OSTEOPATHIC APPROACH TO UPPER EXTREMITY

ANATOMY, INJURIES, TREATMENTS & OMT
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DISCLOSURES

• I HAVE NO COMMERCIAL, FINANCIAL OR LEGAL DISCLOSURES
OBJECTIVES

- BASIC ANATOMY REVIEW OF THE UPPER EXTREMITY, WITH KEY AREAS OF THE SHOULDER, ELBOW, WRIST AND HAND
- COMMON INJURIES—SHOULDER, ELBOW, WRIST AND HAND
  - MECHANISM OF INJURY
  - DIAGNOSIS
  - TREATMENTS
- UPPER EXTREMITY OSTEOPATHIC MANIPULATIVE TREATMENTS
SHOULDER ANATOMY

- Shoulder is the proximal segment of the upper extremity and connects it to the axial skeleton.
- It includes the pectoral, scapular, and deltoid regions.
- Ligaments: Transverse humeral lig, superior acromioclavicular lig, coraco-acromial lig, coraco-clavicular lig, interclavicular lig, anterior sternoclavicular lig, costoclavicular lig.
- Joint capsule: Glenoid labrum.
- Tendons: Biceps tendon, sits muscles, triceps tendon.
- Bursae: Semitendinous bursae of subscapularis, subdeltoid bursae, subacromial bursae, subcoracoïd bursae.
- The bones that make up the shoulder consist of:
  - Sternum
  - Clavicle
  - Scapula
  - Humerus
SHOULDER ANATOMY– JOINTS

THERE ARE 5 TOTAL JOINTS–

- **ACROMIOCLAVICULAR JOINT**– ACROMION OF THE SCAPULA AND THE DISTAL CLAVICLE. A DIARTHRODIAL JOINT THAT ALLOWS MOTION IN ALL 3 PLANES. ENCLOSED BY A CAPSULE.

- **STERNOCLAVICULAR JOINT**– MANUBRIUM OF THE STERNUM AND THE CLAVICLE. HAS A JOINT CAPSULE THICKENED BY 4 LIGAMENTS. ALLOWS MOVEMENT OF DISTAL CLAVICLE IN SUPERIOR, INFERIOR, ANTERIOR AND POSTERIOR DIRECTION.

- **CORACOCLAVICULAR JOINT**– SYNDENOMIS JOINT OF THE CORACOID PROCESS OF THE SCAPULA AND THE INFERIOR DISTAL CLAVICLE. ATTACHED BY THE CORACOCLAVICULAR LIGAMENT. VERY LITTLE MOVEMENT IS PERMITTED HERE.

- **SCAPULOTHORACIC JOINT**– PERMITS THE SCAPULA TO GLIDE ALONG THE THORAX ON A CURVED SURFACE OF LOOSE CONNECTIVE TISSUE

- **GLENOHUMERAL JOINT**– BALL AND SOCKET (GLENOID FOSSA OF THE SCAPULA AND THE HUMERUS) SYNOVIAL JOINT THAT PERMITS WIDE RANGES OF MOTION. HOWEVER, THIS MAKES THE JOINT RELATIVELY UNSTABLE. SURROUNDED BY A JOINT CAPSULE THAT IS REINFORCED BY THE SITS MUSCLES TO ADD STABILITY.
Coracoid process
Acromial end of clavicle
Acromion of scapula
Lesser tubercle
Greater tubercle
Intertubercular sulcus (bicipital groove)
Surgical neck
Body of scapula
Deltoid tuberosity
Shaft of humerus
Superior border
Superior angle
Sternal end
Supraspinous fossa
Head of scapula
Suprascapular notch
Neck of scapula
Infraspinous fossa
Subscapular fossa
Lateral border
Inferior angle
Spine of scapula
Acromioclavicular joint
Acromion
Acromial angle
Greater tubercle
Head of humerus
Surgical neck of humerus
Anatomical neck of humerus
Deltoid tuberosity
Radial groove
Shaft of humerus
SHOULDER ANATOMY – MUSCLES

- PECTORALIS MAJOR
- PECTORALIS MINOR
- SUBCLAVIUS
- SERRATUS ANTERIOR
- LEVATOR SCAPULAE
- RHOMBOID MAJOR
- RHOMBOID MINOR
- DELTOID
- CORACHOBRACHIALIS

- SUPRASPINATUS
- INFRASPINATUS
- SUBSCAPULARIS
- TERES MINOR
- TERES MAJOR
- TRICEPS
- BICEPS
- LATISSIMUS DORSI
MOTION AT THE SHOULDER

- Extensive ROM at the shoulder is due to the loose glenohumeral joint and limited bony articulations.

- Movement typically involves rotation at the sc, ac and gh joints in combination.

- Scapulohumeral rhythm is a key element in any movement at the shoulder, it enables greater ROM.

- The scapula has its own ROM.

- Primary motions at the gh include: flexion, extension, abduction, adduction, medial and lateral rotation.
SCAPULAR MOTION

FIGURE 6.25. Movements of scapula and muscles producing them. Arrows indicate the direction of pull; the muscles (and gravity) producing each movement are identified by numbers, which are listed in Table 6.5.
MOST NERVES OF THE UPPER EXTREMITY ARISE FORM THE BRACHIAL PLEXUS

IT EXTENDS FROM THE NECK TO THE AXILLA

FORMED FROM THE ANTERIOR RAMI OF C5–C8 AND T1
DIAGNOSING A SHOULDER INJURY

1. Shoulder problems (pain, instability, stiffness)
   - Clinical examination

   2. Decreased external rotation
      - Frozen shoulder
      - Osteoarthritis
      - Appropriate management (may include radiographs, US)

   3. Shoulder trauma including dislocation
      - Shoulder radiographs

   4. 1) Pain with elevation and / or internal rotation
       2) Weak elevation and external rotation
       - Impingement syndrome
       - Rotator cuff tear

   5. Fracture
      - Complex injuries may require further evaluation with CT and MRI

   6. Shoulder instability but no fracture
      - Age ≥ 40yrs (rotator cuff tear more likely), no fracture
      - Consider MR arthrography
      - MRI contraindicated
      - Consider CT arthrography

   7. Consider US if expertise available
      - If US expertise not available or persistent pain
      - Consider MRI
STINGERS

- AKA BURNER SYNDROME
- TRANSIENT STINGING AND BURNING SENSATIONS FROM FORCEFUL CONTACT TO NECK AND ANTERIOR SHOULDER REGION
- TRANSIENT DYSFUNCTION TO THE BRACHIAL PLEXUS
  - USUALLY OF THE UPPER PLEXUS
- SYMPTOMS USUALLY RESOLVE IN MINUTES TO HOURS TO DAYS
  - EMG IF SYMPTOMS LAST GREATER THAN 3 WEEKS
- USUALLY DON'T NEED TO WORK UP, NO SPECIAL TESTS.
- R/O OTHER INJURIES
AC SPRAINS

- SPRAINS—RUPTURE OR PARTIAL RUPTURE TO THE AC AND OR CORACOCLAVICULAR LIGAMENT

- USUALLY THE RESULT OF A DIRECT BLOW TO THE AC JOINT, FALL TO THE POINT OF THE SHOULDER, FOOSH INJURY

- CLASSIFICATION IS BASED ON THE SEVERITY AND THE LIGAMENT INVOLVED
AC SPRAIN

TX–

I AND II: RICE, NSAIDS, ROM EXERCISES AS TOLERATED. IMMobilization in sling only if pain is present. INJECTION may be beneficial if pain and swelling are persistent.

III: Most treated conservatively– immobilization in a sling for 2–4 weeks then pendulum exercises, elbow ROM exercises, all plane isometrics, rope and pulley exercises as tolerated. Surgical fix– start pendulum and isometric exercises before surgery, limited abduction and flexion ROM for 3–4 weeks after surgery. Return to sports may take 10–12 weeks, with contact sport return at 3–5 months.

IV–VI: Open or arthroscopic intervention is necessary. Immobilization from 4–6 weeks after which a progressive ROM and strengthening program is begun. Return to sport permitted about 6 months after re-mobilization begins and isometric testing is equal to the contralateral side.
AC SPECIAL TESTS

- AC SHEAR TEST
- PIANO KEY TEST – SPRING TEST
- AC COMPRESSION / DISTRACTION TEST
ADHESIVE CAPSULITIS

- AKA FROZEN SHOULDER
- A CONDITION OF VARYING SEVERITY CHARACTERIZED BY THE GRADUAL DEVELOPMENT OF GLOBAL LIMITATION OF AROM AND PROM WITHOUT OSTEOPENIA AND WITH SEVERE SHOULDER PAIN
- PAINFUL PROGRESSIVE STIFFENING OF THE SHOULDER
- PRIMARILY IDIOPATHIC, BUT MAY BE ASSOCIATED WITH OTHER DISEASE OR INJURIES
- SY: 3 PHASES: 1) PAIN THAT’S WORSE AT NIGHT WITH INCREASED STIFFNESS OVER 2–9 MONTHS, 2) INTERMEDIATE STIFFNESS, LOSS OF ROM, LESS PAIN OVER 4–12 MONTHS, 3) RECOVERY, GRADUAL RETURN OF ROM OVER THE NEXT 5–24 MONTHS
- DG: USUALLY A CLINICAL DIAGNOSIS BASED ON HISTORY AND PHYSICAL EXAM
- TX: SHORT COURSE ORAL STEROIDS, OMT, PT, INJECTIONS, DILATIONS, SURGICAL RELEASE
ROTATOR CUFF INJURIES

- TENDINOPATHY, RUPTURE, PARTIAL TEARS

- SY: TENDERNESS AT THE INSERTION POINTS OF THE TENDON, NORMAL TO DECREASED ROM, NORMAL TO DECREASED STRENGTH, PAIN WITH ROM AND OR TESTING

- DG: PHYSICAL EXAM, US, MRI, SPECIAL TESTS

- TX:
  - CONSERVATIVE: ICE, REST, ACTIVITY MODIFICATIONS, NSAIDS, PT, OMT, STIM
  - INJECTIONS, CRYOTHERAPY, SURGERY
ROTATOR CUFF SPECIAL TESTS

- LIFT OFF TEST (GERBER’S TEST) – SUBSCAPULARIS, SHOULDER INSTABILITY
- DROP ARM TEST – SUPRASPINATUS
- EMPTY CAN TEST – SUPRASPINATUS
- FULL CAN TEST – SUPRASPINATUS
- INFRASPINATUS TEST
- HORNBlOWER’S TEST (PATTE TEST)
- RENT SIGN
IMPINGEMENT

- IMPLIES THAT THERE IS AN ACTUAL MECHANICAL ABUTMENT OF THE ROTATOR CUFF AND THE SUBACROMIAL BURSA AGAINST THE CORACOACROMIAL LIG AND THE ACROMION

- USUALLY DUE TO A FORCE OVERLOAD TO THE ROTATOR CUFF OF AND BURSA DURING ABDUCTION, FORWARD FLEXION AND MEDIAL ROTATION– RESULTING IN COMPRESSION BETWEEN THE HUMERAL HEAD AND THE ACROMION

- SY: PAIN THAT IS USUALLY DEEP, WORSE AT NIGHT, WORSE WITH IMPINGEMENT ACTIVITIES, TENDER TO PALPATION AT THE SUBACROMIAL SPACE, +/- SITS MUSCLE ATROPHY

- THERE ARE MULTIPLE STAGES OF IMPINGEMENT

- DG: PHYSICAL EXAM, X-RAYS, US, MRI OR CT, SPECIAL TESTS,

- TX: REST, NSAIDS, STIM, MESSAGE, CRYOTHERAPY, PT, OMT, INJECTIONS, SURGERY
IMPINGEMENT SPECIAL TESTS

- HAWKINS–KENNEDY TEST
- JOBE TEST
- HORIZONTAL ADDUCTION TEST
- NEER TEST
LABRUM INJURIES

- Tears may occur due to degeneration, trauma, or age, many times are incidental findings and asymptomatic.

- Bankart lesion – tearing of the labrum and inferior glenohumeral lig, associated with anterior shoulder instability.

- Slap lesion – superior labrum tear that disrupts the attachment of the long head of the biceps tendon. There are 4 types of slap tears.

- SY: Pain, catching or weakness, especially with overhead motion, +/- popping and clicking in joint.

- DG: Physical exam, MRI or CT or US, special tests.

- TX:
  - Conservative: Rest, NSAIDS, PT, OMT, injections.
  - Surgical – arthroscopic debridement, surgical repair/fixation.
LABRAL SPECIAL TESTS

- BICEPS LOAD TEST— TESTS THE SUPERIOR LABRUM
- COMPRESSION ROTATION TEST
- O’BRIEN TEST— SLAP LESION
- CLUNK OR GRIND TEST
BURSITIS

- USUALLY ASSOCIATED WITH OTHER INJURIES
  - I.E.: IMPINGEMENT, DEGENERATIVE CHANGES, TENDINOPATHIES, ROTATOR CUFF PATHOLOGY

- WITH CERTAIN MOVEMENTS BURSA BECOME IMPINGED

- SY: SUDDEN SHOULD PAIN, POINT TENDERNESS AT THE ANTERIOR AND LATERAL ACROMION PROCESS, PAINFUL ARC BETWEEN 70–120 DEGREES, INABILITY TO SLEEP ON AFFECTED SIDE, PAIN MAY BE REFERRED TO THE DISTAL DELTOID ATTACHMENT SITE

- DG: PHYSICAL EXAM, US

- TX: REST, NSAIDS, ICE, PT, OMT, INJECTION
  - TREAT THE UNDERLYING CAUSE: ADJUST MOVEMENTS, STRENGTHING THE SURROUNDING MUSCLES, ETC.
SHOULDER DISLOCATIONS

- 3 MAIN DIRECTIONS OF DISLOCATION—ANTERIOR, POSTERIOR AND INFERIOR
- ACUTE: HAVE ASSOCIATED FRACTURE AND NERVE DAMAGE, CONSIDERED A SERIOUS INJURY, NEEDS TO BE REDUCED RIGHT AWAY
  - INTENSE PAIN, +/- NUMBNESS
- CHRONIC: RECURRENT OR “TRICK” DISLOCATIONS, TEND TO BE ANTERIOR AND INTRACAPSULAR, DECREASED FORCE NEED TO OCCUR, CREPITUS AND CLICKING NORMAL, DEAD ARM SYNDROME
  - DG: PALPATION, MOI, VISUALIZATION, X-RAYS
  - TX: REDUCTION, +/- IMMOBILIZATION 3–6 WEEKS, REST, ICE, NSAIDS, PT, OMT, SURGERY
SHOULDER DISLOCATIONS

- **ANTERIOR**— Blow to the shoulder with the arm abducted, externally rotated and in extension, humeral head in front of the acromion, prominent acromion process, won't move arm across chest.

- **POSTERIOR**— Blow to the anterior shoulder with axial loading of adduction and internal rotation, flat anterior shoulder, prominent posterior, coracoid process prominent, can't externally rotate arm, light bulb sign on X-ray.

- **INFERIOR**— AKA Luxatro Erecta, axial loading with arm fully abducted or forceful hyperabduction, fall and opposite arm used to catch self, arm help above head and can not adduct arm, forearm pronated, humeral head below the coracoid or glenoid.
Hill–sachs deformity

Light bulb sign
GLENOHUMERAL INSTABILITY/DISLOCATION
SPECIAL TESTS

- APPREHENSION TEST (CRANK TEST)
- ANTERIOR/ POSTERIOR LOAD AND SHIFT TEST
- JERK TEST
- RELOCATION TEST
- POSTERIOR APPREHENSION TEST
- SULCUS SIGN– INFERIOR OR MULTIDIRECTIONAL INSTABILITY
SCAPULAR FRACTURES

- Fracture may occur due to a foosh or a direct blunt trauma to the scapula.
- SY: Most result in minimal displacement, localized hemorrhage or edema, reluctance to move arm, painful abduction, patient keeps arm in adduction.
- DG: X-rays with multiple views, CT scan.
- TX:
  - Conservative: immobilization in sling and swathe, cryotherapy within the first 48 hrs, then minimal movement and passive stretching.
  - Surgical: if significant displacement or other associated fractures, angulation of the neck of the scapula– metal plates and screws are used to hold the pieces together, then bracing and rehab.
SCAPULAR WINGING

- Scapula protrudes posteriorly, appears like a wing on the back
- Usually asymptomatic
- DG: EMG to nerve, muscle and strength testing, shoulder stability testing

2 main types

- Medial winging – Serratus anterior and long thoracic nerve. Due to compression injury, repetitive stretch injury or previous anesthesia. Weakness with lifting away from body or overhead. TX conservatively, strengthening,

EXTREME CASE OF WINGED SCAPULA
SCAPULAR DYSKINESIS

- SCAPULAR MALPOSITION, ASYMMETRIC SCAPULAR POSITIONING AND ALTERED MOTION
- USUALLY CAUSED BY NEUROLOGIC INJURY, KYPHOSIS OF THE THORACIC SPINE, PERISCAPULAR MUSCLE FATIGUE, POOR MOVEMENT MECHANICS, SECONDARY TO PAIN
- SY: ANTERIOR SHOULDHER PAIN, AFFECTED SCAPULA LOWER AND DISPLACED, MINIMAL SCAPULAR WINGING, SCAPULOTHORACIC CREPITUS
- DG: PHYSICAL EXAM (X-RAYS USUALLY UNREMARKABLE)
- TX: CONSERVATIVE—NSAIDS, PT TO STRENGTHEN AND STABILIZE THE SHOULDER GIRDLE, OMT, INJECTIONS
SCAPULAR SPECIAL TESTS

- SERRATUS WALL TEST (SCAPULAR WINGING TEST)
- SCAPULAR REPOSITIONING TEST (SCAPULAR STABILIZATION OR SCAPULAR RETRACTION)
- SCAPULAR ASSISTANCE TEST
ELBOW ANATOMY

- CARRYING ANGLE: Angle between the humerus and the ulna in anatomical position, as the forearm angles away from the body.
- LIGAMENTS: Lateral (radial) collateral lig, medial (ulnar) collateral lig, annular lig
- CAPSULOLIGAMENTOUS STRUCTURE REINFORCES THE ELBOW, FORMS A THICK CAPSULE AROUND THE JOINT
- BURSAE: There are several small bursae in the elbow. The most relevant is the subcutaneous olecranon
- BONES:
  - Humerus
  - Radius
  - Ulna
ELBOW ANATOMY

JOINTS
- HUMEROULNAR JOINT - HINGE JOINT, MOVEMENT IN FLEXION AND EXTENSION. MOST STABLE JOINT IN THE UPPER EXTREMITY
- HUMERORADIAL JOINT - GLIDING JOINT, RESTRICTED IN THE SAGITTAL PLANE
- PROXIMAL RADIOULNAR JOINT - PIVOT JOINT, WITH MOTION OF SUPINATION AND PRONATION. HELD IN PLACE BY ANNULAR LIGAMENT

MOTION AT THE ELBOW
- 3 JOINTS ALLOW MOTION IN 2 PLANES
  - FLEXION AND EXTENSION IN THE SAGITTAL PLANE
    - BRACHIALIS IS THE PRIMARY FLEXOR
    - TRICEPS IS THE PRIMARY EXTENSOR
  - PRONATION AND SUPINATION IN LONGITUDINAL ROTATION MOVEMENTS. OCCURS AT THE PROXIMAL RADIO-ULNAR JOINT
    - PRONATOR QUADRATUS IS THE PRIMARY PRONATOR
    - SUPINATOR IS THE PRIMARY SUPINATOR
ELBOW ANATOMY– MUSCLES

MANY MUSCLES AT THE ELBOW CROSS THE JOINT AND EXTEND DOWN INTO THE HAND

- BICEPS BRACHII LONG AND SHORT HEADS
- BRACHIORADIALIS
- BRACHIALIS
- PRONATOR TERES HUMERAL AND ULNAR HEADS
- PRONATOR QUADRATUS
- TRICEPS BRACHII LONG, LATERAL AND MEDIAL HEADS
- ANCONEUS
- SUPINATOR
OLECRANON BURSITIS

- Usually caused by a direct blow to the elbow or a fall onto the posterior elbow
  - May also be caused by repeated microtrauma or motions of flexion and extension with resistance

- SY: Usually painless and fluctuant swelling to the posterior elbow, there may be immediate tenderness, swelling and redness to the area post trauma – a goose egg formation, motion may be limited in flexion

- Diagnosis made by physical exam
  - Recommend an X-ray be one to R/O fracture

- TX:
  - Conservative: Ice, rest and compression wrap for at least 24 hrs
  - Can aspirate the bursae to remove the fluid then place a compression
    - After aspiration can inject a corticosteroid
  - Chronic: NSAIDS, cryotherapy, elbow cushions
  - Long term: Regular aspirations or bursal excision
OLECRANON BURSITIS

- Non-septic bursitis—may be a crystalline deposit or rheumatoid associated with an atopic dermatitis—treat the underlying cause.

- Septic bursitis—If the bursae is infected need to treat appropriately.
  - Source of infection may be at a distant site.

- Signs of infection—malaise, fever, significant pain to the elbow, local heat, tenderness, swelling, restricted motion, +/− overlaying cellulitis.

- Tx: Aspirate and culture the fluid, immobilize and place in sling, hot packs, oral antibiotics.
CAPSULITIS OF THE ELBOW

- Usually caused by hyperextension injury to the elbow joint, specifically the anterior compartment
- May be caused by repetitive movements with micro-tearing to the capsule
- SY: Diffuse anterior elbow pain with tenderness to palpation, +/- nerve entrapment - numbness and tingling in the hand
- TX: Immobilize the joint for 3–5 days then begin active ROM exercises
ELBOW DISLOCATIONS – RADIUS

- Subluxation or dislocation of the proximal radial head – “Nurse Maids” elbow

- Usually from a longitudinal traction, extension and pronation to the upper extremity that leads to a tear in the annular lig.

- DG-X-ray (need to confirm dislocation and R/O fracture), pain with pronation and supination

- TX: Relocation of non fractured joint, immobilization 3–6 weeks in a flexed position. Then progressive ROM and strengthening exercises
ELBOW DISLOCATIONS – ULNA

- Hyperextension injury or sudden violent unidirectional valgus force that leads to the ulna going posterior or posterior–lateral
- +/- Fractures, anterior capsule disruption, artery/vein or nerve damage
- Sy: Snapping or cracking sound, severe pain at the joint (especially medially), rapid swelling, total loss of function, obvious deformity, +/- nerve palsies in the hand, +/- crepitus (if associated with a fracture)
- Dg: X-ray, physical exam, observation
- Tx:
  - Closed reduction – if ligaments appear intact and there are no fractures, limited immobilization and early ROM and proprioception training
  - If associated with fracture surgical fix may be necessary, 3–6 weeks immobilization and then gradual ROM and strength and proprioception
RUPTURED TENDONS
BICEPS BRACHII “POPEYE DEFORMITY”

- Degenerative changes make the tendon vulnerable to tear, especially with eccentric loads, proximal > distal, females < males
- SY: Tenderness, swelling, ecchymosis in the antecubital fossa. Biceps tendon not palpable, retracted, painful arc, worse at night
- DG: Physical exam, US, MRI or CT
- TX:
  - Non-operative: (Partial tear or not a candidate) will just have deformity with decreased function
  - Surgical: Reattachment of the tendon to the radial tuberosity. Immobilization at 90 degrees flexion with moderate supination for 8 weeks. Then gradual AROM and strengthening

TRICEPS BRACHII

- Direct blow to the posterior elbow or contraction due to a fall
- SY: Pain and swelling over the distal attachment of the olecranon. Palpable defect or a step off deformity to the olecranon. Weakness or absent active extension
- DG: Physical exam, US, MRI or CT
- TX:
  - Partial tear – Conservative: Ice, compression, immobilization in sling
  - Complete tear – Surgical reattachment, if there is an avulsion fracture then ORIF. Immobilize for 4 weeks in 45 degrees flexion, then decrease flexion and immobilize for another 4 weeks. Gradual ROM and strengthening
TENDON SPECIAL TESTS

- BICEPS:
  - SPEEDS TEST
  - YERGASONS TEST
LATERAL EPICONDYLITIS

- Extensor Tendon Overload, usually form repetitive motions, eccentric loading. Especially in the deceleration phase
- Often involving the Extensor Carpi Radialis Brevis
- Causes can include faulty mechanics, poor fitting equipment, repetitive motions or recurrent injury, age 30–50 YO
- DG: Physical Exam, US
- SY: Pain anterior or distal to the lateral epicondyle that radiates into the forearm extensor muscles. Pain increased with resisted wrist extension, pain worse with repetitive motions
- TX:
  - Ice, compression, NSAIDS, rest, activity modification (avoid grasping in a pronated position)
  - Increase strength, endurance and flexibility of the extensor muscle group
  - Can wear a counterforce strap 2–3 inches distal to the joint (at the muscle belly)
  - Injections– Homeopathic or steroid
  - Physical Therapy
  - OMT
MEDIAL EPICONDYLITIS

- REPEATED MEDIAL TENSION / LATERAL COMPRESSION (VALGUS) FORCES PLACED ON THE ARM, ESPECIALLY DURING ACCELERATION
- COMMON TENDONS INVOLVED: PRONATOR TERRIS (HUMERAL HEAD) AND FLEXOR CARPI RADIALIS
- MEDIAL EPICONDYLE AND MEDIAL SUPRACONDYLAN RIDGE INVOLVED
- IN KIDS, IF THE MEDIAL HUMERAL GROWTH PLATE IS AFFECTED KNOW AS “LITTLE LEAGUE ELBOW”
- DG: PHYSICAL EXAM, US
- SY: SWELLING, ECCHYMOSIS, POINT TENDERNESS OVER THE HUMEROULNAR JOINT, THE FLEXOR/PRONATOR ORIGIN, OR DISTAL AND LATERAL TO THE MEDIAL EPICONDYLE. PAIN THAT IS SEVERE AND AGGRAVATED BY RESISTED WRIST FLEXION AND PRONATION OR VALGUS STRESS. +/- NUMBNESS OR TINGLING
- TX:
  - ICE, NSAIDS, ACTIVITY MODIFICATIONS
  - ABOVE + IMMOBILIZATION IN SLING FOR 2–3 WEEKS WITH WRIST IN SLIGHT FLEXION
  - TENS, US, EARLY ROM, GENTLE RESISTED ISOMETRIC EXERCISES AND STRENGTHENING THAT PROGRESSES
SPECIAL TESTS FOR THE ELBOW

- COMMON EXTENSOR TENDINITIS TEST (LATERAL)
- MEDIAL EPICONDYLITIS TESTS
- LIGAMENTOUS INSTABILITY TESTS—VALGUS/VARUS TESTING OF THE ELBOW
- TINEL’S FOR ULNAR NEURITIS
FOREARM, WRIST & HAND ANATOMY

- THE WRIST AND HAND ARE COMPOSED OF NUMEROUS SMALL BONES AND ARTICULATIONS THAT ALLOW FOR DEXTEROUS MOVEMENTS TO BE PERFORMED.

- RETINACULA OF THE WRIST – 2 (FLEXOR AND EXTENSOR) STRONG FIBROUS BANDS THAT SURROUND THE WRIST. FORMS A PROTECTIVE PASSAGEWAY FOR THE TENDONS, NERVES AND VESSELS THAT PASS TO THE HAND.

- TENDON SHEATHS – STARTS AT THE METACARPAL HEADS. PROVIDES LOW FRICTION GLIDING. PULLEYS AT THE JOINTS PREVENT BOWSTRINGING.

- THE EXTRINSIC FLEXORS OF THE HAND ARE 2X AS STRONG AS THE EXTRINSIC EXTENSORS – THEY GRIP, GRASP AND PINCH DAILY
FOREARM, WRIST & HAND ANATOMY

BONES

- RADIUS
- ULNA
- CARPAL BONES–
  - SCAPHOID
  - LUNATE
  - TRIQUETRAL
  - PISIFORM
  - TRAPEZIUM
  - TRAPEZOID
  - CAPITATE
  - HAMATE
- METACARPALS
- PHALANGES: PROXIMAL, MIDDLE AND DISTAL

JOINTS

- CARPOMETACARPAL JOINTS– THUMB IS A SADDLE JOINT AND THE FINGERS ARE GLIDING JOINTS. ALL SURROUNDED BY JOINT CAPSULE
- INTERMETACARPAL JOINTS– GLIDING JOINTS, SURROUNDED BY A JOINT CAPSULE
- METACARPOPHALANGEAL JOINTS– “KNUCKLES” OF THE HAND, CONDYLOID JOINTS, ENCLOSED IN A CAPSULE REINFORCED BY COLLATERAL LIGS,
- INTERPHALANGEAL JOINTS– PIP AND DIP ARE ALL HINGE JOINTS, SURROUNDED BY AN ARTICULAR CAPSULE
- RADIOLCARPAL JOINT– MOST WRIST MOTION OCCURS HERE, IS A CONDYLOID JOINT
- DISTAL RADIOULNAR JOINT– HAS A TRIANGULAR FIBROCARTILAGE AT THE DISTAL END AND IS A STABILIZER TO THE JOINT
- INTERCARPAL JOINTS
MOTION AT THE FOREARM, WRIST, & HAND

- **FOREARM**
  - PRONATION
  - SUPINATION

- **WRIST**
  - FLEXION
  - EXTENSION
  - HYPEREXTENSION
  - RADIAL DEVIATION
  - ULNAR DEVIATION

- **HAND/ PHALANGES**
  - CM JT: ABDUCTION AND ADDUCTION, FLEXION AND EXTENSION
  - MP JT: FLEXION, EXTENSION, ABDUCTION, ADDUCTION AND CIRCUMDUCTION
  - IP JT: FLEXION AND EXTENSION, IN SOME HYPEREXTENSION
  - THUMB: FLEXION, EXTENSION, PALMAR ABDUCTION AND ADDUCTION, OPPOSITION AND CIRCUMDUCTION

- **HAND GRIPS**
  - 3 TYPES: POWER, PRECISION GRIP, FENCING GRIP (LATERAL PINCH)
## EXTRINSIC MUSCLES
- EXTENSOR POLLICIS LONGUS
- EXTENSOR POLLICIS BREVIS
- FLEXOR POLLICIS LONGUS
- ABDUCTOR POLLICIS LONGUS
- EXTENSOR INDICIS
- EXTENSOR DIGITORUM
- EXTENSOR DIGITI MINIMI
- FLEXOR DIGITORUM PROFUNDUS
- FLEXOR DIGITORUM PROFUNDUS

## INTRINSIC MUSCLES
- FLEXOR POLLICIS BREVIS
- ABDUCTOR POLLICIS BREVIS
- OPPONENS POLLICIS
- ADDUCTOR POLLICIS
- ABDUCTOR DIGITIS MINIMI
- FLEXOR DIGITI MINIMI BREVIS
- OPPONENS DIGITI MINIMI
- DORSAL INTEROSSEI (4 MUSCLES)
- PALMAR INTEROSSEI (3 MUSCLES)
- LUMBRICLES (4 MUSCLES)
Muscles of the Forearm
(right arm, posterior compartment)

Superficial
- Triceps brachii
- Brachioradialis
- Extensor carpi radialis longus
- Extensor carpi radialis brevis
- Flexor carpi ulnaris
- Anconeus
- Extensor digitorum
- Extensor retinaculum

Deep
- Triceps brachii
- Brachioradialis
- Extensor carpi radialis longus
- Extensor carpi radialis brevis
- Flexor carpi ulnaris
- Anconeus
- Abductor pollicis longus
- Extensor pollicis brevis
- Extensor pollicis longus
- Extensor indicis
- Tendons of extensor carpi radialis longus and brevis
SPRAINS AND STRAINS

- REPETITIVE TENSILE STRESS TO THE TENDONS AND LIGAMENTS
  - USUALLY ASSOCIATED WITH INADEQUATE WARM UP OR FATIGUE

- SY: PALPABLE PAIN (TENDERNESS AT THE MUSCLE BELLY) WHEN THE INVOLVED MUSCLE IS MOVED. PAIN WITH ACTIVE AND RESISTED MOTION, +/- SWELLING

- DG: PHYSICAL EXAM, SPECIAL TESTS, US

- TX: ICE, COMPRESSION, REST, +/- BRIEF IMMOBILIZATION (<5DAYS), ACTIVITY MODIFICATION, NSAIDS, GRADUAL AROM AND STRENGTHENING ACTIVITIES
JERSEY FINGER

- Typically occurs when an individual grips an opponent’s jersey while they are twisting. The jerking motion may force the finger to rapidly extend and rupture the flexor digitorum profundus tendon on distal phalanx.

- SY: If avulsed—can palpate tendon proximally, unable to flex the DIP. Hematoma formation along flexor tendon sheath, pain and swelling in the affected finger.

- DG: Physical exam, X-ray, MRI

- TX: Bracing of the finger in slight flexed position. Ice, NSAIDs, rest. If ruptured fully and/or avulsion fracture present then surgical fix.
TRIGGER FINGER

- STENOSING TENOSYNOVITIS CAUSED BY INFLAMMATION OF FLEXOR TENDON SHEATH, CAN ALSO BE CAUSED BY REPEATED TRAUMA TO THE PALMAR ASPECT OF THE HAND

- THIS CAUSES THICKENING OF THE TENDON SHEATH AS IT PASSES OVER THE PROXIMAL PHALANX.


- DG: CLINICAL FROM PHYSICAL EXAM AND HISTORY

- TX: NSAIDS, RESTING THE FINGER, SPLINTING, STEROID INJECTIONS INTO THE A1 PULLEY. SURGICAL RELEASE OF THE ANNULAR LIGAMENT AROUND
DE QUERVAIN’S TENOSYNOVITIS

- THE ABDUCTOR POLLICIS LONGUS AND THE EXTENSOR POLLICIS BREVIS SHARE A TENDON SHEATH, WHEN OVER USED OR CONTINUED FORCEFUL GRIP WITH ULNAR DEVIATION OCCURS CAN GET DYSFUNCTION

- SY: PAIN OVER THE RADIAL STYLOID PROCESS THAT INCREASES WITH THUMB AND WRIST MOTION. POINT TENDERNESS OVER THE TENDONS, +/- CREPITUS, PAINFUL MOVEMENTS OF THE THUMB,

- DG: PHYSICAL EXAM, SPECIAL TESTS

- TX: ICE, REST, NSAIDS, STEROID INJECTIONS, IMMOBILIZATION WITH THUMB SPICA SPLINT FOR 3 WEEKS, IF SEVERE SURGICAL DECOMPRESSION
CARPAL TUNNEL SYNDROME

- ANY IRRITATION TO THE SYNOVIAL SHEATH COVERING THE TENDONS CAN LEAD TO SWELLING OR EDEMA THAT PLACES PRESSURE ON THE MEDIAN NERVE.

- CTS IS THE MOST COMMON COMPRESSION SYNDROME OF THE WRIST AND HAND. CAN BE CAUSED BY DIRECT TRAUMA, REPETITIVE OVERUSE, OR ANATOMICAL ANOMALIES.

- SY: PAIN THAT WAKES AT NIGHT, RELIEVED BY SHAKING OF THE HANDS. PAIN, NUMBNESS OR TINGLING, BURNING SENSATION IN THE HANDS, FROM INDEX FINGER TO HALF OF THE RING FINGER, +/- DECREASED GRIP OR PINCHING STRENGTH. IN CHRONIC MAY SEE THENAR ATROPHY

- DG: SPECIAL TESTS, US, EMG

- TX: SPLINTING AT NIGHT– IN EXTENSION FOR 3–5 WEEKS, ICE, NSAIDS, PT, OMT, STEROID INJECTIONS, SURGICAL DECOMPRESSION OR CARPAL TUNNEL RELEASE
CARPAL TUNNEL SYNDROME

Hypothenar eminence atrophy
STRESS TESTS FOR WRIST AND FINGERS

- FINKELSTEIN’S TEST
- CARPAL TUNNEL COMPRESSION TEST
- TINEL’S SIGN
- PHALEN’S TEST
SLAC WRIST

- SLAC: SCAPHO–LUNATE LIGAMENT INJURY
- PRESENTS WITH DIFFICULTY WEIGHT BEARING, INTERVAL PAIN AT THE SL JOINT, PROGRESSIVE WEAKNESS AND WRIST STIFFNESS
- LEADS TO EARLY AND ACCELERATED WRIST ARTHRITIS
- CAN PROGRESS TO THE RADIOSCAPHOID JOINT AND THEN THE CAPITOLUNATE JOINT. (THE RADIOLUNATE JOINT IS USUALLY SPARED)
- DG: SCAPHOID SHIFT TEST (WATSON’S TEST) AND X–RAY IMAGING
- TX: SURGICAL REPAIR– STYLOIDECTOMY AND SCAPHOID STABILIZATION, AND ANTERIOR INTEROSSEOUS NERVE DENERVATION (TO CONTROL PAIN). IF MORE SEVERE THEN CARPECTOMY OF THE PROXIMAL ROW. LAST STAGE ARTHRITIS AND ALL INVOLVEMENT IS SCAPHOID EXCISION AND FOUR CORNER FUSION – WRIST FUSION
SLAC WRIST
TRIANGULAR FIBROCARTILAGE COMPLEX INJURY

- TFCC - INVOLVES: DORSAL AND VOLAR RADIOULNAR LIGS, CENTRAL ARTICULAR DISC, MENISCUS HOMOLOG, ULNAR COLLATERAL LIG, EXTENSOR CARPI ULNARIS SUBSHEATH, ORIGIN OF THE ULNOLUNATE AND ULNOTRIQUETRAL LIG

- THE CENTRAL PORTION IS AVASCULAR

- MCC TYPE 1 - TRAUMATIC FALL ON EXTENDED ARM WITH THE FOREARM IN PRONATION, OR TRACTION INJURY TO THE ULNAR WRIST (I.E.: FOOSH)

- MCC TYPE 2 - DEGENERATIVE

- WRIST PAIN AND TWISTING PAINFUL. TENDERNESS SOFT SPOT BETWEEN ULNAR STYLOID AND FLEXOR CARPI ULNARIS TENDON, BETWEEN VOLAR SURFACE OF ULNAR HEAD AND PISIFORM.

- IMMOBILIZATION, NSAIDS, STEROID INJECTIONS

- MULTIPLE SURGICAL TREATMENTS RANGING FROM ARTHROSCOPIC DEBRIDEEMENT AND REPAIR TO RESECTIONS OF THE DISTAL ULNA DEPENDING ON TYPE
<table>
<thead>
<tr>
<th>Class 1 - Traumatic TFCC Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
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<tr>
<td>1B</td>
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<tr>
<td>1C</td>
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<tr>
<td>1D</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2 - Degenerative TFCC Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
</tr>
<tr>
<td>2B</td>
</tr>
<tr>
<td>2C</td>
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<tr>
<td>2D</td>
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<tr>
<td>2E</td>
</tr>
</tbody>
</table>

**Palmar TFCC**

**Dorsal TFCC**

- Ulnolunate ligament
- Radioulnar ligament
- Ulnolunate ligament homologue
- Articular disc
- Radioulnar ligament
- Extensor carpi ulnaris tendon sheath
- Ulnar collateral ligament
- Articular disc
- Meniscus homologue
DISLOCATIONS

DISTAL RADIOULNAR JOINT–

- Usually due to hyperextension
- SY: Deformity to the joint, swelling, tenderness to palpation
- Need to R/O fractures, may have damage to the TFCC.
- DG: By X-ray

TX: Simple dislocations can be stabilized (after internal fixation of associated fractures) immobilize in an above elbow cast for up to 6 weeks and then begin rehab. Can use a splint or cast if simple dislocation with no fracture 3–4 weeks then rehab.

METACARPAL AND PHALANGES

- MCP– are rare, hyperextension or a shearing force is usually the cause.
- PIP– is one of the most common locations for dislocation in the body. Injury is usually due to hyperextension and axial compression
- DIP– usually occur dorsally and may be associated with an open wound
- SY: Swollen, painful finger at joint line, may have angular deformity
- DG: X-rays

TX: If stable and no displaced fracture can brace with buddy tape for 2–3 weeks. Early AROM. PIP splint at 30 degrees flexion for 10–14 days. If complex then brace in extension for 6 weeks. DIP use a volar splint for 3 weeks. ROM and OMT after splint removed.
DISTAL RADIAL AND ULNAR FRACTURES

- In adolescents you must pay close attention to fractures to the epiphyseal and metaphyseal regions.
- Most distal radial and ulnar fractures will heal on their own if simple.
- Usually caused by a fall or direct trauma.
- Sy: Pain—may be intense or dull, swelling, +/- deformity, +/- neurovascular compromise.
- Dg: X-ray.
- Tx: Immobilization, if severe then ORIF and casting. Then PT, OMT.
CARPAL FRACTURES

- Usually from a fall onto the hand. Scaphoid and Lunate are the most commonly fractured.
- SY: Pain with palpation over the carpal bone, swelling, increased pain with ROM, weakness
- DG: X-rays
- TX: For scaphoid use a thumb spica splint, other use a splint. NSAIDs, ice, rest. PT. If severe surgical fixation. Splints may need to be worn up to 6 weeks.

- NOTE: Air on the side of caution and brace...repeat X-rays 10 days later if high suspicion. With many of these fractures regular X-rays at 3 weeks are done to monitor the healing process.
METACARPAL FRACTURES

- AXIAL COMPRESSION ON THE HAND CAN LEAD TO A FRACTURE AND/OR DISLOCATION OF THE METACARPALS. (OFTEN SEEN WITH PUNCHING OR FALL ON CLOSED FIST)

- SY: IF UNCOMPPLICATED WILL HAVE SEVERE PAIN, SWELLING AND DEFORMITY, DECREASED ROM, LOSS OF GRIP STRENGTH

- DG: X-RAYS, PERCUSSION

- TX: IMMOBILIZED IN POSITION OF FUNCTION (PALM DOWN WITH FINGERS FLEXED). ICE, COMPRESSION, REST. IF SEVERE, ROTATIONAL, DISPLACED, OR MULTIPLE MAY NEED SURGICAL FIX.
UPPER EXTREMITY OMT
INTEROSSEOUS MEMBRANE TECHNIQUE

- Patient seated or supine. Doctor in front of the affected side of the patient.
- Doctor palpates affected forearm over interosseous membrane. Notes any tautness, fibrous bands, pain, elastic asymmetry.
- Doctor places thumbs over anterior dysfunction of the interosseous membrane with the palm and fingers encircling the forearm.
- Doctor monitors cephalad and caudal, right and left rotation, and clockwise and counter-clockwise motion.
- Determine ease-bind asymmetry, then doctor either indirectly or directly meet ease-bind barrier.
- Force applied is gentle to moderate and is held for 20–60 sec until release is palpated. Follow creep until it doesn’t occur.
WRIST, CARPAL TUNNEL RELEASE

- Patient sitting or supine, doctor is in front of the patient or on their affected side.
- Patient's hand is placed palm up in anatomical position.
- Doctor's thumbs are placed over the medial and lateral eminences of patient's carpal region, with fingers wrapped around dorsal carpal region.
- Doctor exerts tension on the carpal region—thumbs into the volar surface and pushing them apart and dragging the skin and superficial fascia apart.
- Pressure is maintained for 20–60 seconds or until a release is felt, repeated.
<table>
<thead>
<tr>
<th>Tender point</th>
<th>Location</th>
<th>Treatment position</th>
<th>acronyms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long head of biceps</td>
<td>Over tendon in the bicipital groove</td>
<td>Elbow flexed, shoulder flexed, abduction &amp; internal rotation</td>
<td>F Abd IR</td>
</tr>
<tr>
<td>Short head of biceps</td>
<td>At inferolateral aspect of coracoid process</td>
<td>Elbow flexed, shoulder flexed, adduction &amp; internal rotation</td>
<td>F Add IR</td>
</tr>
<tr>
<td>Radial head lateral.</td>
<td>On anterolateral aspect of radial head at attachment of supinator muscle</td>
<td>Elbow full extension, forearm in supination with slight valgus force</td>
<td>E Sup Val</td>
</tr>
<tr>
<td>Medial epicondyle</td>
<td>On medial epicondyle of the humerus at common flexor tendon and attachment of pronator teres muscle</td>
<td>Flexion, marked pronation, slight adduction of forearm, slight flexion of wrist</td>
<td>F Pro Ass</td>
</tr>
<tr>
<td>Doral wrist</td>
<td>Dorsal surface of 2nd metacarpal and 5th metacarpal</td>
<td>Wrist extension with slight ABDuction Wrist extension with slight ADDuction</td>
<td>E Abd E Add</td>
</tr>
<tr>
<td>Palmar wrist</td>
<td>Palmar base of 2nd or 3rd metacarpal</td>
<td>Wrist flexion with slight</td>
<td>F Abd</td>
</tr>
</tbody>
</table>
MUSCLE ENERGY

AC JT—RIGHT INTERNAL ROTATION

- Patient seated and doctor stands behind
- Doctor's left hand on distal clavicle medial to AC JT and right hand grasps patient's right wrist
- Doctor's left hand exerts gentle compressive force to stabilize AC JT, patient's right hand is flexed, abducts, and externally rotates shoulder to restrictive barrier
- Patient instructed to push wrist forward and down to the floor and internally rotate the shoulder, while the doctor applies a counterforce
- Isometric contraction held for 3–5 seconds, then patient relaxes completely and is repositioned to the new barrier
- This is repeated 3–5 times to maximally improve dysfunction at the AC JT
- Recheck the ROM and dysfunction

AC JT—RIGHT EXTERNAL ROTATION

- Patient seated and doctor stands behind
- Doctor's left hand placed on the distal clavicle medial to the AC JT, and grasps the patient's right wrist
- Doctor's left hand exerts gentle compressive forces to stabilize the AC JT, patient's right hand is flexed, abducted, and internally rotated at the shoulder to the restrictive barrier
- Patient instructed to lift the right wrist up toward the ceiling and externally rotate the shoulder, while the doctor applies a counterforce
- Isometric contraction held for 3–5 seconds, then the patient relaxes completely and is repositioned to the new barrier
- This is repeated 3–5 times to maximally improve dysfunction at the AC JT
- Recheck the ROM and dysfunction
MUSCLE ENERGY

POSTERIOR RADIAL HEAD – PRONATION DYSFUNCTION
- Patient seated and doctor stands in front and to the side of the patient’s dysfunction.
- Doctor grasps patient’s hand on dysfunction side, index finger contacting the palmar side of the distal radius.
- Doctor’s other hand palm up with thumb resting against posterolateral aspect of the radial head.
- Doctor supinates the patient’s forearm to edge of restrictive barrier at radial head.
- Patient instructed to pronate against doctors counterforce.
- Contraction is held 3–5 seconds, then stop and relax.
- Once relaxed doctor brings patient to new restrictive border and the process is repeated 3–5 times.
- Recheck.

ANTERIOR RADIAL HEAD – SUPINATION DYSFUNCTION
- Patient seated and doctor stands facing the patient.
- Doctor grasps the patient’s hand on the side of dysfunction, contacting dorsal side of distal radius with the thumb.
- Doctor’s other hand is palm up with the thumb resting against the anterior and medial radial head.
- Doctor pronates the patient’s forearm to edge of restrictive barrier at radial head.
- Doctor instructs patient to supinate against doctors counterforce.
- Contraction is held 3–5 seconds, then stop and relax.
- Once relaxed doctor brings patient to new restrictive border and the process is repeated 3–5 times.
- Recheck.
### MUSCLE ENERGY

#### WRIST ULNAR DEVIAION
- Patient seated with doctor standing facing the patient
- Doctor abducts the patient’s wrist to edge of restrictive barrier (radial deviation)
- Doctor instructs the patient to adduct wrist while the doctor applies counterforce
- Isometric contraction held for 3–5 seconds, then stops and relaxes
- Once relaxed then patient is brought to the new restrictive barrier
- Repeat 3–5 times
- Recheck

#### WRIST RADIAL DEVIAION
- Patient seated with doctor standing facing the patient
- Doctor adducts the patient’s wrist to edge of restrictive barrier (ulnar deviation)
- Doctor instructs the patient to abduct wrist while the doctor applies counterforce
- Isometric contraction held for 3–5 seconds, then stops and relaxes
- Once relaxed then patient is brought to the new restrictive barrier
- Repeat 3–5 times
- Recheck
HVLA

DORSAL CARPALS

- Patient seated with doctor facing them
- Doctor grasps the patient’s wrist with doctors thumbs on the dorsal aspect, fingers wrapped around wrist
- Doctor places the thumb over the displaced carpal bone and reinforces it with the other thumb
- Simple whipping motion is carried out while pressure is maintained over the displaced carpal bone
- Recheck

ELBOW

- Patient seated and doctor facing them
- Patients wrist (of arm to be treated) is held against doctors waist using their elbow
- Doctor places the thumbs on top of the forearm in the antecubital fossa
- Doctor places traction down toward the floor, elbow carried into further flexion
- Pressure is placed under the elbow up toward the shoulder. Pressure is maintained as the elbow is carried through full extension
- Recheck
BALANCED LIGAMENTOUS TENSION AND LIGAMENTOUS ARTICULAR STRAIN

GLENOHUMERAL DYSFUNCTION -

- Patient lies lateral recumbent with injured side up, doctor stands behind patient
- Doctor places the olecranon process of the patient’s flexed and relaxed elbow in palm of distal hand and grasps patient’s shoulder with the other hand
- Controlling the humerus from the elbow the doctor compresses the HG JT and then draws the elbow into abduction and anterior or posterior to balance
- Doctor holds the position until a release is felt, then returns to neutral position
- Recheck
SHOULDER GIRDLE TECHNIQUE– GLENOID LABRUM

- PATIENT LIES PRONE WITH ARM/SHOULDER OFF THE SIDE OF THE TABLE, DOCTOR SITS FACING THE ARM OFF THE TABLE.
- DOCTOR’S HANDS ENCIRCLE THE PROXIMAL HUMERUS UNDER THE AXILLA, THUMBS NEXT TO EACH OTHER PADS DOWN DISTAL TO THE GREATER TUBERCLE AT THE DELTOID
- DOCTOR ENGAGES A SLIGHT TRACTION FORCE DOWNWARD (DISTAL) ON ARM AND BEGINS TO MOVE SHOULDER IN A HINGE LIKE FASHION, INITIATING SMALL ARCS OF ABDUCTION AND ADDUCTION. DONE FOR 10–20 CYCLES FOR 15–30 SECONDS EACH
- RETURN TO NEUTRAL POSITION, START MOVING THE HUMERAL HEAD IN SMALL CLOCKWISE AND COUNTER-CLOCKWISE CIRCULAR MOTIONS IN VERTICAL PLANE PARALLEL TO LONG AXIS FOR 30–60 SECONDS EACH
- RETURN TO NEUTRAL POSITION, DOCTOR PUSHES THE HUMERUS WITH THUMBS TO THE GLENOID FOSSA, ADDS DOWNWARD TRACTION, THEN DRAW ARM LATERALLY AND UPWARD, AND THEN AN OUTWARD PROGRESSION– FORMING A FIGURE 8 MOTION. REPEAT
- THE SHOULDER IS RECHECKED
SPENCER TECHNIQUE

- Patient lies lateral recumbent with affected shoulder up. Doctor stands in front of the patient.
- Doctor’s cephalad hand places compression and stabilization on the shoulder, and the caudad hand is placed at the elbow for maneuvering.
- Steps – (7 stages)
  - Glenohumeral extension
  - Glenohumeral flexion
  - Circumduction with compression
  - Circumduction with traction
  - Abduction
  - Internal rotation
  - Milking
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