Study Guide - Upper Limb

Abbreviations to Remember:
- A.T.C – Certified Athletic Trainer (National)
- L.A.T - Licensed Athletic Trainer (State)
- N.A.T.A – National Athletic Training Association
- S.W.A.T.A – Southwest Athletic Trainers (Texas)
- Advisory Board of Athletic Trainers – responsible for governing Licensing of Athletic Trainers in Texas
- B.O.C - Board of Certification (National Test)

Review ALL your Terminology!

Anatomical Position – body is erect with hands at side palms forward
- Abduction – moving away from midline
- Adduction – moving toward the midline
- Flexion – bending, decreasing the angle of a joint
- Extension – straighten – increasing the angle of a joint
- Hyperextension – continuation of extension beyond normal
- Bursa – a sac or pouch of synovial fluid located at friction points

Strain – injury to tendons
Sprain – injury to ligaments
Contusion – Bruise
Edema – abnormal accumulation of fluid in tissue (swelling)
Hemotoma – a tumor-like mass produced by an accumulation of coagulated blood
Dislocation – displacement of a bone from a joint with tearing of ligaments and tendons
Subluxation – partial dislocation

Hand / Wrist / Arm

8 Carpal Bones:
- Scaphoid (Navicular) Never, Lunate Lower, Triquetrum Tilley’s, Pisiform Pants, Trapezium Trouble, Trapezoid Times, Capitate Can, Hamate Happen

Scaphoid- Most commonly fractured carpal
Also known as the Navicular
Forms the “anatomical snuff box”
Hard to heal because of poor blood supply
Pain may indicate a FX
Extensor Pollicis longus, abductor Pollicis longus, Styloid process of the radius and both the trapezium and primarily the Scaphoid can be palpated
Is most visible during thumb extension

Hamate- Hook of the Hamate FX

5 Metacarpal Bones
- Metacarpals are number 1-5, beginning with the thumb
- Thumb is considered a Saddle Joint

14 Phalanges
- 3 phalanx per finger / 2 phalanx per thumb

Subungual hematoma- bleeding under the Finger nail
Joints of the hand/ Fingers are named for the bones that they comprise:
- PIP Joint = Proximal / Inter / Phalangeal
- DIP Joint = Distal / Inter / Phalangeal
- MCP Joint = Meta / Carpal / Phalangeal or MP Joint= Metacarpal / Phalangeal

Tenosynovitis- is inflammation of the lining of the sheath that surrounds a tendon (the cord that joins muscle to bone).

Forearm: Radius (thumb side in anatomical position)
Ulna (Pinky Side)

Upper Arm: Humerus

Wrist Joint – Carpals
  Radius
  Ulna

Elbow Joint (Hinge Joint) Humerus
  Radius
  Ulna
Distal end of the Humerus forms the medial & lateral epicondyles
Extensor Muscle Group attaches to the Thumb side
  Flexors- Pinky side

Olecranon= elbow (proximal head of the Ulna)

Motions of the Wrist: Flexion / Extension/ Deviation
Motions of the Elbow: Flexion / Extension / Rotation (Pronation & Supination)
Motions of the Shoulder: Flexion/ Extension/ Abduction/ Adduction/ Internal Rotation/ External Rotation

Flexor Retinaculum (fibrous band holds tendons in place)
Palmar Aponeurosis (a broad, sheet like tendon bind muscles together)
Interosseus membrane – connective tissue that keeps the radius & ulna from separating

SHOULDERS
Ball & Socket Joint
Axilla – armpit region

BONES:
Humerus – Head of Humerus fits into the glenoid fossa of the scapula
Clavicle – Collar Bone
Scapula – Shoulder blade
Sternum – Breast bone
Coracoid Process: Inferior to acromion, important for muscle attachment
Acromion Process Follow along the Spine of the Scapula leads to Acromion process
  Site of muscle attachment (Articulates with clavicle)
Spine of the Scapula: bony ridge of Scapula
  Important landmark for palpation (divides supraspinatus and Infraspinatus)

MUSCLES:
Deltoid – abducts, flexes & extends
Rotator Cuff Muscles: SITS
  Supraspinatus  Infraspinatus  Teres Minor  Subscapularis

JOINTS:
Acromio / Clavicular (AC) – acromion process of scapula & clavicle
Glenoid / Humeral (GH) – glenoid fossa of scapula & head of the Humerus
Sterno / Clavicular (SC) – Sternum & Clavicle
Scapulothoracic (ST) - Scapula and posterior aspect of the ribs

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The **glenoid fossa** of the scapula is very shallow thus making the joint susceptible to injury (as opposed to the Acetabulum of the hip joint)

**Signs and Symptoms**

- **Tingling** - same as numbness or possible circulatory problem
- **Clicking** - intra-articular disc lesion, or carpal subluxations (lunate or capitate)
- **Snapping** - trigger finger or thumb, stenosing tenosynovitis
- **Popping or tearing** - ligament or muscle tear, may occur with carpal subluxation or joint dislocation
- **Grating** - osteoarthritic changes or articular cartilage degeneration
- **Crepitus** - tenosynovitis, irregularities in joint surface (osteoarthritis)

**INJURIES**

- **Barton Fracture** - FX through dorsal articular area of radius with dorsal & proximal displacement

- **Bennett's Fracture**: a fracture + dislocation of the Metacarpal bone at the base of the thumb, caused by hitting the thumb against opponent when throwing a punch

- **Boutonniere Deformity**: The sheath that holds the extensor tendon on top of the finger is torn – PIP joint flexes / DIP joint hyper extends

- **Boxer’s Fracture**: Fracture to the metacarpal bones (knuckles), commonly 5th metacarpal neck, causing flexion deformity, results from throwing round house punch with closed fist where force goes through 5th metacarpal. Boxers with a proper punching technique will fx 2nd or 3rd metacarpal

- **Carpal tunnel syndrome** (median nerve entrapment) caused by Pitcher repeatedly snapping the wrist the when throwing sliders

- **Colles Fracture** - fx of distal end of radius, possibly an associated Ulnar fx causing a “dinner-fork” deformity

- **De Quervain’s disease** (Constrictive tenosynovitis), tendonitis of the abductor pollicis longus & extensor pollicis brevis where they pass through the first compartment

- **Distal Radial Fracture**- trying to break fall by putting hand down

- **Dupuytren’s contracture** - palmar aponeurosis contracture pulls fingers into flexion

- **Epiphysis Injury**: Injury involving the growth plate, usually a fracture

- **Extensor Intersection Syndrome** - inflammation of abductor pollicis longus & extensor pollicis brevis in the upper forearm where they cross over one another - seen in weight lifters & paddlers

- **Frozen Shoulder**: stiff shoulder joint that has temporarily lost the ability to move freely

- **Galeazzi Fracture** - FX of distal radial shaft accompanied by distal Ulnar dislocation

- **Golfers Elbow**: Medial epicondylitis

- **Hamate Fracture**= Hook of the Hamate, golf club breaks off the Hamate
**Impingement Syndrome** (usually caused by overhead movements), Compression of either the biceps tendon or the supraspinatus tendon below the acromion process

**Jersey Finger:** Avulsion fracture of the flexor tendon (middle joint in flexion / distal joint is in extension)

**Kienboch disease** - progressive necrosis of Lunate

**Little League Elbow:** In younger athletes- growth plate (the medial epicondylar physis) injury

**Mallet Finger:** Avulsion fracture of the extensor tendon (finger tip is in flexion)

**Monteggia Fracture** - FX of proximal ½ of ulna (associated with radial head dislocation), Ulnar nerve can be damaged

**Roland Fracture** - intra-articular FX of 1st metacarpal caused by excessive axial pressure through the joint

**Shoulder Instability:** shoulder goes a little out of place or feels like it might. "Instability" means that the shoulder bones aren't stable--they aren't held together as tight as they should be- muscle weakness

**Shoulder Separation:** Sprain of the AC joint classified into 3 degrees

**Skier’s Thumb/ Game Keepers Thumb:** (most common) Injury to the medial collateral ligament/ ulnar collateral ligament of the thumb

**SLAP Lesion/ Tear:** Superior Labrum tears from Anterior to Posterior

**Smith Fracture** - occurs by falling on the back of the hand with the wrist flexed, causing a angulated fx to the (volar) distal radius

**Tennis Elbow:** Lateral epicondylitis

**Tenosynovitis:** Inflammation of the tendon sheath most commonly flexor carpi radialis & flexor carpi ulnaris

**Tommy Johns Injury/ Surgery:** Ulnar collateral ligament reconstruction (or UCL) named after Tommy John, a pitcher for the Los Angeles Dodgers who was the first professional athlete to successfully undergo the operation in 1974. The procedure was performed by Dr. Frank Jobe (JOBEs Exercises)

**Trigger finger** - fibrous nodule in flexor tendon that catches on annular sheath opposite the metacarpal head

**Wrist ganglion** - synovial herniation in tendinous sheath or joint capsule, usually dorsal, very soft or firm