PLEASE CLICK ON THE FOLLOWING LINK TO WATCH THE LECTURE ONLINE:-

https://www.youtube.com/watch?v=uR9OBLbf4Yo&list=PLuBRb5B7fa_dOavBF4DJizjSFmXchrX9o&index=1

Anterior shoulder instability

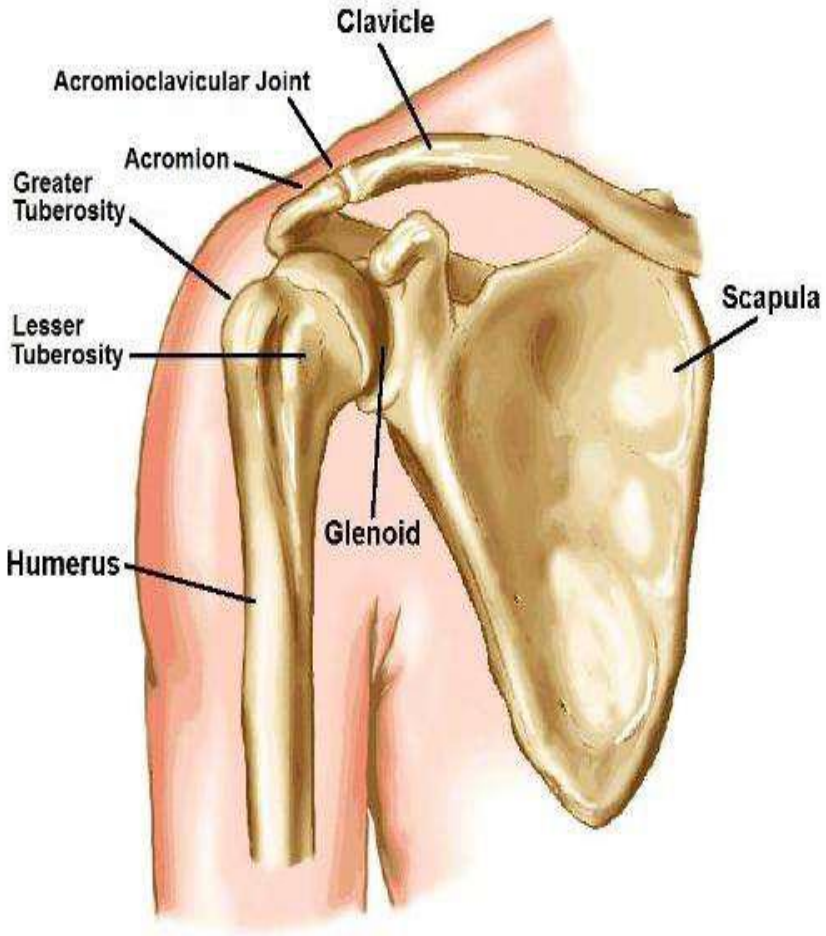
Nizar Abu Alannaz
Orthopedic and sport surgeon

terminology

- **Instability**: Inability to maintain the humeral head in the glenoid fossa.
- **Subluxation**: Partial loss of glenohumeral articulation with symptoms.
- **Dislocation**: Complete loss of glenohumeral articulation.
- **Laxity**: Increased motion of the glenohumeral joint without associated pain or discomfort.

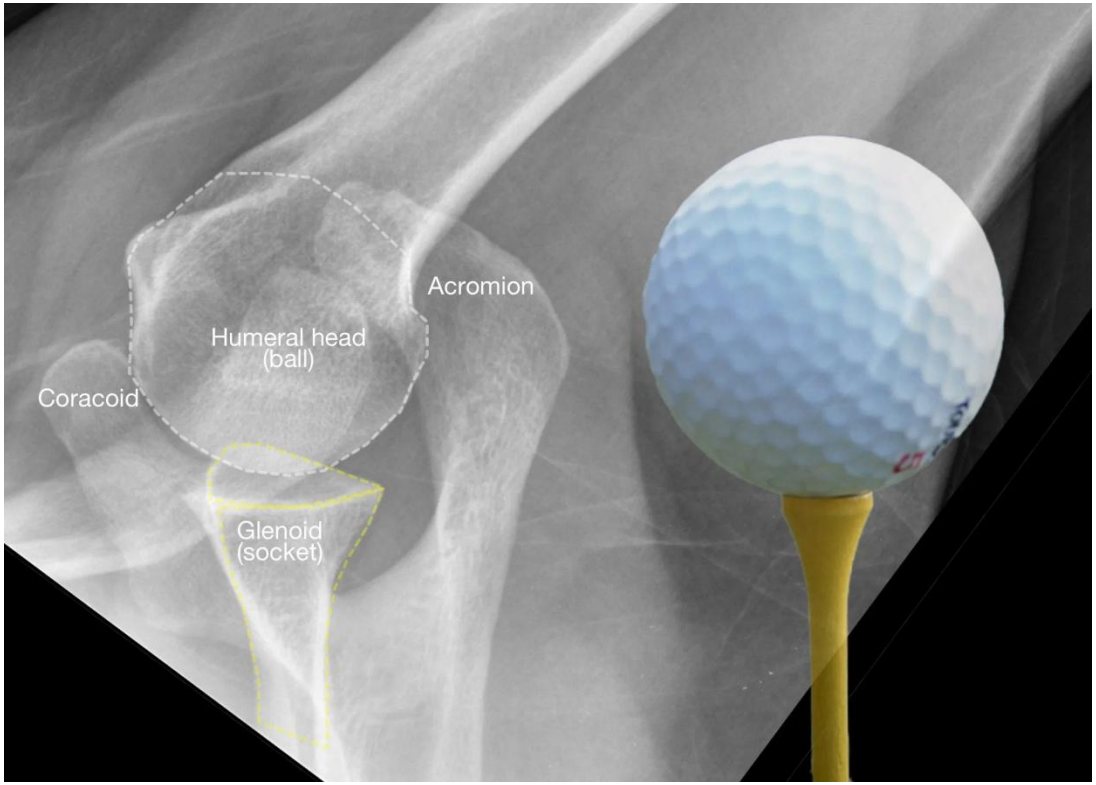
Shoulder Anatomy

- Osteolog



- **Proximal humerus :**
- The humeral head averages 19° of retroversion
- 41° of inclination (neck-shaft angle).
- The anterolateral ascending branch of the anterior humeral circumflex artery provides the ***primary*** blood supply to the humeral head.
- It travels proximally in the lateral aspect of the intertubercular groove. The terminal intraosseous portion of the artery enters at the proximal aspect of the intertubercular groove as the : arcuate artery.

- The humeral head is three times larger than the glenoid fossa.
- Only 25-30% of the humeral head is covered by the glenoid fossa during any range of motion.
  - Advantage: Increased shoulder ROM.
  - Disadvantage: Decreased stability of the joint.
- Labrum Increases humeral contact to 75%.



- Alterations of glenoid version can lead to instability
  - **Posterior instability**
    - ✓ Significant retroverted glenoid
    - ✓ Hypoplastic glenoid
    - ✓ Posterior glenoid rim fracture
  - **Anterior instability**
    - ✓ Chronic anteroinferior bone loss

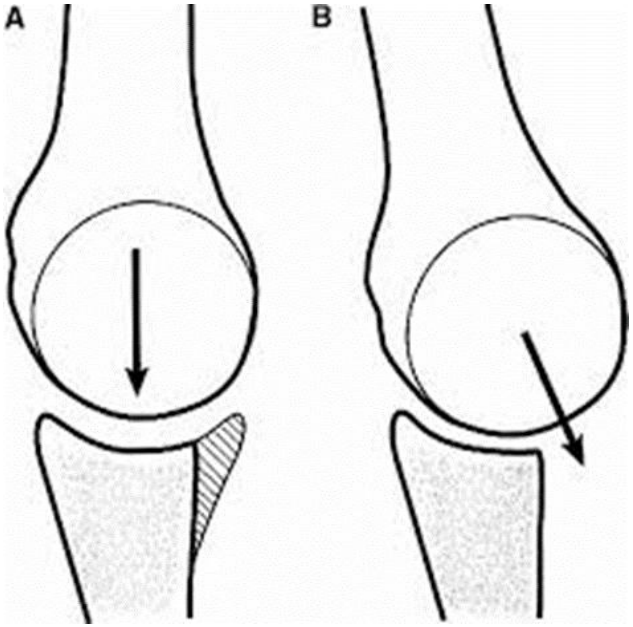
Traditionally , glenoid bone loss has been divided into

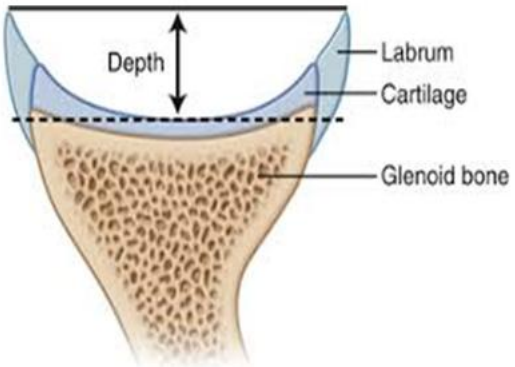
- **Minimal** (0% to20%) :soft tissue procedures
- **Moderate** (20% to 30%) :arthroscopic/open bony procedures
- **Significant** (over 30%) : open bony procedures

Labrum

* Functions :

1. **Deformable structure** with high compliance interposed between 2 surfaces to more evenly distribute contact pressures between the surfaces, increase boundary lubrication, and maximize concavity/compression characteristics, much like a washer between 2 surfaces
2. **Pressure sensor** maximizing proprioceptive feedback
3. **Attachment site** for muscles and ligaments, to optimize their **tension**


A
B

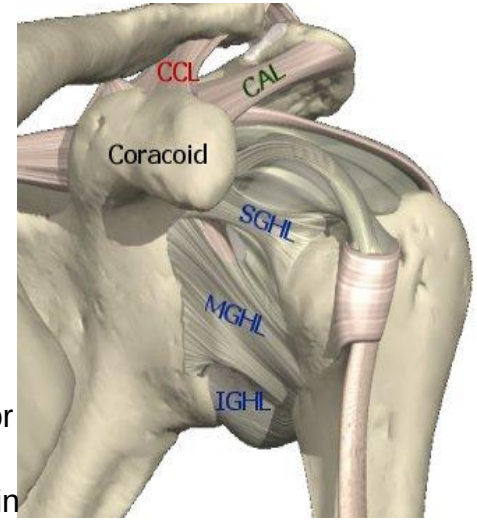

Depth
Labrum
Cartilage
Glenoid bone

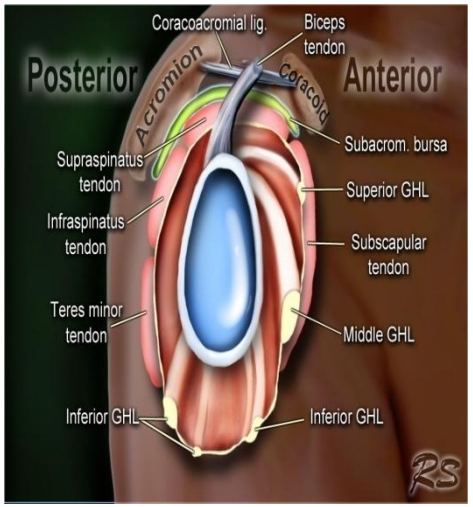
Glenohumeral ligaments

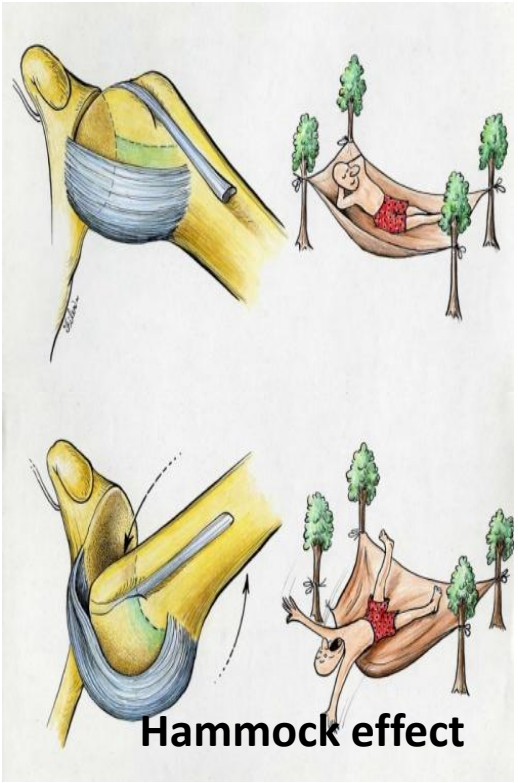
- **Superior GHL**
  - runs from anterosuperior labrum to the humerus
  - Function- resists anterior translation of adducted arm

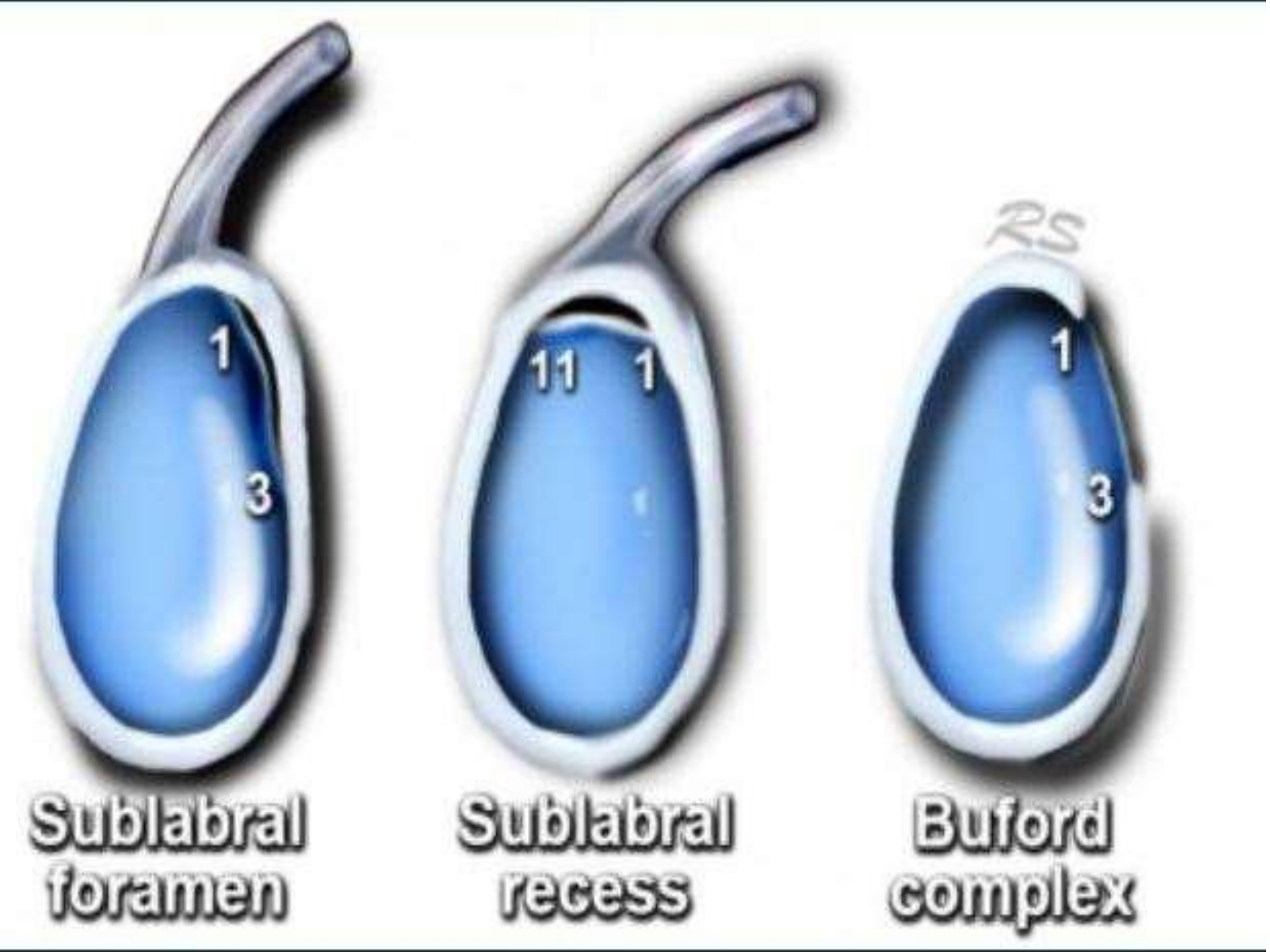
- **Middle GHL**
  - runs from anterosuperior glenoid arising just inferior to S.GHL to anterior aspect of the anatomical neck
  - Function- resists anterior and posterior translation in the mid range of arm abduction at 45° and external rotation

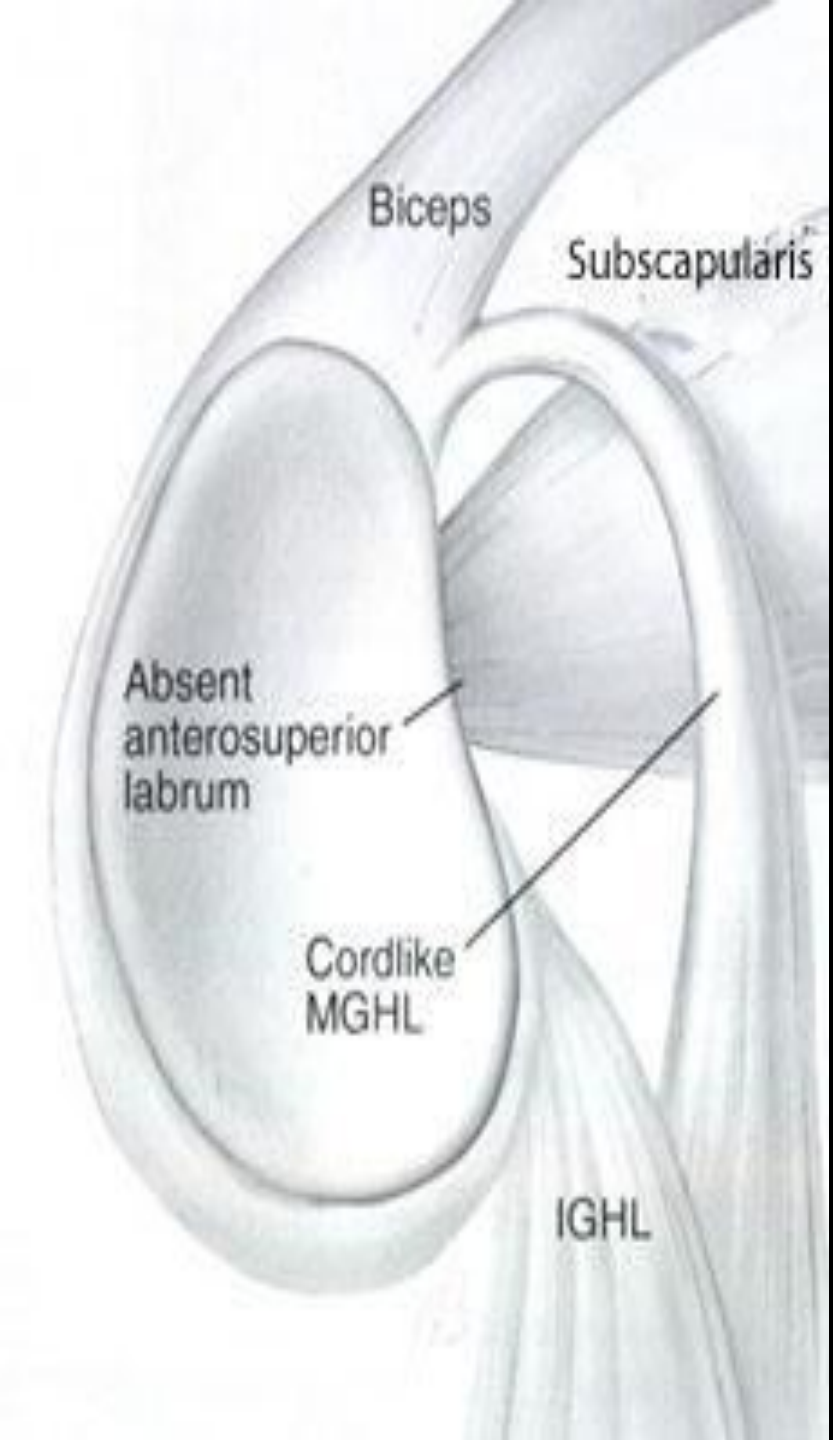
- **Inferior GHL**
  - runs from inferior ⅔ of glenoid cavity to lateral humerus
  - **Anterior band function** – primary stabilizer that limits antero-inferior translation of arm in 90° abduction and external rotation
  - **anterior band forms weak line that predispose to bankart lesion.**
  - **Posterior band function** – resists posterior translation in adduction and internal rotation
  - **tightness of the posterior band leads to impingement and increases shear forces on superior labrum.**

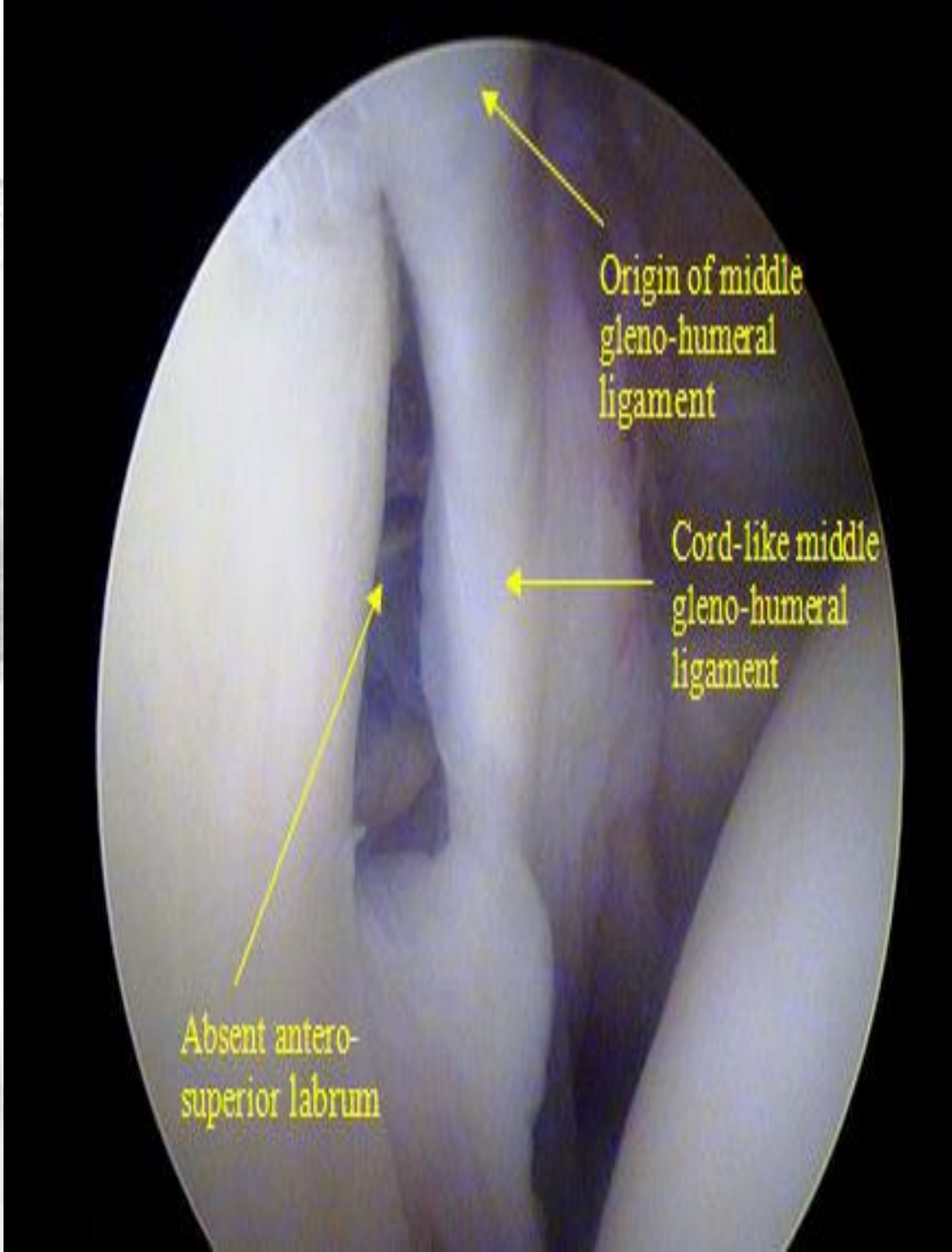







1
3
11
1
1
3
Sublabral foramen
Sublabral recess
Buford complex


Biceps
Subscapularis
Absent anterosuperior labrum
Cordlike MGHL
IGHL


Origin of middle gleno-humeral ligament
Cord-like middle gleno-humeral ligament
Absent antero-superior labrum

Why is it important to address those normal variants ?

- It is important to recognize these variants, because they **can mimick a SLAP tear.**
- These normal variants will usually **not mimick a Bankart-lesion**, since it is located at the 3-6 o'clock position, where these normal variants do not occur.
- However labral tears may originate at the 3-6 o'clock position and subsequently extend superiorly.
- Attaching a Buford complex will lead to painful and restricted **external rotation and elevation**.

Normal Variants VS Labral tears

- High signal extends medially and follows the contour of the glenoid cartilage
- Smooth margin
- < 3mm
- Located at biceps anchor

- High signal extending laterally
- Irregular margin
- Can be > 3mm
- Located at biceps anchor and posteriorly

Shoulder stabilizers

Static Stabilizers

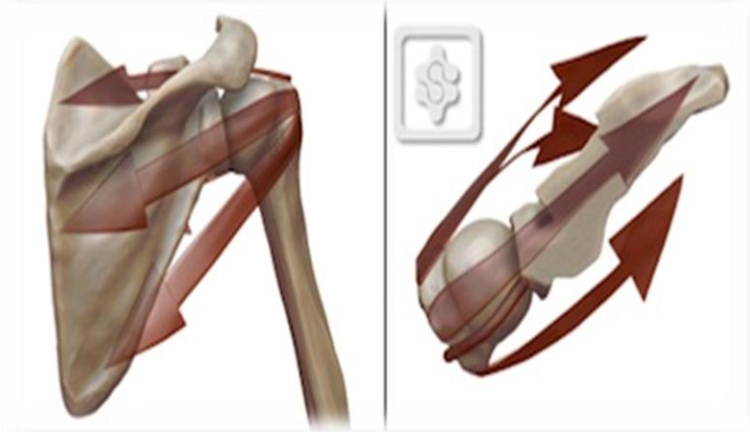
- Articular congruence
- Glenoid labrum
- Capsule and ligaments
- Negative pressure
  - The osmotic action of the synovium to remove fluid creates a negative intra-articular pressure in the joint.
  - This makes the pliable labrum centered by a non-compliant osseous glenoid stick to the humeral head like a suction cup.
  - This negative pressure is lost in capsular tear or excessive capsular laxity.
- Coracoacromial arch- Anterosuperior stability

Dynamic stabilizers

- Rotator cuff
- Biceps Tendon
- Scapulothoracic motion
- Propioception

Rotator cuff

- Active contraction of the rotator cuff contributes to joint stabilization by coordinated muscular activity and by secondary tightening of the ligamentous constraints.
- This effect works in combination with the concavity-compression mechanism, in which muscle contraction causes compression of nearly congruent articular surfaces into one another.
  - This coordinated compressive function of the rotator cuff muscles is required to counteract the upward shearing force of the strong deltoid muscle during abduction and/or flexion.

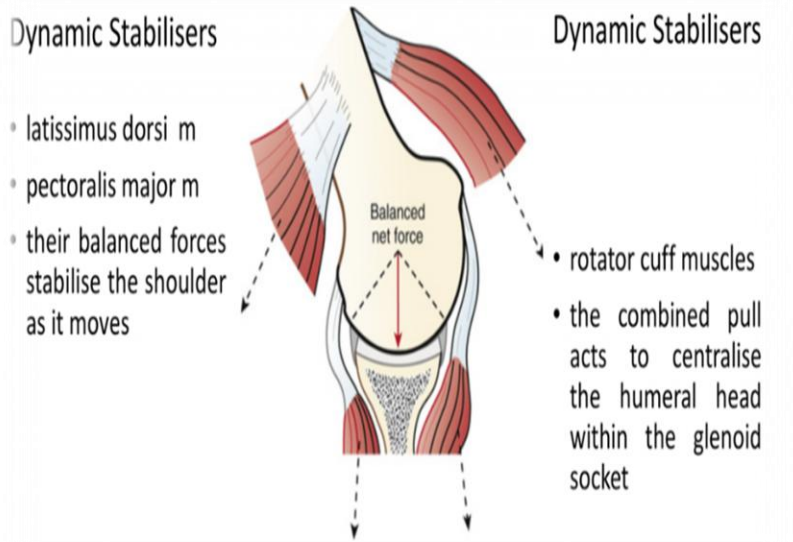


Concavity-compression effect

- Deltoid produces primarily vertical shear forces, tending to displace the humeral head superiorly
- Forces from the rotator cuff provide compressive or stabilizing forces.
- Loss of the labrum can reduce this stabilizing effect by 20%.

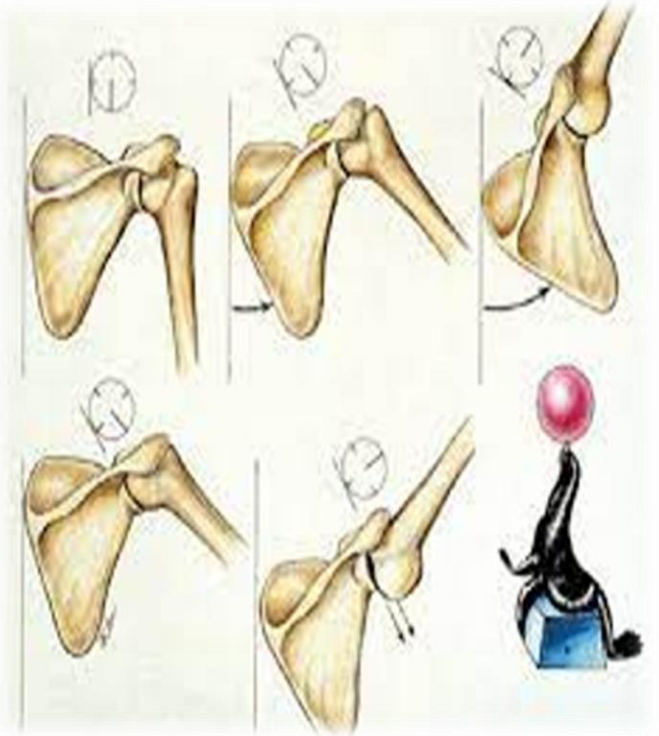
Other Factors

- Muscles around the shoulder
  - Levator Scapulae
  - Rhomboids
  - Trapezius
- Biceps Brachii (Long head), Deltoid- secondary stabilizer, head depressor
- Periscapular Muscles- help position scapula and orient glenohumeral joint contributes compressive force across joint
- Scapulothoracic motion- trapezius, serratus anterior , teres major, levator scapulae; less stable platform



Scapulo-thoracic motion

- Primarily achieved by the serratus anterior and trapezius muscles, which provide overall rhythm of the shoulder motion.
- Maintains the glenoid as a stable platform underneath the humeral head as the shoulder rotates into positions required for overhead motions such as throwing.

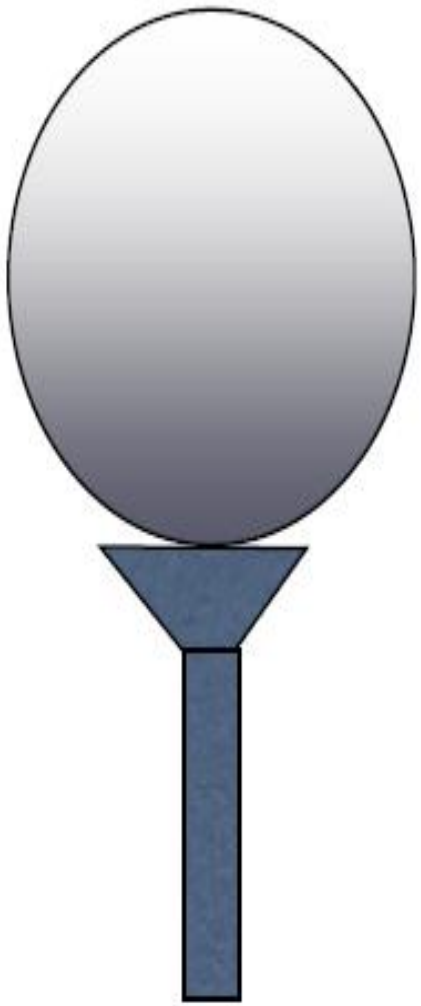


Understanding Instability

Understanding Stability

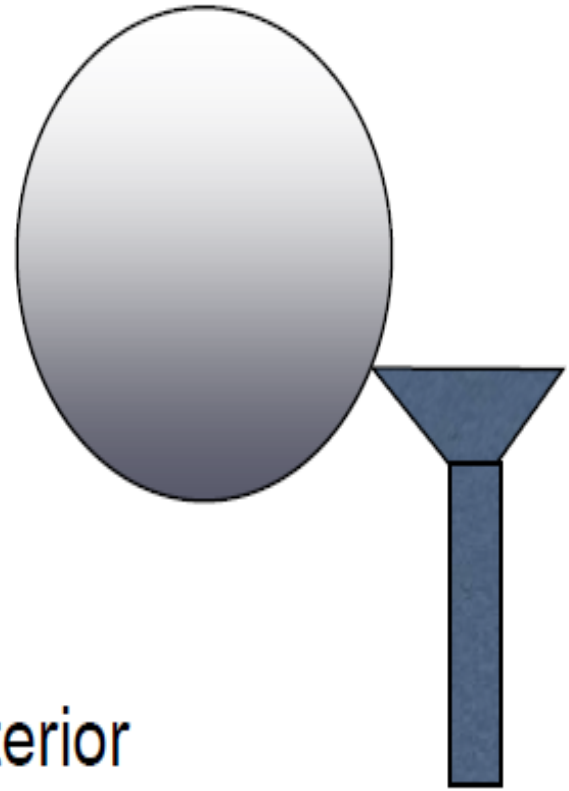
Static Stabilisers

Bone



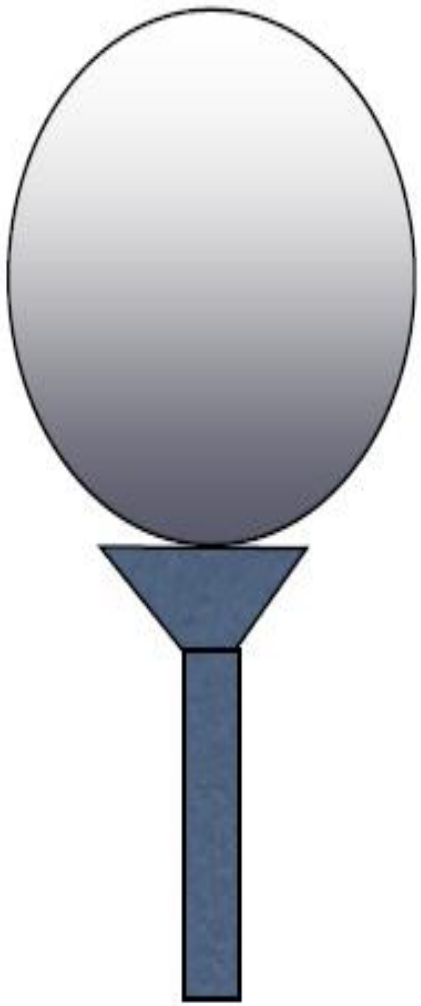
Anterior

Posterior



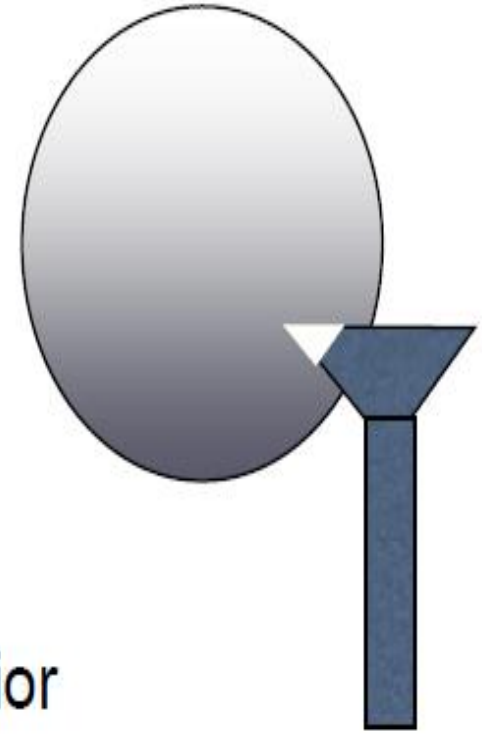
Anterior

Posterior



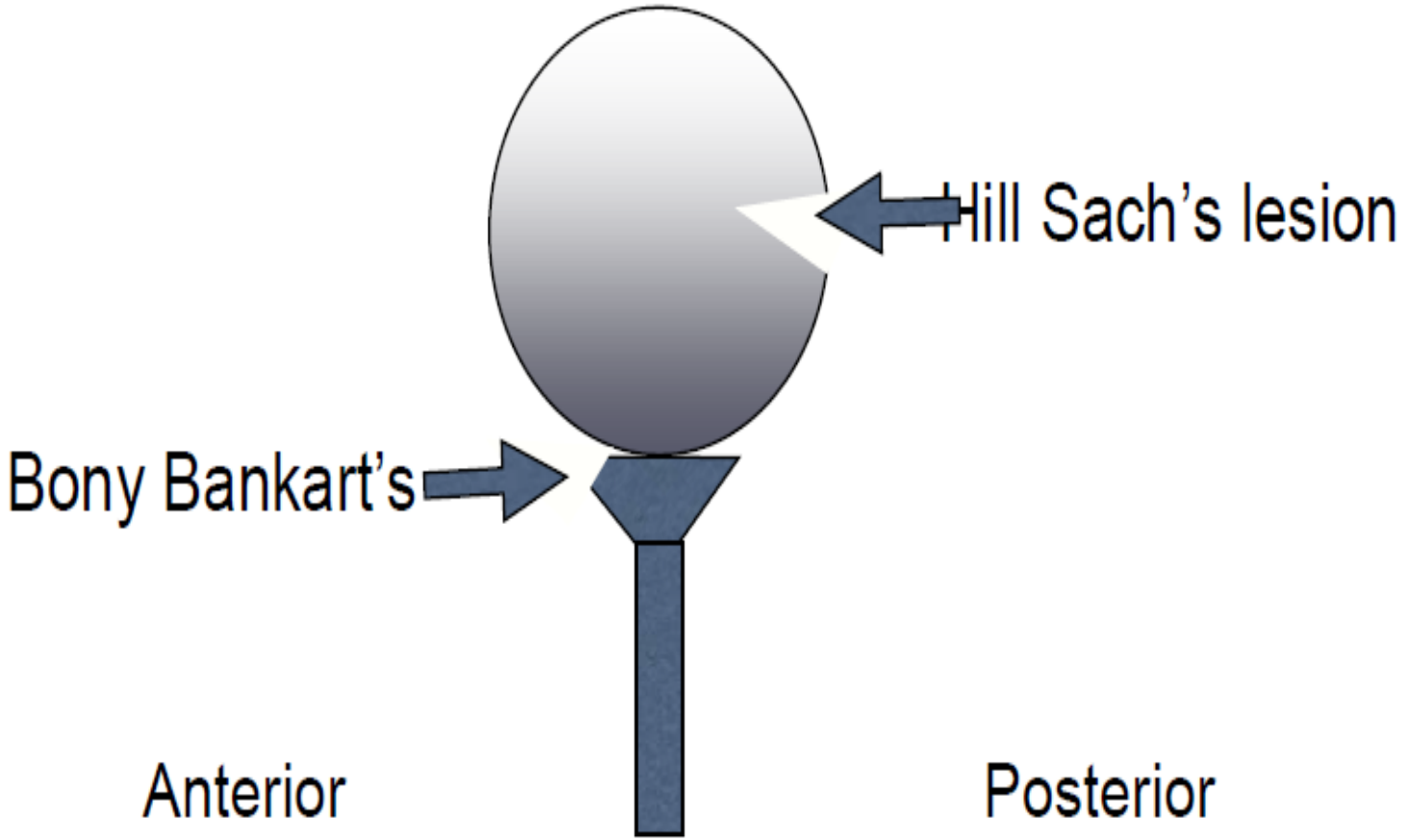
Anterior

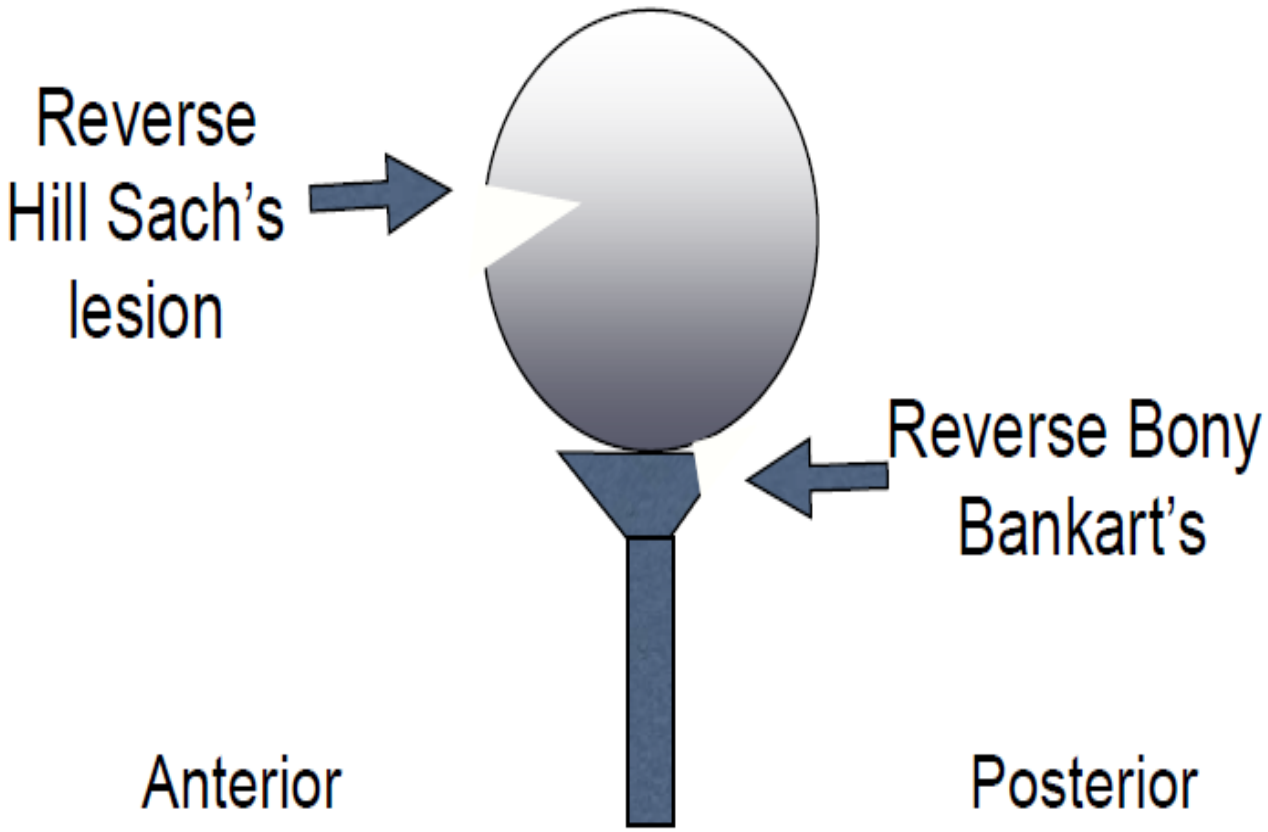
Posterior



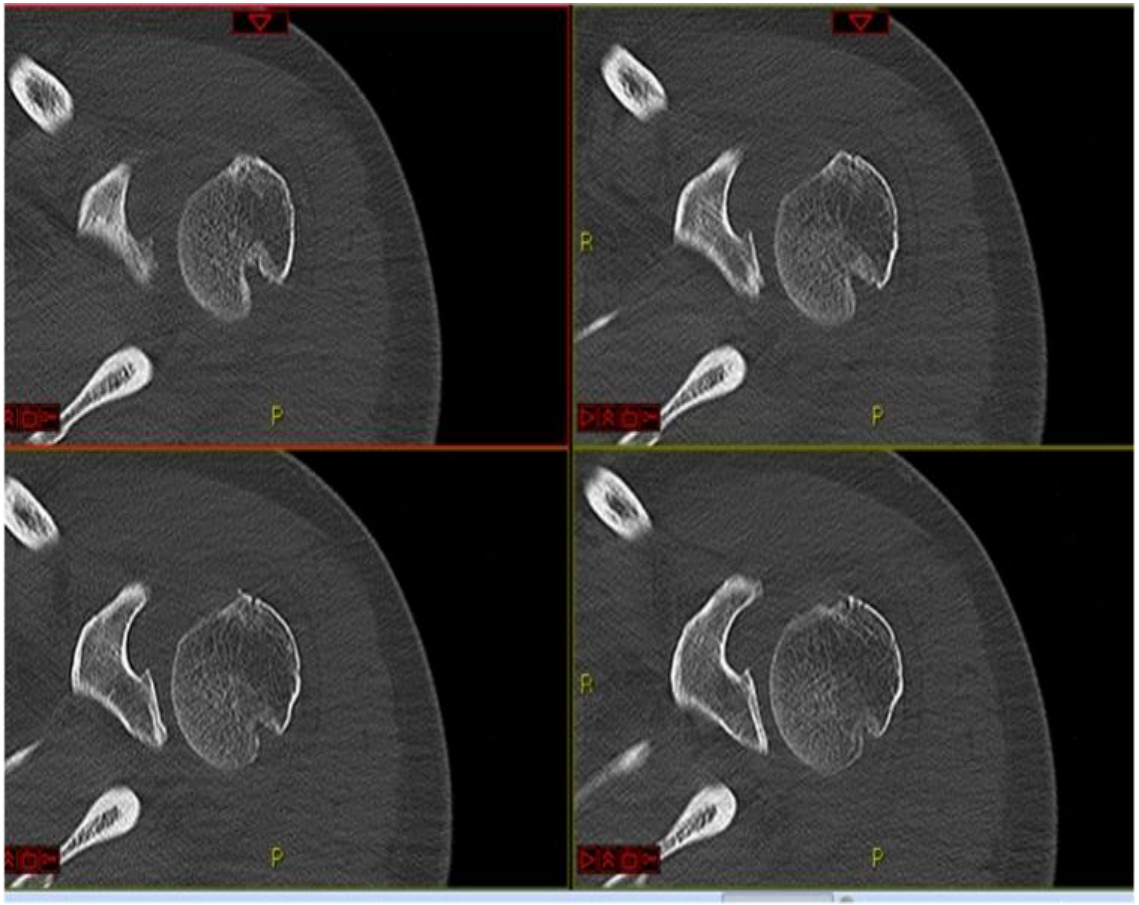
Anterior

Posterior


Hill Sach's lesion
Bony Bankart's
Anterior
Posterior


Reverse
Hill Sach's
lesion
Reverse Bony
Bankart's
Anterior
Posterior

Hill Sachs defect



Understanding Stability

Static Stabilisers

- Bone
- Labrum
- GH ligaments

Understanding Instability

Bankart lesion

Understanding Instability

AB-IGHL injury

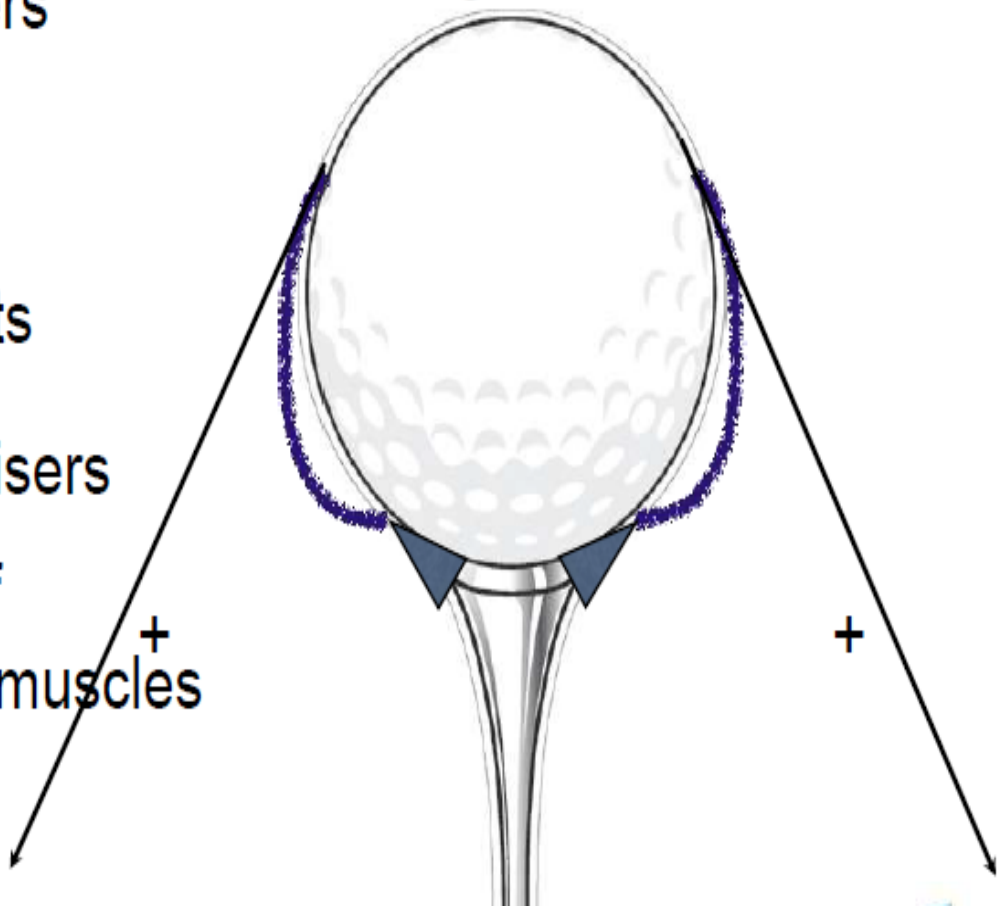
Understanding Stability

Static Stabilisers

- Bone
- Labrum
- GH ligaments

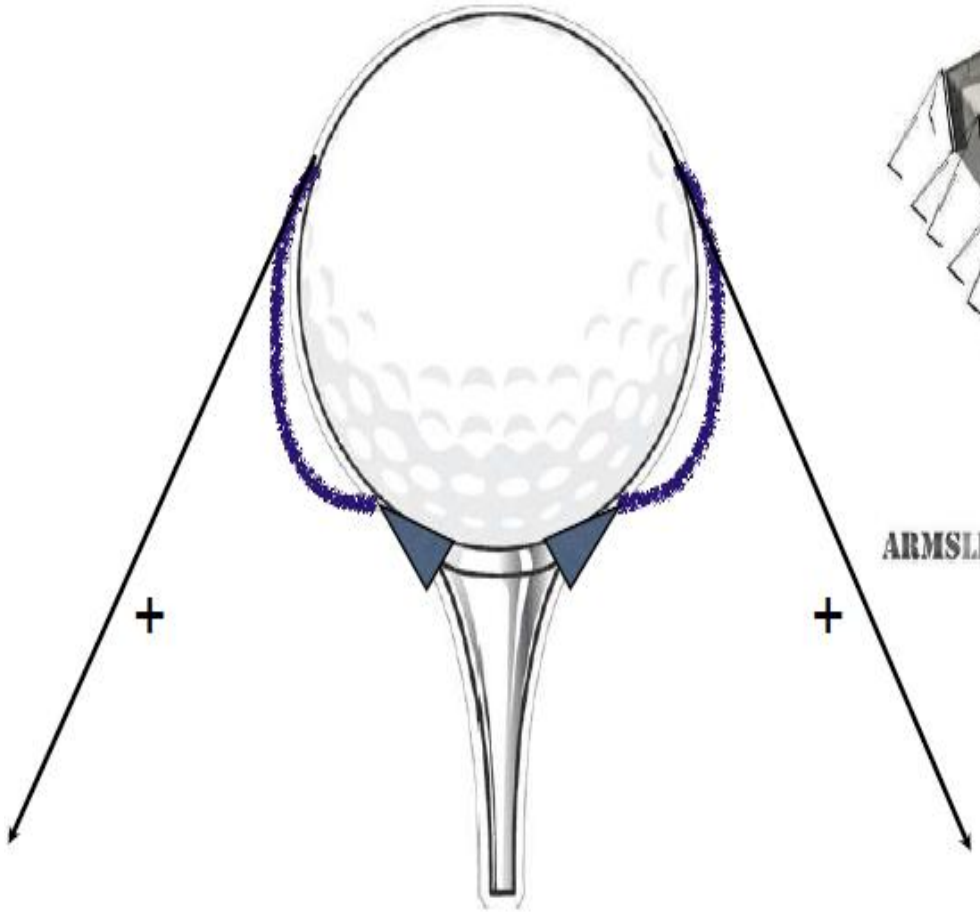
Dynamic Stabilisers

- Rotator Cuff
- Periscapular muscles



Concavity compression

Scapulo-humeral balance



Understanding Stability

Static Stabilisers

Bone

Labrum

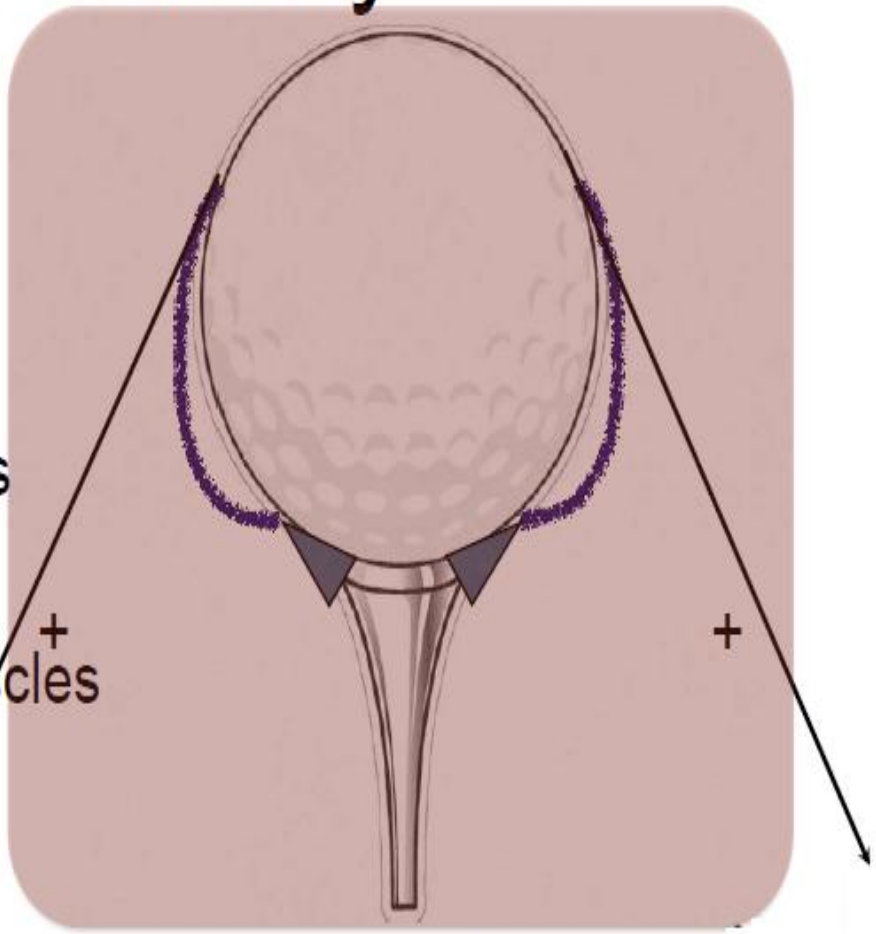
GH ligaments

Dynamic Stabilisers

Rotator Cuff

Periscapular muscles

Proprioceptors

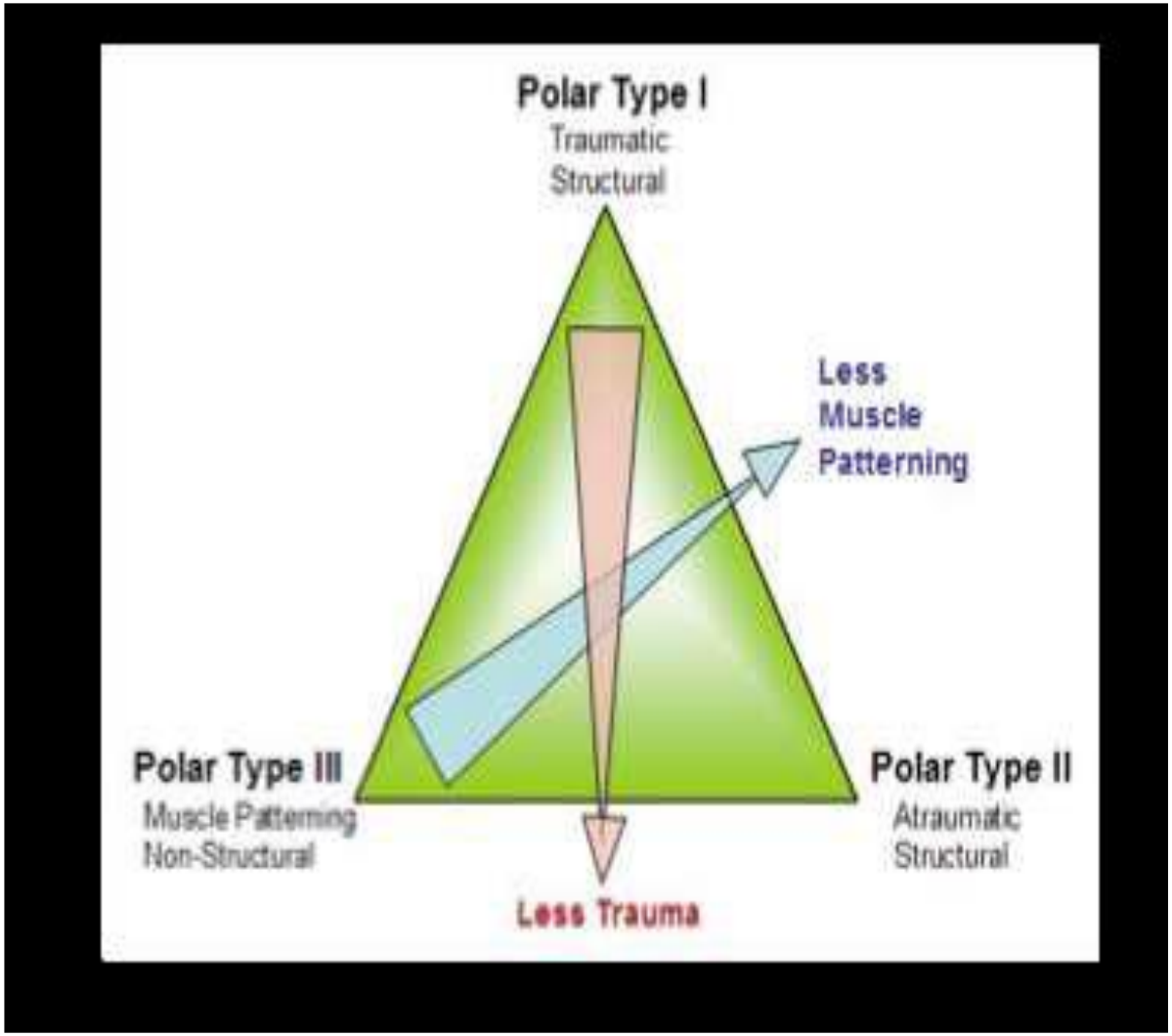


Classification of Shoulder instability

1- According to **Stanmore triangle** (3 polars types)

2- According to **Direction of dislocation**

Stanmore triangle



TYPES

- Traumatic structural instability

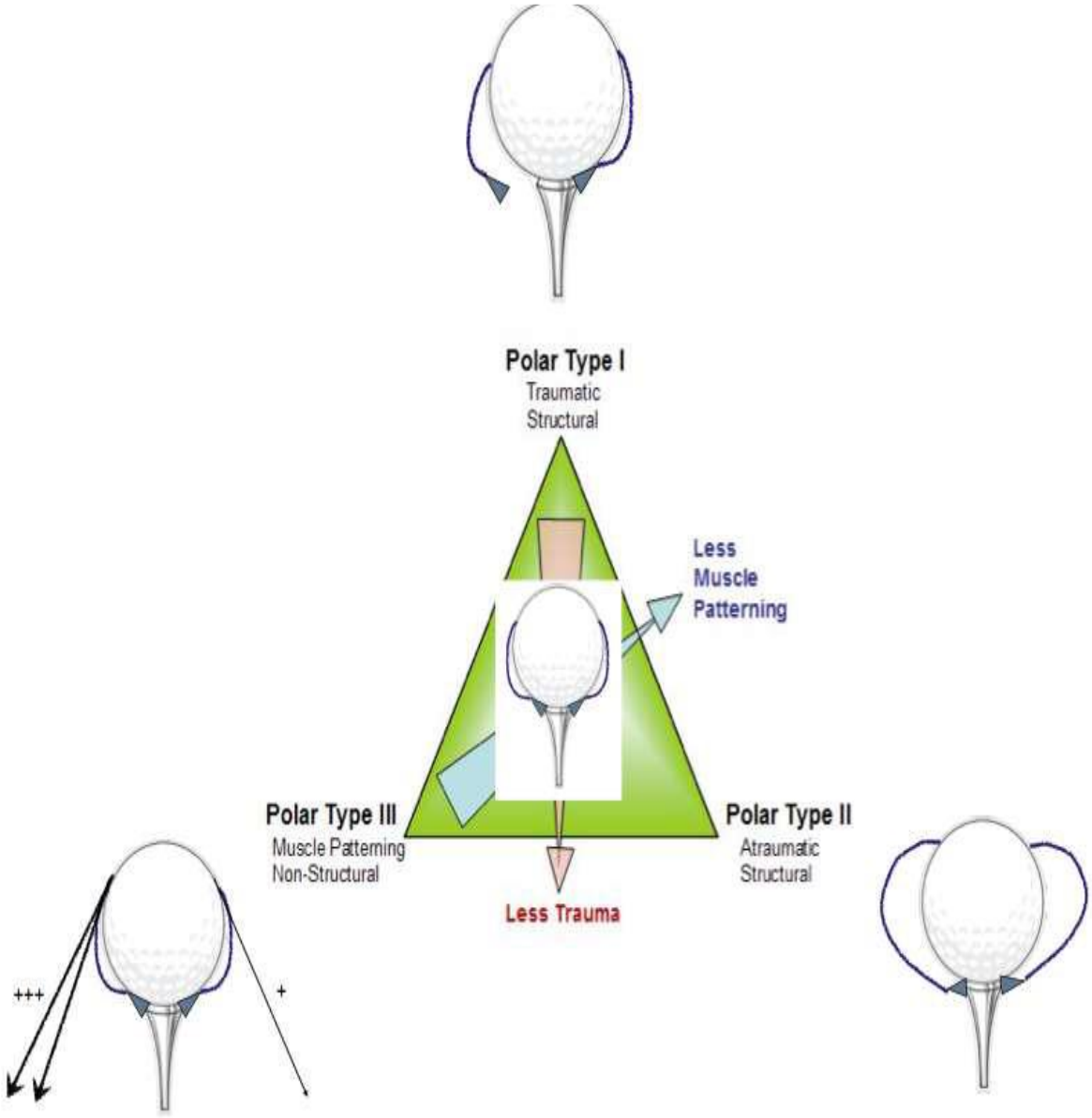
Type I

- Atraumatic (or minimally traumatic) structural instability

Type II

- Atraumatic non-structural instability

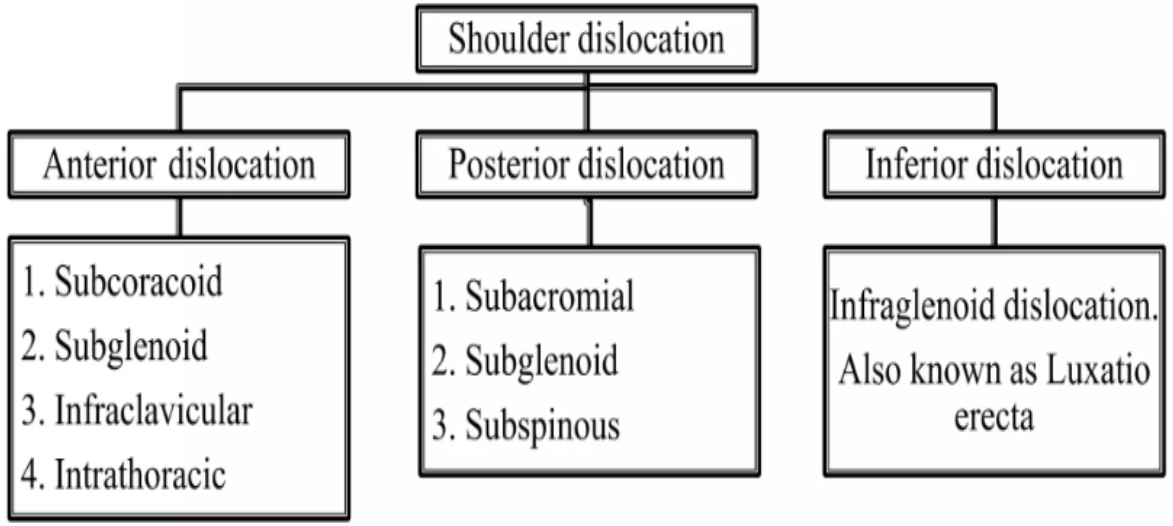
Type III

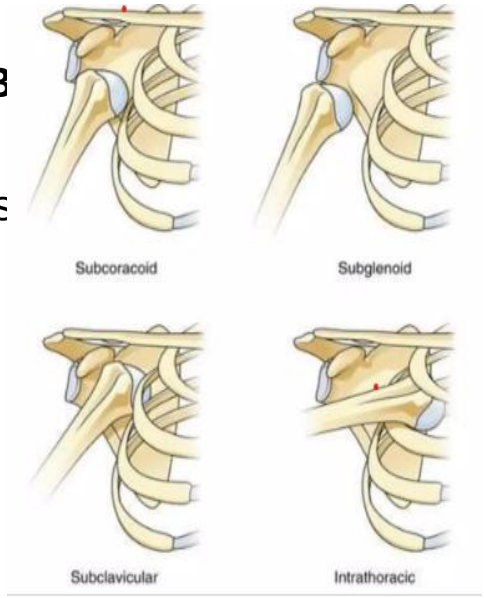

Polar Type I
Traumatic
Structural
Less
Muscle
Patterning
Polar Type III
Muscle Patterning
Non-Structural
Polar Type II
Atraumatic
Structural
Less Trauma
+++
+

	TYPE 1	TYPE 2	TYPE 3
Type of disorder	Traumatic structural instability	Atraumatic (or minimally traumatic) structural instability	Atraumatic non-structural instability
Trauma	Yes	No	No
Articular surface damage	Yes	Yes	No
Capsular problem	Bankart lesion	Dysfunctional	Dysfunctional
Laxity	Unilateral	Uni/bilateral	Bilateral
Muscle patterning	Normal	Normal	Abnormal

C

- **ACCORDING TO DIREC**
  1. Anterior
  2. Posterior
  3. Inferior
  4. Multidirectional
- **DEGREE OF INSTABIL**
  - Subluxation
  - Dislocation
- **DURATION OF INSTAB**
  1. Acute
  2. Chronic (>6 Weeks





MASTEN'S CLASSIFICATION SYSTEM

TUBS

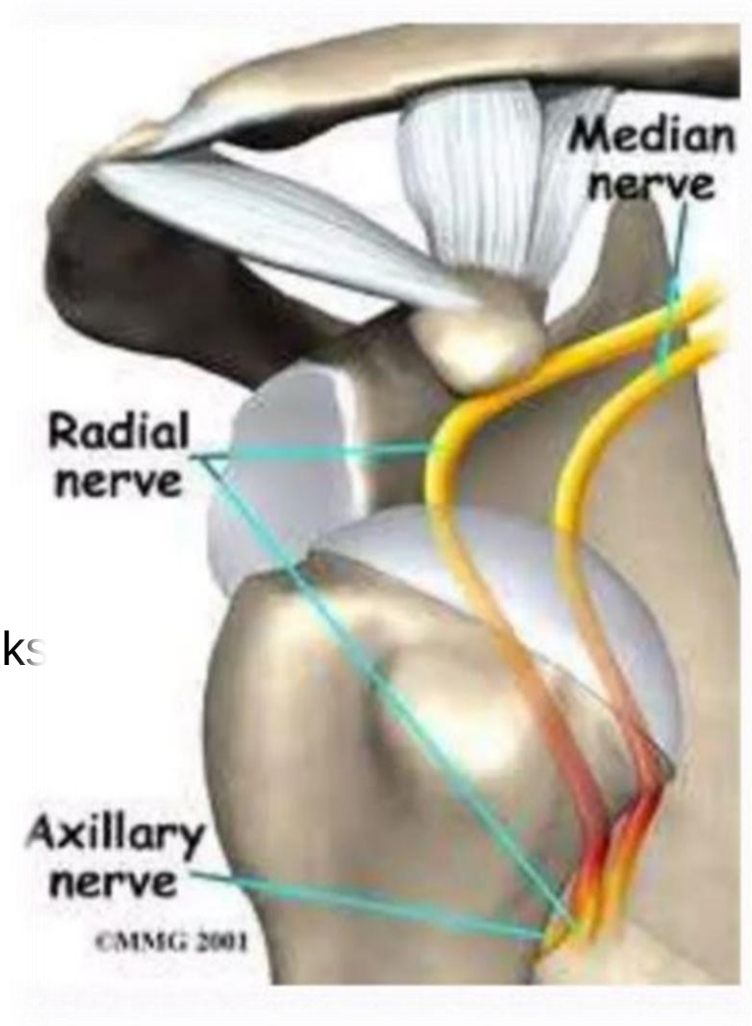
- ❑Traumatic
- ❑Unidirectional
- ❑Bankart lesion
- ❑Surgery is often necessary

AMBRII

- ❑Atraumatic
- ❑Multidirectional
- ❑Bilateral
- ❑Rehabilitation is the primary mode of treatment
- ❑Inferior capsular shift
- ❑Internal closure often performed

Associated injuries

- Fractures
  - Humeral head & neck
  - Glenoid
- Rotator cuff tears
- Neurological injuries (Axillary Nerve)
  - Incidence-
    - 10-25% (1st time)
    - 2-5% recurrent dislocations
  - Poor prognosis if no recovery by 10 weeks
- Vascular injuries (Axillary artery)



Pathoanatomy of shoulder instability

LABRAL LESIONS	CAPSULAR INJURY	BONE LOSS
Bankart	Intrasubstance Tear	Glenoid (>20%)
Reverse Bankart	HAGL	Humeral Head- Hill Sachs Lesion
SLAP Lesions	Capsular Laxity	

Pathoanatomy

Capsule	▪Bankart lesion ▪Capsular stretching ▪Congenital laxity ▪Wide rotator interval
Glenoid	▪Bony Bankart (4%) ▪Glenoid fracture ▪Glenoid dysplasia
Labrum	▪Bankart tear ▪Posterior labral tear (10%) ▪SLAP tear
Humerus	▪Tear of the lig. insertion (HAGL) ▪Greater tuberosity fracture ▪Hill-Sachs lesion (77%)
Rotator cuff (13%)	▪Supraspinatus tear ▪Subscapularis avulsion

According to **Direction** of dislocation

1 - Traumatic Anterior Shoulder Instability

= **TUBS** (Traumatic Unilateral dislocations with a Bankart lesion requiring Surgery)

incidence

- one of most common shoulder injuries (**Commonest** type of instability (>95% cases)
- have a high recurrence rate that correlates with age at dislocation :
- up to 80-90% in teenagers
- **90%** chance for recurrence in age **<20**
- Patients aged 21-30 years have a 40-79% recurrence rate.
- Patients aged 31-40 years have a 40-72% recurrence rate.
- Patients aged 41-50 years have a 0-24% recurrence rate.

- Long-term studies (according to AAOS) with 10-year follow-up showed :
- 66% risk of recurrent anterior instability for patients younger than 22 years
- A 56% risk for patients age 23 to 29 years
- A 20% risk for patients age 30 to 40 years.

Associated injuries

cartilage injuries (**Bankart** lesions &

* These injuries are **always located in the 3-6 o'clock** position because they are caused by an anterior-inferior dislocation.

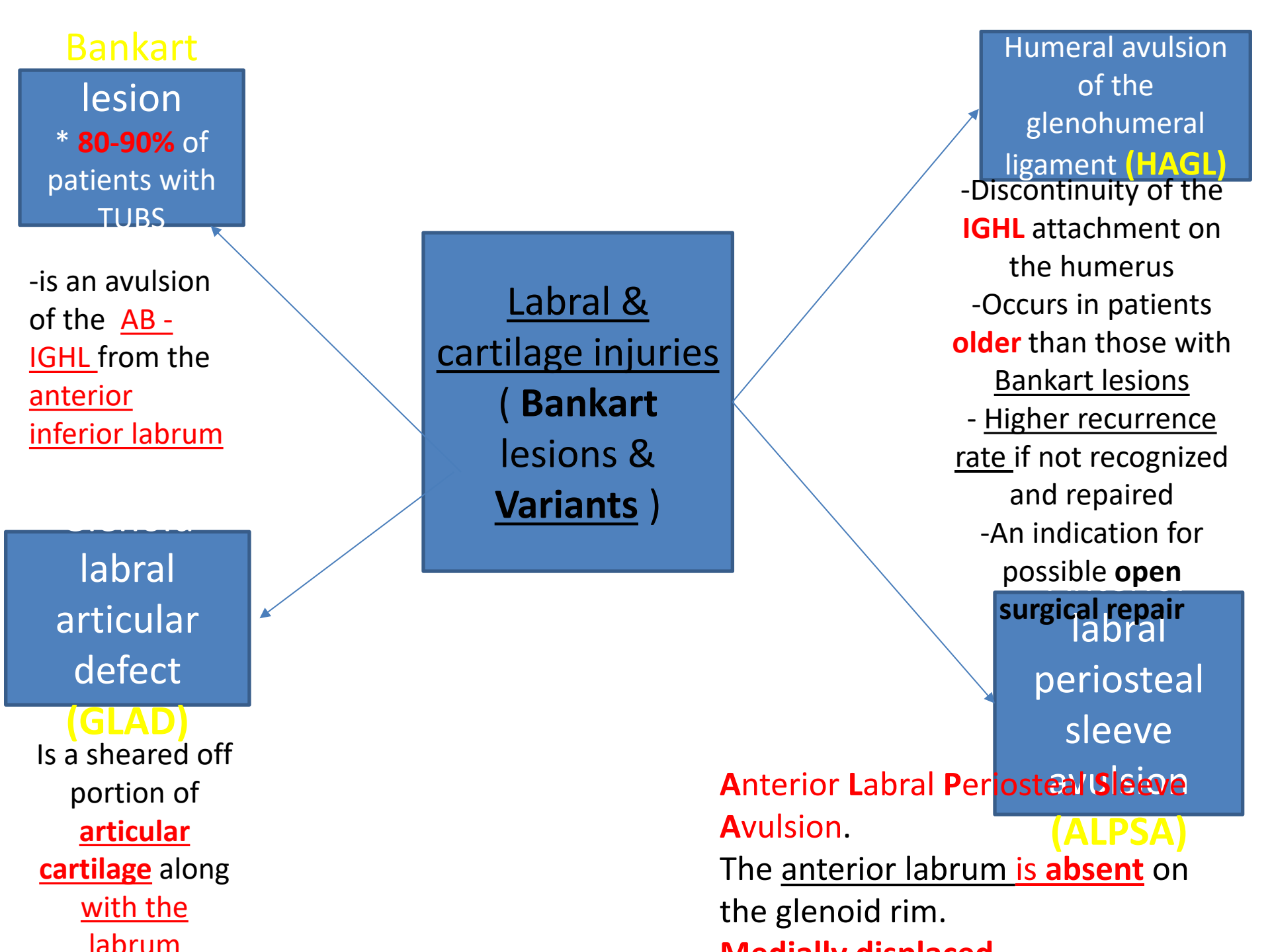
Fractures & bone defects

Nerve injuries

Axillary nerve injury : is most often a transient neurapraxia of the axillary nerve present in up to **5%** of patients

Rotater Cuff tears

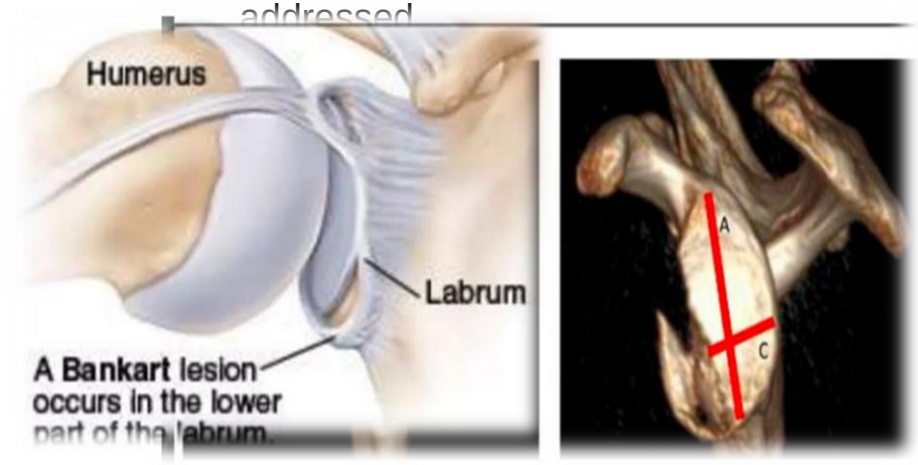
* 30% of TUBS patients > 40 years of age
* 80% of TUBS patients > 60 years of age


Bankart lesion
* 80-90% of patients with TUBS
-is an avulsion of the AB - IGHL from the anterior inferior labrum
Labral & cartilage injuries (Bankart lesions & Variants)
Humeral avulsion of the glenohumeral ligament (HAGL)
-Discontinuity of the IGHL attachment on the humerus
-Occurs in patients older than those with Bankart lesions
- Higher recurrence rate if not recognized and repaired
-An indication for possible open surgical repair
labral articular defect (GLAD)
Is a sheared off portion of articular cartilage along with the labrum
labral periosteal sleeve avulsion (ALPSA)
Anterior Labral Periosteal Sleeve Avulsion.
The anterior labrum is absent on the glenoid rim.

Labral pathology

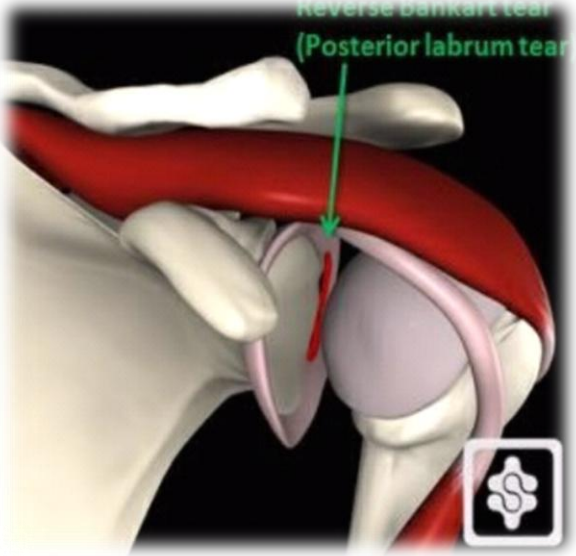
Bankart lesion

- The traumatic detachment of the glenoid labrum (antero-inferior) (85%).
- Common complication of Anterior dislocation.
- 80% of patients with anterior instability have both Hill-Sachs and glenoid bone lesions, called a 'bipolar lesion'.
- Types:
  - Soft tissue bankart
  - Bony bankart
    - 49% of patients with recurrent dislocations
    - Higher risk of failure of arthroscopic treatment if not addressed

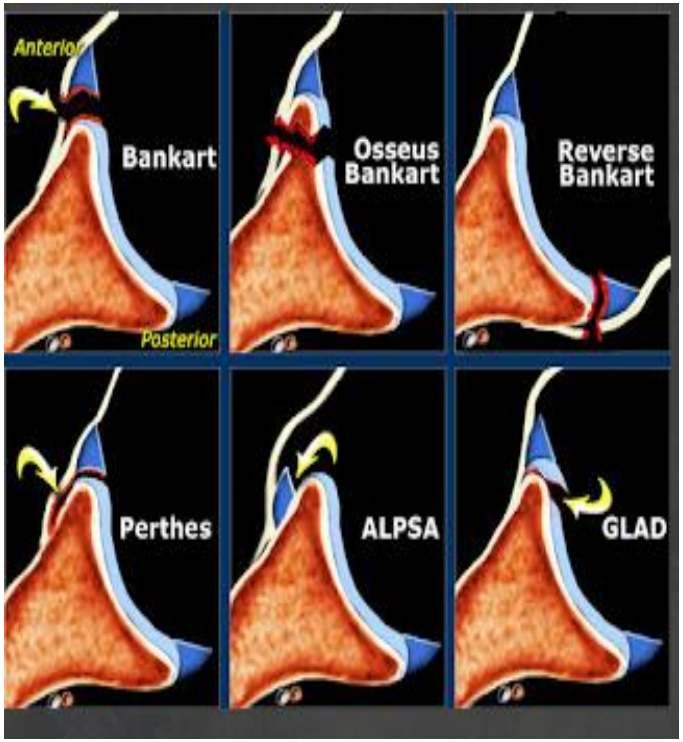


Posterior labral pathology /disruption.

- **Reverse Bankart**
  - detached posterior labral flap (Leads to laxity of posterior band of the inferior glenohumeral ligament)
- **Kim lesion**
  - marginal crack without labral detachment



Variants of the Bankart lesion



1. Perthes lesion

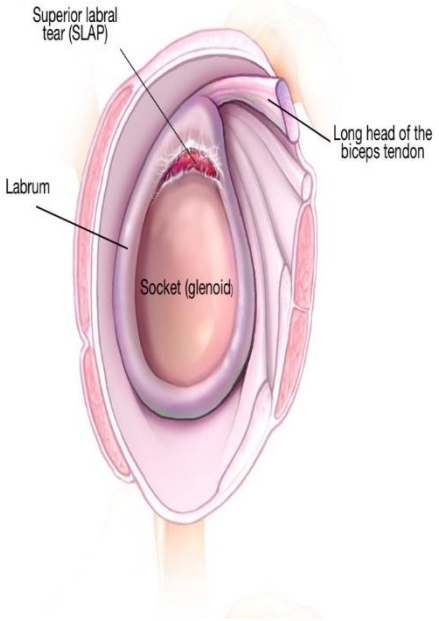
- Avulsion of capsulolabral complex from the anterior-inferior aspect of the glenoid
- But the medial scapular periosteum remains intact.
- Non displaced Bankart lesion

2. Anterior Labral Ligamentous Periosteal Sleeve Avulsion (ALPSA)

- Capsulolabral complex is avulsed and the medial scapular periosteum is stripped and subsequently displaced down the denuded anterior glenoid neck
- In chronic situations, labrum and attached periosteum of anterior glenoid can heal in a medialized position

3. GlenoLabral Articular Disruption (GLAD)

- Represents a partial tear of anteroinferior labrum with adjacent cartilage damage.



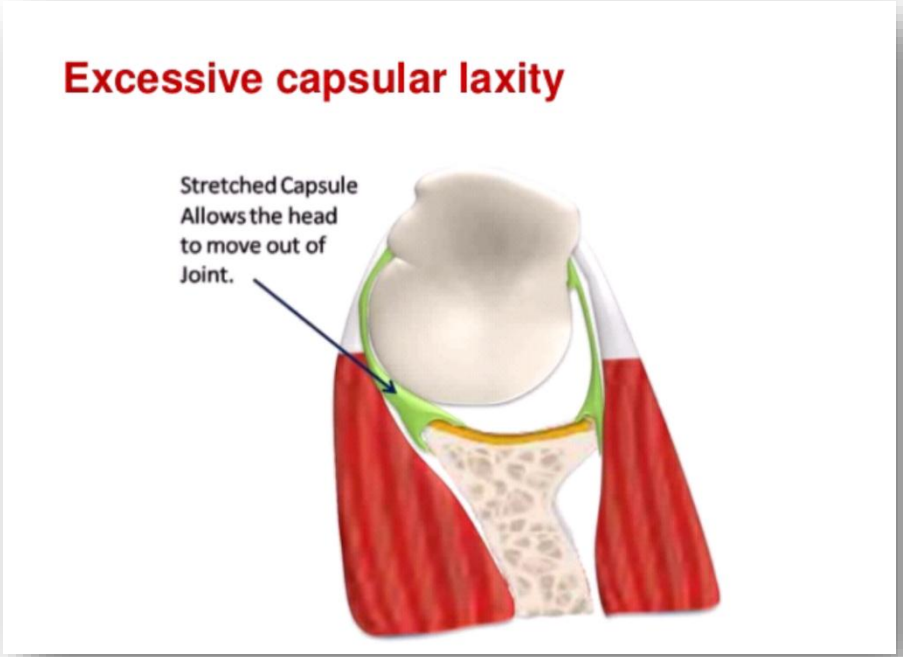
4. **Superior Labrum Anterior Posterior Tears (SLAP)**

- Generally seen in higher energy trauma
- Compressive loading of shoulder in flexed abducted position can damage superior labrum anteriorly and posteriorly
- Injury begins posteriorly and extends anteriorly up to mid-glenoid notch

Humeral Avulsion of Glenohumeral Ligaments (HAGL)

- Traumatic rupture of the IGHL complex at humeral attachment
- Typically occurs in hyperabduction and external rotation resulting in instability

- Risk factors
  - 10% of recurrent anterior shoulder dislocators have HAGL
  - 27% of shoulder instability patients without bankart have HAGL
  - 18% of failed anterior stabilization have HAGL



The instability severity in

- **< 6 points**
  - An acceptable recurrence risk of 10% with arthroscopic stabilization.
- **> 6 points**
  - A score of > 6 points has an unacceptable recurrence risk of 70% and should be advised to undergo open surgery (i.e. Laterjet procedure).

Instability Severity Index Score Based on a Preoperative Questionnaire, Clinical Examination, and Radiographs

PROGNOSTIC FACTORS	POINTS
AGE AT SURGERY (YEARS)	
<20	2
>20	0
DEGREE OF SPORT PARTICIPATION (PREOPERATIVE)	
Competitive	2
Recreational or none	0
TYPE OF SPORT (PREOPERATIVE)	
Contact or forced overhead	1
Other	0
SHOULDER HYPERLAXITY	
Shoulder hyperlaxity (anterior or inferior)	1
Normal laxity	0
HILL-SACHS LESION ON ANTEROPOSTERIOR RADIOGRAPH	
Visible in external rotation	2
Not visible in external rotation	0
GLENOID LOSS OF CONTOUR ON ANTEROPOSTERIOR RADIOGRAPHS	
Loss of contour	2
No lesion	0
***TOTAL* (POINTS)**	**10**

Bankart repair +/- capsular plication

Arthroscopic Bankart repair

- Indications
  - Relative indications
    - first-time traumatic shoulder dislocation with Bankart lesion confirmed by MRI in athlete younger than 25 years of age
    - high demand athletes
    - recurrent dislocation/subluxation (> one dislocation) following nonoperative management
    - < 20-25% glenoid bone loss
- Increased failure rates seen in patients with:
  - global hyperlaxity,
  - glenoid bone loss,
  - too few fixation points
- **Studies support use of ≥ 3 anchors (< 3 anchors is a risk factor for failure)**
- **Too many anchors does pose a risk for fracture through the anchor holes (postage stamp fracture)**

FIGURE 52-3 "Beach chair" position for arthroscopic shoulder

Open Bankart repair

- Indications
  - Bankart lesion with glenoid bone loss < 20%
  - humeral avulsion of the glenohumeral ligament (HAGL)
  - concomitant acute glenoid fracture
- Outcomes
  - Results are equivalent to arthroscopic repair, although patients have more pain and less range of motion postoperatively
  - patients with greater than 13.5% glenoid bone loss have higher rates stability

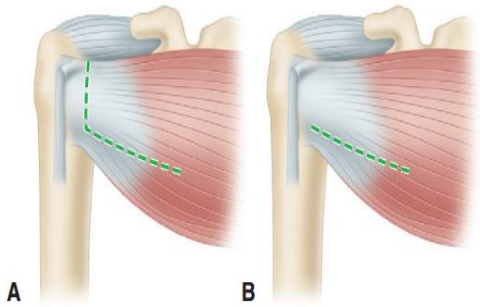
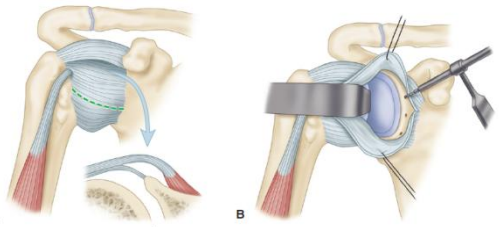


FIGURE 47-33 Division of subscapularis tendon. **A,** Lower fourth of subscapularis tendon is left intact to protect anterior humeral circumflex artery and axillary nerve. **B,** Subscapularis muscle is split horizontally and retracted superiorly and inferiorly to expose underlying capsule.



Latarjet or Bristow Procedure (Coracoid tran

Indications

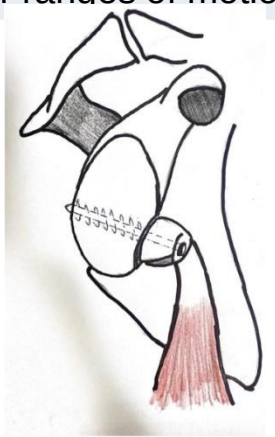
Bony deficiencies with >20% glenoid deficiency (inverted pear deformity to glenoid) or subcritical (>13.5%) bone loss

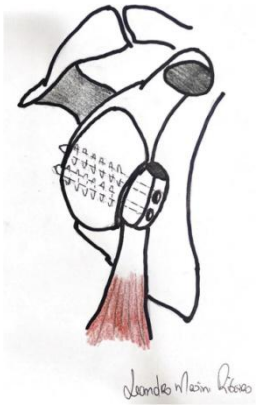
Stabilization of the glenohumeral joint occurs by three mechanisms (Latarjet triple effect):

1. A bony effect by correcting the anterior glenoid deficiency (increases glenoid track).
2. Muscular ("sling") effect created by maintaining the inferior third of the subscapularis in an inferior position by the conjoined tendon. (conjoined tendon on top of subscapularis)
3. Capsular effect by the capsular repair.

	Latarjet procedure	Bristow procedure
Osteotomy	2-2.5 cm long	about 1 cm long
Fixation	two small-fragment screws (3.5mm diameter) with washers (partial thread sponge)	one screw
Orientation of the osteotomy	the inferior portion of the graft is fixed in the glenoid.	the osteotomy face is fixed in the glenoid

- The Latarjet technique showed better results in the initial range of motion, but in the last follow-up, both procedures yielded similar ranges of motion.





Autograft (tricortical iliac crest or distal clavicle) or Allograft (iliac crest or distal tibia) for glenoid bone loss

- Indications
  - bony deficiencies with >20-25% glenoid deficiency (inverted pear deformity to glenoid)
  - revision to failed latarjet

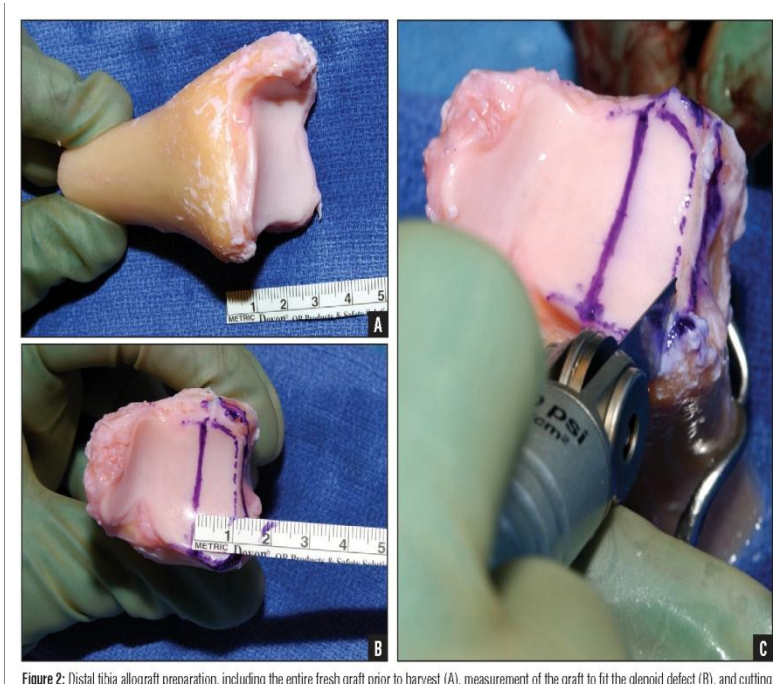
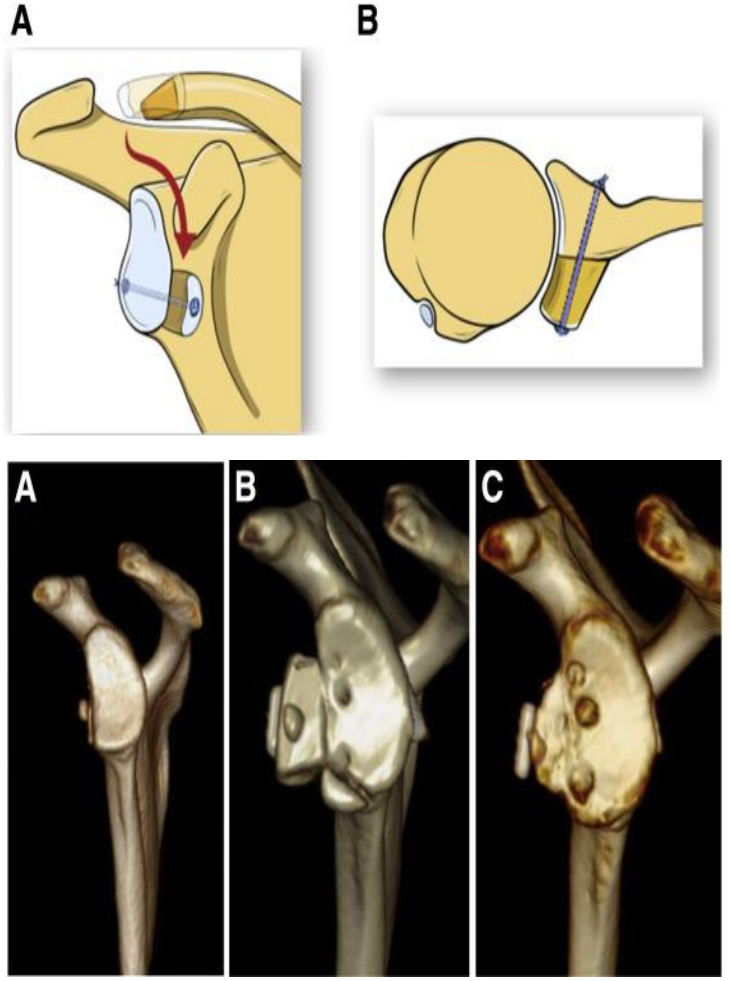


Figure 2: Distal tibia allograft preparation, including the entire fresh graft prior to harvest (A), measurement of the graft to fit the glenoid defect (B), and cutting

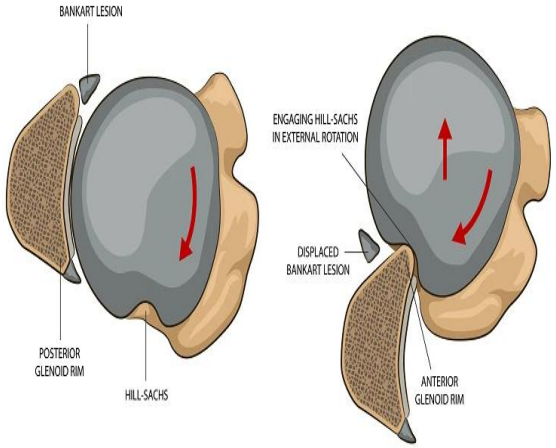


Humeral Head

Hill-Sachs Lesions

- Compression fracture of the posterosuperolateral humeral head caused by anterior rim of glenoid
- Sequela of anterior dislocation
- Created with the arm in abduction and external rotation
- Prevalence of HSL :
  - 65% to 67% after initial dislocation
  - 84% to 93% after recurrent dislocation

- Instability occurs :
  - ➢ when the defect engages the glenoid rim in functional arc of motion(abduction/external rotation)
  - ➢ Humeral head defects of 35-40%



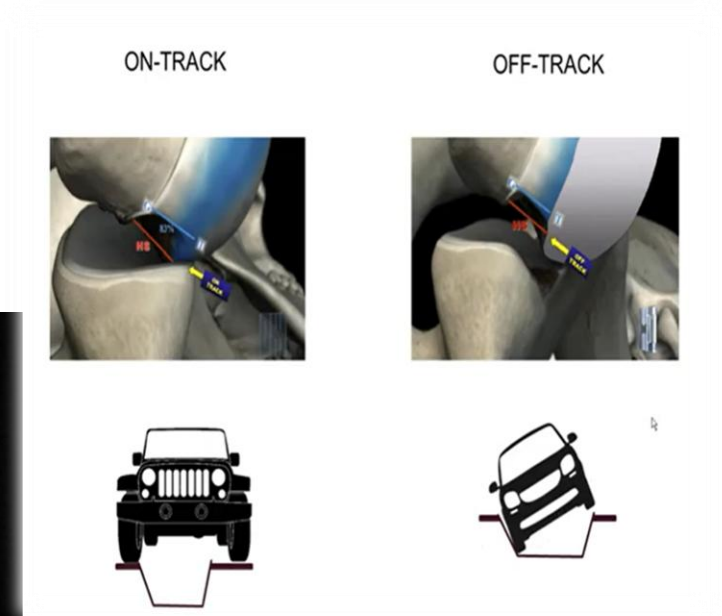
Reverse Hill-Sachs Lesions

- Also called a **McLaughlin lesion**
- Impaction fracture of anteromedial aspect of the humeral head following posterior dislocation
- Initial size of a “reverse” Hill–Sachs on the anterior humeral head is an important predictor for recurrent instability

Concept of On-Track and Off-Track Lesions

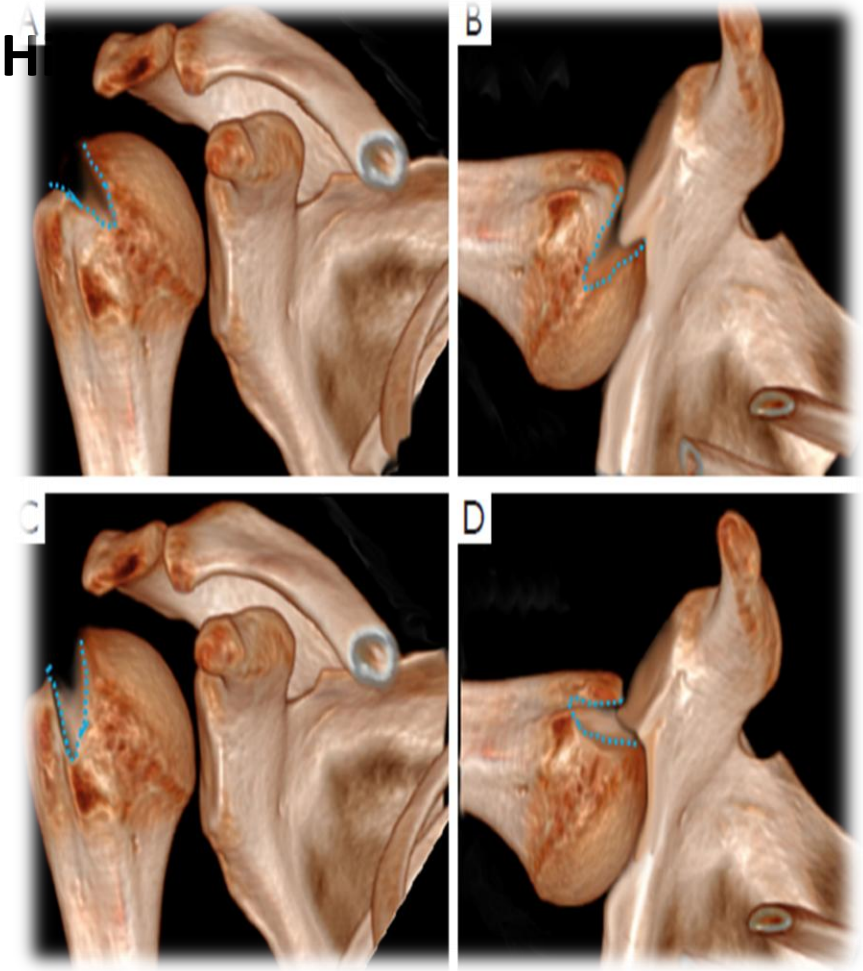
- The glenoid track is a contact zone of the glenoid on the humeral head with the arm at the end range of motion, e.g., in various degrees of elevation with the arm in maximum external rotation and maximum horizontal extension.
- When the arm is moved along the posterior end-range of movement keeping in maximum external rotation and maximum horizontal extension, the glenoid moves along the posterior articular surface of the humeral head. This contact zone is defined as the ‘glenoid track’.
- Width of the glenoid track, defined as the distance between the medial margin of the glenoid track and the medial margin of the footprint of the rotator cuff
- 83% of the glenoid width with arm abducted to 90°

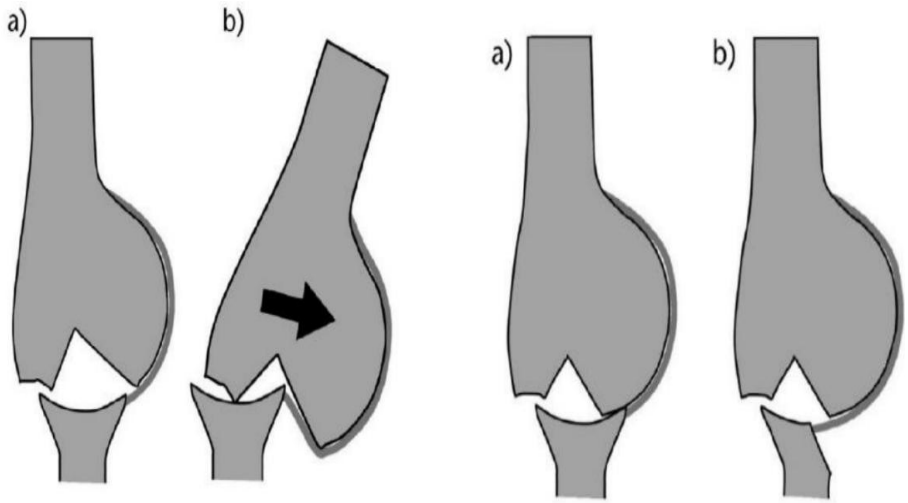
- If the Hill-Sachs lesion is always covered by the glenoid at this end range of motion, or in other words, if the Hill-Sachs lesion stays within the glenoid track, the lesion does no harm, because it is always covered by the glenoid even at the end range of motion. On the other hand, if the lesion comes out of the glenoid coverage, it engages with the anterior rim of the glenoid and causes a dislocation.



Engaging and Nonengaging H

- **Engaging Hill Sachs lesion**: defined as defects which are parallel to the long axis of the glenoid rim in positions of function (abduction and external rotation)
- **Nonengaging Hill Sachs lesiom**:(C) Hill Sachs lesions vertically oriented on neutral view become more diagonally oriented to anterior labral rim in ABER position and have lower tendency to engage (D).

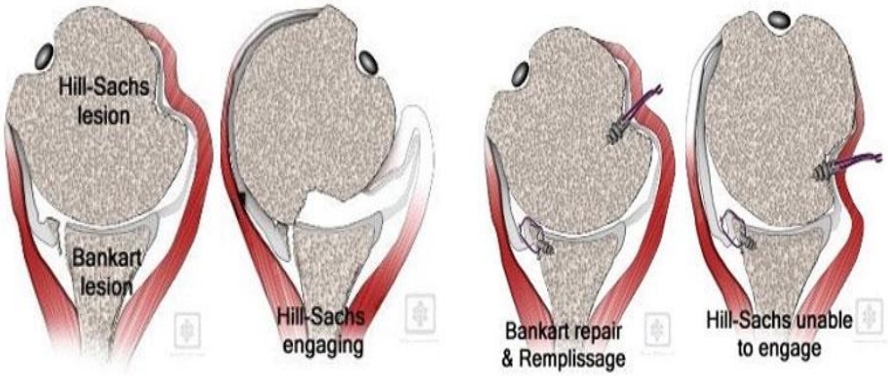




Hill Sachs defect treatment

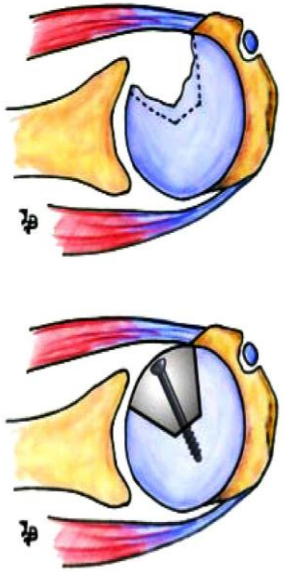
Remplissage technique for Hill Sachs defect

- Indication
  - Engaging large (>25%) Hill-Sachs defect
  - "off-track" Hill-Sachs lesions with <20-25% glenoid bone loss
- Technique
  - posterior capsule and infraspinatus tendon sutured into the Hill-Sachs lesion
  - may be performed with concomitant Bankart repair
  - Decreasing size of Hill-Sachs, converts on off-track lesion into an on-track lesion
- outcomes
  - when compared to latarjet with 2-year outcomes, remplissage + bankart had lower recurrent instability rates (1.4% vs. 3.2%) despite greater bipolar bone loss



Bone graft reconstruction for Hill Sachs defects

- indication
  - engaging large (>40%) Hill-Sachs lesions
  - Technique
    - Allograft reconstruction
    - Arthroplasty
    - Rotational osteotomy



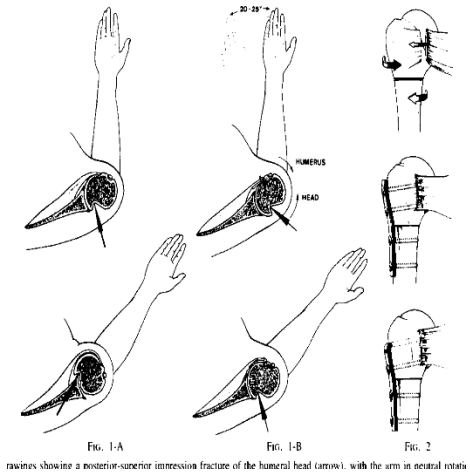
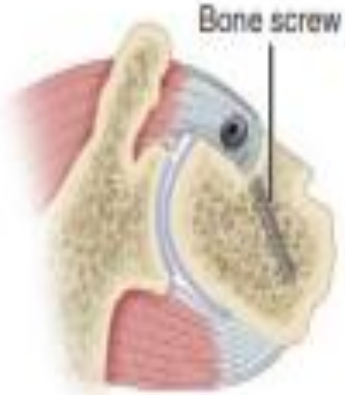
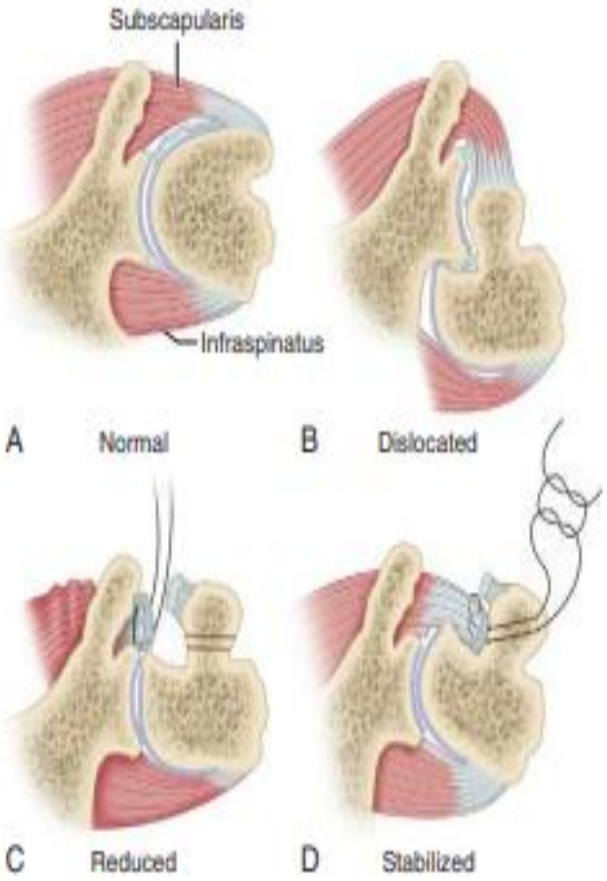


FIG. 1-A FIG. 1-B FIG. 2
rawings showing a posterior-superior impression fracture of the humeral head (arrow), with the arm in neutral rotati

Open reduction with subscapularis transfer (McLaughlin) or lesser tuberosity transfer to the defect (Modified McLaughlin)

- indications
  - chronic dislocation < 6 months old
  - reverse Hill-Sachs defect < 40%





What are the factors for recurrent instability

- **Patient related:**
- Male/young age/sports

- **Surgeon related:**
- Misdiagnosis/failure to address pathology

- **Pathology related:**
- Glenoid bone loss (>25%)
- IGHL laxity
- Large Hill-Sachs lesion

Recurrence after the first dislocation:

90% of patients younger than 20 years old,
60% of patients aged 20-40 years,
Only 10% of patients older than 40 years of age.

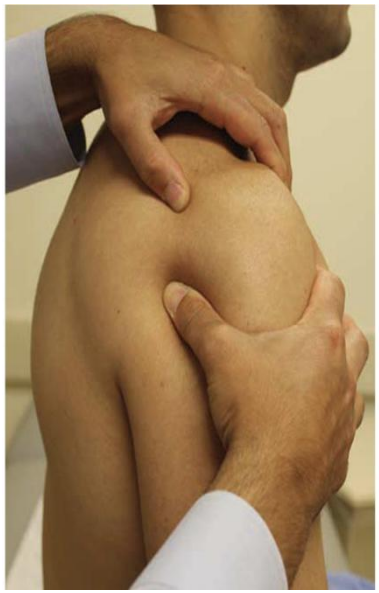
Beighton Hyperlaxity Score

CHARACTERISTIC	SCORING*
Passive dorsiflexion of the little finger beyond 90 degrees	1 point for each hand
Passive apposition of the thumb to the ipsilateral forearm	1 point for each hand
Active hyperextension of the elbow beyond 10 degrees	1 point for each elbow
Acute hyperextension of the knee beyond 10 degrees	1 point for each knee
Forward flexion of the trunk with the knees fully extended so that the palms of the hands rest flat on the floor	1 point

*A score of ≥4 points, on a 9-point scale, is diagnostic of hyperlaxity.

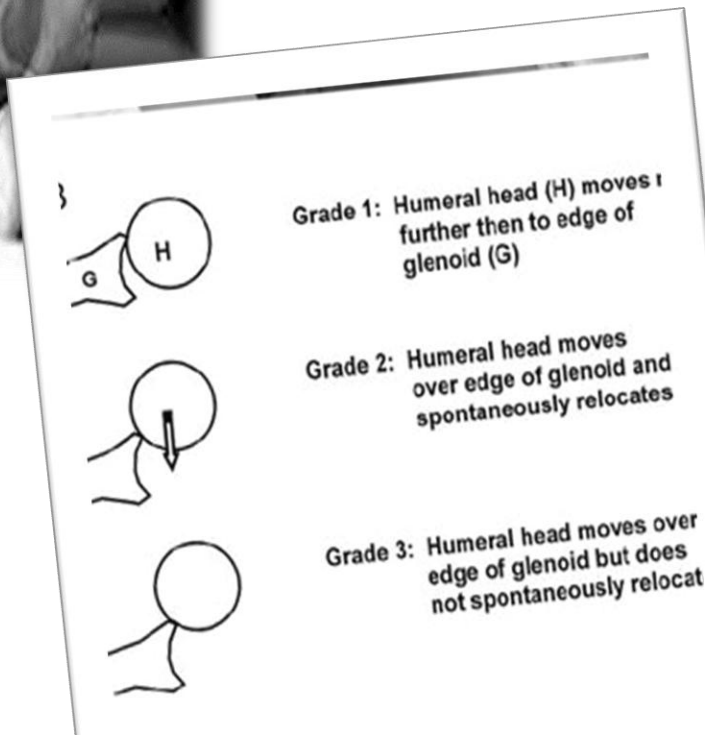
Drawer test

- If the maneuver reproduces the clinical symptoms of apprehension or pain, a presumed diagnosis of instability (anterior or posterior) may be established if consistent with the history and other examination findings



Load and shift test

- Easy subluxation of the humeral head indicates loss of the glenoid concavity.



Sulcus Test

- If distance between humeral head and acromion
- <1 cm: 1+
- 1-2 cm: 2+
- > 2 cm: 3+

- Subluxation at 0° is indicative of laxity at rotator interval and that at 45 ° is indicative of IGHL complex

Gagey hyperabduction test

- Abduction over 105° reflects increased laxity
- Symptoms of apprehension-inferior instability
- Typically positive with MDI
- Should be performed for all patients with posterior instability as there is frequently a bidirectional component

Apprehension test

- Although pain may be used as an indicator for instability, it is typically not as specific or as reliable as apprehension in documenting anterior instability.

Anterior

Shoulder in 90 abduction and elbow in 90 degree flexion

External rotation of the extremity with Anterior Stress applied to the humerus

Posterior

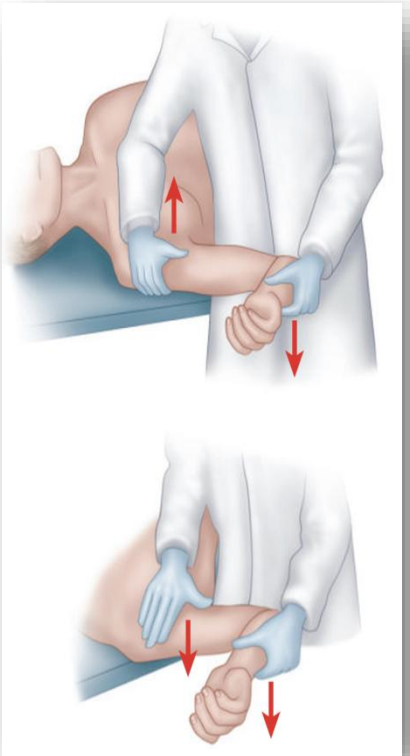
Shoulder in 90 degree abduction and brought to a forward flexion

Internal rotation of the extremity with Posterior Stress applied to the humerus

Clunk is felt as humeral head subluxes , producing pain or a feeling of apprehension or instability is produced

Jobe's relocation test

- Used for evaluating instability in athletes involved in sports requiring overhead motion
- A feeling of apprehension or subluxation indicates anterior instability



Specific Examinations for Posterior Instability

Jerk test

- Provocative for posterior instability
- With a positive test, sudden jerk occurs when the humeral head slides off the glenoid and when it is reduced back onto the glenoid

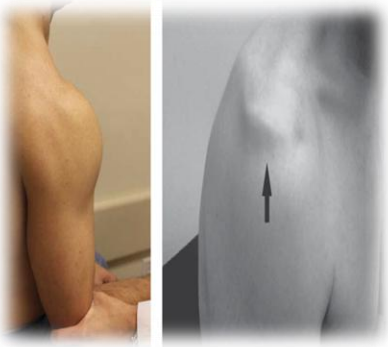
Kim Test

- Combination of positive Kim and jerk tests has 97 % sensitivity for posterior instability
- Indicates reverse bankart lesion

Examinations for Multidirectional Instability

No specific test for MDI, but inferior instability, by definition, is a major aspect of the pathology. Therefore, specific tests of inferior laxity such as

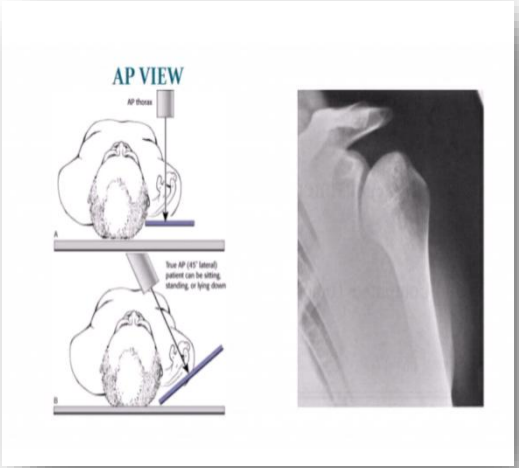
- Sulcus test
- Gagey hyperabduction test
- Drawer test
- Load and shift test
- The Beighton hyperlaxity scale .

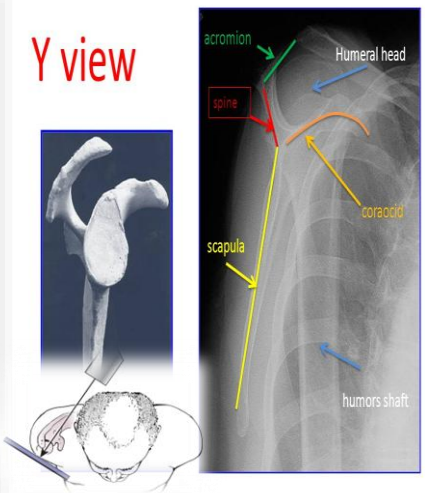


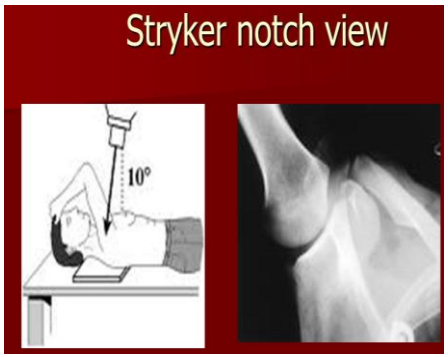
Diagnosis

- Radiographs
  - X-ray views
    - AP view
    - Axillary view
    - Scapular Y-view
    - Apical oblique view
    - AP in ER/IR views
    - Strykar notch view
    - West point view

- CT Scan
- MRI
- Arthroscopy

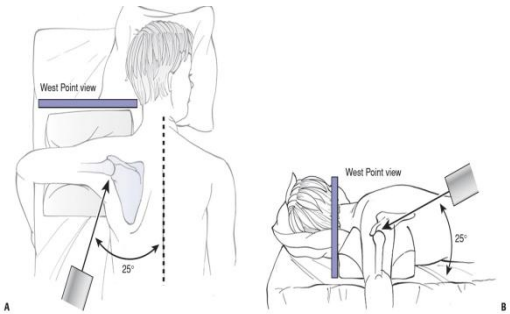






It helps detecting Hill Sach's lesion

Reveals the anterior inferior and posterior superior



Provides tangential view of anteri

Posterior shoulder dislocation - AP view

Hover over image to show findings

Posterior shoulder dislocation - AP view

- The glenohumeral joint is widened
- Cortical irregularity of the humeral head indicates an impaction fracture
- Following posterior dislocation the humerus is held in internal rotation and the contour of the humeral head is said to resemble a 'light bulb'
- **NOTE** - Any X-ray acquired with the humerus held in internal rotation will mimic this appearance

Clinical information

- Bilateral shoulder pain following epileptic fit

Diagnosis

- Bilateral posterior shoulder dislocation (left not shown)

Radiograph

CT scan

- Most sensitive for detecting and measuring bone deficiency, retroversion of glenoid or bony pathology
- **Indications**:
  - ✓ Blunting of glenoid outline or obvious bony defect on plain x-rays
  - ✓ Evaluation of recurrent instability
  - ✓ Failed surgical procedures.

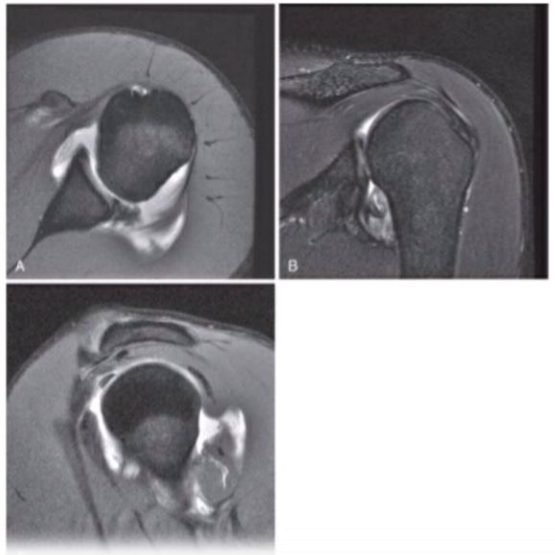
FIGURE 47-26 A, Three-dimensional CT showing large Hill-Sachs lesion and deficient glenoid. B, Three-dimensional CT with humeral head subtracted showing loss of anterior glenoid surface.

MRI

Gold standard for evaluating capsulo-labral structures, especially Bankart lesion.

Addition of contrast improves ability of MRI to show Rotater cuff pathology, humeral avulsion of inferior glenohumeral ligament, and capsular tears.

Magnetic resonance imaging/ arthrography



Diagnostic Arthroscopy

Advantages

- Reproducible technique
- Visualization of all pertinent structures
- Technique can be performed in beach chair or lateral decubitus positions
- Thorough 360° glenohumeral evaluation
- Gold standard to diagnose shoulder pathology

Disadvantages

- Requires general anesthesia
- Risk of infection
- Risk of iatrogenic injury to anatomic structures
- Risk of traction neuropathy in lateral decubitus position
- Risk of cerebral hypoperfusion in beach chair position

Treatment

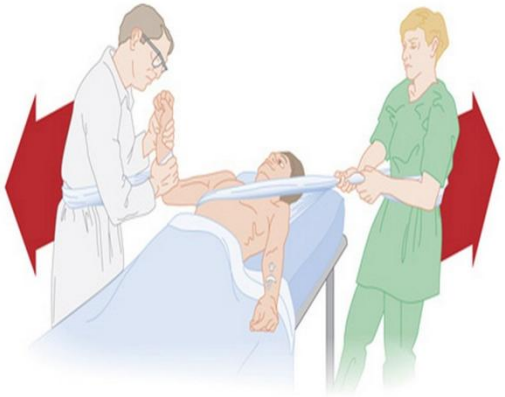
1) **TUBS (Traumatic Unilateral dislocations with a Bankart lesion requiring Surgery)**

Nonoperative

- **Acute reduction, ± immobilization, followed by therapy**
  - **Indications**
    - All patients who sustained a traumatic 1st time dislocation regardless of age
    - Patients >40yrs with recurrent instability
    - All patints atraumatic instability
  - **Reduction**
    - simple traction-countertraction is most commonly used
    - relaxation of patient with sedation or intraarticular lidocaine is essential
  - **Immobilization**
    - some studies show immobilization in external rotation decreases recurrence rates
    - thought to reduce the anterior labrum to the glenoid leading to more anatomic healing
    - subsequent studies have refuted this finding and the initially published results have not been reproducible
  - **Physical therapy**
    - strengthening of dynamic stabilizers (rotator cuff and periscapular musculature)

- All patients <30y- shoulder immobilized for 3 weeks
- Patients 30-40y- shoulder immobilized 1-2 weeks
- Patients > 40y- shoulder immobilized for 1 week
- Atraumatic instability- immobilization not required
- Patients with anterior instability- limit external rotation to 30° and abduction to <60 °.
- Patients with posterior instability- avoid flex. >60° and internal rotation >30°.

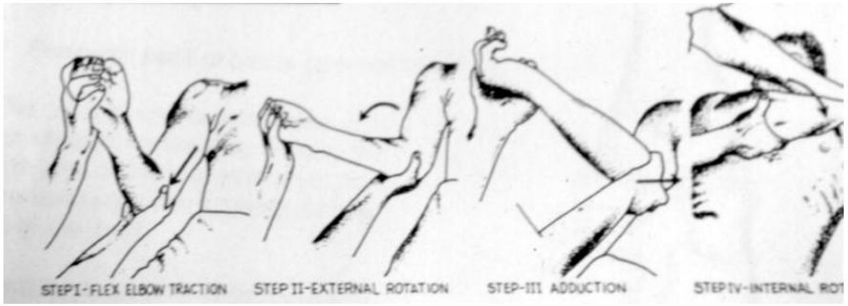
Traction-countertraction



Hippocrates Method

Stimpson's technique

Kocher's Technique



Operative Treatment

Capsulolabral Repair

- Bankart repair

Corcoid-Transfer Procedures

- Bristow
- Latarjet

Hill Sach's lesion procedures

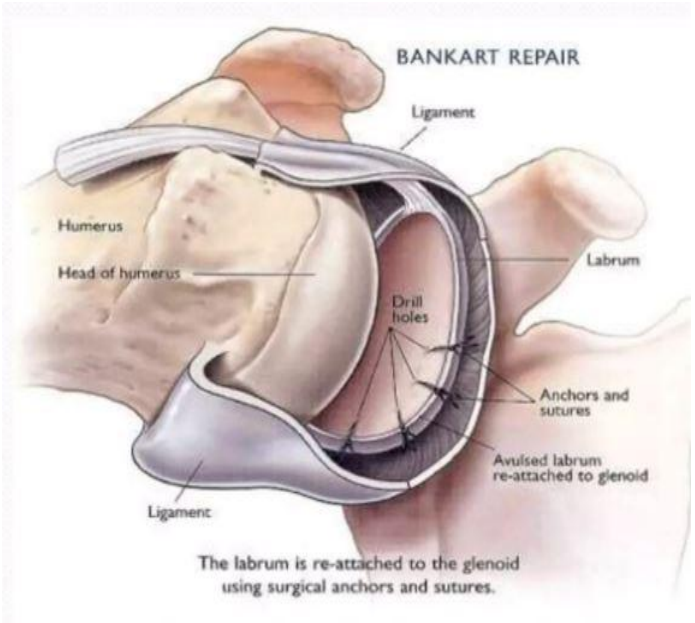
- Remplissage technique
- Allograft reconstruction
- Arthroplasty
- Rotational osteotomy

Reverse Hill-Sachs Lesions

- Subscapularis transfer (McLaughlin)
- Lesser tuberosity transfer to the defect (Modified McLaughlin)

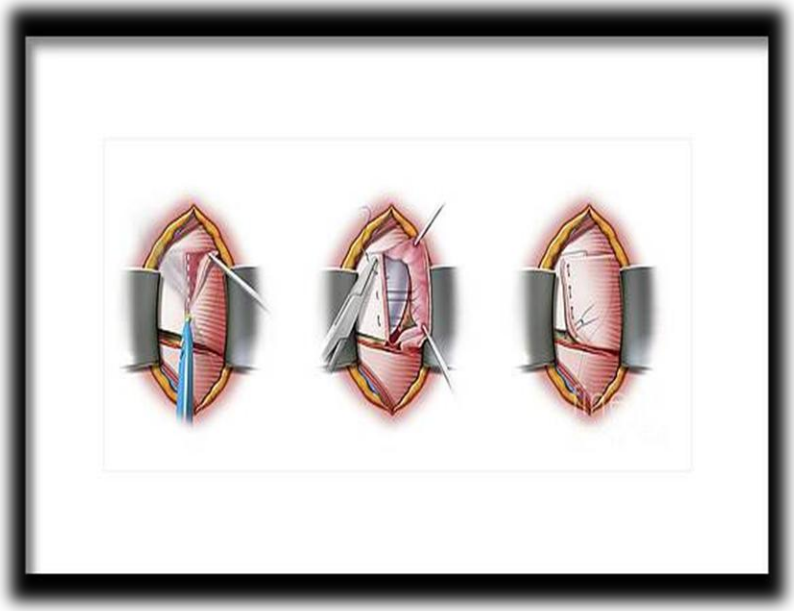
Subscapularis Procedures

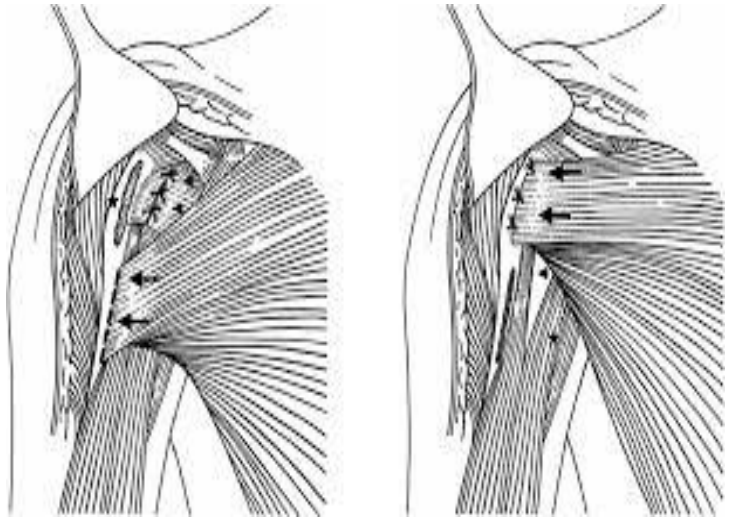
- Putti-platt
- Magnuson-stack
- Boyd-Sisk



Historical procedures:
Putti-Platt / Magnuson-Stack / Boyd-Sisk

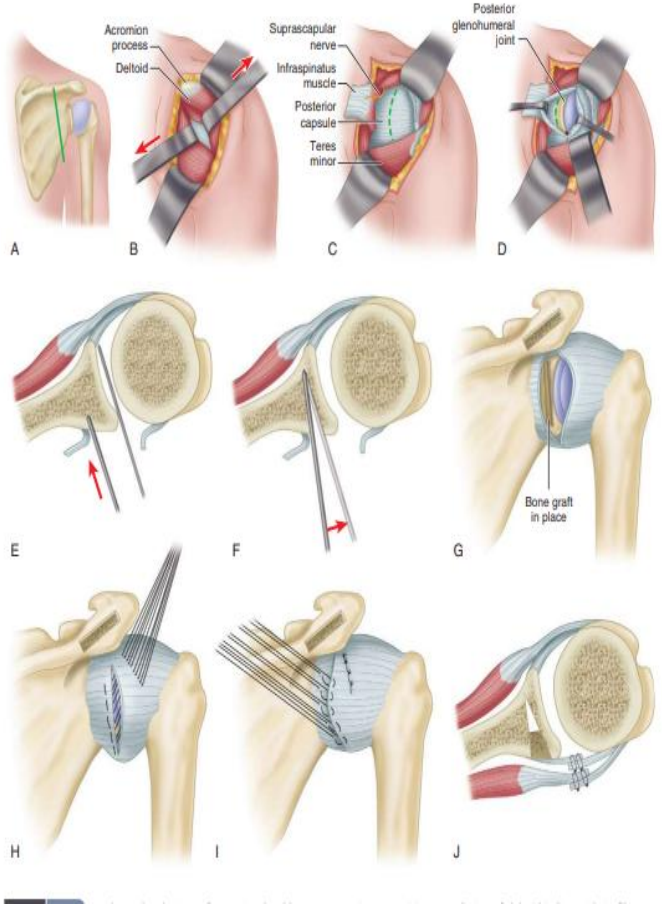
- Led to over-constraint and arthrosis
- Goal is to tighten subscapularis
- Technique
  - Putti-Platt is performed by lateral advancement of subscapularis and medial advancement of the shoulder capsule
  - Magnuson-Stack is performed with lateral advancement of subscapularis (lateral to bicipital groove and at times to greater tuberosity)
  - Boyd-Sisk is transfer of biceps laterally and posteriorly
- Outcomes
  - high rate of post-operative stiffness and subsequent osteoarthritis
    - typical presentation of open procedure performed in 1970s-80s, now with presenting complaint of pain and stiffness from glenohumeral OA, especially lack of ER, and signigicant posterior glenoid wear and retroversion
  - high rate of recurrent instability with Boyd-Sisk





Capsular shift reconstruction with posterior glenoid osteotomy

- Posterior glenoplasty rarely is indicated.
- Can be used if severe developmental or traumatic glenoid retroversion of more than 20 degrees is confirmed on CT reconstructed films.
- High recurrence rates of up to 53% have been reported with this procedure.
- Complication rate of up to 29%, including:
  - osteonecrosis of the glenoid
  - degenerative arthritis of the glenohumeral joint.



Hemiarthroplasty

- Indications
  - Chronic dislocation > 6 months old
  - Severe humeral head arthritis
  - Collapse of humeral head during reduction
  - Reverse Hill-Sachs defect > 50% of articular surface

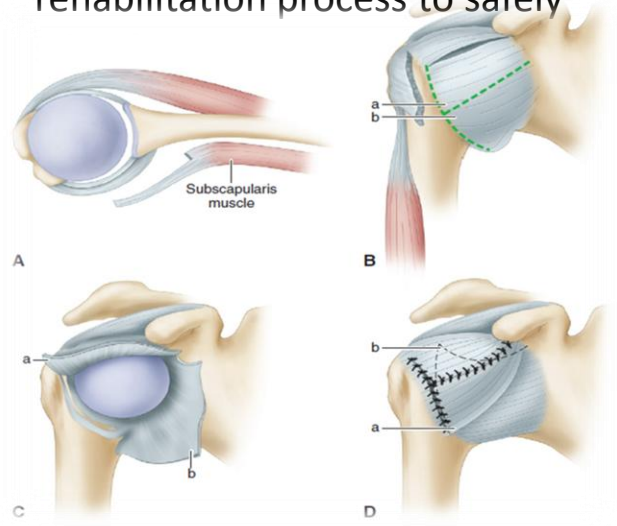
Total shoulder arthroplasty

- Indications
  - Significant glenoid arthritis in addition to one of the hemiarthroplasty indications

Multidirectional shoulder instability (AMBRI)

Non-operative

- Dynamic stabilization physical therapy
  - Indications
    - First line of treatment
    - Vast majority of patients
  - Technique
    - 3-6 month regimen needed
    - Strengthening of dynamic stabilizers (rotator cuff and periscapular musculature)
    - Closed kinetic chain exercises are used early in the rehabilitation process to safely



Operative

- **Capsular shift / /Stabilization procedure (open or arthroscopic)**
  - Indications
    - Failure of extensive nonoperative management
    - Pain and instability that interferes with sports activities
  - Contraindications
    - Voluntary dislocators
- **Capsular reconstruction (Allograft)**
  - Rare, described in refractory cases and patients with collagen disorders
- **Thermal capsulorrhaphy (historical)**
  - is contraindicated because of complications including capsular thinning/insufficiency and attenuation, and chondrolysis

Complications

- **Recurrence**
  - often due to unrecognized glenoid bone loss treated with a soft tissue only procedure
  - Poor surgical technique (ie, < 3 suture anchors)
  - increased risk with preoperative risk factors (age < 20, male sex, contact/collision sport, ligamentous laxity, and unrecognized glenoid and/or humeral head bone loss)

- **Shoulder pain and stiffness**
  - overtightening during labral repair can lead to post-capsulorrhaphy arthropathy

- **Nerve injury**
  - musculocutaneous
  - axillary
- **Stiffness**
- **Infection**
- **Graft lysis (Latarjet)**
- **Hardware complications**
  - anchor pull-out (Bankart repair)
  - screw pull-out (Latarjet)
- **Chondrolysis**
  - historically due to use of thermal capsulorraphy (now contraindicated) or intra-articular pain pumps (now contraindicated)

- **Subscapularis deficiency**
  - More common after open anterior-inferior capsular shift
  - May be caused by injury or failed repair

- **Late arthritis**
  - Usually wear of posterior glenoid
  - May have internal rotation contracture

Thank you