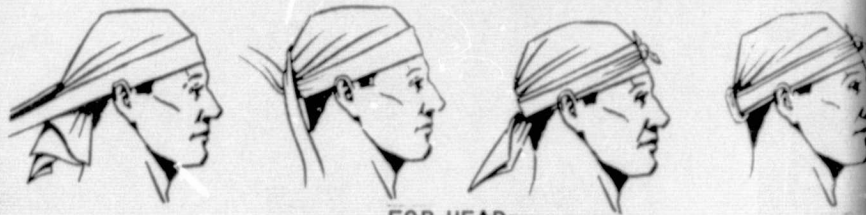


FOR ANKLE/HEEL

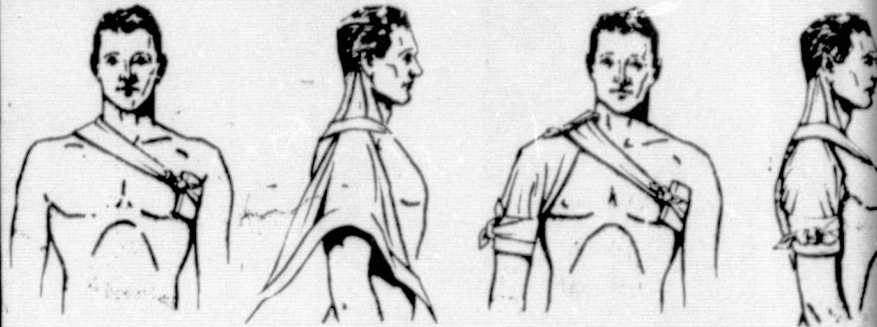


TRIANGLE BANDAGING

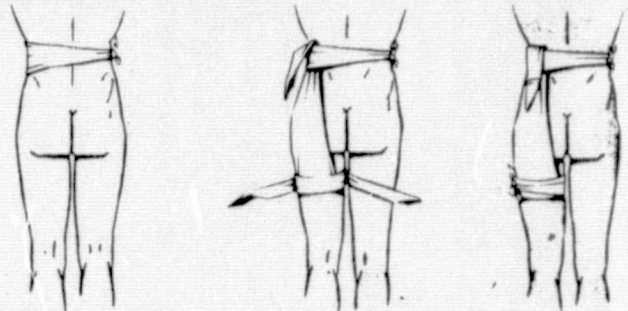
FOR HEAD



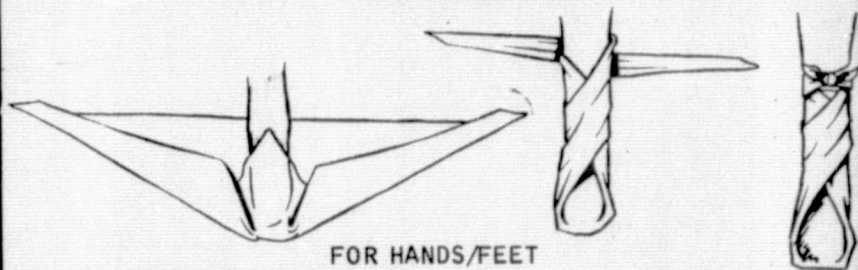
FOR SHOULDER



FOR HIPS



FOR HANDS/FEET



• LONG EDGE NEXT TO BODY

FOR ARM SLING

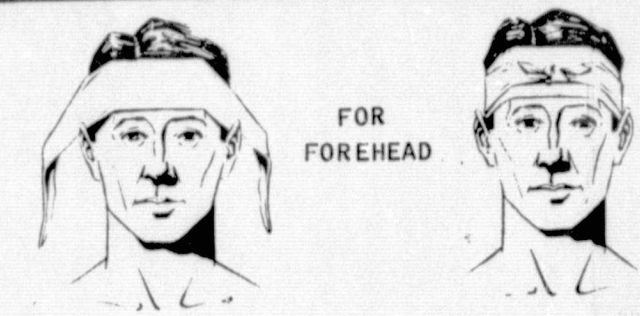
- PIN OR TAPE CORNER FOR CRADLE



G



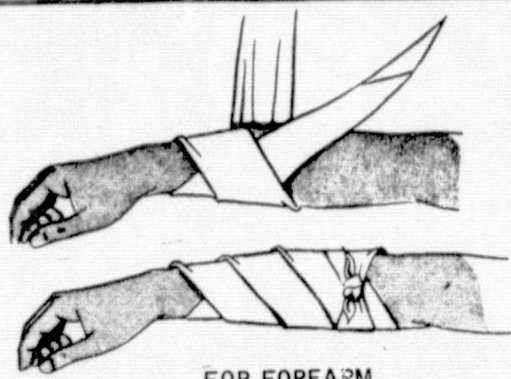
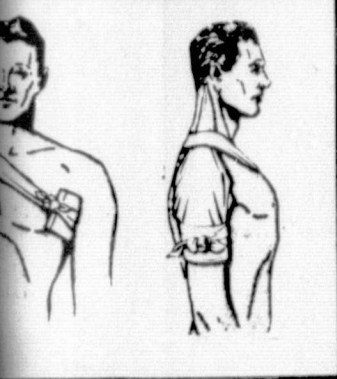
CRAVAT BANDAGING



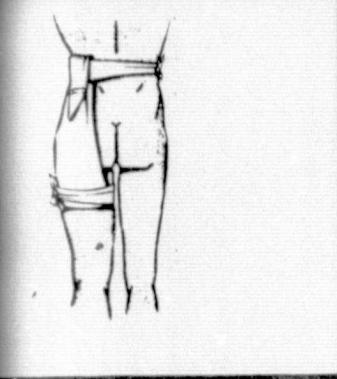
FOR FOREHEAD



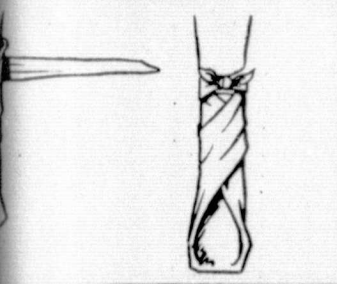
FIGURE "8" FOR ELBOW



FOR FOREARM



FOR ARMPITS



FOR ARM SLING



FOR ARM SLING

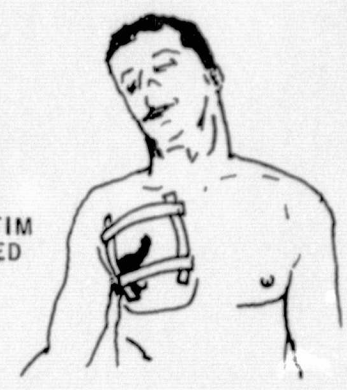


FOR KNEE BANDAGING

SPECIAL BANDAGING

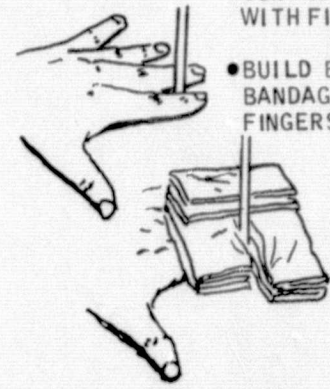
PUNCTURE OF CHEST CAVITY

- COVER WOUND WITH FOLDED ALUMINUM FOIL
- SEAL EDGE OF DRESSING WITH OVERLAPPING WIDE TAPE
- TRANSPORT VICTIM LYING ON INJURED SIDE



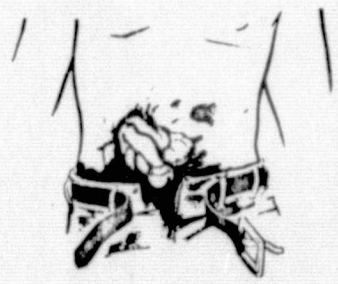
IMPALED OBJECT (DO NOT REMOVE)

- CONTROL BLEEDING WITH FINGER PRESSURE
- BUILD BULKY BANDAGE OVER FINGERS
- FASTEN DRESSINGS WITH WIDE TAPE



ABDOMINAL INJURIES

- PLACE PATIENT ON BACK WITH LEGS FIXED
- IF ORGAN PROTRUDING THROUGH WOUND
 - DO NOT REPLACE ORGANS WITHIN CAVITY
 - COVER ORGANS WITH
 - ALUMINUM FOIL
 - MULTI-TRAUMA DRESSING HELD IN PLACE WITH TAPE



SKIN BURNS

SEVERE BURNS MAY RESULT IN "SHOCK" DUE TO FLUID LOSS, PAIN AND OTHER FACTORS.

MAJOR TYPES OF BURNS OF CONCERN:

HEAT BURNS - SERIOUSNESS DEPENDS ON DEGREE OR DEPTH OF BURN AND THE AMOUNT OF BODY SURFACE AFFECTED.

CHEMICAL BURNS - STRONG CHEMICALS LIKE ACIDS AND ALKALI'S BURN RAPIDLY (ALKALI'S BURN DEEPER AND LONGER). MUST BE WASHED OFF QUICKLY TO PREVENT INJURY.

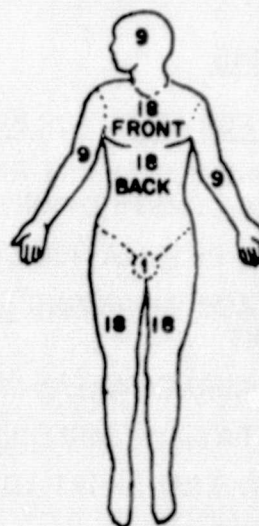
ELECTRICAL BURNS - ELECTRICITY CONTINUES TO BURN AS IT PENETRATES SKIN
-LOOK FOR TWO BURNS WHERE ELECTRICITY ENTERS AND LEAVES THE BODY.
-OFTEN ACCOMPANIED BY RESPIRATORY AND CARDIAC ARREST.

BURNS SHOULD BE EXAMINED AND REPORTED AS TO DEGREE (DEPTH) AND EXTENT OF AREA BURNED.

DEGREE (DEPTH CRITERIA):

- FIRST DEGREE (EPIDERMIS ONLY - SKIN REDNESS AND INFLAMMATION)
- SECOND DEGREE (DAMAGE INTO UPPER DERMIS - BLISTERS)
- THIRD DEGREE (DAMAGE TO ALL LAYERS WHICH USUALLY APPEARS DRY, PALE, OR WHITE, MAY BE BROWN OR CHARRED - MAY BE LOSS OF PAIN SENSATION IN INJURED AREA)

CRITERIA FOR ESTIMATING EXTENT (% OF TOTAL BODY AREA ASSOCIATED WITH SPECIFIC BODY PART)



CRITICAL BURNS INCLUDE:

- BURNS COMPLICATED BY RESPIRATORY TRACT INJURY AND FRACTURES
- 3RD DEGREE BURNS INVOLVING CRITICAL AREAS OF FACE, HANDS, FEET
- 3RD DEGREE BURNS OVER MORE THAN 10% OF BODY
- 2ND DEGREE BURNS OVER 30% OF BODY.

MODERATE BURNS

- 3RD DEGREE BURNS OVER 2-10% OF BODY AREA AND NO CRITICAL AREAS
- 2ND DEGREE BURNS OVER 15-30% OF BODY SURFACE
- 1ST DEGREE BURNS OVER 50-75% OF BODY

MINOR BURNS

- 3RD DEGREE BURNS OF LESS THAN 2% OF BODY
- 2ND DEGREE BURNS OF LESS THAN 15% OF BODY
- 1ST DEGREE BURNS OF LESS THAN 20% OF BODY AND NO CRITICAL AREAS.

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EMERGENCY CARE FOR BURNS

CHEMICAL BURNS

- REMOVE ALL CONTAMINATED CLOTHING, ESPECIALLY SHOES AND SOCKS
- FLOOD THE AFFECTED AREA WITH WATER LONG ENOUGH TO FLUSH CHEMICAL FROM SKIN

CAUTIONS

DRY LIME - WATER MAKES DRY LIME A CORROSIVE SUBSTANCE,
- BRUSH IT OFF CAREFULLY FIRST PRIOR TO A THOROUGH
FLOODING OF THE AREA WITH WATER.

CARBOLIC ACID (PHENOL) BURNS - WASH OFF WITH ALCOHOL SINCE
CARBOLIC ACID IS NOT SOLUBLE
IN WATER.

- COVER AREA WITH STERILE DRESSINGS OR BURN SHEETS.
- TREAT FOR SHOCK AS REQUIRED.

THERMAL BURNS

- CHECK FOR SMOKE OR FUME INHALATION
(INHALING HOT SMOKE AND FUMES MAY CAUSE THROAT TISSUES TO SWELL-UP
CAUSING CONSTRICTION)
- PROVIDE RESPIRATION SUPPORT, AS REQUIRED.
- TREAT ACCOMPANYING LACERATIONS OR FRACTURES AS IF NO BURNS
PRESENT
- COVER BURNED AREAS WITH STERILE BURN SHEET
- TREAT PATIENT FOR SHOCK AND MAINTAIN BODY HEAT.
- QUICKLY TRANSPORT TO HOSPITAL.

BRAIN AND SKULL INJURIES

CLASSIFICATION:

- Open
 - Combination of scalp lacerations, fragmented skull material (from skull fractures), and lacerations of membranes covering the brain.
- Closed
 - Scalp laceration may or may not be present
 - Skull intact and no abnormal opening to the brain
 - Brain damage transmitted by trauma to the depths of the brain

SIGNS OF SKULL FRACTURE:

- Deformity of the skull may be evident
- Blood or clear, watery fluid in the ears or nose
- Discoloration of soft tissue under eyes
- Unequal pupils

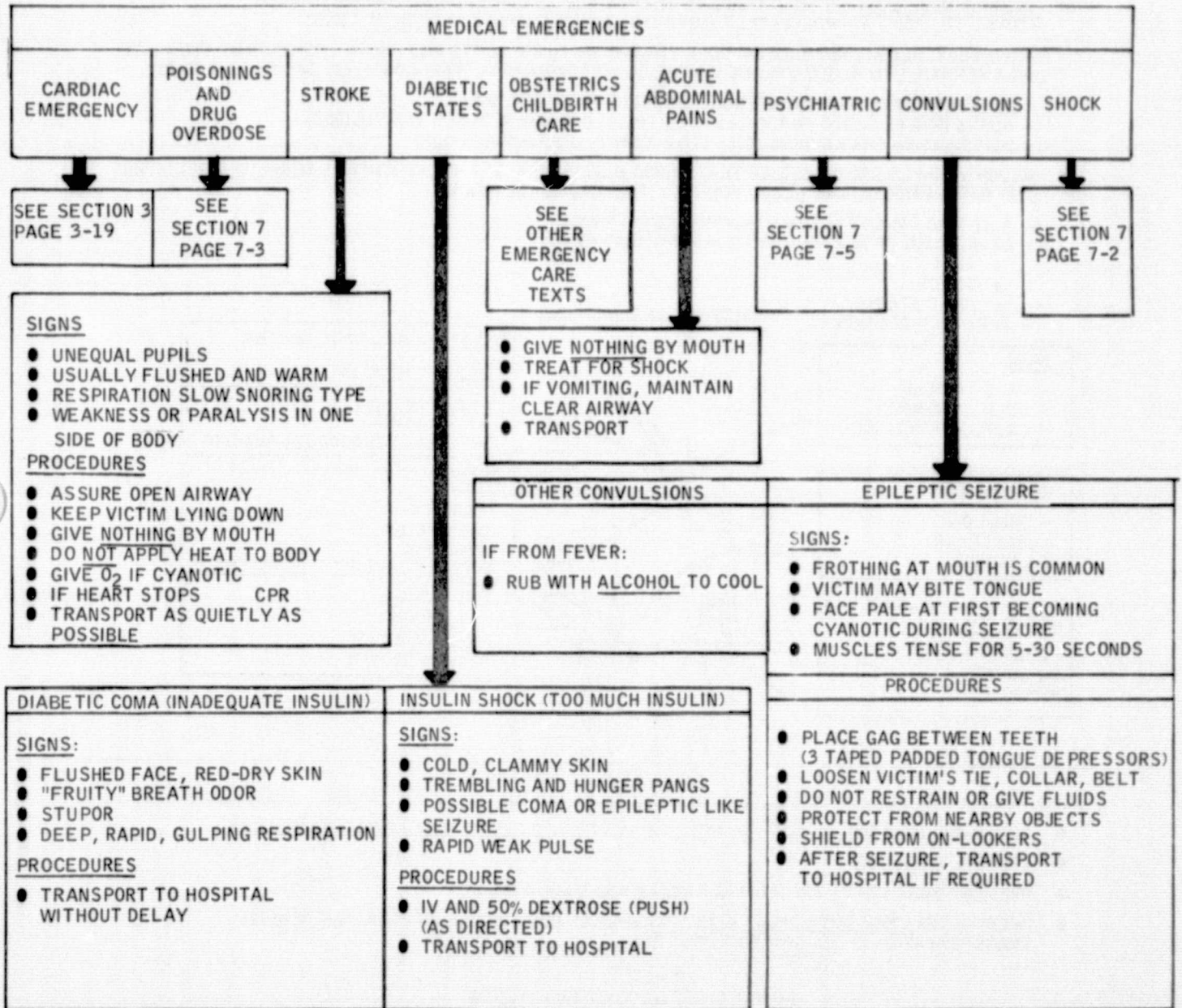
EMT PROCEDURES WHEN SKULL AND/OR BRAIN INJURY SUSPECTED:

- Evaluate state of consciousness by checking victim's
 - Awareness of surroundings and situation
 - Reaction to pain
 - Reaction of pupils to light
- Verify if pupil sizes are same or unequal.
- Treat as if victim has neck as well as head injury.
- Maintain open airway.
- Check for and stabilize neck injuries.
- Do not attempt to control drainage from ears, mouth or nose.
- Cover open wounds to head with minimum of pressure.
- Do not remove impaled objects.
- Transport victim to hospital without delay--carefully.
- Administer 100% oxygen during transportation.

NOTE

PLACE VICTIM ON HIS
SIDE IF POSSIBLE.

**GENERAL PROCEDURAL LOGIC FOR
EMT'S APPROACH TO THE EMERGENCY SCENE**



SHOCK

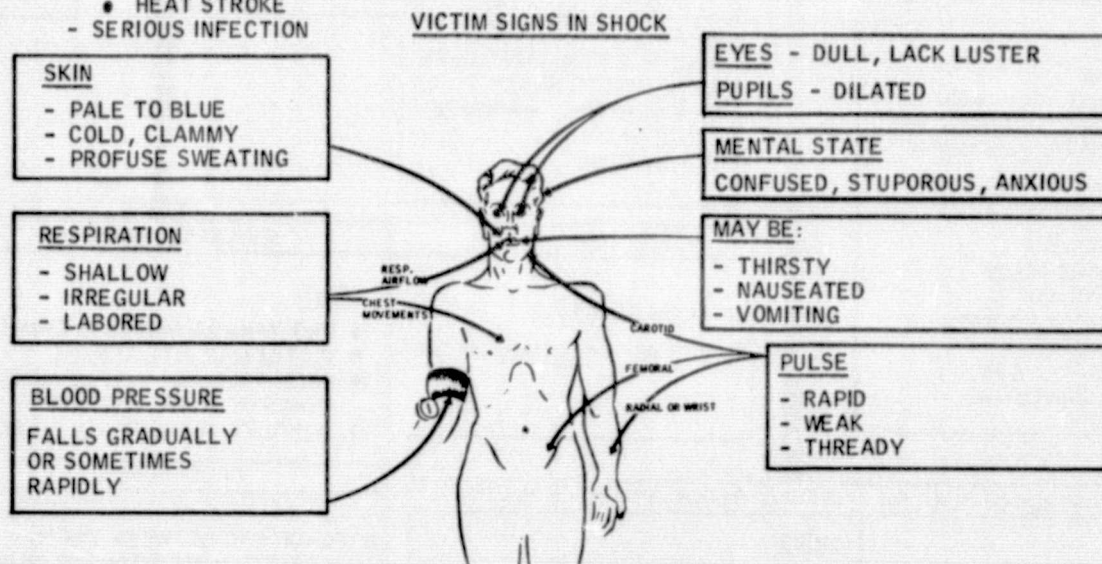
"SHOCK" IS A DEPRESSED CONDITION OF VITAL BODY FUNCTIONS DUE TO FAILURE OF ENOUGH OXYGENATED BLOOD TO CIRCULATE THROUGHOUT THE BODY.

THREE BASIC CAUSES OF SHOCK:

- HEART CAN BE DAMAGED SO THAT IT FAILS TO PUMP PROPERLY SUCH AS IN:
 - HEART ATTACK (CLOTS/INFARCTION) INFLAMMATION
 - VALVE DAMAGE (TRAUMA TO CHEST)
 - SEVERE DISTURBANCE OF ELECTRICAL FUNCTIONS OF HEART (ARRHYTHMIAS)
 - CONGESTIVE HEART FAILURE
- BLOOD CAN BE LOST SO THAT THERE IS INSUFFICIENT VOLUME IN CIRCULATING SYSTEM (TOTAL VOLUME - APPROXIMATELY 6 QUARTS, 1 QUART LOSS IS A SERIOUS LOSS.)

A SYSTOLIC BLOOD PRESSURE OF LESS THAN 80 mm Hg REFLECTS INEFFICIENT PUMPING BY THE HEART OR A SERIOUS LOW BLOOD VOLUME CONDITION (HYPOVOLEMIA). THIS CONDITION CAN RESULT FROM:

 - BLEEDING (EXTERNAL OR INTERNAL) USUALLY FROM TRAUMA
 - BURNS (WHERE BLOOD PLASMA LEAVES THE BLOOD AND REDUCES THE VOLUME)
 - DEHYDRATION (VIA KIDNEYS, DIGESTIVE TRACT, HEAT EXHAUSTION)
- BLOOD VESSELS CAN DILATE SO THAT BLOOD FLUIDS POOL IN THE EXTREMITIES SERIOUSLY REDUCING THE BASIC CIRCULATORY BLOOD VOLUME. THIS CAN RESULT FROM:
 - ALLERGIC DRUG REACTIONS (ANAPHYLACTIC SHOCK)
 - DEPRESSION OF NERVOUS SYSTEM FUNCTIONS FROM:
 - PAIN
 - DRUGS
 - HEAT STROKE
 - SERIOUS INFECTION



TREATMENT FOR SHOCK

- CLEAR AND MAINTAIN AIRWAY--AS PER CPR (VENTILATION AND CIRCULATION) PROCEDURES.
- CONTROL BLEEDING.
- PREVENT BODY HEAT LOSS (BLANKET UNDER AND OVER PATIENT)
- KEEP VICTIM LYING DOWN, FEET ELEVATED UNLESS RESPIRATION DIFFICULTIES REQUIRE TRANSPORTATION IN SEMI-SITTING POSITION.

CAUTION
DO NOT GIVE FLUIDS BY MOUTH EVEN IF VICTIM COMPLAINS OF THIRST



BASIC SHOCK POSITION



POSITION TO EASE RESPIRATION

- CHECK BLOOD PRESSURE REGULARLY
- GIVE IV FLUIDS, AS DIRECTED, TO INCREASE BLOOD VOLUME
- CONTINUE TO MONITOR AND REPORT VITAL SIGNS TO BASE STATION.

POISON AND DRUG ABUSE

BACKGROUND

POISONS ARE SUBSTANCES WHEN TAKEN INTO THE BODY CAN AFFECT THE FUNCTION AND STRUCTURE OF THE BODY SUCH THAT HEALTH OR LIFE IS THREATENED.

ABUSE OF DRUGS BY INDIVIDUALS TRYING TO ESCAPE BOREDOM, GRIEF, LONELINESS, DISCOMFORT CAN LEAD TO EXCESSES THAT CAN ALSO THREATEN HEALTH AND LIFE.

POISONS OR DRUGS MAY ENTER BODY:

- BY MOUTH - SWALLOWED INTENTIONALLY OR UNINTENTIONALLY
- INHALED - TOXIC GASES OR DUST
- INJECTED - BY BITES FROM SNAKES, INSECTS, RABID ANIMALS OR HYPODERMIC INJECTIONS
- ABSORBED - THRU THE SKIN FROM INSECTICIDES OR HERBICIDES

GENERAL CLASSES OF POISONS/DRUGS AND PROBABLE SYMPTOMS

	● CORROSIVE	● IRRITANTS	NEUROTOXIC			
			DEPRESSANTS	STIMULANTS	HALLUCINOGENS	CONVULSANTS
TYPICAL SUBSTANCES	<ul style="list-style-type: none"> ● ACIDS HYDROCHLORIC, SULFURIC, NITRIC, OXALIC, CARBOLIC ● ALKALIES CAUSTIC SODA, LYE-LIME, POTASH, AMMONIA ● PETROLEUM GASOLINE, KEROSENE, TURPENTINE ● OTHER VOLATILE LIQUIDS 	<p>FOUND IN MANY SUBSTANCES AROUND THE HOUSE:</p> <ul style="list-style-type: none"> - ARSENIC - COPPER - IODINE - LEAD - MERCURY - PHOSPHORUS - SILVER NITRATE - ZINC 	<p>DRUGS GIVEN TO RELIEVE PAIN OR INDUCE SLEEP:</p> <ul style="list-style-type: none"> - OPIUM, HEROIN, MORPHINE - PAREGORIC, SLEEPING PILLS/ CAPSULES <p>SLANG</p> <ul style="list-style-type: none"> - SNOW, H.M., JUNK - DOWNERS 	<p>DRUGS USED TO COMBAT SLEEP, FATIGUE AND APPETITE</p> <ul style="list-style-type: none"> - AMPHETAMINES <p>SLANG</p> <ul style="list-style-type: none"> - PEP PILLS, BENNIES, SPEED, UPPERS 	<p>MIND AFFECTING DRUGS</p> <p>LSD - "ACID"</p> <p>MARIJUANA - "POT" "GRASS"</p>	<p>BELLADONNA STRYCHNINE CYANIDES*</p> <p>↓</p> <p>*BREATH SMELLS OF BITTER ALMONDS</p> <p>RAPID ACTING</p>
SYMPTOMS	<ul style="list-style-type: none"> ● LIPS AND MOUTH STAINED ● SEVERE PAIN IN MOUTH, THROAT, AND STOMACH ● USUALLY INTENSE THIRST ● SHOCK 	<ul style="list-style-type: none"> ● LIPS AND MOUTH STAINED ● METALLIC TASTE IN MOUTH ● SEVERE PAIN IN STOMACH FOLLOWED BY NAUSEA AND VOMITING 	<ul style="list-style-type: none"> ● WEARINESS, DROWSINESS ● FACE PALE OR BLUE ● SKIN COLD ● PUPILS CONTRACTED AND DO NOT REACT TO LIGHT ● PULSE: FIRST STRONG AND SLOW THEN RAPID AND WEAK ● RESPIRATION SHALLOW AND IRREGULAR 	<ul style="list-style-type: none"> ● INCREASED HEART RATE AND BLOOD PRESSURE ● RAPID BREATHING ● DILATED PUPILS ● MENTALLY DISORGANIZED ● EMOTIONALLY DULL 	<p>LSD</p> <ul style="list-style-type: none"> ● SEVERE HALLUCINATIONS ● INCOHERENT SPEECH ● LAUGHING, CRYING ● HOMICIDAL OR SUICIDAL TENDENCIES ● IRREGULAR BREATHING <p>MARIJUANA</p> <ul style="list-style-type: none"> ● SLEEPINESS OR TALKATIVE/HILARIOUS ● ENLARGED PUPILS ● LACK OF COORDINATION 	<ul style="list-style-type: none"> ● CONVULSIONS ● SHOCK ● SEVERE RESPIRATION DIFFICULTIES

POISONS - DRUG ABUSE

VICTIM MAY PRESENT EITHER:

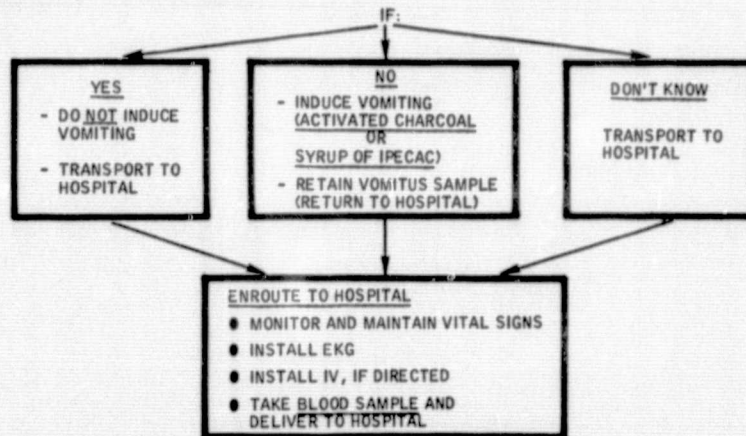
(A) MENTAL DISTURBANCE	(B) CONVULSIONS	(C) RESPIRATION PROBLEMS	(D) STOMACH DISTRESS
<p>MENTAL REACTIONS CAN BE FROM "APATHETIC" TO "PANIC" OR "SELF DESTRUCTION"</p> <p>IF VICTIM VIOLENT:</p> <ul style="list-style-type: none"> ● CALL POLICE FOR ASSISTANCE IF VICTIM CONSIDERED CAPABLE OF HARMING SELF OR OTHERS ● UTILIZE BY-STANDERS TO ASSIST IN RESTRAINT IF NO WEAPONS INVOLVED. ● DO NOT LEAVE SCENE UNTIL POLICE ARRIVE AND ASSESS SITUATION 	<ul style="list-style-type: none"> ● INSERT PADDED TONGUE BLADE BETWEEN TEETH ● MAINTAIN AIRWAY ● PREVENT VICTIM FROM INJURING HIMSELF - GUIDE HIS MOTIONS ● CALL POLICE FOR ASSISTANCE IN RESTRAINING VICTIM 	<p>DEPRESSANT AND STIMULANT DRUG OVERDOSES CAN CAUSE RESPIRATION DIFFICULTIES</p> <ul style="list-style-type: none"> ● MAINTAIN OPEN AIR-PASSAGE ● ADMINISTER O₂ ● IF BREATHING STOPS - BEGIN RESUSCITATION 	<ul style="list-style-type: none"> - STOMACH PAINS AND CRAMPS - NAUSEA - VOMITING

RECOMMENDED PROCEDURES

MAKE OBSERVATIONS AND REPORT:

- | | |
|--|---|
| <ul style="list-style-type: none"> - PRESENCE OF BURNS ABOUT MOUTH - ODORS ON BREATH - PRESENCE OF VOMITUS AND OTHER DISCHARGE MATTER (RETURN SAMPLE TO HOSPITAL) | <ul style="list-style-type: none"> - CONDITION OF SKIN (NEEDLE MARKS ETC.) - PECULIARITIES OF SPEECH - SIZE OF PUPILS - VITAL SIGNS |
|--|---|

- ① TRY TO ESTABLISH WHAT VICTIM HAS INGESTED, INHALED, OR ADMINISTERED (IF POSSIBLE, OBTAIN SAMPLE OF CONTAINER AND SUBSTANCE AND RETURN TO HOSPITAL)
- ② IS "INGESTED" SUBSTANCE CORROSIVE? (I.E., ACIDS, ALKALIES, PETROLEUM PRODUCTS OR OTHER VOLATILE LIQUIDS)



BASIC APPROACH TO PSYCHIATRIC VICTIMS

- TAKE YOUR TIME.
- EVALUATE WHAT HAS AND IS HAPPENING.
- RESTRAIN YOUR OWN EMOTIONS AND REMAIN CALM.
- BE HONEST.
- DO NOT USE FORCE UNLESS RESTRAINT IS ABSOLUTELY NECESSARY.
- TRANSPORT VICTIM TO HOSPITAL IN THE MOST APPROPRIATE MANNER POSSIBLE. (I.E. - FAMILY CAR WITH FAMILY MEMBERS TAKING VICTIM, POLICE CAR, OR AMBULANCE.)

PANIC

SYMPTOMS OF PANIC VICTIM:

- MAY ATTEMPT TO FLEE SCENE
- MAY LOSE ALL JUDGEMENT
- MAY WEEP UNCONTROLLABLY
- MAY WANT TO DO UNREASONABLE THINGS

HANDLING OF VICTIM IN PANIC:

- BE FIRM BUT GENTLE
- ISOLATE VICTIM IF HE MAY ENDANGER OTHERS OR CAUSE OTHERS TO PANIC (THIS MAY REQUIRE SUPPORT OF POLICE OR BYSTANDERS).
- CALL ANOTHER AMBULANCE OR POLICE CAR TO TAKE DISTURBED VICTIM TO HOSPITAL IF INJURED VICTIMS ARE TO BE TRANSPORTED IN YOUR VEHICLE.
- NEVER STRIKE A VICTIM WHO IS IN PANIC.

HYSTERIA OR VIOLENCE

SYMPTOMS OF HYSTERIA:

- ANXIOUS
- FEARFUL
- COMPLAINS OF ILLNESS AND/OR PAINS
- PARALYSIS (EXTREME CASES)
- HEADACHE
- DIZZINESS
- IRRITABILITY
- TREMORS
- SWEATING

HANDLING OF HYSTERICAL OR VIOLENT VICTIM:

- REASSURE AND ATTEMPT TO CALM VICTIM.
- TAKE PRECAUTIONS TO PREVENT HARM TO EMT CREWMEN OR THE VICTIM. APPROACH IN NUMBERS AT THE ONSET, RESTRAIN VICTIM AND TRANSPORT TO HOSPITAL. OBTAIN POLICE SUPPORT IF REQUIRED, PARTICULARLY WHERE WEAPONS ARE INVOLVED.
- ALWAYS HAVE FEMALE ACCOMPANY ANY FEMALE VICTIM.
- IF RESTRAINT IS REQUIRED FOR TRANSPORT, GET PERMISSION FROM:
 - (1) POLICE,
 - (2) BASE PHYSICIAN, OR
 - (3) FAMILY MEMBERIN THAT ORDER OF PRIORITY.

DEPRESSION

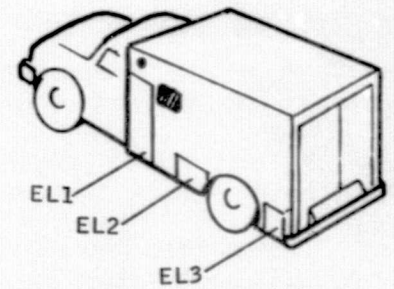
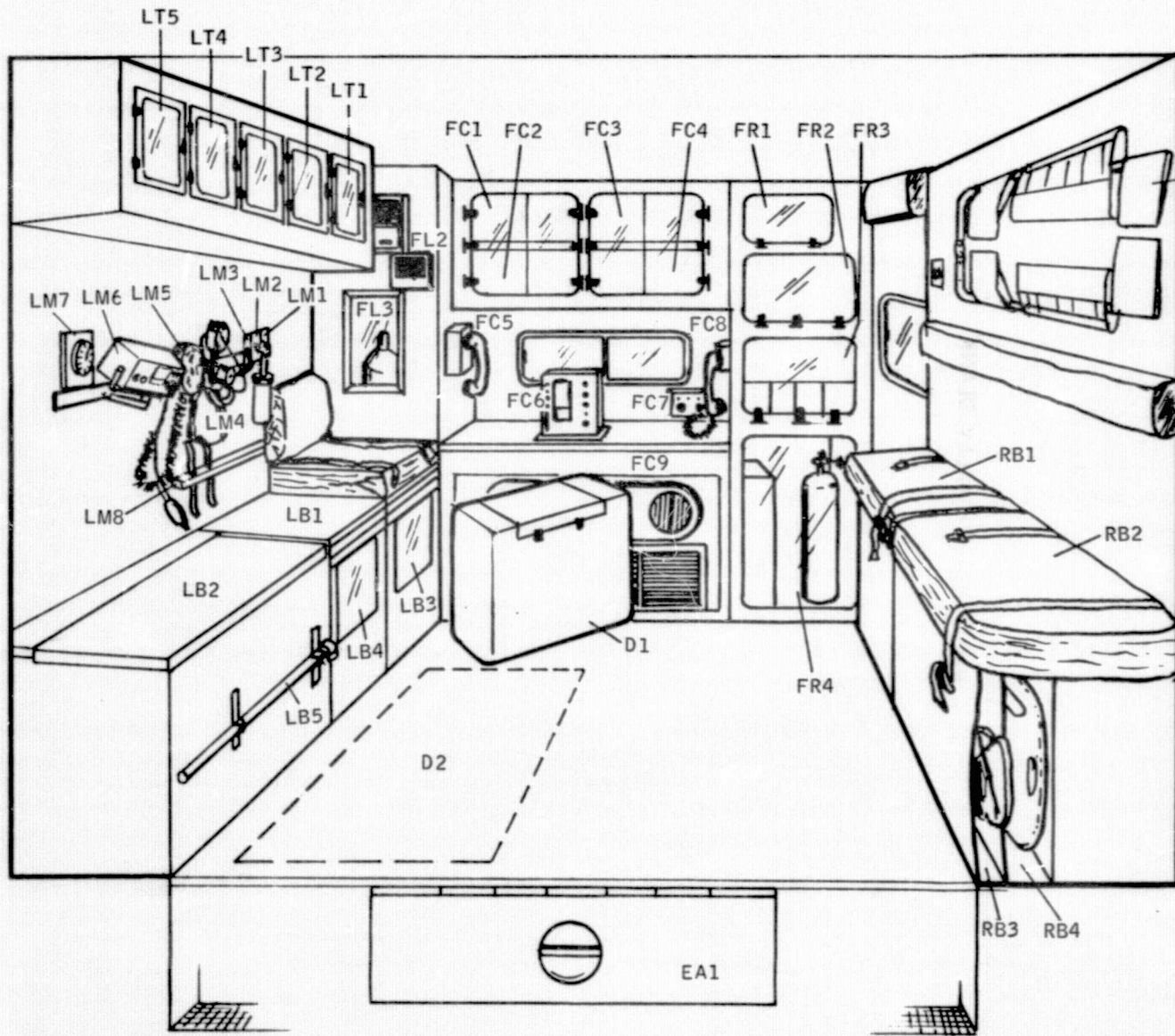
SYMPTOMS OF DEPRESSED REACTIONS:

- WITHDRAWAL
- VICTIM APPEARS UNAWARE OF SURROUNDINGS AND SITUATION
- VACANT EXPRESSION WITHOUT EMOTION
- "ANXIOUS" FACIAL EXPRESSION
- MAY BE CRYING

HANDLING OF DEPRESSED VICTIM:

- CONTACT MUST BE GENTLE.
- ATTEMPT TO GET VICTIM TO TALK.
- NEITHER "COMMAND" NOR SHOW PITY. SHOW UNDERSTANDING BUT NOT RESENTMENT.

RECOMMENDED STOWAGE CODES FOR MODULANCE TYPE SA-138 - MODIFIED FLOOR PLAN "C"



LEGEND

1ST DIGIT	2ND DIGIT	3RD DIGIT
L = LEFT	T = TOP	LOCATION #
R = RIGHT	M = MIDDLE	
D = DECK	B = BOTTOM	
F = FORWARD	L = LEFT	
O = OVERHEAD	C = CENTER	
E = EXTERIOR	R = RIGHT	
	A = AFT	

RECOMMENDED		ITEM	RECOMMENDED		ITEM
LOC.	QTY.		LOC.	QTY.	
-	-	<u>ADHESIVE TAPE:</u> Two Inch One Inch One Half Inch	FC2	12 rls.	<u>EKG TAPE</u>
LT2 & LM8		<u>AIRWAYS:</u> Adult Child Infant	FC1	2	<u>EYE PACKS</u>
LT2	2			1	<u>FOILLE SPRAY</u>
LT2	2			36	<u>GELECTRODES</u>
LT2	2			2 pr.	<u>GLOVES, STERILE</u>
-	-	<u>AIRWAYS, RESUSCI-TUBE:</u> Adult Pediatric	FC1	1 box	<u>ICE PACKS</u>
L13	1		-	-	<u>IV KITS:</u> Vennsets
L13	1		FR2		
	2 btl.	<u>ALCOHOL</u>	FR3	-	<u>IV FLUIDS:</u>
	10	<u>AMMONIA INHALANT</u>	FR3	6 bags	D5W
LM1	1	<u>ASPIRATOR</u>	FR3	4 bags	D5 1/4
-	-	<u>BAG MASKS:</u> Adult Child	FR3	4 bags	Ringers Lactate
	1		FR3	4 bags	Sodium Chloride, 9%
	1	<u>BANDAGE SHEARS</u>	-	-	<u>LINENS:</u>
-	-	<u>BANDAGES:</u> Kling Gauze - 6" x 5 yds. - 4" x 5 yds. - 3" x 5 yds. - 2" x 5 yds. Triangular Band-aids	LB2	1	Blanket
FC4	1 box			1	Pillow
FC3	1 box			24	Sheets, Disposable
FC3	1 box		LM5	1	<u>MANOMETER, ANEROID</u>
FC4	1 box		FC1	1 btl.	<u>MERTHIOLATE</u>
FC3	20		FR2	-	<u>NEEDLES:</u>
FC4	100		FR2	10	Butterfly 19
-	-	<u>BOARDS:</u> Long Backboard, 6' Neckboard Short Backboard, 4'	FR2	10	Butterfly 23
RB4	1		FR2	25	Medicut 18
RB1	1		FR2	25	Medicut 20
RB3	1			3 btl.	<u>NORMAL SALINE</u>
FR1	2	<u>BURN SHEETS</u>	LT3	2	<u>OB KIT</u>
D2	1	<u>COT, FERNO WASHINGTON</u>	LB4	1 gal.	<u>O-SYL SOLUTION</u>
EA1	1	<u>COLLAPSABLE COT</u>	EL1	1	<u>OXYGEN BOTTLE, INSTALLED</u>
-	-	<u>COLLARS:</u> Large Medium	FR4	1	<u>OXYGEN BOTTLE, PORTABLE</u>
LT5	1		LM2	1	<u>OXYGEN FLOWMETER</u>
LT5	1		LT1	2	<u>OXYGEN MASK, DISPOSABLE</u>
LT4	4	<u>COMPRESS, TRAUMA</u>	LM4	2	<u>OXYGEN MASK, VALVE-INHALATOR</u>
FC2	12	<u>DEFIB JELLY</u>	FC2	1	<u>POISON KIT</u>
FC2	12	<u>DEFIB PADS</u>	LM6	1	<u>PULSE TACHOMETER</u>
	1	<u>DISINFECTANT, SPRAY</u>	-	-	<u>RESCUE TOOLS:</u>
	1 gal.	<u>DISTILLED WATER</u>	EL1	1	Axe, Flathead
-	-	<u>DRESSINGS:</u> Carlisle	EL1	1	Bolt Cutter
FR4	-	<u>DRUGS:</u> Adrenalin Aramine Atropine 50% Dextrose Isuprel, 5 mg. Isuprel, 0.2 mg. Lidocaine Nitroglycerin Sodium Bicarbonate Valium	EL2	1	Crescent Wrench
FR4	2		EL1	1	Crow Bar
FR4	2		EL2	1	Hack Saw
FR4	2		EL2	1	Hammer, 5 lbs.
FR4	2		EL2	1	Rescue Line, 50 ft.
FR4	1		EL2	1	Screwdriver, Flathead
FR4	5		EL2	1	Screwdriver, Phillips
FR4	4		EL1	1	Shovel
FR4	4		EL2	1	Tin Snips
FR4	1 btl.		EL2	1	Tool Pouch
FR4	4		EL1	1	Wrecking Bar
FR4	2		EL2	1	Vise Grips
			FC2	12	<u>SAFETY PINS</u>

RECOMMENDED		ITEM
LOC.	QTY.	
	1 btl.	<u>SALT TABLETS</u>
	2	<u>SAND BAGS</u>
	10	<u>SANITARY NAPKINS</u>
RT1	1	<u>SCOOP STRETCHER</u>
FC2	1	<u>SNAKEBITE KIT</u>
-	-	<u>SPLINTS:</u>
-	-	Rigid
	2	- Short Arm
	2	- Long Arm
	2	- Long Leg
RE1	2	- Thomas Half Ringed
-	-	Inflatable
	1	- Full Arm
	1	- Half Arm
	1	- Full Leg
	1	- Half Leg
	1	<u>STAIR CHAIR</u>
	1	<u>STETHOSCOPE, DIAPHRAGM</u>
D1	1	<u>TELECARE</u>
LM2	1	<u>TIMER</u>
	1 box	<u>TONGUE DEPRESSORS</u>
LT4	1	<u>TRAUMA PACK</u>