Understanding Shoulder Injuries

- History
  - Traumatic
  - Overuse
  - Aging
  - Infection
  - Metabolic
  - Congenital
  - Neurological
History

- The most important part of the evaluation
- 80% of the diagnosis should be able to be made with a proper history
- What happened?
- How and when did it happen?
- What makes it worse or better?
- Is there any sensation of
  - Popping
  - Painful popping
  - Catching
  - Night time awakening
History (cont.)

- Loss of motion
  - Diminished abduction and flexion: look for impingement
  - Diminished internal rotation: look for adhesive capsulitis (frozen shoulder) or captured shoulder (post surgical adhesions)

- Painful overhead arc?

- Trouble lifting, reaching, throwing, etc

- Night time awakening suggests internal derangement
History

- Traumatic
  - Work injury
  - Falls
  - Sports
  - Motor vehicle
Overuse

- Repetitive strain
- Abnormal posture
- Overhead use
- Twisting
- Lifting
- Reaching, pushing, pulling, carrying
Basic Anatomy
Degenerative conditions

- Rotator cuff tendonitis
- Rotator cuff tears
  - Partial tears
  - Complete tears
  - Complex tears
- Biceps tendon tears
- Biceps tendon subluxation
- Labral tears
- Degenerative arthritis glenohumeral joint
- Degenerative arthritis acromioclavicular joint
- Calcific tendonitis of rotator cuff
Aging (cont.)

- Degenerative type 3 acromion
  - Tends to occur with chronic rotator cuff degeneration
  - Can possibly contribute to rotator cuff tearing or impingement

- Degenerative acromioclavicular joint inferior spur can lead to impingement
Calcific Tendonitis
Partial and Full thickness cuff tears
Bankart Lesion
Infection

- Usually post operative
- Rarely due to other sources
Metabolic

- Rheumatoid arthritis
- Gout
- Avascular necrosis
  - Chronic steroid use
  - Rare: sickle cell anemia
  - Rare: scuba diving

Rare: sickle cell anemia
Rare: scuba diving
Congenital

- Ligamentous laxity
  - Multidirectional laxity, may lead to
    - Multidirectional instability
  - More easily injured
  - Usually bilateral, may or may not involve other joints
  - Sporadically involves the AC joint
Instability Types

- **Traumatic** “TUBS”
  - Traumatic, Unidirectional, with Bankart lesion often needing Surgery
  - AMBRI: Atraumatic, Multidirectional, usually Bilateral, responds to Rehabilitation and rarely requires Inferior capsular shift
  - Traumatic superimposed upon pre-existing atraumatic instability
  - Mild instability: negative MR Arthrogram, seen only at arthroscopy
Neurologic

- Neck (Pain radiates along nerve pathways)
  - Facet syndrome
  - Degenerative spondylosis (arthritis)
  - Discogenic pain
  - Foraminal stenosis
  - Herniated disc
Neck Pain

Examples of Disc Problems

- Normal Disc
- Degenerated Disc
- Bulging Disc
- Herniated Disc
- Thinning Disc
- Disc Degeneration with Osteophyte Formation

Radicular Pain

A) C2-3
B) C3-4
C) C4-5
D) C5-6
E) C6-7
F) C7-T1
Neck Pain (cont.)
Facet Pain

Vertebra - the spine is made up of 24 vertebrae
Spinal canal
Disc
Facet Joint
Neurologic (cont.)

- Brachial plexus
  - Strain
  - Tumor
  - Myofacial pain syndrome/trigger point
- Complex regional pain syndrome (reflex sympathetic dystrophy)
  - Shoulder-hand syndrome
- Neuropathic pain
Neurologic (cont.)

- Cubital tunnel syndrome
  - Radiates pain to scapula
  - Numbness and tingling to ring and/or little fingers
  - Paresthesias increase with elbow flexion
  - Weakness
  - May awaken

- Carpal tunnel syndrome
  - Radiates pain to trapezius
  - Numbness, tingling to thumb, index, middle, and ring fingers
  - Weakness, may drop things
  - Awakens at night, has to shake hand out or move fingers
Neurological (cont.)

Median Nerve

Ulnar Nerve
Neurological (cont.)
Shoulder Injuries, Traumatic

- Traumatic injuries are often superimposed upon degenerative conditions
- Physician must try to differentiate between new and pre-existing conditions medicolegally
- Acromioclavicular sprain
  - Grade 1: no displacement
  - Grade 2: clavicle elevated 50%
  - Grade 3: clavicle elevated 100%
    - Complete tear of acromioclavicular and coracoclavicular ligaments
AC Strain
Trauma (cont.)

- Glenohumeral joint strains
  - Anterior dislocation (95%)
  - Posterior dislocation (5%)
  - Subluxation
  - Labral tear
    - Anterior
    - Inferior
    - Posterior
    - Superior—SLAP tear (superior labral tear from anterior to posterior)
  - Combinations
    - Bankart lesion (anterior labral tear, may involve fracture)
  - Capsular stretch or tear
SLAP Tear
SLAP Tear at arthroscopy
Repaired SLAP Tear
Bankart Lesion, Anterior Shoulder Dislocation
Trauma (cont.)

- Rotator cuff tears
  - Complete tear, with or without retraction
  - Partial tear, with or without retraction
  - Rotator interval tear
  - May cause instability on occasion
  - Chronic complete tears often lead to rotator cuff muscle atrophy and/or degenerative arthritis (cuff tear arthropathy)
Rotator Cuff Bursal Side Tear
Rotator Cuff Tear, Arthroscopic View
Subacromial Bursitis/Impingement
Subacromial Bursitis, Partial Cuff Tear
Subacromial bursitis

- Associated with impingement or can cause impingement
- Can cause acromioclavicular joint pain due to the fact that the AC joint becomes inflamed, since the AC joint is adjacent to the subacromial bursa
- Chronic bursitis is more difficult to treat than acute
- Any internal derangement of the shoulder can cause bursitis and can lead to impingement because the bursa swells, leaving less room for the rotator cuff with upward shoulder motion
Trauma (cont.)

- Not all subacromial bursitis is related to trauma, but can also occur when there is sufficient degeneration or tearing of the rotator cuff.

- Bursitis may occur spontaneously with rupture of a calcium deposit. It is usually severe, but it is often short lived.
Trauma (cont.)

- Fractures
  - Clavicle
    - Most are treated conservatively
    - Infrequently require surgical repair acutely
    - Chronic nonunions often require repair
  - Proximal Humerus
    - 1, 2, and 3 part fractures most often will heal
    - Some require surgery if displaced
    - 4 part fractures usually require hemiarthroplasty (shoulder joint replacement) due to avascular necrosis
Greater Tuberosity Fracture
Physical Examination

- 15% of the diagnosis
- Should confirm the history
- Must be comprehensive
AC Joint Stress Compression
Load and Shift: Supine
Supraspinatus Impingement Sign
Neer Test: Impingement

In the Neer test, the examiner forward flexes the arm maximally. Reproduction of the shoulder discomfort is a positive test, consistent with rotator cuff tendinopathy.
The Hawkins test involves shoulder abduction to 90 degrees, slight forward flexion, and internal rotation of the humerus performed by the examiner. Reproducing the patient's discomfort is a positive finding, consistent with rotator cuff tendinopathy.
O’Brien Test: SLAP tear
(? Impingement)
Apprehension: Anterior Instability (Suppression/Relocation)
Sulcus Sign: Inferior laxity
Sulcus Sign
Speeds Test: Bicipital Tendonitis (Impingement)
Winging: Serratus Weakness
Subscapularis Lift off Test
Spurling’s Sign: Nerve root compression (Kemp’s Test, with out axial loading = facet syndrome)
Median Sensory Distribution/Carpal Tunnel Release
Cubital Tunnel Syndrome
Injection Tests

- Subacromial injection, local anesthetic, with or without cortisone: repeat impingement signs.
  - If impingement signs disappear, then one has a positive IMPINGEMENT TEST.
  - Helps to differentiate between impingement or bursitis and frozen shoulder or even myofacial pain

- AC joint injection similarly helps to localize pain of the AC joint and distinguish it from local myofacial pain
Subacromial Injection

Subacromial space
Imaging Studies

- X-Ray
- MRI scan
  - By itself a good test for subacromial bursitis
  - But alone is not the gold standard now
- MR/Arthrogram (possibly with CT scan)
  - Most accurate in diagnosing rotator cuff tears, labral and SLAP tears, or loose bodies
- Ultrasound
  - Cheaper, good for rotator cuff, not much used.
X-ray

- Normal
- Osteoarthritis
Arthrogram: Torn Rotator Cuff
MR Arthrogram

Shoulder arthrogram

Artist enhanced

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Arch (Outlet) View
Normal Cervical MRI
Cervical Herniated Disc
MRI full thickness rotator cuff tear
Other Studies

- Nerve conduction studies for carpal and cubital tunnel syndromes and possibly radial tunnel syndrome
- EMG studies to look for nerve impingement
- Psychological studies as needed
- Ergonomic studies at work
Treatment

- Non-operative
  - Exercises, stretching, postural changes
  - Physical therapy
  - Chiropractic
  - Injections
    - Corticosteroids and/or local anesthetic
    - Subacromial bursa, AC joint, trigger points, carpal tunnel
    - AC joint, shoulder joint
    - Neck: foramenal epidural steroids, facet injections (discograms)
Treatment (cont.)

- NSAID’s
  - Celebrex, Mobic, Relafen, Lodine, Voltaren, Naprosyn, Motrin, etc
- Oral corticosteroids, e.g., Prednisone, Medrol Dose Pack
- Acupuncture
- Supplements
- Dynasplint for frozen shoulder
Treatment, Surgical

- Impingement
  - Acromioplasty vs bursectomy and subacromial smoothing
  - Smoothing/bursectomy 95% as good as acromioplasty but fewer complications

- Rotator cuff partial tears
  - Arthroscopic debridement, subacromial decompression, bursectomy,
  - If >50%, consider repair
  - Acromioplasty if cuff abraded from acromion, e.g. type 3 acromion or thick, abraded coracoacromial ligament
  - Subacromial smoothing is otherwise adequate

- Rotator cuff full thickness tears
  - Arthroscopic or mini open repair
  - +/- acromioplasty
Open/Arthroscopic Acromioplasty

Matsen Fig. 4-34.
Rotator Cuff Repair
Treatment, Surgical (cont.)

- Instability, glenohumeral
  - Dislocation: Labral repairs, Bankart Lesions
  - Multidirectional: Capsular repair
  - Avoid acromioplasty when impingement present, since acromion provides stability
  - SLAP repair

- Instability, biceps tendon
  - Repair SLAP tear
  - Biceps tenodesis
Treatment, Surgical (cont.)

- Instability, acromioclavicular joint, chronic
  - Grade 3 sprain: Modified Weaver-Dunn vs no surgery
- Instability, AC joint, acute:
  - Grade 3: repair all ligaments
- Degenerative arthritis
  - AC joint: arthroscopic or open distal clavicle resection
  - Shoulder joint: Arthroscopic debridement. If severe, total joint replacement
  - Avoid acromioplasty if believe total shoulder replacement eventually likely (need to preserve coracoacromial arch so that shoulder is stable when joint replaced)
- Chronic acromioclavicular strain: Arthroscopic distal clavicle resection
- Biceps tendonitis: Treat as impingement
- Biceps subluxation: Biceps tenodesis
Treatment, Surgical (cont.)

- Loose body: Arthroscopic removal
- Adhesive capsulitis (frozen shoulder)
  - Surgery indicated when conservative treatment fails, e.g. injections, Dynasplint, PT, passage of time
  - Manipulation under anesthesia with Depo Medrol injection
  - Arthroscopic capsulotomies
    - If manipulation does not provide full motion
    - Arthroscopy if other pathology suspected
    - If frozen shoulder is recurrent
    - If prior repair
- Captured shoulder: (Adhesions from previous surgery)
  - Arthroscopic debridement, adhesion lysis
  - Possible mini open adhesion lysis
Arthroscopic Capsulotomy for Adhesive Capsulitis

Incision in Capsule
Independent Medical Examinations

- Defense medical examinations
  - Are not independent in many cases
  - Some independent examiners appear to feel that it is their role to help the insurance company rather than find the truth
  - Often fail to make proper diagnoses in the face of good histories when their physical examination may be inadequate
    - May not discuss what impingement signs were performed or even if they were performed
    - Often Spurling’s Test is not done, and Kemp’s Test is virtually never done
    - Tests for labral instability, biceps tendinitis often not performed
    - Claim that since passive motion is greater than active motion, that therefore there must be poor effort. However, active motion is lost with impingement and bursitis due to pain.
    - Grip and pinch testing must be done with the Jamar Dynamometer and pinch meter to obtain proper curves, to look for objective losses of strength. A single grip or pinch
My Practice

- Performed surgery through 2004
- Approximately 4,000 shoulder cases
- Approximately 1,750 knee cases
- Arthroscopy of the shoulder, elbow, wrist, hip, knee, and ankle
- Assisted in approximately 1,000 neck and back neurosurgical cases
- 1,000 carpal tunnel releases
- Many cubital and radial tunnel releases
My Practice (cont.)

- Independent Medical Examinations for insurers 1980-1990
- Second Independent Medical Examinations for State of Alaska, 2003-current
- State of Oregon Arbiter Examinations, current
- Independent Medical Examinations from any source
  - A proper IME requires the entire file/images
- I welcome cases as a treating physician
  - If the patient is not progressing satisfactorily
  - If the patient’s current physician is closing a claim prematurely
Hippocratic Oath—Modern Version

I swear to fulfill, to the best of my ability and judgment, this covenant: I will respect the hard-won scientific gains of those physicians in whose steps I walk, and gladly share such knowledge as is mine with those who are to follow.

I will apply, for the benefit of the sick, all measures [that] are required, avoiding those twin traps of overtreatment and therapeutic nihilism.

I will remember that there is art to medicine as well as science, and that warmth, sympathy, and understanding may outweigh the surgeon's knife or the chemist's drug.

I will not be ashamed to say "I know not," nor will I fail to call in my colleagues when the skills of another are needed for a patient's recovery.

I will respect the privacy of my patients, for their problems are not disclosed to me that the world may know. Most especially must I tread with care in matters of life and death. If it is given me to save a life, all thanks. But it may also be within my power to take a life; this awesome responsibility must be faced with great humbleness and awareness of my own frailty. Above all, I must not play at God.
Hippocratic Oath (cont.)

I will remember that I do not treat a fever chart, a cancerous growth, but a sick human being, whose illness may affect the person's family and economic stability. My responsibility includes these related problems, if I am to care adequately for the sick.

I will prevent disease whenever I can, for prevention is preferable to cure.

I will remember that I remain a member of society, with special obligations to all my fellow human beings, those sound of mind and body as well as the infirm.

If I do not violate this oath, may I enjoy life and art, respected while I live and remembered with affection thereafter. May I always act so as to preserve the finest traditions of my calling and may I long experience the joy of healing those who seek my help.
Maimonides Prayer for the Physician  (Excerpt)

Before I begin the... work of healing and creations of your hands, I place my entreaty...that you grant strength of spirit and fortitude to faithfully execute my work. Let not desire for wealth or benefit blind me from seeing truth. Deem me worthy of seeing in the sufferer who seeks my advice-- a person-- neither rich nor poor. Friend or foe, good man or bad, of a man in distress, show me only the man.

If doctors wiser than me seek to help me understand, grant me the desire to learn from them, for the knowledge of healing is boundless. But when fools deride me, give me fortitude. Let my love for my profession strengthen my resolve...Illuminate the way for me, for any lapse in my knowledge can bring illness and death upon your creations... Strengthen me in body and soul, and instill within me a perfect spirit.