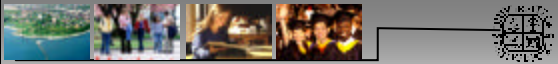



Orthopedics and Neurology Evaluation of the Shoulder

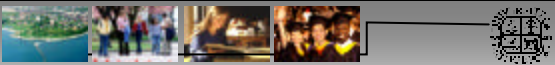
James J. Lehman, DC, MBA, DABCO
University of Bridgeport College of Chiropractic



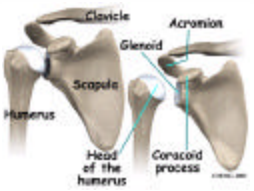
Shoulder Anatomy “Shoulder Girdle”



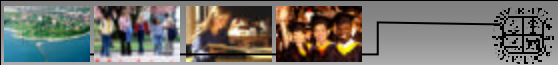
- Consists of several bony joints, or “articulations”
- Connects the upper limbs to the rest of the skeleton
- Provides a large ROM




Shoulder Anatomy Osseous structures of the shoulder girdle



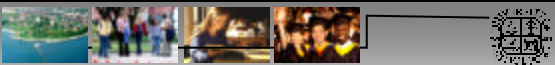
- Clavicle
- Scapula
- Humerus.



Shoulder Function


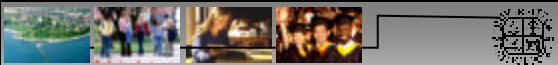


- Adequate shoulder ROM is essential for many ADL
- This is the most important function of the shoulder



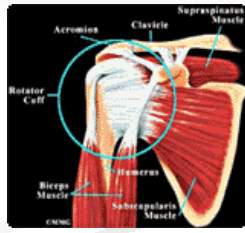
S.I.T. Muscles Posterior Rotator Cuff Muscles

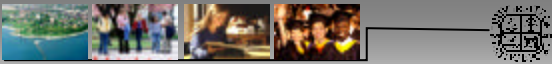
- Supraspinatus
- Infraspinatus
- Teres minor

Rotator Cuff Muscles


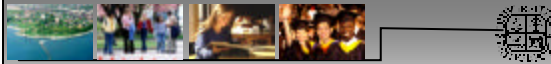
- Supraspinatus
- Infraspinatus
- Teres minor
- Subscapularis





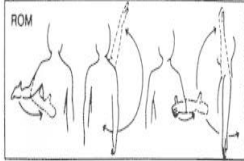
Shoulder Ranges of Motion

- What are the six ranges of motion for the shoulder?

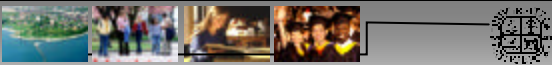



Active Shoulder Motions


AROM evaluation



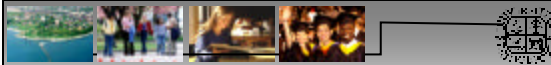
- Flexion
- Extension
- Abduction
- Adduction
- Internal and external rotation



Goniometric Measurements in Degrees



- Flexion = 161-173
- Extension = 52-72
- Int Rotation = 63-75
- Ext Rotation = 95-113
- Abduction = 177-191
- Adduction = 75 or greater from neutral



Active Internal and External Rotation


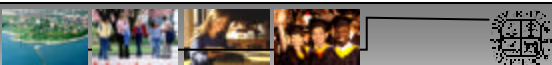



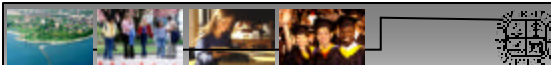
Figure 1. Average ROM for the non-dominant shoulder of baseball pitchers at 90° of shoulder abduction.




Rick Ankiel St. Louis Cardinals



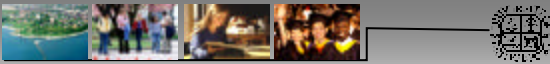
- What would cause a pitcher's shoulder ROM to be reduced?



James Parr Atlanta Braves Draftee




- What would cause a pitcher's shoulder ROM to be increased?

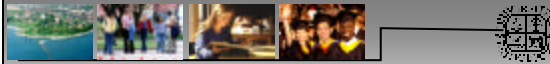


Passive Shoulder Motions

PROM



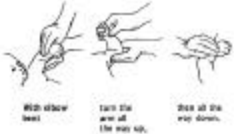
- May produce pain with bursitis, fracture, dislocation, instability, or sprain
- Identify the painful tissue

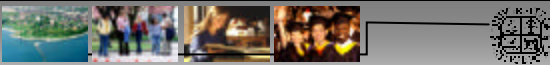


Passive Shoulder Motions

Inspection of PROM

- Pain
- Dislocation
- Crepitus
- Clicking
- Symmetrical ROM




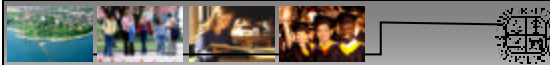


Resistive Shoulder Motions

RRROM evaluation

- Differentiate with O'Donoghue's
- Identify tissue
- Rule in or out strain/sprain



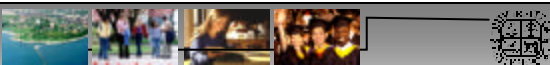


History

The patient should be asked about shoulder pain:

- Instability
- Stiffness
- Locking
- Catching
- Swelling

■ <http://www.aafp.org/afp/20000515/3079.html>

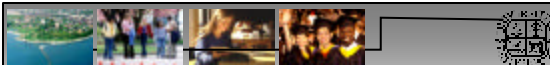


History

Stiffness or loss of motion may be the major symptom in patients with:

- Adhesive capsulitis (frozen shoulder)
- Dislocation
- Glenohumeral joint arthritis

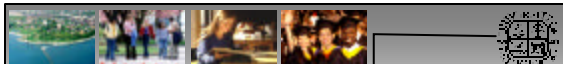
■ <http://www.aafp.org/afp/20000515/3079.html>



History


- Pain with throwing (such as pitching a baseball) suggests anterior glenohumeral instability
- Patients who complain of generalized joint laxity often have multidirectional glenohumeral instability.

■ <http://www.aafp.org/afp/20000515/3079.html>

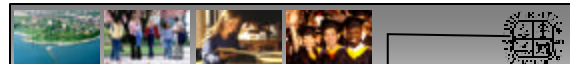


Supraspinatus Tendonitis

Signs and symptoms




- Anterolateral shoulder pain
- Pain with sleeping on affected shoulder
- Stiffness & catching
- Active & passive pain
- Local tenderness

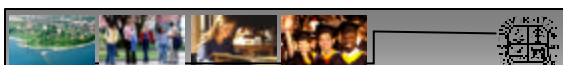


Supraspinatus Tendonitis

Causes




- Trauma
- Overuse (overhead)
- Faulty body mechanics with athletic activity

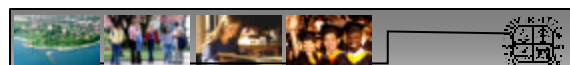


Supraspinatus Tendonitis


Signs



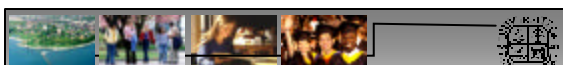
- Painful arc with abduction (60-90)
- Limited AROM
- Painful PROM




Painful Arc of Abduction



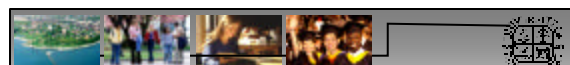
- Why does the pain occur with 60-90 degrees of abduction?
- Why is the AROM limited?
- Why is the PROM painful?




Shoulder Pain with Abduction



- Why does the pain occur within the arc of abduction?

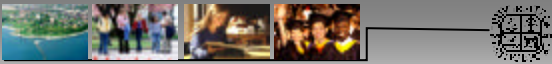


Impingement




Impingement
(Pinching of the tendon between the acromion and tip of the shoulder blade)

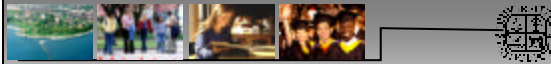
- Why is the AROM painful?




Impingement



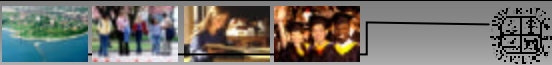
- Local pain with pressing of supraspinatus tendon against coracoacromial ligament




Shoulder Bursitis Causes



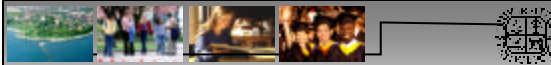
- Repetitive minor trauma or overuse
- Acute injury
- Poor body mechanics




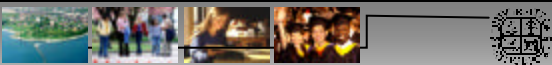
Bracing for Shoulder Bursitis with Instability




- May be utilized with shoulder conditions, which require reduced motion.



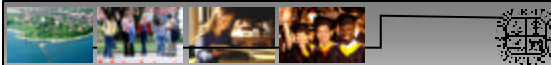
Shoulder Bursitis Exercises

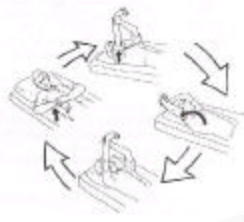
Adhesive Capsulitis of Shoulder



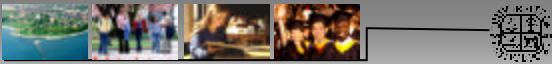
- A global decrease in shoulder range of motion
- Actual adherence of the shoulder capsule to the humeral head




Adhesive Capsulitis



- A syndrome defined as idiopathic restriction of shoulder movement (AROM and PROM)
- Usually painful at onset.



Adhesive Capsulitis Treatment

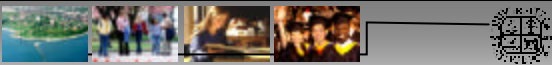


- Recovery is usually spontaneous,
- Treatment with intra-articular corticosteroids
- Gentle but persistent chiropractic therapy may provide a better outcome, resulting in little functional compromise.




How Would You Treat Adhesive Capsulitis?

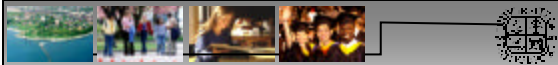
- Immobilization?
- Ice/heat?
- Manipulation?
- Exercises?
- Ultrasound?
- Electrical Stimulation?


Rotator Cuff Tear/Strain



- Why is the PROM painful?



Evaluation and Management Rotator cuff strain

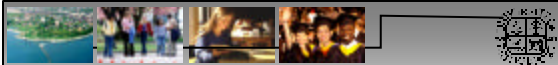


- How do you evaluate and manage rotator cuff strain and shoulder pain?

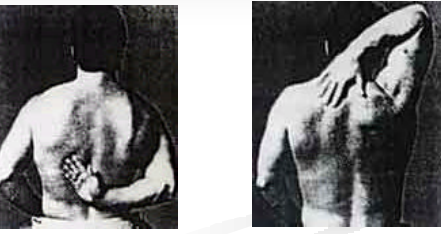


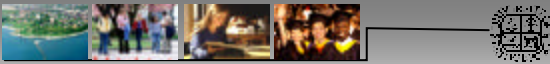
Supraspinatus Stress Test

- Differentiate deltoid muscle strain from supraspinatus tendon/muscle strain

Apley Scratch Test


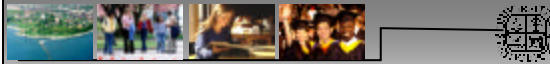




Apley Scratch Test

Rationale


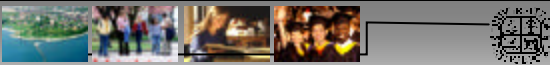
- Stresses rotator cuff tendons
- Supraspinatus is most often involved
- Exacerbation of pain might indicate degenerative tendonitis

Hawkins-Kennedy Impingement


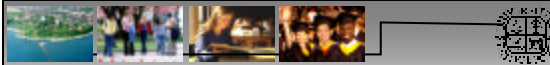
Supraspinatus tendonitis rationale

- Local pain with pressing of supraspinatus tendon against coracoacromial ligament


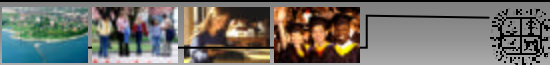
Neer Impingement Test

- Shoulder pain and look of apprehension indicates a positive sign for overuse of supraspinatus tendon
- Most common cause

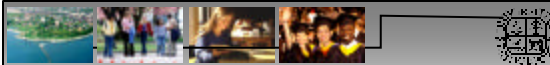
Neer Impingement Sign

- Approximates greater tuberosity of humerus and anterior inferior border of acromion


Bicipital Tendonitis

- Inflammatory condition of the long head of the biceps tendon
- Inserts into the superior aspect of the labrum of the glenohumeral joint
- Passes through the humeral bicipital groove

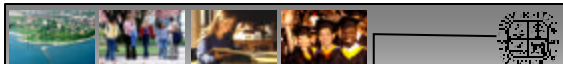


Bicipital Tendonitis

Frequently diagnosed




- In association with rotator cuff disease
- Secondary to intra-articular pathology such as labral tears

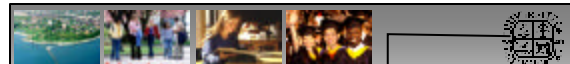


Bicipital Tendonitis


Commonly occurs with overhead athletes



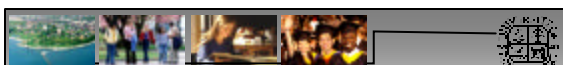
- Baseball players
- Swimmers
- Tennis players




Bicipital Tendonitis



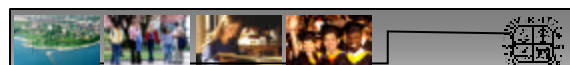
- Why do overhead athletes experience this condition?




Bicipital Tendonitis



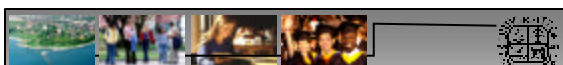
- Associated with rotator cuff injuries, bursitis, and impingement syndromes



How do you manage bicipital tendonitis?




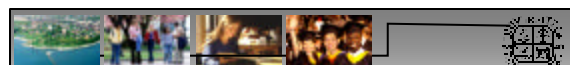
- Laboratory studies?
- Ice or heat?
- Manipulation of immobilization?
- Exercises or stretching?



Bicipital Tendonitis

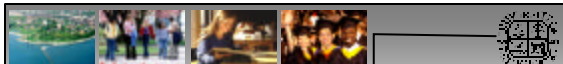
Why do overhead athletes experience this condition?

- Excessive external rotation/abduction
- Repetitive trauma
- Lack of time for recuperation

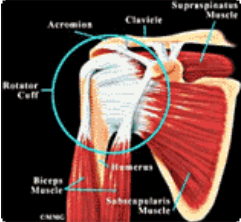
Bicipital Tendonitis

- What type of occupations or activities of daily living might cause this condition?
- How would you treat the patient with bicipital tendonitis?

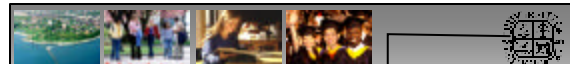


Bicipital Tendonitis

Causes




Full humeral head abduction places the attachment area of the rotator cuff and biceps tendon under the acromion.

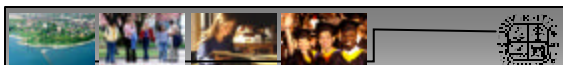


Bicipital Tendonitis

Causes




External rotation of the humerus at or above the horizontal level compresses these suprahumeral structures into the anterior acromion.

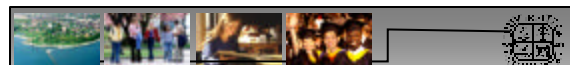


Bicipital Tendonitis

Causes




Repeated irritation leads to inflammation, edema, microscopic tearing, and degenerative changes.

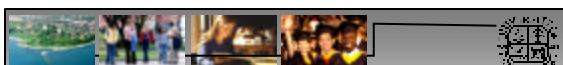


Bicipital Tendonitis

Overuse syndrome




- Gymnasts
- Rowers
- Racquet players
- Swimmers

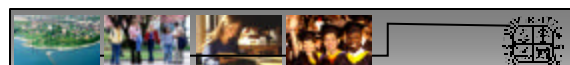


Bicipital Tendonitis

- It is common that the acute trauma involves the rotator cuff tendons and the bicipital tendon
- Supraspinatus most often injured rotator cuff tendon




Impingement
(Grinding of the tendon between the arm and tip of the shoulder blade)

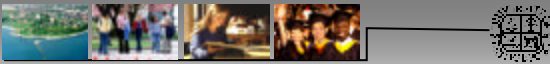


Bicipital Tendonitis


Functional anatomy



- The long head biceps tendon helps stabilize the humeral head, especially during abduction and external rotation

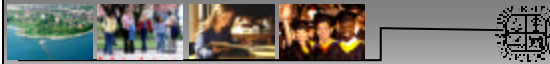


Bicipital Tendonitis



- Anterior shoulder pain
- Pain upon palpation of the bicipital groove
- Pain upon active and passive elbow flexion and extension

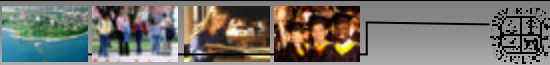
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Bicipital Tendonitis


Palpate the biceps muscle

1. Tenderness at proximal biceps may indicate tenosynovitis
2. Tenderness in the belly of the biceps might indicate either myofascial trigger point or a strain

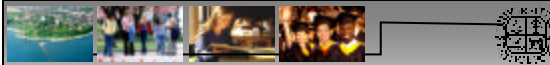


Bicipital Tendonitis

Palpation




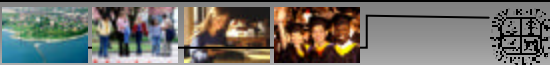
- Local tenderness usually is present over the bicipital groove, which typically is located 3 inches below the anterior acromion and may be localized best with the arm in 10° of external rotation.



Bicipital Tendonitis


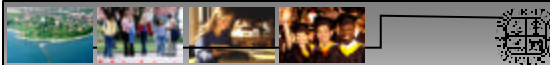
Orthopedic Evaluation

- Flexion of the elbow against resistance aggravates pain.

Bicipital Tendonitis


Passive abduction of the arm in a painful arc elicits pain; however, this finding may be negative in isolated biceps tendonitis.

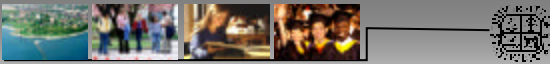



Speed's Test

Bicipital tendonitis

- Patient complains of anterior shoulder pain with flexion of the shoulder against resistance, while the elbow is extended and the forearm is supinated.






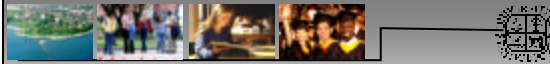
Yergason's Test

Biceps tendon instability

The patient complains of pain and tenderness over the bicipital groove with forearm supination against resistance with the elbow flexed and the shoulder in adduction. Popping or subluxation of the tendon may be demonstrated with this maneuver.

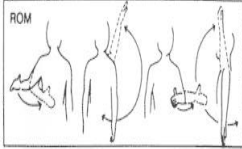


Yergason Test

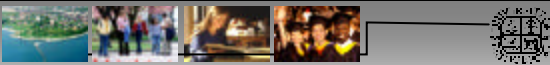


Bicipital Tendonitis

Active and passive ranges of motion




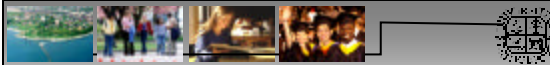
Document active and passive range of motion (ROM)



True Isolated Bicipital Tendonitis


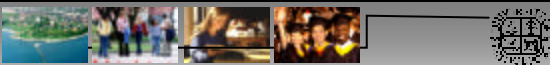
Passive range of motion

- Is there a limitation of passive range of motion?


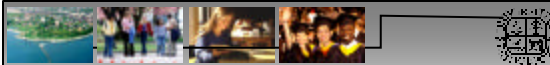
Bicipital Tendonitis

- Chronic condition of shoulder pain with tenderness over the bicipital groove.

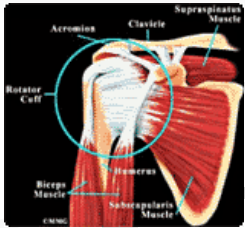
Bicipital Tendonitis

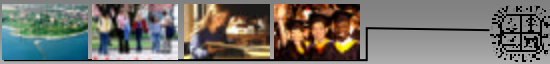
- Frequently associated with capsular synovitis, bursitis, adhesive capsulitis, rotator cuff tears, or osteophytes in the bicipital groove

Causes of Bicipital Tendonitis

- The tendon undergoes degeneration and attrition
- Associated with rotator cuff disease due to shared inflammatory process within the suprahumeral joint.






Complete Strain of Biceps

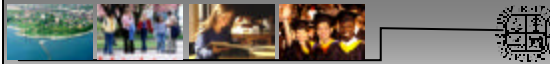
- Acute loading trauma
- 100% tear of biceps
- Conditioning determines type of tissue damage

Shoulder Biceps Rupture Symptoms

Shoulder and arm weakness


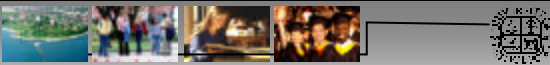
"Balled up" muscle with bruising






Which tissue tears with a complete strain?

- Tendon?
- Muscle?
- Bone?

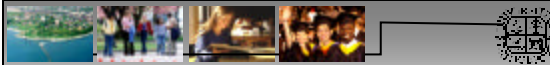



Bicipital Tendonitis

Healed labral tears



Biceps tendonitis with labral tears or rotator cuff tears may not improve if all the diagnoses are not treated.

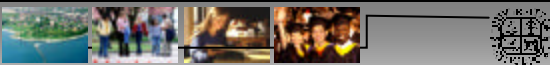


Physical Examination

Shoulder Instability

- This examination is performed in three stages, and involves a search for three broad patterns: **apprehension**, during dynamic manoeuvres designed to reveal instability; **laxity**, and evidence of associated **multidirectional hyperlaxity**.

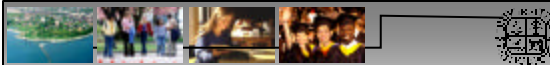
■ http://www.maitrise-orthop.com/corpusmairi/orthopaedic/88_gagey/gageyus.shtml



Physical Examination

Shoulder Instability

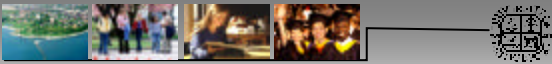
1. Examine asymptomatic shoulder first
2. Axillary nerve involved 15% of cases
3. Secondary adhesive capsulitis may present limited ROM in spite of instability
4. MUA may be required



Motor Testing

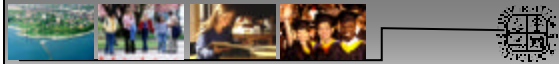
- Check internal and external rotation
- Weakness of the shoulder in external rotation or straight abduction suggests rotator cuff dysfunction resulting from deconditioning or a tear

■ http://www.medscape.com/viewarticle/408488_2



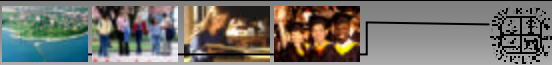
Motor Function

- *Subscapularis can be tested by resisting further internal rotation of the shoulder with the hand behind the back, moving away from the mid-lumbar spine.*




Motor Function

- *Serratus anterior is evaluated by resisted forward flexion of the shoulder at 90° of forward flexion, checking for winging of the scapula*
- *Weakness of the serratus anterior is associated with posterior glenohumeral instability*
- *Scapular winging may be seen with trapezial dysfunction, so it is important to grossly examine and test the strength of the trapezius.*

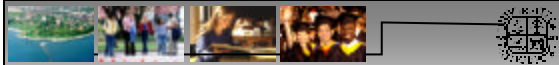


Clunk Test

Tear of the anterior labrum




- Document joint stability in order to assess the rotator cuff and glenoid labrum.

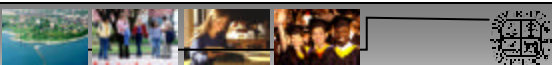


Rowe Test

For multidirectional instability



- Attempt to dislocate
- Look at patient's face for apprehension and/or discomfort
- This is a positive sign
- GH ligament, Rotator cuff tendons and joint capsule



Multidirectional Instability

- This detachment is associated with clicking sounds, locking of the shoulder, and/or a feeling that the shoulder is "not right" but it is rarely associated with frank shoulder instability.



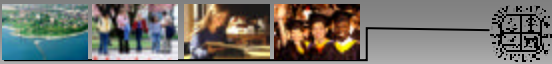
Multidirectional Instability

Arthroscopy




- Best diagnosed by arthroscopy

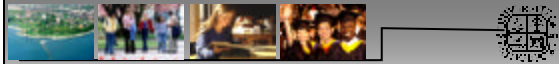
Fig 8a




Arthrogram of Shoulder



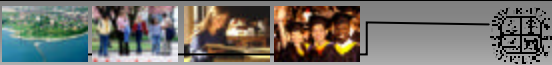
- Arthrography is the x-ray examination of a joint that uses fluoroscopy and a contrast material containing iodine.



Arthroscopic Surgery



- Arthroscopy is defined as procedures which are performed using percutaneous instruments under the guidance of arthroscopes.



Atraumatic SLAP Lesion

Surgical repair of shoulder instability


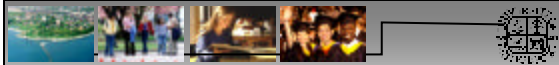


Fig 8f

- A “Superior Labrum Anterior Posterior” lesion
- Separation of the labrum from the upper rim of the shoulder cavity.



Bankart Lesion

Traumatic unidirectional instability

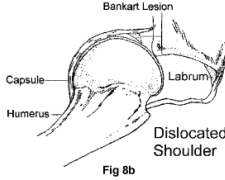
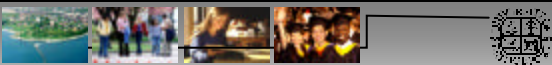



Fig 8b

- Anterior instability is the most common type of glenohumeral instability.



Bicipital Instability and Labral Tear



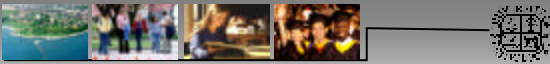
- In younger athletes, relative instability due to hyperlaxity may cause similar inflammatory changes on the bicipital tendon due to excessive motion of the humeral head.



Bicipital Instability and Labral Tear

- Labral tears may disrupt the biceps anchor, resulting in dysfunction causing pain.


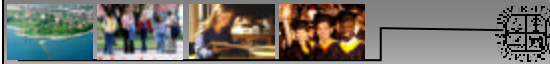




Clunk Test

Anterior Tear of the Glenoid Labrum


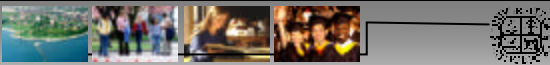
- Anterior pressure against humeral head
- External rotation
- Clunk or grinding indicates a positive test

Chronic Anterior Instability

Characterized by three main parameters


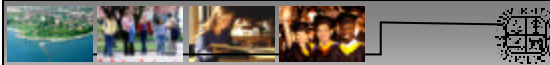
1. Ligamentous laxity,
2. A labral lesion, which may vary greatly in size, and which will worsen with every dislocation of the humeral head
3. Anterior soft-tissue stripping, which will often be very slight.

Abduction Inferior Stability (ABIS) Test


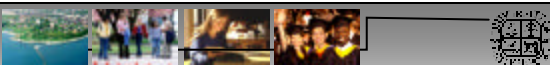
Feagin test + anterior inferior shoulder instability with downward displacement or apprehension

- Patient's arm abducted with the forearm resting on the examiner's shoulder
- Examiner exerts pressure on the arm, gradually pushing the humeral head downwards

Crank Test (3) (Standing or seated) or Fulcrum Test (Supine)


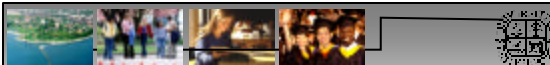
- This test serves to place the shoulder in a position of maximal instability (extremes of abduction and external rotation).
- The test is positive for instability if the patient expresses pain or apprehension.

Relocation Test (4)

Classic fulcrum test

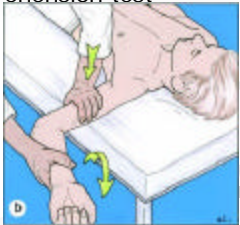
- The humeral head is pushed forward to elicit apprehension

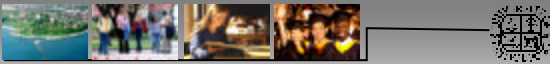



Relocation Test

Prevents anterior subluxation and produces a negative apprehension test

- Pressure over the front of the humeral head prevents the head suluxating anteriorly, and does not cause apprehension.


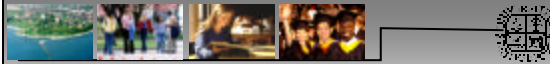




Sulcus Test (1)

A positive test is indicative of abnormal mobility


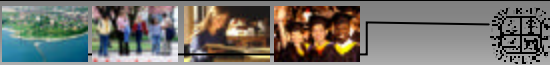
- In the relaxed patient, the examiner gently pulls the humerus downwards. The test is positive if the humeral head descends, with formation of a groove or sulcus under the lateral border of the acromion

Drawer Test (2)

Demonstrates overall non-specific hyperlaxity or anterior instability of the glenohumeral joint


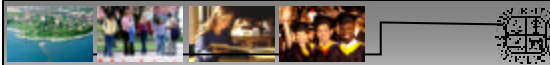
- The patient is made to relax and slightly lean forward.
- The examiner holds the humeral head between his or her thumb and index finger, and tries to make the head slide backwards and forwards.

Positive Hyperabduction Test


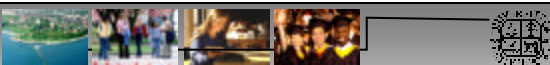
Inferior Glenohumeral ligament determines range of passive abduction (85-90 degrees)

- Marked asymmetry between the affected and the healthy side is characteristic of laxity of the ligament complex.
- Positive test = 105 degrees plus

Multidirectional Hyperlaxity


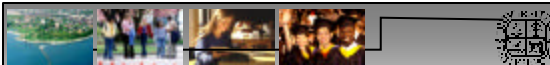
- On examination, there will be a groove of more than 2 cm in the sulcus test, as well as major anterior and posterior drawer movements. External rotation of the upper limb of more than 90° is also considered to be a sign of abnormal laxity.


End of Shoulder Presentation

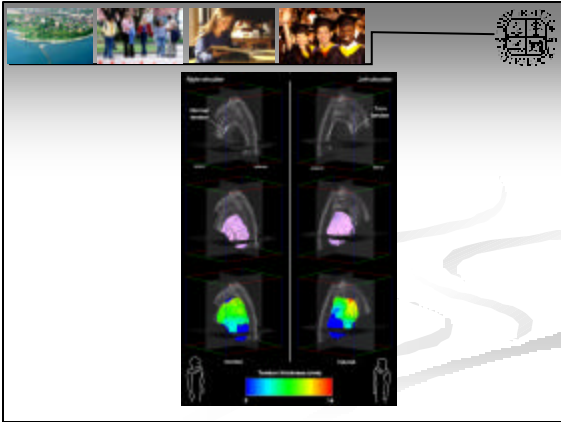
The Doctor of the future will give no medicine but will interest his patients in the care of the human frame, in diet and in cause and prevention of disease.

Thomas A. Edison

Shoulder Sonogram





What is Thoracic Outlet Syndrome?
National Institute of Neurological Disorders and Stroke

- *Thoracic outlet syndrome (TOS) consists of a group of distinct disorders that affect the nerves in the brachial plexus and various nerves and blood vessels between the base of the neck and axilla.*

What is Thoracic Outlet Syndrome?

- *For the most part, these disorders have very little in common except the site of occurrence*
- *The disorders are complex, somewhat confusing, and poorly defined, each with various signs and symptoms of the upper limb.*

True Neurologic TOS

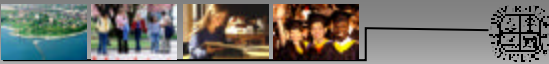
- *Only type with a clear definition that most scientists agree upon. The disorder is rare and is caused by congenital anomalies (unusual anatomic features present at birth). It generally occurs in middle-aged women and almost always on one side of the body. Symptoms include weakness and wasting of hand muscles, and numbness in the hand.*

Disputed TOS

- *Also called common or non-specific TOS, is a highly controversial disorder. Some doctors do not believe it exists while others say it is very common. Because of this controversy, the disorder is referred to as "disputed TOS." Many scientists believe disputed TOS is caused by injury to the nerves in the brachial plexus. The most prominent symptom of the disorder is pain. Other symptoms include weakness and fatigue.*

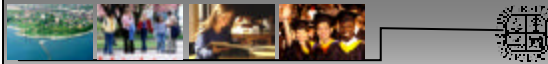
Arterial TOS

- *Occurs on one side of the body. It affects patients of both genders and at any age but often occurs in young people. Like true neurologic TOS, arterial TOS is rare and is caused by a congenital anomaly. Symptoms can include sensitivity to cold in the hands and fingers, numbness or pain in the fingers, and finger ulcers (sores) or severe limb ischemia (inadequate blood circulation).*



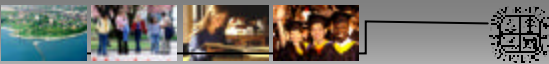
Venous TOS

- *Also a rare disorder that affects men and women equally. The exact cause of this type of TOS is unknown. It often develops suddenly, frequently following unusual, prolonged limb exertion.*



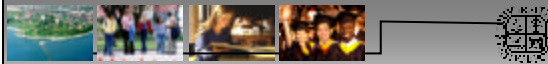
Traumatic TOS

- *May be caused by traumatic or repetitive activities such as a motor vehicle accident or hyperextension injury (for example, after a person overextends an arm during exercise or while reaching for an object).*




Traumatic TOS

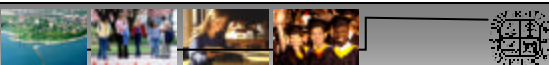
- *Pain is the most common symptom of this TOS, and often occurs with tenderness. Paresthesias (an abnormal burning or prickling sensation generally felt in the hands, arms, legs, or feet), sensory loss, and weakness also occur. Certain body postures may exacerbate symptoms of the disorder.*



Thoracic Outlet Syndrome




- *How could you differentiate vascular from neurogenic TOS?*

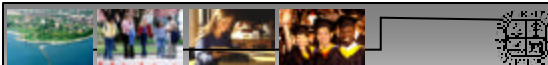


Neurovascular Evaluation

Adson's test




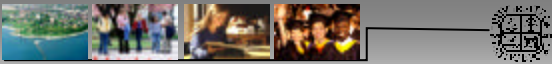
Your evaluation should include a complete neurovascular assessment



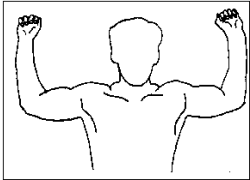
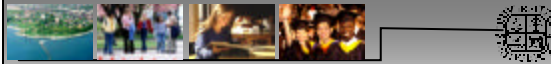
Thoracic Outlet Syndrome

Wright's Test


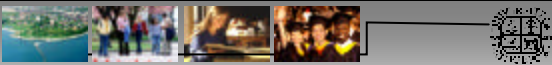




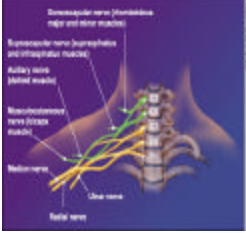
Thoracic Outlet Syndrome Roos Test

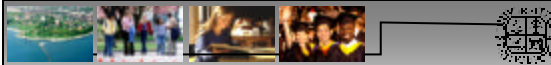
Thoracic Outlet Syndrome Adson's Test

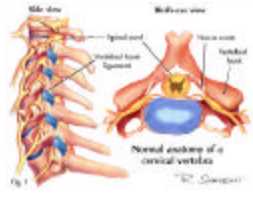
Brachial Plexus Irritation



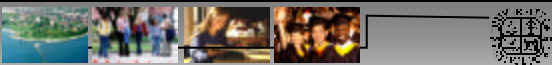
- How would you differentiate a nerve root lesion from a brachial plexus lesion?



Cervical Anatomy



- Brachial Plexus Stretch test
- Bikele's test
- Brachial Plexus Tension test
- Bakody's sign



Brachial Plexus Irritation