TRAUMATIC SHOULDER INSTABILITY

ALEX RENSHAW

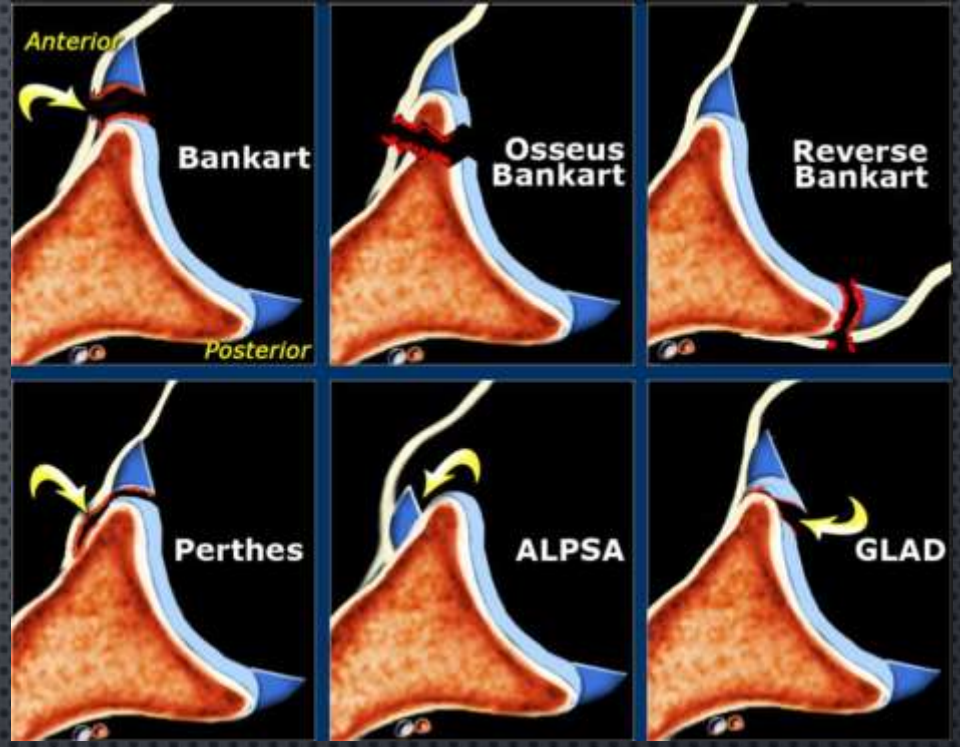
Introduction

- Traumatic Anterior Shoulder Instability
  - TUBS
    - Traumatic
    - Unilateral
    - Bankart lesion
    - Surgery
- One of most common shoulder injuries
- 1.7% annual rate
- High Recurrence Rate
  - Correlates with age at dislocation
  - 90% recurrence if <20 years of age

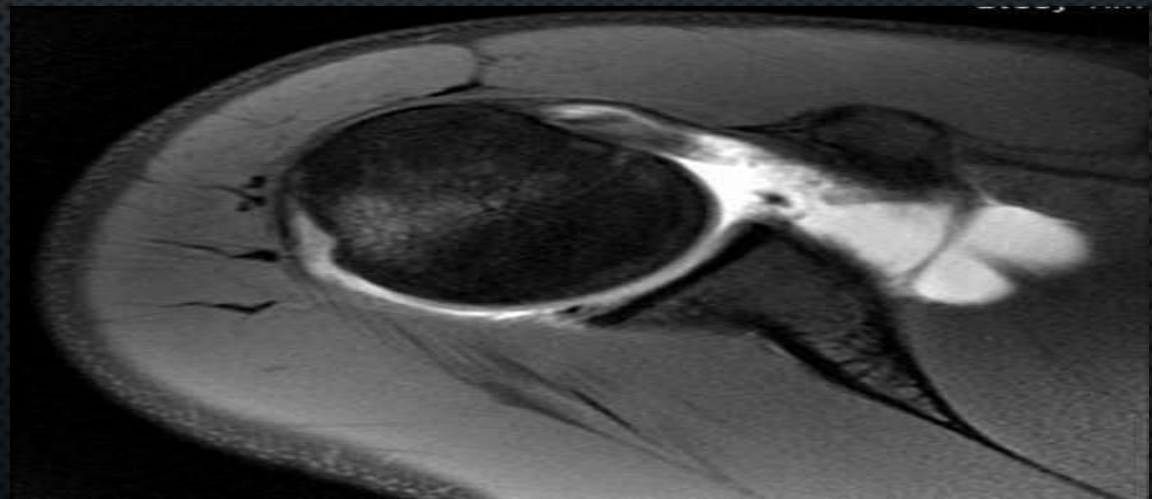
PATHOPHYSIOLOGY

- Anterior directed force
- Shoulder abducted/Externally rotated

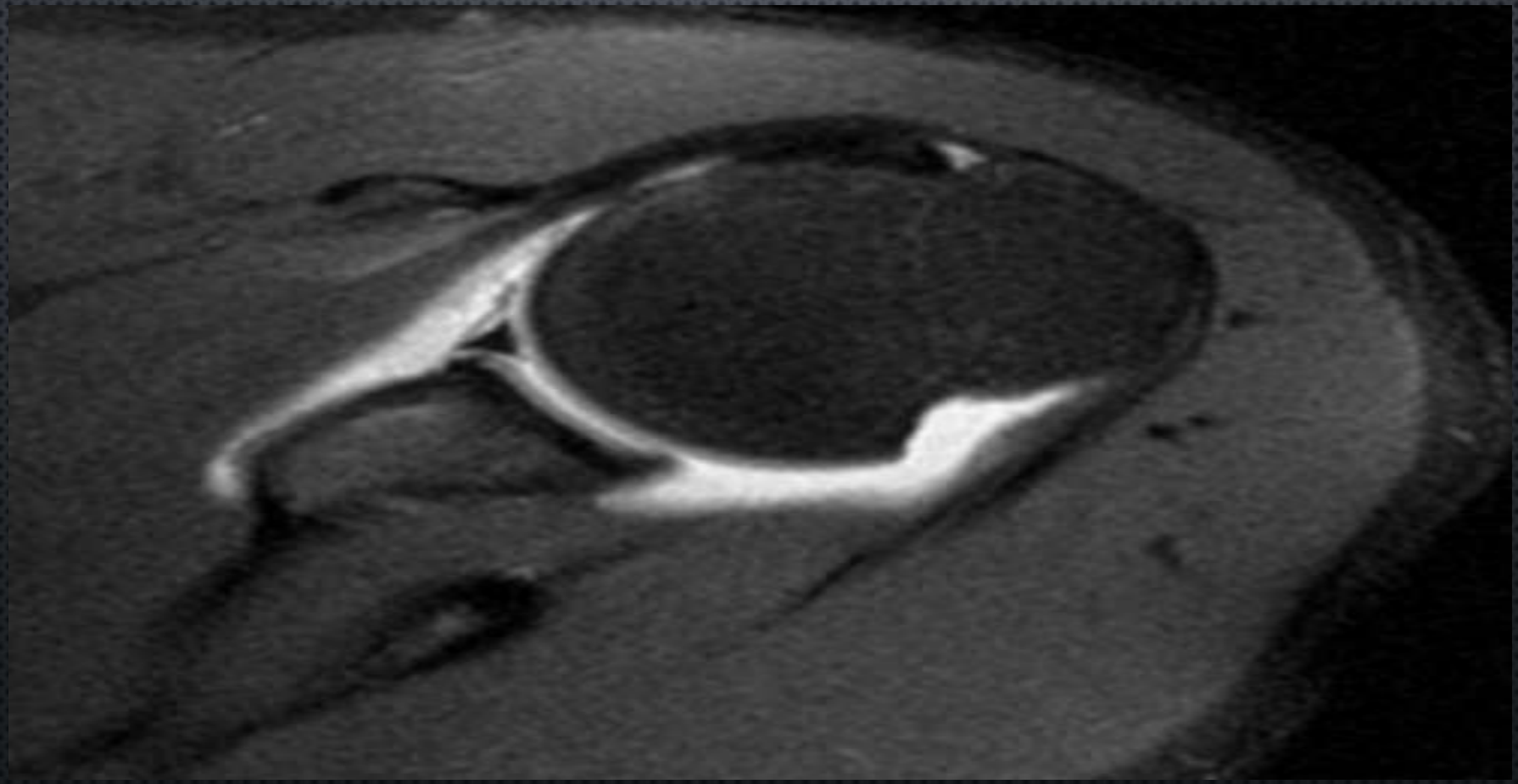
ASSOCIATED INJURIES



- Labral and Cartilage Injuries
  - Bankart Lesion
    - Avulsion of anterior labrum/ anterior inferior glenohumeral ligament from glenoid
    - Present in 80-90% of patients with TUBS

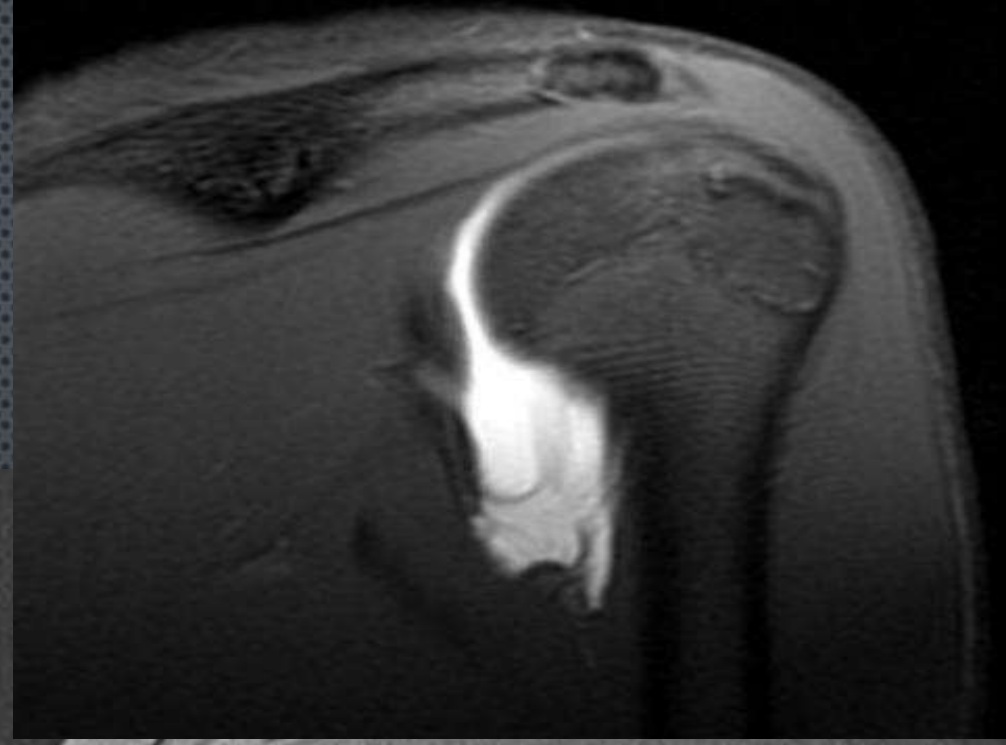


BANKART LESION

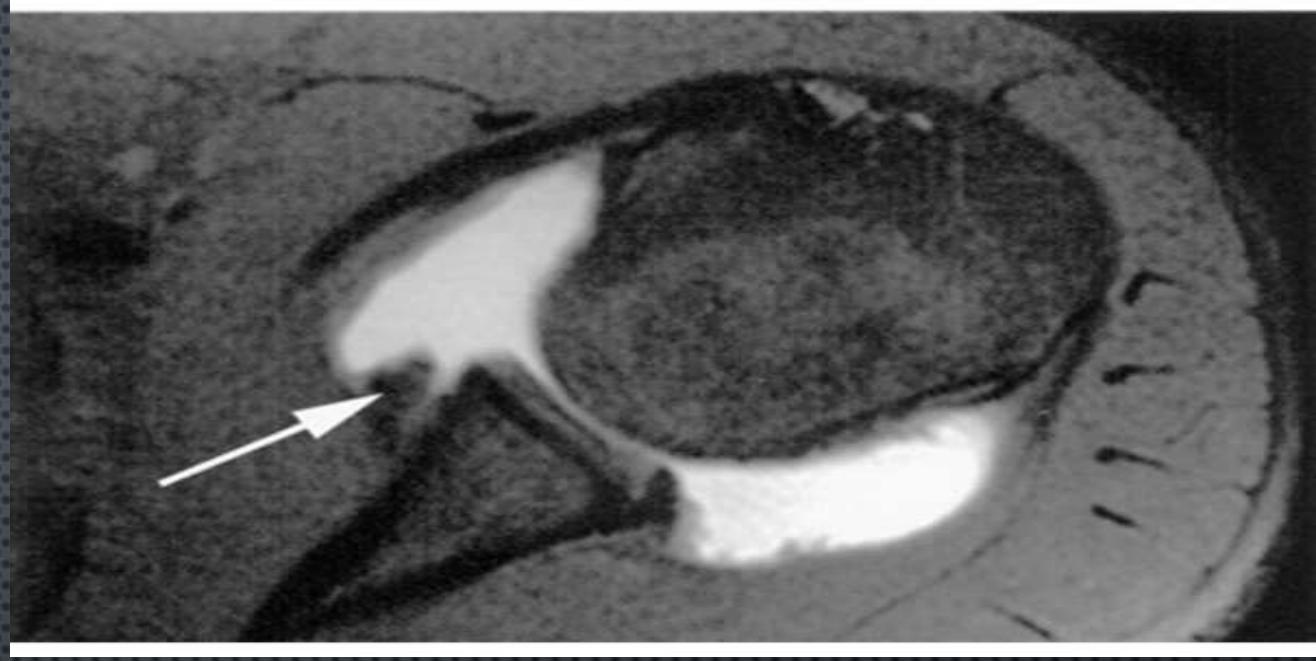


ASSOCIATED INJURIES

- HUMERAL AVULSION OF THE GLENOHUMERAL LIGAMENT
  - HAGL
  - HIGH RECURRENCE RATE IF NOT RECOGNIZED
  - GOLD STANDARD: OPEN REPAIR



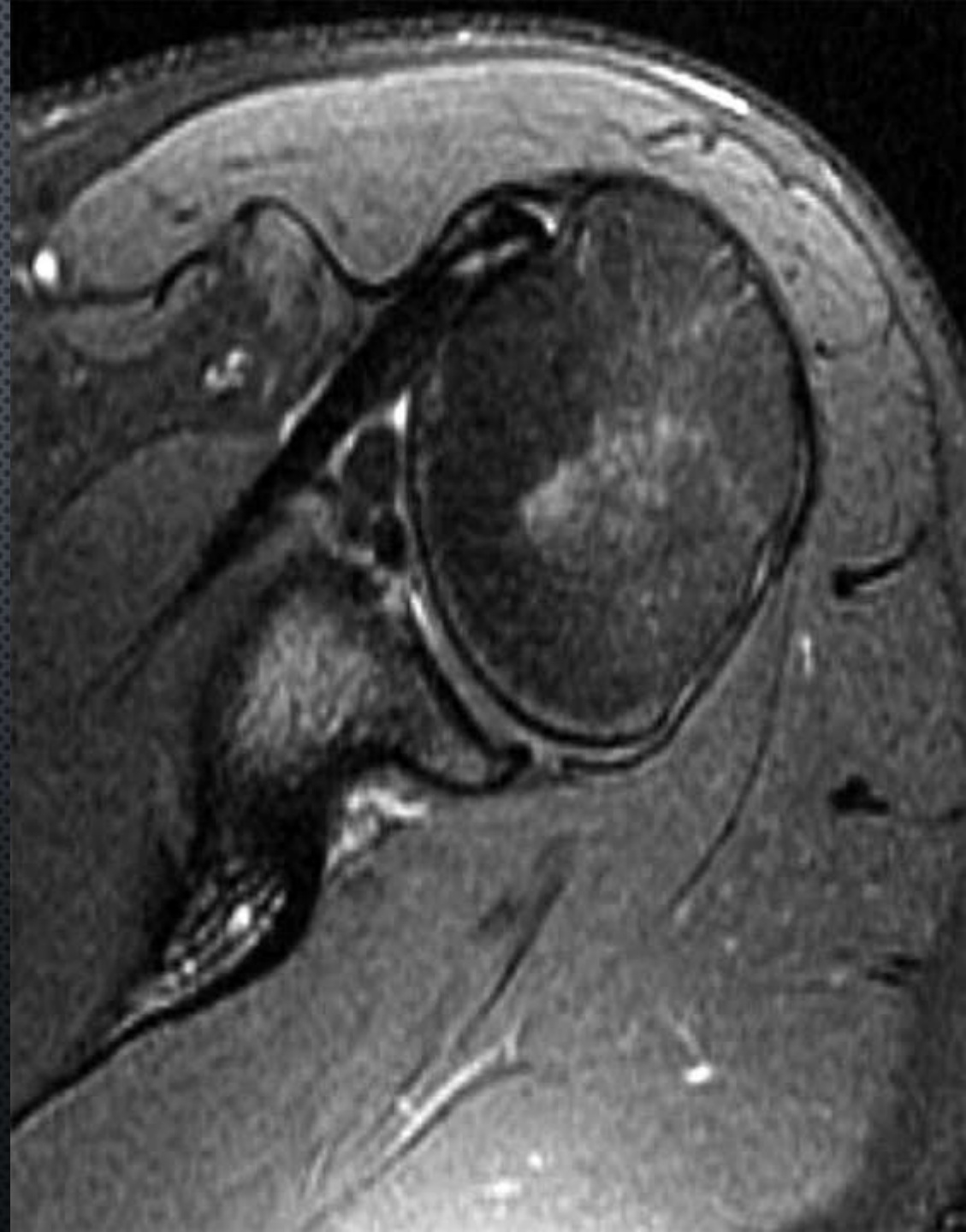
ASSOCIATED INJURIES



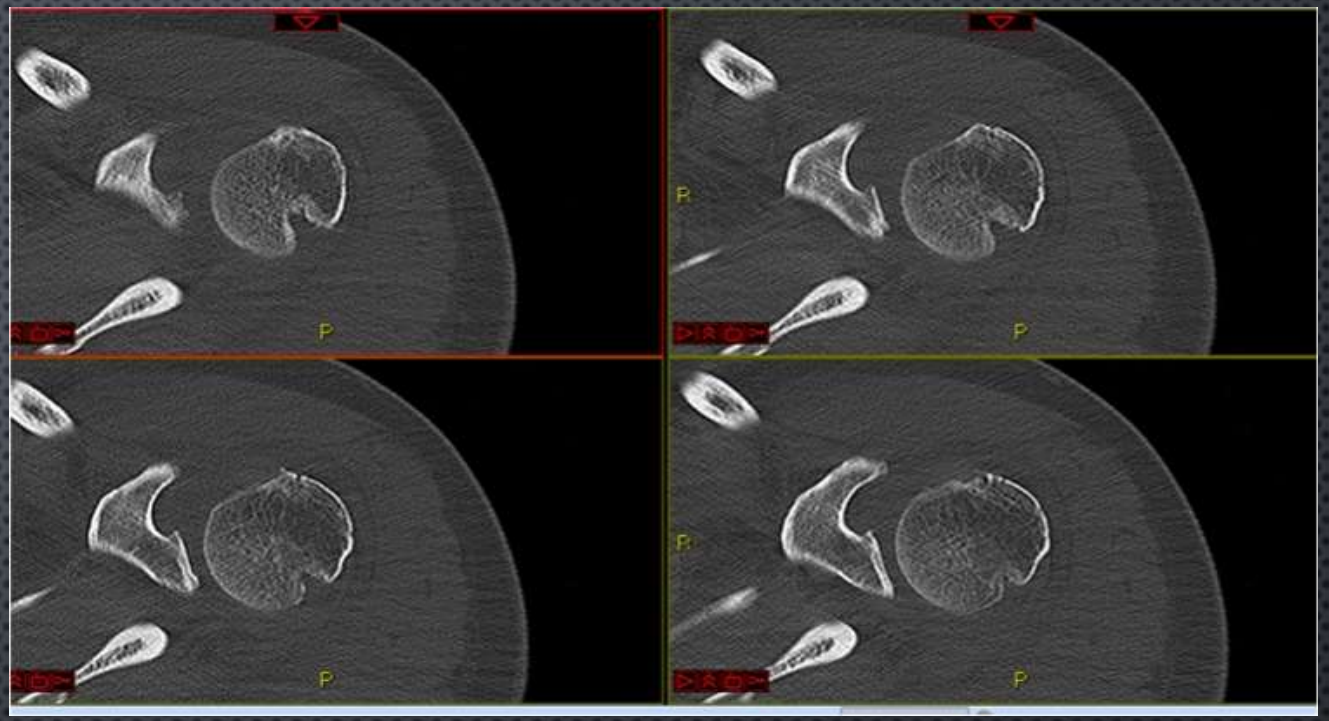
- Glenoid labral articular defect
  - GLAD lesion
    - Sheared portion of articular cartilage
- Anterior labral periosteal sleeve avulsion
  - ALPSA lesion
    - Associated with high failure rates with arthroscopic treatment

Associated Injuries

- Bony Bankart Lesion
  - Fracture of anterior inferior glenoid
  - Defects >20-25% is critical bone loss
    - Requires bony procedure to restore bone loss
    - Latarjet/ allograft bone block



ASSOCIATED INJURIES

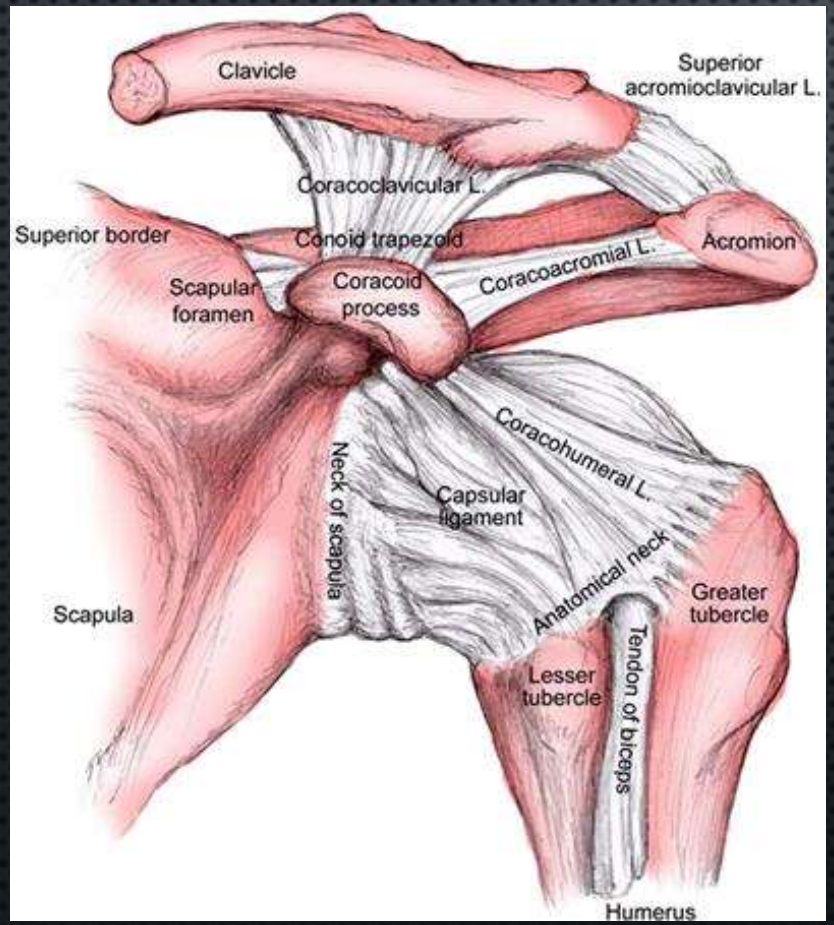


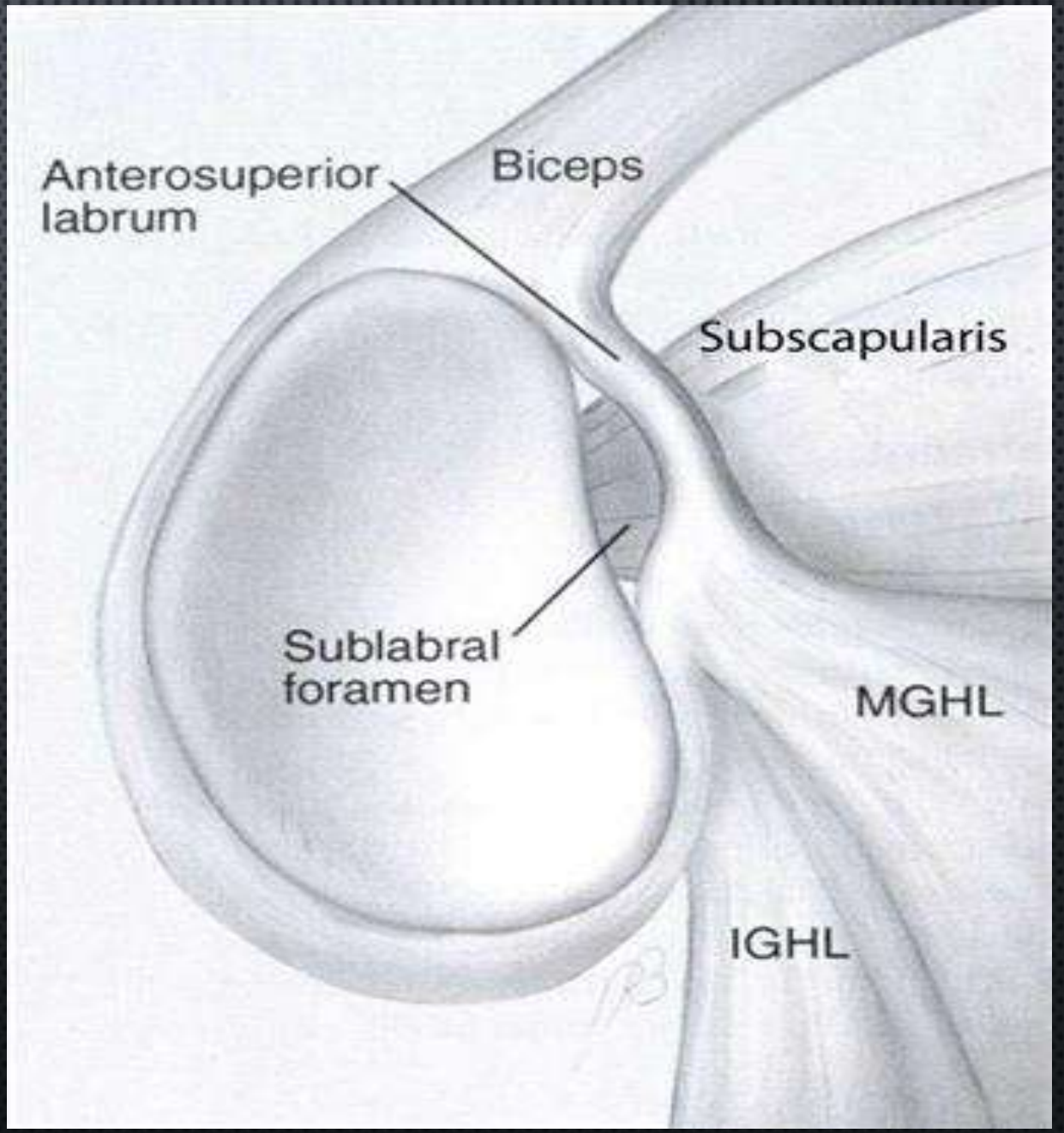
- HILL SACHS DEFECT
  - CHONDRAL IMPACTION INJURY OF POSTEROSUPERIOR HUMERAL HEAD
  - PRESENT IN 80% OF TRAUMATIC DISLOCATIONS
  - NOT CLINICALLY SIGNIFICANT UNLESS ENGAGES THE GLENOID

Associated Injuries

- Nerve Injuries
  - Axillary Nerve Injury
    - Most common a transient neuropraxia
    - 5% of patients
- Rotator cuff tears
  - 30% of patients >40 years of age
  - 80% of patients>60 years of age

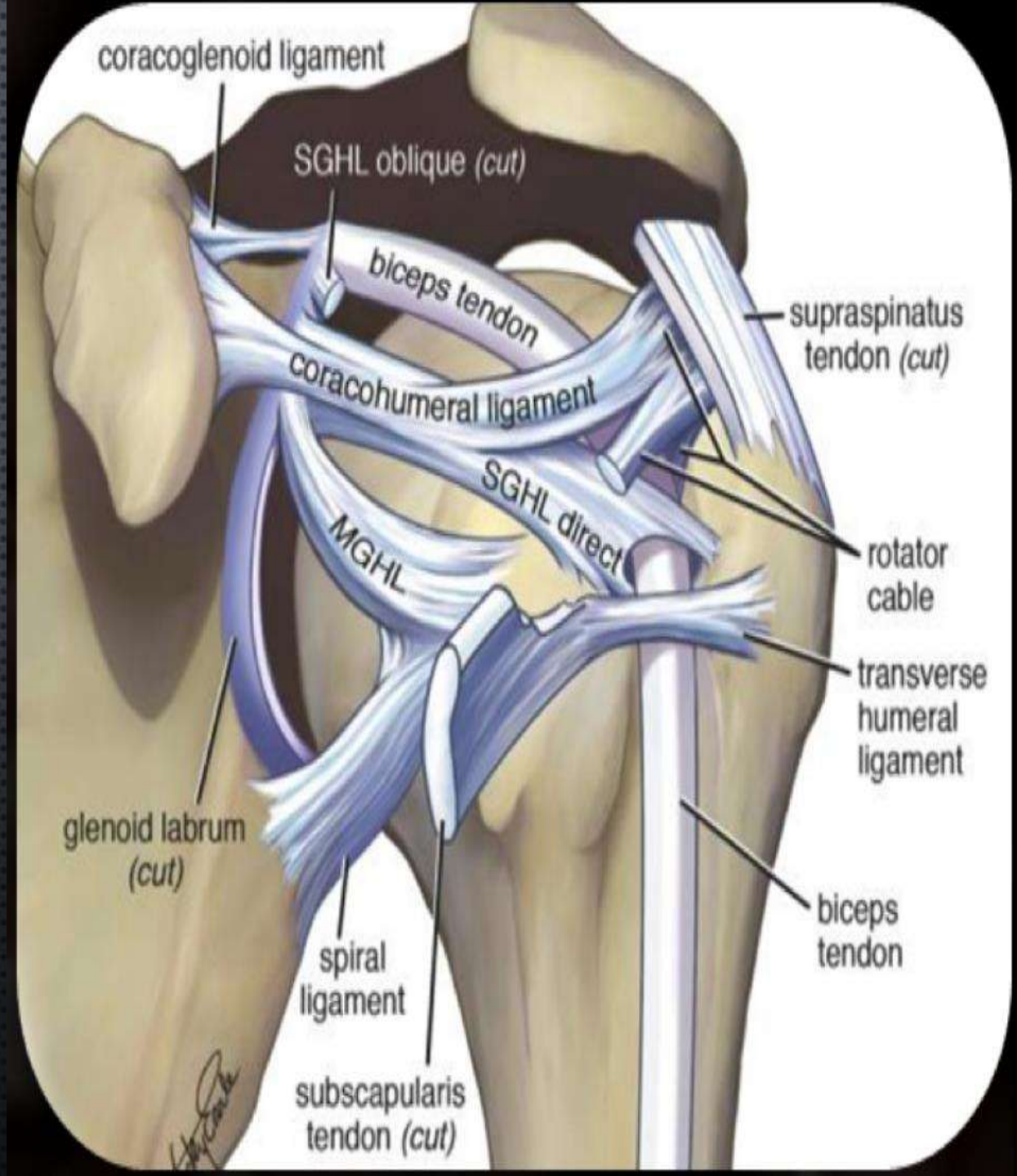
ANATOMY


Clavicle
Superior acromioclavicular L.
Coracoclavicular L.
Superior border
Conoid trapezoid
Acromion
Coracoacromial L.
Scapular foramen
Coracoid process
Coracohumeral L.
Capsular ligament
Neck of scapula
Anatomical neck
Greater tubercle
Scapula
Tendon of biceps
Lesser tubercle
Humerus


Anterosuperior labrum
Biceps
Subscapularis
Sublabral foramen
MGHL
IGHL

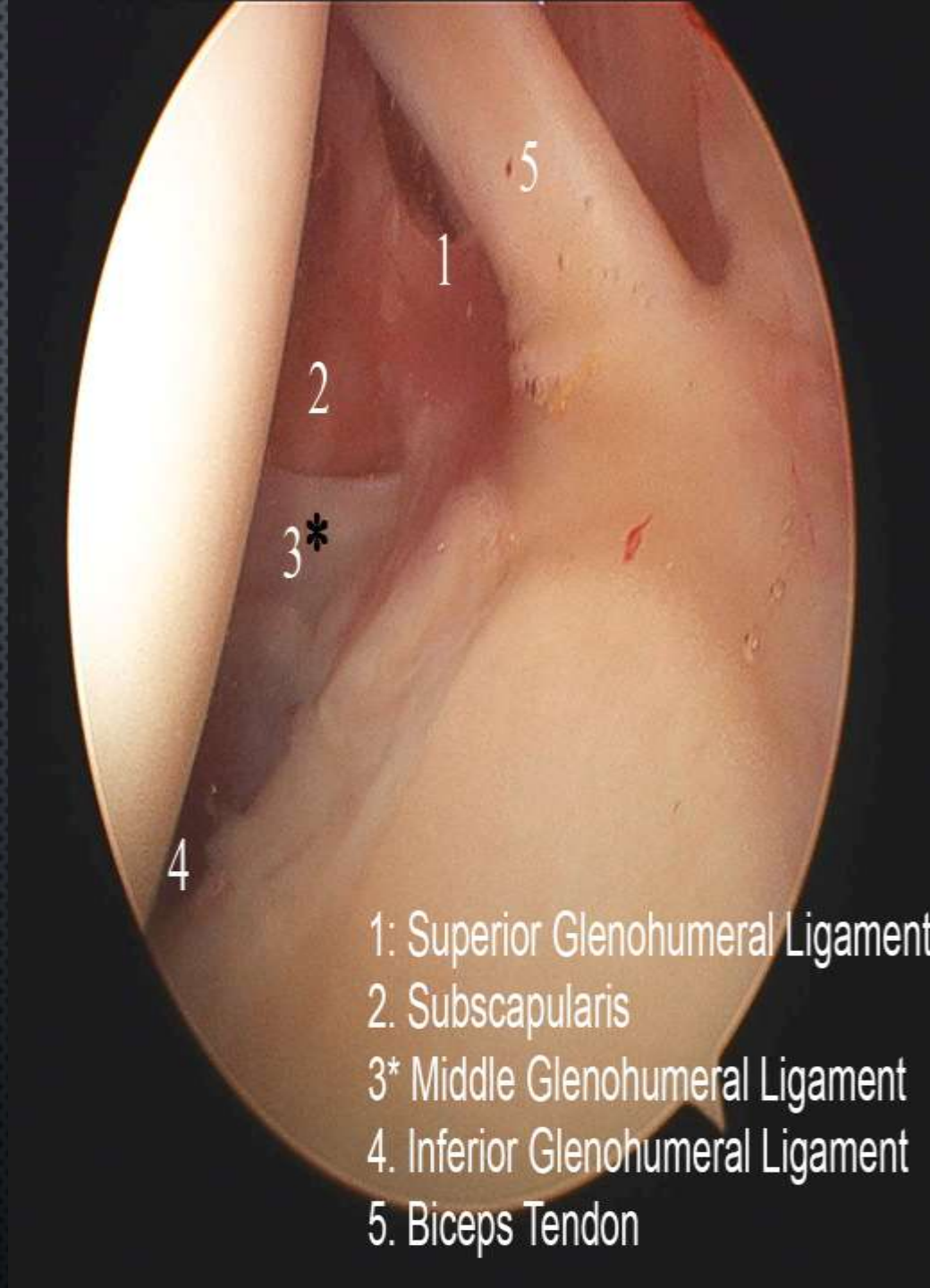
ANATOMY

- Static Constraints of the Shoulder
  - Articular congruity and version
  - Capsule/ Glenohumeral Ligaments
    - Superior Glenohumeral Ligament (SGHL)
    - Coracohumeral Ligament (CHL)
    - Middle Glenohumeral Ligament (MGHL)
    - Inferior Glenohumeral Ligament (IGHL)
      - Anterior/ Posterior Band
  - Labrum
  - Negative Intra-articular pressure



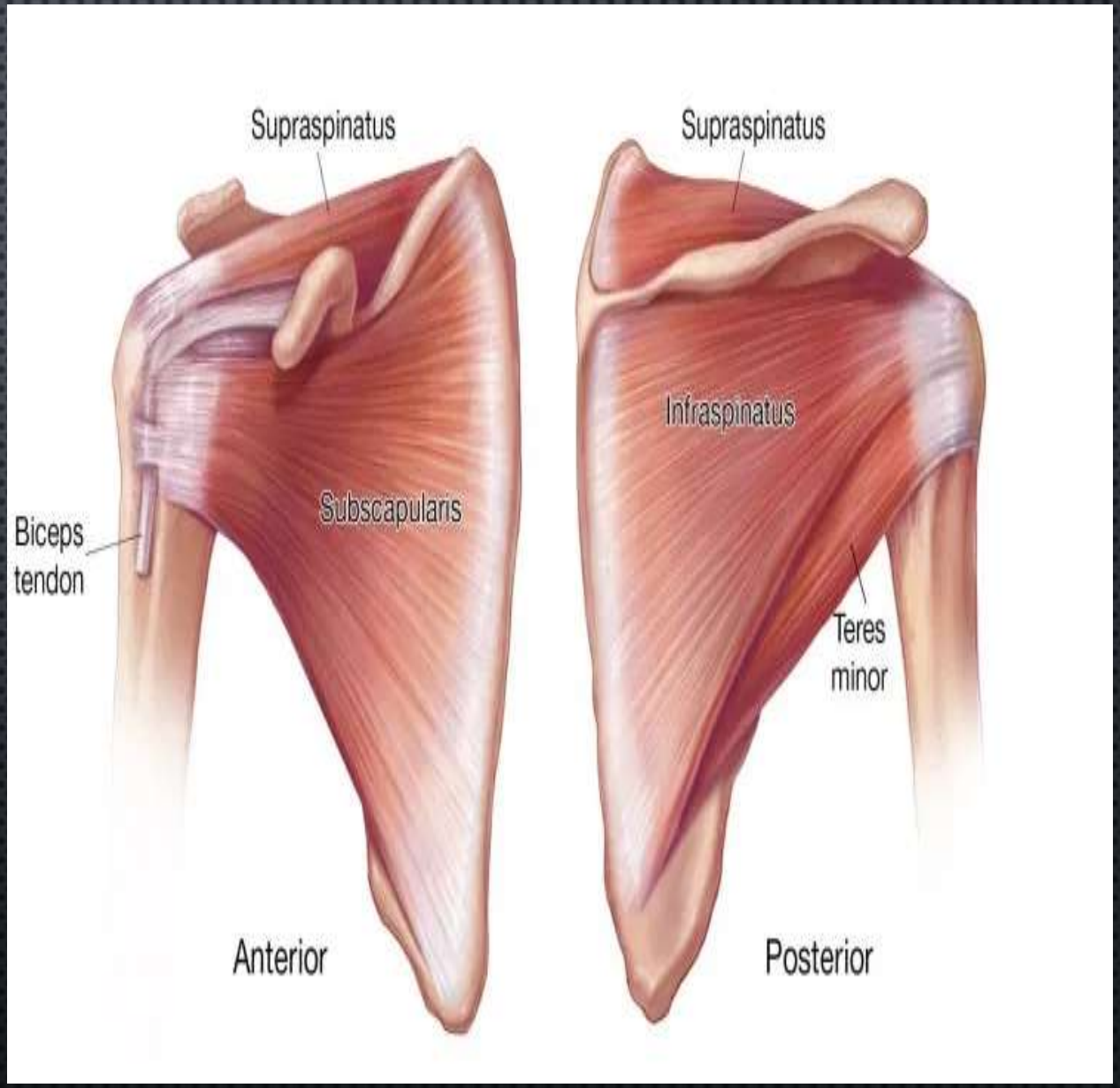
GLENOHUMERAL LIGAMENTS

- SGHL
  - Inferior translation w/arm at side
- MGHL
  - Anterior/posterior translation at 45 abduction
- IGHL
  - Posterior band
    - Posterior subluxation 90 flexion/ IR
  - Anterior band
    - 90 abduction w/ max external rotation



ANATOMY

- Dynamic Constraints
  - Rotator cuff
    - Compresses humeral head to glenoid
  - Long head of biceps tendon
    - Depresses humeral head

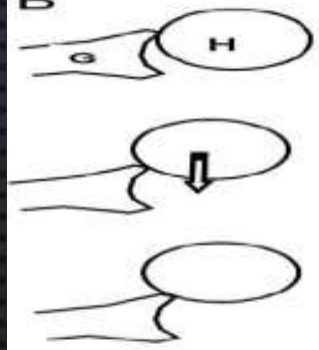


PHYSICAL EXAM

- Subjective
  - Pain and feeling of instability
- Objective/ Tests
  - Load and Shift
  - Apprehension Sign
  - Relocation Sign
  - Sulcus Sign
  - Generalized Ligamentous Laxity
    - Beightons criteria
    - Hyper ER with arm at side of body
    - Hyperabduction > 120 degrees (Gagey Sign)
    - >2+ load and shift in 2 or more planes

A

B

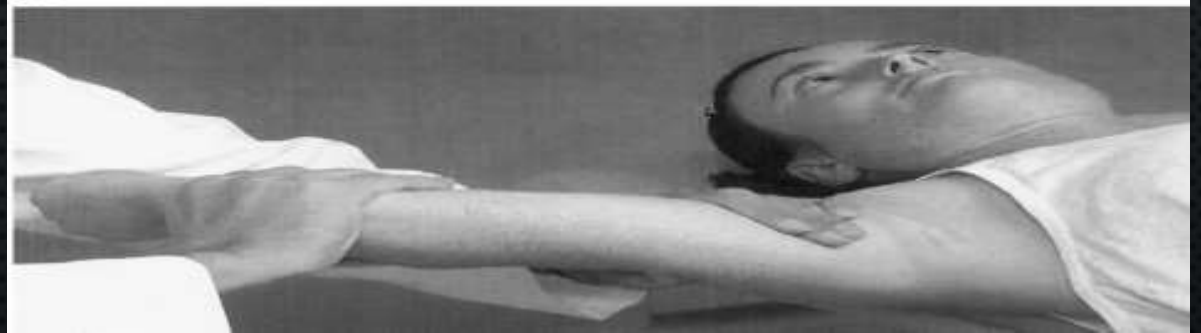


Grade 1: Humeral head (H) moves no further then to edge of glenoid (G)

Grade 2: Humeral head moves over edge of glenoid and spontaneously relocates

Grade 3: Humeral head moves over edge of glenoid but does not spontaneously relocate

C



APPREHENSION/RELOCATION

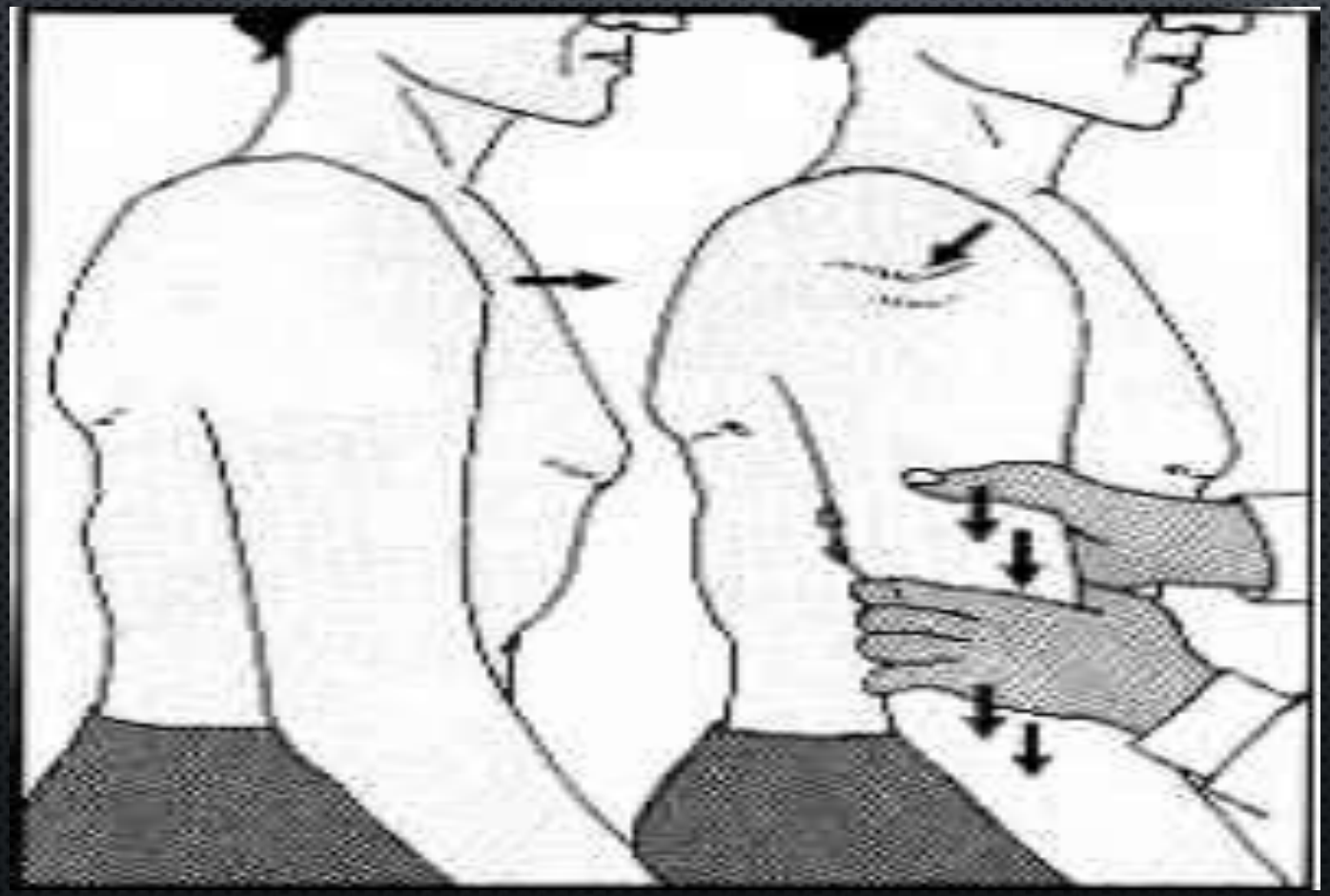
APPREHENSION TEST - SUPINE

- Patient in supine position with affected shoulder at edge of table, arm abducted 90°
- Examiner externally rotates by pushing forearm posteriorly.
- Positive test = patient expresses apprehension

RELOCATION TEST

- Performed after positive result on anterior apprehension test
- Patient supine
- Examiner applies posterior force on proximal humerus while externally rotating patient's arm
- Positive test = patient expresses relief

SULCUS SIGN

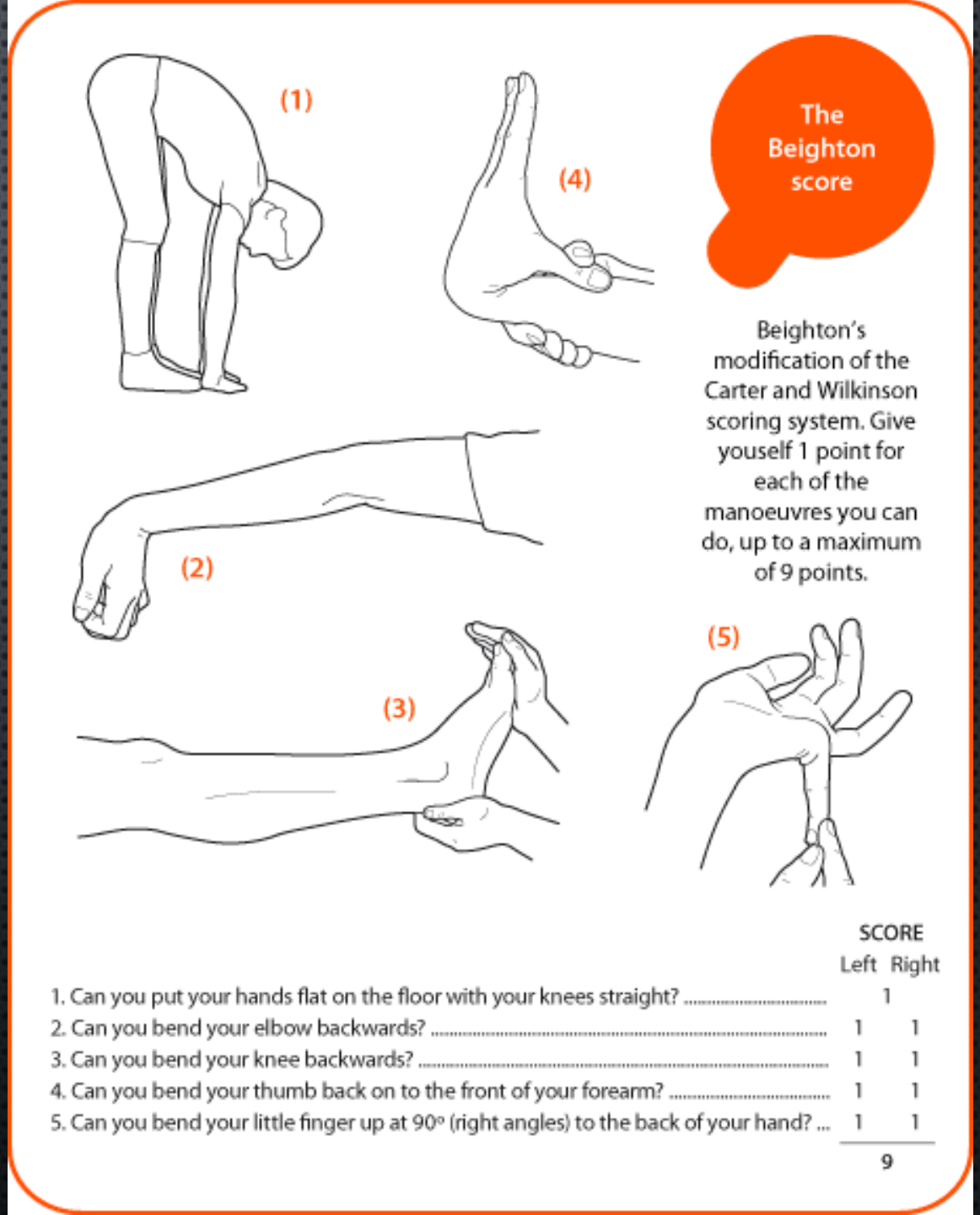


BEIGHTON'S CRITERIA

Table 1 The nine-point Beighton hypermobility score (Beighton[14])

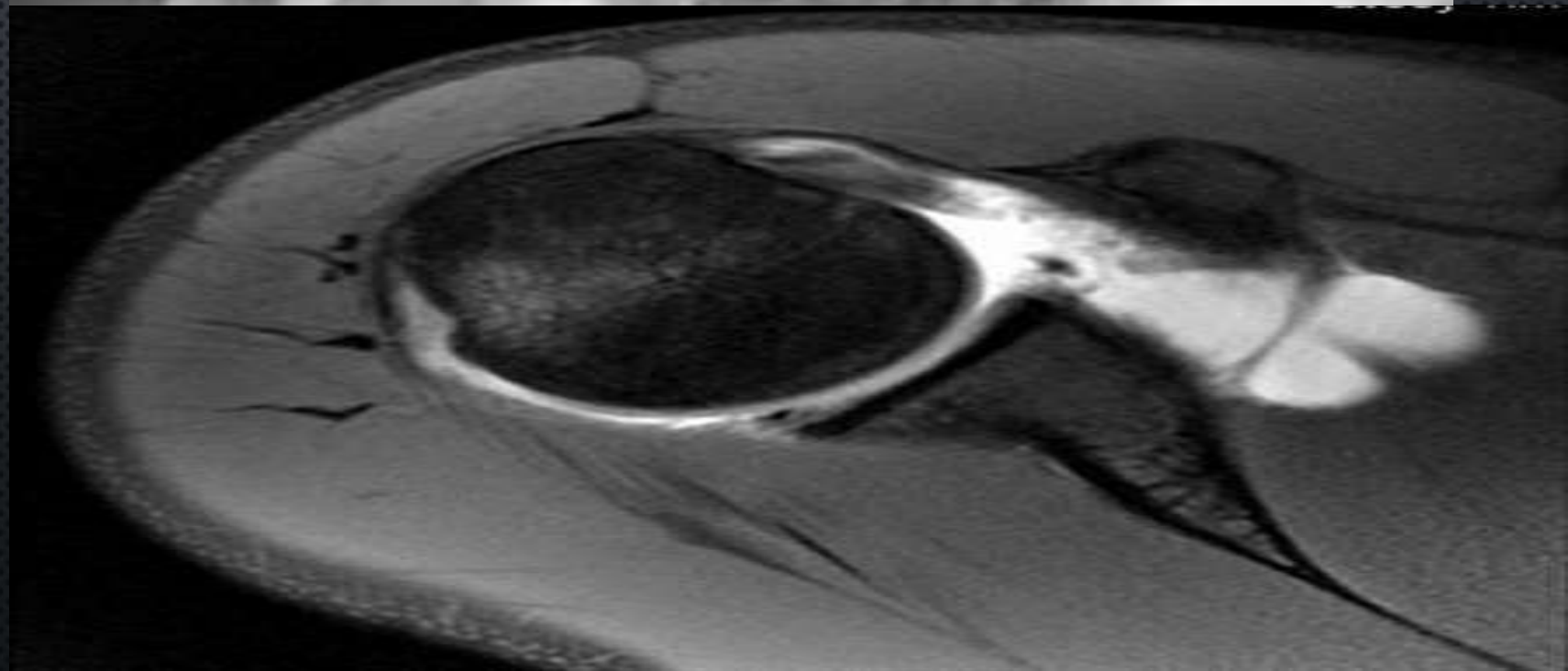
The ability to:	Right	Left
(1)Passively dorsiflex the fifth metacarpophalangeal joint to > 90°	1	1
(2) Oppose the thumb to the volar aspect of the ipsilateral forearm	1	1
(3) Hyperextend the elbow to > 10°	1	1
(4) Hyperextend the knee to > 10°	1	1
(5) Place hands flat on the floor without bending the knees	1	
Total	9	

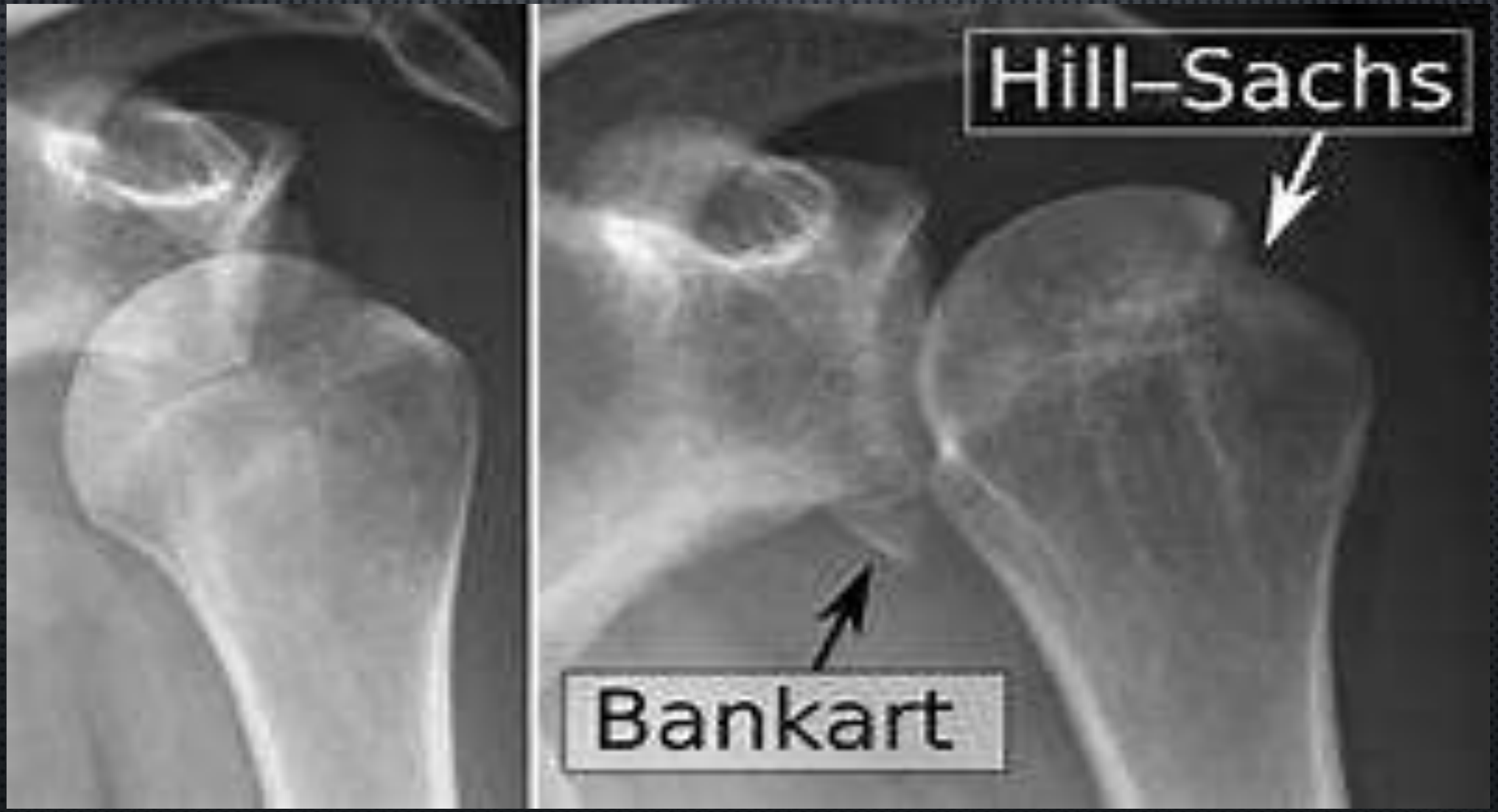
Score: one point may be gained for each side for manoeuvres 1-4, so that the hypermobility score will have a maximum of nine points if all are positive.



IMAGING

- XRAYS
  - TRUE AP
  - SCAPULAR Y
  - AXILLARY
- CT SCAN
- MRI




Hill–Sachs
Bankart

TREATMENT

- Acute reduction +/- Immobiization followed by Therapy
- Reduction
  - Relaxation
    - Sedation
    - Intra-articular injection of lidocaine
  - Simple traction/ countertraction
- Immobilization
  - Simple sling 2 weeks, no longer
- Therapy
  - Focus on restoring dynamic stabilizers

INSTABILITY SEVERITY INDEX SCORE

Prognostic factors	Points
Age at surgery (yrs)	
≤ 20	2
> 20	0
Degree of sport participation (pre-operative)	
Competitive	2
Recreational or none	0
Type of sport (pre-operative)	
Contact or forced overhead	1
Other	0
Shoulder hyperlaxity	
Shoulder hyperlaxity (anterior or inferior)	1
Normal laxity	0
Hill-Sachs on AP* radiograph	
Visible in external rotation	2
Not visible in external rotation	0
Glenoid loss of contour on AP radiograph	
Loss of contour	2
No lesion	0
Total (points)	10

* AP, anteroposterior

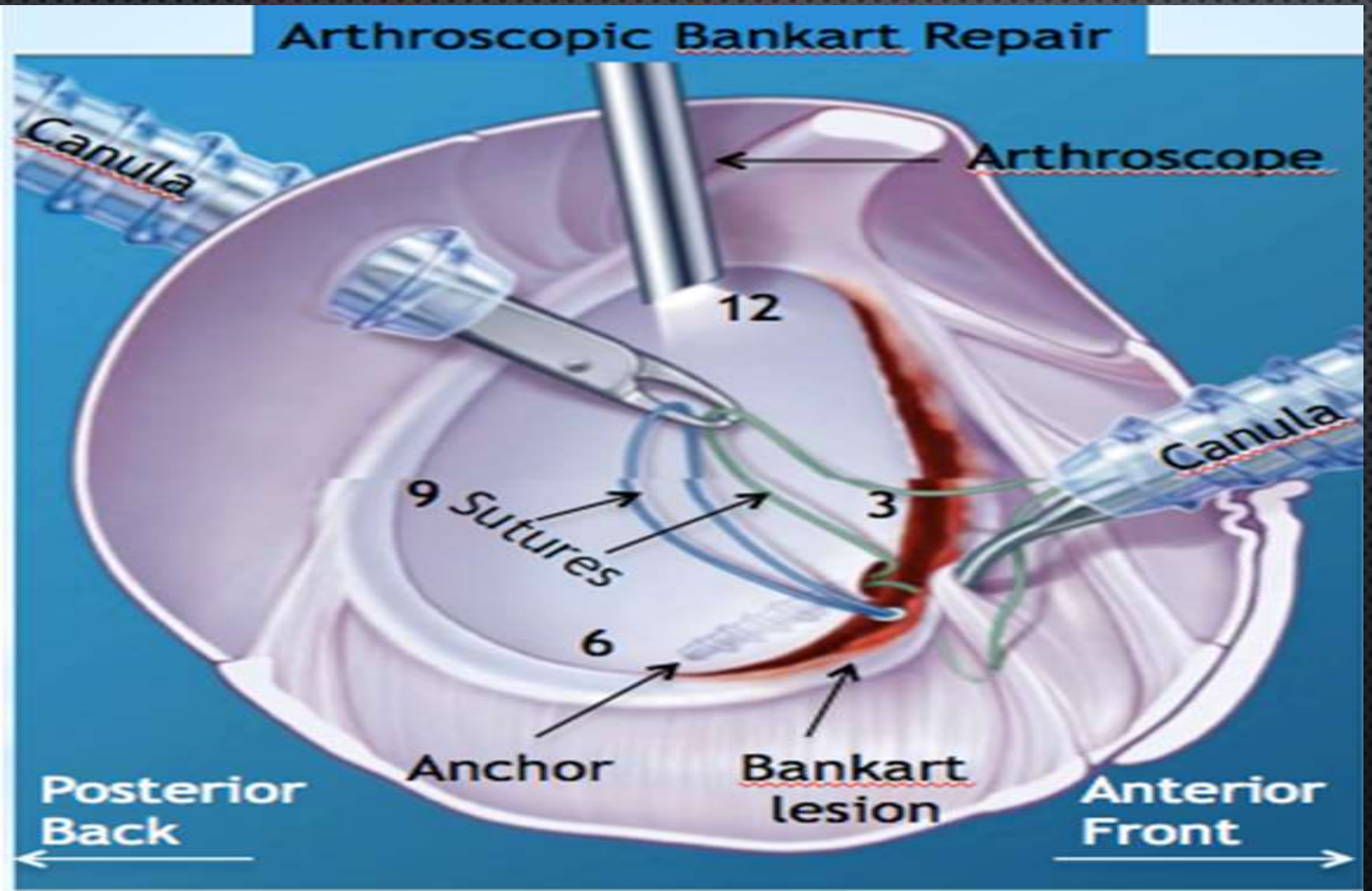
<6 points ther is <10% chance recurrence with arthroscopic stabilization

>6 pints indicated for open Latarjet

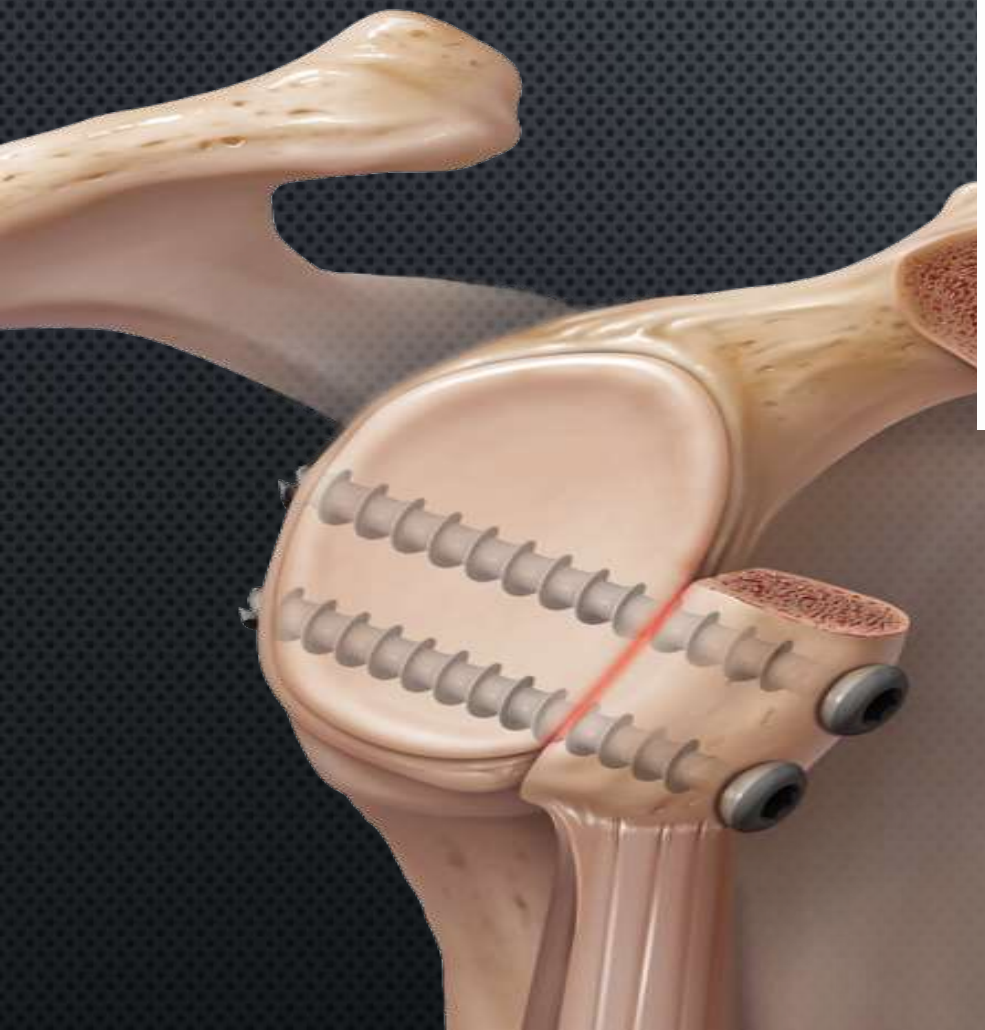
Operative Treatment

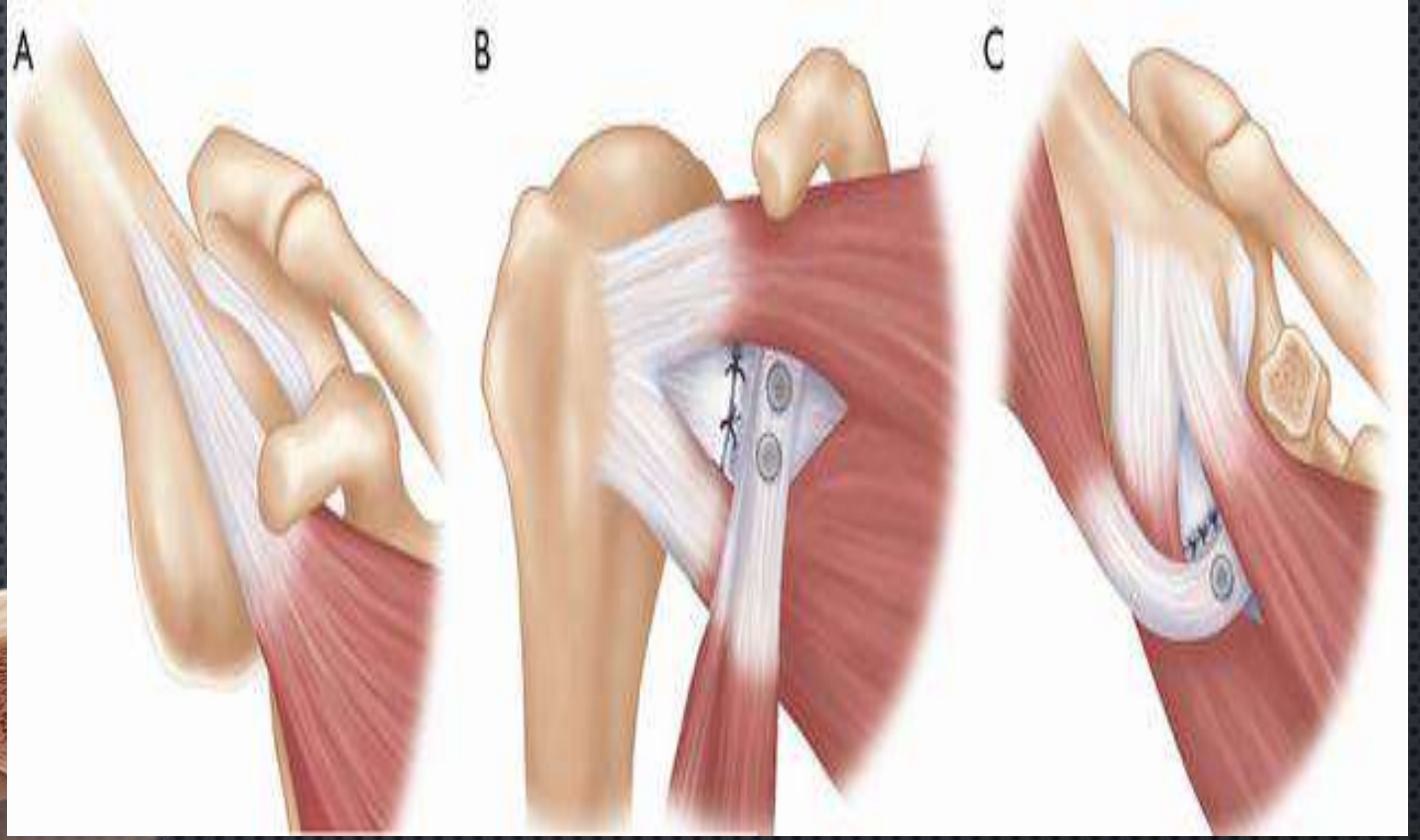
- Arthroscopic/Open bankart repair with capsular shift
  - Indications
    - First time traumatic dislocation athlete < 25
    - High demand athletes
    - Recurrent dislocator <13% glenoid bone loss
- Latarjet bone block procedure
  - Chronic bony deficiency

ARTHROSCOPIC BANKART REPAIR



LATARJET





CLINICAL SIGNIFICANCE OF TRAUMATIC INSTABILITY

- J Bone Joint Surg Am. 1996 Nov;78(11):1677-84.

- **Primary anterior dislocation of the shoulder in young patients. A ten-year prospective study.**

- Hovelius L[1], Augustini BG, Fredin H, Johansson O, Norlin R, Thorling J.
- **Author information**

- **Abstract**

- Two hundred and forty-five patients who had had 247 primary anterior dislocations of the shoulder were followed for ten years in a multicenter study at twenty-seven Swedish hospitals. The ages of the patients at the time of the dislocation ranged from twelve to forty years. The patients were assigned to one of three treatment groups: immobilization with the arm tied with a bandage to the torso for three to four weeks after reduction of the dislocation; use of a sling, which was discontinued after the patient was comfortable; or immobilization for various durations. At the ten-year follow-up evaluation, no additional dislocation had occurred in 129 shoulders (52 per cent). Recurrent dislocation necessitating operative treatment had developed in fifty-eight shoulders (23 per cent): thirty-four (34 per cent) of the ninety-nine shoulders in patients who were twelve to twenty-two years old, sixteen (28 per cent) of the fifty-seven shoulders in patients who were twenty-three to twenty-nine years old, and eight (9 per cent) of the ninety-one shoulders in patients who were thirty to forty years old. Twenty-four (22 per cent) of the shoulders that had had at least two recurrences during the first two or five years seemed to have stabilized spontaneously without operative intervention at ten years. Dislocation of the contralateral shoulder occurred in association with sixteen (16 per cent) of the ninety-nine shoulders in patients who were twelve to twenty-two years old, twelve (21 per cent) of the fifty-seven shoulders in patients who were twenty-three to twenty-nine years old, and only three (3 per cent) of the ninety-one shoulders in patients who were thirty to forty years old. The type and duration of the initial treatment had no effect on the rate of recurrence. Radiographs, made for 185 shoulders at the time of the primary dislocation, demonstrated an evident Hermodsson (Hill-Sachs) lesion in ninety-nine shoulders (54 per cent); this finding was associated with a significantly worse prognosis with regard to recurrence than was no evident lesion ($p < 0.04$). Radiographs made for 208 shoulders at the ten-year follow-up examination were evaluated for post-dislocation arthropathy. Twenty-three shoulders (11 per cent) had mild arthropathy and eighteen (9 per cent) had moderate or severe arthropathy. Some of the shoulders that had arthropathy had had no recurrence.

CLINICAL SIGNIFICANCE OF TRAUMATIC INSTABILITY

- J Shoulder Elbow Surg. 2009 May-Jun;18(3):339-47. doi: 10.1016/j.jse.2008.11.004. Epub 2009 Feb 28.

- **Neer Award 2008: Arthropathy after primary anterior shoulder dislocation--223 shoulders prospectively followed up for twenty-five years.**

- Hovelius L[1], Saeboe M.
- **Author information**

- **Abstract**
- **BACKGROUND:**
- Shoulder dislocation may cause arthropathy, but the natural history of this evolution is not well described. We therefore conducted a radiographic follow-up 25 years after the primary shoulder dislocation.
- **METHODS:**
- A prospective Swedish multicenter study (1978-1979) included 257 shoulders in 255 patients (age, 12-40 years) with a first-time anterior shoulder dislocation. After 25 years, 227 patients (229 shoulders) were alive and had follow-up. Radiographic imaging was performed in 223 shoulders (97%).
- **RESULTS:**
- Shoulders were normal in 44%. Arthropathy was mild in 29%, moderate in 9%, and severe in 17%. Of the shoulders without a recurrence, 18% had moderate/severe arthropathy. The corresponding figures were 39% for shoulders that recurred once or more (without surgery) and 26% (16 of 62) for surgically stabilized shoulders. Seven of 221 patients (7 of 223 shoulders) were considered alcoholic at 25 years and all had severe arthropathy (P < .001). Other factors that correlated with moderate/severe arthropathy were age older than 25 years at primary dislocation (P = .01) and primary dislocation caused by high-energy sports activity (P = .009). Shoulders that had not recurred had less arthropathy than shoulders classified as recurrent (P = .047) or stabilized over time (P = .007). Sixty-two surgically stabilized shoulders had less arthropathy than those that became stable over time (P = .047). Mild arthropathy at 10 years was associated with moderate/severe arthropathy at 25 years in 19 of 30 shoulders (63%) compared with 13 of 146 (9%) classified as normal at 10 years (P < .001). Joint incongruence at 10 years was associated with moderate/severe arthropathy at 25 years (P = .001).
- **CONCLUSION:**
- Age at primary dislocation, recurrence, high-energy sports, and alcohol abuse were factors associated with the development of arthropathy. Also shoulders without a recurrence were associated with arthropathy.

How I manage the anterior traumatic shoulder dislocation

- 1. make sure shoulder is reduced
  - Good xrays, must get axillary lateral
- 2. Get a thorough history and physical exam
- 3. Order appropriate imaging
  - MRI or CT arthrogram
- 4. Classify the risk for recurrence
- 5. Have a serious discussion about surgery for those at risk for recurrence
- 6. Athletes in season
  - Depends on sport/ level of play/ age
  - If returning to sport without surgery must regain painless full range of motion and strength
    - Second dislocation gets surgery

DON'T MISS THIS

TRAUMATIC POSTERIOR SHOULDER DISLOCATION

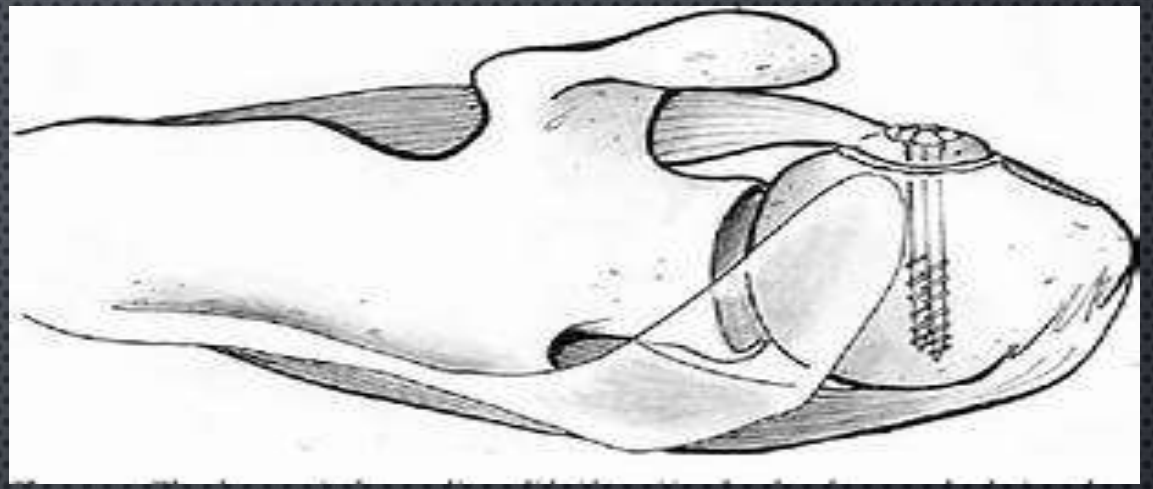
POSTERIOR SHOULDER DISLOCATION

- TRAUMA
  - ARM FLEXED AND INTERNALLY ROTATED WITH POSTERIOR FORCE
- SEIZURES AND ELECTRIC SHOCK

ASSOCIATED FINDINGS

- Reverse hill sachs
- Posterior labral tears
- Lesser tuberosity fractures
- Bony reverse bankart fractures

TREATMENT



- Acute reduction
- Immobilize in sling in 10-20 degrees of external rotation
- Begin PT in about 2 weeks post op
- Surgery for those patients with recurrence
  - Modified McLaughlin Procedure
    - Transfer the lesser tuberosity into reverse hill sachs defect
    - Great surgery with great results

QUESTIONS

TRAUMATIC ELBOW DISLOCATION/ INSTABILITY

- Common major joint dislocation
  - Second only to the shoulder
- 10-25% of total elbow injuries
- Posterolateral most common type
- 10-20 yo
  - Most common dislocated joint in children


ARMENIA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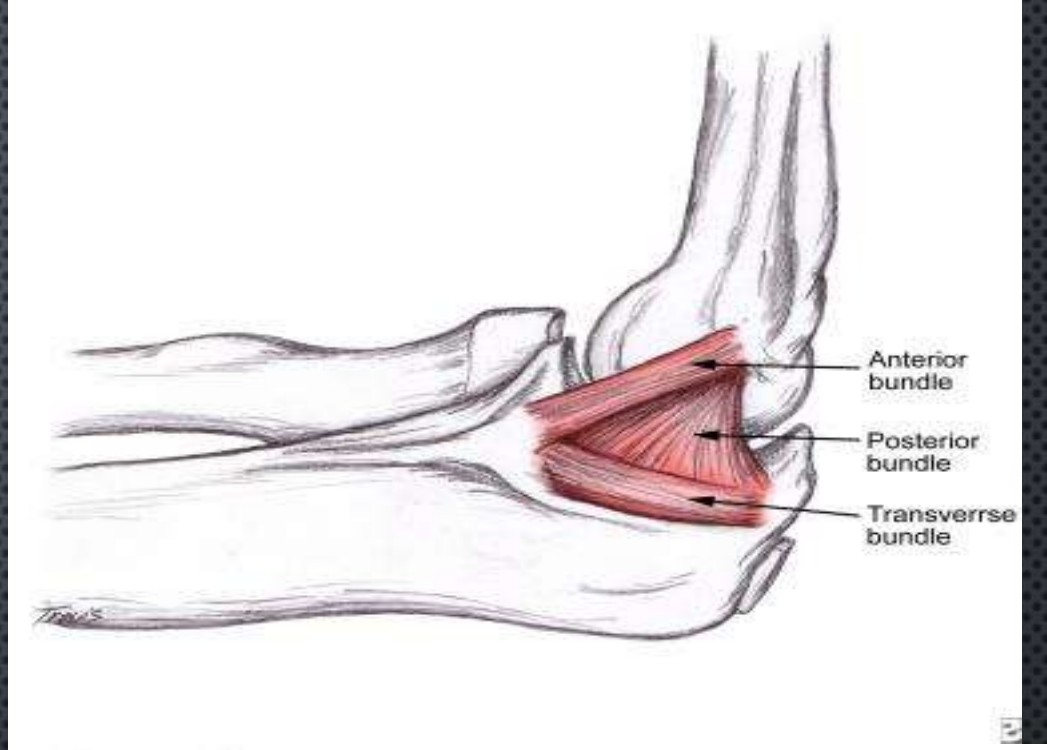
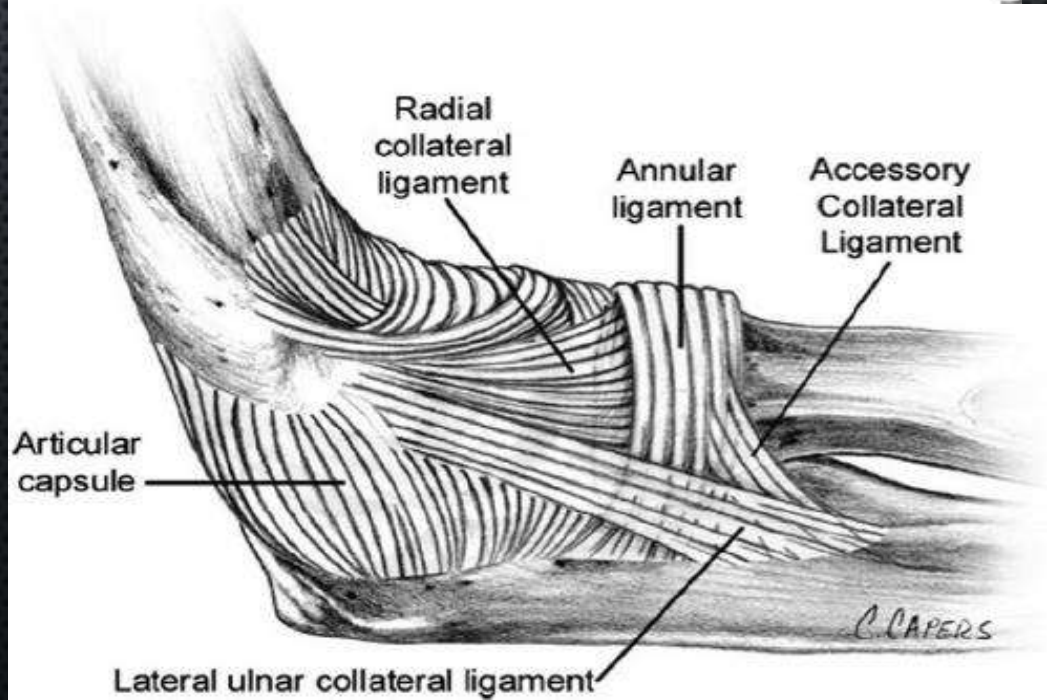
ELBOW ANATOMY

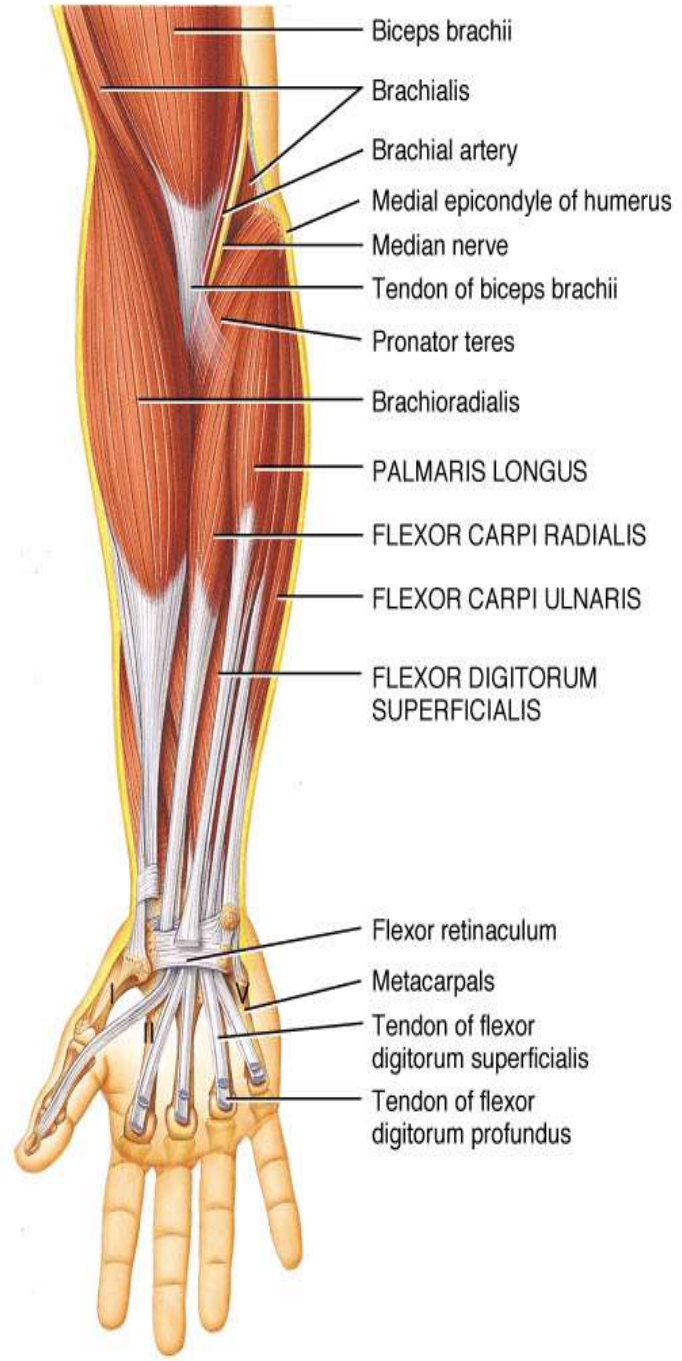
- STATIC AND DYNAMIC STABILIZERS
- STATIC PRIMARY
  - ULNOHUMERAL JOINT
  - ANTERIOR BUNDLE MCL
  - LCL COMPLEX
- STATIC SECONDARY
  - RADIAL HEAD
  - CAPSULE



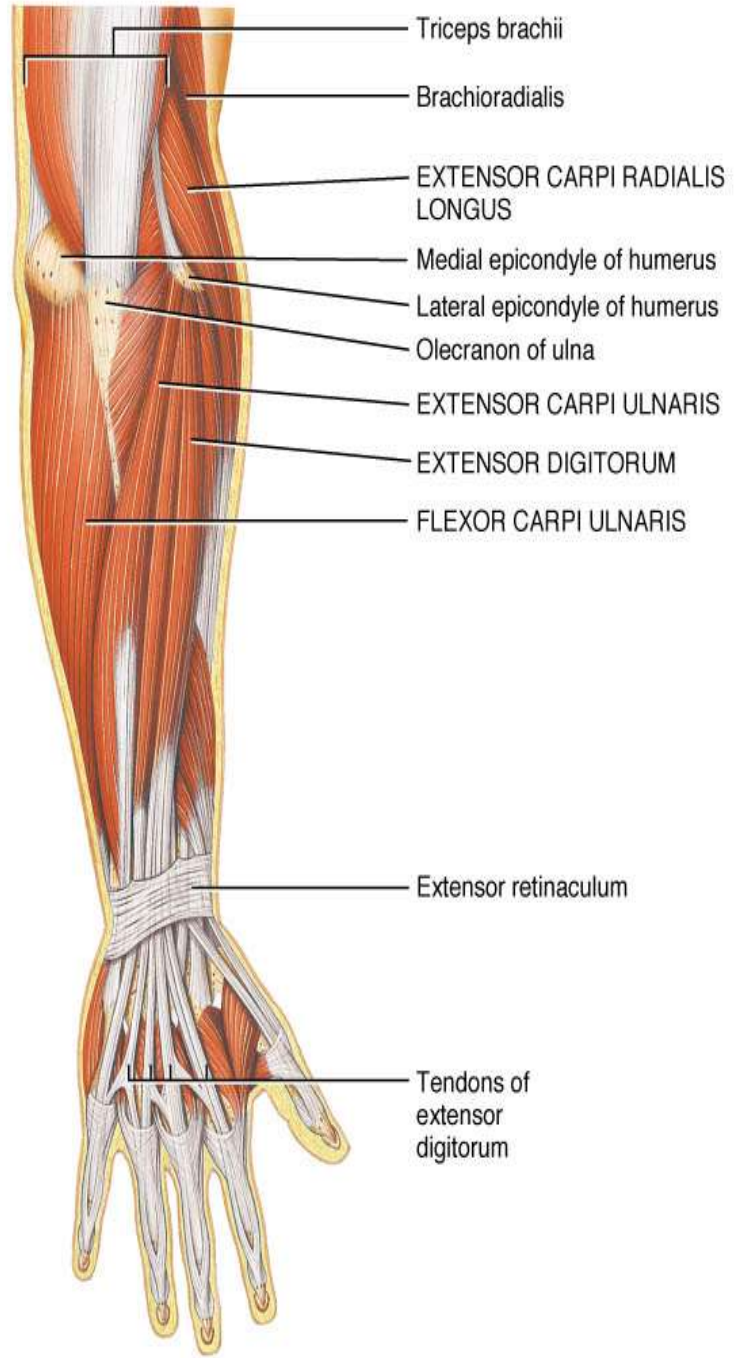


ELBOW ANATOMY

- DYNAMIC STABILIZERS
  - MUSCLES CROSSING ELBOW JOINT
  - PROVIDE COMPRESSIVE STABILITY
    - ANCONEUS
    - BICEPS
    - TRICEPS
    - BRACHIALIS



(a) Anterior superficial view



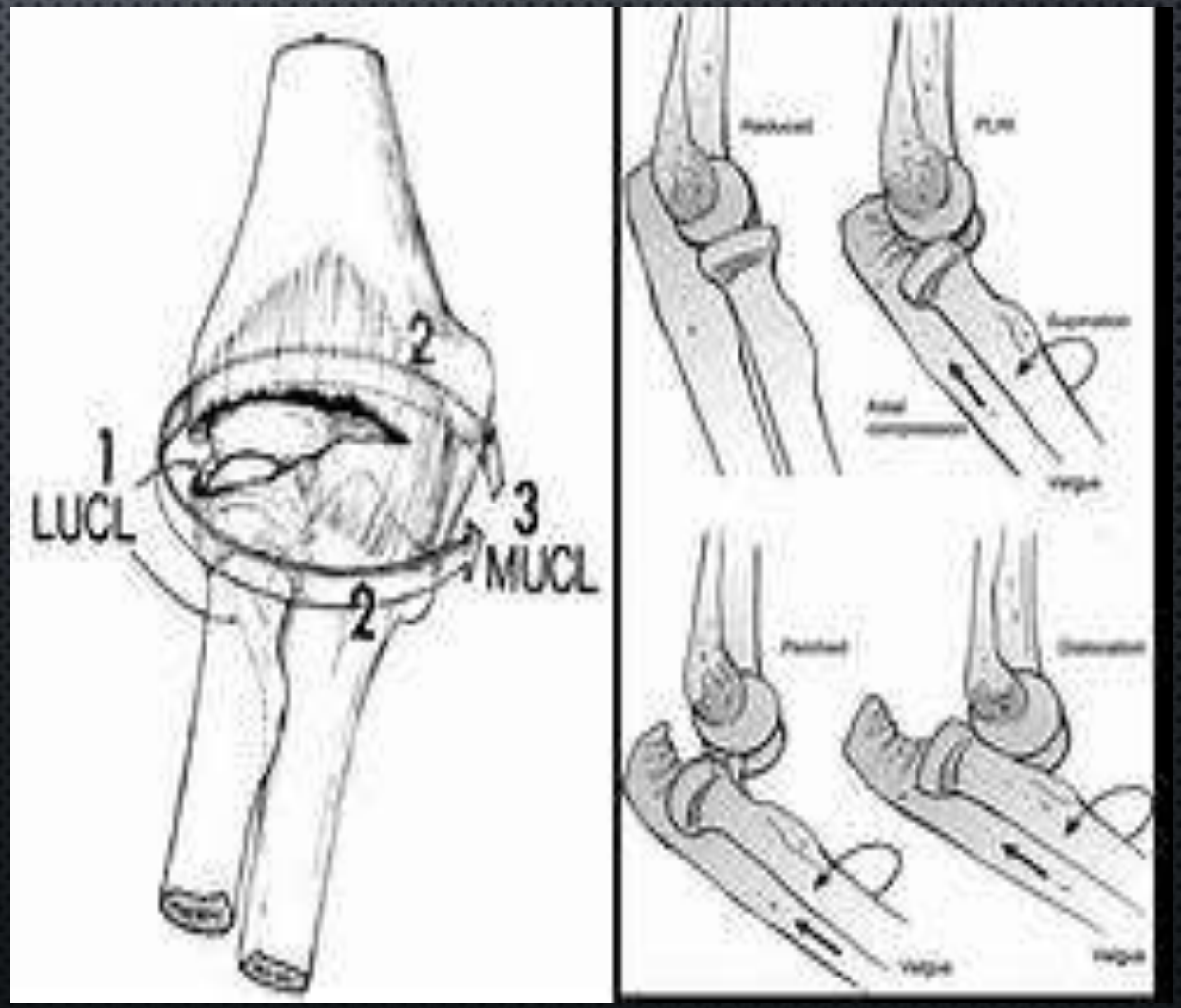
(b) Posterior superficial view

MECHANISM

- Posterolateral
  - Axial load
  - Supination
  - Valgus force

MECHANISM (CIRCLE OF HORI)

- Circular disruption of elbow structures
- Progresses lateral to medial
  - LCL fails first
    - Avulsion of humerus,
    - Midsubstance rare
  - MCL fails last



CLASSIFICATION

- Anatomic description
  - Named for position of olecranon relative to humerus
    - Posterolateral
    - Posteromedial
    - Posterior
- Simple
  - No fractures
  - 50-60% of elbow dislocations
- Complex
  - Associated fracture

TERRIBLE TRIAD

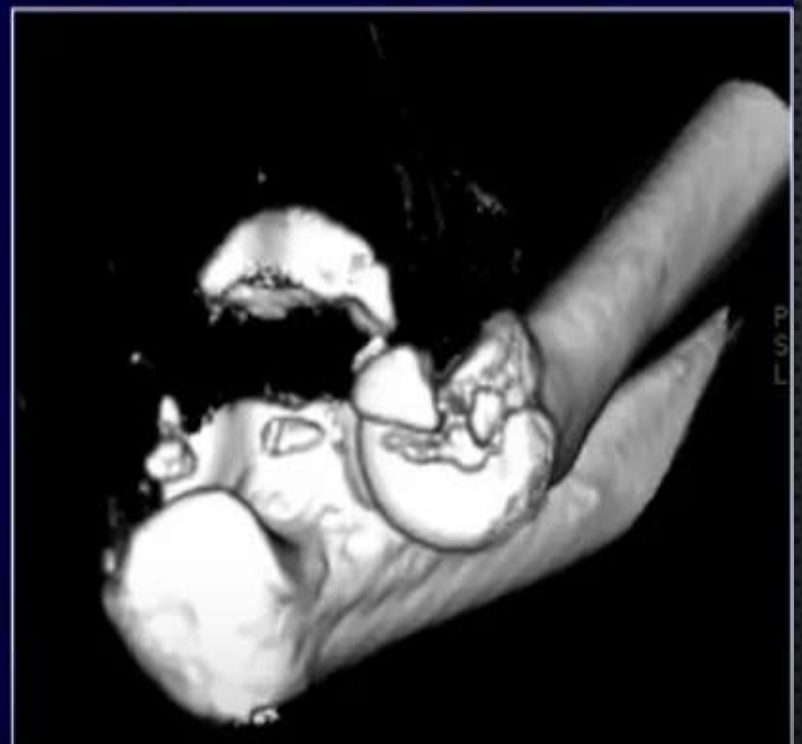
- DISLOCATION
- LUCL TEAR
- RADIAL HEAD FRACTURE
- CORONOID TIP FRACTURE

Terrible Triad

Posterior dislocation

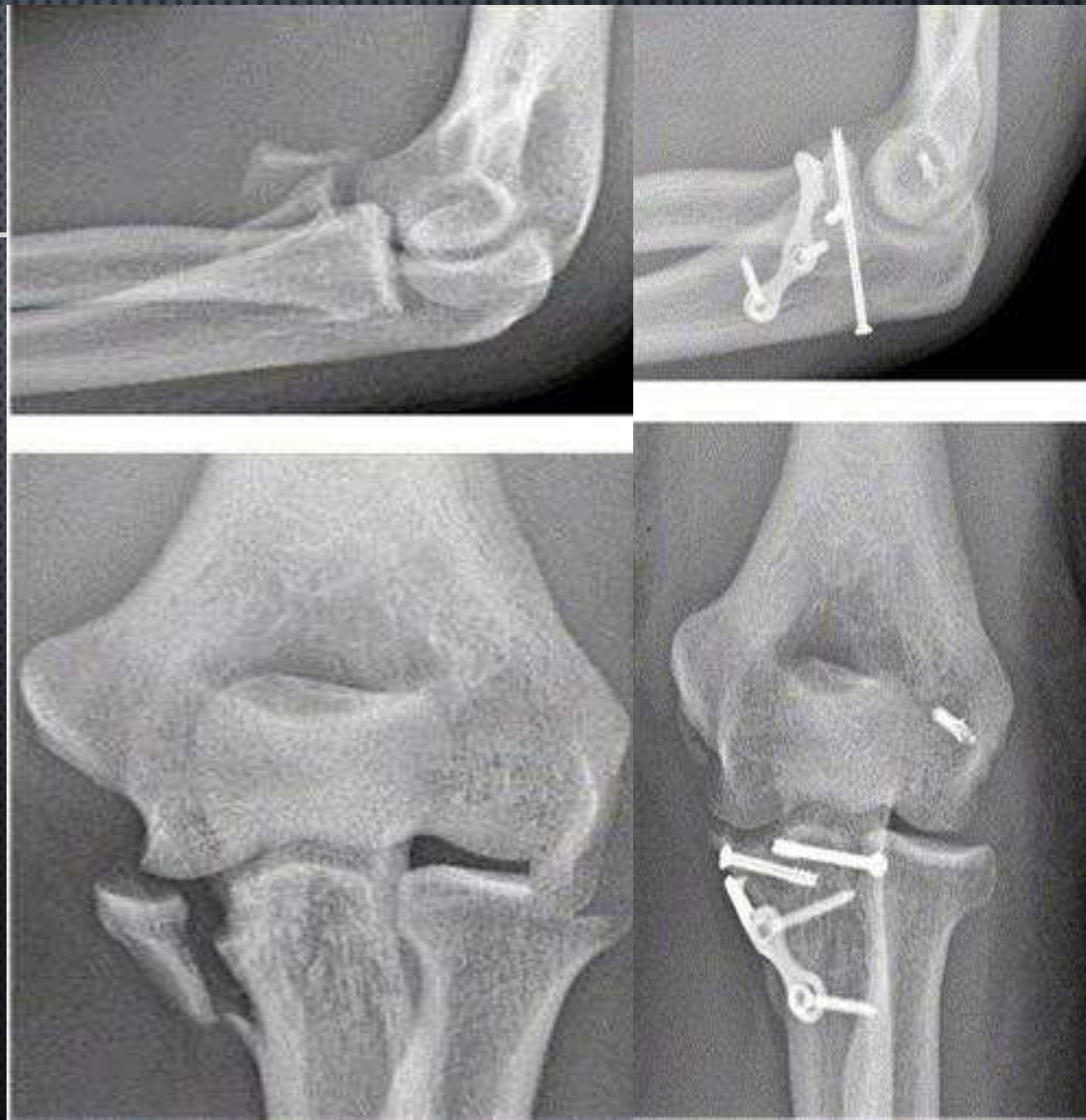
Radial head fracture

Coronoid fracture



VARUS POSTEROMEDIAL

- LCL tear
- Coronoid fracture
  - Usually large medial facet fracture

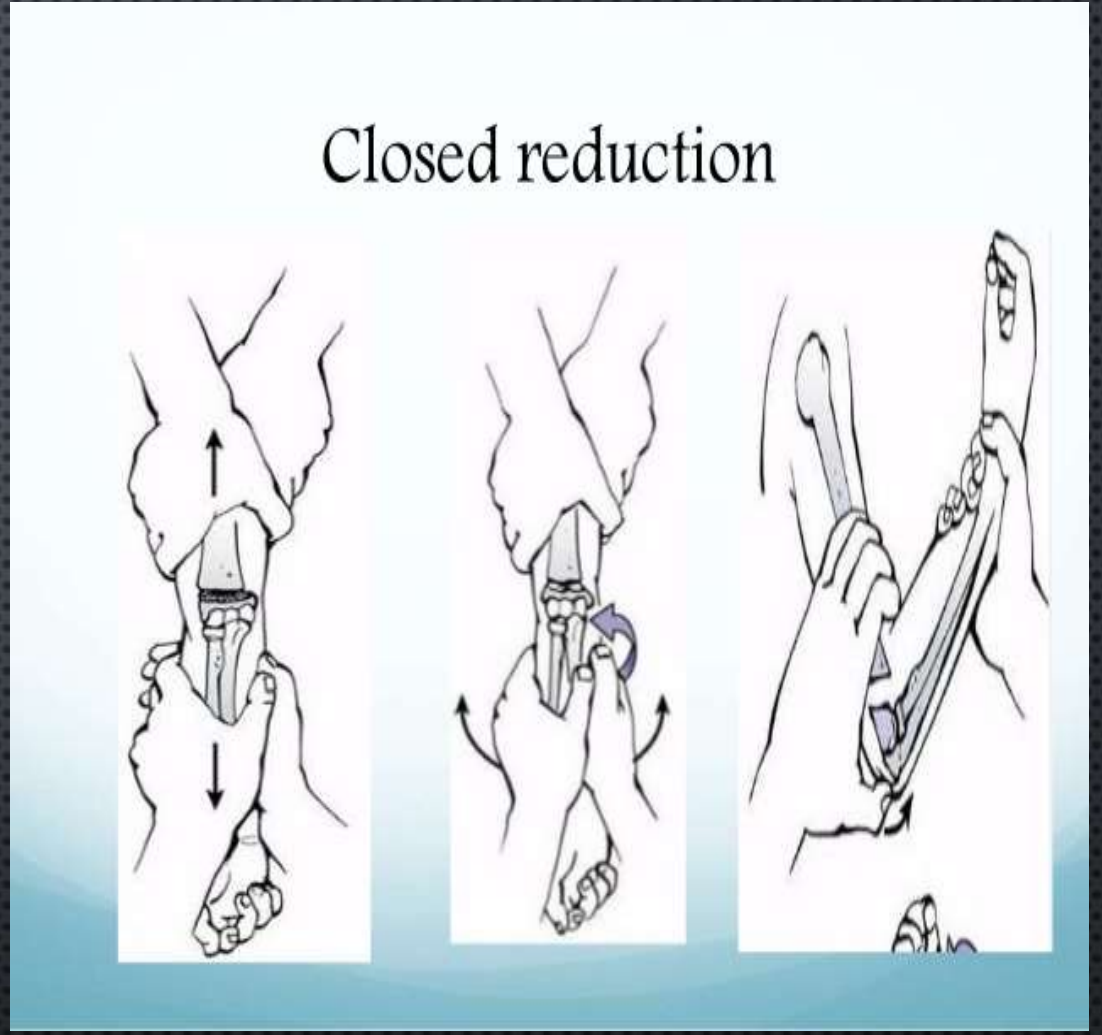


PHYSICAL EXAM

- Status of skin
  - Open vs closed
- Compartments
- Neurovascular status
- Shoulder and Wrist
  - Xray of both
  - 10-15% will have shoulder/ wrist injuries

TREATMENT

- Reduction of elbow
- Assess stability
  - Usually unstable in extension/varus
- Repeat xray
- Splint 5 days
- Begin early therapy
- Recurrent instability after simple dislocation rare
  - <1-2%



CLOSED REDUCTION

- NEED PATIENT RELAXED
- CORRECT CORONAL PLANE W/ INLINE TRACTION
- SUPINATE FOREARM
  - SHIFT CORONOID UNDER TROCHLEA
- FLEX ELBOW
- APPLY PRESSURE TO TIP OF OLECRANON

Posterior Elbow Dislocation

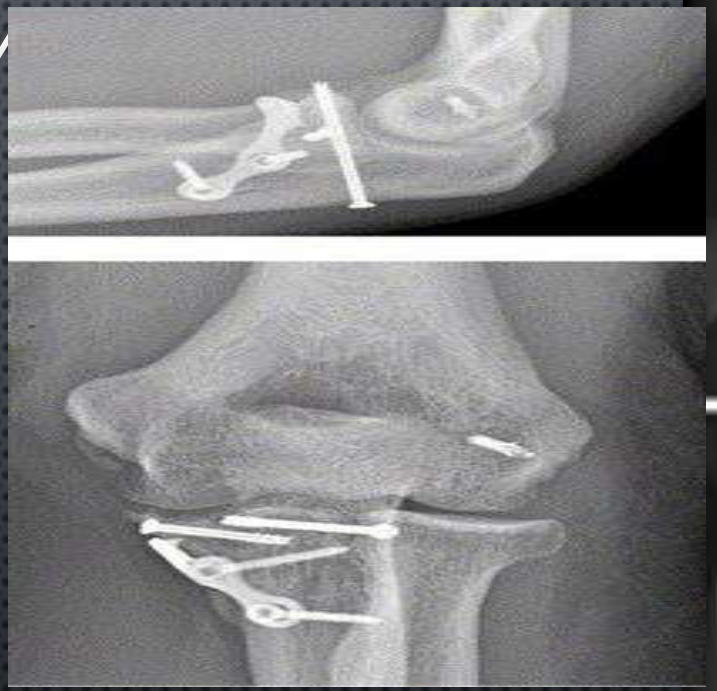
SPLINTING

- SPLINT AT LEAST 90 DEGREES OF FLEXION
- IF LCL DISRUPTED
  - SPLINT IN PRONATION
- IF MCL DISRUPTED
  - SPLINT IN SUPINATION

REHAB GUIDELINES

- INITIAL
  - IMMOBILIZE FOR 5-10 DAYS
  - IMMOBILIZATION FOR >3 WEEKS RESULTS IN POOR FINAL ROM OUTCOMES
- EARLY
  - SUPERVISED (THERAPIST) ACTIVE AND ACTIVE ASSIST RANGE-OF-MOTION EXERCISES WITHIN STABLE ARC
  - EXTENSION BLOCK BRACE IS USED FOR 3-4 WEEKS
  - PROCEED WITH LIGHT DUTY USE 2 WEEKS FROM INJURY
  - LOSS OF EXTENSION IS THE MOST COMMON COMPLICATION AFTER AN SIMPLE DISLOCATION

WHO NEEDS SURGERY



- Open dislocations
- Fracture Dislocations
  - Terrible Triad
- Simple Dislocations that fail conservative treatment

QUESTIONS