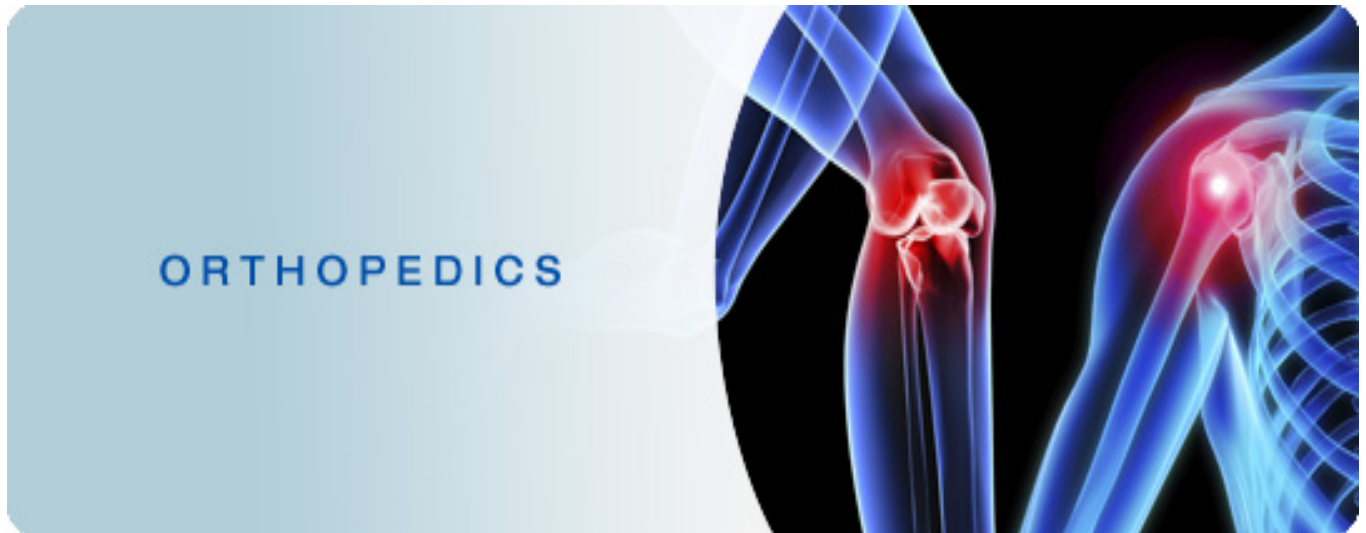


Isn't it funny how someone can say "I believe in Allah " but still follow the Satan who by the way also, " believes " in Allah...

430 ORTHOPEDICS TEAM



Lecture: Common Shoulder Disorders

Team Members:

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Team Leader:

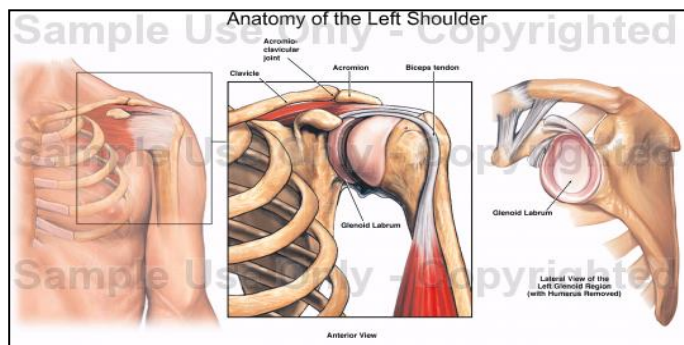
Ayedah Al-Ruhaimi.

- The slides were provided by the doctor.
- Important notes in **Red**
- Copied slides in **Black**.
- Doctor's notes in **green**.

Special thanks to hend Al-Qhtani.

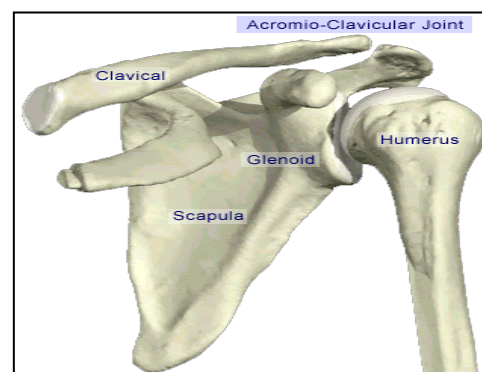
Shoulder Anatomy

The greatest range of motion body



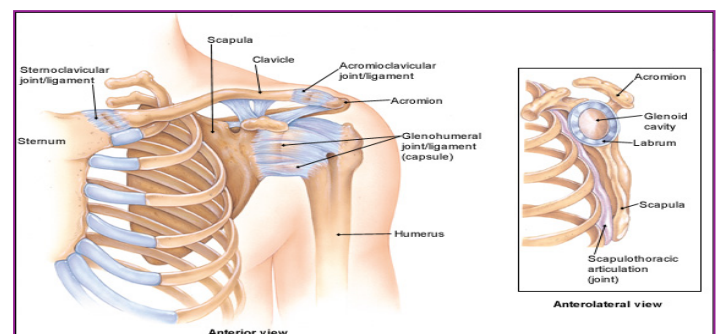
Bony Anatomy

- Humerus
- Scapula
 - Glenoid
 - Acromion
 - Coracoid
 - Scapular body
- Clavicle
- Sternum



Joints

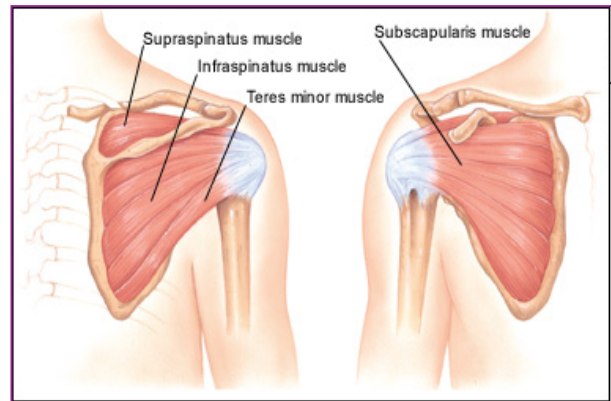
- Glenohumeral joint: the main joint
- Acromioclavicular (AC) joint
- Sternoclavicular (SC) joint
- Scapulothoracic joint



Rotator Cuff Muscles (SITS)

Depress humeral head against glenoid

- **Supraspinatus:**
 - Initiating of Abduction.(there can be cases of complete tears of the ms. And the Pt. can still abduct his shoulder)
- **Infraspinatus:**
 - External rotation
- **Teres Minor:**
 - External rotation
- **Subscapularis:**
 - Internal rotation

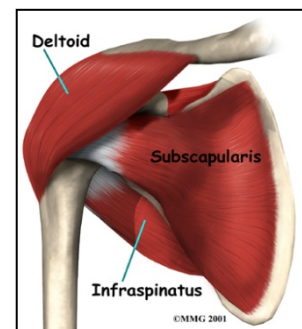


Teres minor is not important clinically –there is no specific test for Teres minor

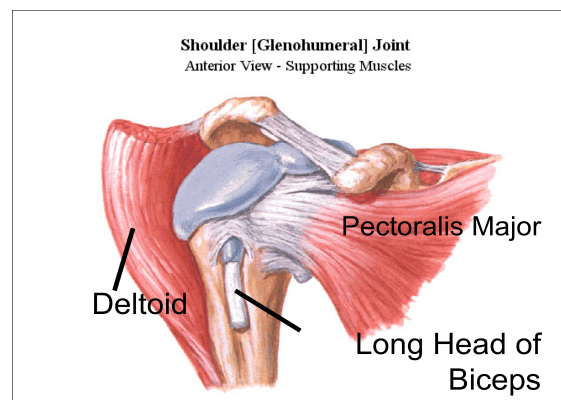
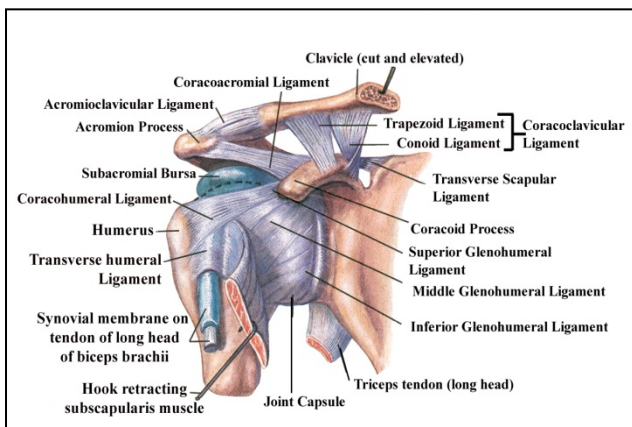
Muscles

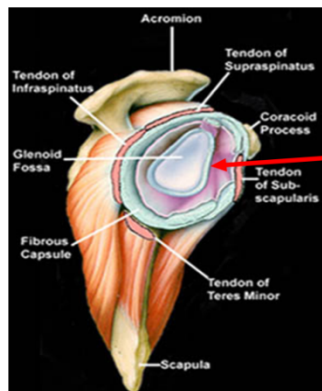
*Deltoid:

Largest, strongest muscle of the shoulder. Most important muscle is the deltoid: 3 origins(scapula spine –acromion-clavicle) and one attachment(proximal third of humerus) supplied by axillary nerve



***Biceps** : 2 heads . long head is deep – the only tendon in the body that goes into a joint . short head attach to cricoid process





LABRUM

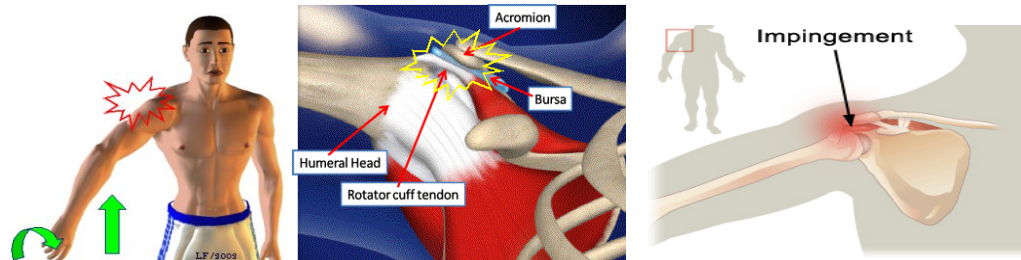
Cartilage ring around the glenoid. Deepens the socket of the G-H Joint

Labrum : makes the glenoid fossa deeper .help in stability of the joint

Subacromial bursa

- Between the acromion and the rotator cuff tendons.
- Protects the acromion and the rotator cuff from grinding against each other.

1.Impingement Syndrome



- Describes 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

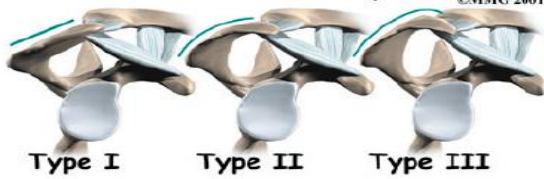
Impingement syndrome caused by :

- 1- the contents gets bigger due to inflammation – bursitis and tendinitis
- 2- the space get smaller due to osteophytes formation

Risk factors:

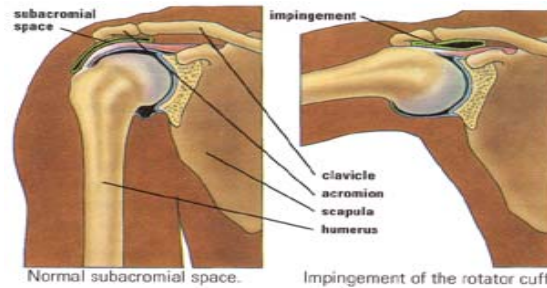
- Age: over 40 years
- Overhead activities (lifting ,swimming, tennis)
- Bursitis and supraspinatus tendinitis
- Acromial shape: type II & III acromion higer risk more than type 1
- AC arthritis or AC joint osteophytes

Variations in Acromion Shape



- 3 Types of acromion:

- I : flat
- II : curved
- III: hooked



Symptoms

- Pain in the acromial area when the arm is flexed and internally rotated → Inability to use the overhead position.
- The pain may result from subacromial bursitis or rotator cuff tendinitis
- Pain when sleeping on the affected side..
- Pain will often become worse at night, as the subacromial bursa becomes hyperemic after a day of activity
- Decreased range of motion especially abduction
- Weakness

sever impingement may lead to rotator cuff tear

Differential diagnosis

- Rotator cuff tears
- Calcific tendinitis
- Biceps tendinitis
- Cervical radiculopathy
- Acromioclavicular arthritis
- Glenohumeral instability
- Glenohumeral osteoarthritis.

Physical examination

- Atrophy of rotator cuff muscles.
- Decreased range of motion (esp. internal rotation & abduction)
- Weakness in flexion and external rotation.
- Pain on resisted abduction and external rotation.
- Pain on “**impingement tests**”.

Impingement tests

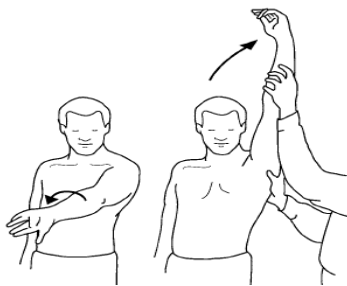
Neer's impingement test:

passive elevation of the internally rotated arm in the sagittal plane (shoulder passive forward flexion).

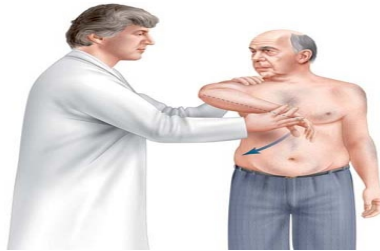
Hawkins' impingement test: more sensitive than Neer's

with the elbow flexed to 90 degrees, the shoulder passively flexed to 90 degrees and internally rotated.

Neer's test



Hawkins test



Radiological findings :

Plain X-rays:

- Acromial spurs
- AC joint osteophytes
- Subacromial sclerosis
- Greater tuberosity cyst



MRI:

To confirm the diagnosis and rule out rotator cuff tear

Management

- **Conservative treatment:**
 - Always start with it
- **Operative:**
 - Indicated when conservative measures fail

X rays shows signs of
impingement syndrome
(hypertrophy of greater
tubersity)

Conservative treatment

Avoid painful and overhead activities

Physiotherapy:

1. Stretching and range of motion exercises
2. Strengthening exercises

NSAIDs (after 2-3 months of physical activity-failed-)

Steroid injection into the subacromial space

Operative treatment

- The goal of surgery is to remove the impingement and create more subacromial space for the rotator cuff
- Indicated if there is no improvement after 6 months of conservative treatment
- The anterolateral edge of the acromion is removed
- Open (called: Acromioplasty – **we open the deltoid ms , Pt need to be immobilize for long time**), or arthroscopic(**better than open**) technique (called subacromial decompression)
- Success rate 70-90%

2.Rotator Cuff Tears

Supraspinatus:

Initiation of abduction + external rotation **Rotator cuff**

Infraspinatus:

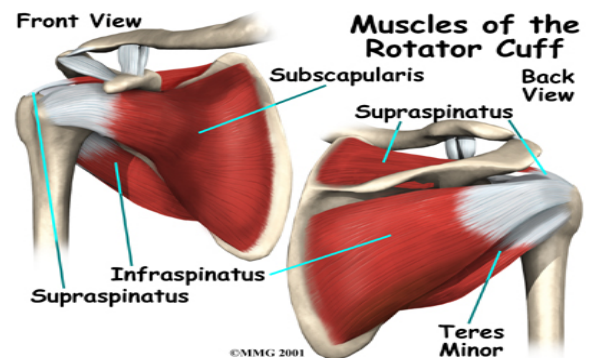
External rotation

Subscapularis:

Internal rotation

Teres Minor:

External rotation



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 to pull the humeral head up

Causes of rotator cuff tears

- **Intrinsic factors:**
 - Vascular = **in the greater tuberosity is very poor>risk of avascular necrosis due to any small injury, malunion**
 - Degenerative (age-related)
- **Extrinsic factors:**
 - Impingement (in acromion, or sub acromioclavicular joint)
 - Acromial spurs
 - AC joint osteophytes
 - Repetitive use
- **Traumatic (e.g. a fall or trying to catch or lift a heavy object)**

Diagnosis

- History
- Physical examination(**empty can, lift off test**)
- X-rays(not showing any abnormalities)
- MRI (**best**)

Symptoms

- Pain(**can't lift his arm up**) radiating to deltoid insertion or biceps(**Pt. said I had pain in the upper part of my arm or in my neck**)
- Insidious progression of pain
- Night pain
- Popping noises
- Weakness
- Could be asymptomatic

Signs

- Painful arc
- 60 degrees - 120 degrees elevation
- Drop arm test
- Restricted internal rotation
- Subacromial crepitus
- Weak RC muscles
- Inability to lift the shoulder
- Palpation of cuff defect and (wasting of supraspinatus muscle in long history of rotator cuff tearing)

Imaging

- Plain radiographs
 - AP + lateral view
 - Supraspinatus outlet view
 - AC - joint view
- Ultrasonography= operator dependent
- Arthrogram = invasive not done usually
- **MRI is the diagnostic tool in rotator cuff tear!**
- MRI – arthrogram
 - Diagnosis of the tear + impingement
 - Size of tendon retraction
 - Atrophy and fatty infeltration



Management

Goals of treatment:

- Elimination of pain(the main aim)
- Restoration of function
- Full range of motion
- Prevention of progression or recurrence

Modalities of management : Degenerative vs traumatic

Degenerative type: (always start with conservative except for traumatic case)

- (If no improvement after 6 months, surgical repair (open or arthroscopic) is indicated)
- Rest
- Physio
- NSAIDs
- Steroid injection

Traumatic type: (acute surgical repair)

- Can't treat it with conservative ! Muscle may retract .

- **Operative treatment**

Depends on:

Patient factors:

- Activity level
- Expectations
- Needs

Pain or weakness:

- Interferes with work, sports, activities of daily living.
- Unresponsive to appropriate non-operative treatment

Wide spectrum of tears:

- **Partial** (just shaving the partial tear)
- **Complete** (need repair the tendon)
- Small
- Large
- Massive (irreparable) : muscle atrophy and contracts– cant do repair – too late and need joint replacement

Surgical Modalities :

If conservative failed after 6 month of trials

1. Rotator cuff tendon debridement
2. Subacromial decompression
 - open
 - arthroscopic = much easier
3. Rotator cuff tendon repair = most immobilize the shoulder to help the tendon bone fixation
 - completely surgically open repair
 - arthroscopic assisted mini-open repair
 - completely arthroscopic repair
4. Reverse shoulder arthroplasty = in massive tear

Complications of RC tears

- Complete tears: if not treated → chronic pain and loss of motion and with time becomes irreparable → deltoid take of the role leading to shoulder elevation and Glenohumeral –rotator cuff arthropathy-
- Complications of surgery: not improving, stiffness, infection, RSD
4-6 wk of immobilization = risk of stiffness in longer duration

3.Adhesive Capsulitis

- Also called “frozen shoulder”
- It is characterized by pain and restriction of all movements of the shoulder (global stiffness)
- (in adhesive capsulitis all movements of shoulder are affected in contrast to impingement syndrome where limitation of abduction only) –
- Usually self limiting (typically begins gradually, worsens over time and then resolves but may take >2 years to resolve)
- Adhesive Capsulitis

Risk factors:

- DM (esp. insulin dependent) the most imp risk factor
- Following injury or surgery to the shoulder
- Hypo and Hyperthyroidism
- High cholesterol

Diagnosis:

- Mainly clinical = global movement limitation
- X-rays and MRI to rule out other pathologies

Stages: each stage takes 2 years

1-Pain (freezing stage)= pain

2-Stiffness (frozen stage)= pain with movement limitation

3-Resolution (thawing stage)= start healing

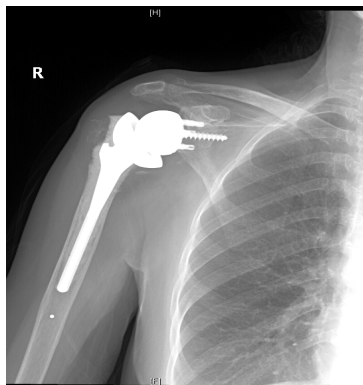
Treatment

- Resolves if untreated over 2-4 years
 - Start with conservative after 6 month if no improvement go for surgery
 - Aggressive Physiotherapy
 - Pain and anti-inflammatory medications
 - Steroid injections
 - Manipulation under anesthesia = risk of fracture due to disuse osteopenia
- } used all together

- Arthroscopic capsular release = **best way of management and safer**

4. Glenohumeral osteoarthritis

- Mainly wear and tear
- Could be a result of RA, AVN or malunited fractures
- Glenohumeral osteoarthritis
- The management starts with conservative measures.
- If it fails to relieve the pain, the best management for elderly patient is arthroplasty (hemi or total shoulder replacement)
- If associated with irreparable rotator cuff tear → for reverse shoulder replacement
- **Note there is 2 types of glenohumeral osteoarthritis:**
 - 1) **Primary osteoarthrosis like the knee > Rx with arthroplasty**
 - 2) **2ry to irreparable rotator cuff tear > Rx with reverse shoulder replacement**



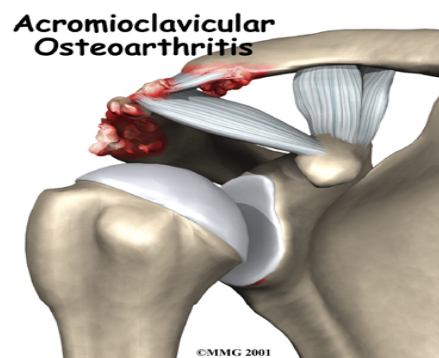
Reverse shoulder replacement



Hemi arthroplasty

4.AC arthritis

Across the chest adduction test (positive if there is pain)



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.

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
- Positive across the chest adduction

Diagnosis:

Clinical and by x-rays

Treatment :

Non-surgical Treatment

- Rest , avoid weightlifting and push-ups(triggering activities)
- Pain medications and NSAID to reduce pain and inflammation

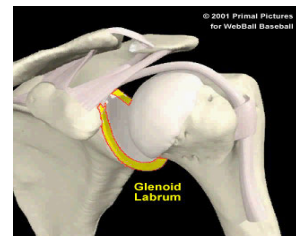
Surgical treatment

- it involves removing of the AC joint applying an artificial joint.
- the bone spurs must also be removed .

5.Dislocation of the Shoulder

Basic anatomy about Glenohumeral Joint :

- Most common dislocated joint
- Lacks bony stability
- Composed of:
 - Fibrous capsule
 - Ligaments
 - Surrounding muscles
 - Glenoid labrum



.Dislocation of the Shoulder:

- According to the direction:
 - Mostly *Anterior* > 95 % of dislocations
 - Posterior Dislocation occurs < 5 % in **3Es: epileptic , electrical shock , alcoholic. patient**
 - True Inferior dislocation (luxatio erecta) occurs < 1%
 - According to the mechanism:
 - Traumatic
 - Non traumatic dislocation may present as Multi directional dislocation due to generalized ligamentous laxity. It may become painless → habitual
- ✓ With laxity minor trauma lead to dislocation
 - ✓ Avoid surgery – Rx with physiotherapy
 - ✓ Traumatic Rx with surgery

Anterior Shoulder dislocation

Usually also inferior(anteroinferior)

Bankart's Lesion : **detachment of the anterior inferior labrum – loss of stabilizing function of the labrum**

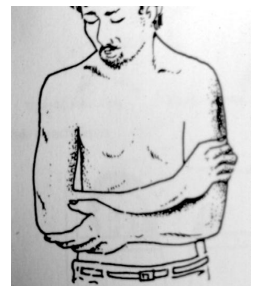
Mechanism of anterior shoulder dislocation

Usually Indirect fall on Abducted and extended shoulder

May be direct when there is a blow on the shoulder from behind

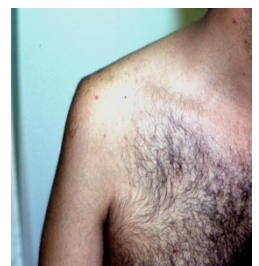
Clinical picture of acute anterior shoulder dislocation

- Patient is in severe pain
- 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



Clinical picture

- Loss of the contour of the shoulder may appear as a step
- Anterior bulge of head of humerus may be visible or palpable
- A gap can be palpated above the dislocated head of the humerus



X-ray anterior shoulder dislocation

Tow views AP and axillary view



Trans-scapula view

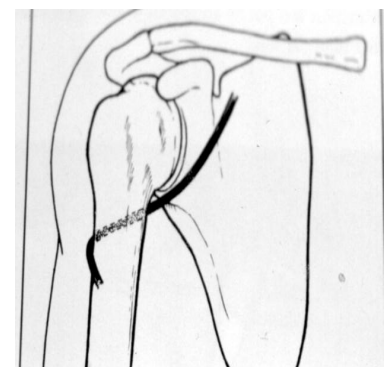
Associated injuries of anterior Shoulder Dislocation

- Injury to the neuro vascular bundle in axilla
- Injury of the Axillary Nerve (Usually stretching leading to temporary neuropraxia) **Deltoid function loss + loss of sensation over the deltoid**
- Associated fracture



Axillary Nerve Injury

- It is a branch from posterior cord of Brachial plexus
- It hooks close round neck of humerus from posterior to anterior
- It pierces the deep surface of deltoid and supply it and the part of skin over it



Axillary nerve injury



Management of Anterior Shoulder Dislocation

- Is an Emergency Why ? Risk of Avascular necrosis & Risk of nerve injury
- It should be reduced in less than 24 hours or there may be Avascular Necrosis of head of humerus (x ray after the reduction)
- Following reduction the shoulder should be immobilized strapped to the trunk for 3-4 weeks and rested in a collar and cuff

Methods of Reduction of anterior shoulder Dislocation

(traction and counter traction)

Hippocrates Method (A form of anesthesia or pain abolishing is required)

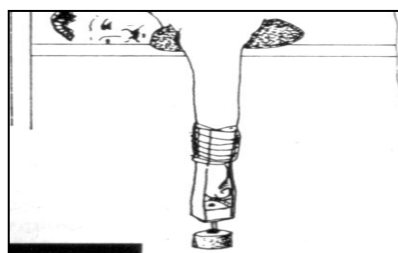
its done out the hospital if no other assistant is there .

Stimpson's technique (some sedation and analgesia are used but No anesthesia is required) not done any more

Kocher's technique is the method used in hospitals under general anesthesia and muscle relaxation



Hippocrates Method



Stimpson's technique



Kocher's Technique

Complications of anterior Shoulder Dislocation : Early

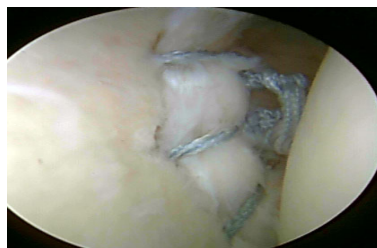
- Neurovascular injury (rare)
- Axillary nerve injury
- Associated Fracture of neck of humerus or greater or lesser tuberosities

Complications of anterior shoulder Dislocation : Late

- Avascular necrosis of the head of the Humerus (high risk with delayed reduction)
- Recurrent shoulder dislocations (the commonest complication) , treated by Bankart repair (either arthroscopic or open)re-attachemtn of the labrum



Bankart lesion



Arthroscopic Bankart



Bankart lesion

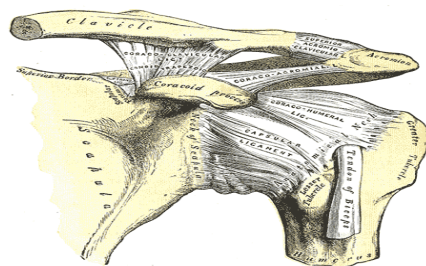
6.Acromioclavicular separation

Acromioclavicular Joint

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 AcromioClavicular joint is stabilized by three ligaments

- 2 Coracoclavicular ligaments
- Conoid
- trapezoid
- AC ligament



Acromioclavicular separation

Mechanisms of Injury:

- Fall on the tip of the unprotected shoulder.
- Fall on the outstretched hand.
- Downward force on the acromion from above.
-

Acromioclavicular separation- Rockwood Classification:

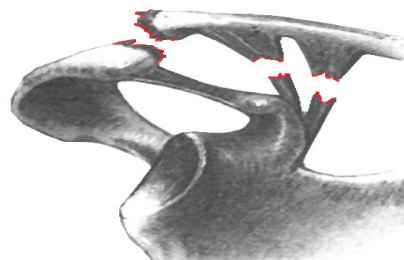
type I: sprain of joint with out a complete tear of either ligament

type II: tear of AC ligaments with intact coracoclavicular ligaments; will not show marked elevation of lateral end of clavicle

type III: both AC & CC ligaments are torn

type IV: distal clavicle is dislocated posteriorly into trapezial fascia

type V: distal clavicle is dislocated inferiorly



GRADE III

type III: both AC & CC



Type 3 X-Ray

type 1 and 2 = no surgery

Type 4 and 5 = surgery

Type 3 = according to the patient state = young athletic patient = rx with re-attachment (surgery)

Elderly /non athletic rx conservative