

Shoulder Injuries

Diagnosis and Management

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Learning Objectives

Identify steps in the general examination of the anterior shoulder.

Recognize the mechanisms of injury, clinical signs and symptoms, diagnostic tests, and treatment for common shoulder disorders.

Disorders Of The Shoulder

**Shoulder Anatomy &
Physical Examination**

Fractures & Dislocations

Rotator Cuff Disorders

Separations



Anatomy Of The Shoulder Review



Bones

Scapula

Spans ribs 2 to 7

Three main processes

Spine

Acromion

Coracoid

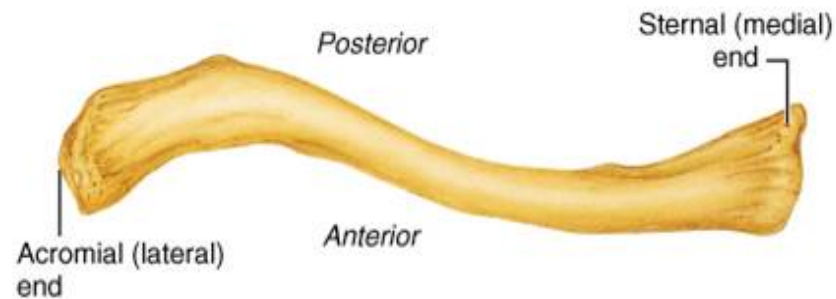


Bones

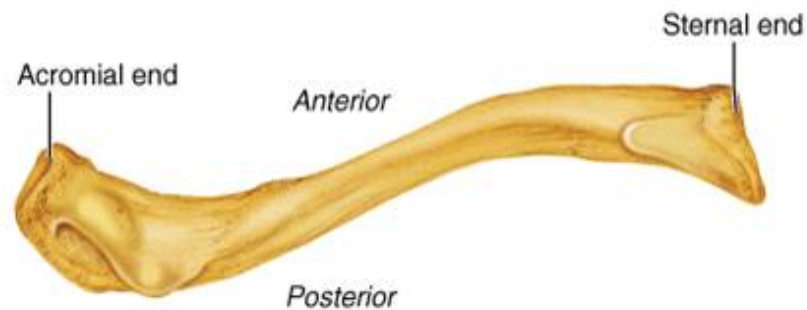
Clavicle

Connects the sternum to the acromion

"S" shaped



(b) Right clavicle, superior view



(c) Right clavicle, inferior view

Bones



**Proximal humerus
(parts)**

Head

Anatomic neck

**Surgical neck
(distal to the
anatomic neck)**

Bones

Proximal humerus (parts)

Greater tuberosity
(rotator cuff insertion
- supraspinatus,
infraspinatus, teres
minor)

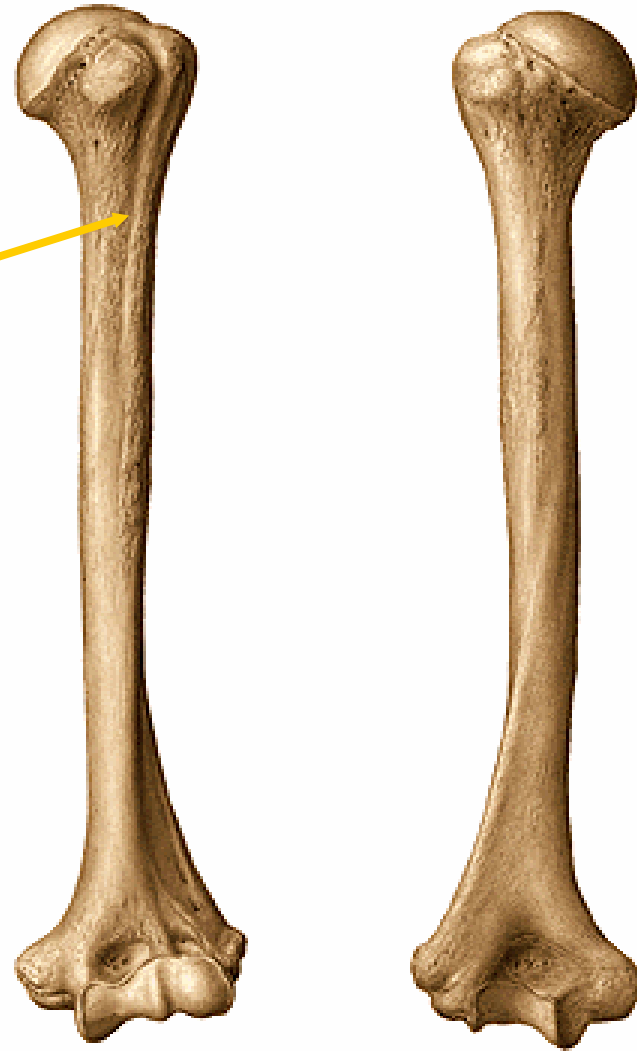
Lesser tuberosity
(rotator cuff insertion
- subscapularis)



Bones

Proximal humerus (parts)

**Intertubercular
groove (bicipital
groove) – Long
head of the biceps**



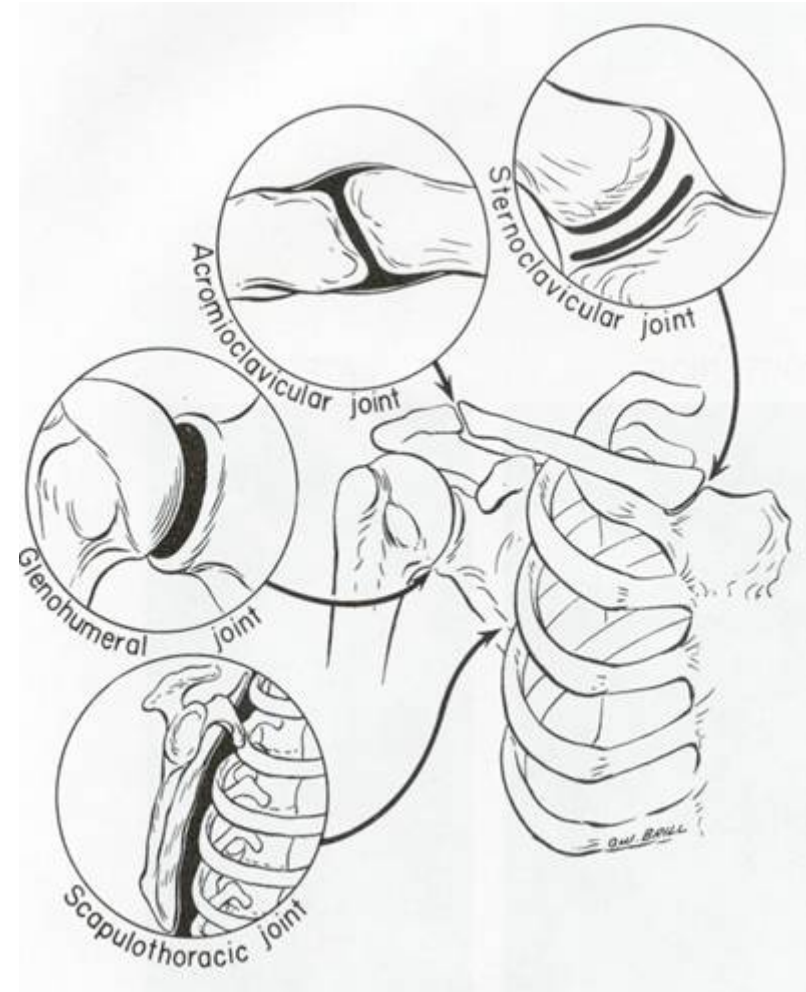
Joints

Glenohumeral joint

Sternoclavicular joint

Acromioclavicular joint

Scapulothoracic joint



Glenohumeral Joint

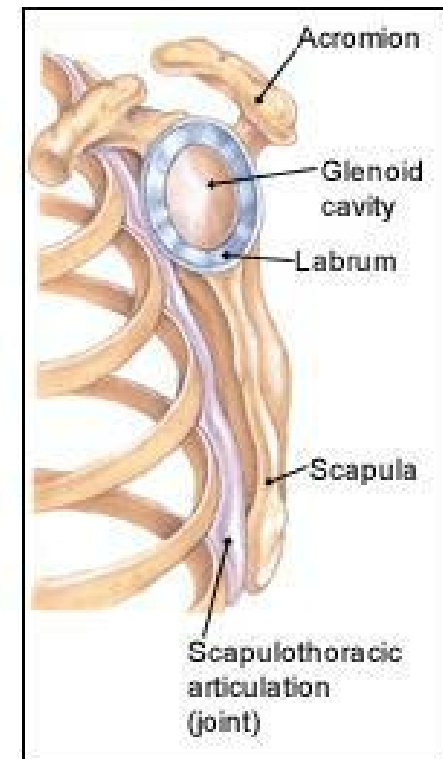
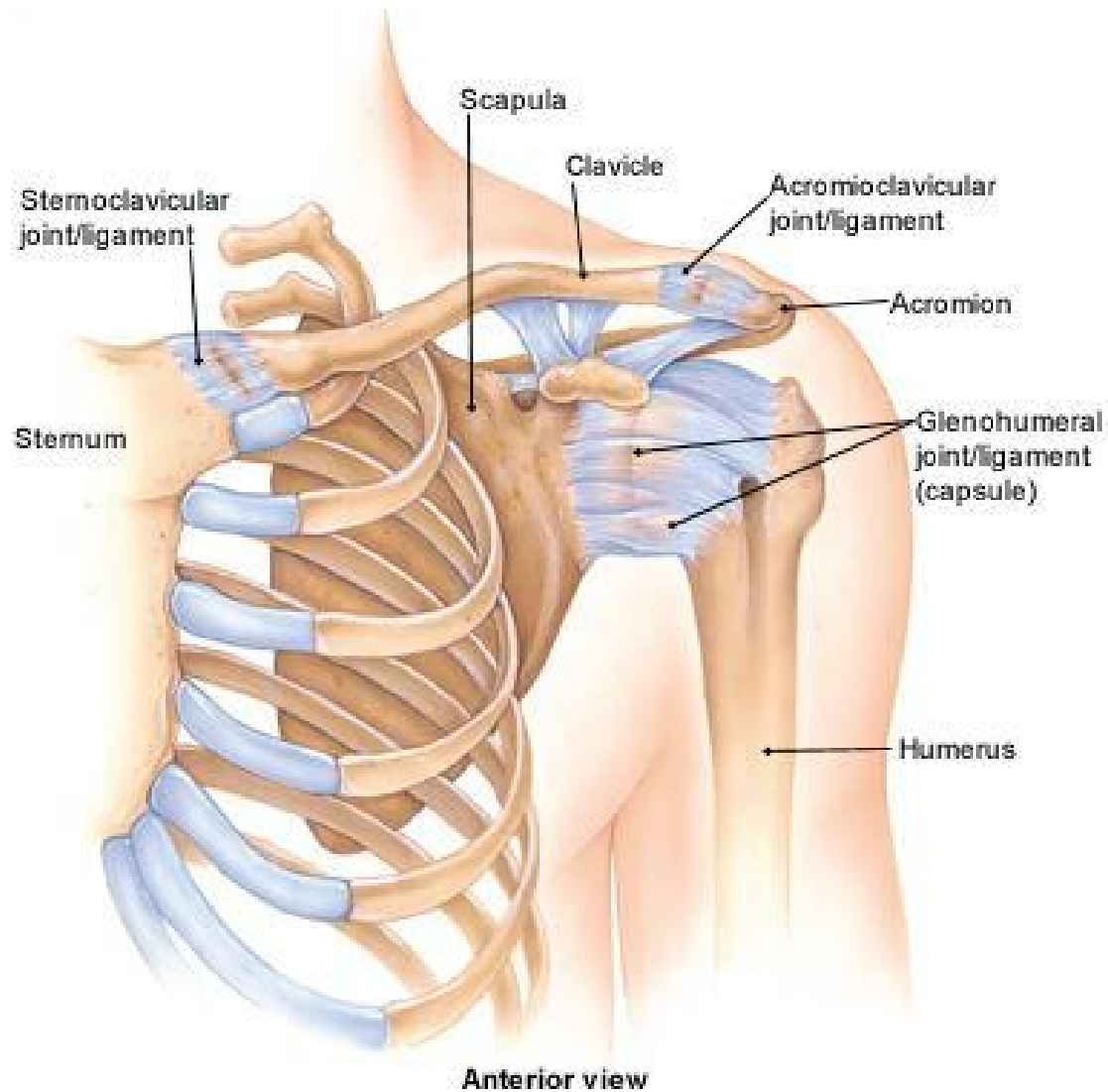
**Ball (Humeral head) and socket
(Glenoid)**

Muscles provide the primary support

**The labrum lines the glenoid cavity
and deepens the socket**

**Ligaments - glenohumeral (inferior
glenohumeral is the most important),
coracohumeral, capsular**

G-H Joint



Anterolateral view

Sternoclavicular Joint

Gliding joint

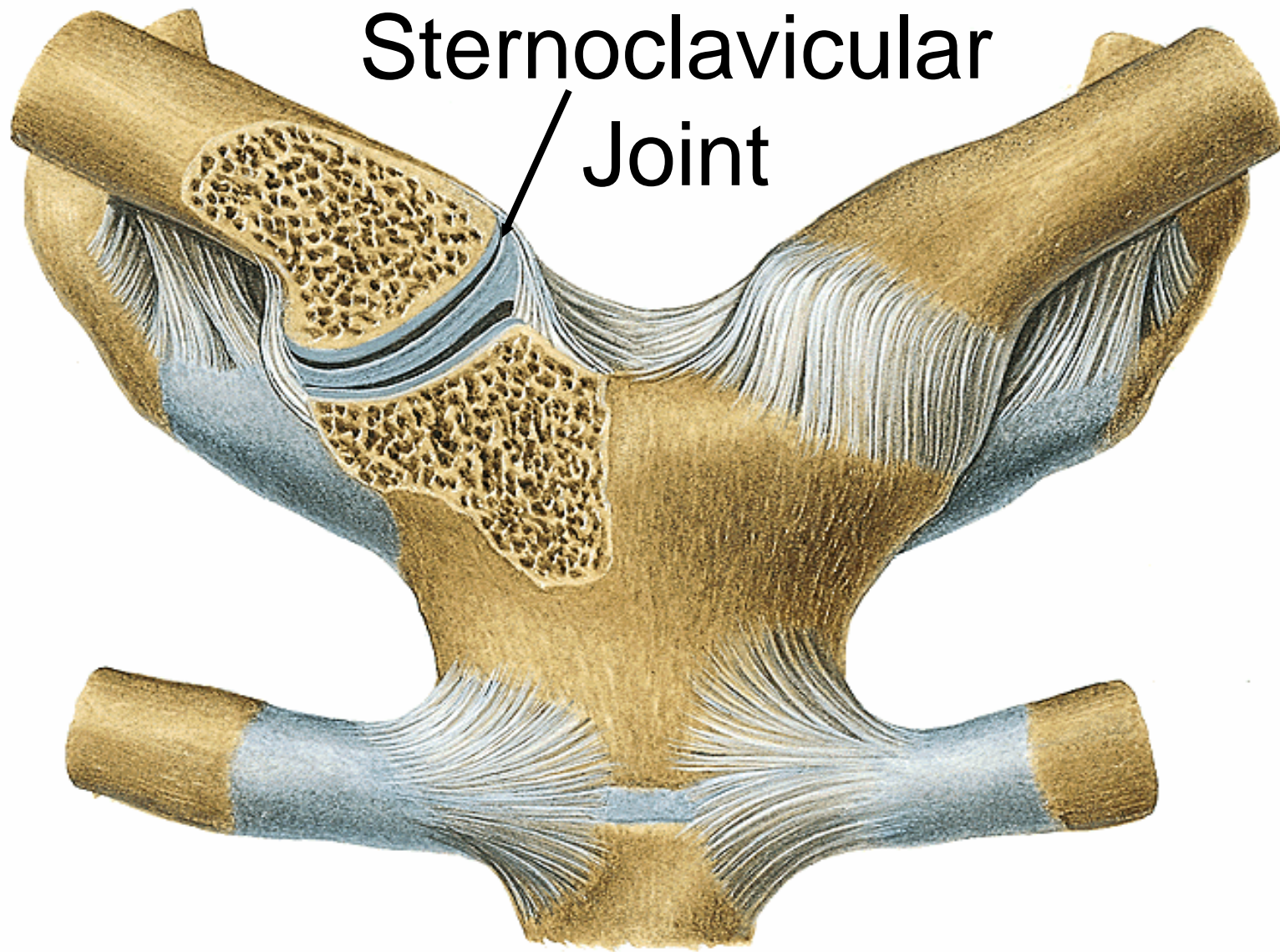
The only bony attachment to the Axial skeleton is the S-C Joint

Articular disc interspaced between surfaces

Rotates 30 degrees with glenohumeral motion

Ligaments - anterior and posterior sternoclavicular, capsular

Sternoclavicular
Joint

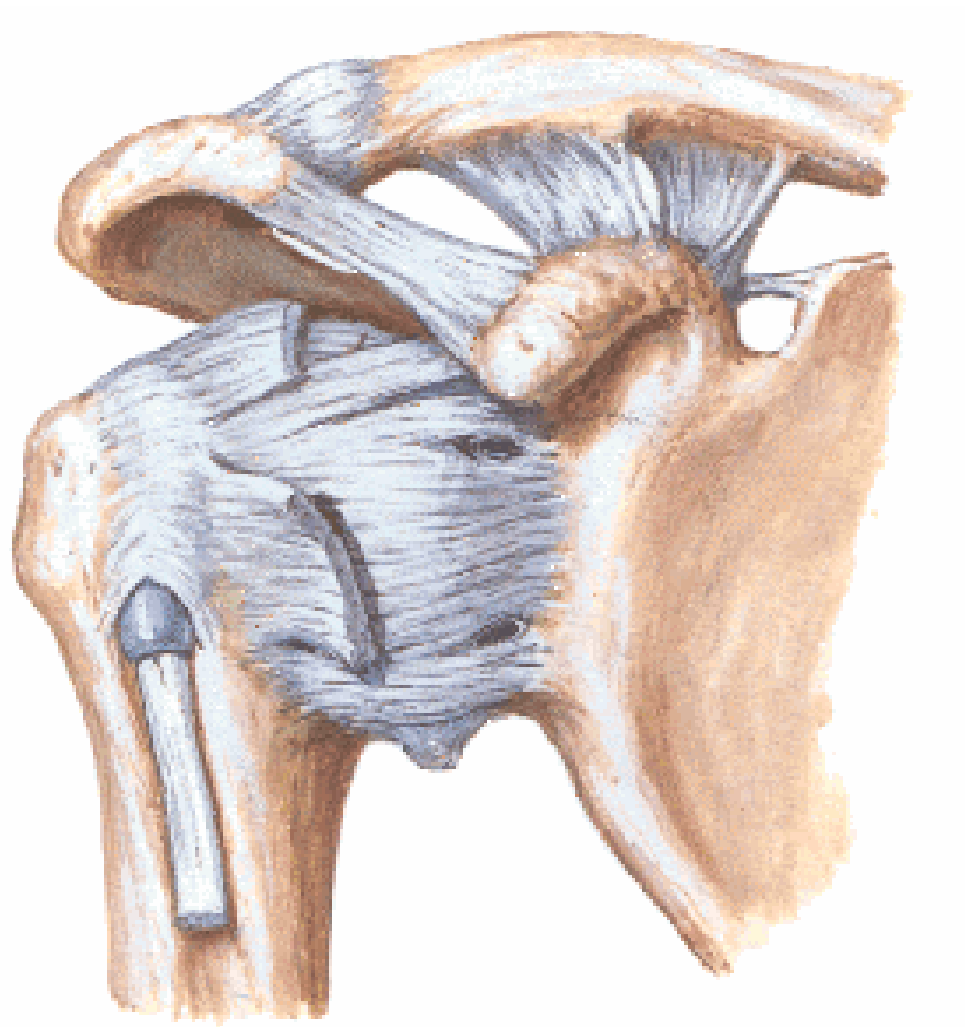


Acromioclavicular Joint

Gliding joint

**Disc
interspaced
between
surfaces**

**Anchors the
lateral clavicle**

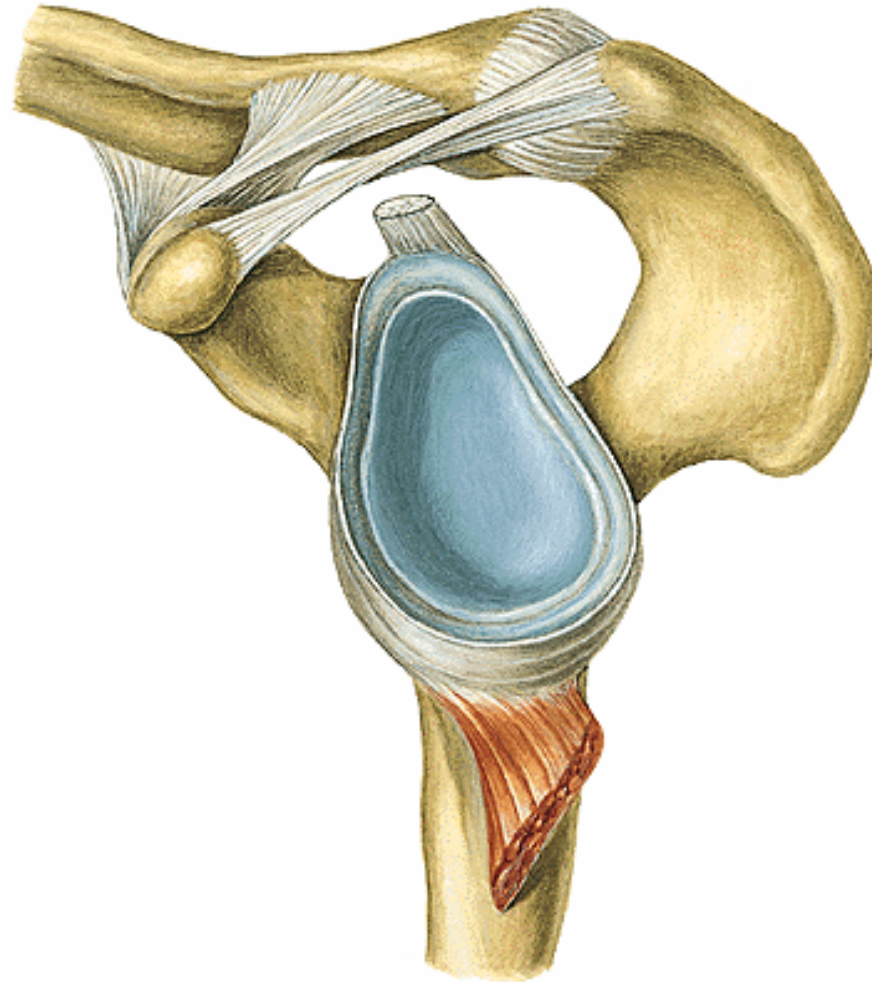


A-C Joint

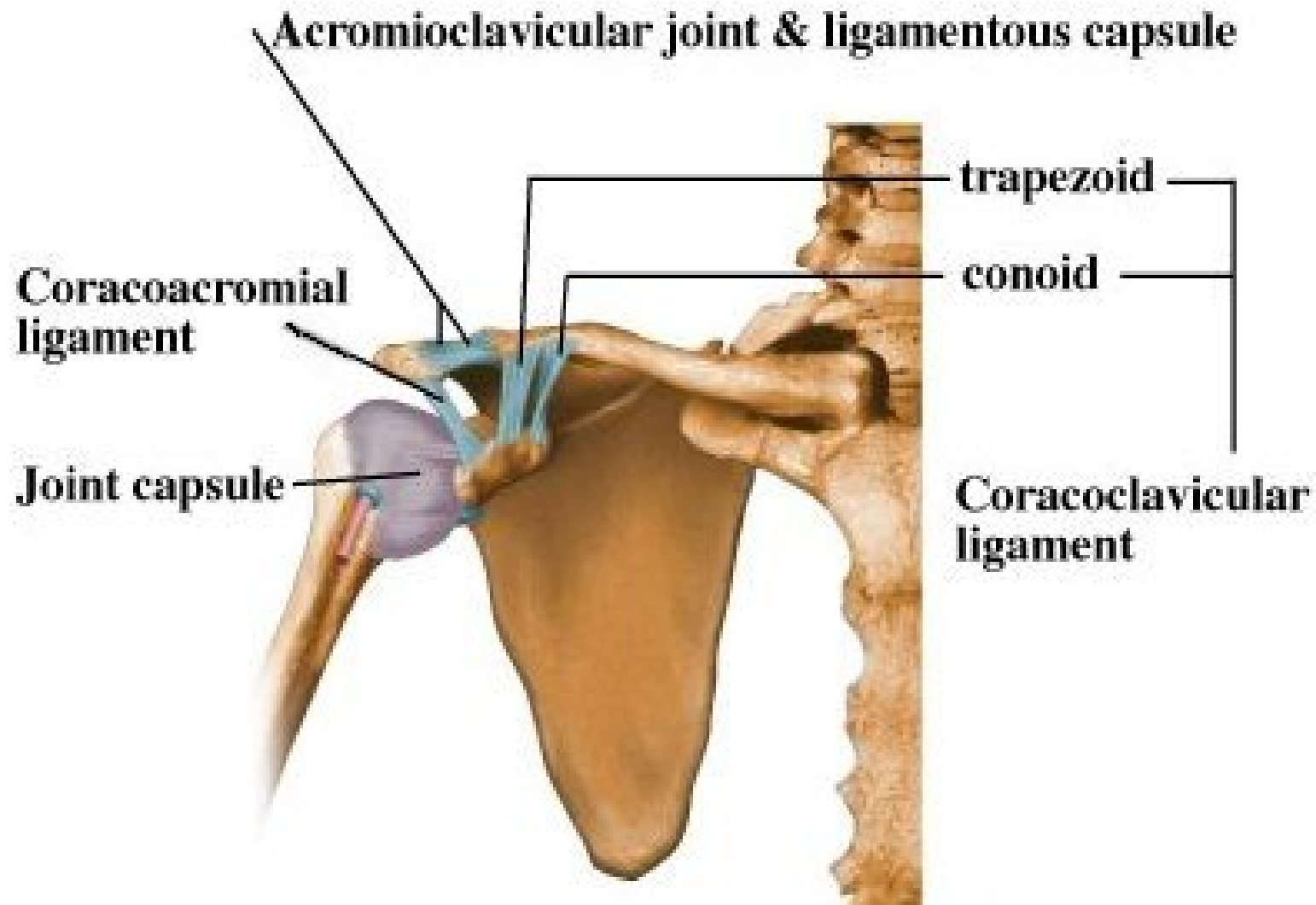
Ligaments

A-C

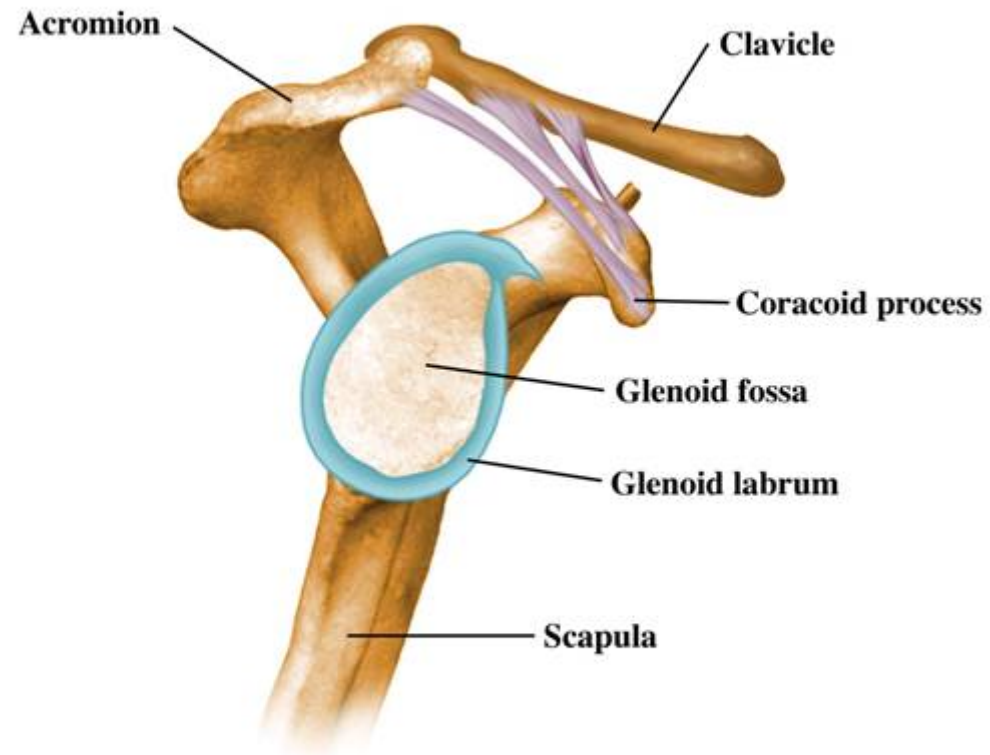
C-C



A-C Joint



A-C Joint

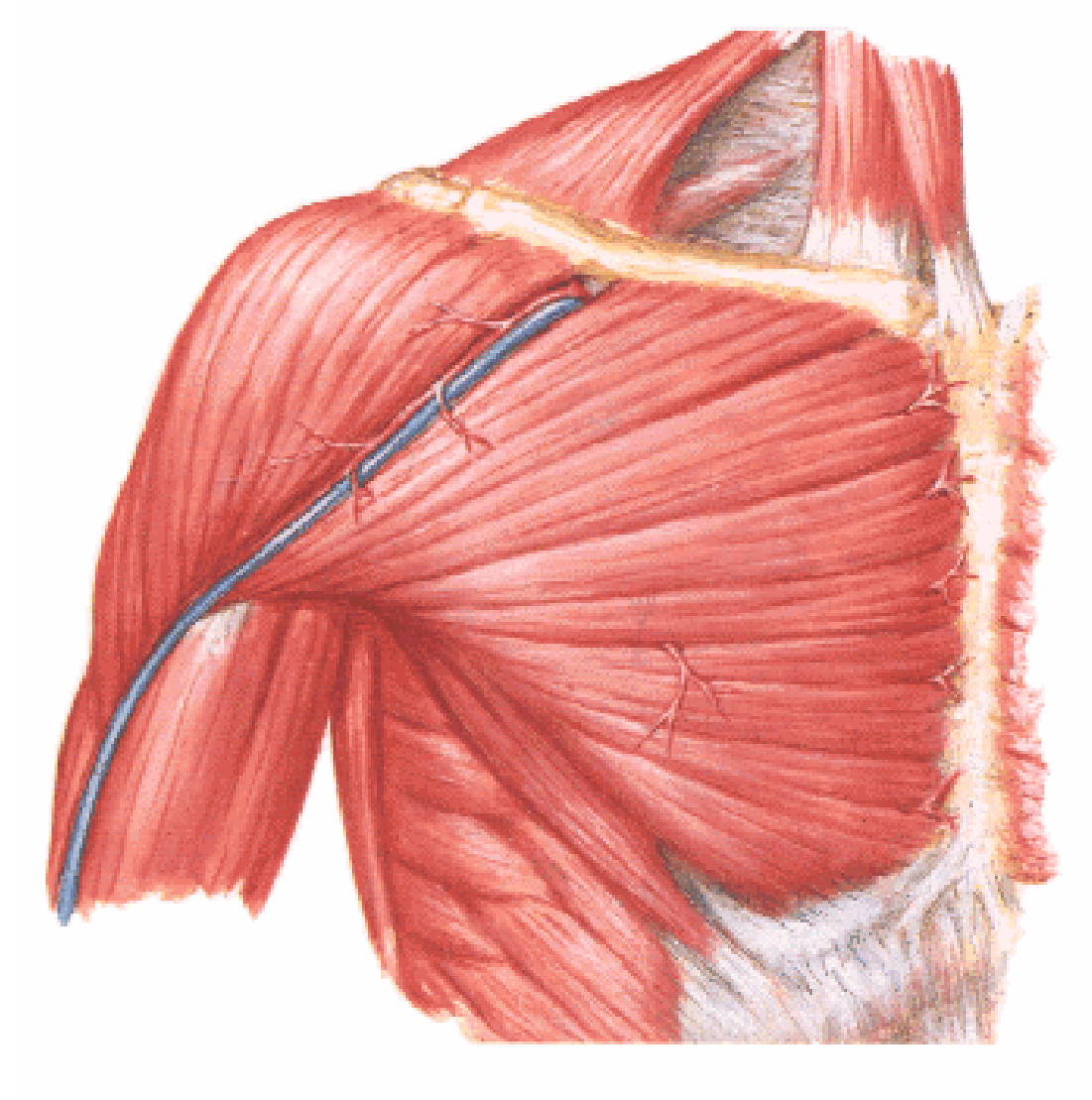


Scapulothoracic Joint

Soft-tissue joint

Allows for scapular translation

Muscles



Muscles

Spine connectors

**Trapezius
(Upper, Middle
& Lower)
Latissimus dorsi
Rhomboids
(Major & Minor)
Levator scapulae
Scalenes**

Thoracic connectors

**Pectoralis major
Pectoralis minor
Subclavius
Serratus anterior**

Muscles

Shoulder movers

**Deltoids (abduction, flexion,
extension, horizontal
AB/ADduction)**

**Teres major (adduction, internal
rotation)**

**Supraspinatus (abduction, external
rotation)**

Infraspinatus (external rotation)

Muscles

Shoulder movers

Teres minor (external rotation)

Subscapularis (internal rotation)

Coracobrachialis (flexion)

Biceps long head (flexion)

Muscles

Rotator cuff muscles ("SITS")

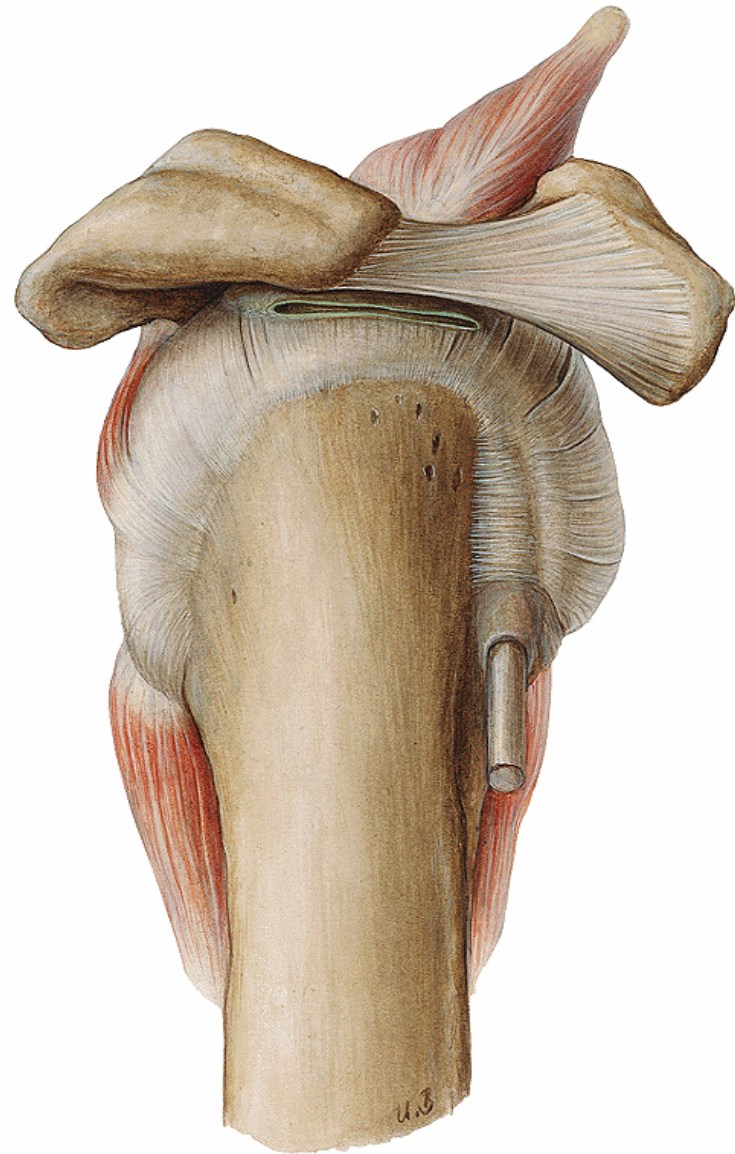
Supraspinatus

Infraspinatus

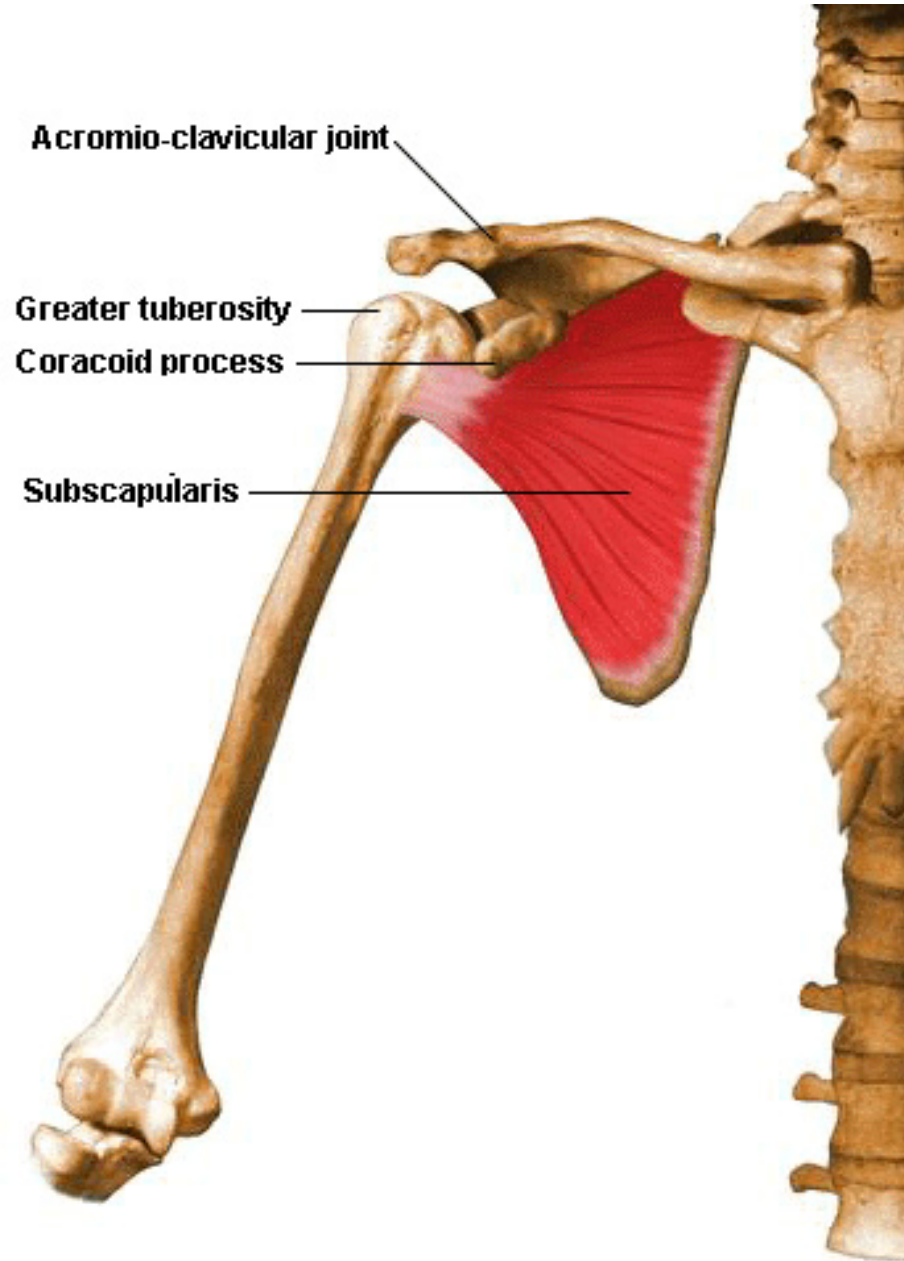
Teres minor

Subscapularis

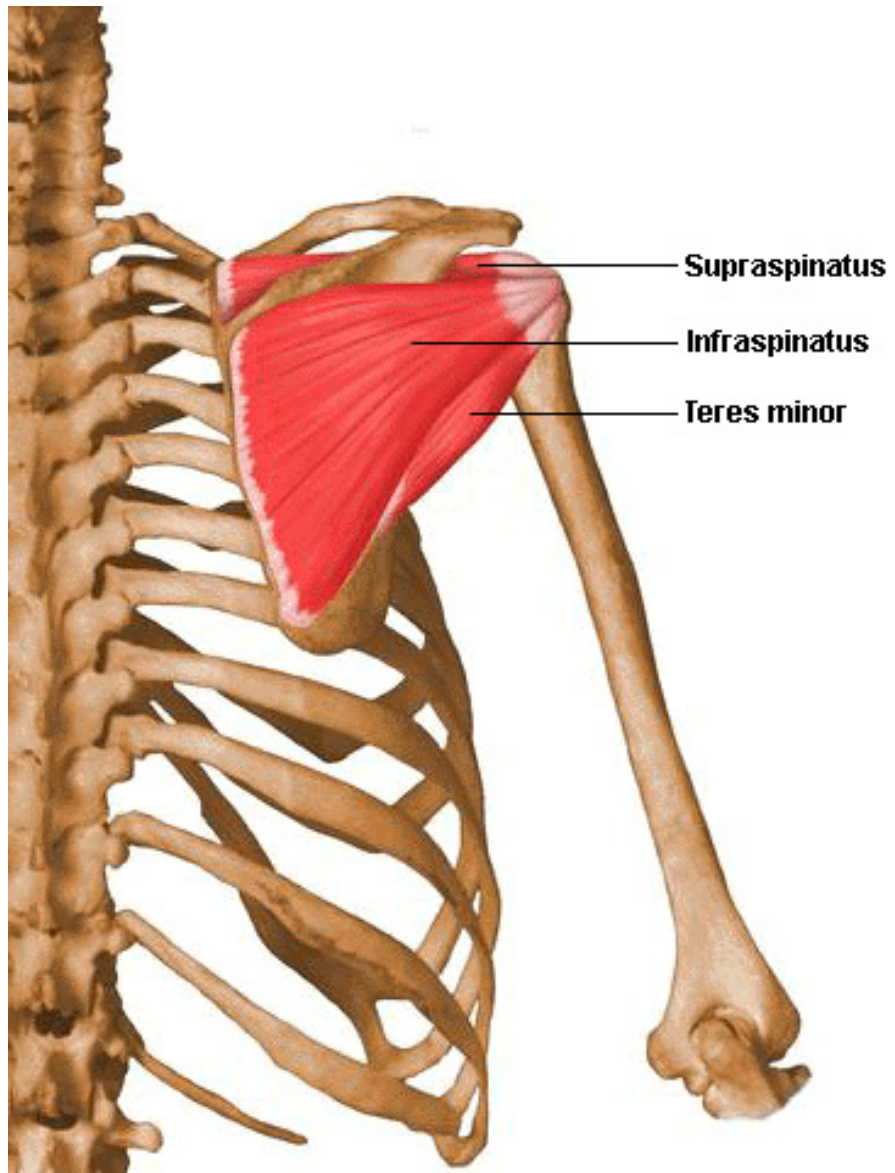
Movers and dynamic
stabilizers



Rotator Cuff

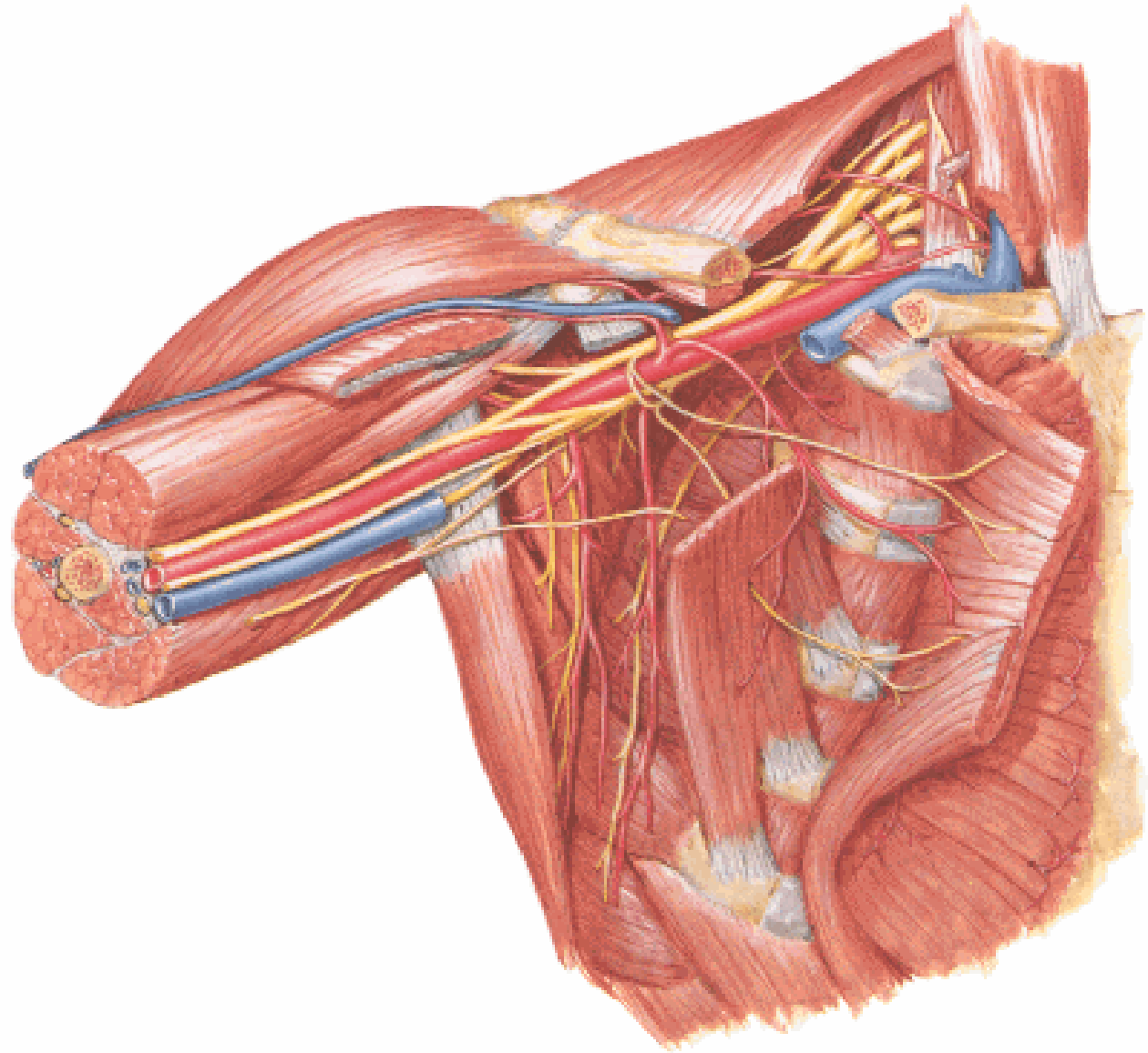


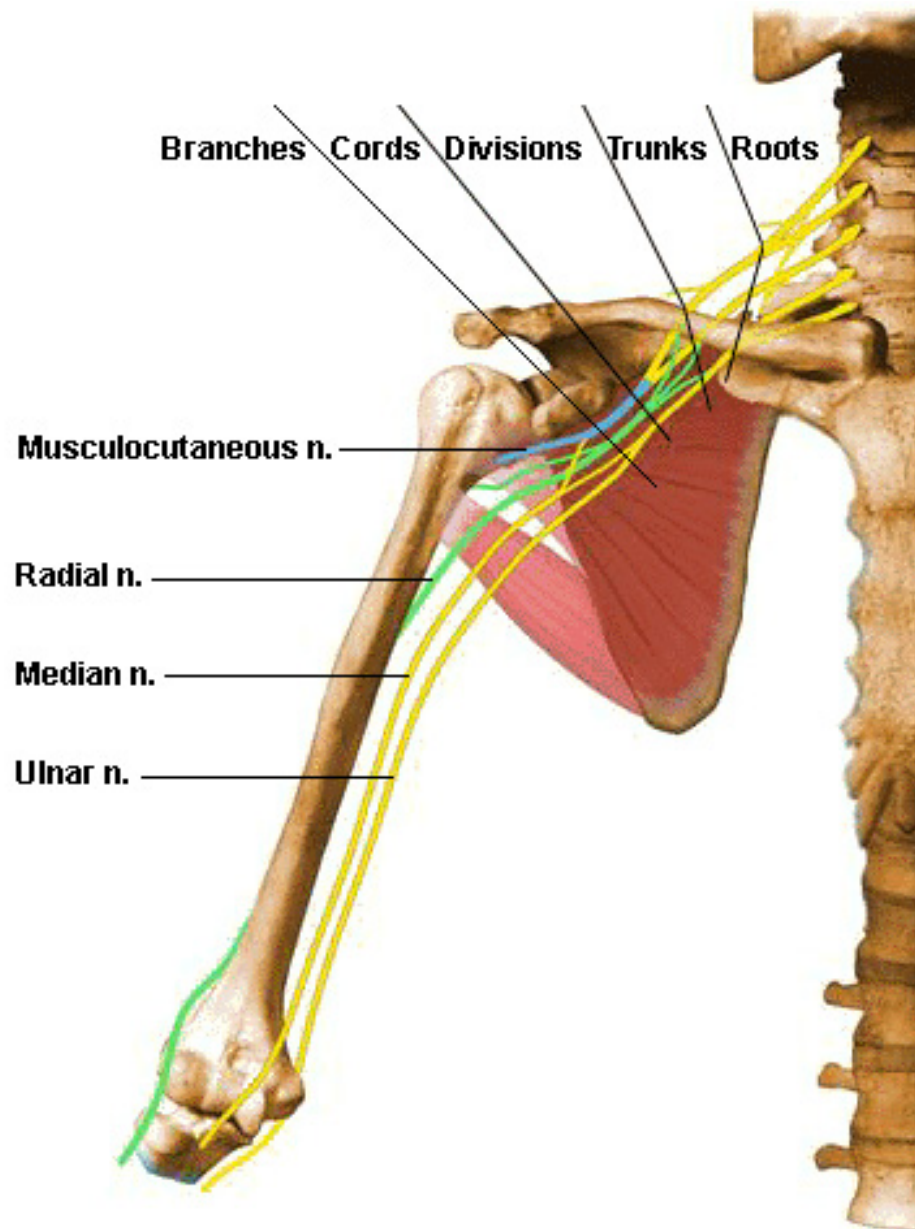
Rotator Cuff



Nerves

Brachial plexus





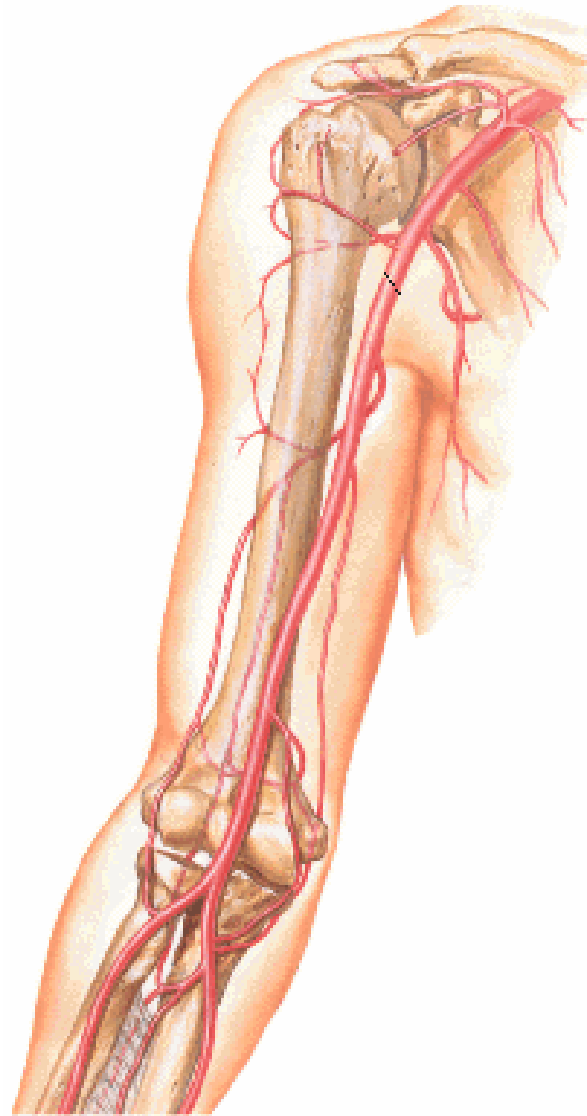
Brachial Plexus

Vessels

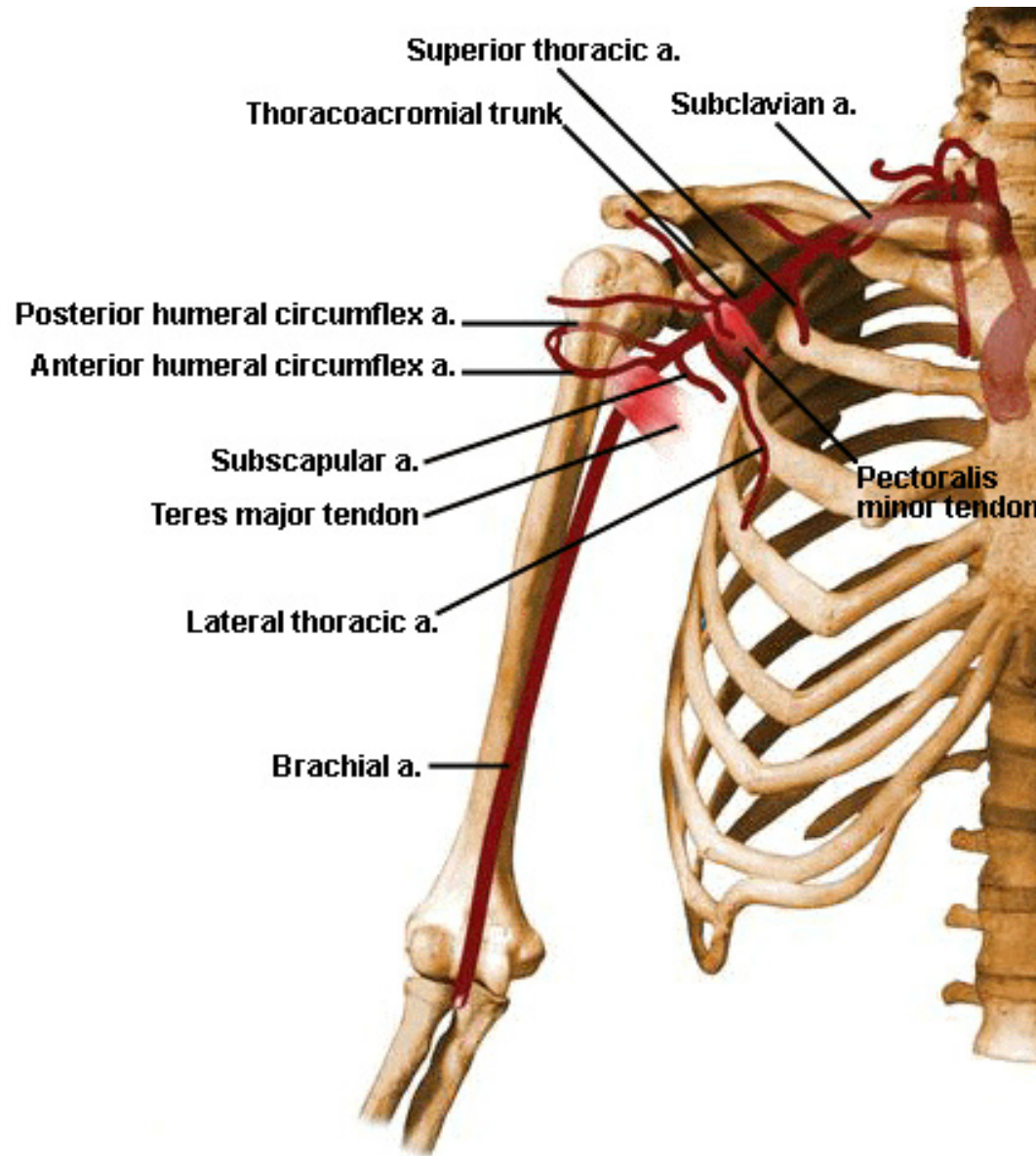
Subclavian artery

**Axillary artery
(divided in thirds
by the pectoralis
minor)**

**Anterior Humeral
circumflex artery:
primary blood supply
to the humeral head**



Vessels



Range-of-motion

Abduction	170 to 180
Flexion and Elevation	160 to 180
Scapular Elevation	170 to 180
Lateral (External) Rotation	80 to 90
Medial (Internal) Rotation	60 to 100

Range-of-motion

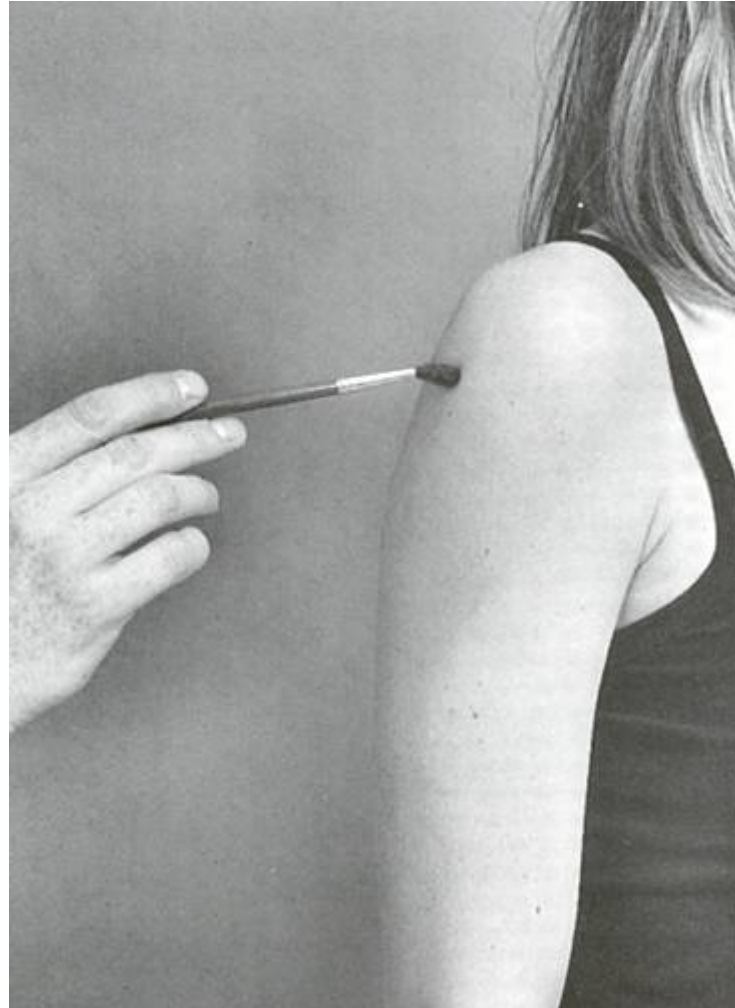
...Cont'

Extension	50 to 60
Adduction	50 to 75
Horizontal AB/ADduction	130
Circumduction	200

Neurovascular Examination

Sensation

**Axillary nerve
(C5) lateral
arm**



Reflexes

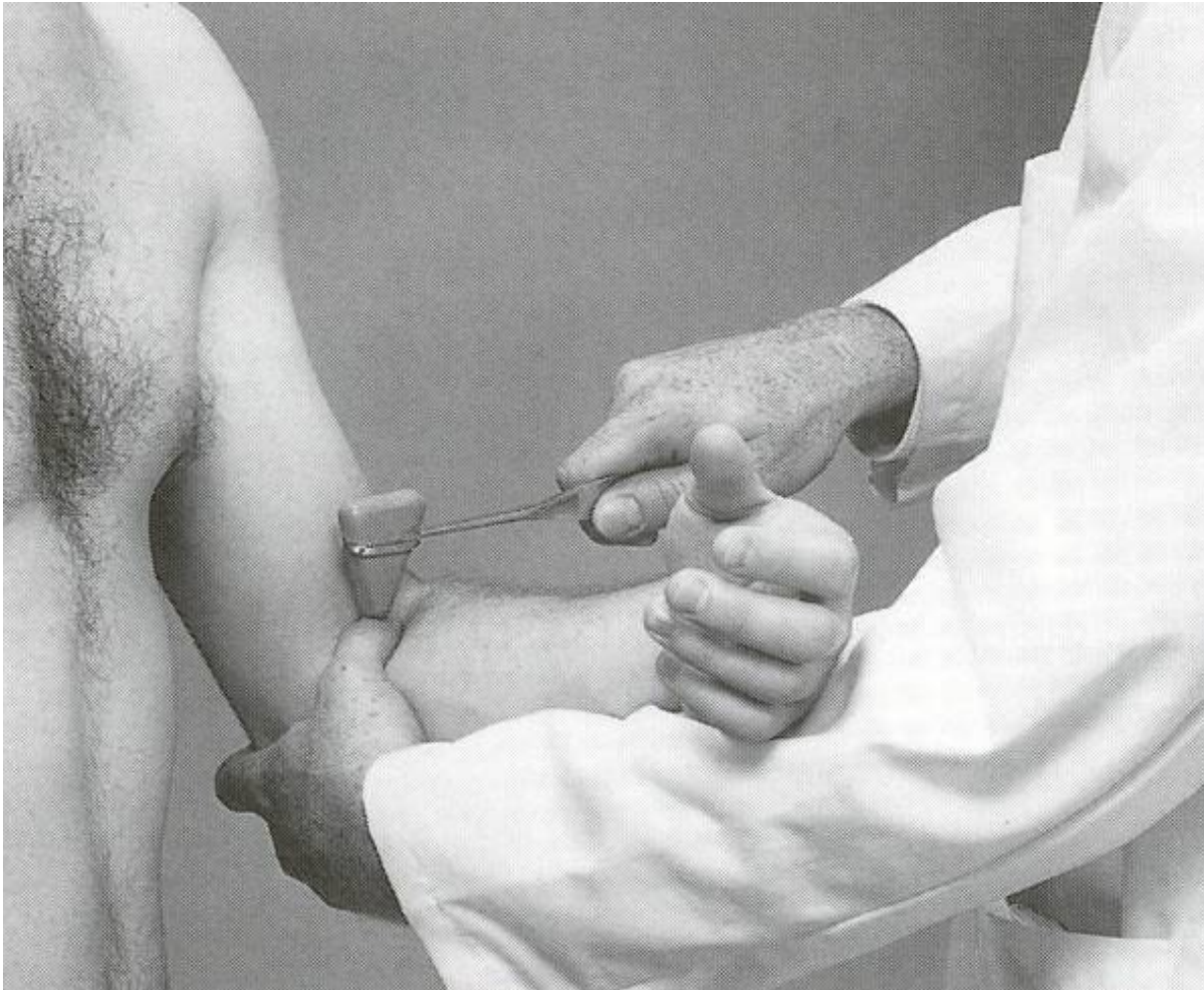
Reflexes

Biceps (C5)

Brachioradialis (C6)

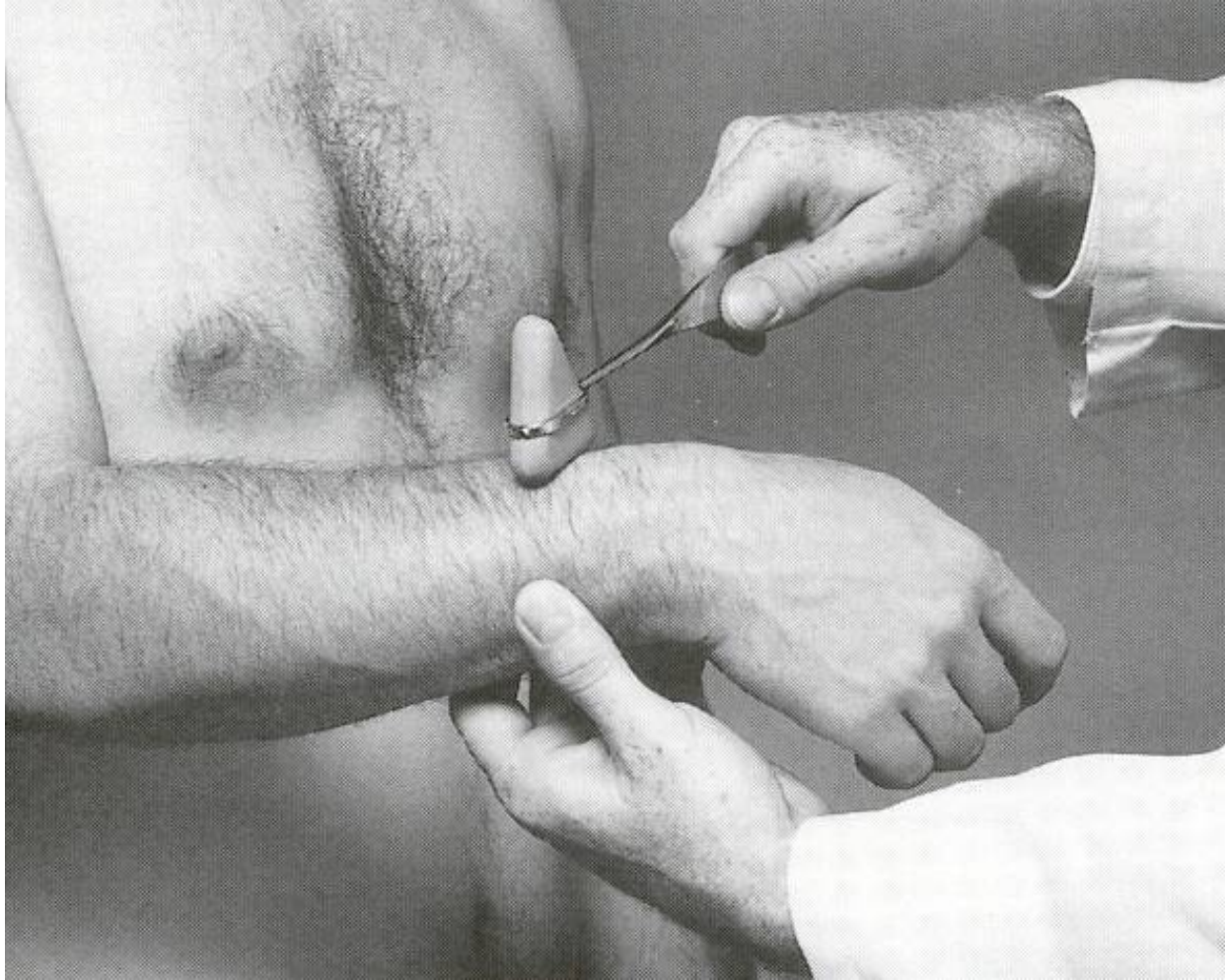
Triceps (C7)

Reflexes

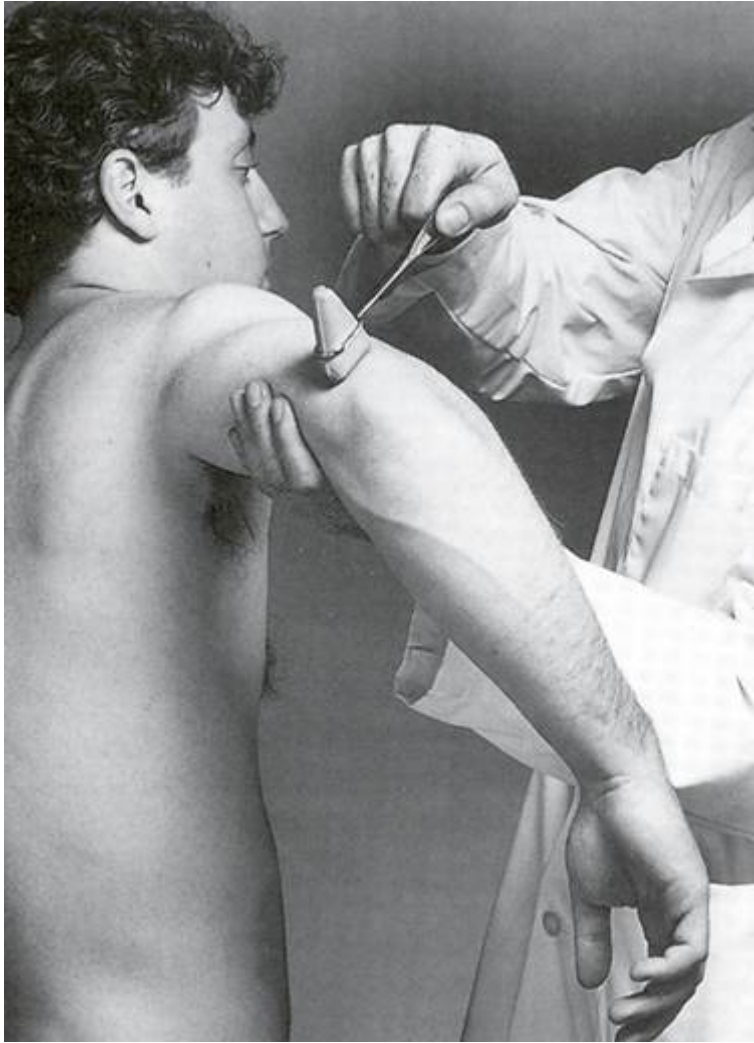


**Biceps
(C5)**

Reflexes



**Brachio-
Radialis
(C6)**



Reflexes

**Triceps
(C7)**

Dislocations/Separations

Definition: Complete or incomplete loss of congruity of a joint

Synonyms

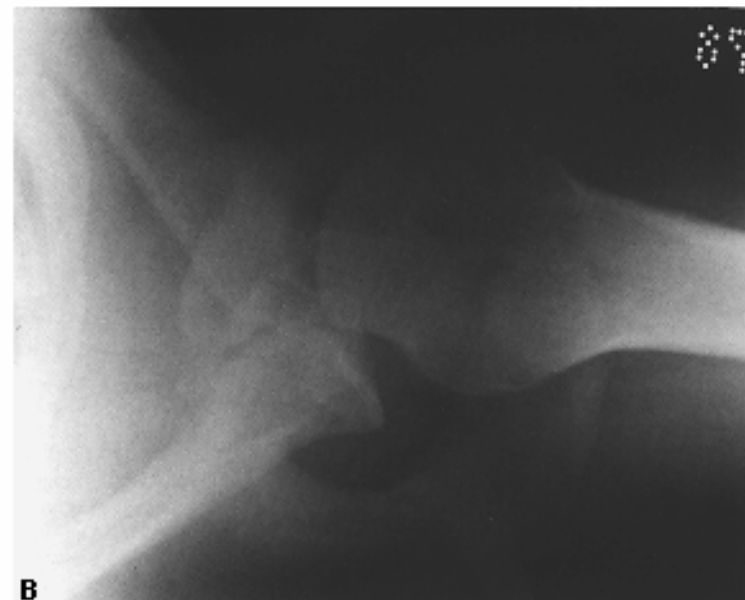
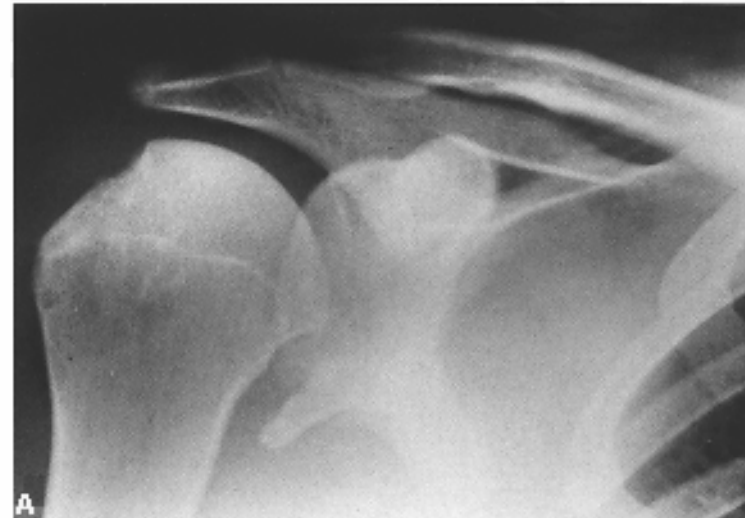
Subluxation

Multi-directional

Instability

Discussion

Shoulder



Dislocations/Separations

Classification

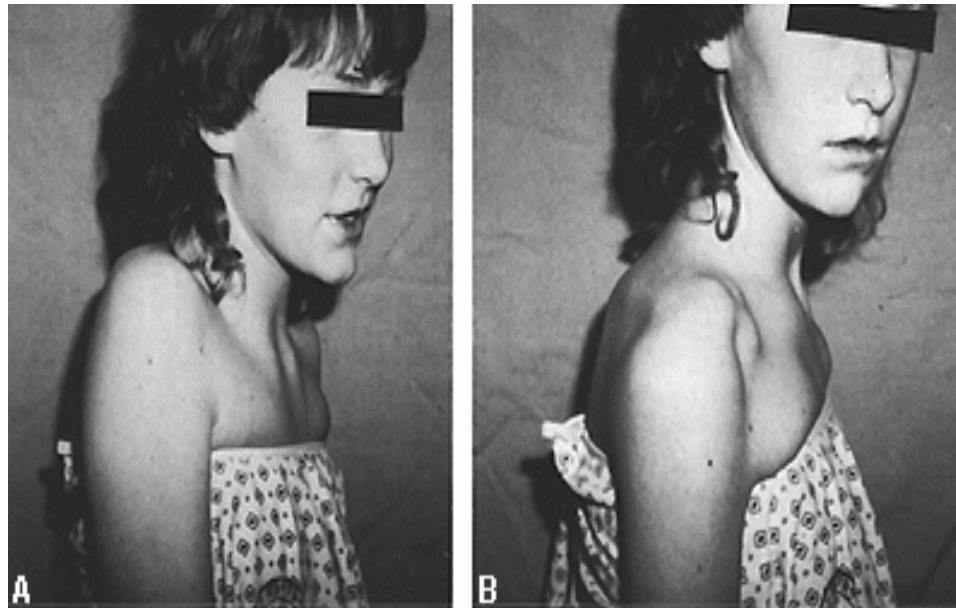
**TUBS -- Traumatic, Unidirectional,
Bankhart lesion, Surgery**



Dislocations/Separations

Classification

**AMBRI -- Atraumatic, Multi-directional,
Bilateral, Rehabilitation, Inferior
Capsular Shift**



Dislocations/Separations

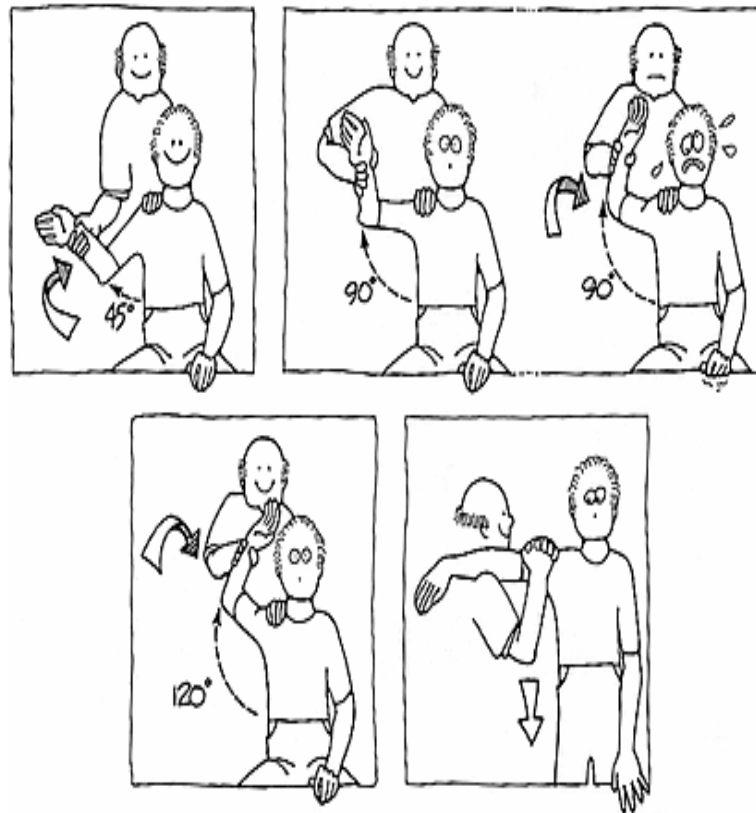
Physical Exam

- + Apprehension Test**
- + Reduction/Release Test**
- + Sulcus Sign**
- + Anterior/Posterior
Translation/Drawer Test**
- + Jerk Test**

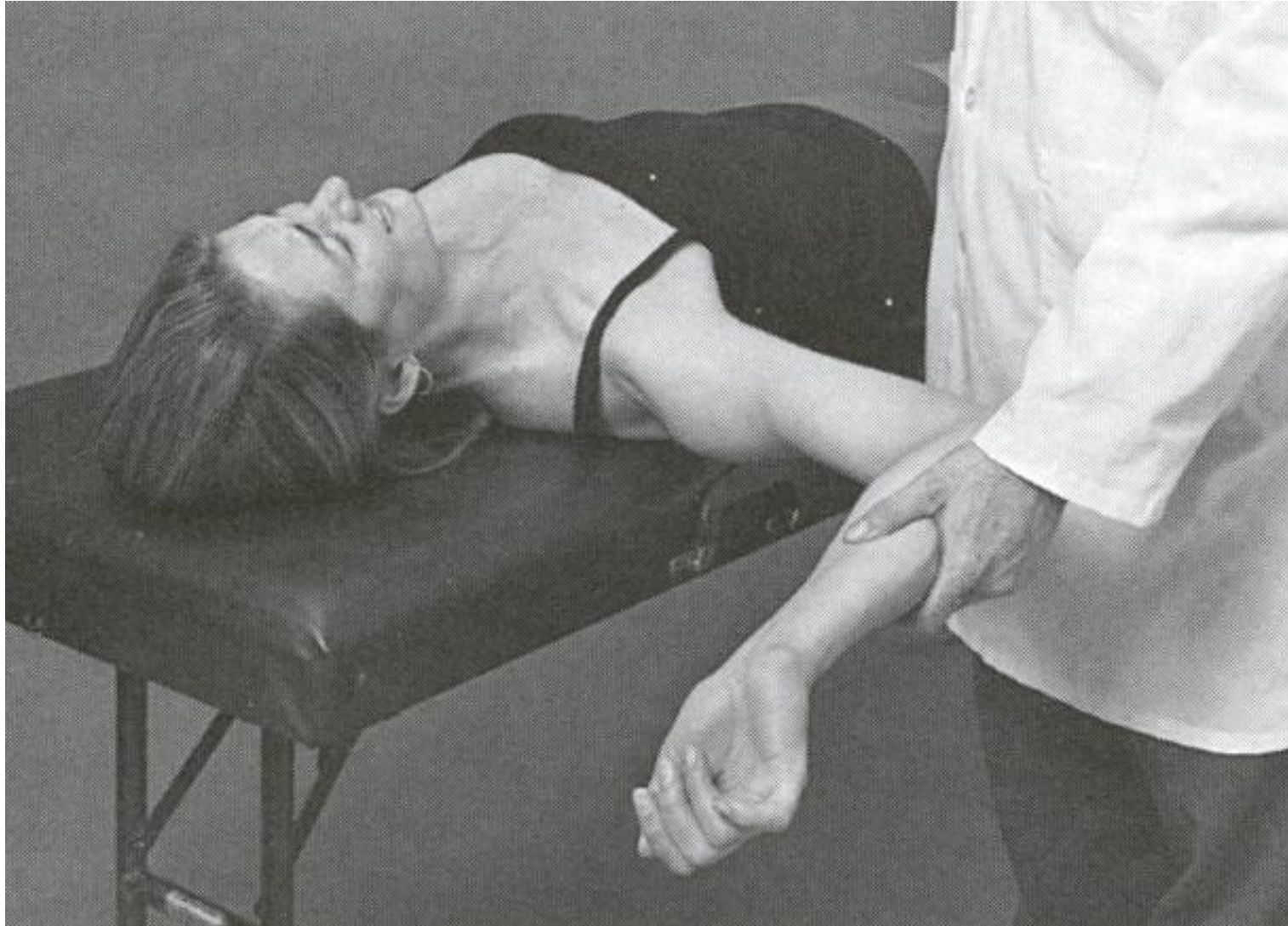
Dislocations/Separations

Physical Exam

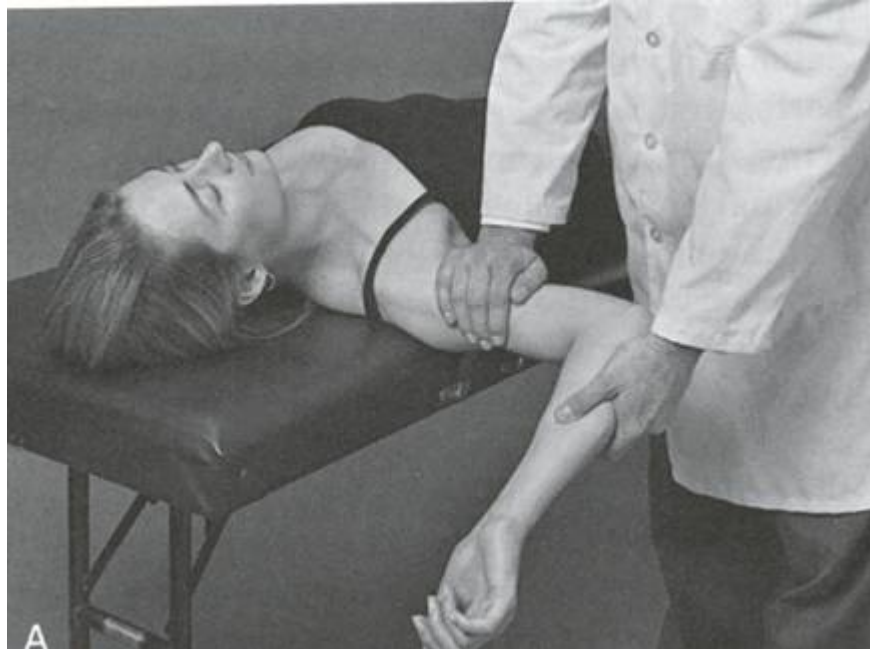
Apprehension Test



Apprehension Test



Relocation/Release

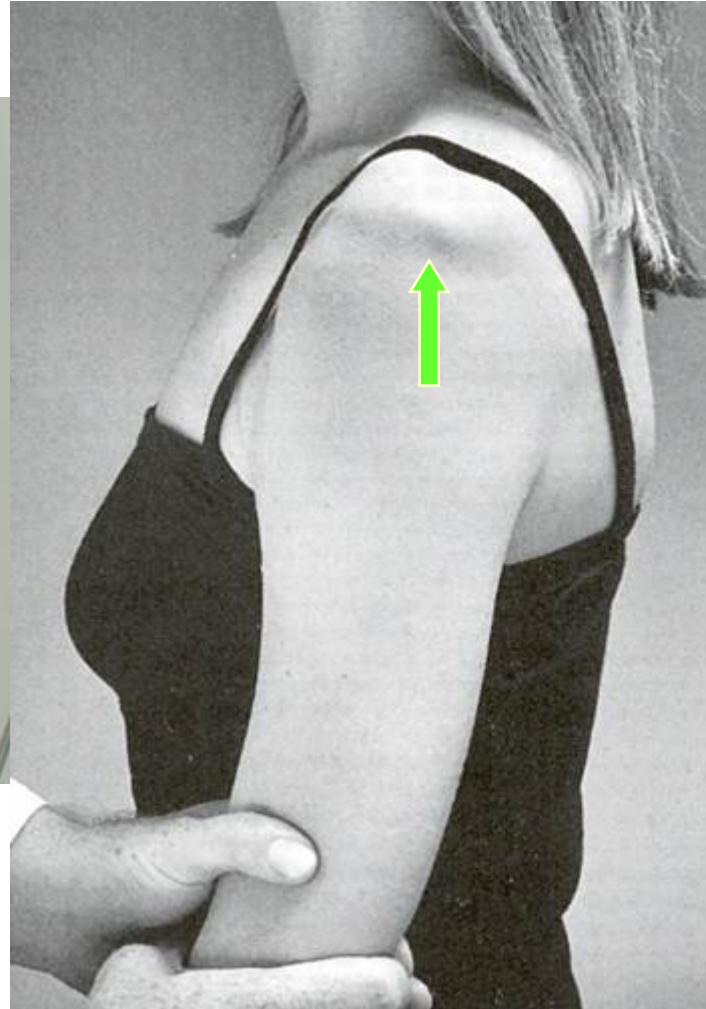


Relocation



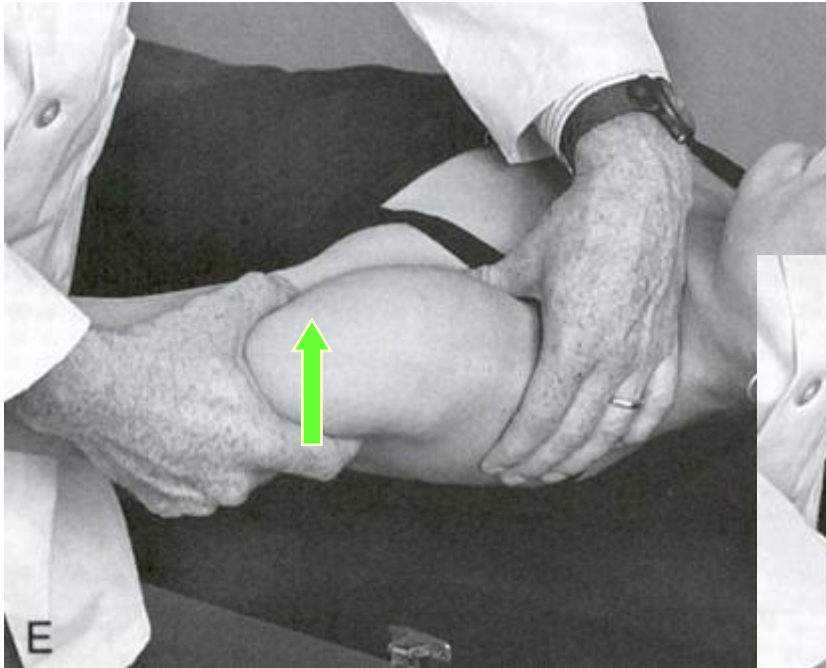
**Release
(Apprehension Test)**

Dislocations/Separations



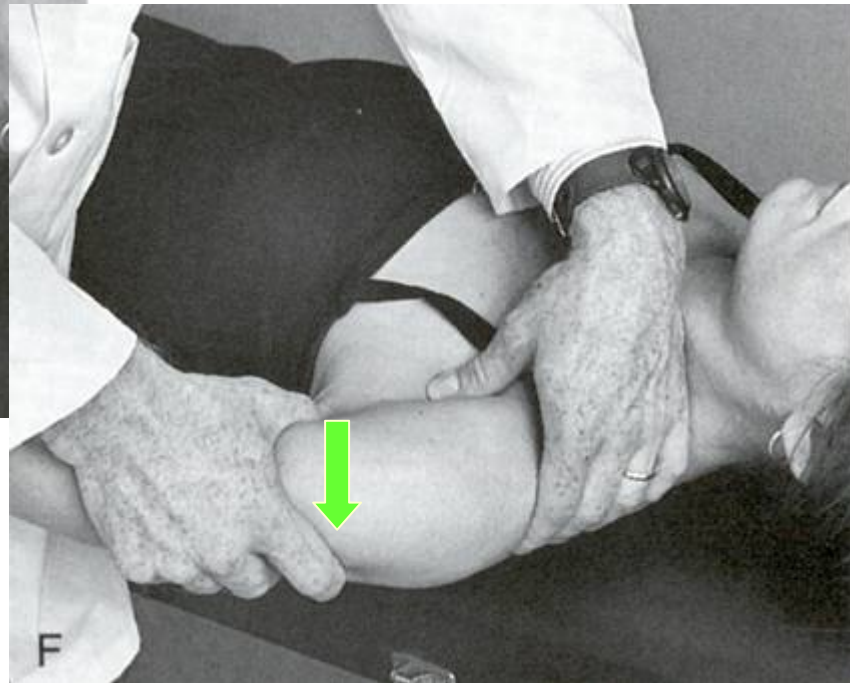
Sulcus Sign

Dislocations/Separations



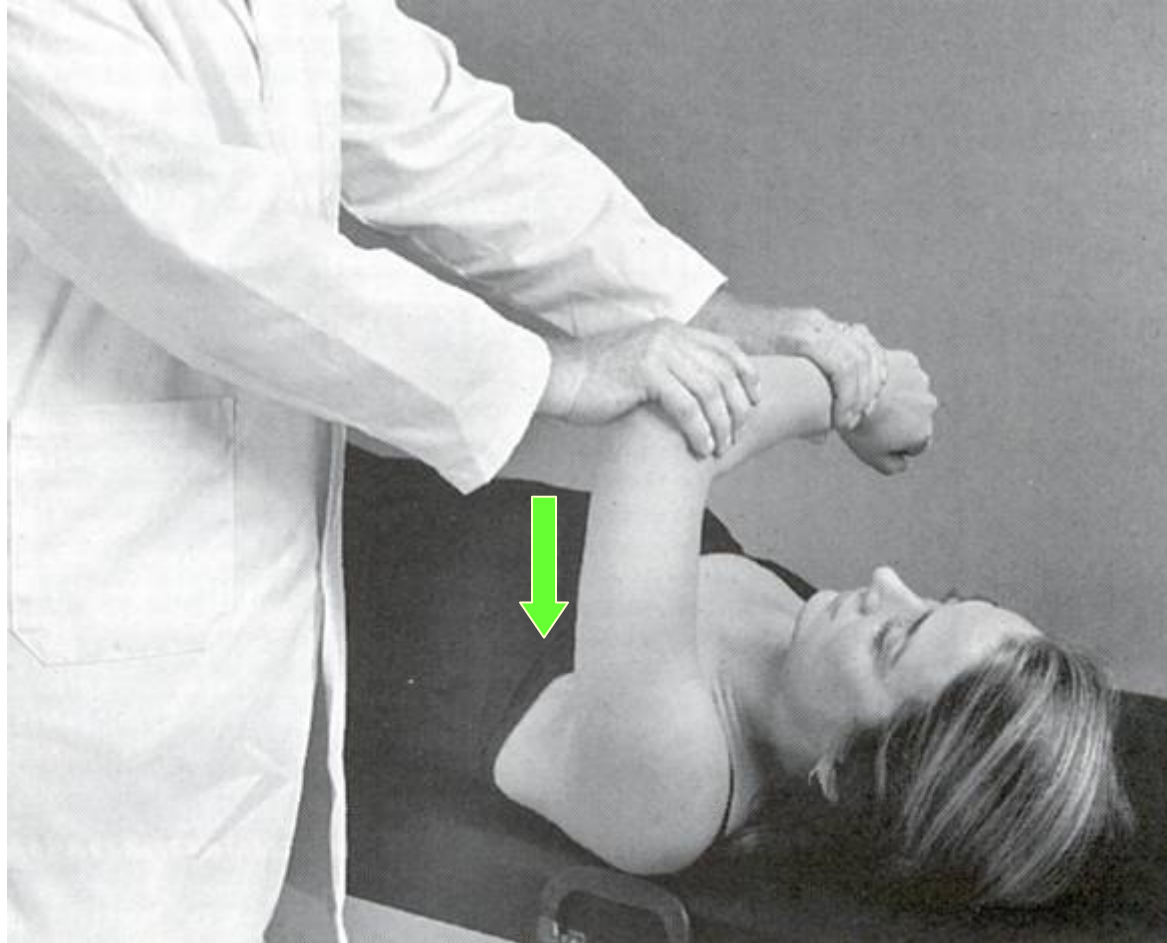
**Anterior
Translation**

**Posterior
Translation**



Dislocations/Separations

Jerk Test

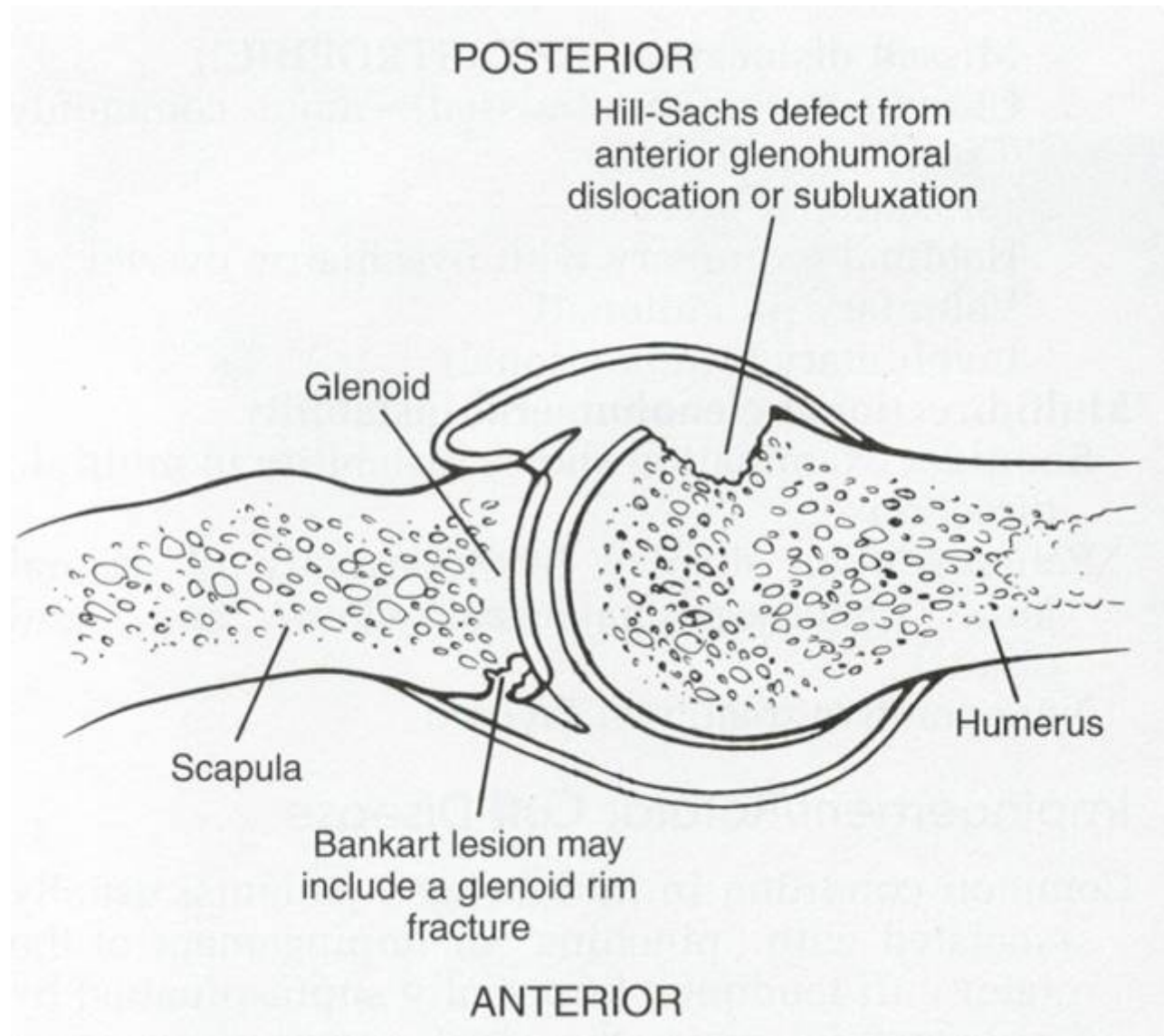


Associated Injuries

Hill- Sachs defect - impression fracture in the posterolateral humeral head

Bony Bankhart lesion - anterior inferior glenoid rim injury

Greater tuberosity fracture - especially in older patients



Hill – Sachs Lesion



Bony Bankhart Lesion



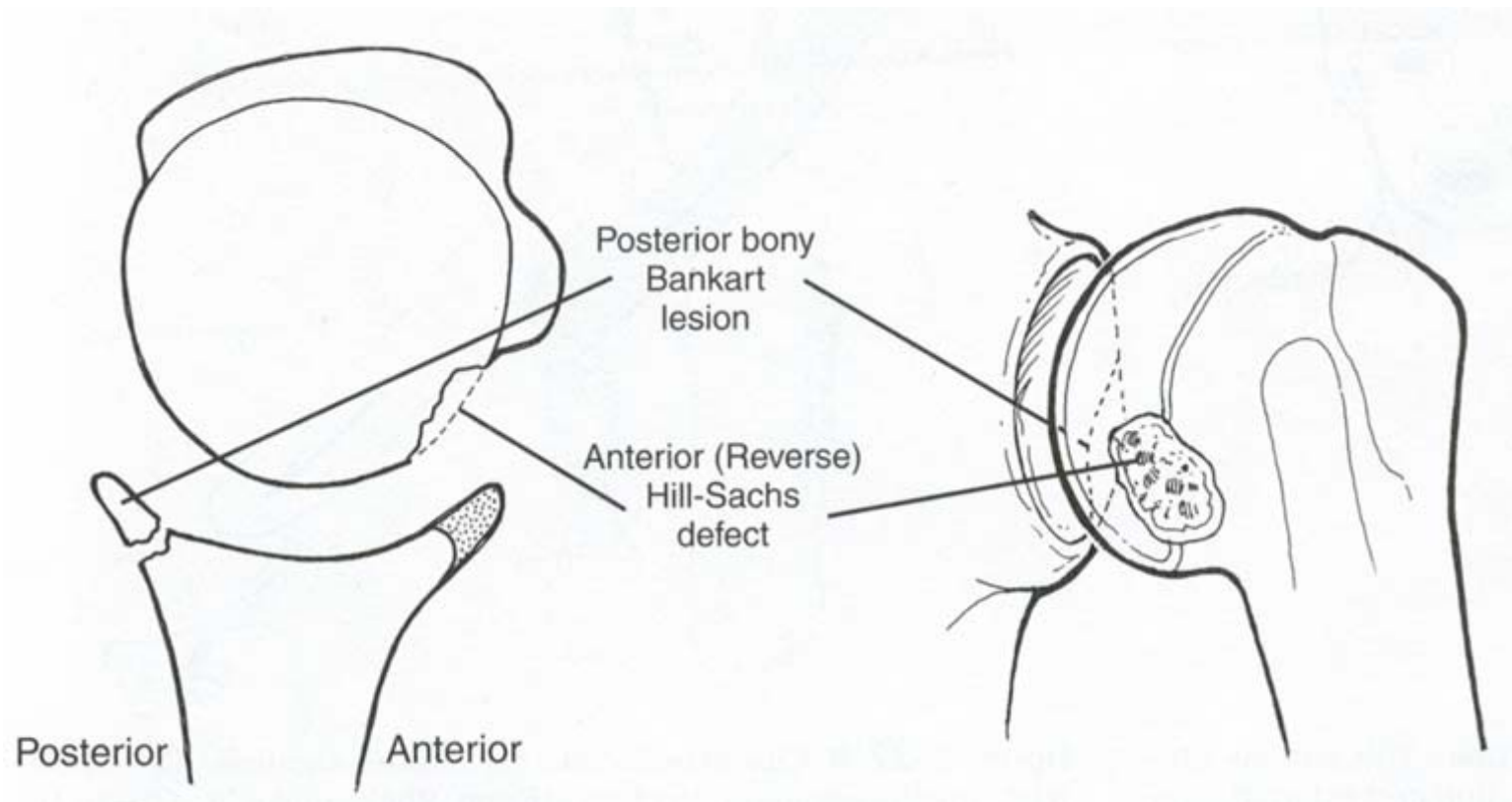
Associated Injuries

Associated fractures:

Reverse Hill - Sachs defect (hatchet - shaped anterior humeral head impression fracture)

Reverse Bankart lesion (posterior glenoid rim)

Lesser tuberosity fracture



Dislocations/Separations

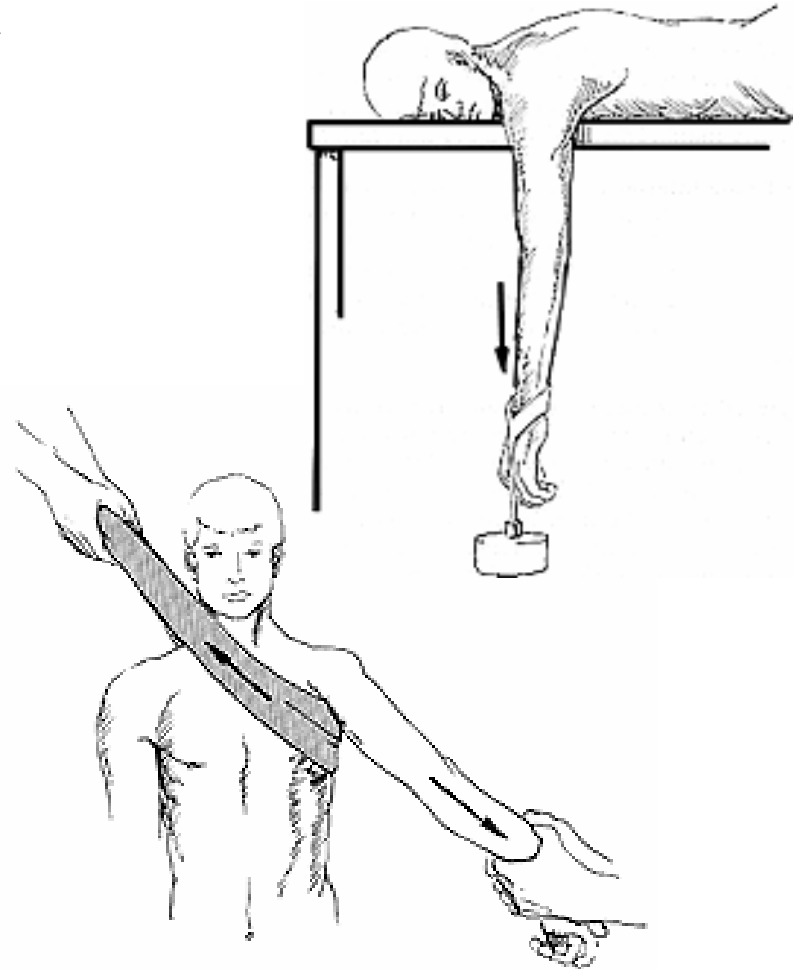
Treatment for Acutely

Reduction

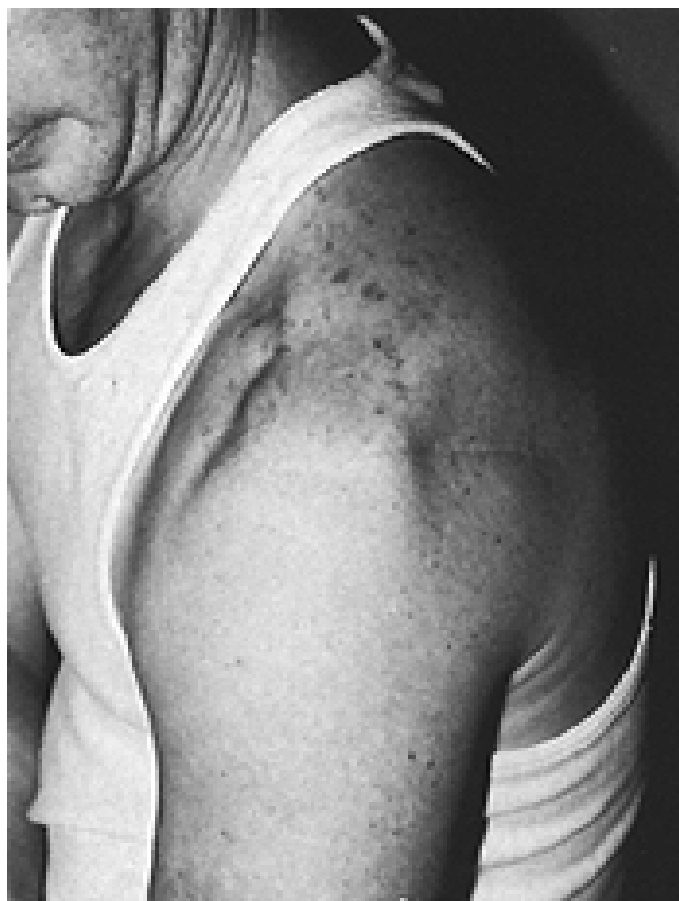
Sling/Immobilizer

x 4-6 wks

Physical Therapy



Dislocations/Separations



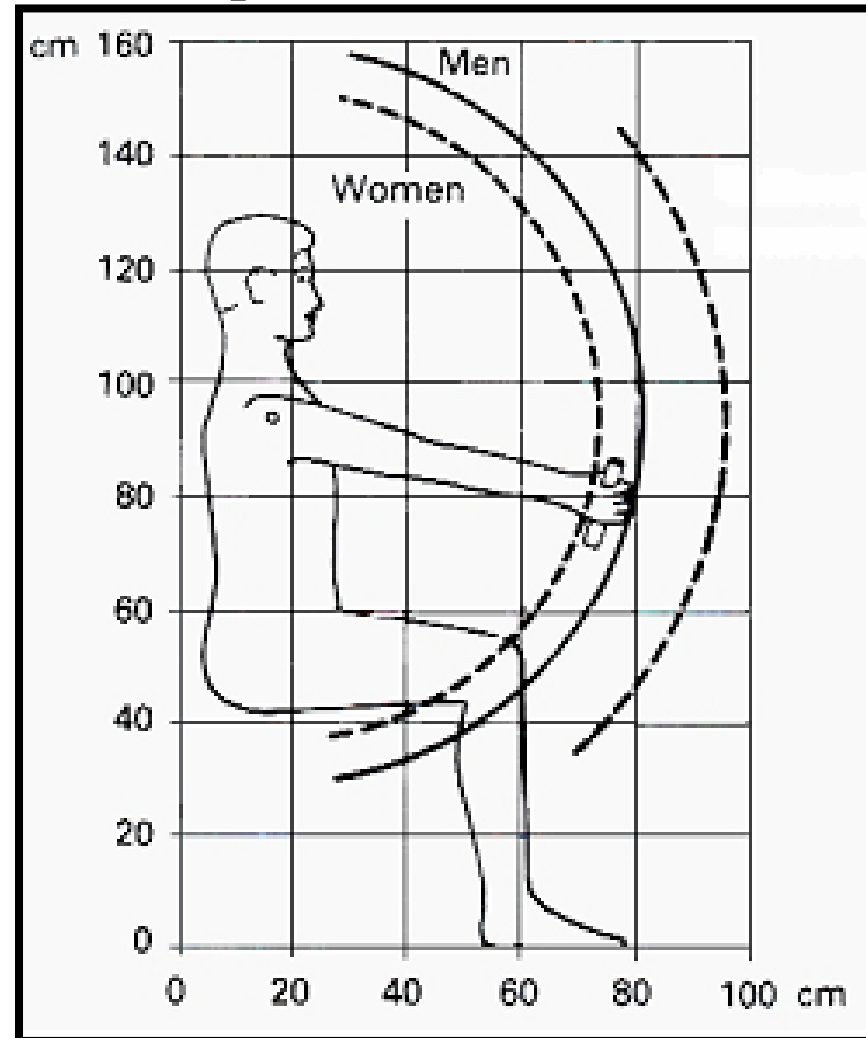
Dislocations/Separations

Physical Therapy

Acutely

**Codman's
Exercises**

**Wand
Exercises**



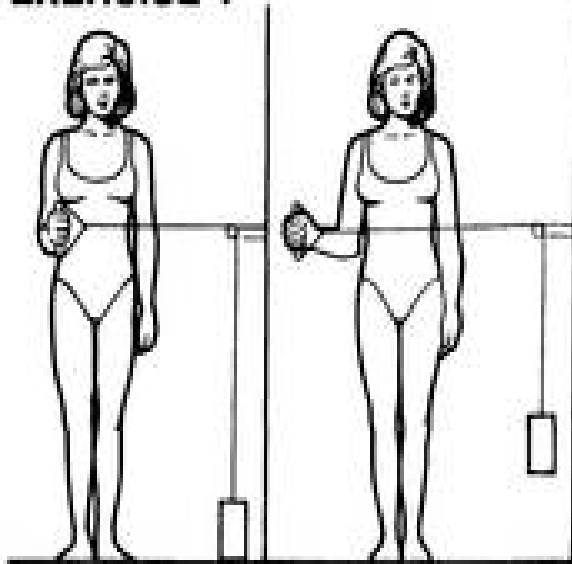
Dislocations/Separations

Physical Therapy

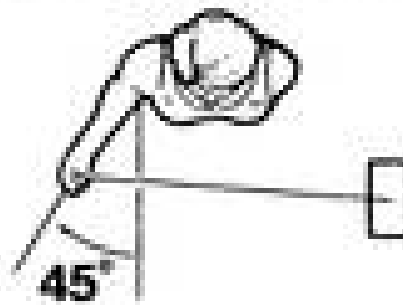
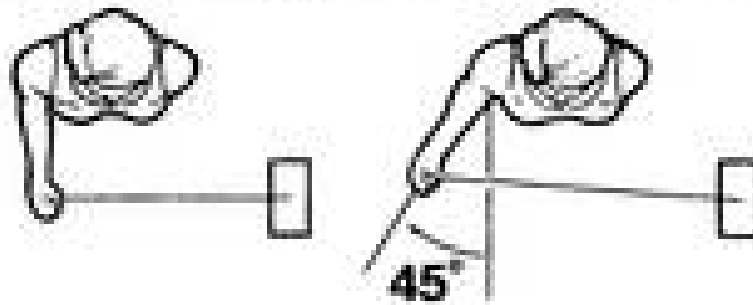
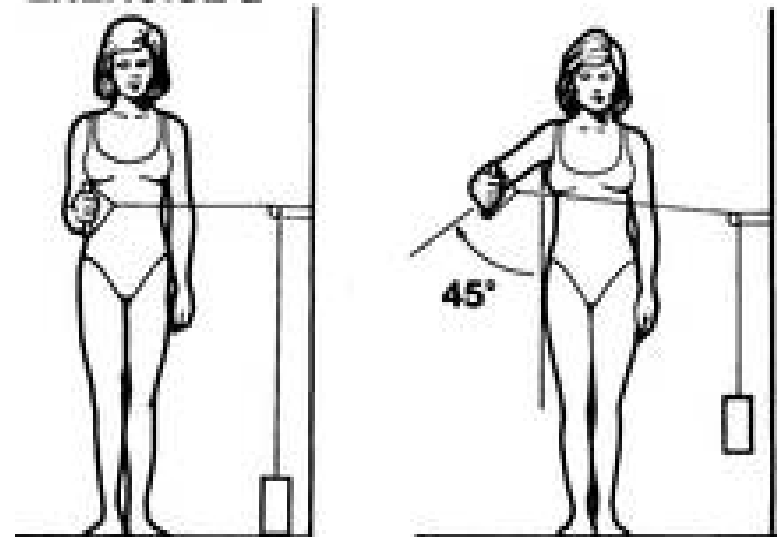
Rotator Cuff Strengthening Exercises

Physical Therapy Exercises

EXERCISE 1

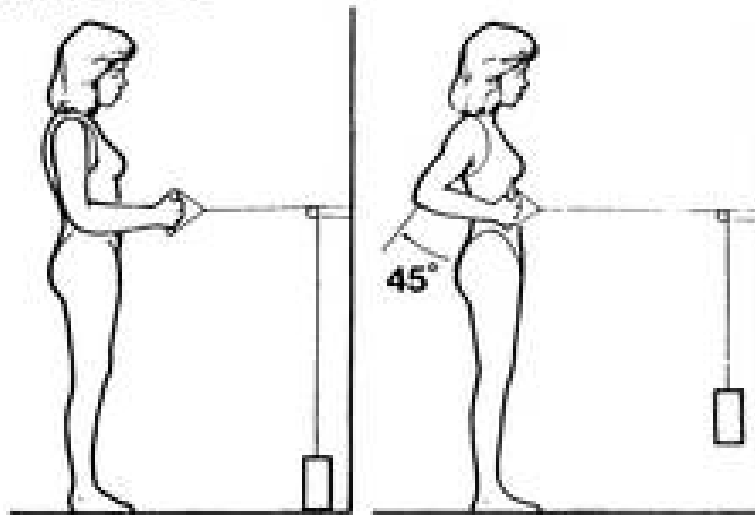


EXERCISE 2

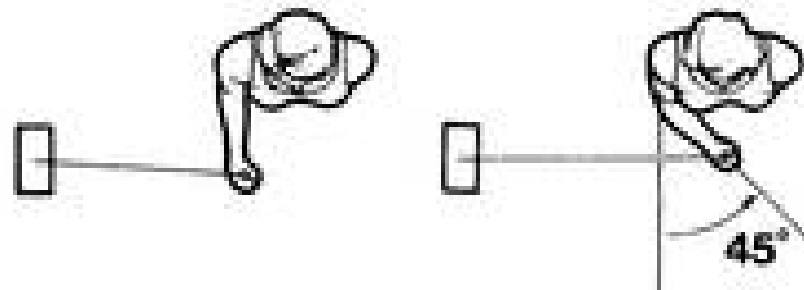
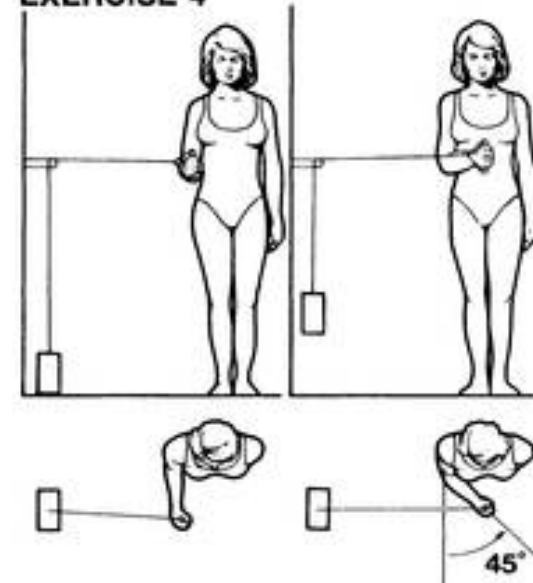


Physical Therapy Exercises

EXERCISE 3

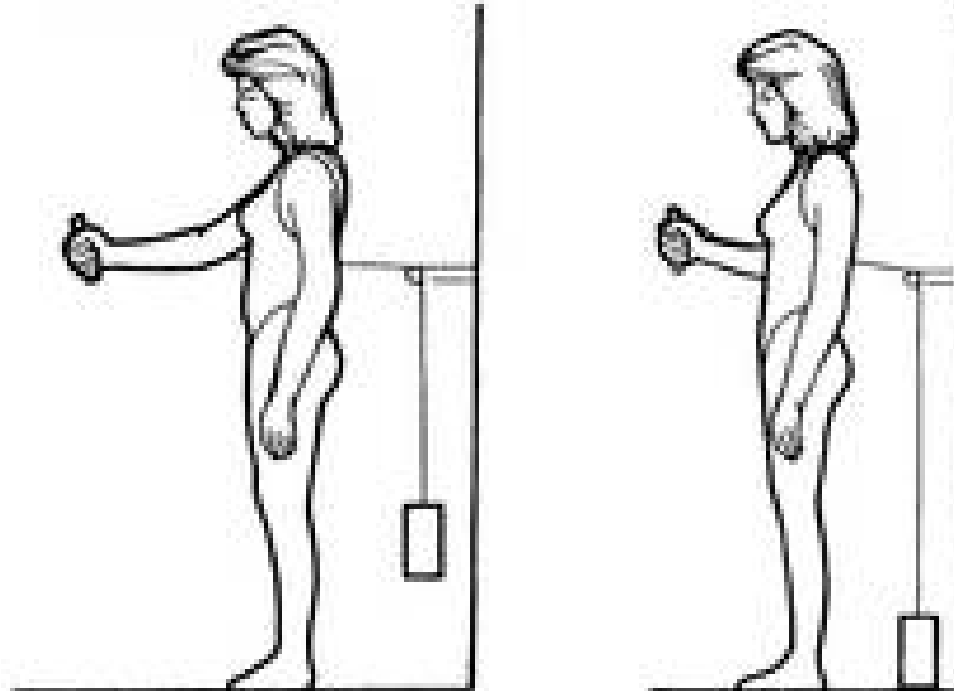


EXERCISE 4



Physical Therapy Exercises

EXERCISE 5



Dislocations/Separations

Prognosis

If pt's age is < 30 , redislocation rate is higher.....Surgery

If pt's age is > 30 , redislocation rate is lower.....Rehabilitation

Dislocations/Separations

Following acute injury -- Treatment based on many factors that relate to surgery

Atraumatic

Age (>35, 1st time dislocator generally does well with strengthening exercises)

Dislocations/Separations

Additional factors include:

Multidirectional vs Unidirectional

Activity level

Symptoms

Dislocations/Separations

TX -- Surgical

Arthroscopic

Bankhart repair

Capsular shift

Open

Bankhart repair

Capsular shift

**Usually a
combination**

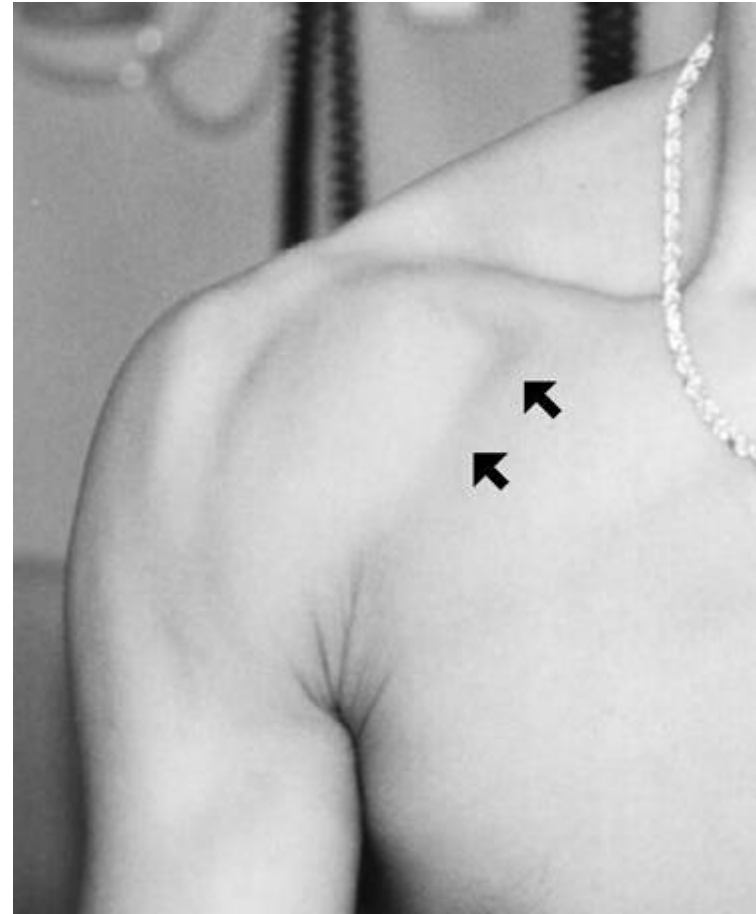


Anterior Dislocation

Mechanism of Injury

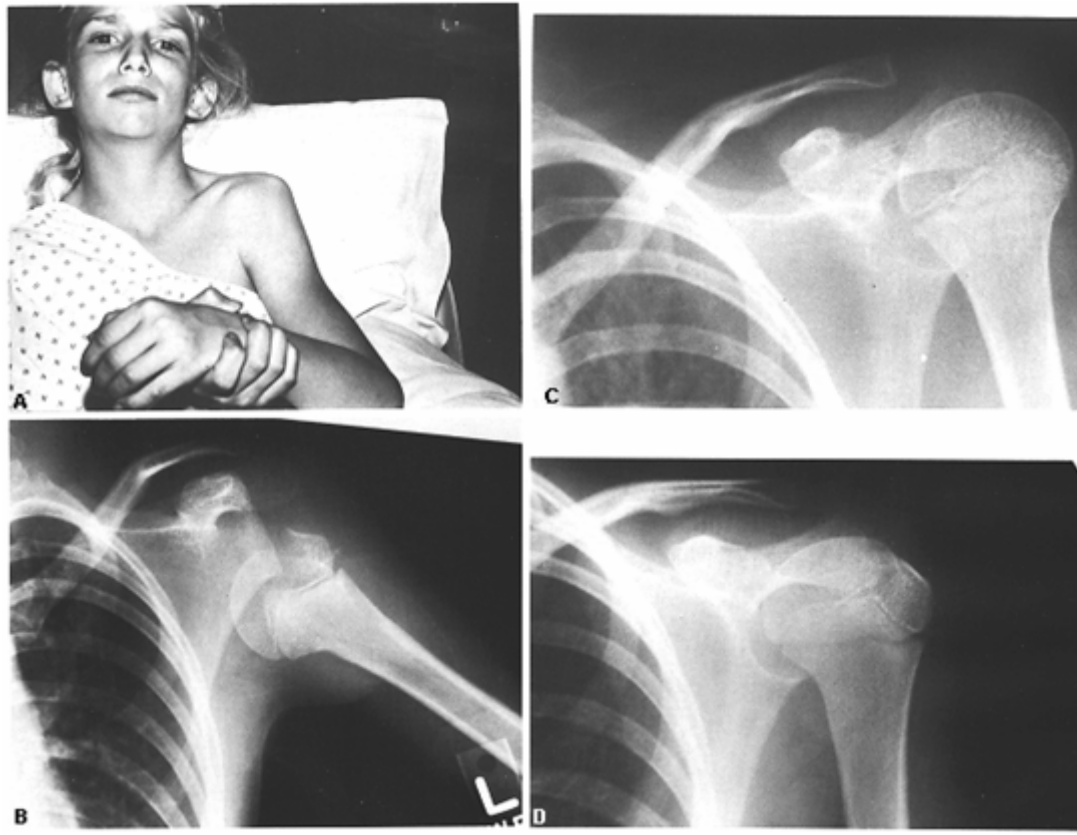
**Forced abduction
and rotation**

**Signs/Symptoms –
Acute Pain, flattened
Deltoid, anterior
fullness, natural
splinting, short
squared
shoulder**



Anterior Dislocation

Radiology- True AP, Axillary lateral or West Point and Scapular Y views



Anterior Dislocation

Special tests

- + Anterior drawer/translation
- + Apprehension test
- + Reduction/release test



Anterior Dislocation

Treatment

Immediate reduction

Ice, rest

**NSAIDs, ASA,
Tylenol®**

**Shoulder Immobilizer
or Sling & Swathe**

PT - early gentle ROM



Anterior Dislocation

Treatment -- Surgical

Arthroscopic

Bankhart repair

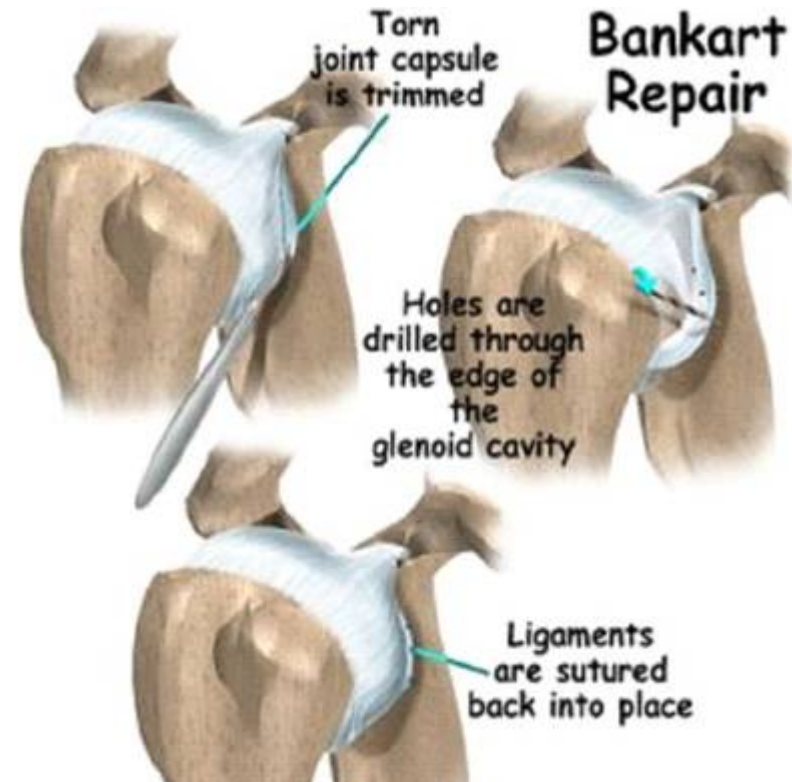
Capsular shift

Open

Bankhart repair

Capsular shift

Usually a combination



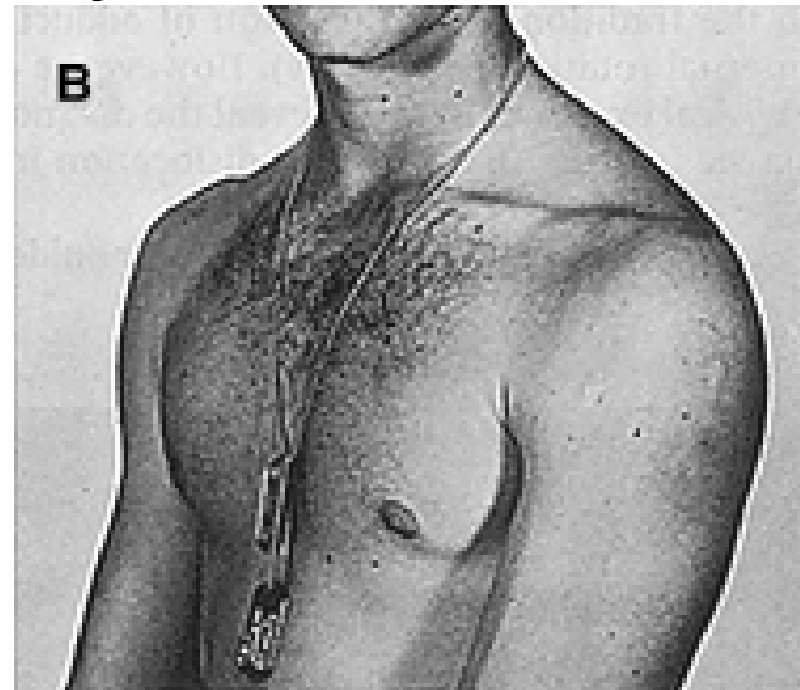
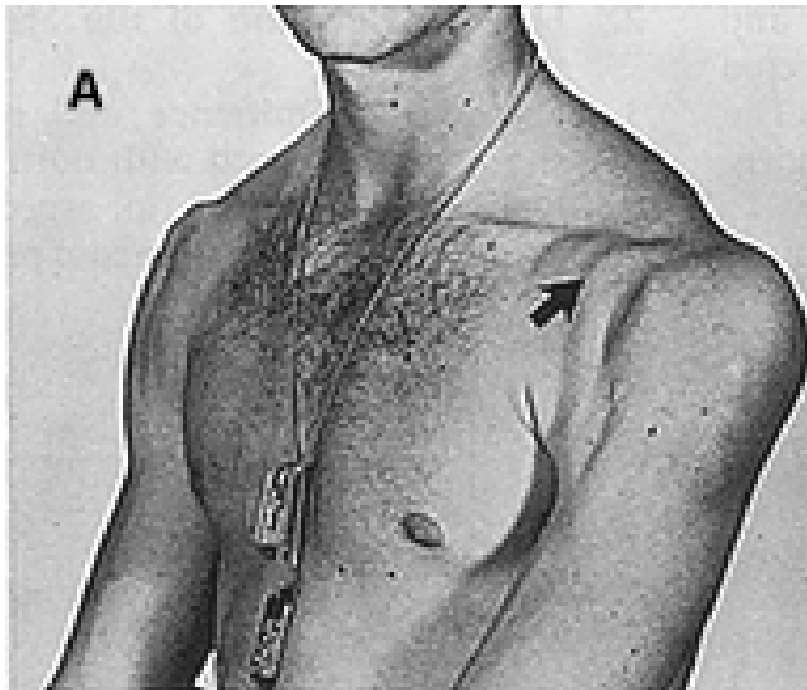
Posterior Dislocation

**Mechanism of
Injury - Fall on the
adducted and
internally rotated
arm**



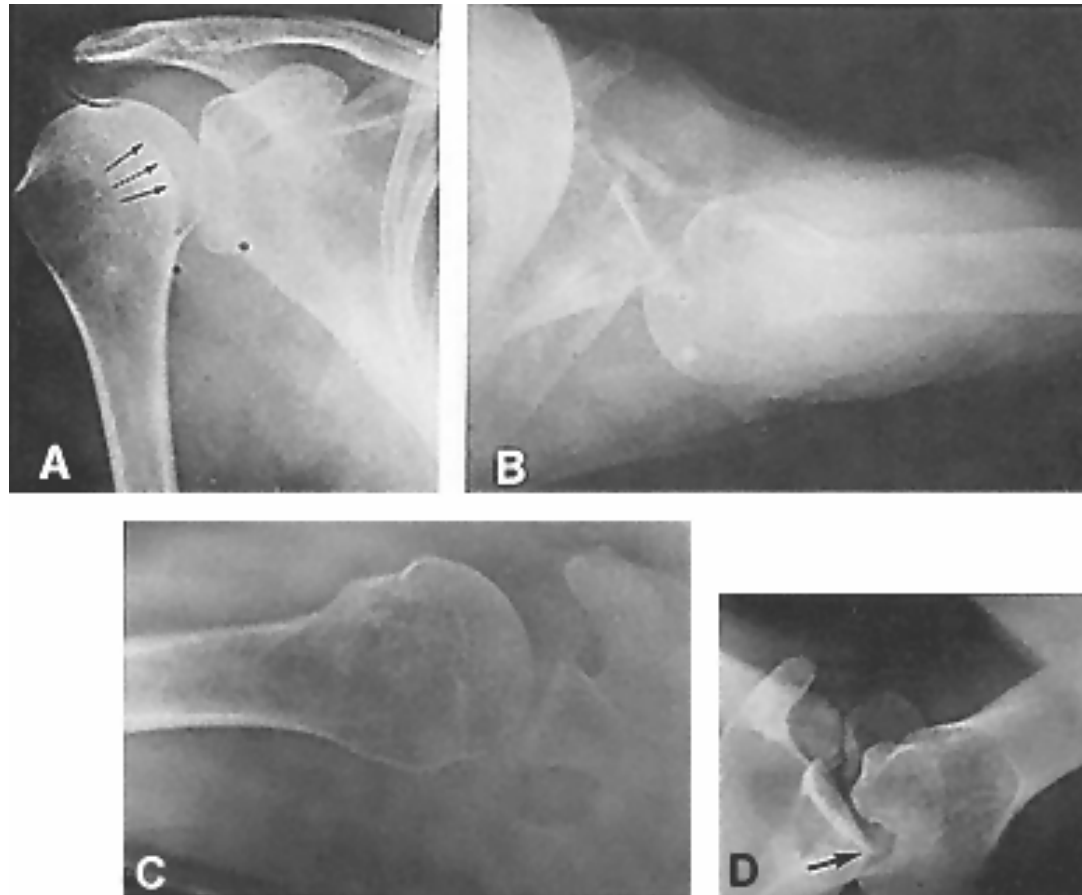
Posterior Dislocation

Signs/Symptoms - Severe Acute Pain, Prominent Coracoid Process, Arm will be adducted, internally rotated



Posterior Dislocation

Radiology- Shoulder series will indicate head of humerus posterior to the labrum

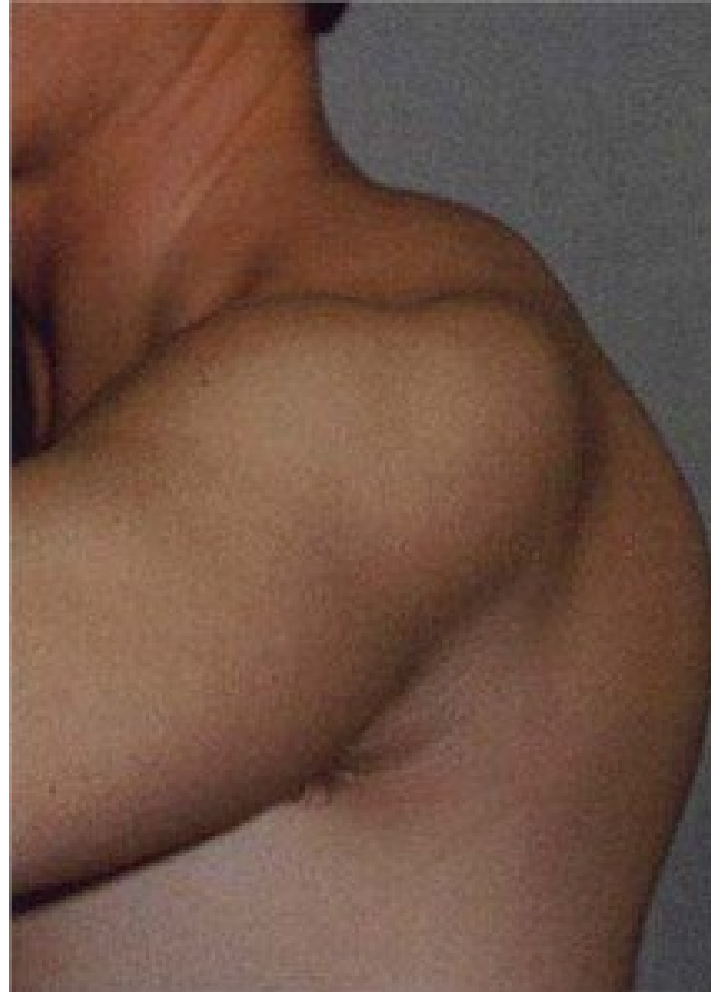


Posterior Dislocation

Special tests

+ Jerk Test

+ Reduction
test



Posterior Dislocation

Treatment

Immediate reduction

Ice, rest

NSAIDs, ASA, Tylenol®

**Shoulder Immobilizer
or Sling & Swathe**

PT - early gentle ROM



Posterior Dislocation

Treatment – Surgical

Arthroscopic

Reverse Bankhart repair

Capsular shift

Open

Reverse Bankhart repair

Capsular shift

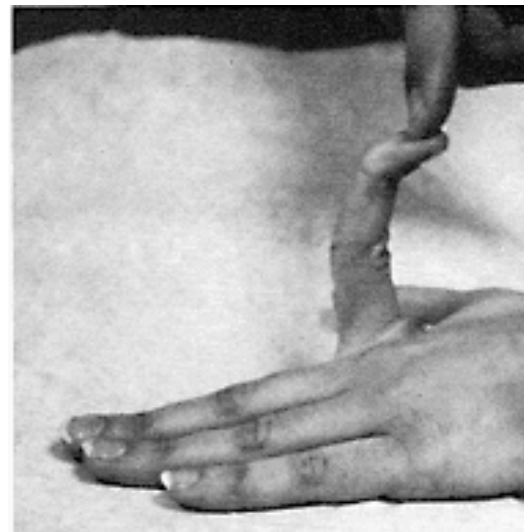
Usually a combination

Inferior & Multidirectional Dislocation

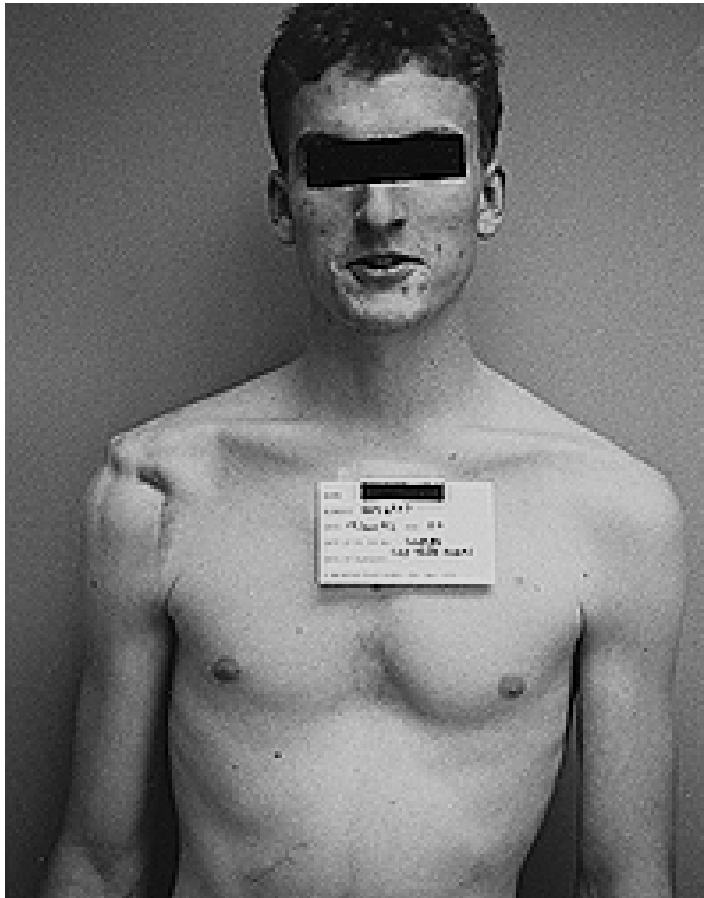
**Shoulder examination shows
instability in multiple directions**

**Patients often display
hyperelasticity (MP joints, elbow,
shoulder, etc.)**

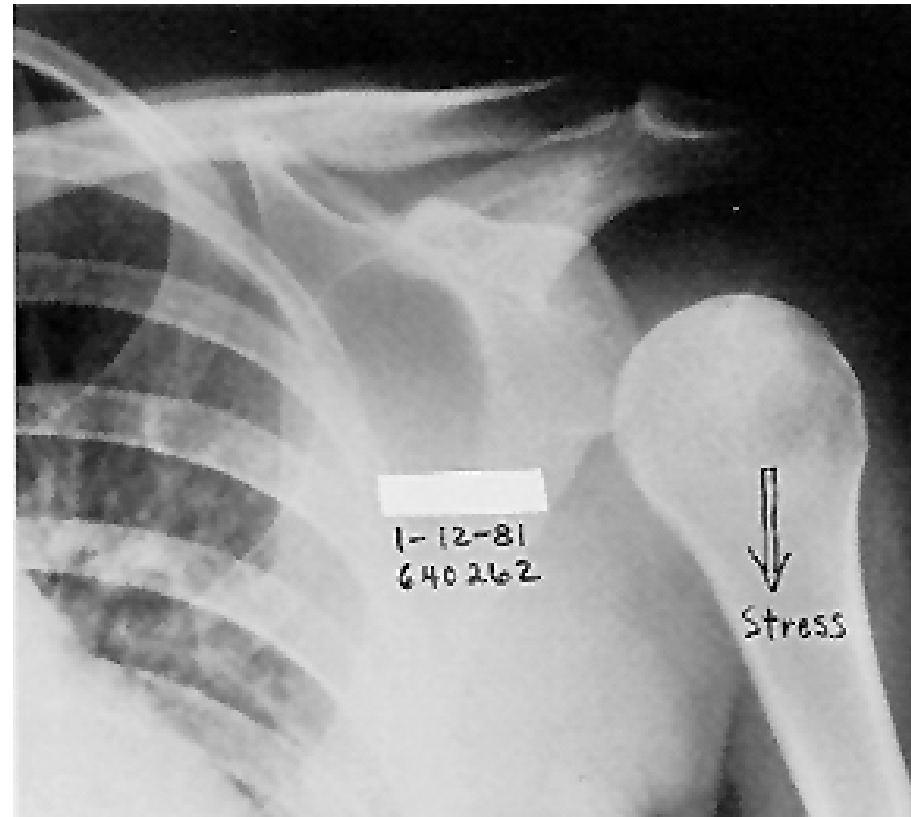
Inferior & Multidirectional Dislocation



Inferior & Multidirectional Dislocation



Inferior & Multidirectional Dislocation



Inferior & Multidirectional Dislocation

Treatment

Nonoperative
treatment
favored

If Surgery –
Capsular Shift

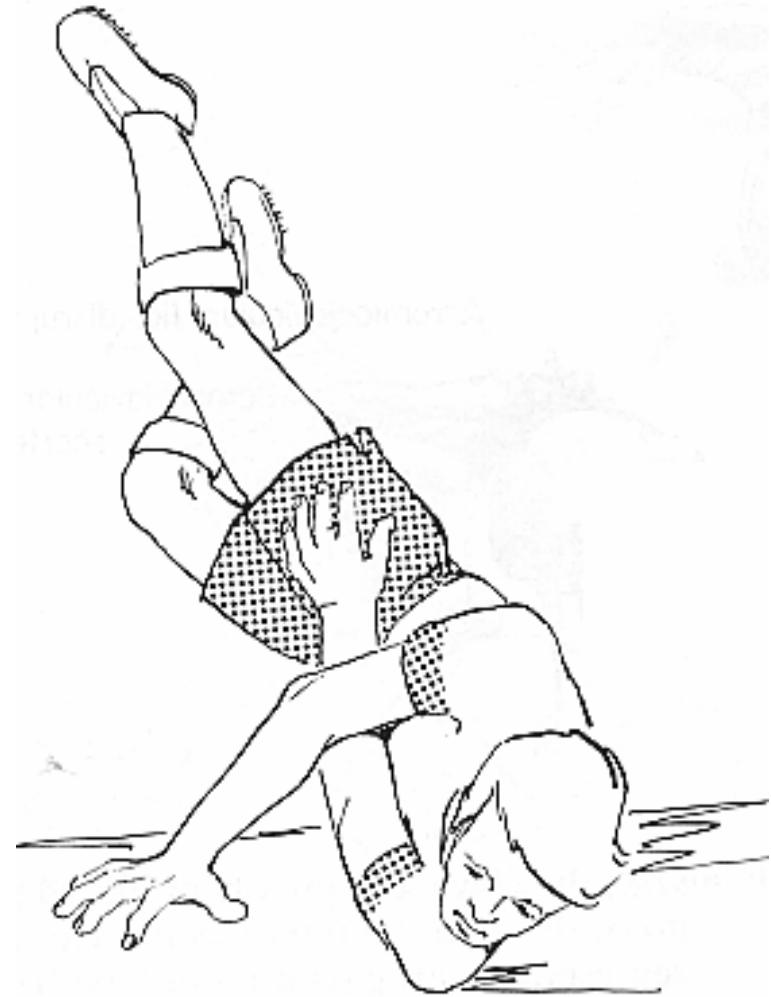


Acromioclavicular Separations

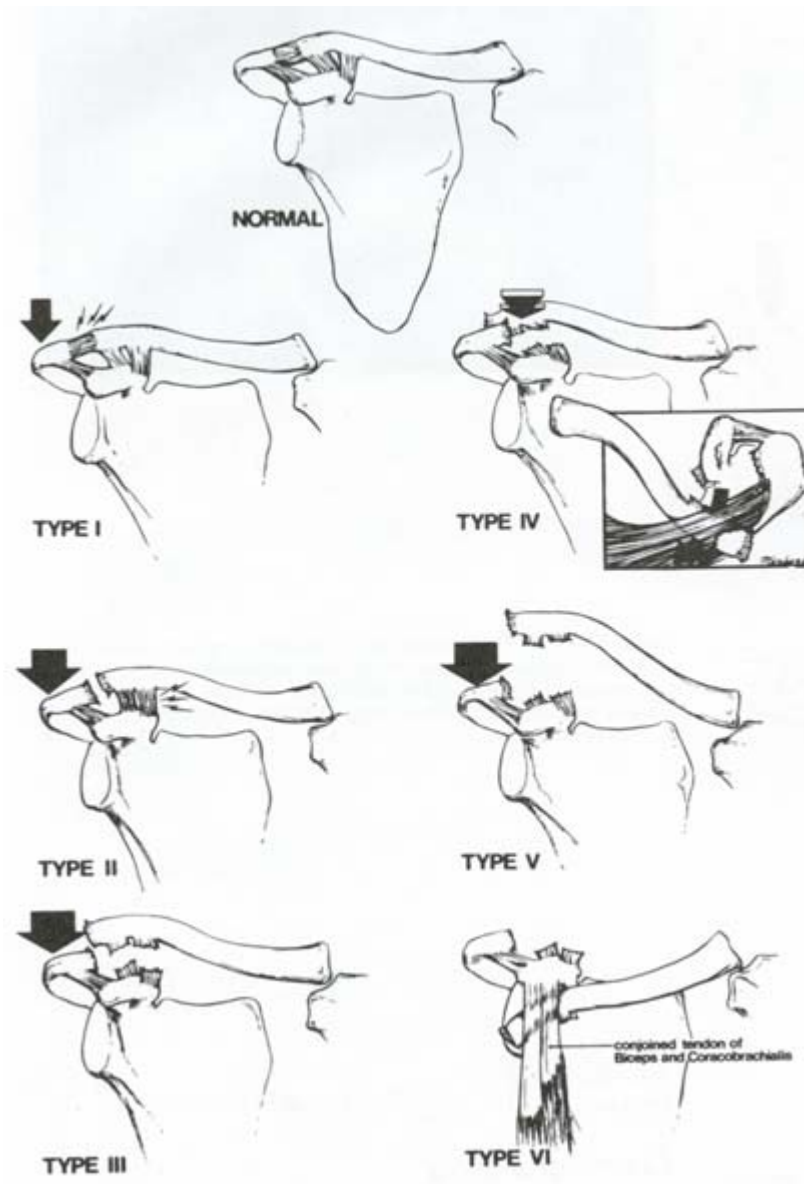
Acromioclavicular injuries (the so-called separated shoulder) can be classified into six types, and treatment is based on the specific type

A-C Separations

**Mechanism of Injury:
FOOSH or Fall onto
the tip of the
shoulder**



A-C Separations



A-C Separations

Type I – AC ligament is partially disrupted; coracoclavicular (CC) ligament is intact

Type II – AC ligament is completely torn CC ligament is partially torn

Type III – AC & CC ligaments are completely torn & there is complete separation of clavicle from the acromion.

Types IV – VI are uncommon

A-C Separations

Signs and Symptoms

Pain over A-C joint & lifting of the arm

Swelling

With Type III & higher...there is an obvious and cosmetically displeasing deformity



A-C Separations



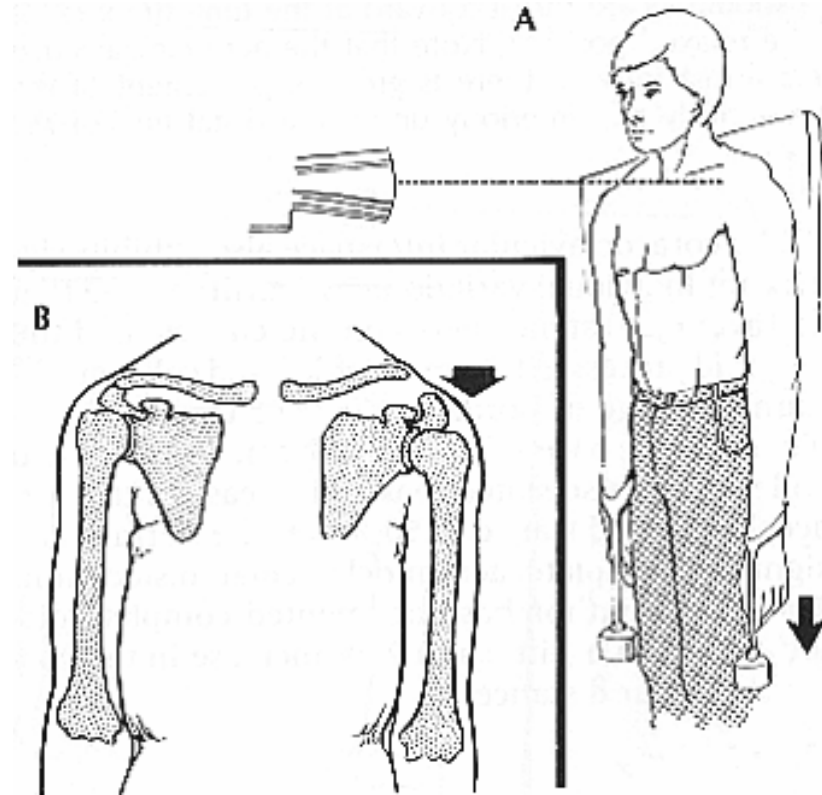
A-C Separations



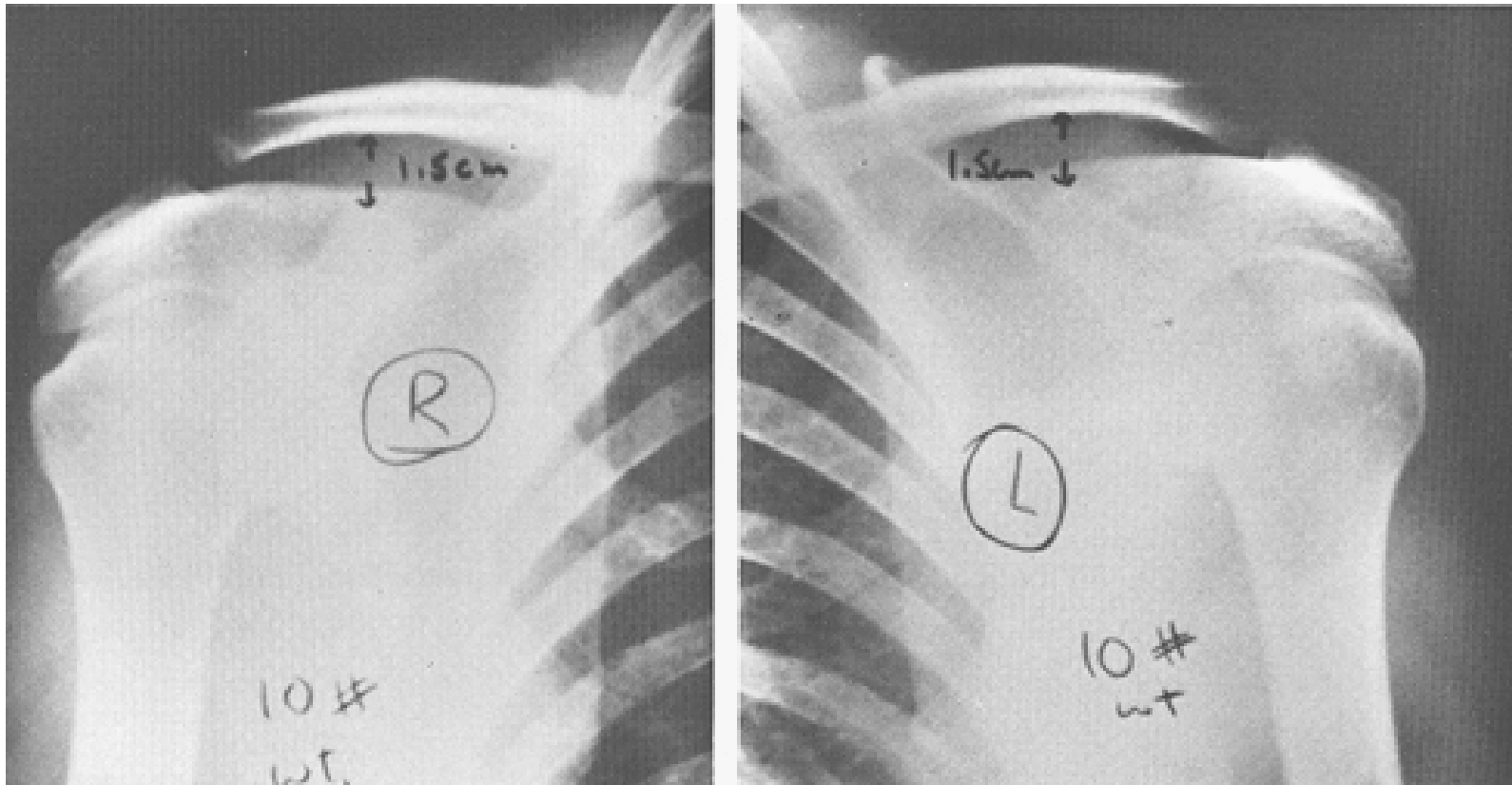
A-C Separations

Diagnosis

**AP Xrays of
both shoulders
will confirm
Type II or higher
A-C separations
(with & without
weights)**



A-C Separations



A-C Separations

Treatment

Type I & II:

Rest & Ice

**Sling, Sling & Swath, Shoulder
Immobilizer or Figure-of-8-clavicle
brace X 4-6 Weeks**

NSAIDs, ASA or Tylenol®

Analgesics esp. at night

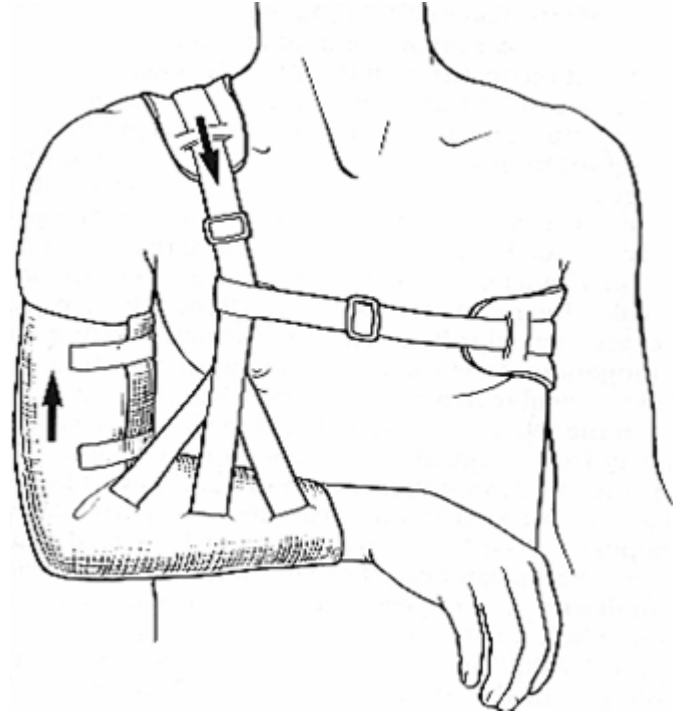
A-C Separations

Treatment

Type III is controversial – Most are treated nonoperatively with good results

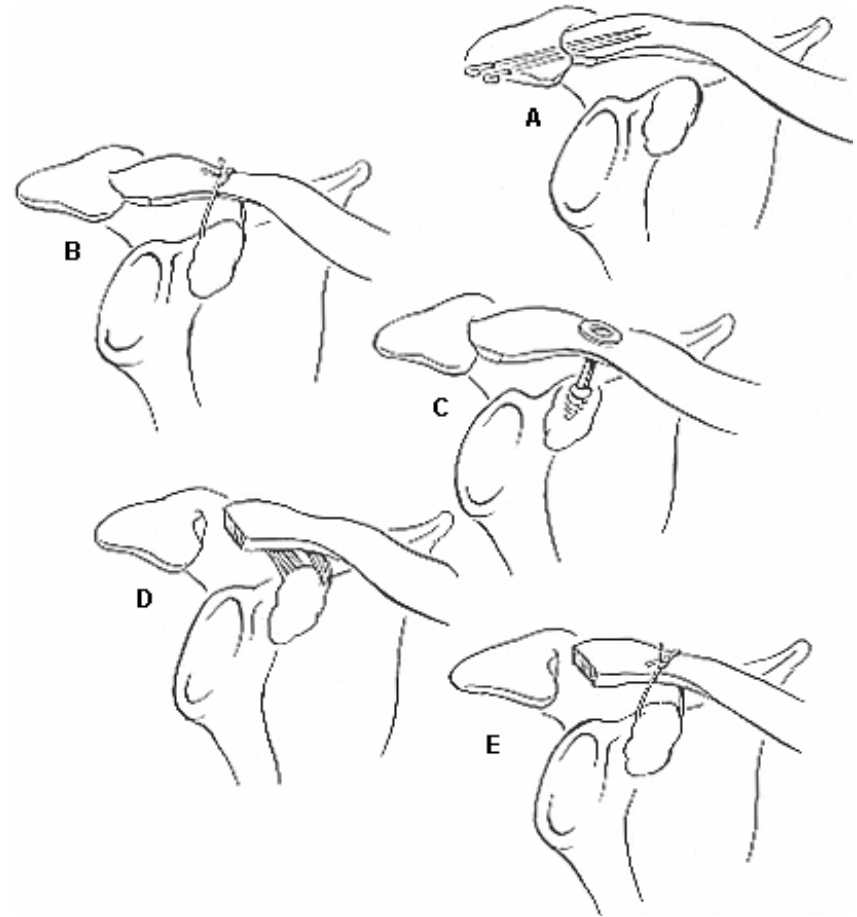
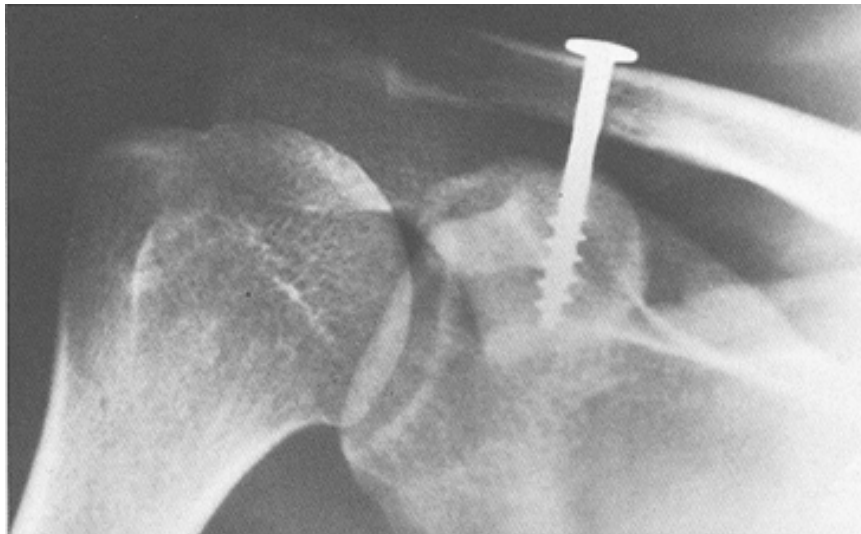
A-C Separations

Immobilizing devices



A-C Separations

Surgical repairs



Rotator Cuff Syndrome

Definition: Rotator cuff syndrome or disease or impingement syndrome is a continuum of pathology starting with inflammatory changes in the sub acromial bursa and rotator cuff tendons, which may continue on to become a rotator cuff tendon rupture or tear.....

Rotator Cuff Syndrome

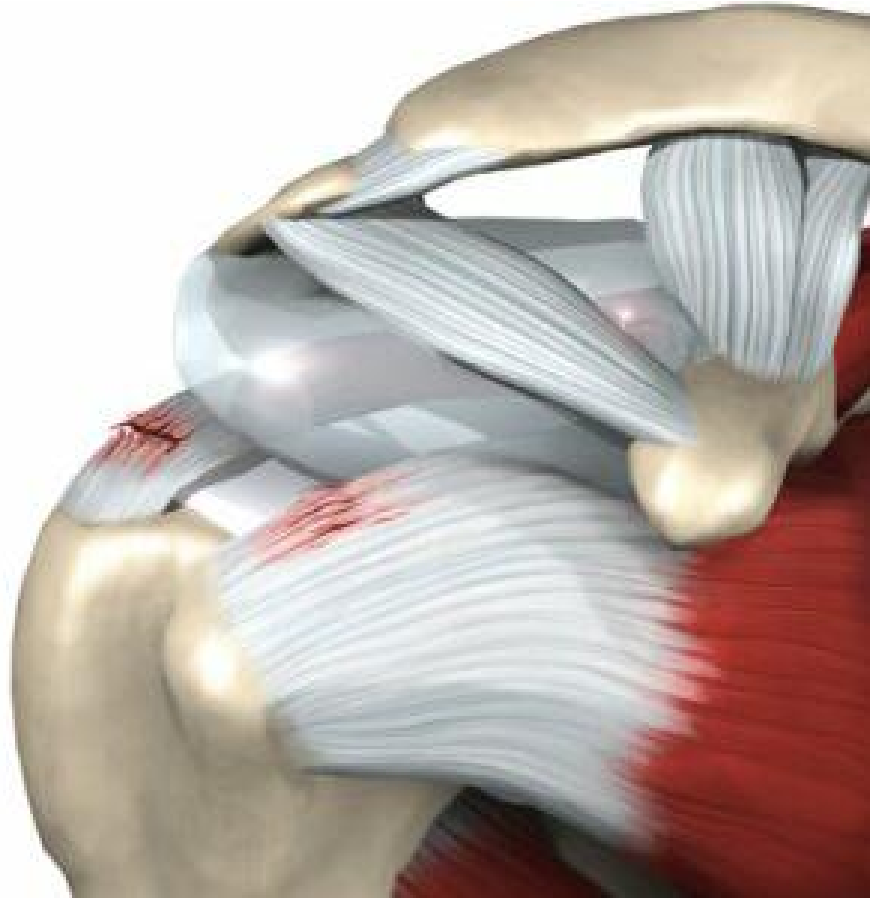
**The rotator cuff is
composed of four
muscles: (SITS)**

Supraspinatus

Infraspinatus

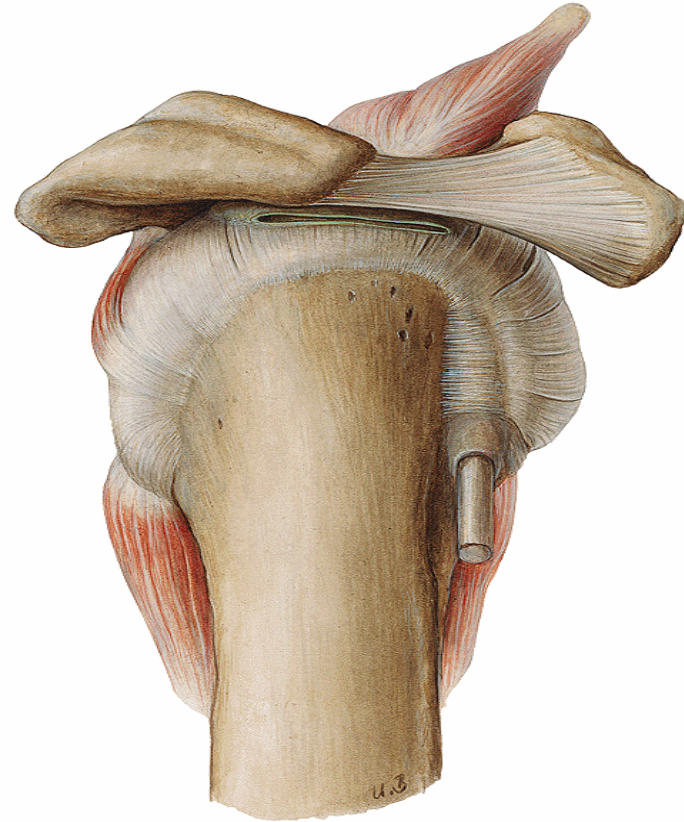
Teres Minor

Subscapularis



Rotator Cuff Syndrome

These muscles form a cover around the head of the humerus whose function is to rotate the arm and stabilize the humeral head against the glenoid



Rotator Cuff Syndrome

Rotator cuff disease primarily affects the Supraspinatus tendon

Signs and Symptoms

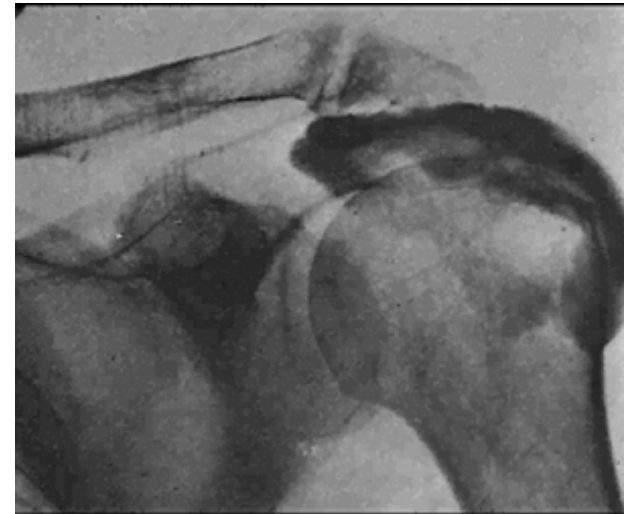
Pain, esp. at night

Difficulty sleeping on it

Weakness

Catching

**Grating esp. with
lifting the arm overhead**



Rotator Cuff Syndrome

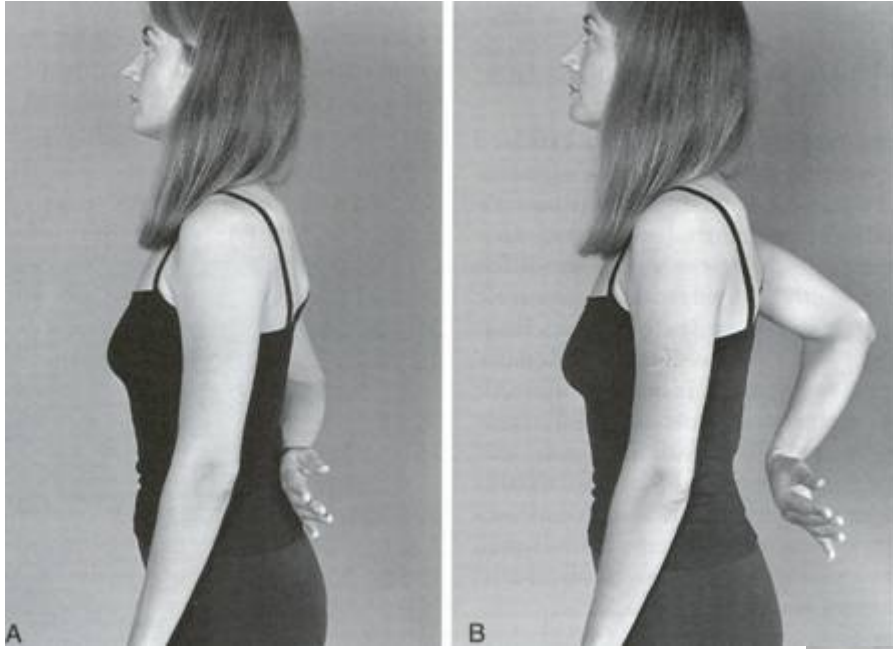
Physical Exam

**Tenderness over greater tuberosity
or A-C joint**

Muscle Atrophy

**AROM is limited (esp. Abduction &
IR) but PROM is usually normal
except in patients with a frozen
shoulder**

Rotator Cuff Syndrome



PE

+ Drop-arm test

+ Lift-off test



Rotator Cuff Syndrome

Diagnosis

Xrays are usually normal unless DJD changes are present or in trauma

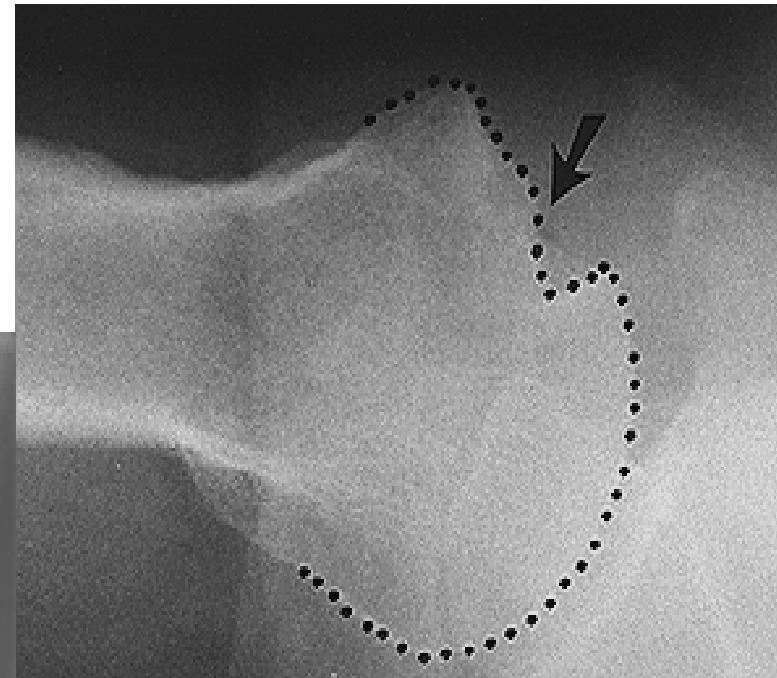
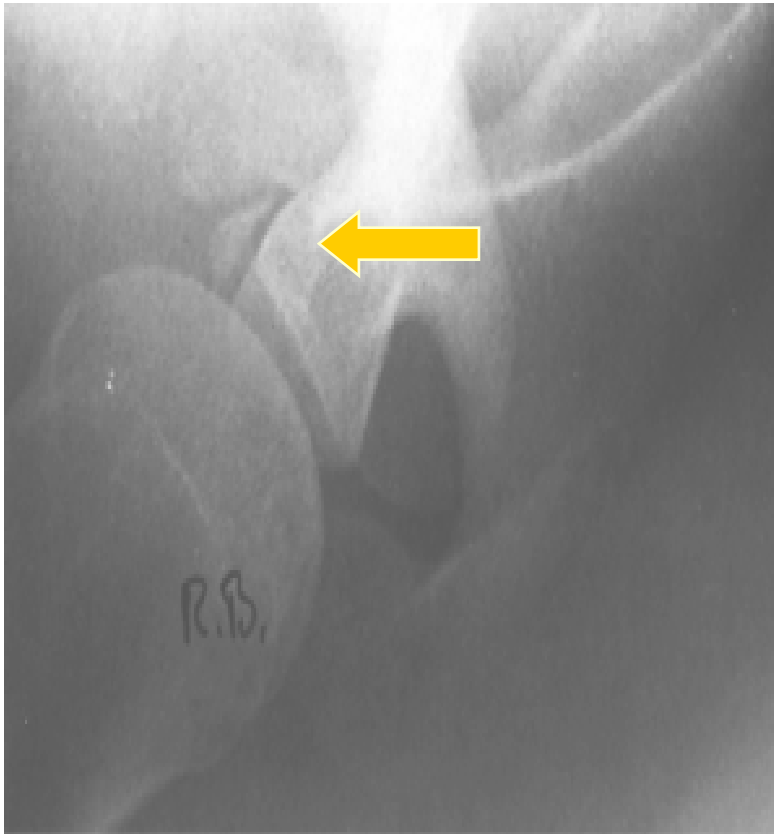
Osteophytes

**Calcific
changes
within the
tendon**

A-C joint DJD



Rotator Cuff Syndrome



Hill-Sachs Lesion

**Bony Bankhart
Lesion**

Rotator Cuff Syndrome

Treatment: Conservative

Rest, Ice & Passive ROM ex's

NSAIDs

**PT: strengthening esp. rotator
cuff muscles**

Rotator Cuff Syndrome

Treatment: Conservative

Avoid overhead and painful activities

Steroid injection should be used with caution (may decrease inflammation, provide pain relief, but steroid injections weakens tendon)

Rotator Cuff Syndrome

Treatment: Surgical
Arthroscopic
Open



Rotator Cuff
Post-Surgery



Rotator Cuff
Pre-Surgery

Impingement Syndrome

Impingement between the rotator cuff tendons and subacromial bursa between the humeral head, greater tuberosity and the acromion occurs when the arm is elevated. This causes inflammation and edema and therefore increased impingement, in a self-perpetuating cycle.....

Impingement Syndrome Classification

**Stage I: Pt's < 25 with reversible
edema & hemorrhage**

**Stage II: Pt's 25 – 40 with fibrosis,
tendonitis & recurring pain
with activity**

**Stage III: Pt's > 45 with bone spurs
or osteophytes & rotator
cuff tendon rupture**

Impingement Syndrome

Differential Diagnosis

Subacromial Bursitis

Supraspinatus Tendonitis

A-C Arthritis

Bicipital Tendonitis

Calcific Tendonitis

Adhesive Capsulitis

Thoracic Outlet Syndrome

Subacromial Bursitis

Signs and Symptoms

Inability to use the arm in the overhead position (Flexed & Internally rotated or Abduction) due to pain, stiffness, weakness & catching

Pain with sleeping on the affected side

Pain in the acromial area

Subacromial Bursitis

Physical Exam

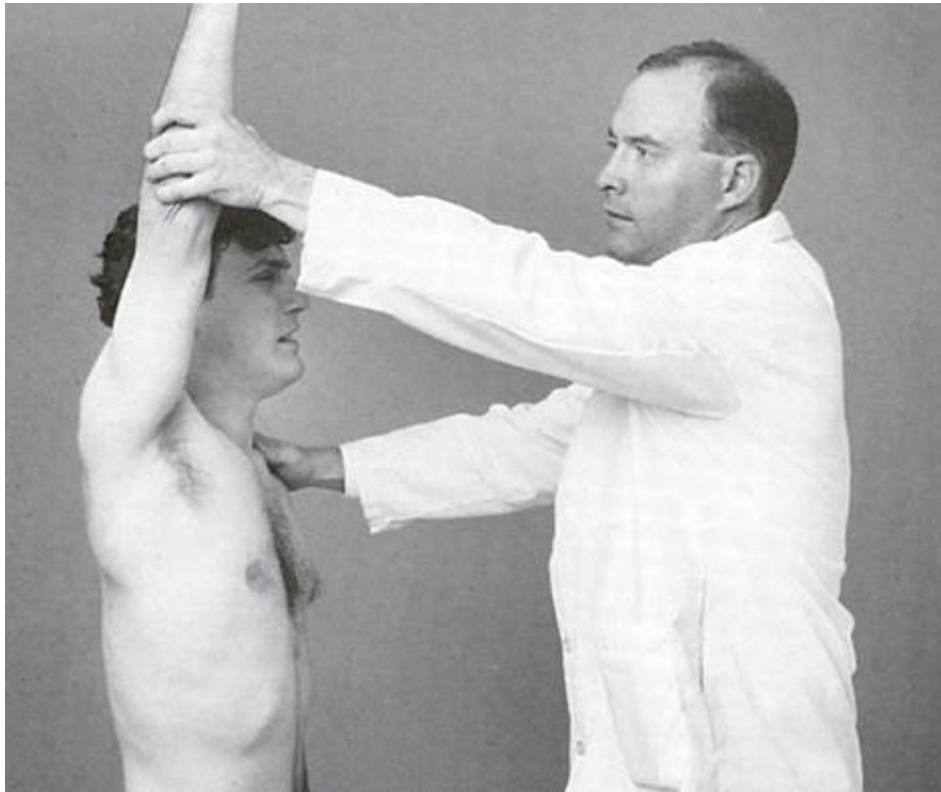
- + Neer Impingement Sign**
- + Hawkins Impingement Sign**
- + Impingement Sign**

Differential Diagnosis

Impingement Test

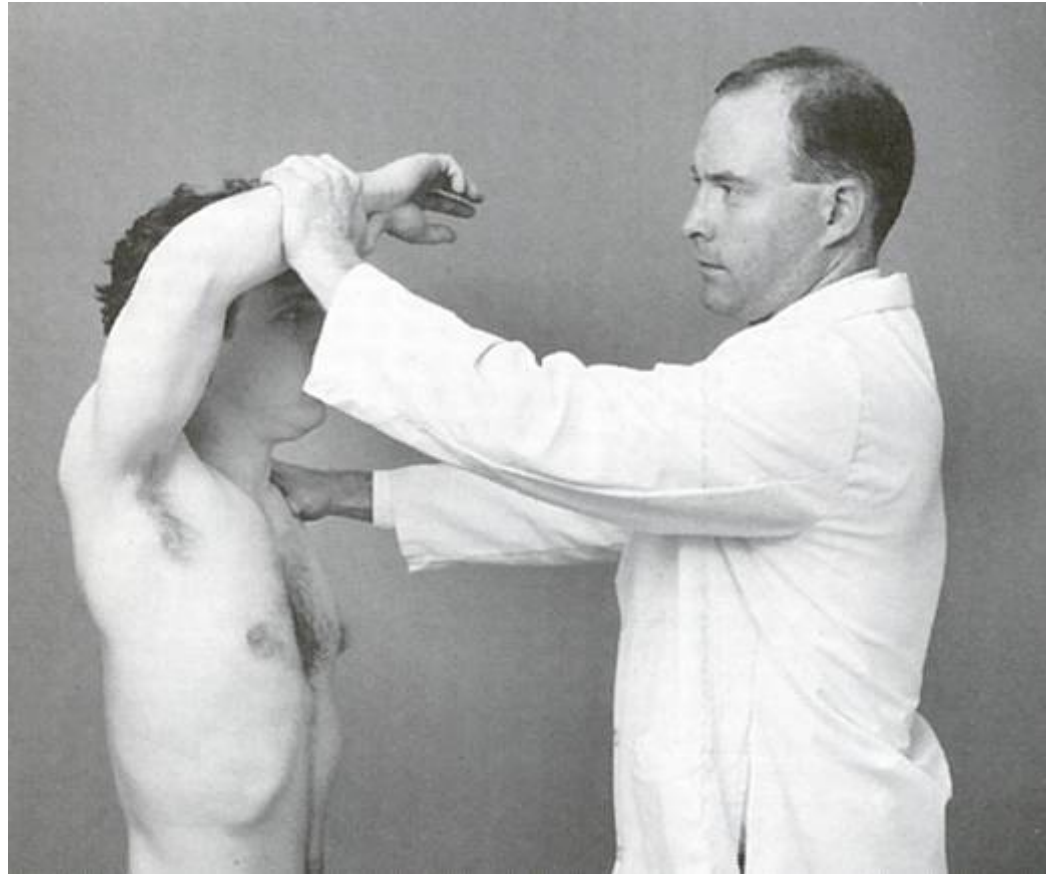
Subacromial Bursitis

+ Neer Impingement Sign



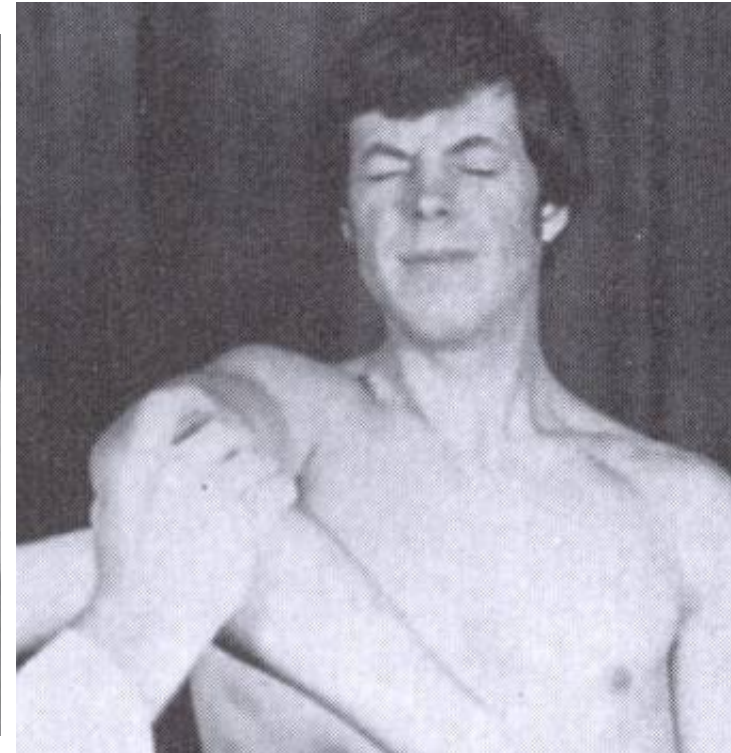
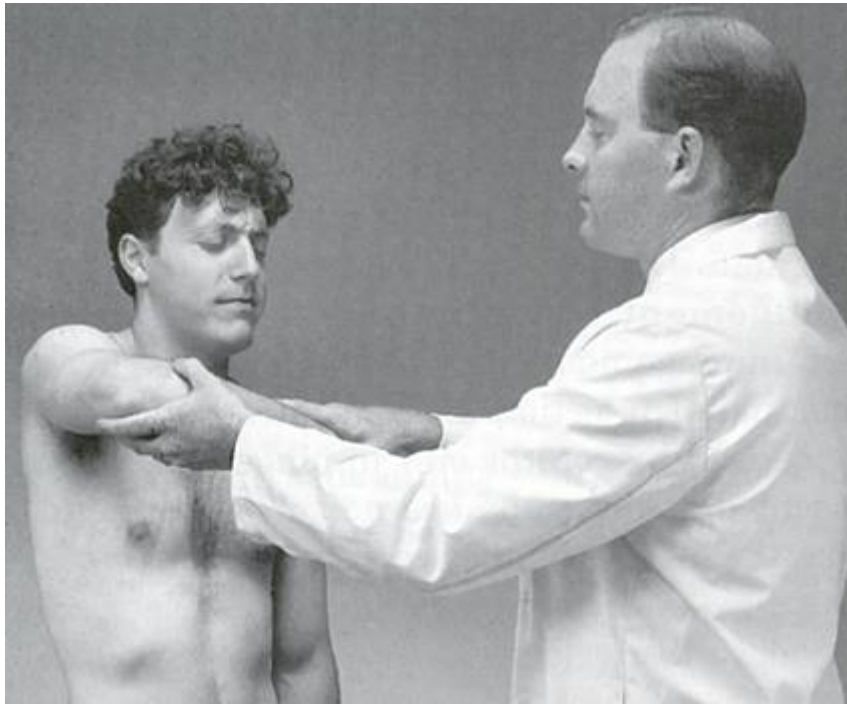
Subacromial Bursitis

+ Modified Neer Impingement Sign



Subacromial Bursitis

+ Hawkins Impingement Sign



Subacromial Bursitis



**Impingement Test –
instill 10cc 1% plain
local anesthetic into
the subacromial
space followed by
impingement testing**

Subacromial Bursitis

Complete pain relief supports a diagnosis of impingement syndrome

To demonstrate supraspinatus weakness compare using the supraspinatus test – If initially patient was weak but strong post injection then inflammation & fibrosis is consistent vs rotator cuff tear

Subacromial Bursitis

TX: Conservative

Rest & Ice

Avoidance of overhead activities

**PT (ROM ex's & Rotator cuff
strengthening ex's)**

**Ultrasound/Phonophoresis/
Iontophoresis**

NSAIDs, ASA or Tylenol®

Corticosteroid injections

Subacromial Bursitis

Treatment: Surgical

Bursectomy

Acromioplasty (Decompression)

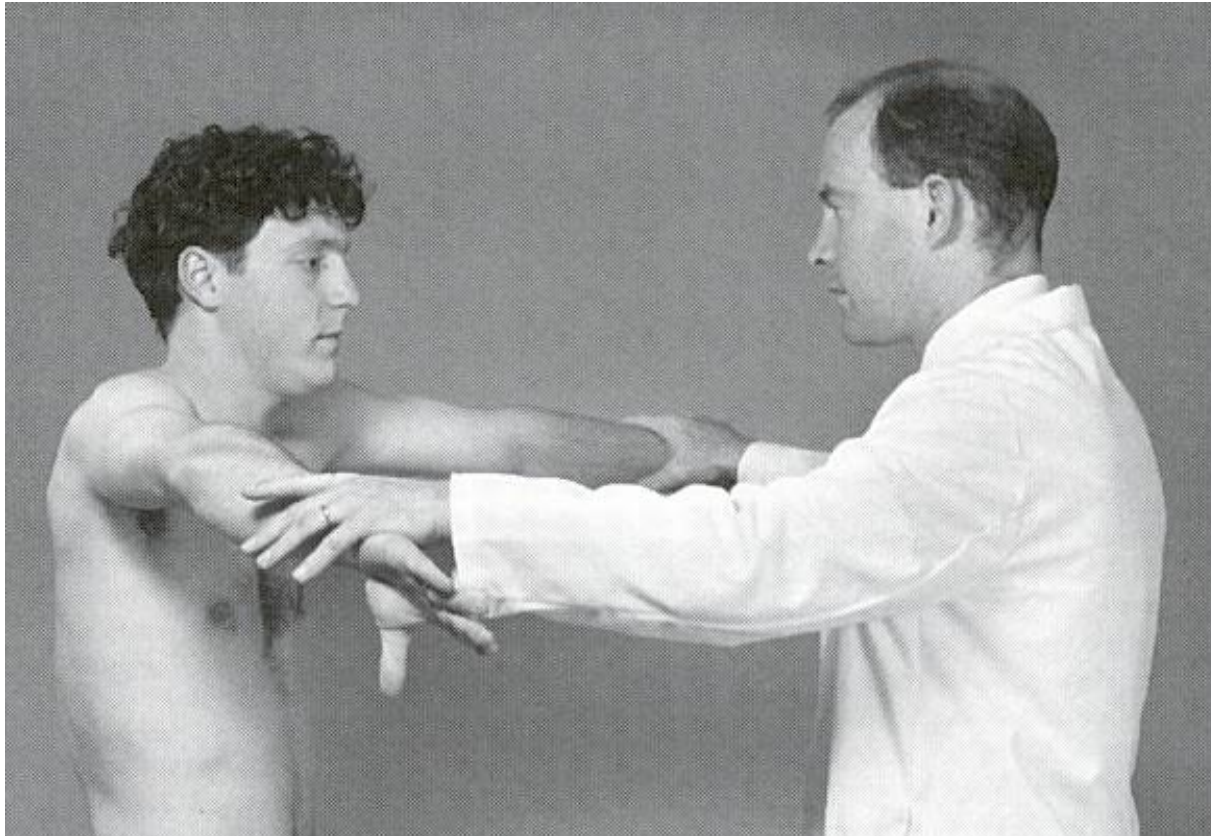
Arthroscopically or Open

Supraspinatus Tendonitis

Signs and symptoms are identical to subacromial bursitis except the inflammation is within the tendon vs bursa

+ Supraspinatus test but no weakness

Supraspinatus Test



Supraspinatus Tendonitis

Treatment: Conservative

Rest & Ice

Avoidance of overhead activities

**PT (ROM ex's & Rotator cuff
strengthening ex's)**

**Ultrasound (Phonophoresis or
Iontophoresis)**

NSAIDs, ASA or Tylenol®

Corticosteroid injections

Supraspinatus Tendonitis

Treatment: Surgical

**Arthroscopic (Debridement &
Acromioplasty)**

**Open (Acromioplasty,
Debridement & RC repair)**

Acromioclavicular (A-C) Arthritis/Arthropathy

Signs and Symptoms

A-C joint tenderness

DJD change on Xrays

Physical Exam

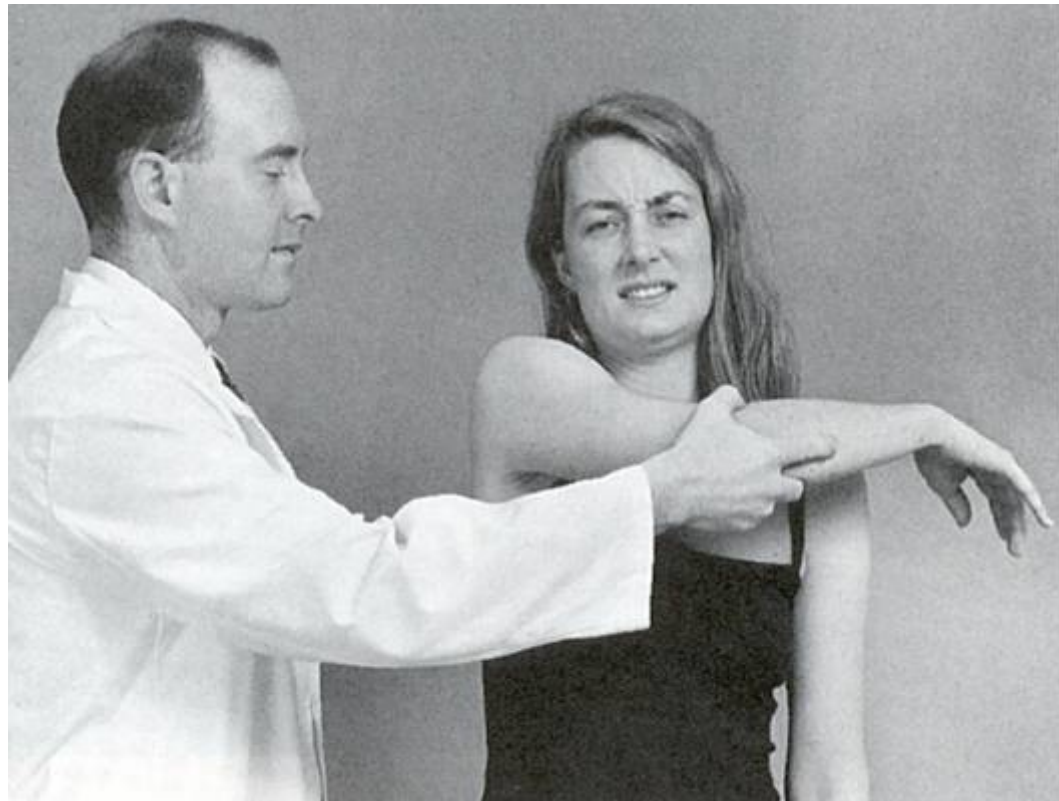
+ Cross-body Adduction

Diagnosis

Lidocaine injection into the A-C Joint

Acromioclavicular (A-c) Arthritis/Arthropathy

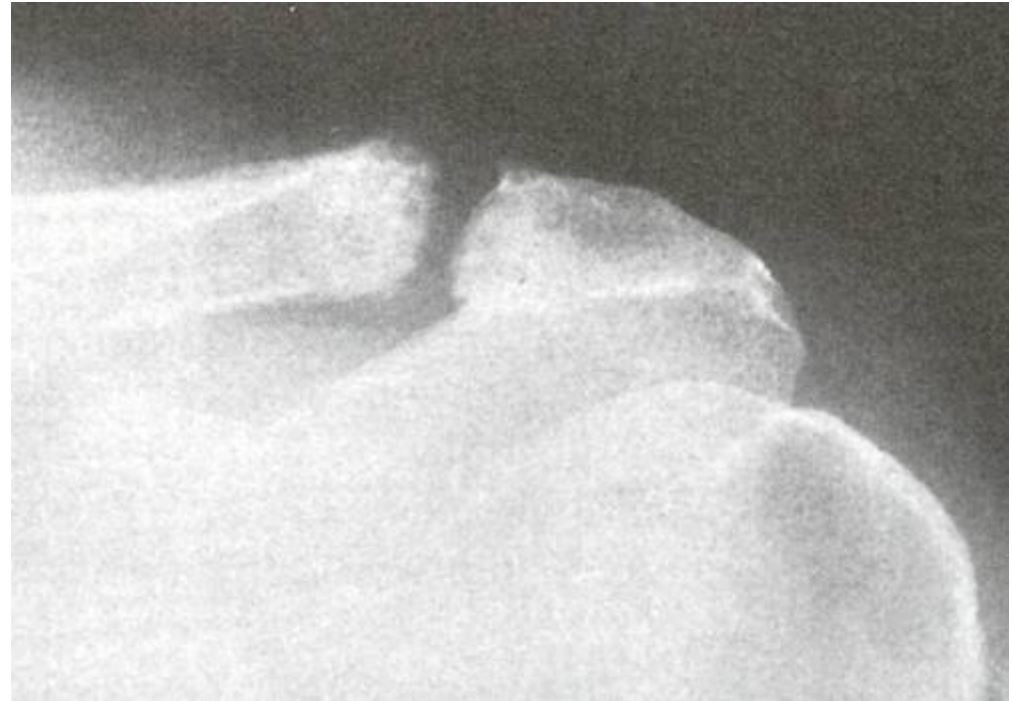
**+ Cross-
Body
Adduction
Test**



Acromioclavicular (A-C) Arthritis/Arthropathy

**Xrays: DJD
changes &
possible
osteolysis or
bone cysts**

**Diagnosis:
Lidocaine
injection into the
A-C Joint**



Acromioclavicular (A-C) Arthritis/Arthropathy

Treatment: Conservative

Rest & Ice

Avoidance of overhead activities

**PT (ROM ex's & Rotator cuff
strengthening ex's)**

**Ultrasound (Phonophoresis or
Iontophoresis)**

NSAIDs, ASA or Tylenol®

Corticosteroid injections

Acromioclavicular (A-C) Arthritis/Arthropathy

Treatment: Surgical

**Open (Acromioplasty & distal
clavicle resection using Mumford
procedure)**

Bicipital Tendonitis

Signs and Symptoms

Pain to palpation over bicipital groove or tendon

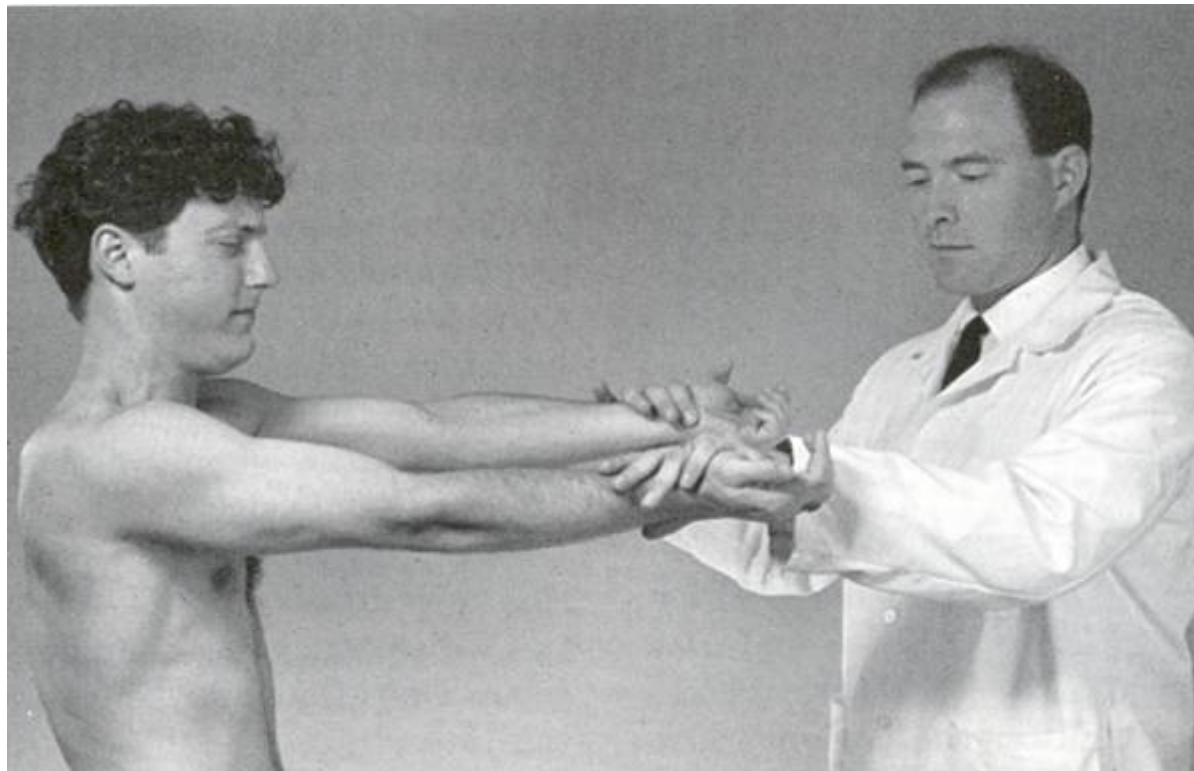
Physical Exam

+Speed's Test

+Yergason's Test

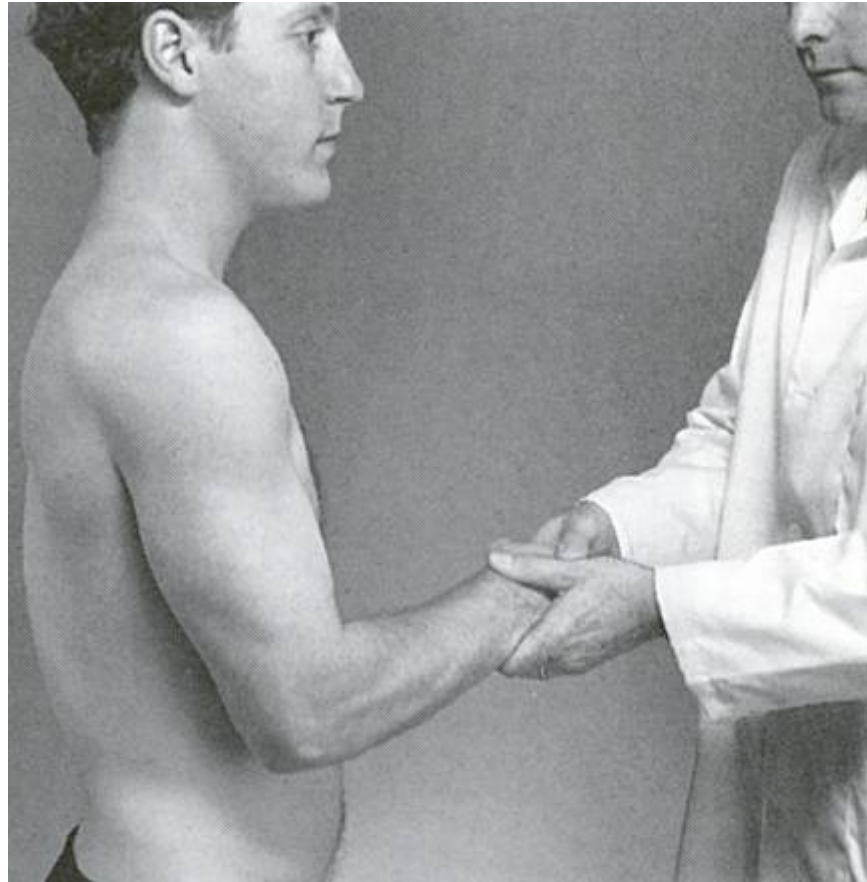
Bicipital Tendonitis

+ Speed's Test



Bicipital Tendonitis

+ Yergason's Test



Bicipital Tendonitis

Treatment: Conservative

Rest & Ice

Avoidance of overhead activities

**PT (ROM ex's & Rotator cuff
strengthening ex's)**

**Ultrasound (Phonophoresis or
Iontophoresis)**

NSAIDs, ASA or Tylenol®

Corticosteroid injections (BEWARE!)

Bicipital Tendonitis

Treatment: Surgical
Arthroscopic
Open

Calcific Tendonitis

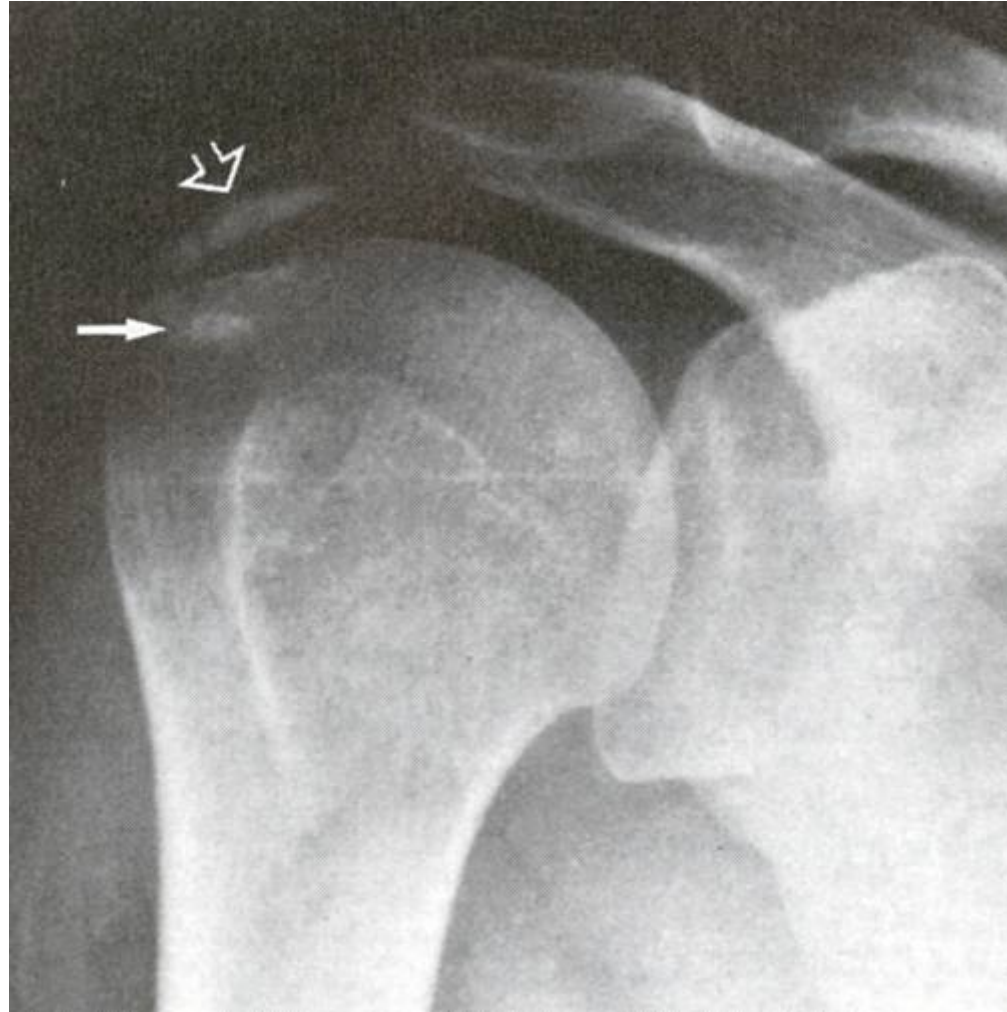
Signs and Symptoms

Localized tenderness

**Associated with impingement
from increased size of the tendon**

Calcific Tendonitis

Diagnosis
Xrays



Calcific Tendonitis

Treatment: Nonoperative

Physical therapy

**Needling calcification with local
anesthetic**

Radiotherapy

Treatment: Operative

Surgical excision

Adhesive Capsulitis

“Frozen Shoulder”

Idiopathic loss of both active and passive motion

Most commonly affects patients between 40 & 60

Most common risk factor is DM Type I

Adhesive Capsulitis

Patients typically have 2 phases

**“freezing” phase with pain &
progressive loss of motion**

**“thawing” phase of decreasing
discomfort associated with a
slow but steady improvement in
range-of-motion**

Adhesive Capsulitis

Physical Exam -- reveals significant reduction in both active & passive range-of-motion, at least 50%, when compared with the opposite normal shoulder

Motion is painful, especially at the extremes

Pain & tenderness are common at the deltoid insertion

Adhesive Capsulitis

Treatment

NSAIDs

Non-narcotic analgesics

Moist Heat

Stretching program 3-4 x daily

**? Consider a corticosteroid
injection**

Thoracic Outlet Syndrome

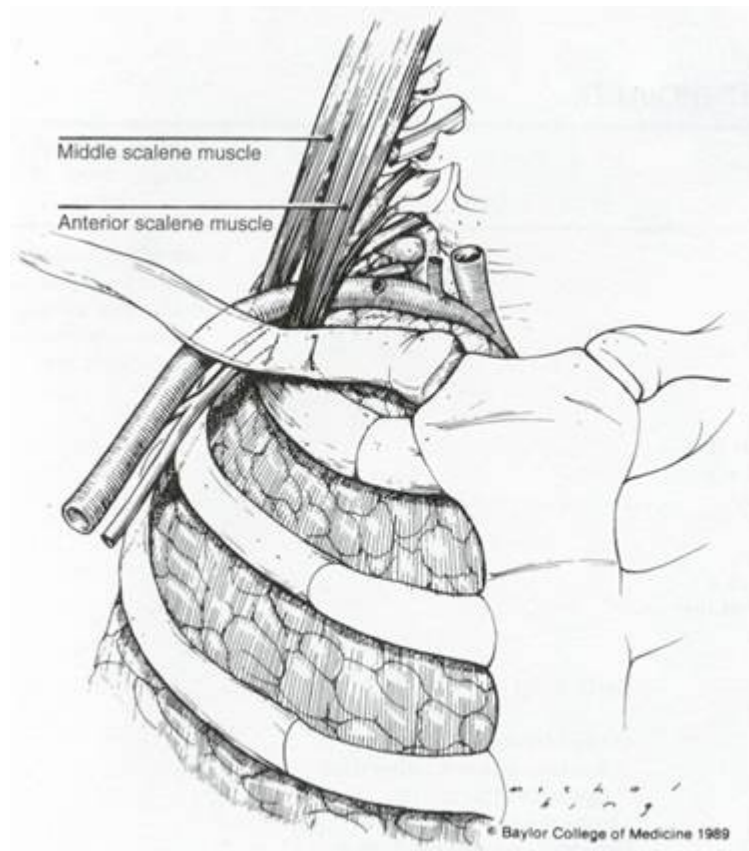
Thoracic outlet syndrome - compression of a portion of the brachial plexus, most commonly the lower portion [C8, T1], and the axillary artery



Thoracic Outlet Syndrome

Etiology

Compression by the scalene muscles/first rib on the lateral cord of the brachial plexus and the subclavian artery



Thoracic Outlet Syndrome

Signs/Symptoms

Related to overuse- paresthesias to hand and arm, pain in upper extremity and neck, weakness of extremity, drooping of shoulder girdle, clear correlation with posture and position



Thoracic Outlet Syndrome

Diagnosis

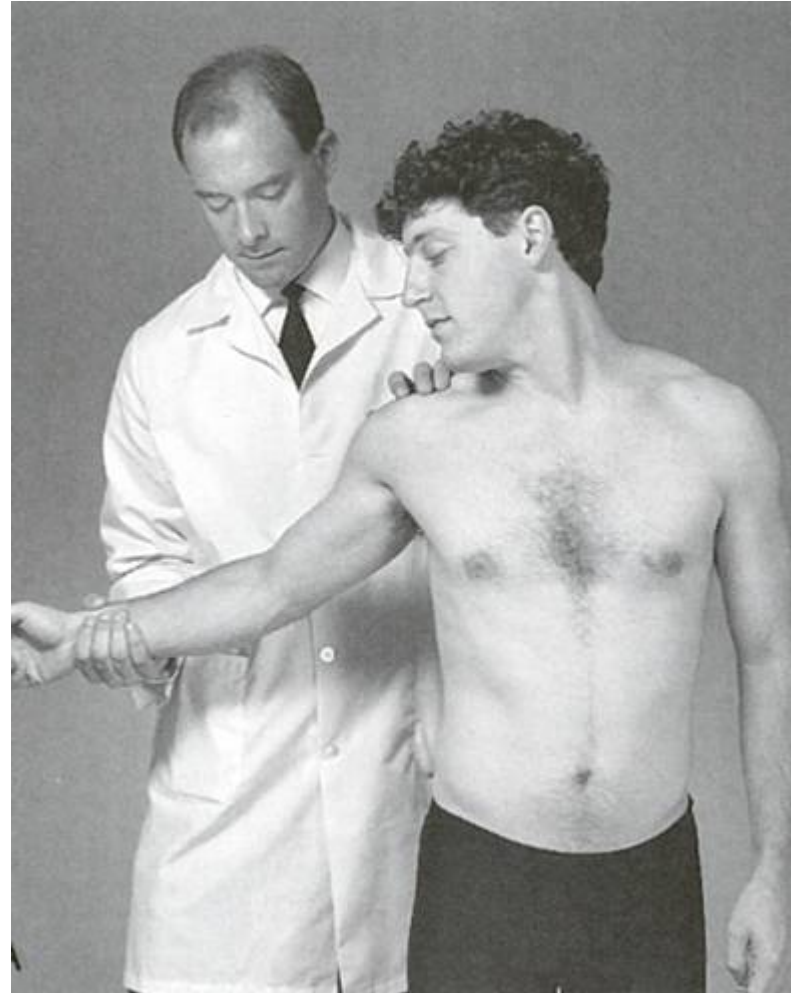
Adson's Maneuver

Wright's Test

Roos Test

Thoracic Outlet Syndrome

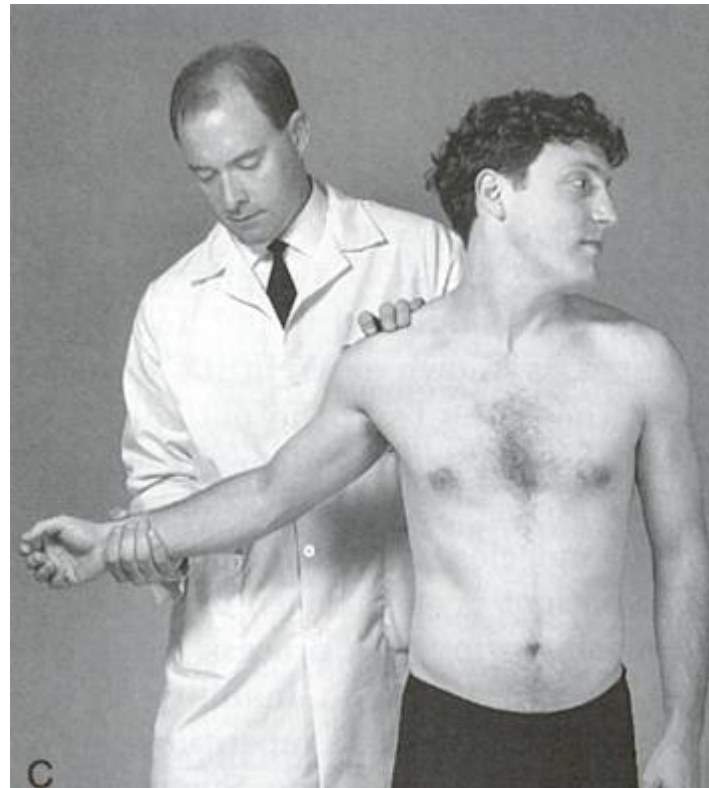
**Adson's maneuver -
shoulder extension
and head rotation to
the ipsilateral side
while holding a
breath leads to loss
of the radial pulse**



Thoracic Outlet Syndrome

Modified Adson's (Wright's) test

Shoulder extension, abduction to 90 degrees, and external rotation with the head rotated to the contralateral side leads to loss of the radial pulse



Thoracic Outlet Syndrome

Roos test - the arms elevated past 90 degrees and the hands opened and closed rapidly 15 times leads to cramping/tingling of the hands (claudication)



Thoracic Outlet Syndrome

Treatment options

**Nonoperative - physical
therapy, postural training**

**Operative - first rib resection,
others**

Summary

Steps in the general examination of the anterior shoulder

Mechanisms of injury, clinical signs and symptoms, diagnostic tests, and treatment for common shoulder disorders