



Common Shoulder Problems

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Objectives:

- Basic shoulder anatomy
- Impingement syndrome
- Rotator cuff pathology
- Adhesive capsulitis
- Acromioclavicular pathology
- Recurrent shoulder dislocations

Color Index:

Original text | **Doctor's notes** | Text book
Important | **Golden notes** | Extra

Shoulder anatomy:

Overview (extra)

The anatomy in the shoulder is very special. In joints we have two things to consider: Range of motion and Stability you have to sacrifice one to gain the other. E.g. the ROM in the knee is limited only in one axis: flexion and extension (although it's not very accurate to say one axis), but the shoulder has many axes: abduction, adduction, forward flexion, extension, internal rotation, external rotation and circumduction (basically all kind of ROM).

Stability is either by static structure (always there, always acting the same way) or dynamic:

Stability by static structures can be due to:

Bony structures:

- Humerus: humeral head is big, glenoid is wide (humerus head is much bigger than glenoid) which can give you some stability but not the best, unlike the femoral head which is more like spherical in shape and the acetabulum is covering most of it (Ball in socket) → more stability, It typically takes a major force or trauma to dislocate the hip (It's a big issue to have someone with hip dislocation!)
- Scapula (Glenoid, Acromion, Coracoid, scapular body)
- Clavicle.
- Sternum.

Shoulder injury caused by low energy; certain movements can get your shoulder out.

Ligaments:

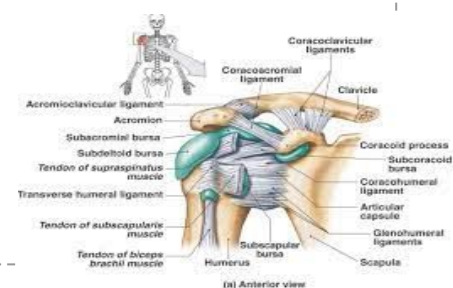
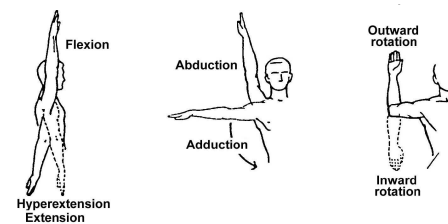
The shoulders' ligaments are not as big and strong as the knees' ligaments, why? The ligaments in the shoulder are just thickening of the capsule.

There are 3 anterior ligaments which prevent anterior dislocations: superior, middle and inferior Glenohumeral ligaments. You have to keep in mind! 95 % of the dislocations are anterior (**commonly anterior-inferior**), while the posterior is extremely rare and only certain traumas will cause the inferior, posterior or superior dislocations.

The anterior dislocation happens when the shoulder is abducted in 90 degree and externally rotated, So in this position Which one of the three ligaments has more chance to get strained and also affected in the anterior dislocation? inferior glenohumeral ligaments

⇒ How? While abducting and externally rotating the shoulder → the inferior ligament will be more stretched, but the ligaments are stronger than any structures although they are only thickening but still they are the strongest → they will not tear but they will detach the labrum from the bone when there is dislocation. **Very IMP I WILL ASK YOU ABOUT IT!!** (What is called? What will you see in MRI? **BANKART LESION** (anterior inferior part of the labrum is detached and (instability causing Labrum is fibrocartilage that gives the depth for accommodating the head also the ligaments attach to it.

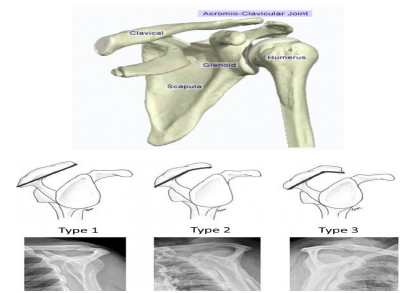
- Acromion is very important, it's a landmark for almost everything you do around the shoulder, and it's supporting the rotator cuff and acts like a roof over the glenohumeral joint. In case of abduction if there was a proximal migration what will happen? The GT will hit the acromion → the supraspinatus impingement
 - Coracoid is attached to the conjoint tendon (tendons of short head of biceps and coracobrachialis)
 - Long head of biceps is a trouble maker passes through the bicipital groove and attached to superior labrum (doesn't attach to bone which is unusual) with age there will be pulling out and detachment of labrum which is called (SLAP lesion superior labrum anterior posterior lesion) or becomes inflamed in old people, very common problem in the West (white ethnicity) but here it is not bad as in the West, what do we do for them? (Shoulder arthroscopy).
- In women base of thumb is usually affected by instability then arthritis in the West, here is not that common.



Shoulder anatomy:

Bones

- Humerus.
- Scapula (Glenoid, Coracoid, scapular body and acromion)
- The acromion has 3 different variations
Type I is Flat, type II is curved and type III is hooked.
(Type III is the normal variation)
- Clavicle.
- Sternum.



1- **Glenohumeral joint**: The main joint, **most commonly dislocated joint**

Why?

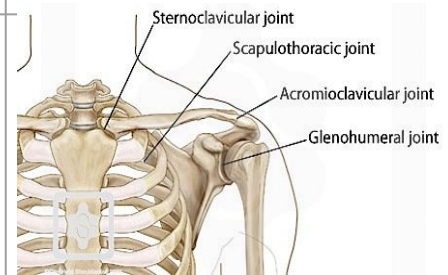
Because it has the widest range of motion among all the joints, and it lacks bony stability.

Composed of:

- Fibrous capsule
- Ligaments
- Surrounding muscles
- Glenoid labrum

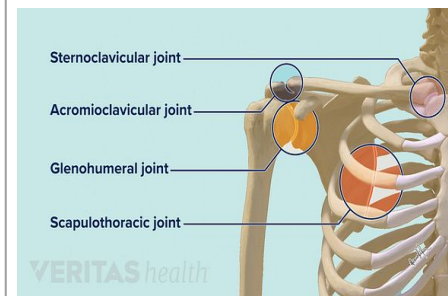
Anterior and posterior labrum which plays a very critical role and stability issue glenohumeral joint

- 2- Acromioclavicular (AC) joint.
- 3- Sternoclavicular (SC) joint.
- 4- Scapulothoracic joint is in the back.



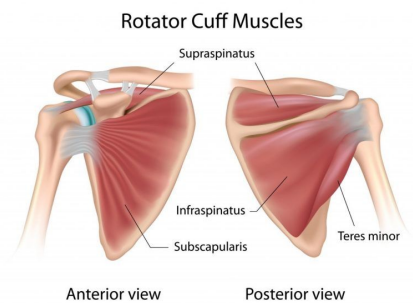
Joints

(all of them called the shoulder girdle) but when we say shoulder joint we mean GHJ)



- Rotator Cuff Muscles (**SITS**): depress humeral head against glenoid

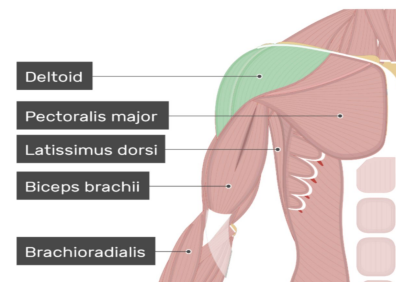
- 1- Supraspinatus: Initiation of abduction + external rotation
- 2- Infraspinatus: External rotation
- 3- Teres Minor **not very important**: External rotation
- 4- Subscapularis: Internal rotation



Muscles

- Deltoid: largest & strongest muscle of the shoulder, **and has three attachments from clavicle, acromion, scapular spine and attaches to the lateral aspect of the proximal humerus.**

- Pectoralis major
- Biceps
- Posterior scapular muscles:
 - 1- Trapezius
 - 2- Rhomboids
 - 3- Levator scapulae
 - 4- Latissimus dorsi
 - 5- Serratus anterior



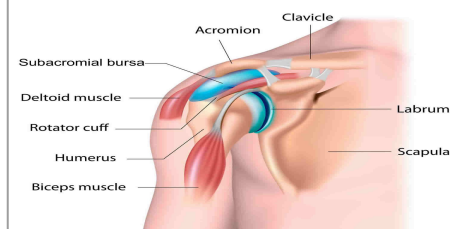
- Between the acromion and the rotator cuff tendons.

- A bursa is a structure that decreases the grinding between bones and muscle.

- Protects rotator cuff tendons from grinding against acromion.

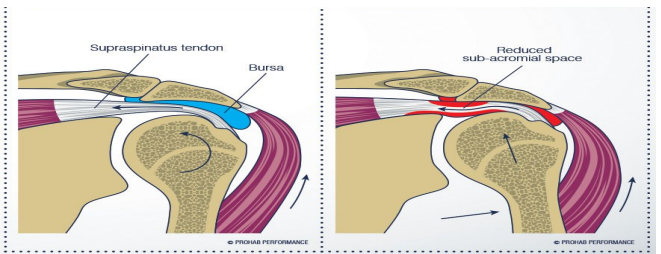
- Pathology → irritation → thickening → subacromial space narrowing → further impingement.

Shoulder Anatomy



Subacromial bursa

Impingement Syndrome:



Mechanism

A condition in which the supraspinatus and bursa are pinched as they pass between the head of humerus (greater tuberosity) and the lateral aspect of the acromion usually happens with the proximal migration. It is the most common disorder of shoulder, accounting for 44– 65 % of all complaints of shoulder pain during a physician's office visit.

Risk Factors

1. Age (over 40y).
2. **Overhead activity** e.g. lifting, swimming, tennis, combing hair, wearing.
3. Bursitis and supraspinatus tendinitis. It makes the space even smaller.
4. Acromial shape: type II (curved) & III (hooked)
5. Acromioclavicular joint arthritis or AC joint osteophytes may result in impingement and mechanical irritation to the rotator cuff tendons.

Symptoms

- Pain in the **acromial area** when the arm is flexed and internally rotated → Inability to use the **overhead position**.
- Pain could be due to Subacromial bursitis or rotator cuff tendinitis.
- **Worse at night** as the subacromial bursa becomes hyperemic after a day of activity.
- Pain when sleeping on the affected side.
- Decrease ROM especially abduction. **After time the pain limited ROM in particular abduction and forward flexion.**
- Weakness.

DDx

- Rotator cuff tear **similar presentation.**
- Calcific tendinitis.
- Biceps tendinitis.
- Cervical radiculopathy.
- Acromioclavicular arthritis
- Glenohumeral instability **usually present as vague pain.**
- Glenohumeral osteoarthritis.

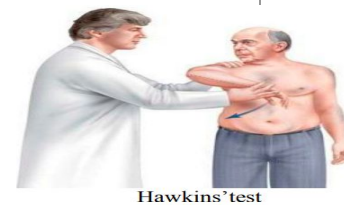
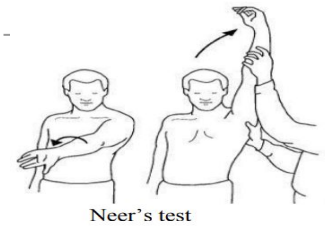
Impingement Syndrome:

Diagnosis

- **History** Pt comes with pain with overhead activities and pain in lateral aspect of arm.
- **Physical Examination.**
- Imaging.

Physical Examination

- Pain on "Impingement tests".
- ↓ ROM → IR & Abduction.
- Weakness in flexion and external rotation.
- Pain on resisted abduction and external rotation.
- **Impingement tests:**
 - **Neer's impingement test:** (not specific because it can be positive with other) passive elevation of the internally rotated arm in the sagittal plane (shoulder forward flexion). Positive if he felt pain.
 - **Hawkins' impingement test:** with the elbow flexed to 90 degrees, the shoulder passively flexed to 90 degrees and internally rotated.



Radiological findings

- Plain x-ray: (Mostly it's normal)
- Acromial spurs (small osteophytes)
- AC joint osteophytes
- Subacromial sclerosis
- Greater tuberosity cyst is common

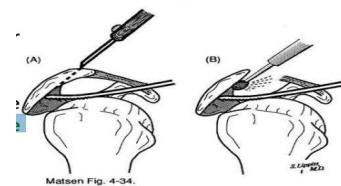


There is a special view called supraspinatus outlet view to give exactly the shape of acromion but we don't use it very often with the presence of MRI

- MRI: To confirm dx and rule out rotator cuff tear.

Management

- Conservative treatment: Always Start with it.
 - Avoid painful activities → especially overhead activities.
 - Physiotherapy:
 - 1- Stretching and range of motion exercises.
 - 2- Strengthening exercises.
 - NSAIDs.
 - Subacromial space steroid injection.
- Operative treatment: Indicated when conservative measures fail after 6 months.
 - Goal → remove the impingement and create more subacromial space for rotator cuff.
 - The anterolateral edge of the acromion is removed.
 - Open (Called: Acromioplasty) or arthroscopic technique (Called: subacromial decompression) and at the same time we do bursectomy. Success rate 70-90%.



Rotator cuff pathology:

Function of rotator cuff muscles

- Keep the humeral head centered on the glenoid regardless of the arm's position in space.
- Generally work to depress the humeral head while powerful deltoid contracts.

Rotator Cuff Tear

- A large tear in the tendon of one or more muscles in the rotator cuff. Often results from progression of smaller tears and inflammation; may be degenerative or traumatic in nature.

Causes of rotator cuff tear

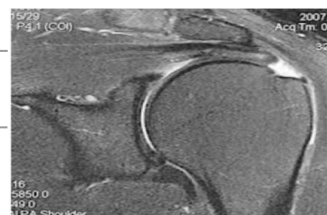
Intrinsic factors	Extrinsic factors	Traumatic
- Vascular : musculotendinous junction has poor vascularity 15:15 - Degenerative : (Age-related and so active (overuse))	- Impingement : not treated > chronic impingement > cuff tear 1- Acromial spurs 2- AC joint osteophytes 3- Repetitive use	e.g. a simple fall or trying to catch or lift a heavy object. If a patient >40 presents with shoulder dislocations DO MRI!! , labrum in elderly is often stronger than rotator cuff muscles. Hx of trauma + not able to move >> high suspicion of rotator cuff injury

Diagnosis

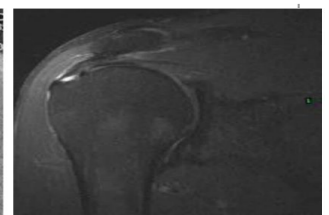
- History and Physical Exam. **Do first impingement tests then test rotator cuff muscle**
- X-rays **It could be normal.**
- MRI (Sensitivity of 84% and a specificity of 96%, **Best for RC evaluation, MODALITY of choice**).
- Ultrasound (Highly operator dependent, Does not provide information regarding concomitant pathologies).

Wide spectrum

- Partial thickness **about 3mm.**
- Full thickness:
 - Small **about 1cm.**
 - Large **about 4cm.**
 - Massive **will come to the level of glenoid (Irreparable= you can't pull it and be attached why? Muscle retracts and if doesn't treat it urgently with time the muscle will shrink and you can't pull it back also with time there will be fatty infiltration).**



Full thickness tear



Partial tear

Treatment

- Non-Operative treatment (Start):
Indication:
 - All partial thickness tears.
 - Full thickness tear **esp small type:**
 - Chronic + degenerative
 - Elderly low demanding + not active. **Degenerative & Young ??? OR**

Rotator cuff pathology:

Modalities of treatment

- Activity modification.
- NSAIDs.
- Physical Therapy:
 - Range of motion.
 - Strengthening of the rotator cuff and periscapular musculature.
- Steroid injections.
- Surgical treatment:
 - **Indications:**
 - **Acute traumatic tear**. with any age even if he is old and did not complain of pain before (acute on chronic)
 - Failed non-operative treatment within 6 months.
 - Full thickness tear:
 - Active, young, painful. if young regardless of the cause do surgery.
 - Old but active.
 - **Options:**
 - Rotator cuff repair (Arthroscopic or open)
 - +/- Subacromial decompression (SAD)



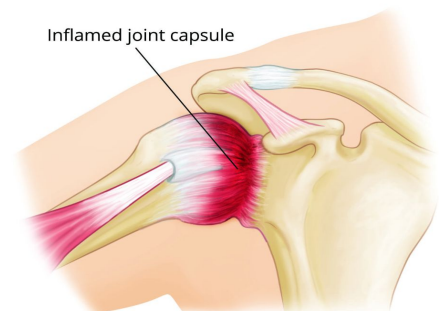
Natural History

- **If not treated** → chronic pain and loss of motion and with time becomes irreparable → **rotator cuff arthropathy**. If not treated the rotator cuff will retract, then becomes very far from the attachment, after that the deltoid will pull the humerus up, thus lead to proximal migration of humerus, which leads to arthritis between humeral head and acromion which is called rotator cuff arthropathy and treated by reverse shoulder replacement الكبف الصاعى المقلوب.
- Complications of surgery: **not improving, stiffness**, and re-rupture
- esp if repair retracted muscle or pt lifting heavy object within recovery period .

Adhesive Capsulitis:

Scenario : **DM pt with severe pain and limited range of motion in all directions.**

- Inflammation of capsules with adhesion
- Also called "**frozen shoulder**" which is not specific term and should not be used
- It is characterized by pain and restriction of **all movements** "active and passive" of the shoulder (global stiffness) due to fibrosis and contracture of the capsule.
- Usually self-limiting (typically begins gradually, worsens over time and then resolves but may take >2 years to resolve)
- 10 % is bilateral
- More common in females



Risk factors

1. **DM** (esp. insulin dependent) (Most common RF by far)
2. Hypo and Hyperthyroidism
3. Following injury or surgery to the shoulder (Called secondary adhesive capsulitis)
4. (Hyperlipidemia)

Adhesive Capsulitis:

Mechanism (extra)

- Primary adhesive capsulitis
Idiopathic, usually associated with DM
Usually resolves spontaneously in 9-18 months
- Secondary adhesive capsulitis → poorer outcomes Due to prolonged immobilization
- Shoulder-hand syndrome: CRPS/RSD14 characterized by arm and shoulder pain, decreased motion, and diffuse swelling → following MI, stroke, shoulder trauma.

Symptoms (extra)

- Pain so severe, worse at night and often prevents sleeping on affected side.
- Restriction of all movements of the shoulder (global stiffness) (decreased active AND passive ROM),
- Not like impingement syndrome IR (internal rotation) and ABD (abduction)

Investigations

1. Pain (**freezing stage**):
The hardest stage because it's very painful
Pain+++ / Hot++, ROM mildly limited, 3-9 Ms
2. Stiffness (**frozen stage**):
Pain decrease, ROM more restricted, 4-12 Ms
3. Resolution (**thawing stage**):
Slow improvement in ROM, 12-42 Ms

Stages

- **Mainly clinical diagnosis** all movements are restricted either active and even passively.
- To rule out other pathologies.
- Most of the time **normal investigations**
- X-rays: b/c pt can't use shoulder there will be disuse osteopenia or mainly no findings.
- MRI: thickening of the joint capsule and diminished filling of the axillary pouch.
- There are the findings of adhesive capsulitis. However, not always seen
- **The diagnosis of adhesive capsulitis is often one of exclusion.**

Treatment

- Resolves if untreated over 2-4 years.
- Aggressive **Physiotherapy**
- Pain relief and anti-inflammatory medications it breaks the adhesions.
- **Steroid injections.**
If not improved:
- Manipulation under anesthesia you break the adhesions by manipulation , but there's risk of bone fractures.
- Arthroscopic capsular release (if 6 months of physiotherapy and steroid injection failed).
Physiotherapy for 3m if not improved give steroids injection not improved so go to surgery

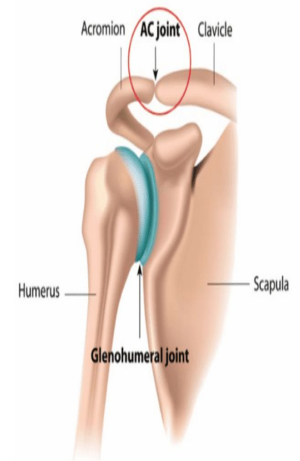
Acromioclavicular pathology:

Anatomy

- Arthritis between acromion and clavicle
- Not very common it's just a Relatively common
- Easy to pick: Diagnosed clinically + X-Ray (by examination: AC joint tenderness + by X-Ray: might show **proximal migration** due to inflammation and tear of rotator cuff).

If you treat the rotator cuff only the patient will not get better because you didn't address the problem, **you have to examine the patient** even if the MRI shows impingement, tear, arthritis ..

- The AC joint is different from joints like the knee or ankle, because it doesn't need to move very much. The AC joint only needs to be flexible enough for the shoulder to move freely. The AC joint just shifts a bit as the shoulder moves. The joint is stabilized by three ligaments AC ligament, Coracoid ligament and Trapezius ligament.



AC joint common conditions

- Traumatic AC joint separation/dislocation
- Osteoarthritis
- Osteolysis of distal clavicle



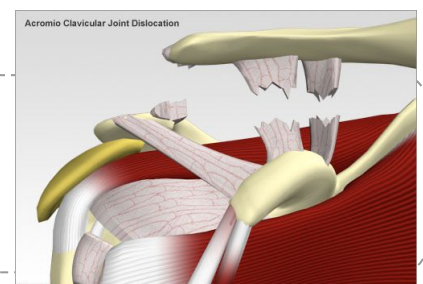
Traumatic AC joint separation/dislocation

- Almost always a direct blow or fall onto acromion
- The joint is stabilized by three ligaments



Treatment

- Conservative : **partial dislocation**
- Surgery : **complete dislocation**



Conservative: partial dislocation



Surgical: complete dislocation



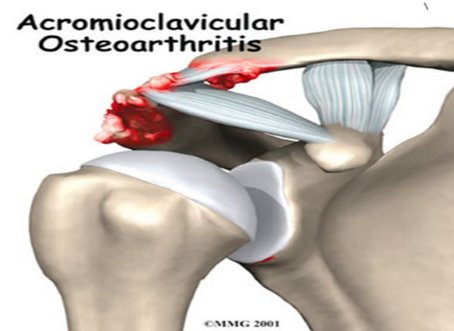
Acromioclavicular pathology:

AC arthritis

- Arthritis is a condition characterized by loss of cartilage in the joint, which is essentially wear and tear of the smooth cartilage which allows the bones to move smoothly.
- Motions which aggravate arthritis at the AC joint include reaching across the body toward the other arm.

Causes of AC arthritis

- Degenerative osteoarthritis.(wear and tear in old aged people)
- Rheumatoid Arthritis
- Gouty Arthritis
- Septic Arthritis
- Atraumatic distal clavicle osteolysis in **weight lifters**. (result of repeated movements that wear away the cartilage)
- Post-traumatic osteolysis of lateral end of clavicle. (like dislocation or a fracture)



Signs and Symptoms

- **Pain**, Which worsens with movement and progressively worsens. (The patient may suffer a night pain which is a sign of arthritis)
- It is commonly associated with impingement syndrome

Diagnosis

Clinical (tenderness over the Ac joint) and by x-rays (after hx and PE, sometimes we do MRI to rule out other diseases. Since it is rare to have isolated AC joint arthritis except in the distal clavicle osteolysis will be isolated)

Treatment

- **Non-Surgical Treatment (partial dislocation):**
- Rest , avoid weightlifting and push-up
- Pain medications and NSAID to reduce pain and inflammation, steroid injection in the joint.
- **Surgical (complete dislocation):**
- If non-surgical tx fails,
- Number of different approaches involving AC/CC ligament reconstruction or screw/hook plate insertion
- Distal clavicle resection

Shoulder dislocation

Acute dislocation is a surgical emergency and demands urgent relocation

- The shoulder joint has the greatest ROM of any joint in the body.
- It relies on soft-tissue restraints, including the capsule, ligaments, and musculature, for stability.
- Therefore, this joint is at the highest risk for dislocation.

Classification

Atraumatic (AMBRI)	Traumatic (TUBS)
<ul style="list-style-type: none"> - Multidirectional instability - Generalized ligamentous laxity. (more common in girls) - Bilateral - Responds well to nonsurgical management - Habitual 	<ul style="list-style-type: none"> - 96% - Unidirectional - Further classified by the direction of the humeral head dislocation: <ol style="list-style-type: none"> 1- Anterior {commonest >95%} 2- posterior < 4% 3-inferior < 1%

Mechanism of acute anterior shoulder dislocation

- Avulsion anterior labrum (the Bankart's lesion **seen on MRI**) and sometimes anterior rim of the glenoid (Bony Bankart lesion)
- Usually Indirect fall on Abducted and extended shoulder (external rotation)
- May be direct when there is a blow on the shoulder from behind humerus pushed anteriorly

Anterior shoulder dislocation

- It is anterior inferior
- **Bankart's Lesion** is detachment of inferior Labrum (fibrocartilage) from the glenoid.
- If it was posterior shoulder dislocation we call it reverse bankart

Clinical picture

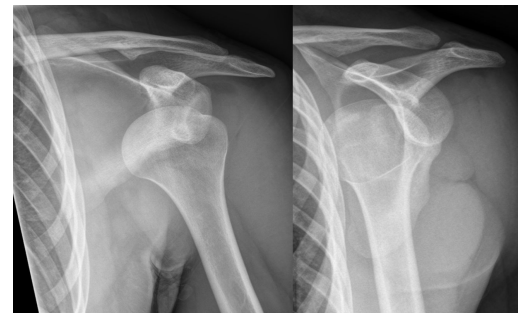
- Patient is in severe pain they come screaming.
- **Holds the injured limb with other hand close to the trunk.**
- The shoulder is abducted and the elbow is kept flexed.
- There is **loss of the normal contour of the shoulder** (Deltoid).
- Loss of the contour of the shoulder may appear as a step.
- Loss of the contour of the shoulder may appear as a step Expose the pt it is very clear.
- Anterior bulge of head of humerus may be visible or palpable. **If pt thin.**
- A gap can be palpated above the dislocated head of the humerus



Shoulder dislocation

Investigations

- You must obtain AP, Lateral & most importantly axillary view
- It is hard to do physical examination when the patient in pain.



Associated injuries of anterior shoulder dislocation

- Injury to the neurovascular bundle in axilla.
- Associated fracture
- Axillary Nerve Injury: "neuropraxia" usually resolves with time.
- It is a branch from posterior cord of Brachial plexus, It is sensory and motor so, you have to examine both, sometimes only the sensory part is affected or only the motor part is !!!!
- It hooks close round neck of humerus from posterior to anterior
- It pierces the deep surface of deltoid (abduct the shoulder) and supply it and the part of skin over it.


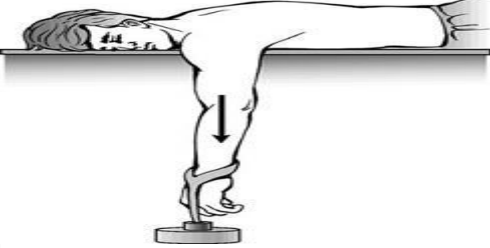
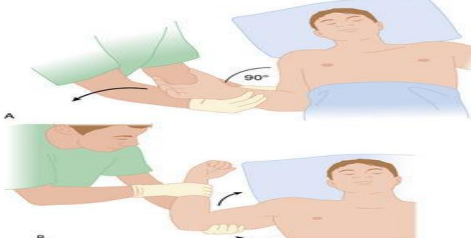
Management of anterior shoulder dislocation

- **Is an Emergency** (Examine neurovascular → reduce → NVE → surgery → NVE)
- It should be reduced in less than 24 hours or there may be Avascular Necrosis of head of humerus If you try in the ER and you cannot do it, take the patient to OR under GA
- Following reduction the shoulder should be immobilized strapped (sling) to the trunk for
- 3-4 weeks and rested in a collar and cuff. (sling then physiotherapy)

Use this space to cry

Shoulder dislocation

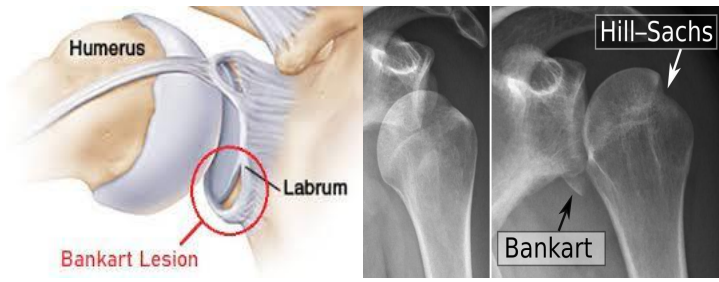

★ Methods of reduction of Anterior Shoulder Dislocation:

Hippocrates Method	Stimpson's technique	Kocher's technique
A form of anesthesia or pain abolishing is required	Some sedation and analgesia are used but No anesthesia is required	It is the method used in hospitals under general anesthesia and muscle relaxation. This is what we nowadays do with conscious sedation.
<ul style="list-style-type: none"> - Put your foot in axilla to counteract and pull the elbow. - An old way used now by soldiers in wars. 	<ul style="list-style-type: none"> - There is a lot of spasm in muscles after dislocation bc of pain which makes the reduction harder. - This technique need strong analgesia (midazolam..) - Put pt in Prone position and put Axillary pad to prevent brachial plexus strain put traction (3-4 kg or less) leave him (15-20 min) until muscles relaxes, most of the time it reduces by itself 	<ul style="list-style-type: none"> - Efficient and quick technique. - The dislocation in this case is inferior internal. - We need good muscle relaxation and good analgesia. <p>How to reduce? Exaggerate the deformity by: Apply traction 'pull the arm down', hold arm and do external rotation then push up and internal rotation. (Need someone to support the axilla)</p>
		

★ Complications of anterior Shoulder Dislocation:

Early	late
<ul style="list-style-type: none"> - Neurovascular injury (rare) - Axillary nerve injury (brachial plexus) - Associated Fracture of neck of humerus or greater commonly or lesser tuberosities 	<ul style="list-style-type: none"> - Avascular necrosis of the head of the Humerus (high risk with delayed reduction) - Recurrent shoulder dislocations (most imp one) the younger the pt the more common. <p>Scenario: 20y old pt, first dislocation from trauma there will be 90% chance of dislocate it again but the older they get the less likely they dislocate.</p>

Shoulder dislocation:

Bankart's lesions	Hill-Sachs lesion
<p>Detachments of the anterior labrum from the glenoid rim 85%. We reattach it with surgery.</p>	<p>An impaction fracture the posterolateral humeral head on the glenoid rim 40-90%</p>
	
<p>RCT or fracture of the greater tuberosity 33%</p>	<p>Neurological injury 13%</p>
<p>Dislocation + Patients > 40 years high risk of RCT (20-54%)</p>	<p>Axillary nerve most common</p>

Post-reduction rehabilitation

- The goal of rehabilitation is to regain maximum ROM while retaining stability.
- The affected arm can be immobilized for 3 weeks, and limited physical rehabilitation is recommended

Important questions read them!

45y lady with Shoulder Pain with overhead activity and limited abduction = rotator cuff and impingement

Q: a 20y old male who was involved in car accident and was unable to abduct- MRI shows tear of supraspinatus? SURGERY

Q: What is the treatment for 50y old have chronic pain for long time and unable to abduct? Conservative

Q: Overhead activity? limited abduction? think about impingement and rotator cuff tear

Quiz

MCQ

Q1: 22-year-old came to the ER after a direct hit to his shoulder during a volleyball match his shoulder was abducted and his arms are flexed he mentioned that it has happened 4 times during this year -An x-ray was provided of shoulder dislocation What is the most likely diagnosis:

- A. Adhesive capsulitis
- B. Shoulder dislocation.
- C. Impingement syndrome
- D. Rotator cuff tear

Q2: 32 y/o banker went to the gym and he hears a “pop” sound in his shoulder after lifting very heavy dumb before 3 weeks. It’s painful and the abduction was restricted and positive empty can and job test no NV problems. The question about the treatment he wants to reduce his pain and regain ROM, back to his work and back to strenuous training. What is the best treatment?

- A. Open or arthroscopic fix.
- B. Physiotherapy.
- C. Reassurance and discharge.
- D. Control his pain by NSAID

Q3: Which nerve is the most likely to be injured in anterior shoulder dislocation?

- A. Axillary
- B. Ulnar
- C. Median
- D. Anterior interosseous

Q4: Young male presented to the ER after falling on his outstretched hand. What is the most likely diagnosis?

- A. Shoulder dislocation
- B. Clavicle fracture
- C. Glenoid fracture.
- D. Sternoclavicular joint dislocation

Q5: A 55-year-old woman comes to the clinic because of chronic right shoulder pain that has persisted for 3 years. She says the pain is especially bothersome at night because she is unable to sleep on her side. Her temperature is 36.7°C (98.2°F), pulse is 60/min, respirations are 16/min, and blood pressure is 136/88 mm Hg. Physical examination shows pain to palpation just inferior to the acromion, and unilateral pain with 2/5 strength when the arm is abducted to 90°, pronated and internally rotated. Which of the following is the most likely diagnosis?

- A. Deltoid tear
- B. Infraspinatus tear
- C. Supraspinatus tear
- D. Subscapularis tear

SAQs

Mention 2 tests you do to diagnose impingement syndrome:

1. Hawkin’s Test
2. Neer’s Test

Answers

Q1	Q2	Q3	Q4	Q5
B	A	A	A	C

THANK YOU

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