



Musculoskeletal Injuries

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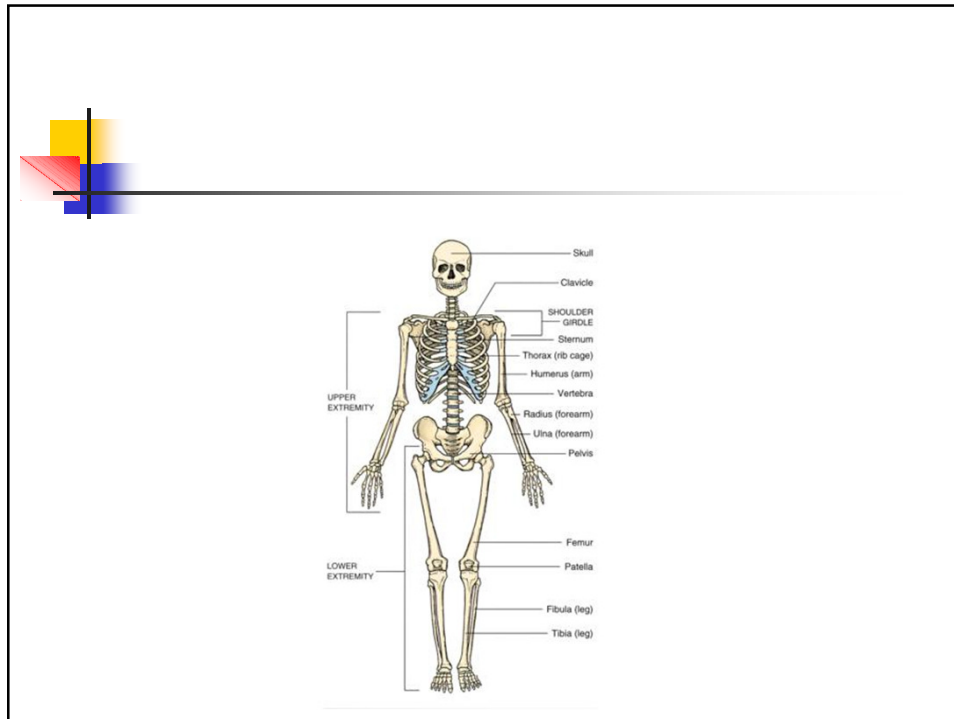
www.es26medic.net

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Anatomy

- Most of the necessary anatomy has been covered under the “Basic Anatomy” lecture
- We’ll extend that as needed in this lecture



Structure of bones

- Formed of dense connective tissue
- Provide the framework
- Produce red blood cells
 - In the **marrow**
- Stores salts and metabolic materials
 - E.g. Calcium



Types of bones

- Long bone
 - E.g. Femur, Tib, Fib, radius, Ulna
- Short
 - E.g. Phalanges
- Flat
 - E.g Sternum
- Irregular
 - Spinous "process"



Anatomy of bones

- Periosteum
 - Fibrous strong white outer covering
- Shaft
 - Long part
- Head
 - Rounded part
- Neck
 - Part that connects head to shaft
 - E.g. "neck of the femur" (hip fracture)
- Marrow
 - Center of bone that produces red blood cells
- "Growth plate"
 - **issues**

Growth Plate fracture



Cartilage

- Covers the outside of bone ends
- Acts as a cushion, to allow for painless articulation
- Also found in the tip of the nose, earlobe, trachea and rib cage



Tendons

- Connects muscle to bone
- Allows for powerful motion



Ligaments

- Connects bones to bones
- Add to structural support and stable range of motion



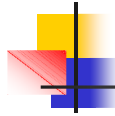
Mechanism of musculoskeletal injuries

- Direct force
- Indirect force
 - Fall from a height transmitting force to other areas
 - E.g. heel → lumbar spine, clavicle
- Twisting
 - Many sports injuries



Indirect force





Mechanism of musculoskeletal injuries - 2

■ **Fractures**

- Disruption in continuity of bone
- Can be:
 - Open
 - Closed
 - Angulated



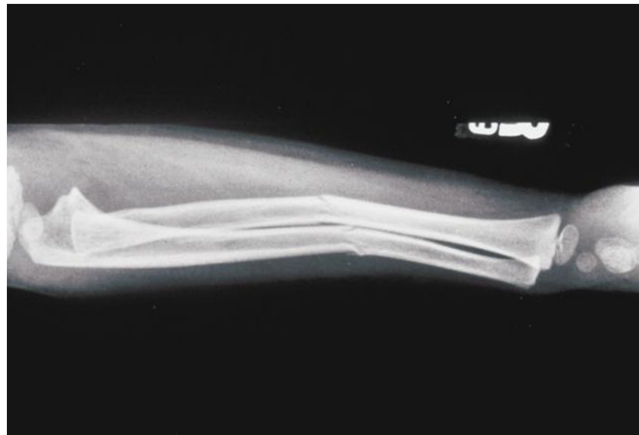
Open tibia fracture



Types of fractures

- Greenstick
 - Incomplete fracture
 - Common in small children
- Comminuted
 - Broken in several places
- Impacted
 - Smashed bone ends
- Pathological
 - Disintegration/fracture due to medical cause

Greenstick fracture



Dislocations

- Disruption in continuity of joint
- Associated with stretching of:
 - Soft tissue
 - **ligaments**

Elbow dislocation





Sprain

- Stretching and tearing of connective tissue
 - Tendons
 - Ligaments



Strain

- Stretching of connective tissue **without** rupture (tearing)



?? Question ??

- As a pre-hospital provider, do we care if the injury is a fracture, dislocation, sprain or strain?
- **NO**
- Report as a "Swollen, painful deformity"
- The EMT treats all musculoskeletal injuries in the same way



Inspection for injuries

- Involves looking, feeling and often hearing
- Can be:
 - Obvious
 - Where there is an obvious deformity or swelling
 - Occult



Signs and Symptoms

- Pain and tenderness
- Deformity
- Angulation
- Crepitus (a grating sound)
- Swelling
- Discoloration
 - Ecchymosis ("black & blue")
- Dependency
 - Inability to use the affected joint
- Nerve and blood vessel damage
 - **How might you know this?**



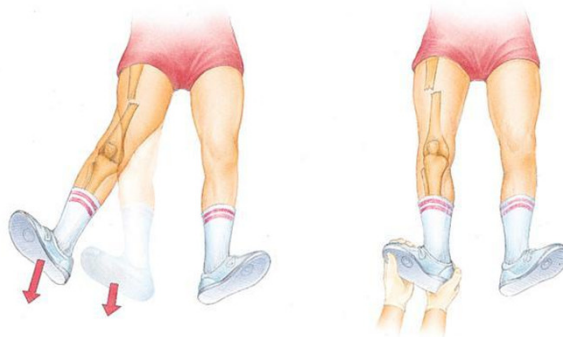
Treatment

- Splinting
 - Minimizing bone and joint motion
 - **KEY CONCEPT: Must immobilize adjacent joints or bones**
- Evaluation of neuro and circulatory function
- Realignment
- Ice and elevation
- **Never put back protruding bone ends!**

Realigning broken bones

- **To be used only when:**
 - **Circulation and nerve damage are suspected or**
 - **Splinting cannot be effectively accomplished**
- Done with manual traction
- Minimize motion

Traction



Types of splints

- Rigid
- Formable
 - "Sam splint"
- Traction
 - For mid-shaft femur only

Sam Splint





Splinting hazards

- Splinting **before** treating life threatening problems
- Inadequate splint
- Improper splinting technique



Common injuries



Shoulder injuries

- Usually present with dependency
 - Patient holding the arm so it “won’t fall off”
- Dislocations can be anterior or posterior
- May need to be splinted in the “position found”



Pelvic injuries

- Often found in MVA’s and falls
- Presents with:
 - Pain
 - Inability to lift legs while supine
 - Pain upon palpating Iliac Crests



Hip Injuries

- Dislocations
 - Anterior
 - Outward rotation and hip flexion
 - Posterior
 - Inward rotation
 - Knees bent
 - Hip flexed
 - Often a lack of sensation to the toes due to compression of the sciatic nerve



Hip fracture

- One of the most common calls in elderly
- Often a death sentence
- **Prevention is key**
- Presents with
 - Severe pain
 - Shortening of the affected limb
 - Outward tibial rotation

Hip Fx



Shortening/Rotation





Femur fracture

- Usually due to extreme forces
- Sometimes due to medical causes
- Presents with:
 - Severe pain
 - Shortening of affected limb
 - Swelling
 - Ecchymosis
 - **Shock**
 - **Thigh can “hold” up to a liter of blood**



Knee injuries

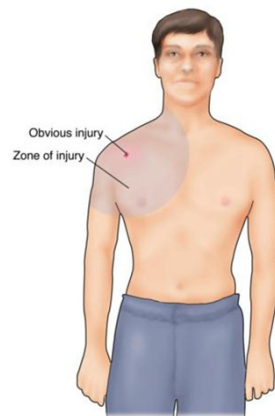
- Knee is a joint – not a bone
- Can injure any bone in the joint as well as adjacent soft tissue
- Presents with:
 - Pain
 - Swelling
 - Deformity
 - Inability to bear weight



Supplemental graphics



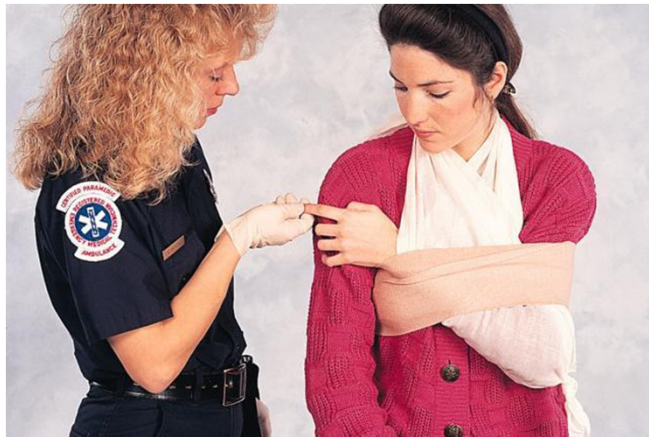
Zone of injury



Compare limbs



Sling and Swath



Elbow splint



Silver Fork/Colle's Fx



Silver Fork/Colle's Fx

