OSC | 11
Ohio Safety Congress & Expo

#393 Shoulder injuries: "It just went pop!"

James Anthony, M.D.

Wednesday, March 30, 2011
11 a.m. to Noon

Ohio | Bureau of Workers' Compensation

Continuing Nursing Education Disclosures

- **Goal:** To educate conference attendees on specific aspects of accident prevention and Ohio's workers' compensation system
- **Learning objectives for session #** 393-Shoulder injuries: "It just went pop!"**:**
  - Describe anatomy of the shoulder and key injury areas;
  - List major injuries to the shoulder;
  - Describe key treatment options including surgical interventions; and
  - Explain options for shoulder rehabilitation
- **Criteria for Successful Completion:** Attend the entire event and complete a session evaluation.
- **Conflict of Interest:** The planners and faculty have no conflict of interest.
- **Commercial Support:** There is no commercial support for this event.
- **Continuing Education:** Awarded 0.1 IACET general CEUs and 1.0 RN* contact hour.

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"Doc, my shoulder just popped" (and it hurts!)

Ohio Safety Congress
Columbus, Ohio

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March 30, 2011

Introduction and Program Objectives

- Overview of Problem
- Describe anatomy of the shoulder
- List major injuries to the shoulder

Introduction and Program Objectives

- Describe key treatment options including surgical interventions
- Explain options for shoulder rehabilitation
- Compare and contrast surgical vs. nonsurgical treatment options
- Questions and Answers

Overview of Problem

- In 2006, 7.5 million people went to the doctor's office for a shoulder problem
- More than 4.1 million of these visits were for rotator cuff problems
- Frequently caused by athletic activities that involve excessive, repetitive, overhead motion, such as swimming, tennis, pitching, and weightlifting
- Injuries can also occur during everyday activities such as work activities, washing walls, hanging curtains, and gardening
- Most problems in the shoulder involve the muscles, ligaments, and tendons, rather than the bones

Overview of Problem

- Some people will have a tendency to ignore the pain and "work through" a shoulder injury, which may:
  - aggravate the condition, or
  - cause more problems
- People also may underestimate the extent of their injury because
  - steady pain,
  - weakness in the arm, or
  - limitation of joint motion becomes almost second nature to them

Brief overview of clinically relevant anatomy

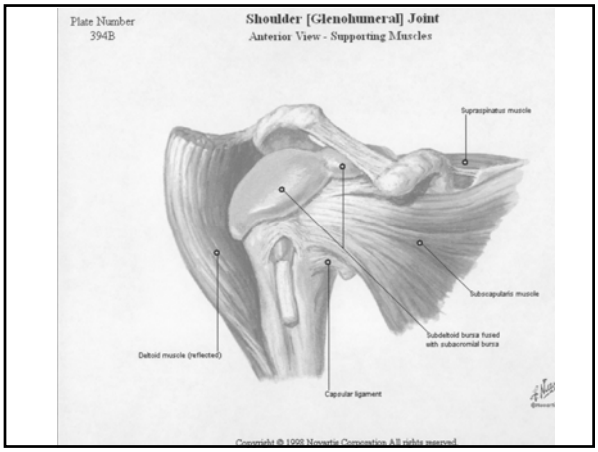
•Anterior shoulder ligaments and tendons

Brief overview of clinically relevant anatomy

•Anterior view muscles and bursa

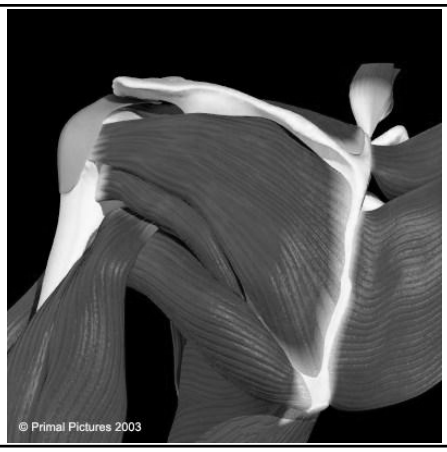
Brief overview of clinically relevant anatomy

•Anterior view muscles and bursa (continued)



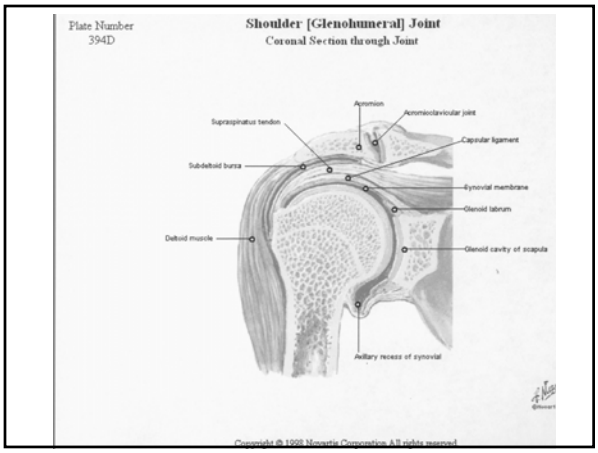
Brief overview of clinically relevant anatomy

•Posterior view muscles (rotator cuff)



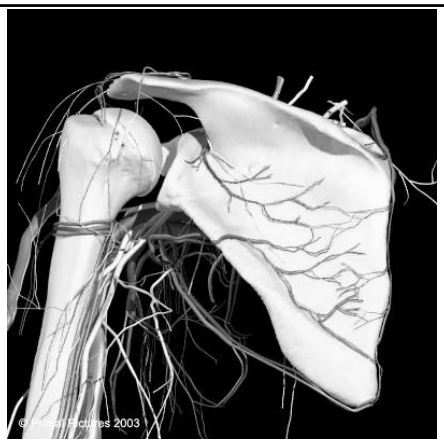
Brief overview of clinically relevant anatomy

•Coronal Section through joint



Brief overview of clinically relevant anatomy

•Suprascapular Nerve



Evaluation of key injuries in the shoulder

- Injury history of the injured worker
  - Onset and activity at onset
  - Pain – Quality, location, duration of symptoms
  - Actions that worsen symptoms
  - What job activities make symptoms intensify?
  - How long or hard do you need to work until symptoms intensify?
  - Overhead motion in your work?
  - Any grinding or popping and when?
  - Past injuries
  - Past treatments

Evaluation of key injuries in the shoulder

- Clinical Pearls of shoulder history/symptoms
  - Anterior shoulder pain and impingement **Glenohumeral Joint instability**
  - Vague overhead weakness (not profound) **Suprascapular nerve/cuff tear**
  - Pain with overhead movement + Night pain **Impingement Syndrome**
  - Pain or "clunking sound" with overhead move **Labral Disorder**

Evaluation of key injuries in the shoulder

- Clinical Pearls of shoulder history/symptoms
  - Pain radiates down arm + not below elbow **Rotator Cuff disorder**
  - Pain radiates up to neck or pain/numb below elbow **Cervical disorder**
  - Cannot use arm above shoulder **Cuff tear (massive) or Worker's Comp**

Examination concepts

- ***Inspection and palpation***
  - Anterior:
    - asymmetry
    - bony prominences
  - Posterior:
    - asymmetry
    - muscle atrophy
    - prominent suprascapular ridge

Examination concepts

- ***ROM***
  - flexion
  - abduction
  - internal rotation
  - external rotation

Examination concepts

- ***Muscle Testing***
  - Deltoid
  - Supraspinatus
  - Infraspinatus/Teres Minor
  - Subscapularis (lift off)
  - Serratus Anterior (scapular wing)
  - Rhomboid

Examination concepts

- ***Special Tests***
  - Neer
  - Hawkins
  - Cross-body adduction
  - Apprehension sign
  - Sulcus sign
  - Jerk test
- ***Special Tests***
  - Active Compression test of O'Brien
  - Anterior/Posterior drawer
  - "Clunk" sign
  - Drop Arm test
  - Posterior Apprehension

Common causes of rotator cuff injuries

- **Lifting or pulling**
  - Lifting an object that's too heavy or doing so improperly
  - Pulling something, such as a heavy container, box, or skid, may cause a shoulder injury
  - A hard "jerk" with a pull, such as when an object is stuck, does not slide easily, or is too heavy
  - All lifts and pulls are especially risky for the rotator cuff when they are done over chest height

Common causes of rotator cuff injuries

- **Falling**
  - Using your arm to break a fall or falling on your arm can bruise or tear a rotator cuff tendon or muscle
  - Falling and grabbing a stair railing or climbing hold on a truck to break your fall places the rotator cuff at high risk

Common causes of rotator cuff injuries

- **Repetitive stress**
  - Repetitive overhead movement of your arms can stress your rotator cuff muscles and tendons, causing inflammation and eventually tearing
  - Common among people in the building trades, such as painters and carpenters
  - Common in athletes, especially baseball pitchers, swimmers and tennis players

Common causes of rotator cuff injuries

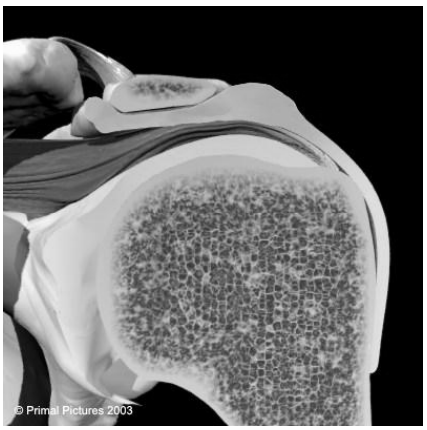
- **Poor posture**
  - When you slouch your neck and shoulders forward, the space where the rotator cuff muscles reside can become smaller
  - This can allow a muscle or tendon to become pinched under your shoulder bones (including your collarbone)
  - More often during overhead activities, such as a lift and push or pull overhead or throwing motion

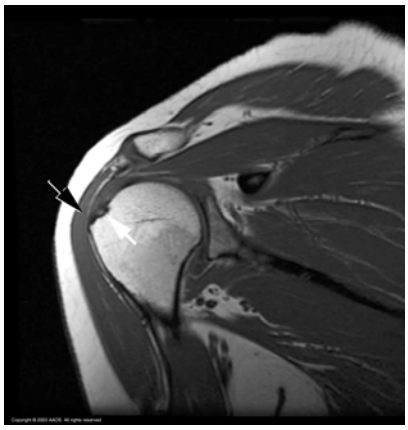
Common causes of rotator cuff injuries

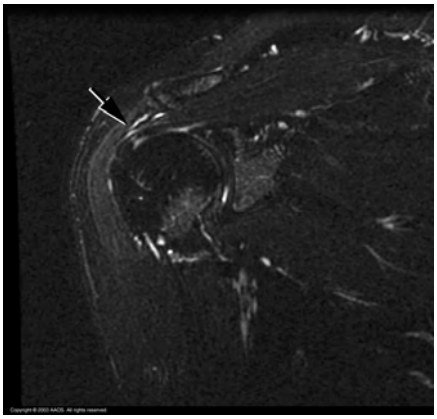
- **Normal wear and tear**
  - Increasingly after age 40
  - normal wear and tear on your rotator cuff can cause a breakdown of fibrous protein (collagen) in the cuff's tendons and muscles
  - more prone to degeneration and injury
  - you may also develop calcium deposits within the cuff or arthritic bone spurs that can pinch or irritate your rotator cuff

Rotator Cuff Disorders

- Acromial Pathology
- Impingment Syndrome
- Primary Instability / Secondary Impingment
- Subacromial Bursitis
- Supraspinatus Tendinosis
- Rotator Cuff Partial Tear
- Rotator Cuff Tear (complete recent, complete massive)
- Rotator Cuff Arthropathy







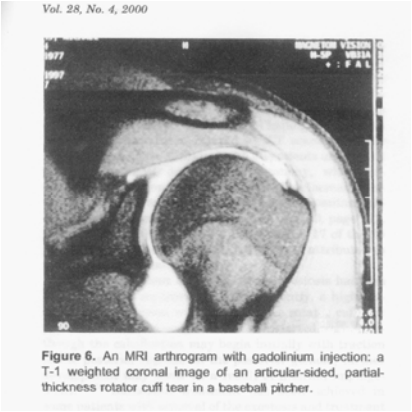


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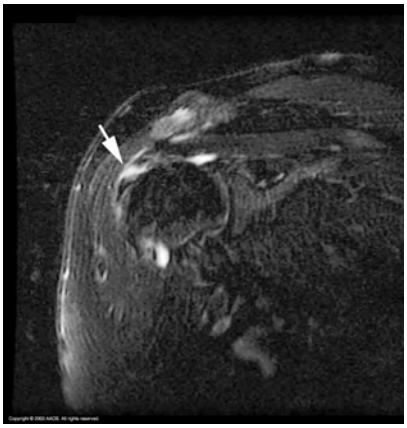
Figure 6. An MRI arthrogram with gadolinium injection: a T-1 weighted coronal image of an articular-sided, partial-thickness rotator cuff tear in a baseball pitcher.



Glenoid Labrium Pathology

- SLAP lesion (Superior Labrum, Anterior to Posterior)
  - Might destabilize the biceps anchor
- Remember the anatomy of the labrum:
  - It is a soft fibrous rim attached to the "cup" or glenoid cavity of the shoulder to deepen the "cup" and allow more stability of the humeral head
  - It also is the attachment for the long head of bicep tendon and other ligaments
- Any tear to this fibrous rim can be significant but the SLAP lesion is a more extensive tear on "top" of socket

Figure 2: Courtesy of David B. Richards, MD

Figure 2. The attachment of the glenoid labrum (*arrow*) to the rim of the glenoid cavity is usually smooth and continuous, as shown in this arthroscopic view of the shoulder. The superior aspect of the glenoid labrum is the attachment site for the long-head tendon of the biceps muscle (*arrowhead*), which helps to stabilize the shoulder.

Shoulder Instability

- Can be a primary problem that leads to other distinct pathology or
- Can be a secondary result of many of the other injury pathologies (even many listed previously)

Initial Treatment of Shoulder Disorders

- ***Control/eliminate pain & restore motion***
  - NSAIDS
  - ICE
  - PT modalities
  - Short-term narcotics
  - Rest
  - Activity avoidance
  - Oral corticosteroids
  - Subacromial corticosteroid injection
  - Other muscular or tendon area injections (eg. Biceps tendon area)

Treatment of Shoulder Disorders

- **Treatment options include:**
  - Nonsurgical (conservative) treatment
  - Surgical treatment – Labrum repair, Bicep Tendon repair, AC joint repair or other surgeries specific to the pathology found
  - Surgical treatment (rotator cuff repair)
    - Open repair
    - Mini-open repair
    - All-arthroscopic repair

Operative Treatment of Shoulder Disorders – Rotator Cuff Tears

- The treating physician or orthopedic consultant may recommend surgery if:
  - Nonsurgical treatment does not relieve symptoms
  - The tear has just occurred and is very painful
  - The tear is in the shoulder of the dominant arm of an active person
  - If maximum strength in the arm is needed for overhead work

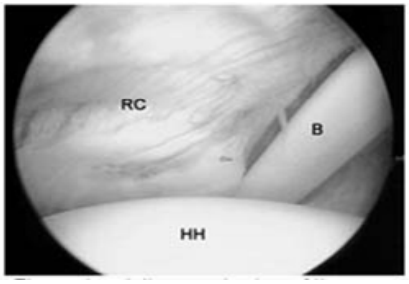
Operative Treatment of Shoulder Disorders – Rotator Cuff Tears

- The type of surgery performed depends on the size, shape, and location of the tear.
  - A partial tear may require only a trimming or smoothing procedure, called a “debridement.”
  - A complete tear within the thickest part of the tendon is repaired by suturing the two sides of the tendon back together.
  - If the tendon is torn away from where it inserts into the bone of the arm (humerus), it is repaired directly to bone.

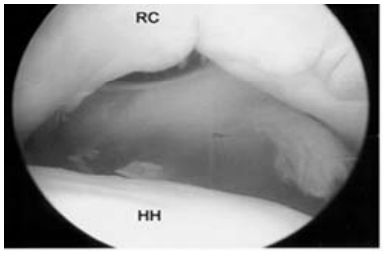
Operative Treatment of Shoulder Disorders – Rotator Cuff Tears

- In the operating room, the surgeon may remove part of the front portion of the scapula, the acromion, as part of the procedure
  - The acromion can potentially cause "impingement " on the tendon. This may make a recurrent tear more likely
- Other conditions such as arthritis of the AC joint or tearing of the biceps tendon may also be surgically addressed along with the cuff repair

Operative Treatment of Shoulder Disorders – Rotator Cuff Tears



Operative Treatment of Shoulder Disorders – Rotator Cuff Tears



Operative Treatment of Shoulder Disorders – Rotator Cuff Tears

- Post-operative Rehabilitation
  - The arm is immobilized to allow the tear to heal
  - Length depends on severity of tear
  - Therapy begins with passive motion and progresses to active motion and then resistive exercises
  - Complete recovery can take several months
  - Strong commitment to rehabilitation is the key to success
  - Work Conditioning or Work Hardening might be needed to complete recovery for full duty return to work

Operative Treatment of Shoulder Disorders – Labrum Injuries

- Even if there is no clear diagnostic test that demonstrates an injury to the labrum, the surgeon will inspect this area at the time of surgery
- If labrum tear does not involve the biceps tendon or any ligament, the surgeon might just remove the torn flap
- If the biceps tendon is involved, it must be reattached and repaired
- Tears below the midpoint of the labrum (bottom) will also be repaired if ligament attachments are affected (Bankart lesion) and the tissue is folded or "pleated" to increase stability

Operative Treatment of Shoulder Disorders – Labrum Injuries

- Rehabilitation of Labrum Repairs
  - Sling for 3 to 4 weeks to allow tissue to begin to heal
  - Gradual motion and eventually strength is restored
  - Might be able to do restricted type work in 6 weeks but full recovery takes about 3 to 4 months

Operative Treatment of Shoulder Disorders – Other Surgeries

- This is not an inclusive list but here are a few other areas that might require surgical correction:
  - Tear of the long head of the bicep (complete) – Because there are two attachments, surgery not always needed
  - Recurrent dislocations – Shoulder might become unstable and need to be repaired and "tightened"
  - Adhesive Capsulitis – shoulder manipulation under anesthesia might be necessary or removal of adhesions
  - AC arthritis - remove the AC joint completely to allow more room for the supraspinatus tendon to move

Nonoperative Treatment of Shoulder Disorders

- ***Goals***
  - Control/eliminate pain
  - restore complete ROM
  - correcting strength deficits
  - restoring normal synchronous muscle activity

Nonoperative Treatment of Shoulder Disorders

- ***Progressive early strengthening***
  - ROM
  - simple strengthening
  - stretching program
  - Early referral to a full physical therapy program for clinically supervised progression

Nonoperative Treatment of Shoulder Disorders

- ***Advanced rehabilitation exercises***
  - More aggressive strengthening
  - Work specific activity by:
    - Advancing a transitional work or restricted duty program
    - Work Conditioning
    - Work Hardening
  - Always include a home exercise program (HEP)

Nonoperative Treatment of Shoulder Disorders

Return to full duty work

- gradual progression
- continue all other rehabilitation activity

Nonoperative Treatment of Shoulder Disorders

Failure

- lack of definitive progress over 3 months
- lack of return to full and unrestricted duty after 6 months

Nonoperative Treatment of Shoulder Disorders

Clincal Pearl

- Remember the importance of the muscular balance for all work and athletic activity
- Must provide balance in the rehab program
- One injury can create the biomechanical path to another injury
- Should rehabilitate muscle groups for joints above and below the injured area and, of course, the opposite side

Surgical vs. Nonsurgical treatment – which is superior for the Rotator Cuff?

- You probably already know that the answer is not clear cut and greatly depends on the patient to weigh the pros and cons of each method
- About 50% of individuals will achieve a satisfactory result without surgery
  - Reduced pain
  - Improved motion
  - Generally a full recovery of strength is not possible

Surgical vs. Nonsurgical treatment – which is superior for the Rotator Cuff?

- Some predictors of poorer outcomes without surgery:
  - Long duration of symptoms (over 6 months)
  - Larger tears (greater than 3 centimeters)
- Some advantages of nonsurgical:
  - No surgical risks (infection, anesthesia)
  - No "down time"

Surgical vs. Nonsurgical treatment – which is superior for the Rotator Cuff?

- Some disadvantages of nonsurgical treatment:
  - Strength does not improve
  - Tears can become bigger over time
    - If the tear extends, it will almost always be painful
    - Chance of tear increasing is about 50%
  - Injured worker may be forced to reduce his/her activity levels

Surgical vs. Nonsurgical treatment – which is superior for the Rotator Cuff?

- Some advantages of surgical treatment:
  - Strength can be improved by surgical repair
  - Satisfactory results occur in about 80 to 95% of patients evidenced by:
    - Reduction in pain
    - Restoration of motion
    - Restoration of function

Surgical vs. Nonsurgical treatment – which is superior for the Rotator Cuff?

- Some "red flags" that surgery might not be as effective as expected:
  - Poor tissue quality noted at repair
  - Large or massive tears
  - Poor compliance with postoperative rehabilitation
  - Patient age (over 65 years old)
  - Worker's Compensation

Surgical vs. Nonsurgical treatment – which is superior for the Rotator Cuff?

- Based on multiple studies, the results of open, mini-open, and arthroscopic repair is very similar as evidenced by:
  - Patient satisfaction
  - Pain relief
  - Strength
- Surgeon expertise is a better predictor than what type of procedure is chosen

Surgical vs. Nonsurgical treatment – which is superior for the Rotator Cuff?

- Complications of surgery are about 10% and include:
  - Nerve injury (1 to 2%)
  - Infection (1%)
  - Deltoid detachment (under 1%)
  - Stiffness (under 1%)
  - Tendon tear – recurrent (6%)
- Most patient's have functional motion and strength within 4 to 6 months after surgery

QUESTIONS & ANSWERS

"Doc, my shoulder just popped"
(and it hurts!)

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