



MANAGE MUSCULOSKELETAL INJURIES





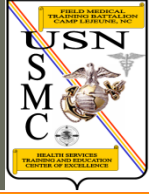
OVERVIEW



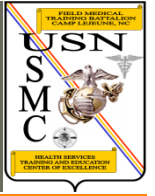
- Anatomy
- Types of Musculoskeletal Injuries
- Types of Splints



LEARNING OBJECTIVES



Please Read Your
Terminal Learning Objectives
And
Enabling Learning Objectives





ANATOMY OF THE MUSCULOSKELETAL SYSTEM

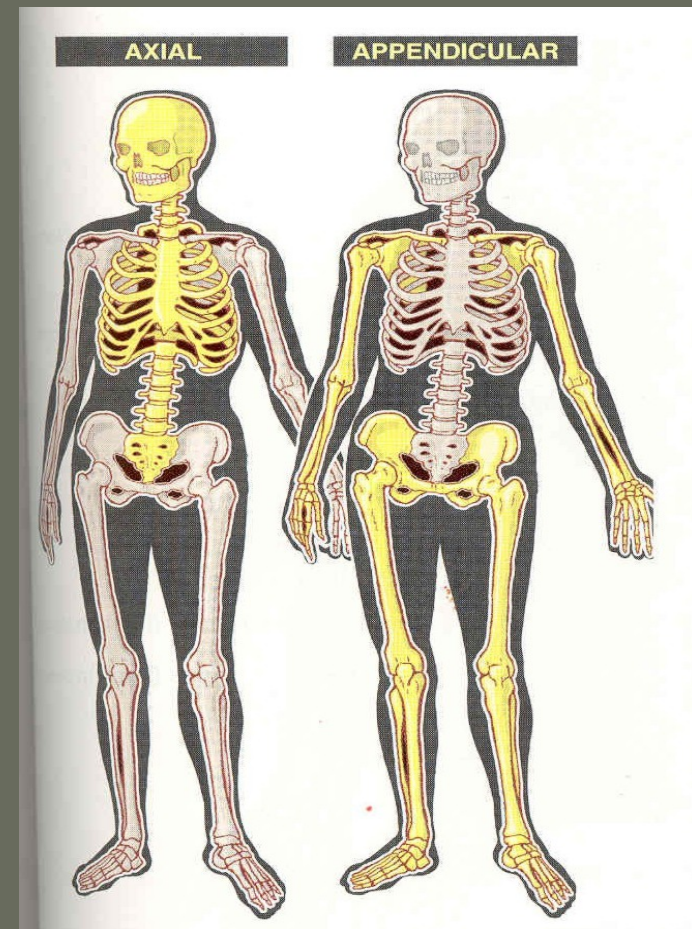
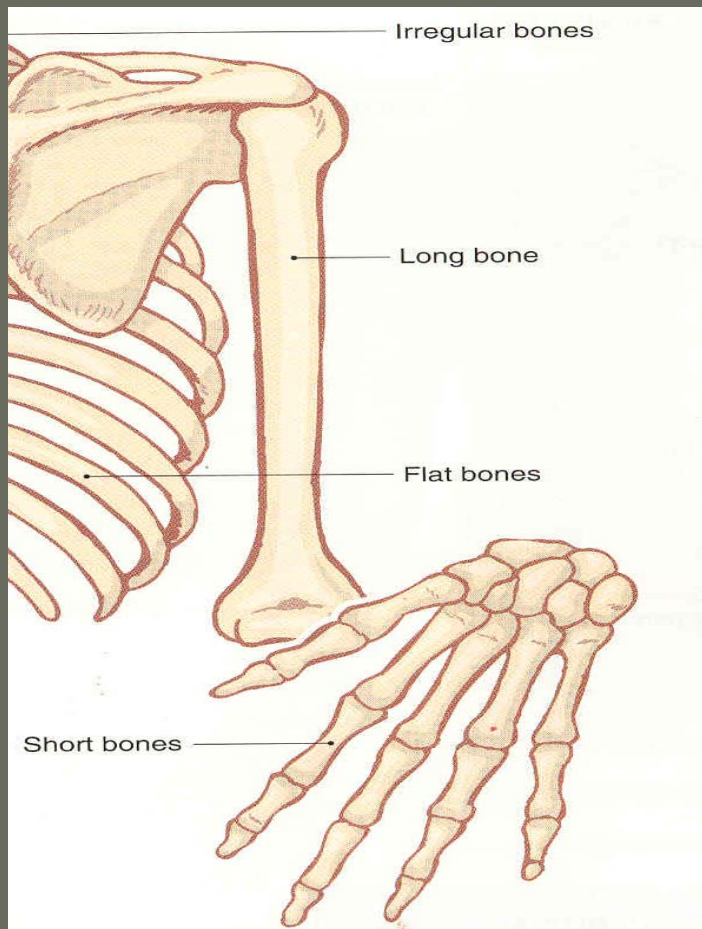


SKELETAL SYSTEM



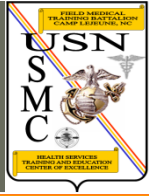
- Boney framework consisting of 206 bones
- Classifications
 - Long, Short, Irregular and Flat
- Divisions
 - Axial Skeleton
 - Appendicular Skeleton

SKELETAL SYSTEM



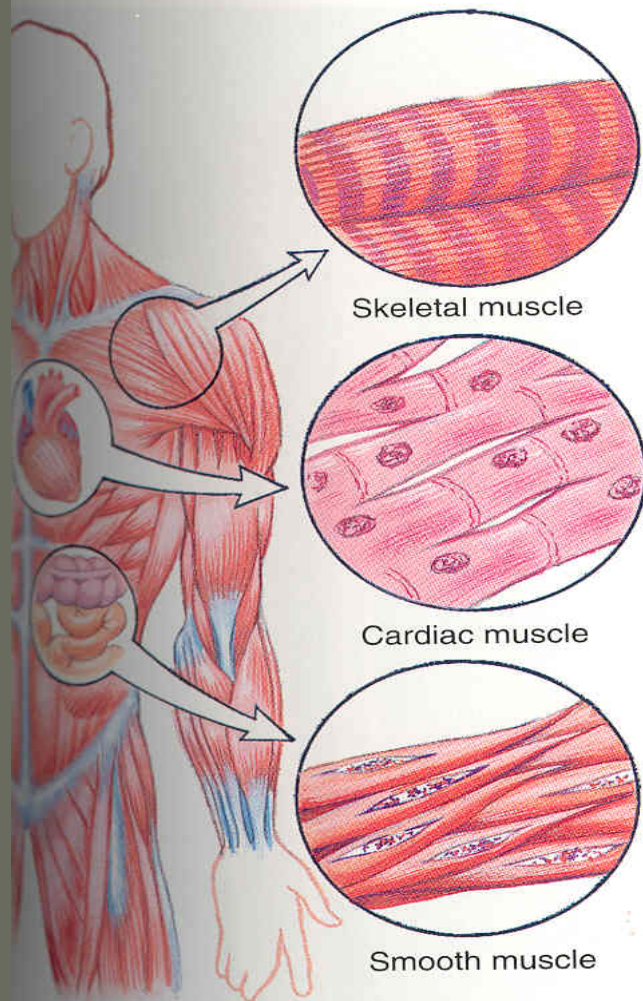


MUSCULAR SYSTEM



- Consists of tissues, muscles, cartilage, tendons and ligaments
 - Functions: Movement, Posture, Heat, Bodily Functions
 - Muscle Types:
 - Skeletal (Voluntary)
 - Smooth (Involuntary)
 - Cardiac (Myocardium)

MUSCULAR SYSTEM



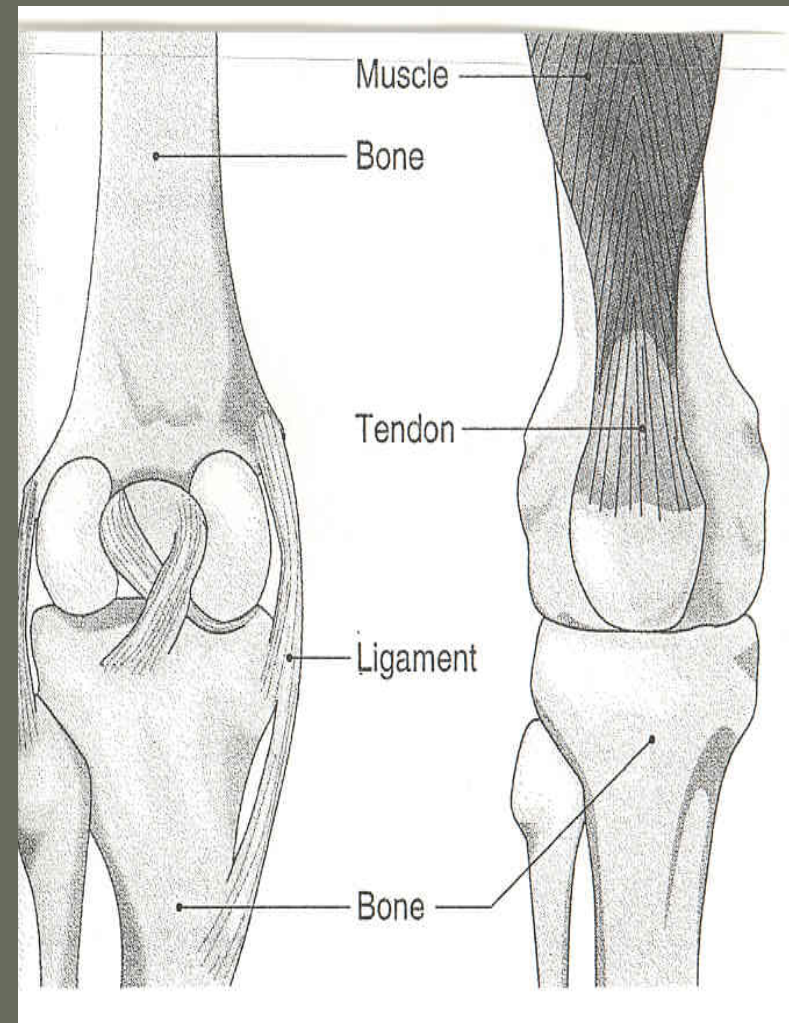
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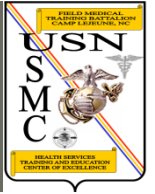
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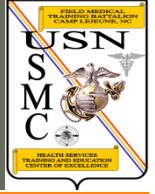
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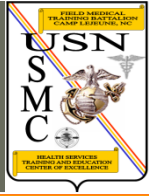




TYPES OF MUSCULOSKELETAL INJURIES



SOFT TISSUE INJURIES



- Involve the skin and underlying musculature
- Injury to the tissues is commonly referred to as either a closed or open wound

OPEN WOUNDS



- Injury in which the skin is interrupted, or broken, exposing tissues underneath

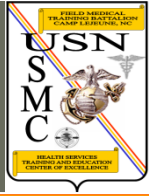
CLOSED WOUNDS

- SKIN IS NOT BROKEN





ABRASIONS



- Superficial scratches of the skin surface
- Oozing blood from injured capillaries
- Painful due to nerve ending damage

ABRASIONS



- Also known as “Road Rash”
- “Rug Burns”
- “Mat Burns”

ABRASIONS

- Treatment
 - Cleanse the wound
 - Cover injury with a small bandage
 - Prevent infection - use anti-bacterial ointment

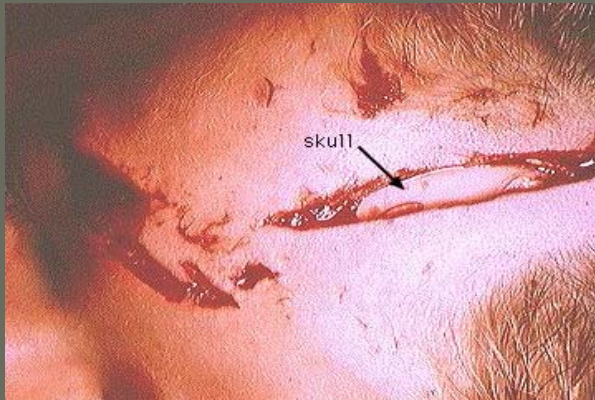


LACERATIONS

- Produced by objects with sharp edges
- A blow from a blunt object
- Can be smooth or jagged



LACERATIONS



- Treatment
 - Hemorrhage control
 - Immobilization - if major tendons and muscles are severed
 - Treat for shock
 - TACEVAC as needed

AVULSIONS

- AVULSION
 - Flap of skin that is torn loose or completely pulled off.



AVULSIONS



"Degloved" finger, caused by forcible removal of tight ring.
Sandzen, Atlas of Acute Hand Injuries, 1980.



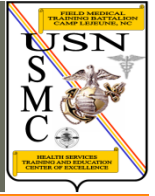
AVULSIONS



- Treatment
 - Control bleeding, apply dressing to avulsed area
 - Replace flap
 - If completely torn off:
 - Wrap in saline soaked gauze or pack in ice
 - Transport with the patient
 - Immobilize extremity as indicated



TRAUMATIC AMPUTATIONS



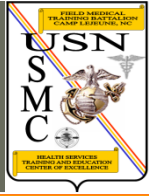
- Non-surgical removal of limb or appendage
- There may be less bleeding when blood vessels spasm and retract

TRAUMATIC AMPUTATIONS

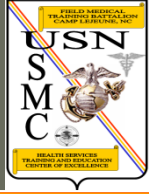




TRAUMATIC AMPUTATIONS



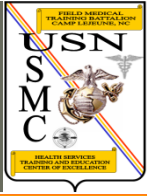
- TREATMENT
 - Hemorrhage control
 - Tourniquet to control life-threatening hemorrhage
 - Treat for shock
 - Preserve amputation in sterile dressing
 - Pack in ice and send with patient
 - TACEVAC ASAP



STRAINS, SPRAINS AND DISLOCATIONS



STRAINS, SPRAINS & DISLOCATIONS



- STRAIN
 - Injury to MUSCLE or tendon resulting from over exertion or over stretching
- SPRAIN
 - Partial or complete tearing or stretching of a supporting LIGAMENT within a joint

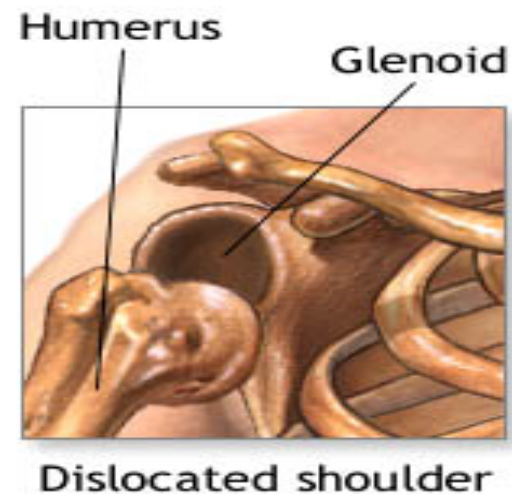
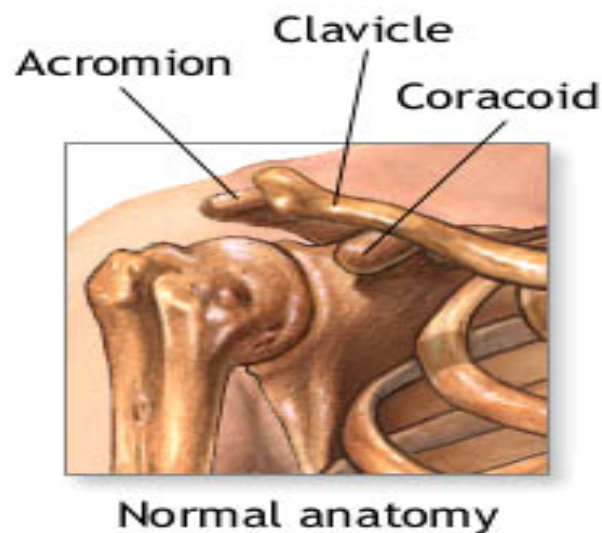


STRAINS, SPRAINS & DISLOCATIONS



STRAINS, SPRAINS & DISLOCATIONS

- DISLOCATION
 - Displacement of bone ends at the joints resulting in an abnormal stretching of the ligaments around the joints



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STRAINS, SPRAINS & DISLOCATIONS

Figures; Courtesy of Mark Tranovich, MD

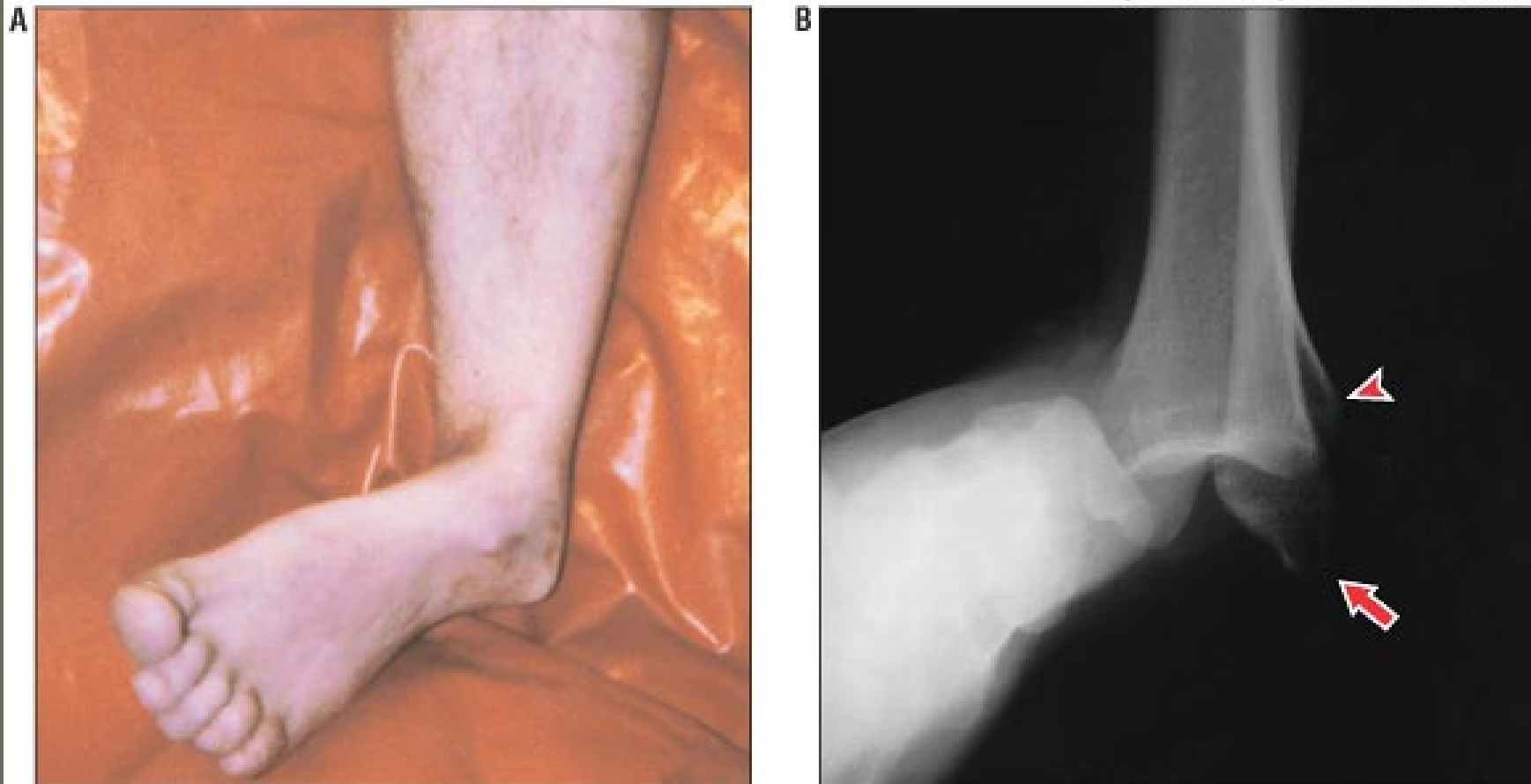


FIGURE 1. Photo (A) of the left ankle of a 33-year-old male recreational softball player shows tibiotalar dislocation of the ankle. The foot is displaced medially, and the skin is tented over the prominence of the lateral malleolus. Anterolateral radiograph of the same ankle (B) shows that the talus is completely disassociated from the ankle mortise (arrow), and a small avulsion of the fibula is evident (arrowhead).



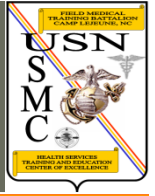
STRAINS, SPRAINS & DISLOCATIONS



- SIGNS AND SYMPTOMS
 - Point tenderness or burning sensation
 - Marked deformity of joint
 - Pain and edema
 - Complete loss or decreased range of motion (ROM)



TREATMENT



- STRAINS
 - Supportive bandaging
 - Immobilize
 - Ensure muscle is in relaxed position
 - RICE
 - » Rest
 - » Ice
 - » Compression
 - » Elevation



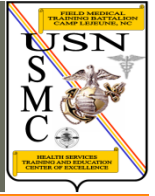
TREATMENT



- SPRAINS
 - Treat like a fracture
 - Supportive Bandage / Immobilize
 - RICE
 - Relieve pain
 - TACEVAC



TREATMENT



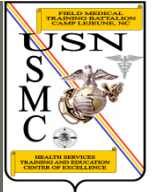
- DISLOCATION
 - Attempt to reduce only if no pulse is present
 - Splint in position it was found
 - Pain management
 - TACEVAC

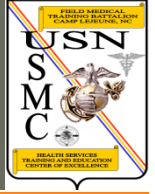


COMPLICATIONS



- Hemorrhage
 - Separated bone ends may tear muscle tissue and lacerate blood vessels
- Nerve Damage
 - Bone ends may cut or pinch nerves





TYPES OF FRACTURES



TYPES OF FRACTURES

- Break in the continuity of a bone
- Two Types:
 - Open
 - Closed



OPEN FRACTURES



- Breaks through overlying tissues
- Bone may protrude through the skin
- Penetrating object breaks through skin to the bone





CLOSED FRACTURES



- Bone does not break through the skin
- Tissue beneath the skin might be damaged





SIGNS & SYMPTOMS



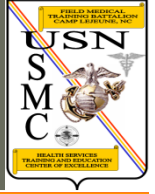
- Inability to move extremity
- Discoloration
- Deformity
- Edema
- Pain with or without movement

SIGNS & SYMPTOMS

- Exposed bone fragments (open fractures)
- Crepitus/Grating
- Injury indicating fracture (e.g. gunshot wounds)



Compound fracture-dislocation of wrist, with ulna protruding from wound. Mills, Morton, Page. A Color Atlas of Accidents and Emergencies, 1984.



GENERAL PRINCIPLES FOR TREATMENT OF FRACTURES



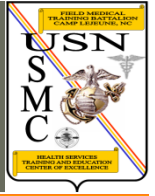
TREATMENT



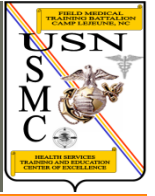
- Control hemorrhage
- Treat for shock
- Check distal pulses
- Immobilize with splint
- Recheck PMS



TREATMENT



- Relieve pain
- Reduce only if no distal pulse
- Document treatment
- Monitor and TACEVAC

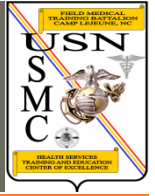




TYPES OF SPLINTS



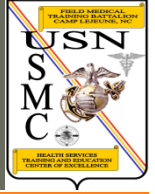
SPLINTING



- PURPOSE OF SPLINTING
 - To immobilize that portion of the body which is injured
 - Prevent further damage
 - Decrease pain



RIGID SPLINTS



- Cannot change shape
- Body part positioned to fit splint
- Examples:
 - Wood
 - Plastic
 - Metal

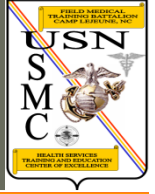
FORMABLE SPLINTS



- Wrap around extremity
- Can be molded
- Examples:
 - Pillows
 - Ponchos
 - Blankets



IMPROVISED SPLINTS



- Made from any available material that can be used to stabilize a fracture
- Only limited by your creativity!
- Examples
 - Sticks
 - Branches
 - Tent poles



ANATOMICAL SPLINTS

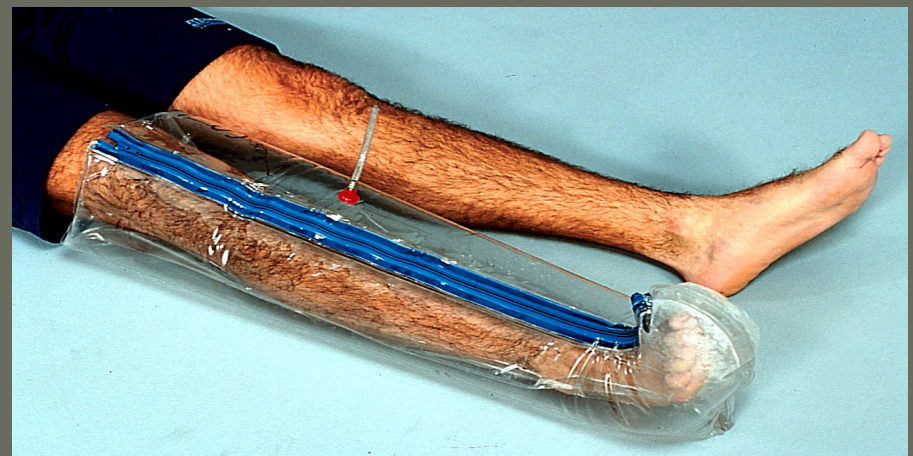
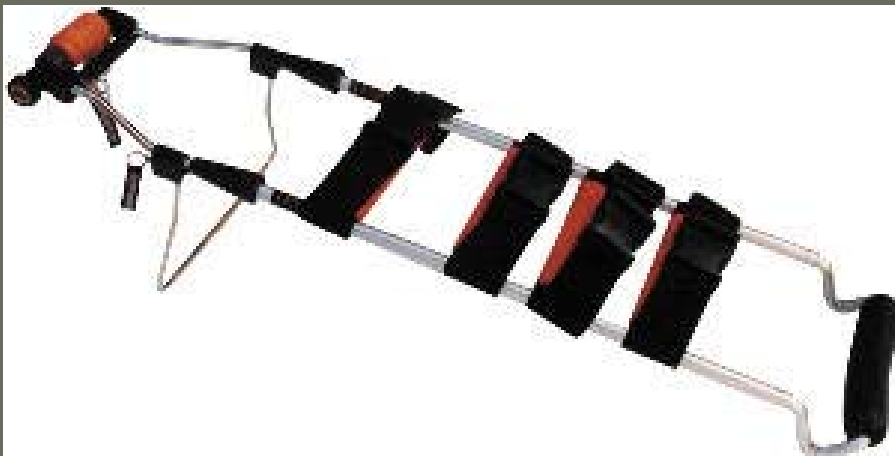


- Readily available
- Use the casualty's body as splint
- Examples
 - Strap legs together
 - Secure arm to body
 - Tape fingers together



MANUFACTURED SPLINTS

- Designed for specific injuries & applications
- Examples in AMAL 635:
 - Thomas Half-Ring Telescopic Splint
 - Pneumatic “air” Splint





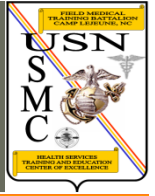
BANDAGES IN SPLINTING



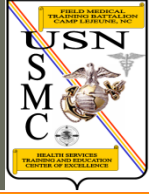
- Used to bind or wrap a body part
- Hold splints in place
- Protect body part from further injury
- Examples:
 - Sling
 - Swathe



GENERAL RULES FOR SPLINTING

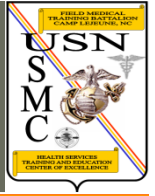


- Control hemorrhage (Dressing/Bandage)
- Expose fracture site
- Establish distal pulse
- Exposed bone
 - Cover ends with sterile dressing
- Splint in position found



GENERAL RULES FOR SPLINTING

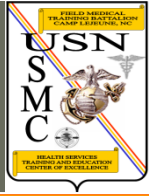
- Attempt to straighten closed fx ONLY if there is no pulse
- DO NOT retract exposed bone (Open Fractures)
- Immobilize above and below fracture
- Reassess pulse after splinting
- When in doubt SPLINT!!
- TACEVAC as needed



TECHNIQUES FOR SPLINTING



JAW FRACTURES

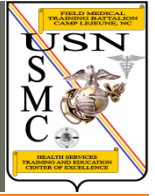


- Apply Modified Barton splint
- Designed to pull lower jaw forward
- Support on head, not neck
- Do not lay patient on their back





CLAVICLE FRACTURES



- Immobilize with Figure 8 bandage
- Use sling and swathe



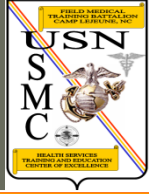
HUMERUS FRACTURES

- Upper arm near shoulder
 - Place pad in arm pit
 - Bandage to body



- Middle of upper arm
 - Use splint on outside of arm
 - Secure to body
 - Support with sling





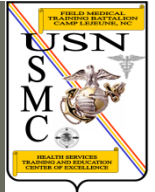
FOREARM FRACTURES

- If only one bone is broken
 - You may use other bone as splint
- Apply two splints above and below forearm
- Cover from wrist to elbow
- Support with sling





WRIST/HAND FRACTURES



- Splint in position of function
- Leave fingers exposed
- Support with sling



RIB FRACTURES

- Assess ABCs
- Single fx
 - Immobilize using arm
 - Sling and secure with bandage
- Multiple fx
 - Immobilize flail segment with tape





PELVIC FRACTURES



- Position of comfort (knees bent or straight)
- Pillow or padding between legs
- Wrap sheet around pelvis
- Tie knees and ankles together



FEMUR FRACTURES

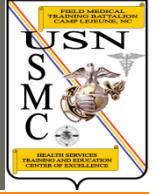
- Use anatomical splint
- Splint in 4 places
 - Above/below fx
 - Above/below knees
 - Around feet
- Consider traction splint for mid-shaft fx



PATELLAR FRACTURES

- Position of comfort
- Place splint underneath leg
-
- Padding under knee
- Immobilize in four places
 - Around thigh
 - Above/below knee
 - Around ankle





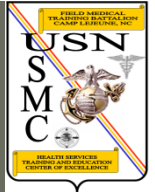
LOWER LEG FRACTURES

- If only one bone is broken
 - You may use the other to splint
- Utilize stirrup with SAM splint





ANKLE/FOOT FRACTURES

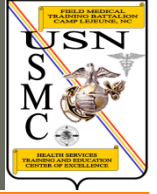


- Wearing boots
 - Use Figure 8 with cravat
- No boots
 - Wrap ankle with bandage or ace wrap
 - Use Figure 8 to secure ankles





SPINAL FRACTURES



- Indications
 - MV accident, Fall (2-3x height), blunt trauma
- Immobilize from head to toe
 - Spine board if available
- Use C-collar for neck
- Maintain & monitor ABCs

