Injuries to the Arm, Wrist, and Hand
Anatomy Review

- The bones of the arm are the __________________________. __________________________.
- The elbow is comprised of three articulations, the ____________, humeroradial, and proximal radioulnar joints.
- Distal end of the forearm articulates with carpal bones to form the _______________ and distal radioulnar joints.
Anatomy Review (continued)

- Joints of the arm allow flexion/extension and ____________________ at the elbow.

- Joints of the wrist allow ________________ and radial & ulnar deviation.
Anatomy Review (continued)

Muscles of the anterior brachial region

Anterior view right arm (superficial)

- Short head
- Biceps brachii
- Long head

Anterior view right arm (deep)

- Coracobrachialis
- Brachialis

Posterior view right arm

- Latissimus dorsi
- Triceps brachii muscle
- Olecranon process of ulna
- Long head
- Lateral head
Anatomy
(continued)
Anatomy Review (continued)
Soft Tissue Injuries to the Upper Arm

Contusions and Fractures

- Such injuries are common in contact sports.
- ____________________________ ____________________________
- __________________________________________________________.
- Significance of damage is
- __________________________________________________________.
- Repeated episodes can result in
  ____________________________ traumatica.
Soft Injuries to the Upper Arm (continued)

- **Myositis Ossificans Traumatica**
  
  - Chronic inflammation of the muscle that results in the development of bone-like tissue within the muscle.
  - May cause ______________, a “benign growth projecting from a bone surface capped by cartilage.”

- **Myositis ossificans traumatica** develops over weeks or months and is often ignored during the early stages.
Myositis Ossificans Traumatica (continued)

Signs and symptoms include:

- ________________________________.
- Pain, discoloration, and swelling.
- ________________________________.
- Loss of sensation distally.

First Aid

- Apply ice and compression.
- Place arm in a sling.
- If symptoms persist for 72 hours, refer to a physician.
Fractures of the Upper Arm

Although rare, such fractures may be associated with activities that involve collisions between participants or high speed falls.

Signs and symptoms include:

- Severe pain in upper arm.
- Deformity & loss of function and unwillingness to use arm.
- Muscle spasm.
- Athlete reports an audible snap or pop at the time of injury.
- Sensory loss in forearm, if radial nerve is affected.
Fractures of the Upper Arm (continued)

First aid includes:

- Immediate application of ice and compression.
- Sling-and-swathe bandage.
- Treatment for shock and transport immediately to medical facility.
Elbow Injuries

Sprains and Dislocations

- The three joints that comprise the elbow are bound together by several ligaments.
- _______________________________ protect elbow from valgus and varus forces.
- Injury mechanism includes falling ________________________________.
- Sprains also result from both valgus and varus forces that occur as ________________________________.
- Elbow dislocations constitute extreme sprains.
Elbow Dislocations
(continued)

Mechanism for this injury includes falling either on

____________________________
____________________________
____________________________

The deformity is usually obvious.
Elbow Dislocation (continued)

Signs and symptoms include:

- Mild swelling & localized pain in minor sprains.
- Difficulty in gripping or making a fist.
- Loss of function & severe pain.
Elbow Dislocation
(continued)

First aid includes:

- Application of ice & compression.
- Application of splint & sling-and-swathe bandage.
- __________________________
  __________________________.
- __________________________.
- Summon EMS.
Elbow Fractures

- Elbow fractures generally involve the proximal ulna or radius.
- If radial artery is compressed, there is risk of ____________________.
- Injury mechanism is similar to sprains and dislocations.
Elbow Fractures (continued)

Signs and symptoms include:

- Recent history of elbow trauma.
- Immediate swelling.
- If forearm feels cold & clammy, and the athlete reports numbness in the hand, the forearm’s blood supply is compromised.
Elbow Fractures (continued)

First Aid

- Immediate application of ice, but
  - Application of splint (avoid moving elbow bones) and support of the arm in a sling.
- Treatment for shock.
- Arrange for transport to medical facility.
Epicondylitis of the Elbow

- __________________________ is ________________________ is the attachment site of the forearm flexors and ulnar collateral ligament.

- __________________________ is _________________________ is the attachment site of forearm extensors and radial collateral ligaments.

- Sports that require gripping combined with wrist movements place much stress on the epicondylar region.
Epicondylitis of the Elbow (continued)

- Little League baseball pitching (“________________________”) and golf (“golfer’s elbow”) associated with medial epicondyle injury.

- “________________________” involves the lateral humeral epicondyle and the tendon of the extensor carpi radialis brevis muscle.

  - Factors include:
    - ________________________________.
    - ________________________________.
    - racket handle that’s too small.
    - change in racket materials.
    - grip that’s too tight.
    - ________________________________.
Epicondylitis of the Elbow (continued)

Signs and symptoms include:

- Pain and swelling in the region of one or both epicondyles.
- Radiating pain into forearm muscles.
- Epicondylar pain associated with _________________________________.

First aid is not practical, but if symptoms worsen:

- Apply ice and compression.
- Refer to physician if pain persists.
Elbow Injuries (continued)

- Contusions of the Elbow

Blows to the elbow are common; the majority result in temporary symptoms.

- Exception involves the _______________.

- Repeated irritation of the bursa can result in inflammation (____________________).
Contusions of the Elbow
(continued)

Signs and symptoms include:

- Swelling around the _______________________.
- Pain and stiffness, especially when elbow is flexed.
- Elevated skin temperature over olecranon process, skin may be taut, and joint may show signs of internal hemorrhage.

First Aid

- Apply ice and compression.
- In cases of bursitis, refer to a physician.
Wrist and Forearm Injuries

Anatomy of the Wrist

- Radius
- Ulna
- Radial artery
- Ulnar artery
- Flexor carpi ulnaris
tendon
- Flexor carpi ulnaris
tendon
- Tendon of flexor
carpi ulnaris
- Tendon of flexor
digitorum profundus
- Pisiform bone
- Tendons of flexor
digitorum superficialis
- Flexor retinaculum
- Median nerve
- Metacarpal bones
- Palmar aponeurosis
Wrist and Forearm Injuries (continued)

Anatomy of the wrist

- Complex structure due to
  ________________________________
  ________________________________
  ________________________________

- Tendons are held in place by the _____________.

- Major vessels and nerves pass through this region. They are:
  - ________________________________ and veins.
  - ________________________________ nerves.
Distal forearm fractures are rare in sports.

- a transverse fracture of the distal radius, is the most serious.
Colles’ Fracture

Signs and symptoms include:

- History of significant trauma.
- Feeling the bone snap or hearing a popping sound.
- Severe pain; and significant loss of wrist, hand, or finger motion.

Loss of sensation in either hand or fingers may occur.
Colles’ Fracture (continued)

First Aid

- Immediately apply ice, compression, and elevation.
- **Do not use ice** if you suspect the vascular or nerve supply is affected.
- Treat for shock and transport to medical facility.
Wrist Fractures

- Fractures of _______________ are commonly seen in sports.

- Most common wrist fractures involve __________ or __________ bone and tend to occur at the “waist,” the narrowest portion of the bone.

- Deformity is typically not present.

- When in doubt, refer to physician.
Wrist Fractures (continued)

Signs and symptoms include:

- History of wrist trauma with popping or snapping sensation.
- Pain with movement, wrist feels locked, and a positive “__________” test.
Wrist Fractures
(continued)

First Aid

- Apply I.C.E.
- Apply a splint that immobilizes wrist.
- Support with sling-and-swathe bandage, leaving fingertips exposed to monitor blood flow beyond the splint.
Wrist Sprains & Dislocations

The same mechanisms that cause fractures can also cause sprains or dislocations in the region.

- Injury affects (wrist) joint and ligaments.

Ligamentous Anatomy -- Palmar
Wrist Sprains & Dislocations (continued)

- ____________________________ is the most commonly dislocated bone of wrist.

- Mechanism of this injury is ________________________________
  ________________________________.

Ligamentous Anatomy -- Dorsal
Wrist Sprains & Dislocations (continued)

**Signs and symptoms include:**

- History of injury combined with snapping/popping sensation.
- Painful movement; movement may be impossible.
- Numbness and/or pain radiating into hands or fingers.

**First Aid**

- Apply I.C.E.
- Splint with sling & swathe bandage.
  - Expose fingertips.
- Refer athlete to a physician.
Nerve Injuries to the Wrist

- ____________, which passes through carpal tunnel, is most commonly injured nerve in the region.
- ________________ may be related to tendonitis or sprains in the region.
- Majority of carpal tunnel syndrome cases involve ________________.
- Sports requiring gripping for extended periods have high incidence.
Nerve Injuries to the Wrist (continued)

Signs and symptoms include:

- ____________ to a portion of hand and fingers and ____________ in fingers affected by the nerve.
- Pain and tenderness on ____________ of the wrist.
- Associated tendonitis.
- Symptoms may worsen when the wrist is fully flexed or extended or an object is gripped.
Nerve Injuries to the Wrist (continued)

First Aid

- Since this injury tends to develop over time, first aid is not a concern.
- If the injury is associated with acute trauma, treat with I.C.E.
  - Do not apply ice if vascular or nerve supply is compromised
- Any athlete complaining of such symptoms should be referred to a physician.
Ganglions

Ganglion results from a surrounding a tendon.

- Herniated area becomes filled with fluid.
- Some ganglions are soft; others are hard and painful.
Ganglions (continued)

Signs and symptoms include:

- Visible swelling.
- Painful, hardened nodule, in advanced cases.

First Aid

- Some ganglions spontaneously regress.
- Leave alone, if possible.
- They can be surgically removed.
Hand Injuries

Hand Fractures

Fractures can occur to any of the 19 bones in the hand.
Hand Fractures
(continued)

- ___________________________ is unique thumb injury.
- ___________________________
  - Mechanism includes blows with a clenched fist.
  - Fracture involves 4\textsuperscript{th} and/or ______________________ bone(s) near the proximal end(s).
  - Metacarpals can be fractured by a crushing mechanism.
  - Phalangeal fractures are common in sports.
Hand Fractures (continued)

Signs and symptoms include:

- History of trauma.
- Associated pain and dysfunction of hand.
- Deformity may be present.
- Significant inflammation.
Hand Fractures
(continued)

First Aid

- Apply I.C.E.
- Apply splint and sling & swathe bandage.
  - Leave fingernails exposed.
  - An isolated phalangeal fracture can be ________________.
- Refer athlete to a physician.
Sprains and Dislocations of the Hand

Any joint in the hand can be involved. Most common forms are:

- ________________________.
- ________________________.
- ________________________.
- ________________________.

**Gamekeeper’s thumb** involves sprain of the ulnar collateral ligament of the thumb.

- Mechanism of injury is a valgus force to the MP joint of the thumb.
- Thumb will be unstable.
GameKeeper’s Thumb

Signs and symptoms include:

- History of an appropriate injury mechanism.
- Pain over the area of the ulnar collateral ligament (MP joint).
Signs and symptoms include:

- Snapping or popping at the time of injury.
- Swelling of the MP joint.
- Inability to move the thumb.
- Inability to grip tightly using the thumb.
Anatomy of the Finger Tendons

- Collateral ligaments
- Extensor expansion
- Collateral ligament
- Tendon of extensor digitorum
- First dorsal interosseous
- Vincula
- Fiberous digital sheath
- Tendon of superficial digital flexor
- First lumbrical
- Tendon of deep digital flexor
Mechanism is a blow to the fingertip while extending it from a flexed position.
Mallet (Baseball) Finger (continued)

Signs and symptoms include:

- __________________________ is the MOST important sign.
- Recent trauma to fingertip.
- __________________________ of the base of distal phalanx.
- Inability to __________________________.
First aid care involves:

- Immediate application of I.C.E.
- Immediate application of splint with the DIP joint extended.
  - Do not let the distal phalanx fall back into flexed position.
- Elevate arm in simple sling.
- Refer to medical care facility.
Boutonnière Deformity

- Injury involves proximal-interphalangeal (PIP) joint. Extensor tendon is involved as it crosses the dorsal surface of the PIP.
- Mechanism of injury is a blow while the finger is flexed during active extension.
Signs and symptoms (continued):

- Joint becomes painful, swollen, then stiff.
- If uncorrected, deformity will develop.
- Deformity is characterized by
  
  "______________________________________________________________________
  ________________________________________________________
  ________________________________________________________"
Boutonnière Deformity (continued)

First Aid

- Apply I.C.E.
- Elevate in simple sling.
- Refer athlete to a physician.
Wrist and Thumb Taping
Wrist and Thumb Taping (continued)
Wrist and Thumb Taping
(continued)
Wrist and Thumb Taping (continued)
Wrist and Thumb Taping (concluded)