Common conditions of the upper-extremity: Getting in right!

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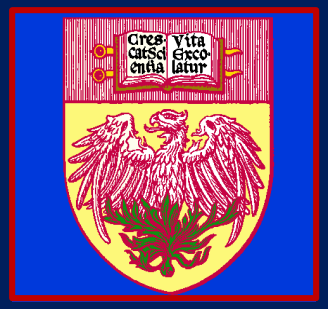


Introduction

Getting in right (GIR)!

- **Better for patient**
  - Less pain
  - Inc function, inc quality
- **Better for attorneys**
  - Avoid cases that will lose
  - Less time
  - Less cost
  - Favorable outcome

Common conditions of the Upper-Extremity:

1. Neuropathy:
   i. Carpal tunnel syndrome vs CTD
   ii. Cubital tunnel syndrome

2. Tendinopathy:
   i. trigger finger
   ii. Lateral epicondylitis
   iii. Rotator cuff

3. Arthropathy:
   i. Thumb 1st CMC OA
   ii. Shoulder OA

Overview:

How do you get in right (GIR)?

Physician prerequisites (GIR):

- In-depth understanding of the condition:
  - current Rx,
  - appropriate diagnostics,
  - time,
  - RTW potential
- Understand patient:
  - time, hysterical, desire for work
- Understand causality:
  - Open and shut

Understand the condition:

- **General vs sub-specialist**
  - Results, cost, time, valuable opinion

"The first doctor who sees the patient with a hand injury most influences the final result."

Sterling Bunnell, M. D.
1901-1988

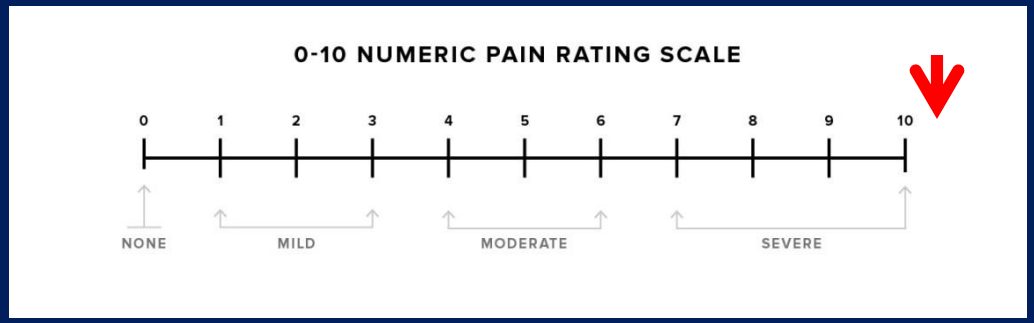
Understand the patient:

- Goals:
  - Cure?
  - Pain-free?
  - Work???
- Insurance – WC, no other
- Secondary gain?
  - Human nature, certain populations, geographical areas.

Work Comp/third party:

Patients incentivized to magnify their symptoms

- rely more on objective findings



Work Comp/Third Party:

- In-depth understanding of secondary gain
- "Pandora's paradox"
  very costly!!!

- Red flags - early
- Cost of work comp in Illinois!!!!

"A Worker's compensation injury is not just a medical problem, it's an example of a complicated bio/psycho/social phenomenon."

Dr. Gaffney 1997!

Pandora's Paradox:

Psychosocial factors involved in some injuries which significantly influence delayed recovery. However, there is a reluctance to open the box and address them. This can be a costly mistake not to look at them. There is a fear of opening Pandora's Box: "If I see it, I'll be responsible for it." However, avoiding the box does not make it go away. These psychosocial factors drive tremendous complications in the system, and in the failure to respond to medical treatment. The reality is that these patients are and will continue to be the biggest consumers of health care dollars.

Psychological exacerbation of symptoms:

Three common mechanisms - human mind increases pain and pain-related disability:

- Psychological distress (depression and anxiety) make pain seem worse.

- Misinterpretation or over-interpretation of pain signals (pain catastrophizing)

- Heightened illness concern or health anxiety. A sense that something is seriously wrong that does not lessen with normal test results and reassurance from health professionals.

Understand causality:

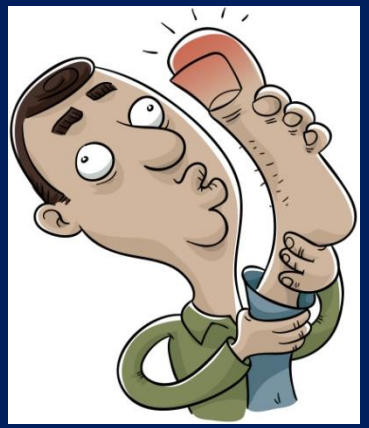
- **Not always linear:**
  - details
  - education, research (LOE), practice

Causality:

- **History:** comprehensive
  - Family history, comorbidities, etc

Sum of the parts

- Correlate the MOI –
  - feasible causal connection
  - temporal relationship



Causation:

- Determining causation is essential
- Compensable injuries:
  - State dependant
  - Aggravate a condition beyond normal progression
  - Significantly contribute to the development of a condition
  - Exacerbation (temporary increase in morbidity)

GOAL:
Work Comp/Third Party:

- Appropriate algorithm
- Realistic goals – maximum function
  <u>alleviate</u> pain
- MMI from injury/treatment

Workforce has changed!

Understand work demographics

- workforce historically young , male

Changes in the workforce:

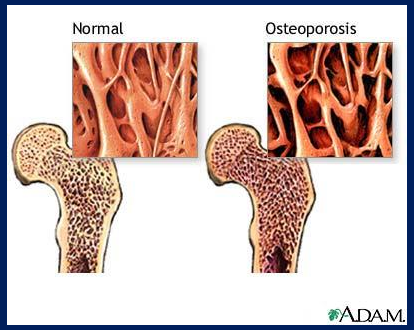
The workforce has gotten <u>older</u>!!

- <u>Woman</u> in the workforce increased

- Economics
- Baby boomers
- Protective laws

Effects of Aging

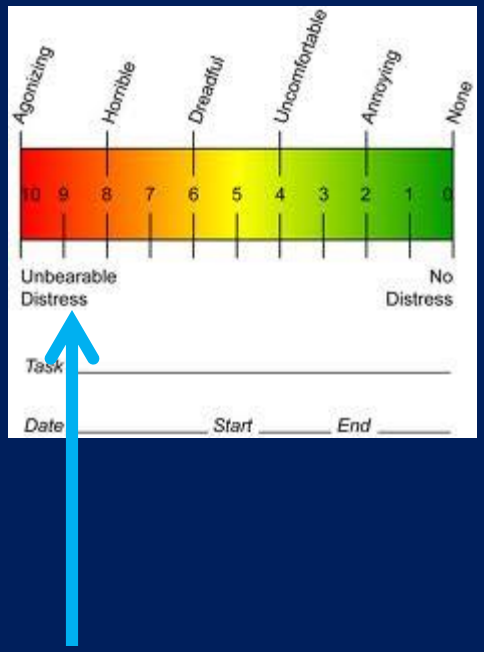
- Diminished muscle & tendon function
- Ligaments become less elastic
- Tendons become more stiff
- Changing neural input
  Decreased hand-grip strength
- Changes in cartilage
- Joints become stiffer
- Bone becomes less dense
  Higher risk of fracture



Work-Related Injuries

- More severe for older workers
- Older workers take longer to recover
- Injuries to older workers resulted in more disability
  - Higher % of fractures & multiple injuries

Common conditions



Carpal tunnel syndrome:

Work Comp CTS

- Number 1 cause of disability and lost time off work
- Average cost - $30,000.00/worker
- Inferior subjective outcomes

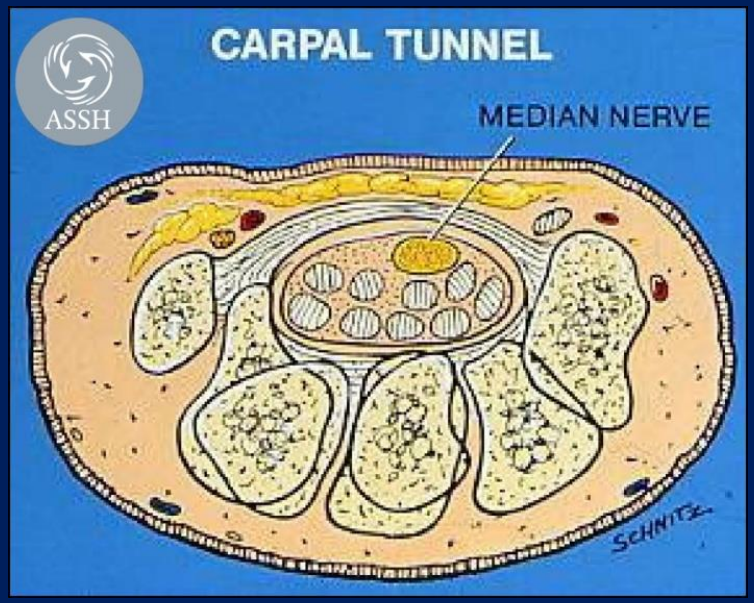
Carpal Tunnel Syndrome:

- Most common nerve compression – 2-3%
- Age 40-78

Occurs when the median nerve becomes compressed within the carpal tunnel.

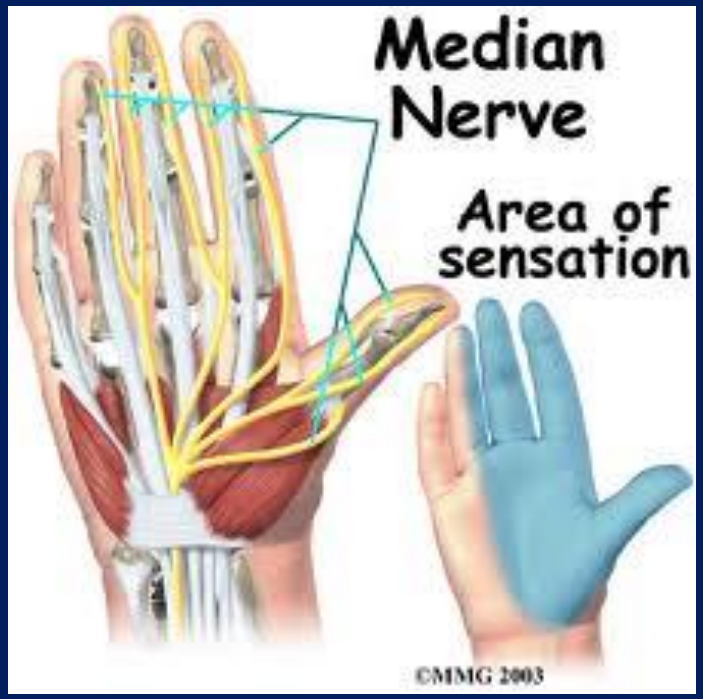
Anatomy:


Transverse Carpal
Ligament
Ulna
Median Nerve
Radius


CARPAL TUNNEL
ASSH
MEDIAN NERVE

Function:

- Sensation radial 3 and half digits
- Strength of thumb



Causes of Carpal Tunnel Syndrome

- Increase in Carpal Content
  - Edema - pregnancy
  - Tenosynovitis – RA, gout, pseudogout, SLE, etc
  - Space occupying lesion e.g. ganglion, tumor, OA, fracture, anatomic anomalies etc
- Decrease in Carpal Tunnel Size
  - Extreme flexion or extension of the wrist
  - Osteoarthritis
  - Age, Genetics
- Miscellaneous
  - Metabolic e.g. diabetes, thyroid disorder etc

- CTS - Systemic

Rheumatoid arthritis	Hemophilia
Diabetes	Multiple myeloma
Hypothyroidism	Obesity
Gout	Renal failure
Amyloidosis	Pregnancy
Osteoarthritis	Menopause
Alcoholism	Mucopolysaccharidosis

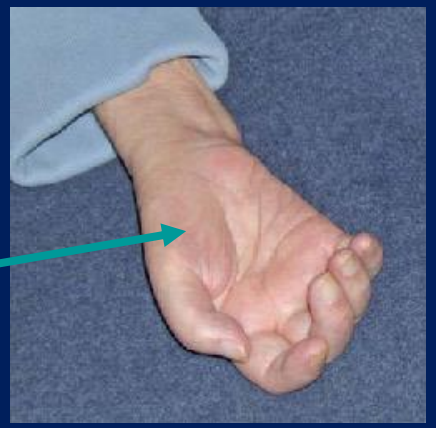
Symptoms of CTS

- Numbness (thumb, index, middle, ½ ring finger)
  - inability to button shirt etc.
- Night sx.
- Paresthesia
  - Tingling
  - Burning
- Weakness
  - Pinch and Grip

Common Clinical Findings

- 2-pt discrimination (S)
- loss of sweat (O)
- Semmes Weinstein monofilament (S)
- Tinel's Sign (S)
- Phalen's Test (S)
- Wrist compression test (Durkin) (S)
- Weak thumb palmar abduction (S)
- atrophy of thenar mass (O)

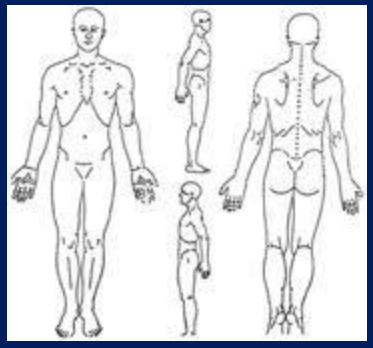
S – subjective; O - objective



- **CTS - Diagnosis**

	ity	Specifi	
Phalen			
Tinel			
Durkan	8		
Semmes-Weinste			nbo + Hand 18:269-77, 002

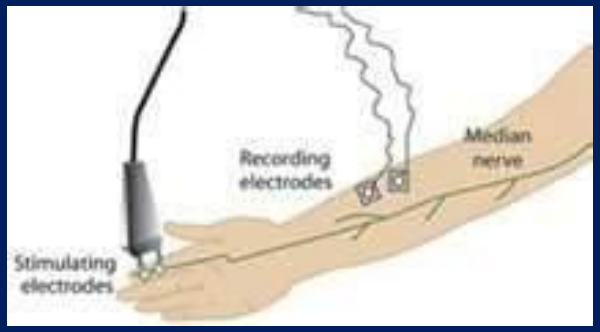
- **Concordant Pain diagram - best**



Objective Corroboration:

- Nerve Conduction Studies(NCS)
- Electromyography (EMG)
  - confirm diagnosis
  - determine the severity
  - identify additional problem
  - double crush

AAOS recommendations 2010



Is Carpal Tunnel Syndrome Work Related?

- Ideally:
  - Slam dunk – what can we agree on?

Is Carpal Tunnel Syndrome Work Related?

- Historically:
  - Almost every activity either caused or exacerbated carpal tunnel syndrome!
- Research low quality
- Look at current evidence:
  - RPCS, LOE 1,2 etc

• A longitudinal study of predictors of research-defined carpal tunnel syndrome in industrial workers: findings at 17 years.

J Hand Surg Br 2005 Dec;30(6):593-8. Epub 2005 Aug 29

Although obesity and gender are consistent predictors of CTS, workplace demands appear to bear an uncertain relationship to CTS.

• Carpal Tunnel Syndrome and Keyboard Use at Work A Population-Based Study

Isam Atroshi, et al. ARTHRITIS & RHEUMATISM, November 2007

Conclusion. Intensive keyboard use appears to be associated with a lower risk of CTS.

• Lozano-Calderon, et al JHS, April 2008, 33-A: 525-538

117 English language published articles

"There is insufficient evidence to implicate hand use of any type, typing in particular, as an important and direct cause of CTS."

• Cochrane Database:

Ergonomic positioning or equipment causing carpal tunnel syndrome.

no strong evidence for or against the use of ergonomic keyboards for the treatment of CTS

Carpal tunnel syndrome: The role of occupational factors:

Best Pract Res Clin Rheumatol. 2011 Feb; 25(1): 15–29.

- Diagnosis – sx, NCS, both

- force
- frequency/repetition – every 30 seconds, >50% of cycle
- duration
- work rest cycle
- accuracy – video, tracking devices
  - self reporting – 2.5x higher tan actual
- vibratory load – low vs. high

Evidence regarding occupational causes:

- Vibrational exposure: high, >6hrs/day
- Extremes of wrist flexion and extension WITH force: - >1/3 max strength
  - Construction workers
  - Cold exposure + manual labor
  - Meat cutters

- Consider highest risk
  - Obesity
  - post menopausal
  - females

- **Problem:**
  - Starts with the misinformed – PCP, NP etc
  - Physician secondary gain – 3x reimbursement if WC

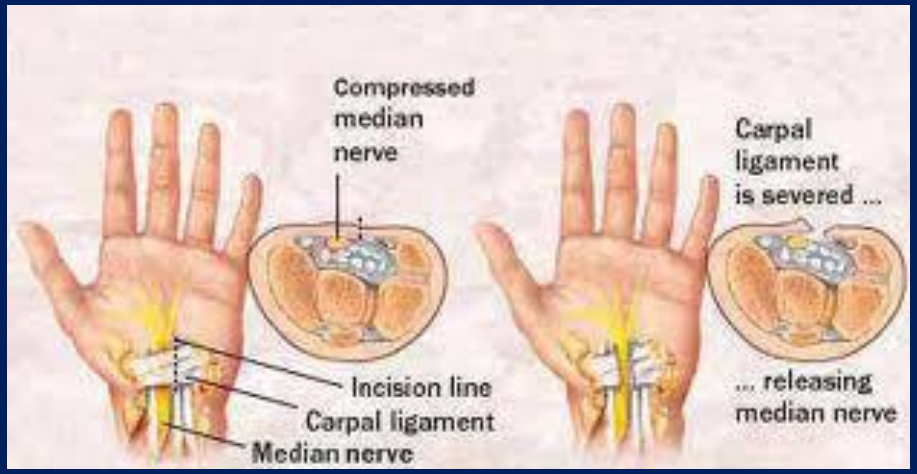
Treatment of CTS

- Conservative:
  - Splinting (night)
  - Corticosteroid injection
    - Diagnostic!!!!, therapeutic

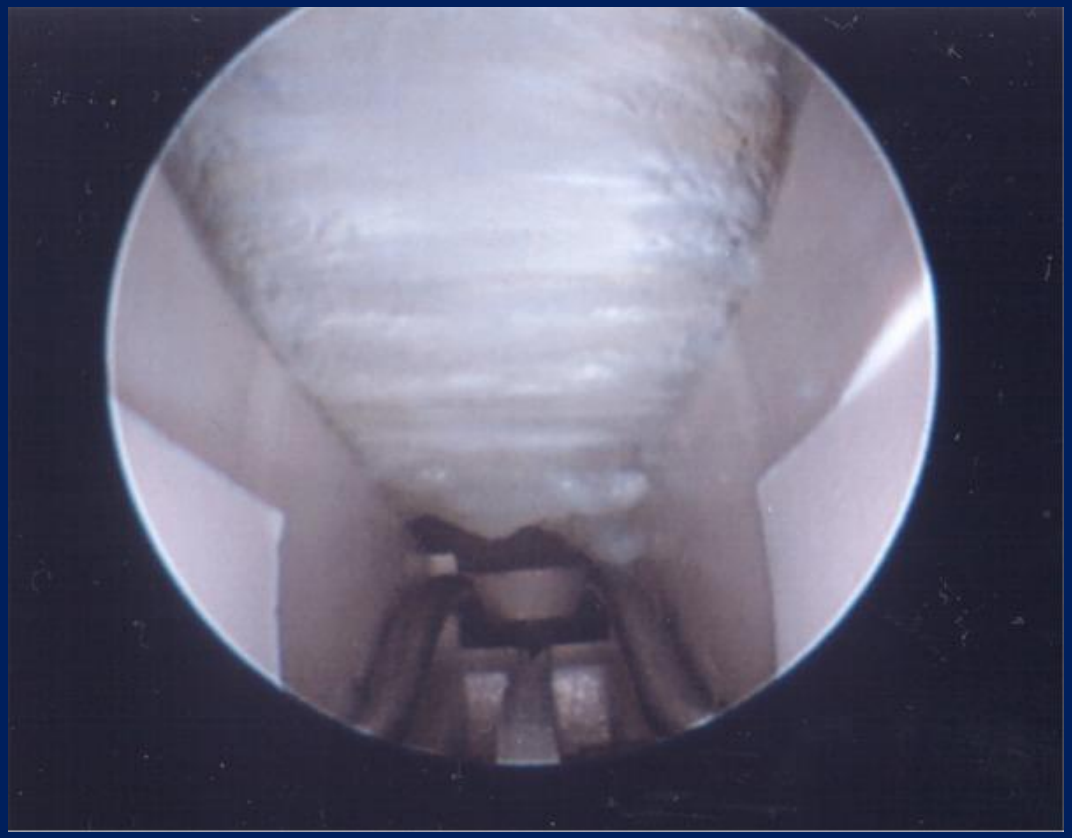
- Therapy , NSAIDs, Vit B, diuretics, Chiropractic manip of no benefit and are costly.

Surgery:

- Release of the TCL (endoscopic or open)



Endoscopic CTR



Advantages of ECTR

- Faster patient recovery – half time.
- Better grip strength following surgery
- No pillar pain
- Patient has use of hand and fingers day after surgery. Important for patients needing walkers or wheelchairs.

  - Brown et al, *JBJS (Am) 1993.*
  - Trumble et al, *JBJS (Am) 2002.*

Recovery:

- Return to light duty 1 week after surgery
- Return to most normal activities 1 month after surgery
- Return to all activities 2 months after surgery
- No OT
- MMI 4 months after surgery

"Repetitive Motion Disorders"

Definition:

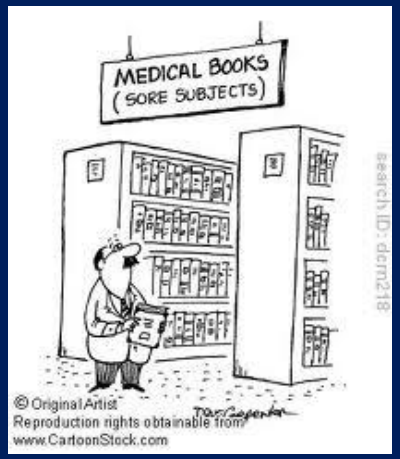
- "a family of muscular conditions that result from repeated motions performed in the course of normal work or daily activities". Wikipedia

"Repetitive Motion Disorders":

Includes:

- carpal tunnel syndrome, bursitis, tendonitis, epicondylitis, ganglion cyst, tenosynovitis, and trigger finger.

- Not well defined in medical texts
- In fact Not defined in medical texts



- AAOS - OKU 10 – P215 – 7 lines – OA
- ASSH - HSU IV – 'repetitive stress injury' see CRPS

Repetitive Motion Disorders:

Causes (Internet, No LOE):

- too many uninterrupted repetitions of an activity or motion,
- unnatural or awkward motions such as twisting the arm or wrist,
- overexertion,
- incorrect posture,
- muscle fatigue.

- The disorders are characterized by pain, tingling, numbness, possible swelling or redness of the affected area, and the loss of flexibility and strength. – vague, synonymous with many conditions

Definition:

The term "repetitive strain injury" is most commonly used to refer to patients in whom there is no discrete, objective pathophysiology that corresponds with the pain complaints.

- umbrella term incorporating other discrete diagnoses that have (intuitively but often without proof) been associated with activity-related arm pain such as carpal tunnel syndrome, cubital tunnel syndrome, thoracic outlet syndrome, DeQuervain's syndrome, stenosing tenosynovitis/trigger finger/thumb, intersection syndrome, golfer's elbow, tennis elbow, and focal dystonia.

http://www.cochrane.org/about-us/evidence-based-health-care

"Repetitive Motion Disorders":

Diagnosis:

- By appropriate specialist or subspecialist
- Use objective tests
- Diagnosis of exclusion
- Understand psychology of disease and work

Treatment:

- We can't even define the condition!
- ? Ergonomics etc

Case #1.

- 65 yo RHD female
- 2 yrs increasing numbness/tingling in right hand
- Worse at night
- Non-smoker
- No other medical conditions
- Works as a clerk at Hospital x 25 years – <1hr typing, no heavy use
- Tried night splints with partial benefit

PE:

- Concordant numbness
- Positive provocative tests: Tinel, Phalen, compression
- NO FLEXOR TENOSYNOVITIS, MASSES ETC.

NCS/EMG:

- Chronic Rt>Lt CTS, moderate severe

Rx:

- Braces – mild help
- PCP – Dx CTS, told work related, referred fro Rx

Dx:

CTS – idiopathic

- Patient in low risk job
- Patient is postmenopausal female
- Has no evidence of temporal relationship to work
- Has no evidence of flexor tenosynovitis

Paradigm:

- I get paid 3x as much to do a CTR when paid by work comp than private insurance

Case #2.

- 35 yo RHD male
- Started work as an independent contractor 3 months ago – working construction
- Noticed numbness/tingling both hands after 2 weeks at work
- Worse at night and when he works in the cold
- Non-smoker
- Suffers from depression

PE:

- Concordant numbness
- Positive provocative tests: Tinel, Phalen, compression
- OBVIOUS FLEXOR TENOSYNOVITIS in distal forearm bilaterally – swelling, pain, digital stiffness.

Dx:

CTS – work related

- Patient in relatively high risk job
- Has obvious temporal relationship to work
- Has evidence of flexor tenosynovitis due to inc strain bilaterally

Case #3.

- 45 yo RHD male
- 2 yrs increasing arm pain – diffuse 9/10 at rest 10/10 with activities
- numbness/tingling in all fingers frequently radiates to neck, worse with activities
- Worse during day
- Smoker
- Medical conditions – depression and anxiety
- Works at UPS 10 years. Has had multiple episodes off work for LBP
- Tried narcotics (PCP) no relief
- PCP told CTS and work related – clerk at hospital, types ,1hr/day

PE:

- Numbness in all 5 digits – 2pt off the chart
- Provocative tests: non anatomic
- Pain everywhere – out of proportion!

NCS/EMG:

- Normal

MRI C spine:

- normal

Dx:

Non-organic pain syndrome. Multiple red flags!

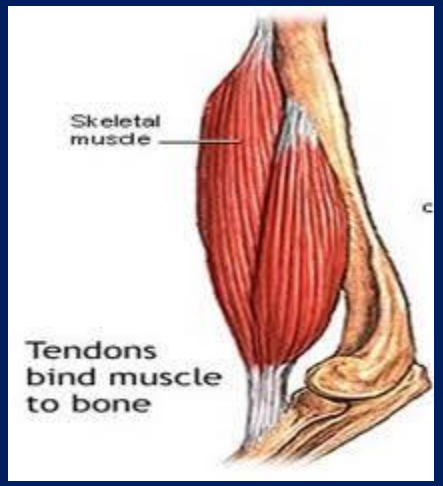
Outcome:

- This pt will not get better with any surgery!

Defense:

- Physician – accurate, unbiased PE
- Up to date on CONTEMPORARY literature
- Seasoned in work comp
- TRUTH. NEED TO CALL IT WHAT IT IS!

Tendons



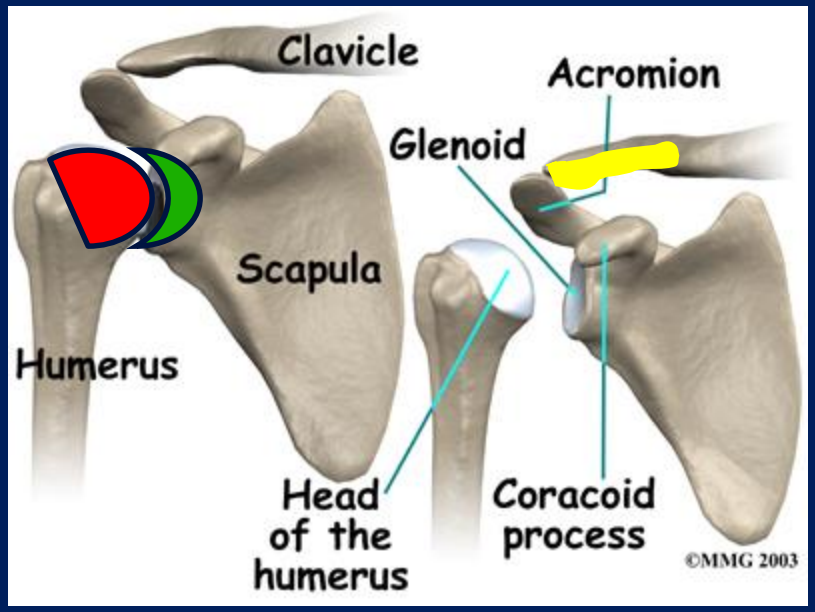
Common misconceptions regarding the Rotator Cuff:

Rotator Cuff:

- Workhorse of the shoulder
- Responsible for almost all function
- Responsible for overhead motion and getting your hand behind your back

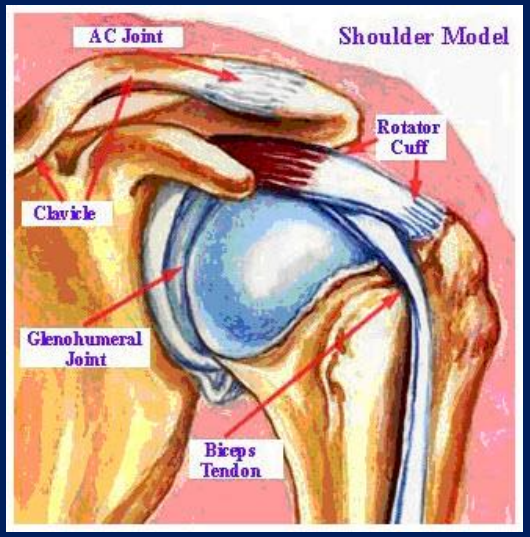
Anatomy - Bony

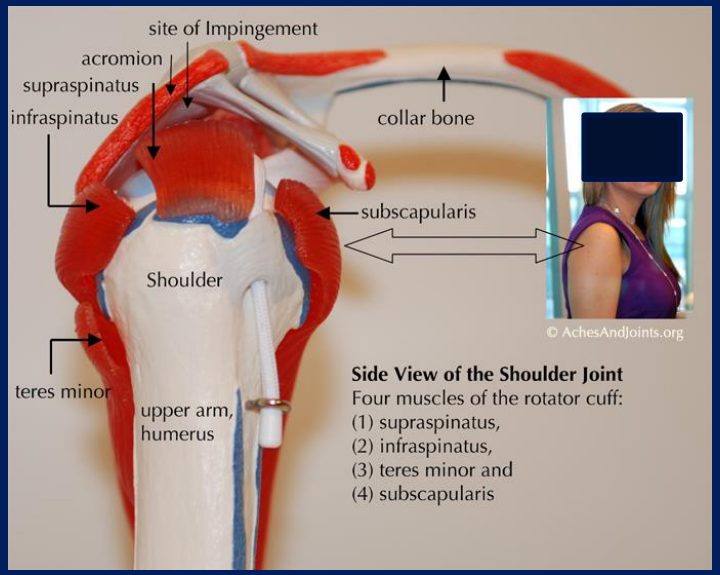
- Humeral head – convex
  greater/lesser tuberosity: insertion of cuff
- Glenoid – extension of the scapula, concave
- Acromion – roof for the rotator cuff

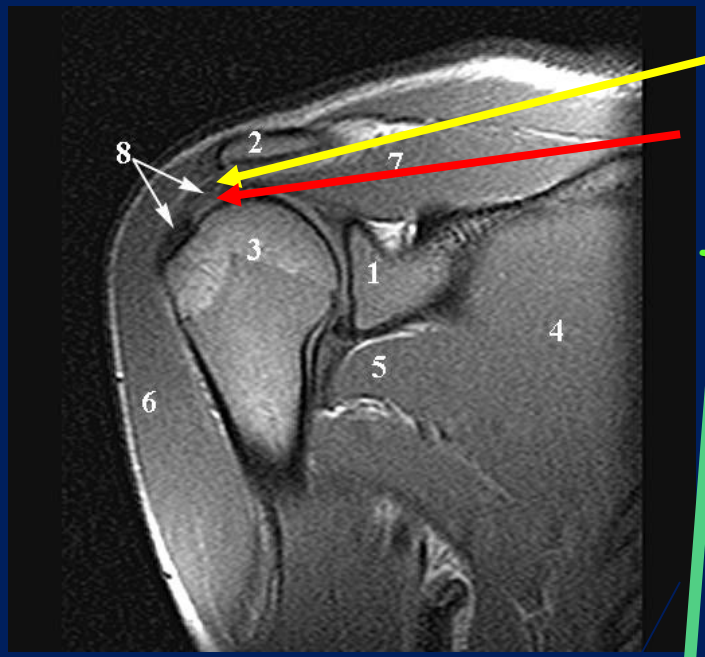


Anatomy - Muscles

- **Rotator cuff ('SITS')**
  - Supraspinatus (abd)
  - Infraspinatus (abd/ER)
  - Teres minor (ER)
  - Subscapularis (IR)
- **Biceps – long head**



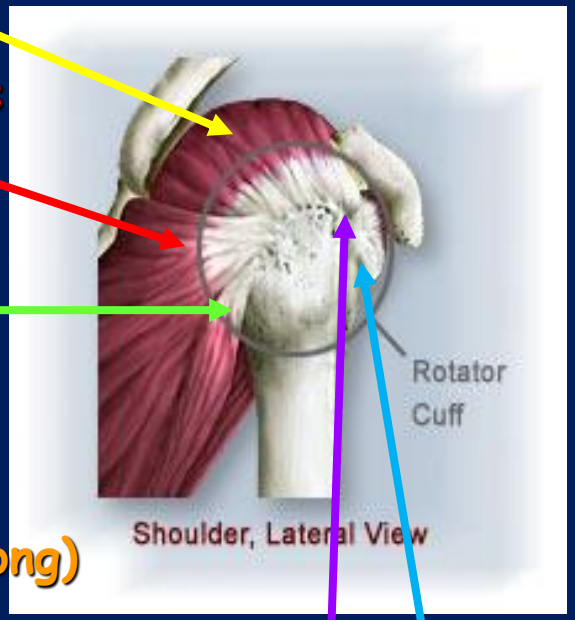




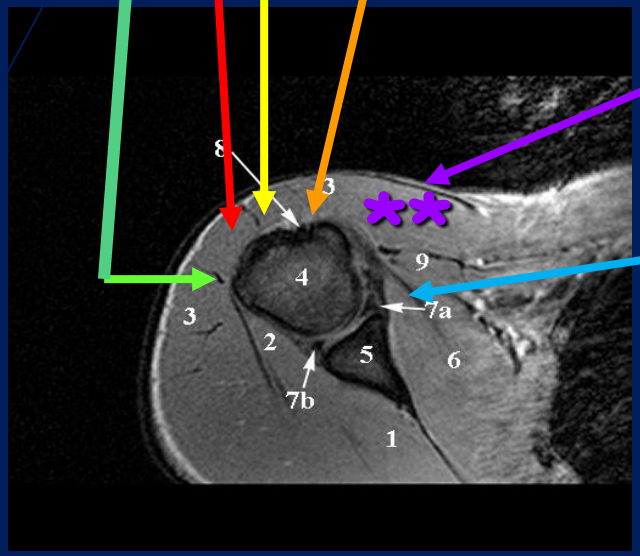
Supraspinatus

Infraspinatus

Teres Minor



Biceps (long)

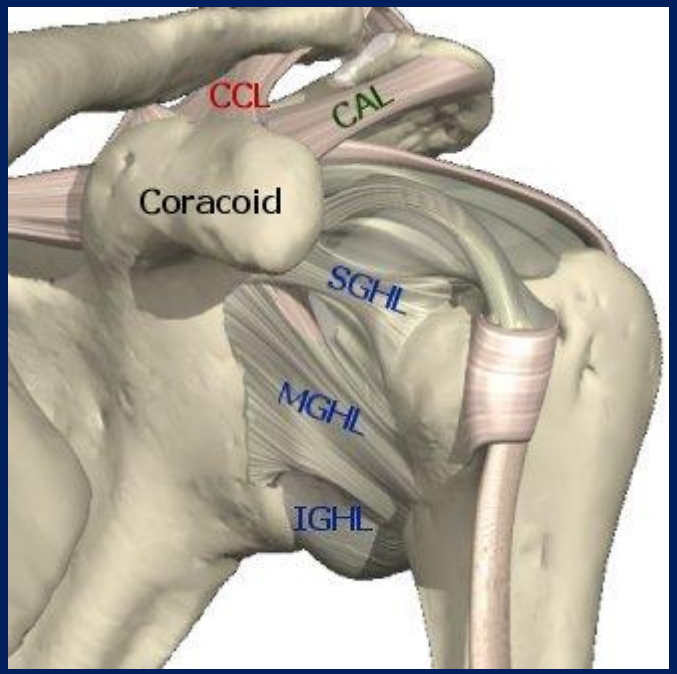


Rotator Interval

Subscapularis

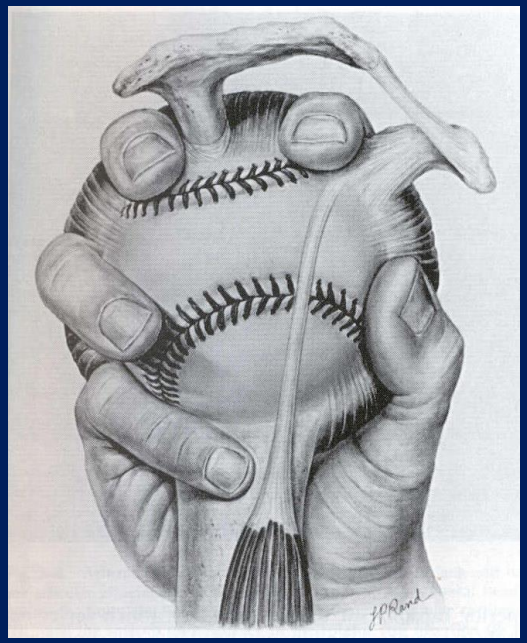
Anatomy - Ligaments

- Capsular expansions
  - Superior
  - Middle
  - Inferior sling (imp)
    - Anterior band
    - Posterior band
- Primary stability



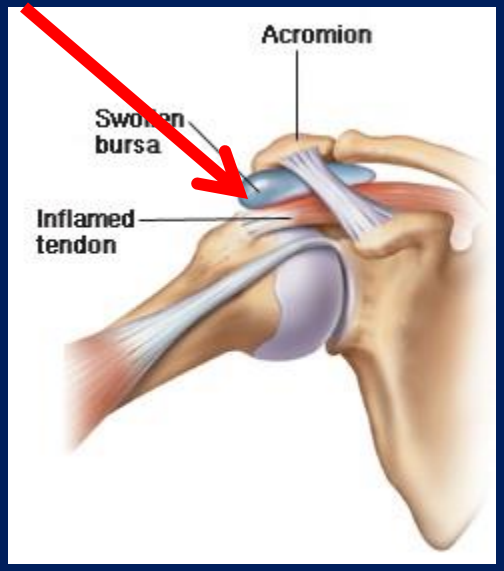
Rotator Cuff Function: Motion and Stability

- Maintain joint center
- AROM >30 to 130 degrees



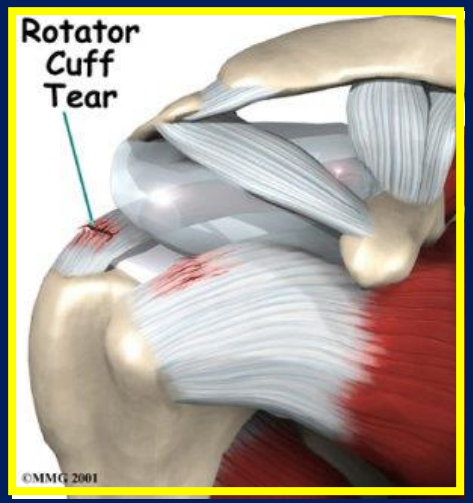
ETIOLOGY OF PATHOLOGY:

- **Intrinsic:**
  - Natural aging (hypovascularity)
  - Wear – and – tear
  - DM, inflammatory (RA, gout etc), smoking
- **Extrinsic:**
  - Coracoacromial arch: Impingement
  - Trauma
  - Other Impingement – malunion etc.



Intrinsic Failure

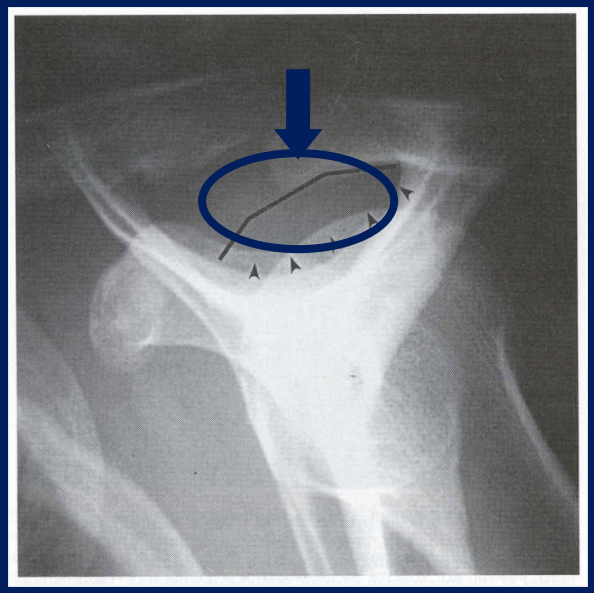
- Critical zone = watershed between muscular and osseous circulations
- Age and use related deterioration of collagen – 60% of people over 60 yo have tears on autopsy/MRI (asymptomatic)

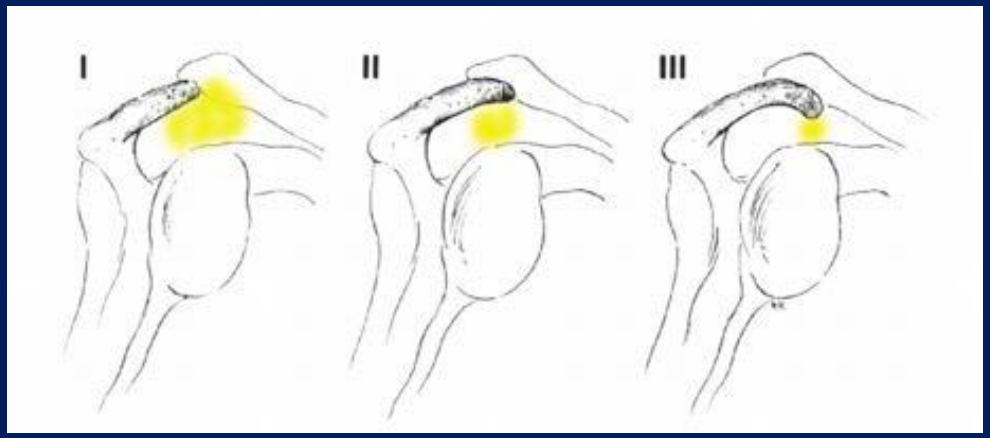


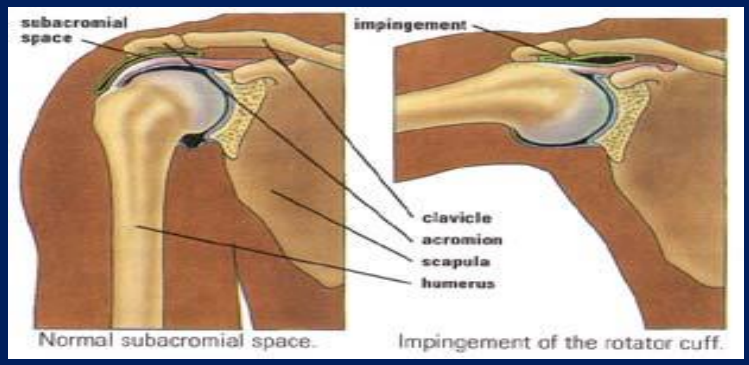
Extrinsic - Impingement:

Coraco-acromial Arch:

- Space too small vs. tendon too big
- Acromial type: **I,II,III**
  Bigliani et al

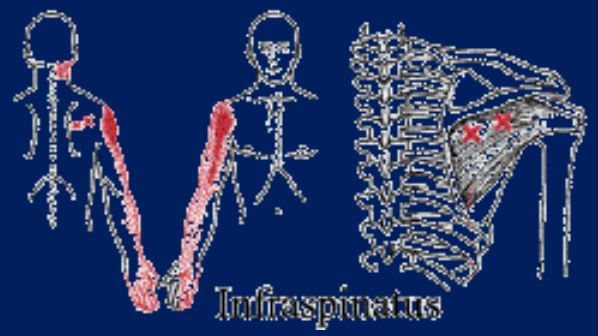






Rotator Cuff Symptoms:

- Lateral shoulder/arm pain – neural innervation
- Pain (concordant) with overhead use
- Night pain
- Weakness – pain or structural failure?

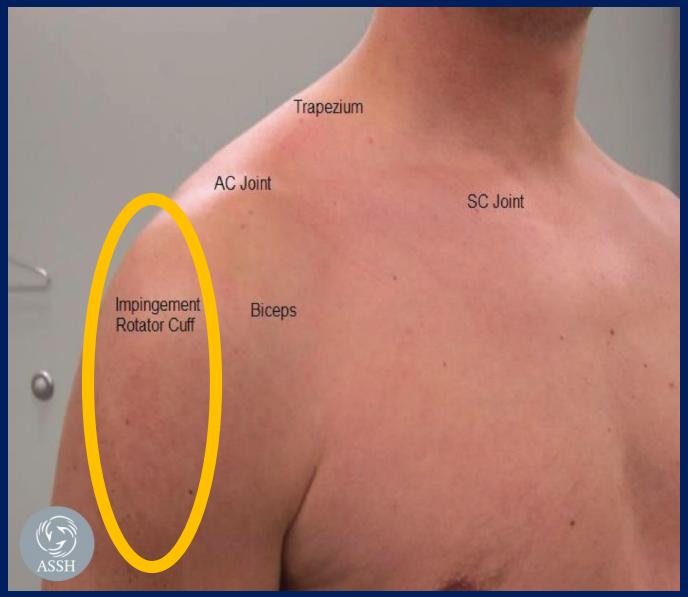


Pain:

Location of pain critical:

Pain should be fairly focal:

- lateral shoulder and arm: rotator cuff



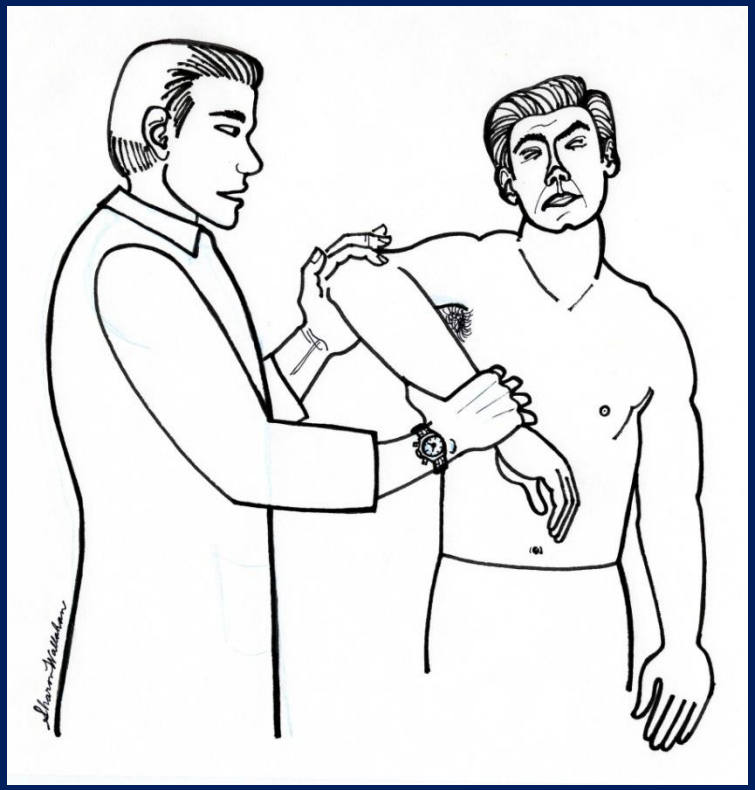
- Be concerned about diffuse pain, trapezial pain, parascapular pain!

Physical Exam:

- Deformity
  - atrophy – chronic; swelling + bruising - acute
- Tenderness- ac. vs subacromial, greater tuberosity
- Crepitus – painful?
- A/P ROM
- Impingement signs
  - Hawkins
  - Neer

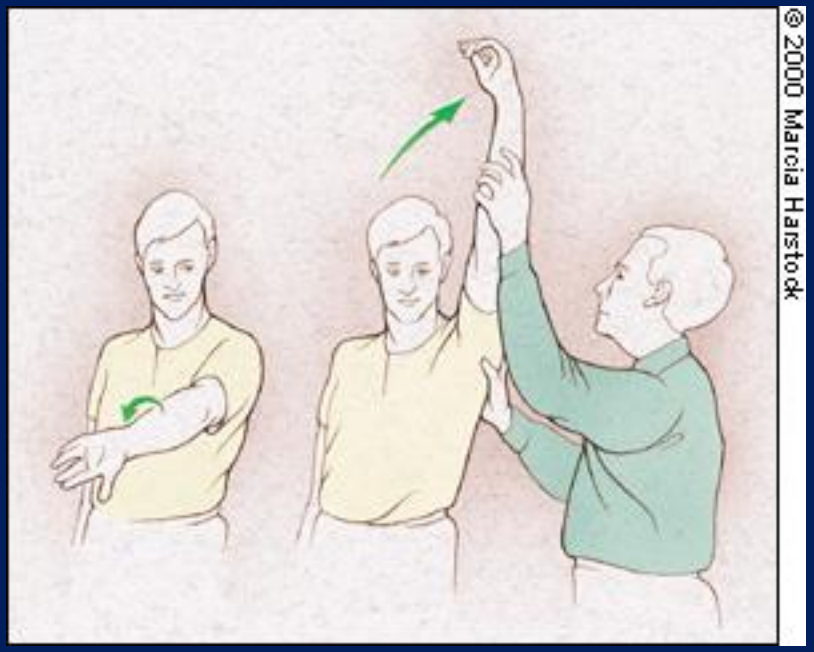
RC Provocative Tests:

- Hawkins:



RC Provocative Tests:

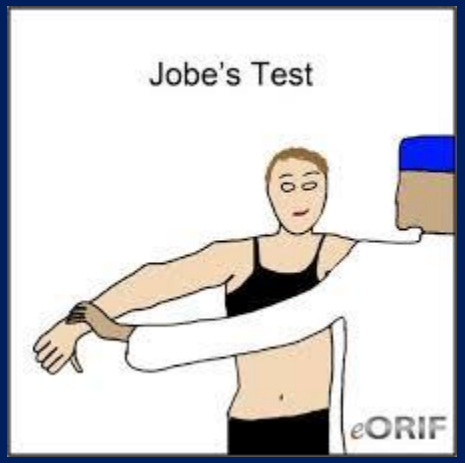
- Neer:



RC strength tests:

- Jobe's/empty can:

- Strength
  - Jobe – supraspinatus
  - Hornblower – teres minor (ER)
  - Liftoff – subscapularis



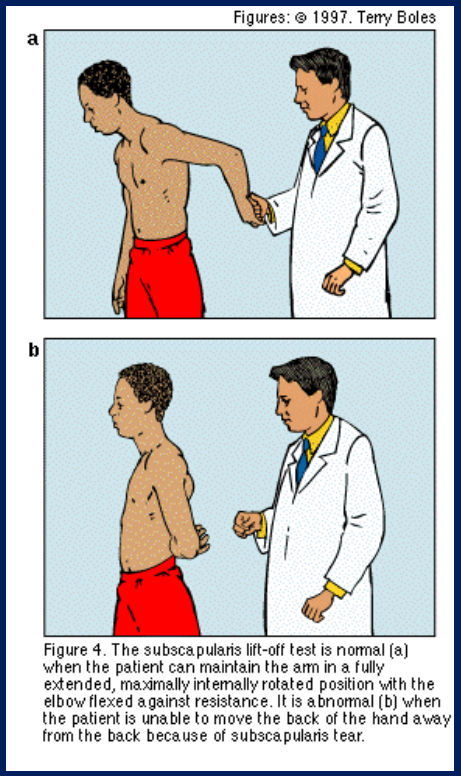


Figure 4. The subscapularis lift-off test is normal (a) when the patient can maintain the arm in a fully extended, maximally internally rotated position with the elbow flexed against resistance. It is abnormal (b) when the patient is unable to move the back of the hand away from the back because of subscapularis tear.

Shoulder Test

HORNBLOWER'S (PATTE TEST)

Purpose: Test teres minor muscle

Position: Seated

Technique: Shoulder in 90° abd & elbow flexed so that the hand comes to the mouth (blowing a horn)

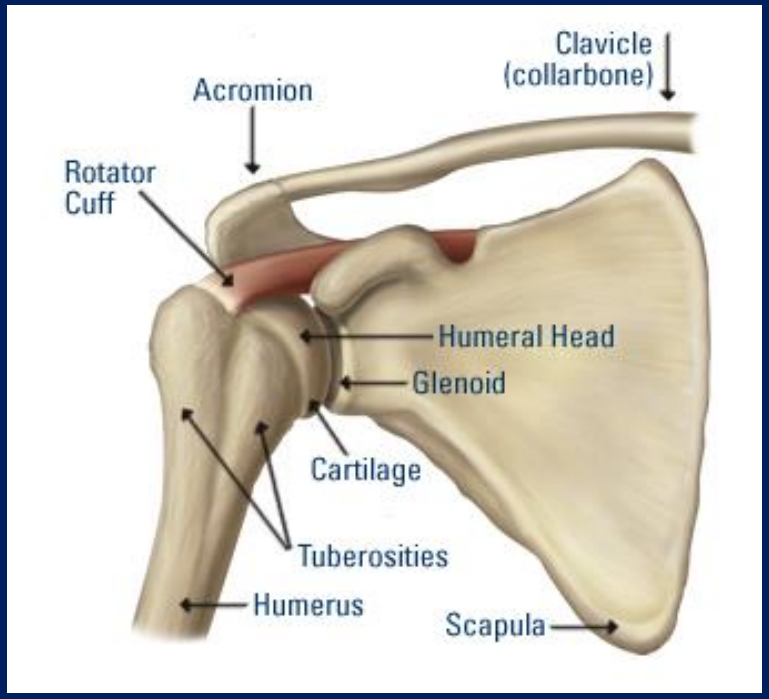
Interpretation: + test = reproduction of pain &/or inability to maintain UE in ER

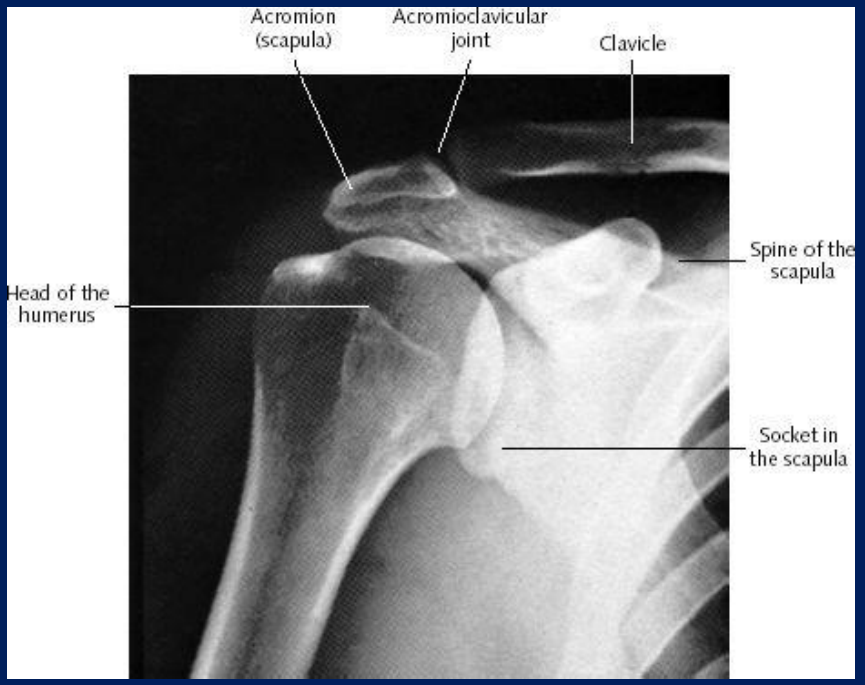
Source: From Gulick, D., 2008, page 110.

Differential Diagnosis

- A-C joint derangement
- Instability
- SLAP lesion
- Adhesive capsulitis
- Biceps pathology
- Glenohumeral DJD
- Calcific tendonitis
- Internal impingement
- Coracoid impingement
- Scapulothoracic dysfunction
- Nerve Injury - Suprascapular

X-Ray

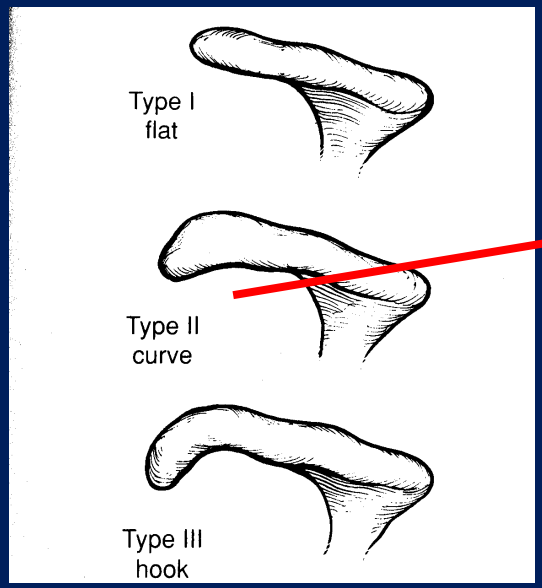




- exclude OA, tumor, calcific tendinopathy
- asses acromial morphology

X-Ray

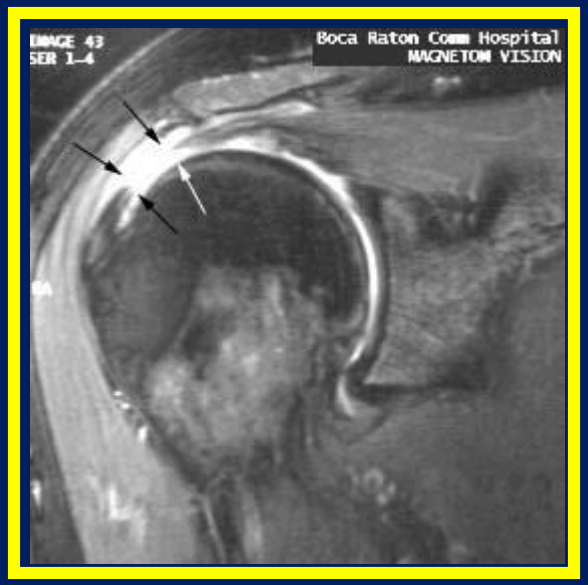
Type of acromion - I, II, III

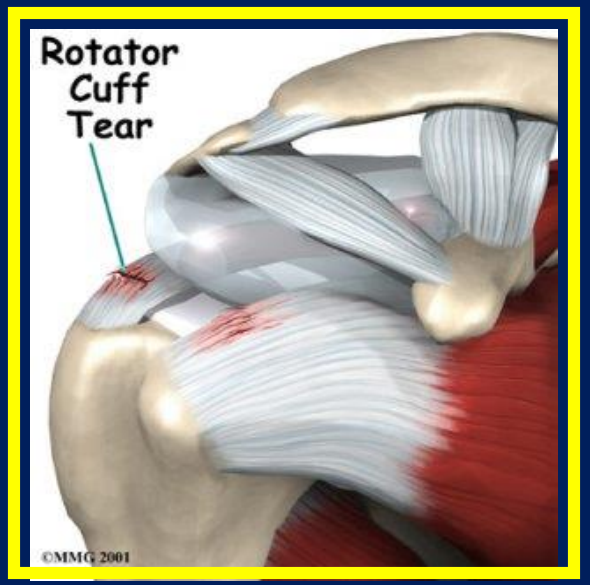


Bigliani et al

MRI

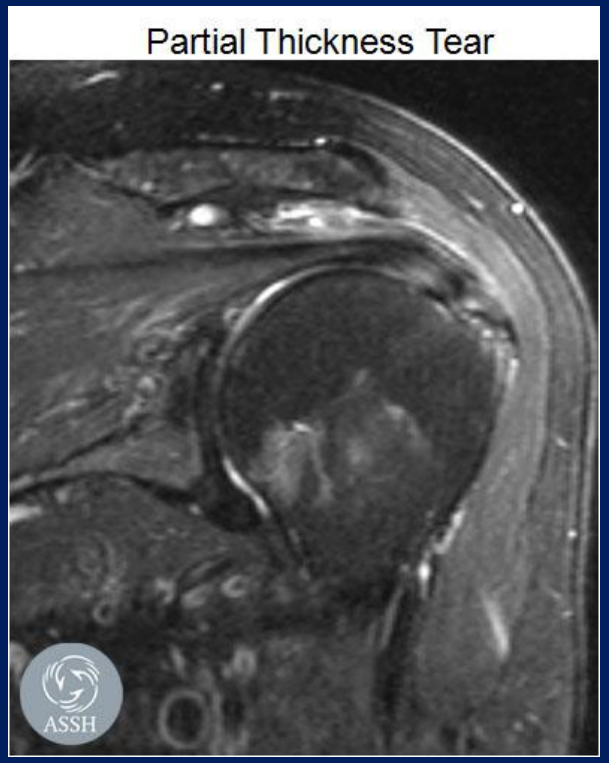
- Soft tissue: cartilage, muscle, tendon, ligaments, fluid, acute trauma!!!





Radiographic Evaluation

- MRI – excellent test for RC
- MRI + intraarticular gadolinium - gold standard - labrum



Terminology – misleading

- Partial 'tear' – implies trauma
  - actually means tendon 'thinning', aka tendonitis, tendinopathy
- Acute tears – inflammation, hemarthrosis, echymosis etc
- Chronic tears – tendon retraction, multiple tendons, fraying of edges, muscle atrophy, humeral head high-riding, early arthritis (RC arthropathy)

Treatment:

- **Partial tear** (unless close to completely tearing):
  - Conservative always!!!!
  - Pain or motion not a guide to size of tear!!!!

- **Full thickness tear**:
  - Young - ? Fix
  - older – always conservative

Treatment:
'Partial RC tear', tendonitis

Conservative

- Activity modification - temporary
- NSAIDs – old, new????
- Gentle ROM
- Scapular stabilization – PT, HEP
- Cuff-specific strengthening – PT, HEP

Treatment: Conservative

- Corticosteroid injections for night pain or lost ROM
  - Adjunct to regaining full motion
  - Capture of pain syndrome

Treatment:

Partial tears, tendinopathy:

- >85% good or excellent results with 6 months conservative treatment.
  - Physical therapy + HEP
  - Subacromial cortisone injection

- Work Comp worse – 65% good/excellent

Treatment:

- After failure of >6 months conservative Rx – surgery indicated:
  - Subacromial Decompression +/- RC repair (if >50% THINNED)

Treatment:
Full thickness rotator cuff tear

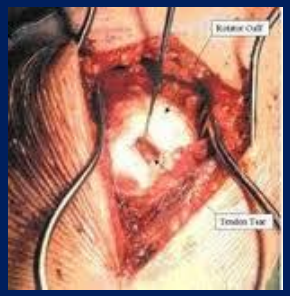
- If concordant symptoms in active individual with full-thickness rotator cuff tear – repair!

- Non-operative management of a rotator cuff tear can provide relief in approximately 50 percent of patients.

Predictors of poor outcome from non-surgical treatment:

1. Long duration of symptoms (more than 6-12 months)
2. Large tears (more than 3 centimeters)
3. Active independent individuals
4. Work Comp

Rotator Cuff Repair Options:

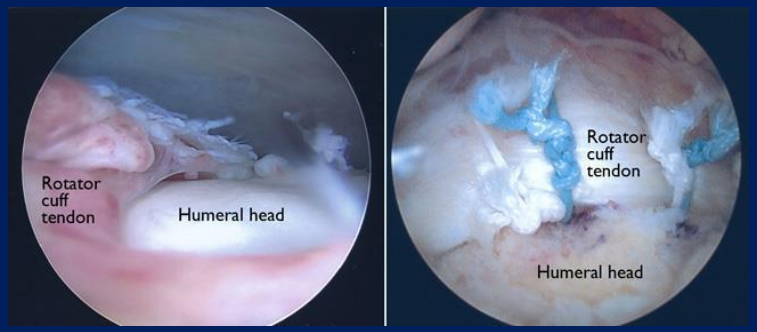


- Open repair
  - –Involves removal of deltoid origin
  - – Never done anymore!!!!

- Mini-open repair

  - –Deltoid is split to gain access to rotator cuff insertion (left attached)
  - –Acromioplasty arthroscopically

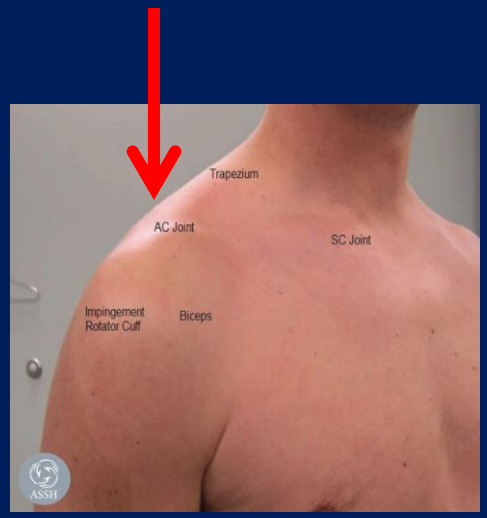
- Arthroscopic Repair



BE AWARE!!

- DIFFUSE myofascial pain:
  - Blitzkrieg – cuff, ac, biceps, labrum

- Ac joint resection
  - everyone >40yo has ac joint oa
  - must have pain at ac joint
  - +ve provocative test



Case 1

42 y.o. male presents with:

2 weeks of right-sided 'shoulder pain'

related to 'work injury'

History

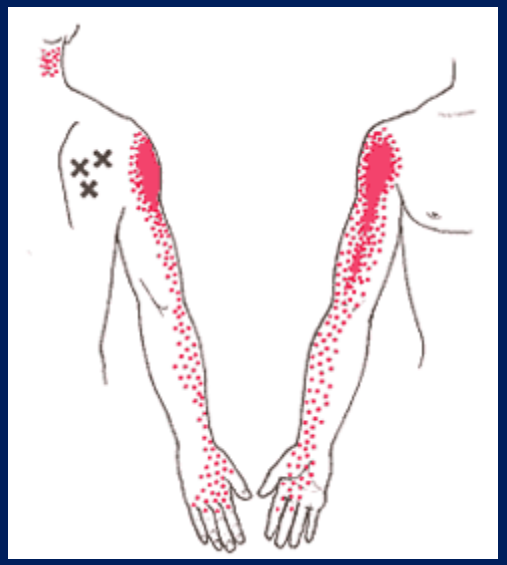
- Fell 10 feet from a ladder onto right arm
- Went to ER: documented right shoulder echymosis (bruising), swelling, pain, ⇓ ROM

  X-rays: negative for fracture/dislocation

  Dx: Shoulder strain/contusion

  Rx: NSAID's, sling, f/u with MD

Initial evaluation:



History:

- No previous shoulder pain/problems
- Pain: lateral shoulder, radiating down arm
  worse with overhead activities
  worse at night
- Associated shoulder weakness
- No numbness/tingling
- No associated co-morbidities (DM, Gout, RA etc)

- Works construction

Initial evaluation:

Physical Examination (L,F,M):

- Echymosis/bruising lateral shoulder – in ER
- Swelling around shoulder
- Decreased shoulder ROM – abduction
- Lateral shoulder pain and weakness with overhead motion

Provocative tests:

- Hawkins:
- Neer:
- Jobe's:
- Empty can:

MUST REPRODUCE CONCORDANT LATERAL SHOULDER + ARM PAIN

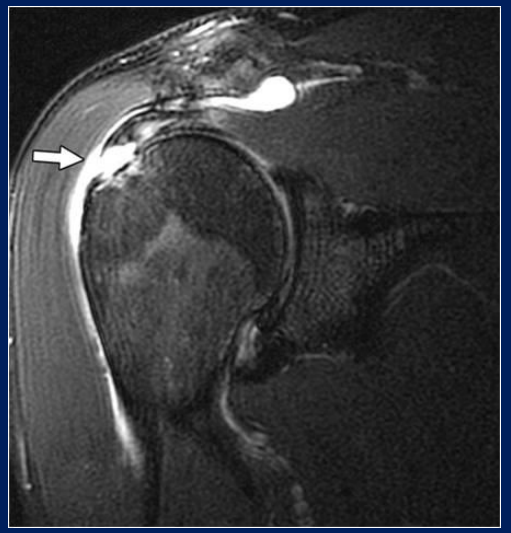
Work-up:

X-rays:

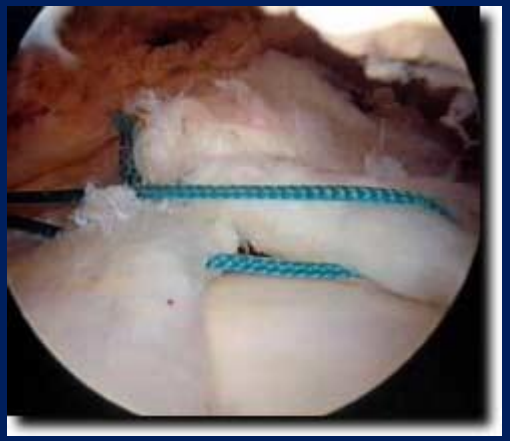
- no fx/disloc, type II acromion

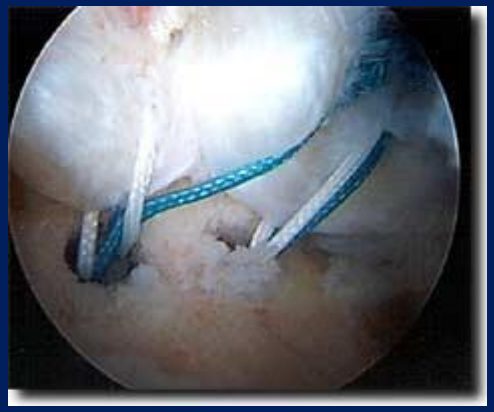
MRI:

- Acute supraspinatus tendon tear
- ecchymosis, edema, rest looks normal



Surgery:





Case 2:

59 y.o. male presents with:

- 4 months of right-sided 'shoulder pain'
- related to 'work injury'
- Saw Work doc, General Ortho
- Attorney referred to Chiropractor- had 'treatments' x 6 months – 1 day relief
- had MRI with "tear"
- told needs surgery to repair tear

History:

Mechanism of injury:

- Lifting packages (<30lbs) from shelf to bucket
- developed suddenly excruciating 'Rt shoulder' pain

Initially saw work doc 3 days later:

- documents pain in shoulder
- examination only states 'pain in Rt shoulder worse with motion'
- X-rays: N
- Dx: Rt shoulder pain/strain r/o rotator cuff tear

Sequence of events:

Work Doc Rx:

- NSAIDs, Flexeril
- Narcotics
- Sleeping tablet
- Off work

  - f/u 6 times with no change
  - referred to PT – 2x/wk x 6 weeks
    no change
  - MRI obtained 2 months after 'injury' – 'tear'
    Referred for Orthopaedic care

General Ortho notes:

History:

- Pain refractory to pain meds, NSAIDs etc, + PT

Physical Examination:

- Pain in right shoulder
- Worse pain with all provocative tests

Studies:

MRI: 'rotator cuff tear'

Treatment:

- cortisone shot, PT if no help surgery

F/U 3 weeks later:

History:

- No relief after shot and PT

Suggest:

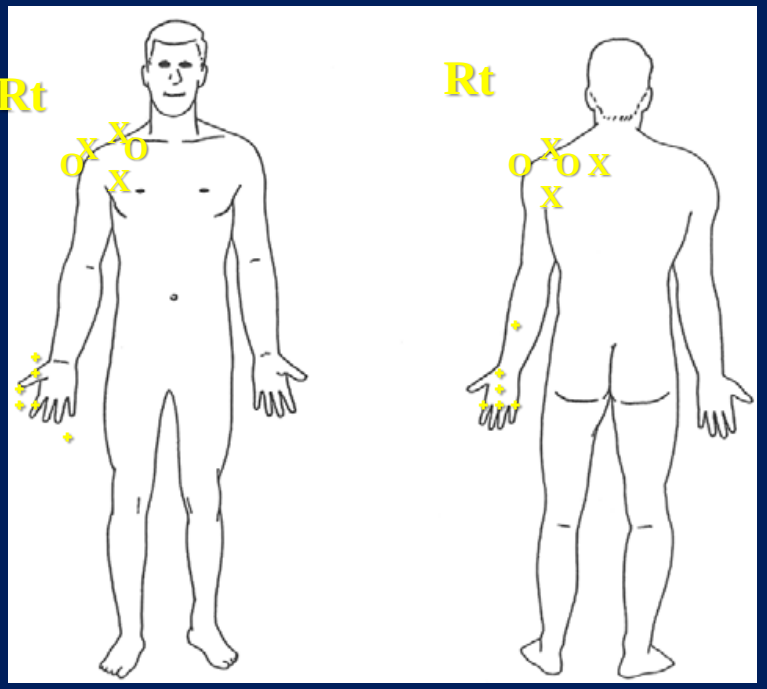
- Surgery – subacromial decompression + rotator cuff repair + biceps tenodesis and ac joint resection

NOW:

4 months of right-sided 'shoulder pain':

- where?
  - parascapular
  - paracervical
  - superior shoulder
  - anterior chest
  - diffuse

- pain diagram
  VAS: 9-10/10



Specifically

Pain:

- at rest
- worse with any arm motion – even at side
- day>night
- unresponsive to meds (NSAID/narcotic etc)

- Now developing numbness is arm and entire hand (not fingers)

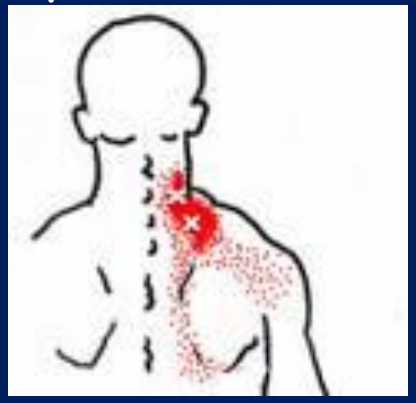
Work History:

- Works at UPS for 25 years
- Drives and delivers (lifting/carrying 10 - 40lb)
- Notably: 3 previous work related injuries – knee, elbow, neck
  - all resolved after extensive time 'off work'
  - last 3 years prior

Examination:

- No distress despite high VAS, resting HR 72bpm
- moves hand normally during history
- removes jacket normally

- no deformity
- multiple trigger points in SCM + trapezius
- skin sensitivity to gentle touch around all muscles, superior shoulder, anterior chest wall and scapula



Specifically:

- Full cervical spine flexion/ext with pain (9/10)
  negative Spurling's test
  tender around paraspinal and parascapular m.

- shoulder AROM 150° FF/120°abd with pain - diffuse
  PROM 90° FF/100° abd with pain
  - provocative tests all elicit diffuse/parascapular shoulder pain
  - weakness due to pain
  - cogwheel strength

Additionally:

- pain in forearm
- normal sensation in fingers
- elbow and wrist ROM cause shoulder pain
- neg. provocative tests for CTS and CuTS

- Grip strength testing:
  - Rt – 2lbs
  - Lt 70lbs

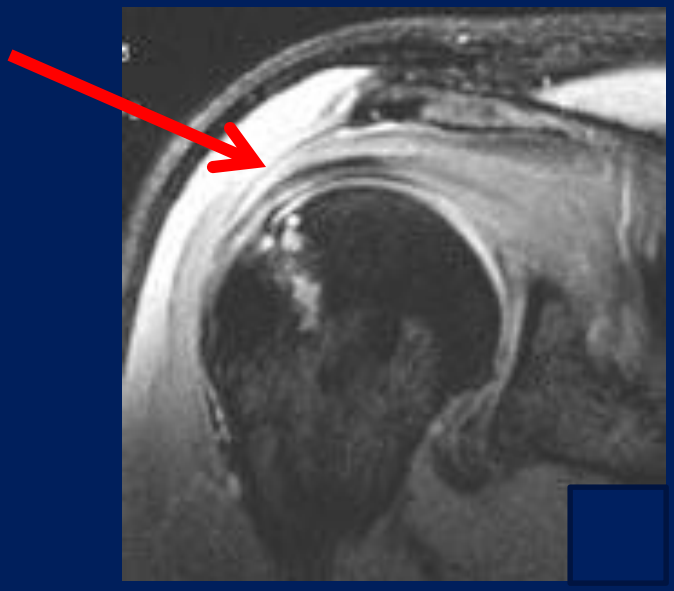
Diagnostic tests:

X-ray:

- No fractures/dislocations
- Type of acromion – II
- No arthritis – GH or ac joint
- No unusual findings – calcific tendons etc

MRI:

- 'Partial tear' in supraspinatus and infraspinatus tendons
- No muscle atrophy
- Degenerative labrum
- Ligaments intact
- Mild ac joint arthritis



Diagnosis:

1. Myofascial pain syndrome!

2. Oh and by the way he also has some rotator cuff tendon wear (tendinopathy)!!!

Treatment:

1. Physical therapy: joints supple, myofascial modalities
2. Pharmacological mx: long-term
3. Behavioral modification
4. ? Physiatrist, pain MD, psychiatrist
5. NO SURGERY:
   - Will not help
   - Same predicament 1 year later

Chronic full thickness cuff tear:

1. Older patient
2. Concordant pain
3. Overhead weakness
4. Appropriate MOI
5. MRI – full thickness RC tear, retraction to glenoid, atrophy, high riding humeral head, diffuse tendinopathy, degen labrum, etc
6. NO SURGERY:
   - Will not help
   - Retear rate very high!!

Post-operative RCR PT:
• mini-open or arthroscopic (deltoid safe)

- 1-6 weeks:

  passive range of motion – prevent adhesive capsulitis
  CPM machines – no long term benefit!

- >6 weeks:

  active range of motion

- >8 weeks:

  strength

>12 weeks:

endurance, work conditioning etc

COMPLICATIONS:

Acute:

- infection, pain syndrome

Subacute:

- stiffness

Chronic:

- stiffness
- weakness – retear, scar, atrophy
- pain

Incidence of Re-tears:

- 30% re-tear in elderly- open – asymptomatic
- 50% re-tear in arthroscopic only group – regardless of age – JBJS 2004 Yamaguchi et al.
- Outcomes similar - ? PT, SAD, debridement

Work Comp:

- more post-op pain
- close patient monitoring
- PT supervision (2-3x/wk x 4months)
- Avoid stiffness!!!!!!
- work conditioning
- MMI at 6 months from surgery

Work Status:

- **RTW:** 3-4 weeks: waist level only <2lbs
  no overhead

  8 weeks: waist level <10lbs
  overhead without weight

  12 weeks: waist level no limit
  overhead 5-7lbs

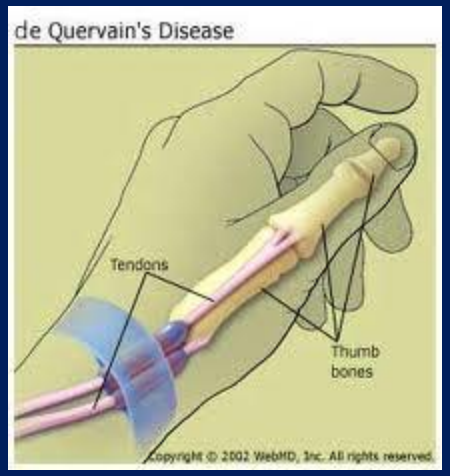
  16weeks: waist level no limit
  overhead 15-20lbs frequent breaks

  24 weeks: no restrictions/FCE

THANK YOU

Dequervain's Tenosynovitis

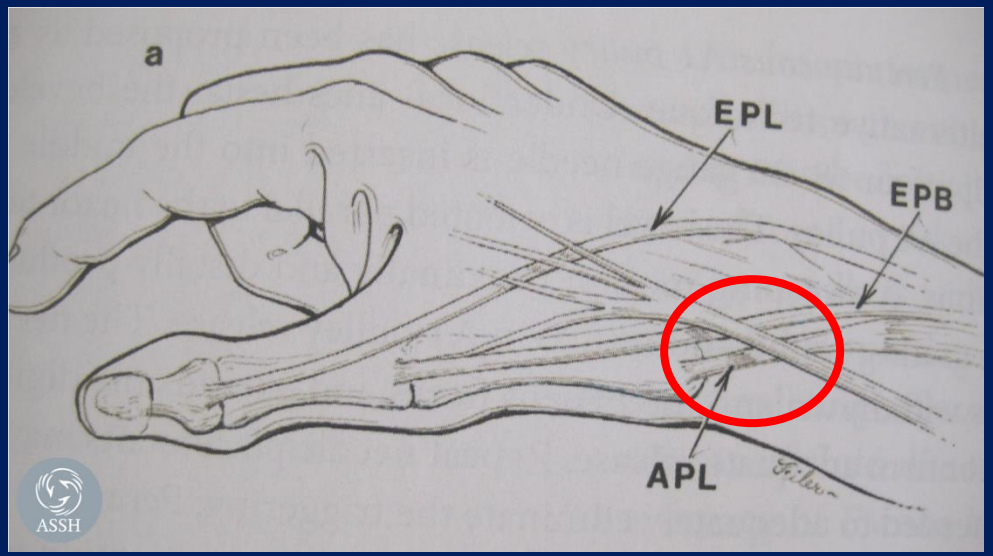
- Tendonitis over the radial aspect of the wrist - of the 1st dorsal tendon compartment



- Usually due to frequent thumb adduction with the wrist ulnarly deviated
- Occasionally trauma to radial wrist

Dequervain's Tenosynovitis

- Involves APL and EPB tendons at the level of the radial styloid
- 30 to 50 year olds
- 10 times more common in women
  - especially with infants



Complaints

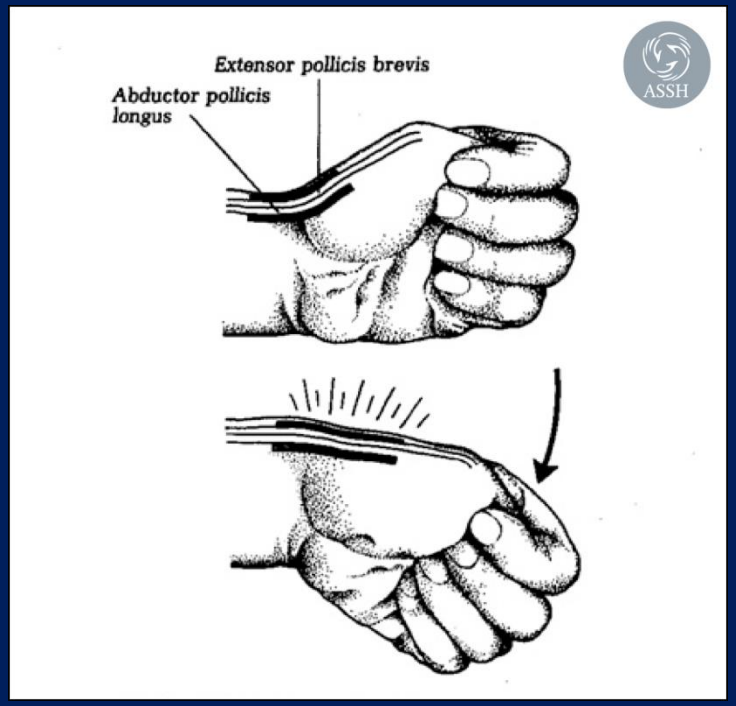
- Radial sided wrist and thumb pain with thumb motion
- Occasionally clicking of thumb

- No numbness/tingling

Dequervain's Tenosynovitis

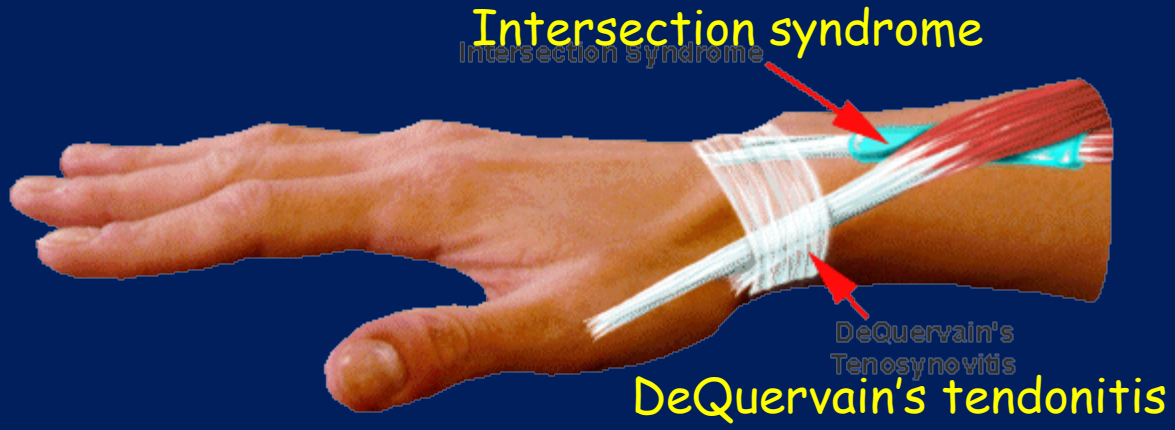
Physical exam

- Tenderness and swelling 1-2 cm proximal to radial styloid
- Pain with resisted thumb abduction
- Positive Finklestein's test
- Negative X-rays



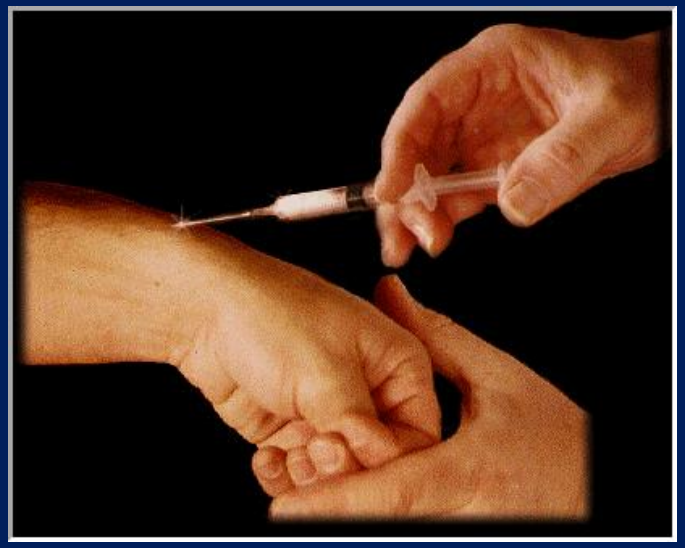
Differential diagnosis:

- Thumb CMC joint arthritis/instability
- Wrist degenerative changes
- Wrist ligament disruption
- Intersection syndrome (tendonitis in forearm – more proximal)



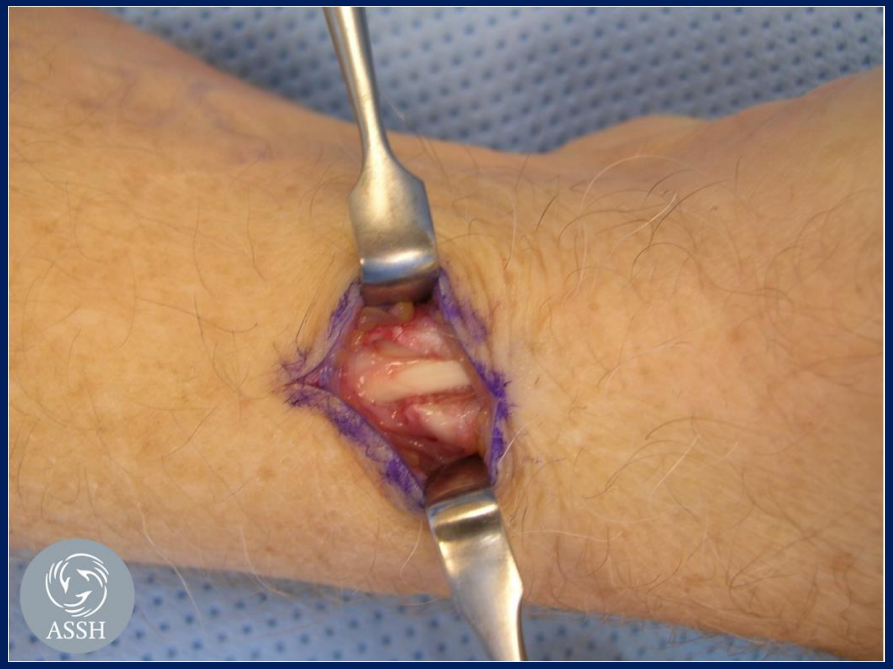
DeQuervain's: Treatment

- NSAIDs - mild
- Thumb spica splint
- 1 – 2 cortisone injections
- Activity modification
- OT – mod's, stretches



Surgery:

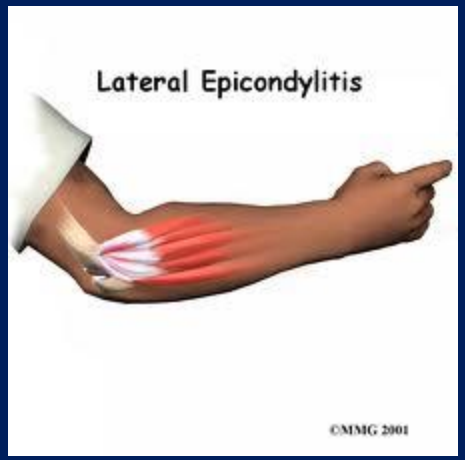
- Operative release required in 10% of patients after failed conservative treatment
- Results – 98% back to normal
- RTW – normal 2 months later



Lateral Epicondylitis

Lateral Epicondylitis:

- One of the most common overuse syndromes encountered in the upper extremity
- Known as tennis elbow after being described by Morris in 1882 to be caused by lawn tennis
- Tendinosis of the components of the extensor origin



- Epidemiology
  - 1-3% of population will experience lateral epicondylitis in their lifetime
    - Equal male/ female incidence
    - Usual onset between age 35-50

Epidemiology:

- Risk factors
  - Manual labor with heavy tools
  - Repetitive heavy activities
  - Dominant arm
  - Can be associated with acute traumatic episode
    - Direct trauma to lateral elbow
    - After lifting an object
  - Poor coping mechanism
  - Depression

Anatomy:

- Common extensor origin (CEO)
  - A confluence of the origins of the ECRB, EDC, EDQ, and ECU.

- The ECRB tendon is implicated in lateral epicondylitis
  - Watershed area of diminished blood supply

Pathoanatomy :

- Lateral epicondylitis begins as a microtear
- Inadequate healing response
- Progresses to macrotears after 6-8 months of continued sx.

- Histologically proven tendinosis (Nirschl)
  - Degenerative

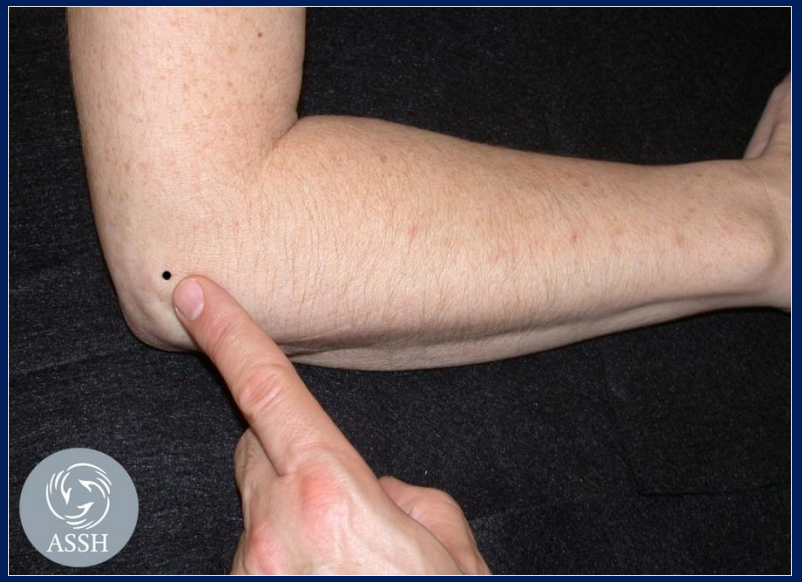
Clinical Presentation:

- Pain over the lateral aspect of the elbow
  - Localized at or just distal to epicondyle
  - Sharp/aching in nature
  - Radiation along course of wrist extensors
  - Worsened by active wrist extension or forearm rotation with elbow extended
- Weakness of grip
- Difficulty grasping or lifting items

- Night pain present when elbow gets stiff
- Stiffness upon wakening – stretch of inflamed tendon
- Pain with even light daily activities
  - Shaving
  - Picking up coffee cup, gallon milk

Physical Examination:

- Assess for warmth or erythema
- Point tenderness just distal and anterior to lateral epicondyle
- Examine for tenderness in radial tunnel
- Fluid elbow range w/o mechanical sxs or clicking



Physical Examination:

- Pain with resisted wrist extension
- Pain with resisted supination
- Long finger extension test (DD: RTS)
- Pain with passive wrist and digital flexion with elbow extension

Pain always at lateral elbow

Differential Diagnosis:

- Cervical Radiculopathy – burning, tingling, numb
- Radial Tunnel Syndrome - distal
- Intra-articular elbow pathology (11-69%)
  - Arthritis
  - Fracture
  - Synovitis
  - Loose body
  - Posterolateral plica
- Posterolateral elbow instability

Imaging:

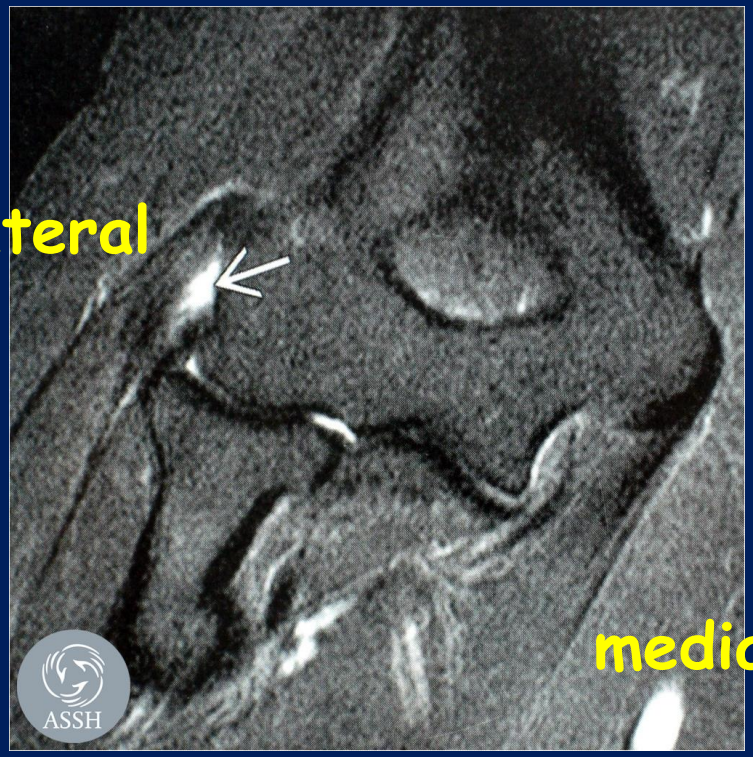
Radiographs:

- Rule out intra-articular pathology
  - Radiocapitellar view
- Calcification around extensor origin
- Pomerance (JSES 2002)
  - Findings influenced management in only 2 cases

Imaging:

MR findings:

- Edema and thickening of origin
- Extent of tendon involvement correlates with operative findings
- May be negative



Ultrasound findings:

- Intrasubstance tears and thickening
- Findings are moderately sensitive, but variably specific
- Very dependent on operator's experience

Epidemiology: Natural History

- 80% of newly diagnosed lateral epicondylitis will be symptomatically improved at one year
  - Natural history confuses objective outcomes assessment of any treatment type

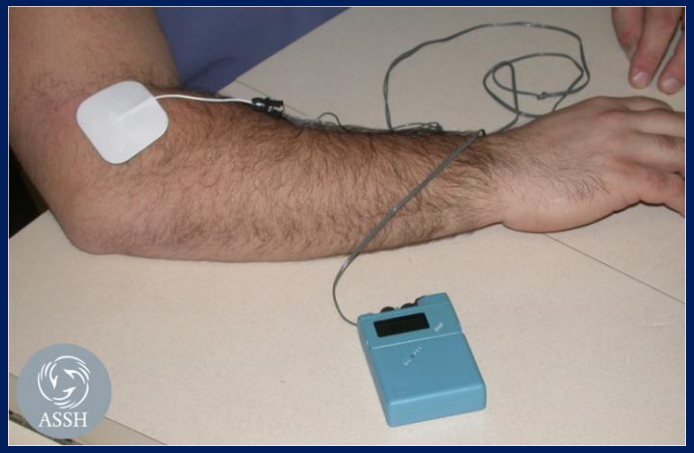
- 4-11% patients will require surgery
  - Manual labor
  - Dominant arm
  - Poor coping mechanism
  - Longer duration of pain

Treatment:

- Activity modification
  - Limit lifting and repetitive grasping
  - Lifting with elbow flexed or forearm supinated need not be restricted
  - No vibrational tools
  - Equipment modification
    - Restring racquet
    - Change grip size
    - No gloves (they increase gripping force)

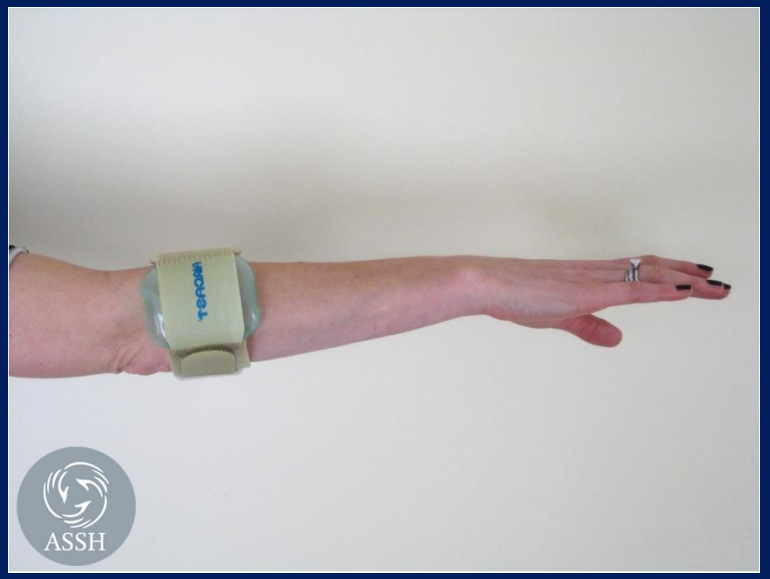
Nirschl Exercises:

- Stretch wrist extensors w/ elbow extended
- Progress to isometric and concentric strengthening
- Occupational Therapy
  - Cross friction massage
  - Eccentric strengthening
  - Ultrasound
  - Iontophoresis



Treatment: Orthosis

- Counterforce brace
  - Theoretically limit muscle expansion
  - Create a new more distal muscle origin
  - Less tensile stresses seen by injured tendon
- Wrist cock-up splint
  - Diminishes contraction of the wrist extensors



- **Treatment: Needles**
  - Corticosteroid injection
  - Autologous blood injection, PRP
  - Acupuncture
  - Botulinum toxin (Botox)

Corticosteroid Injection:

- Treat the acute pain
- Allow more rapid and pain free rehabilitation
- Short term gains in pain relief seen, but no long term differences in outcome seen

Surgical Treatment:

- Indicated for patients who fail 6-12 months of conservative therapy
- Usually only 4-11% of people will require surgical intervention
- Long history of multiple techniques with good results

Open Tendon Debridement:

- Lateral incision over and just distal to epicondyle
- Identification of the patholo fibers of the ECRB (± EDC)
- Resection of the diseased tissue
- some repair or lengthen the remaining tendon
- 95%-97% cure at 6 months

Summary:

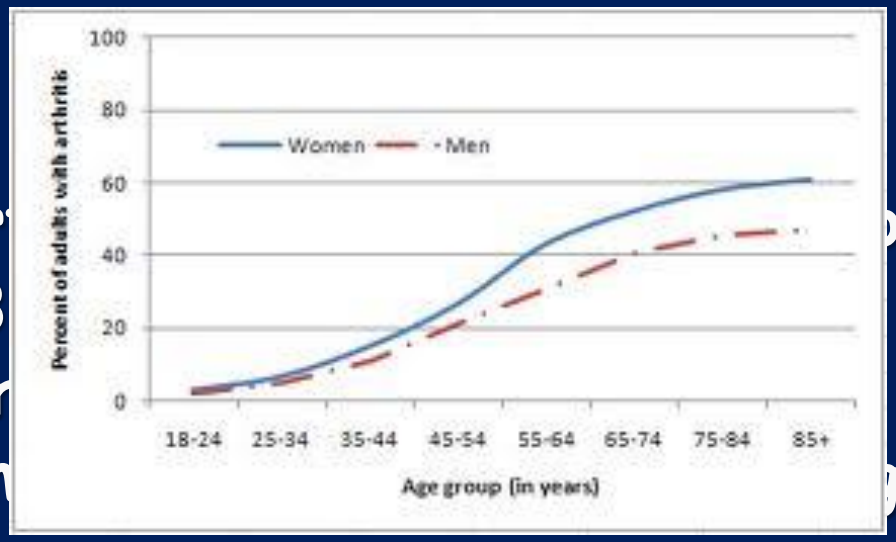
- Work Comp is different
- Understand psychological issues
- Confident seasoned physician
- Truth based on PE and objective studies
- Up to date with literature
- Look for red flags
- Identify early prevents problems later

THANK YOU

ARTHRITIS

Arthritis:

- Epidemiology:
  - ❖ 2001 - ar… …op.[1]
    - 43…
    - over…
    - wom… …ge



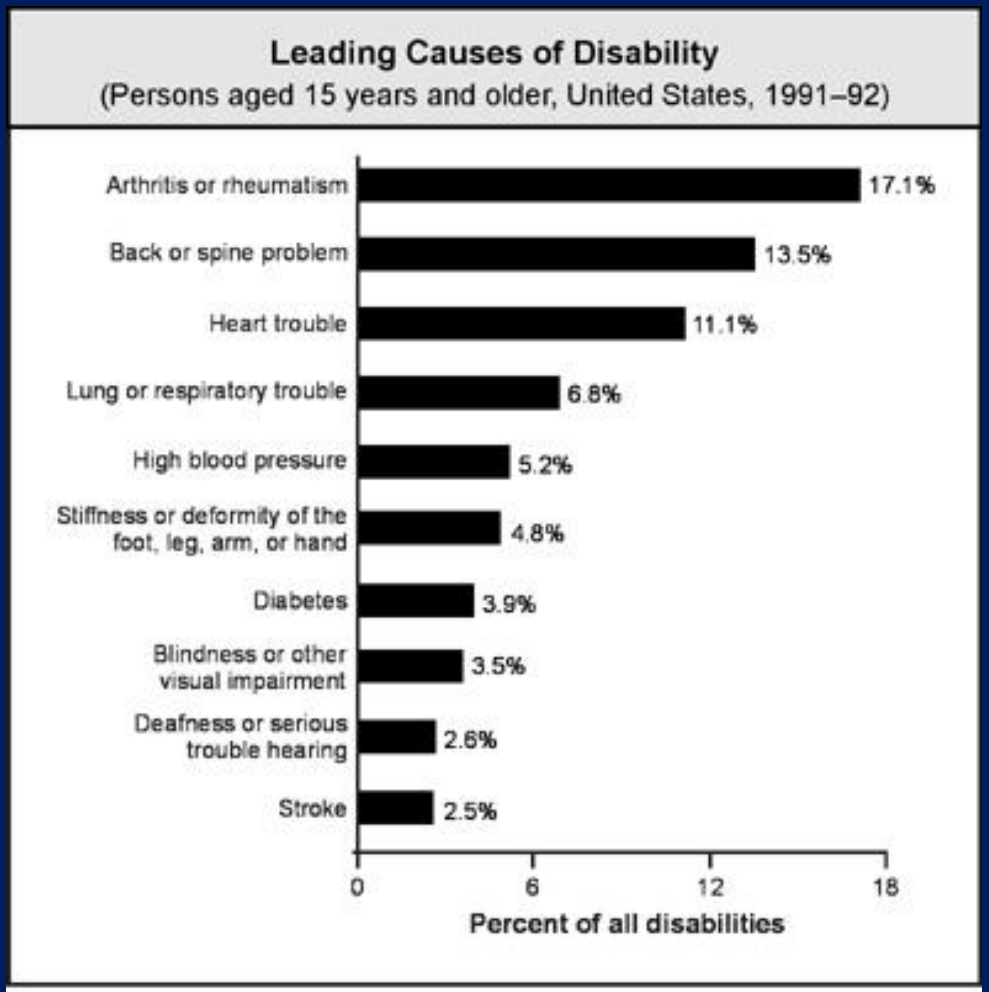
  - ❖ 2020 – estimated 18.3% US pop. [2]
    - 60 million people
    - expansion of indiv > 60 years old

[1] Center for Disease Control & Prevention: MMWR 2001 50(17), 334-356
[2] Population Division Dept of Economic & Social Affairs of the UN Sec 1999

Costs of Arthritis:

- The total costs attributable to arthritis and other rheumatic conditions in the United States in 2003 was approximately $128 billion, or 1.2% of the 2003 GDP.
- $80.8 billion was spent on direct costs like medical expenses.
- $47.0 billion was spent on indirect costs from lost earnings and lost productivity.
- Work limitation due to arthritis by people with diagnosed arthritis ranges from 25.1% to 51.3% working adults

COST!!!!!!!!



Source: CDC. Prevalence of disabilities and associated health conditions—United States, 1991–92. *Morbidity and Mortality Weekly Report* 43(40):730-731, 737-739, 1994.

Arthritis in workforce:

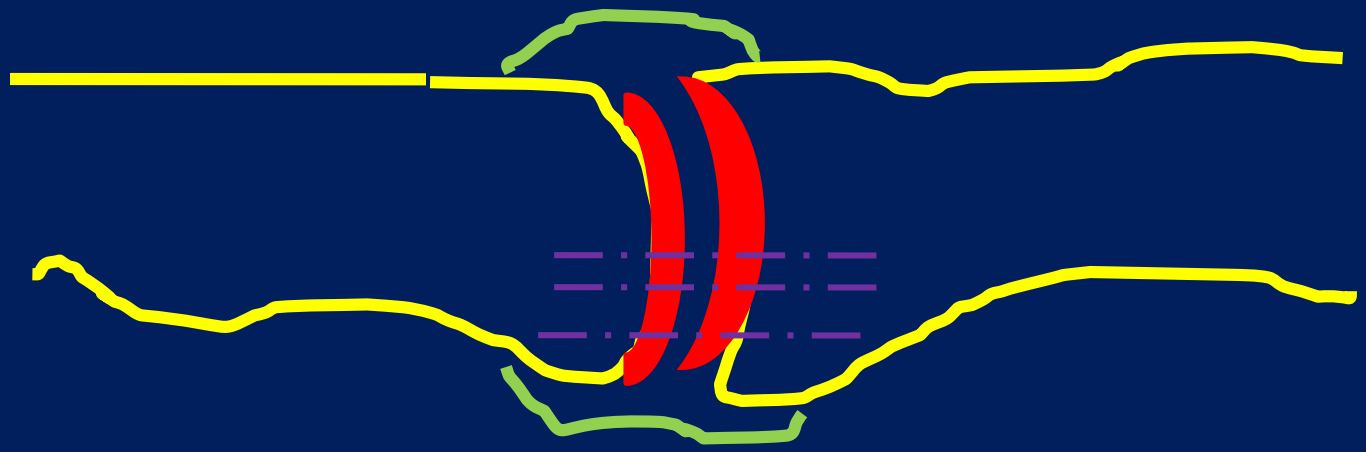
- 6.7% severe enough to limit work ability
- AAWL affects 1in20 indiv age 18-64 years old
- AAWL 1 in 3 for <u>self reported</u>
- 3.4% Hawaii – 15% Kentucky

ARTHRITIS

- What is arthritis?

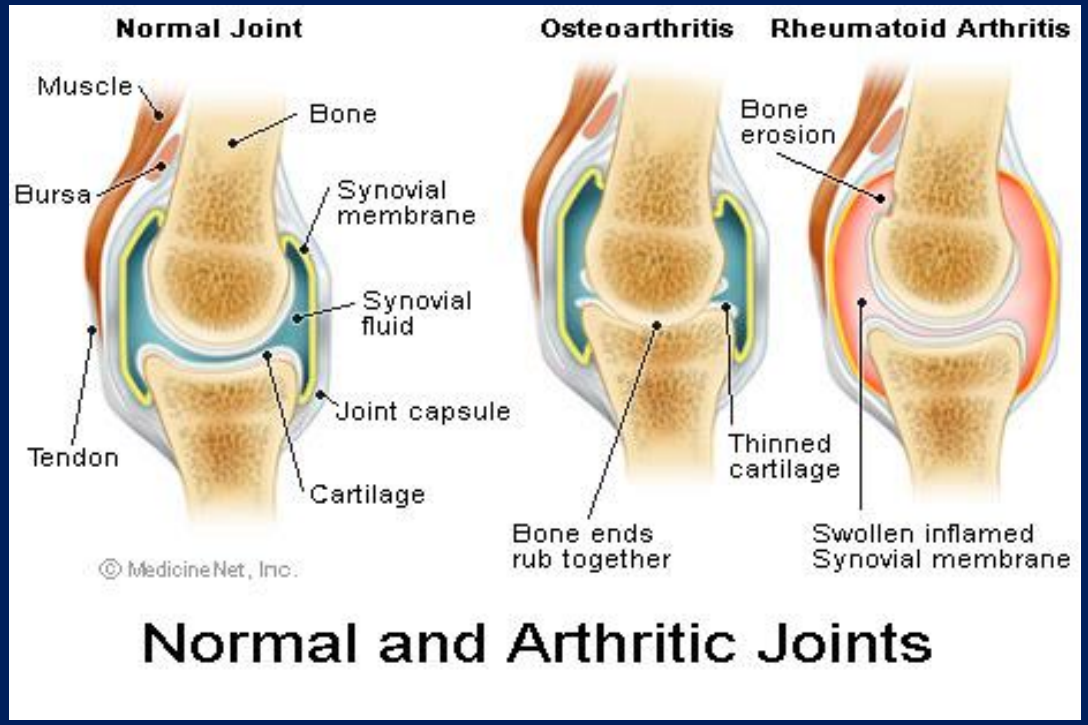
- Joint

  bone, cartilage, capsule, ligaments



ARTHRITIS

- **Defined:**
  - Wear and tear of joint
    - cartilage fragments



Normal

Thinning

Full thickness
Bone exposed

ARTHRITIS

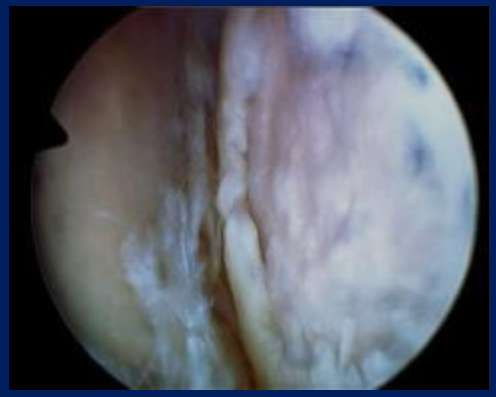
Clinically:

- joint pain
- swelling (effusion)
- noises (crepitus)
- decreased range of motion (stiffness)
- ? locking of joint
- deformity - angulation
- weakness – from disuse

ARTHRITIS

Radiographically (X-ray):

- joint space narrowing
- joint irregularity
- bone cysts
- bone spurs (osteophytes)
- thickened bone underneath joint



CAUSES:

- Genetic!!!!
- Trauma
- Inflammation:
  - RA, Gout, Pseudogout (Ca), U/C, psoriasis etc
- Infection
- Hemophilia
- Tumors etc.

ARTHRITIS

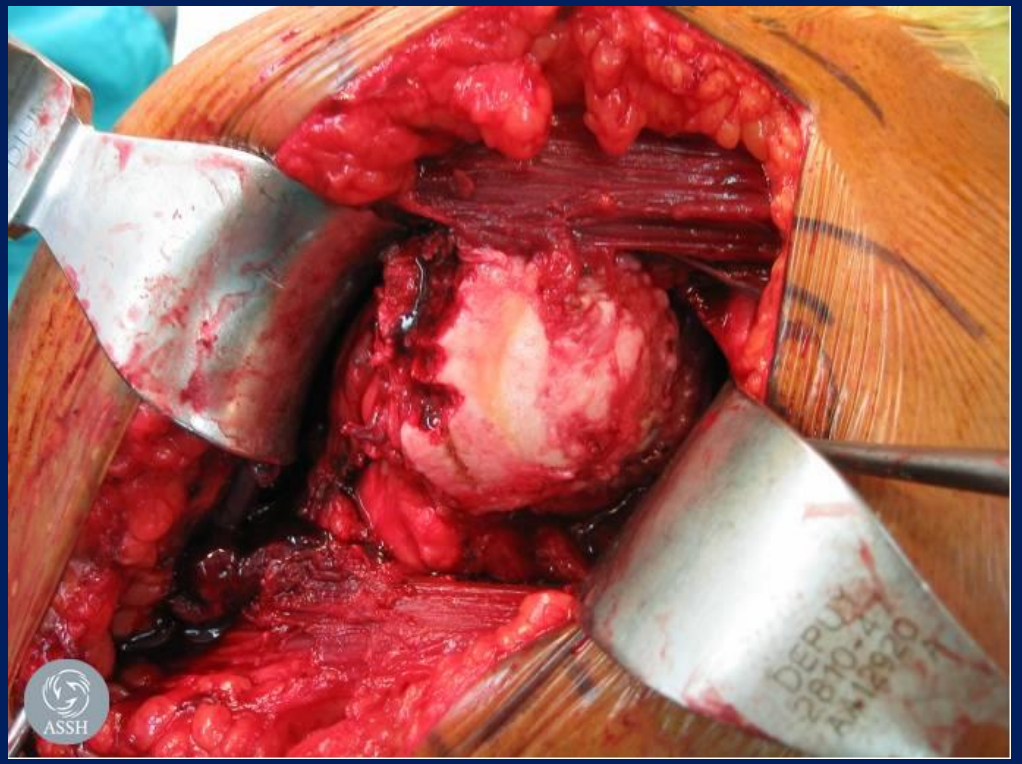
- **Types:**
  - OA – 15.8 million (2004) – 20million in 2005
  - RA – 2.1 million
  - Gout – 1 million
  - Other – ankylosing spondylitis, juvenile arthritis, psoriatic arthritis, lupus – 800 thousand

Shoulder:

Anatomy:

- Bony
- Soft tissue

Shoulder arthritis - Loss of the cartilage on the articular surfaces of the glenohumeral joint



Types of shoulder arthritis

- Primary - OA
- Secondary:
  - Traumatic
  - Rotator cuff insufficiency
  - Avascular necrosis
  - Infection
  - Inflammatory:
    - RA, psoriasis, gout, pseudogout, etc
  - Other

Arthritis

- **Evaluation**
  - History
  - Exam
  - Imaging

Arthritis

- **History**
  - Insidious onset of symptoms
  - Progressive worsening over time
  - History of injury, infection and/or surgery
  - Other joint involvement
  - Family history

Arthritis

- **History**
  - Rest pain
  - Stiffness esp IR
  - Weakness
  - Grinding or clicking
  - Functional limitation

Arthritis

- **Physical Exam**
  - Atrophy
  - Weakness
  - Range of Motion (Stiffness – IR, ER)
  - Crepitation
  - Tenderness
  - Swelling

Pain:

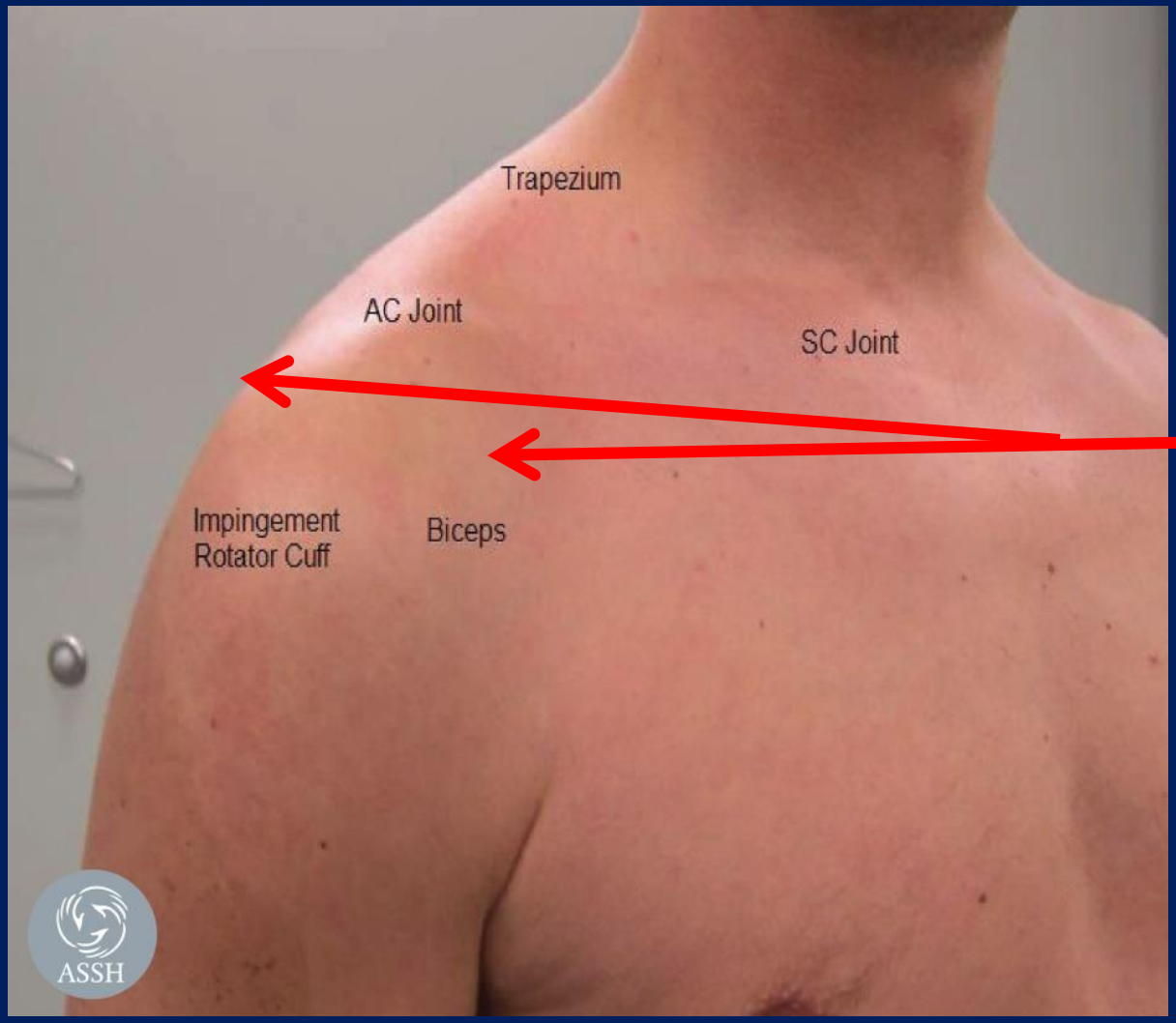
Location of pain critical:

Pain should be fairly focal:

- lateral shoulder and arm: Rotator cuff
- ant/post shoulder – capsulitis - OA (inflammation of joint lining)
- superior shoulder – ac joint
- anterior pain – ac joint, biceps, capsule

- Be concerned about diffuse pain!

Location of pain:



- X-ray

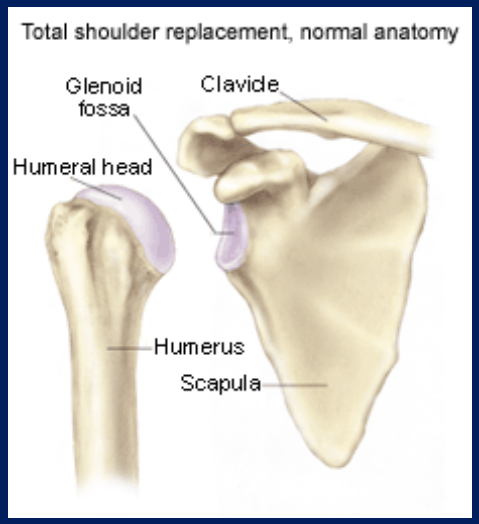
Grashey
(AP GH jt)

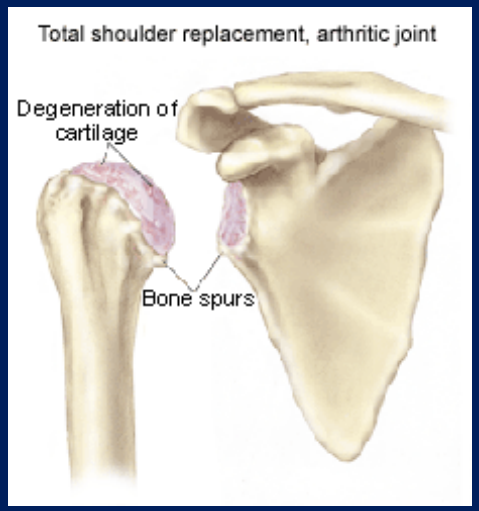
Scapular "Y"

Axillary

PRIMARY OA


Front
Back


Total shoulder replacement, normal anatomy
Glenoid fossa
Clavicle
Humeral head
Humerus
Scapula


Total shoulder replacement, arthritic joint
Degeneration of cartilage
Bone spurs

Inflammatory Arthropathy

Avascular Necrosis

Post traumatic arthritis

Rotator Cuff Arthropathy

Other studies:

- CT scan
  - Evaluate bone stock (glenoid)
  - Articular alignment
- MRI
  - Soft tissues (rotator cuff
  - Early AVN
- Serology
  - C-reactive protein
  - Rheumatoid factor
  - Sedimentation rate
- Aspiration

- **Differential Diagnosis:**
  - Infection
  - Neuropathic (Charcot) joint
  - Proximal humerus fracture
  - Herniated cervical disc
  - Rotator cuff tear
  - Tumor

• Rotator Cuff Arthropathy

- common

Function of the rotator cuff
- depress humeral head

Function of Deltoid
- elevate humeral head

Pathogenesis of Cuff Tear Arthropathy

- Massive rotator cuff tear leads to superior migration of humeral head
- Diminished acromiohumeral distance → Subacromial impingement with further cuff damage

- Instability/shearing from loss of rotator cuff results in articular surface wear
- Loss of enclosed joint space results in poor diffusion of nutrients to articular cartilage

Rotator Cuff Tear Arthropathy

Spectrum of shoulder pathology with 3 critical features

1. Rotator cuff insufficiency
2. Superior migration of the humeral head
3. Degenerative changes of the glenohumeral joint

Additional features may include:

- Acetabularization of the acromion
- Erosion of superior glenoid
- Humeral head collapse
- Shoulder pseudoparalysis

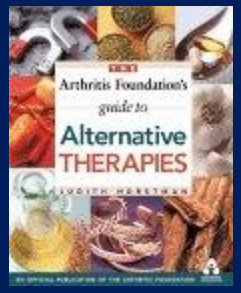
Conservative Treatment

Less to more invasive/ less to more SE

- Activity modification
- Therapy ??????
- NSAIDS
- Steroid injection
- Synvisc
- Debridement and removal of loose bodies
- Soft tissue releases (posterior capsule)

Beware:

Many stories – few facts!



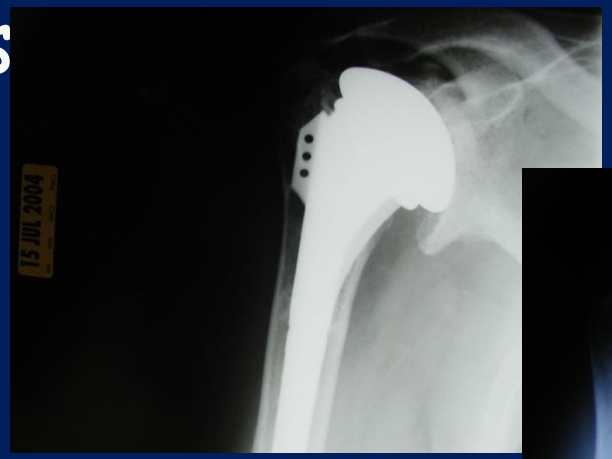
Tai Chi Productions BY DR. PAUL LAM

- Diet, Supp
- Exercise
- Music The
- Pet / Anim
- Herbal Re
- Prolothera
- Acupunctu
- Aromather
- Art Thera
- Cod Liver
- Bee Sting
- Biofeedba
- Certo / Fr
- Chiropract
- Supplemen

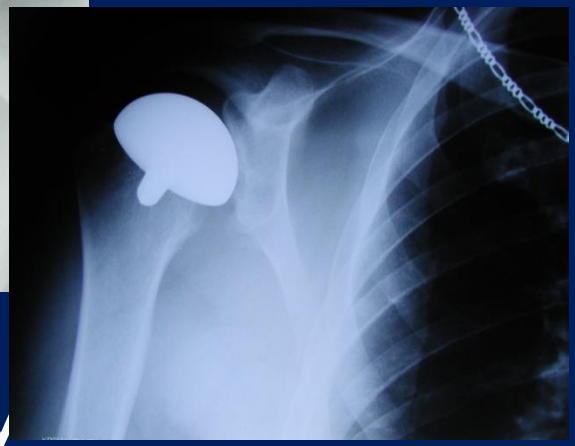
- py / Colorology
- , Ginseng Root
- celets / Magnet therapy
- ver
- / Homeopathic
- ils, Topical Creams
- ughter Therapy
- Self-Hypnosis
- Therapy
- erapy
- drotherapy
- / Relaxation/Yoga

TYPES OF SHOULDER ARTHROPLASTY

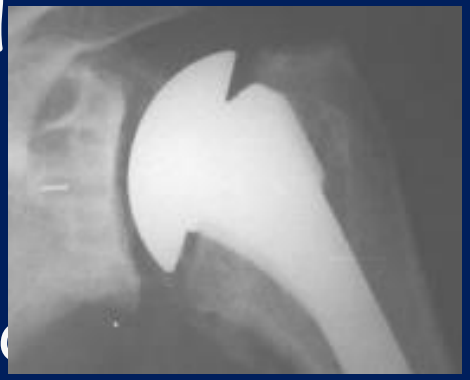
- Hemiarthroplas
  - conventional



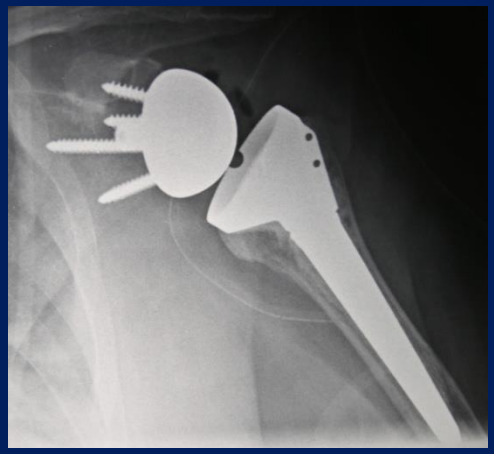
- Resurfacing



- Total Shoulder Arthroplasty
  - Non-constrained



- Reverse
  - Semi-constraine

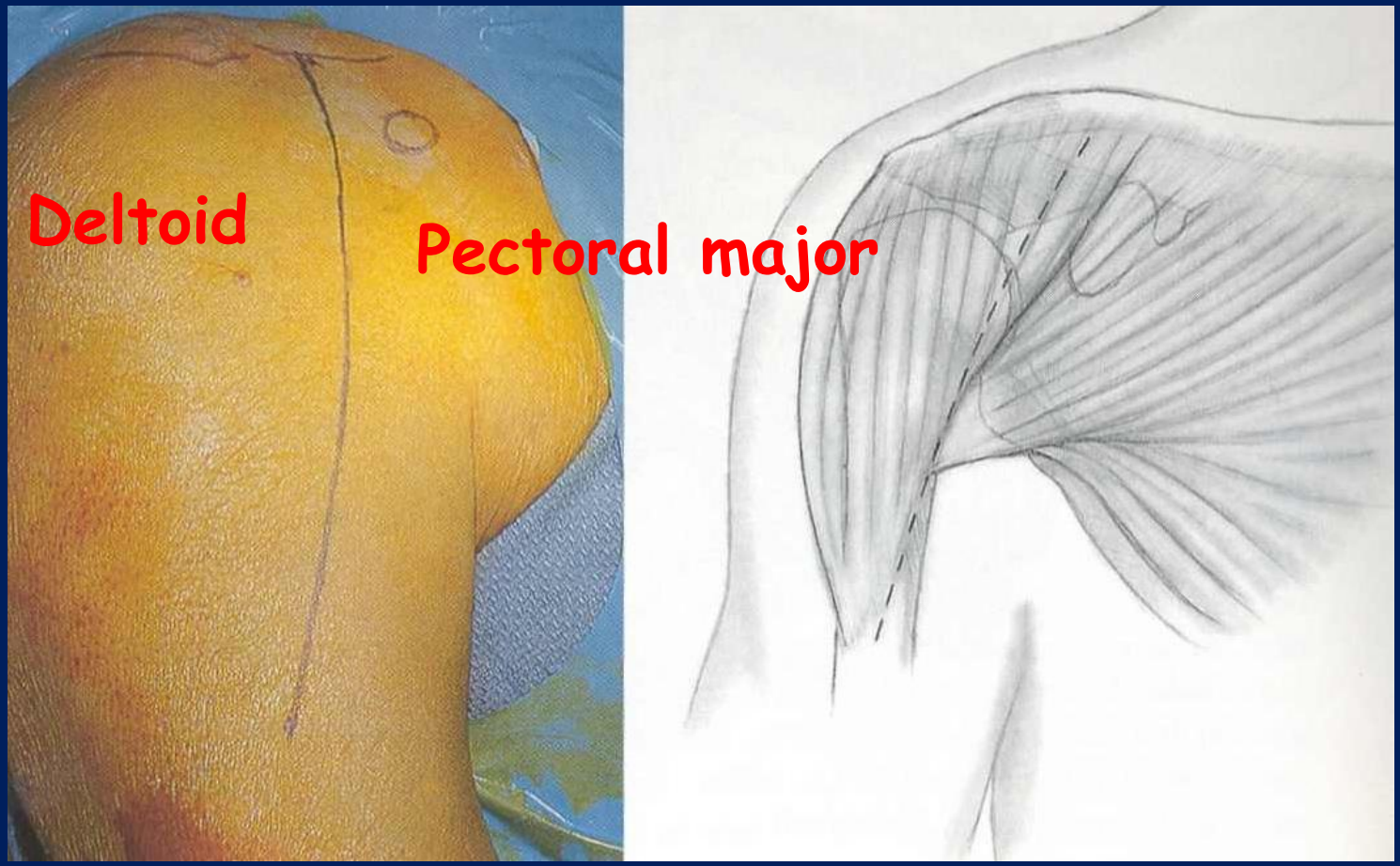


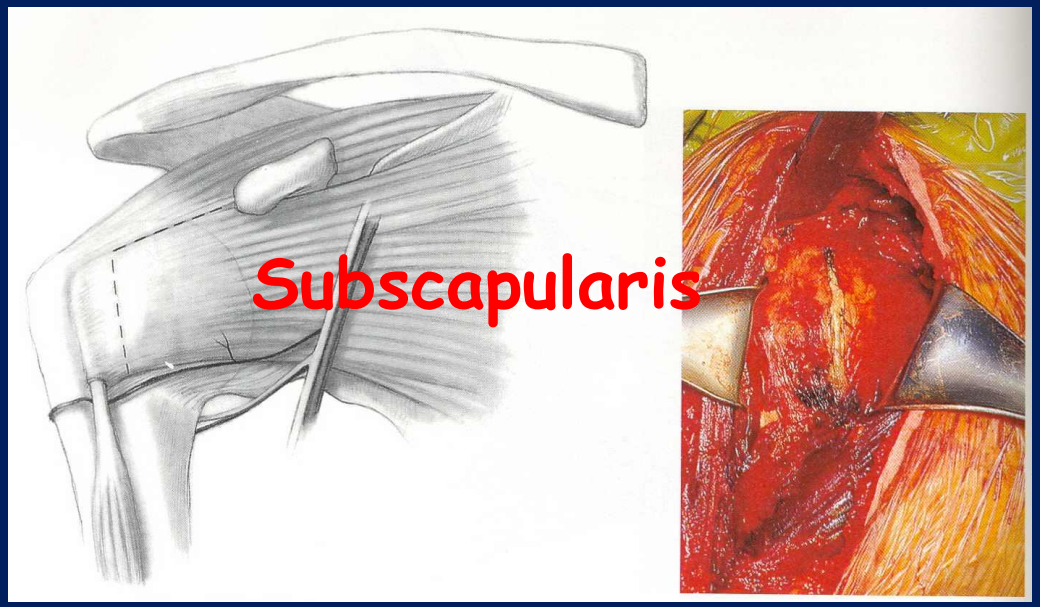
INDICATIONS FOR TOTAL SHOULDER ARTHROPLASTY

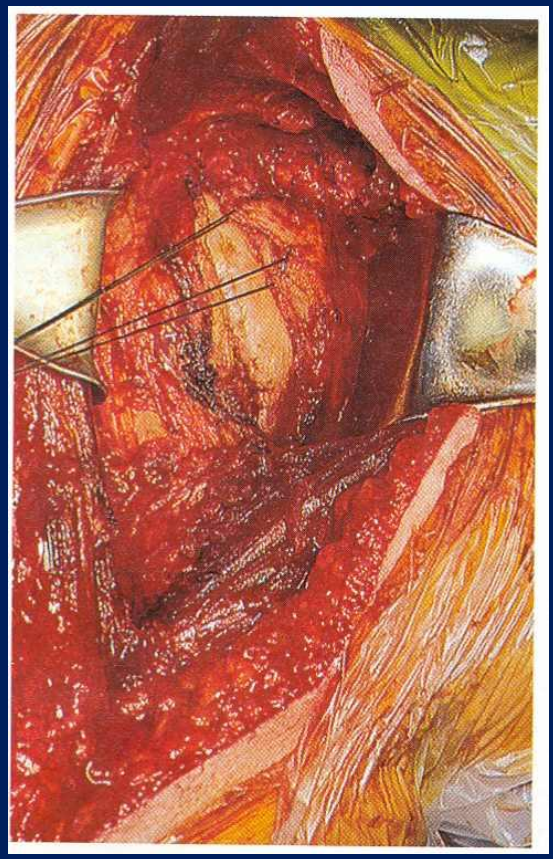
- PRIMARILY: - 10 lb weight restriction
  - Primary OA
  - Inflammatory arthritis
  - Post traumatic etc.

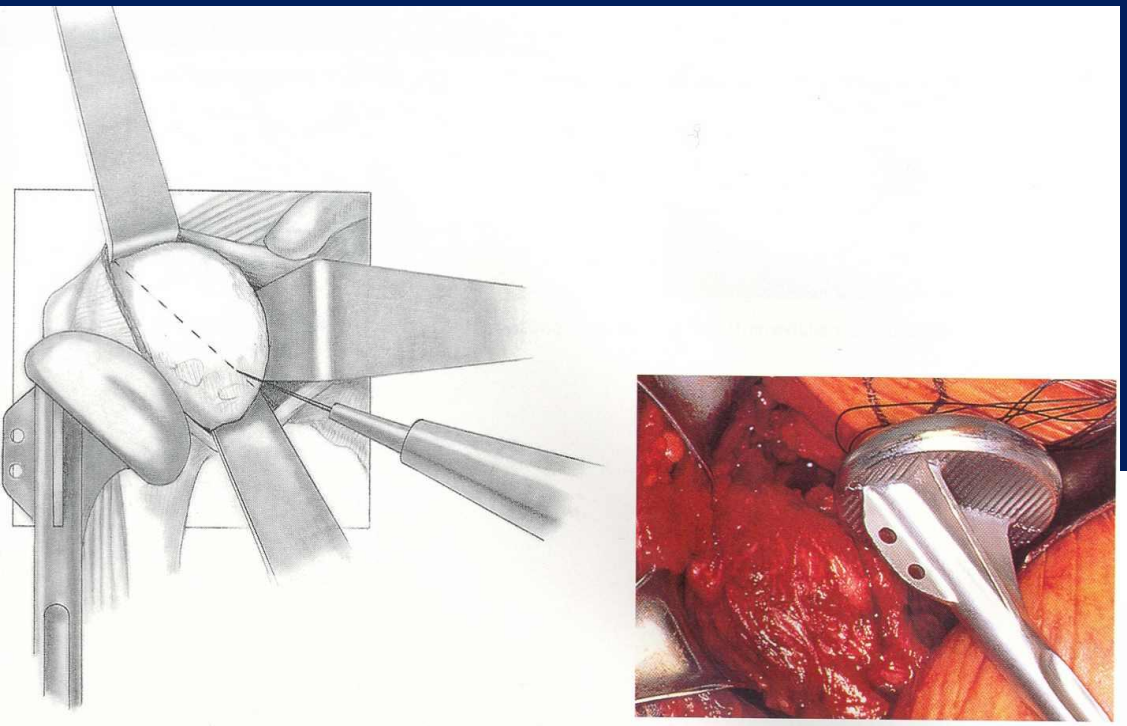
- PREREQUISITE
  - Intact rotator cuff
  - Intact Deltoid

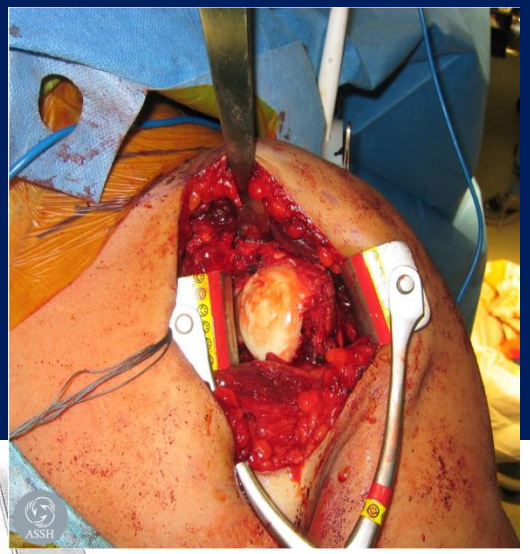
TOTAL SHOULDER ARTHROPLASTY TECHNIQUE

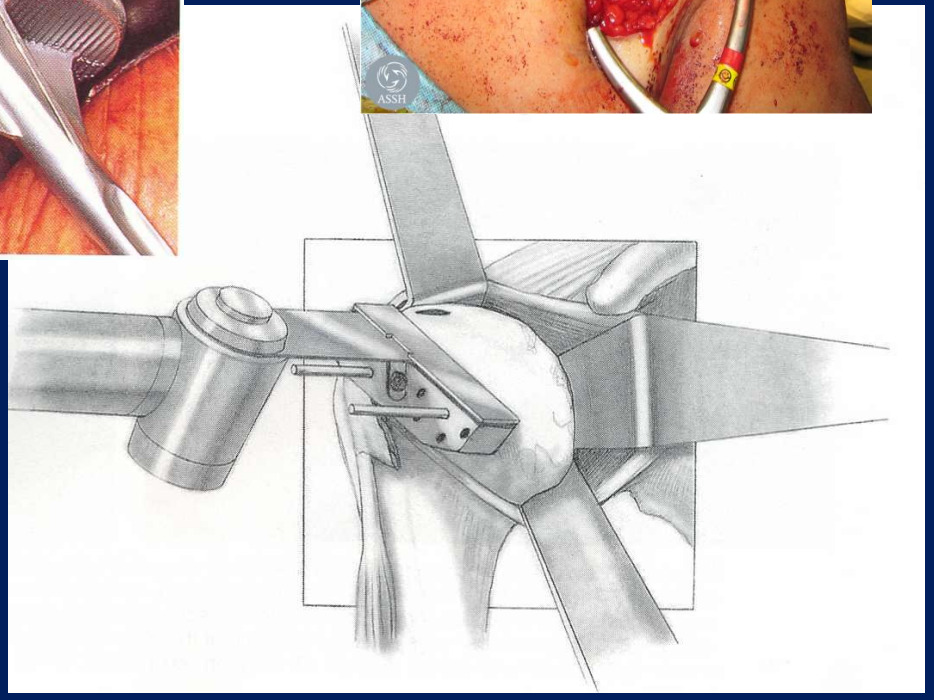


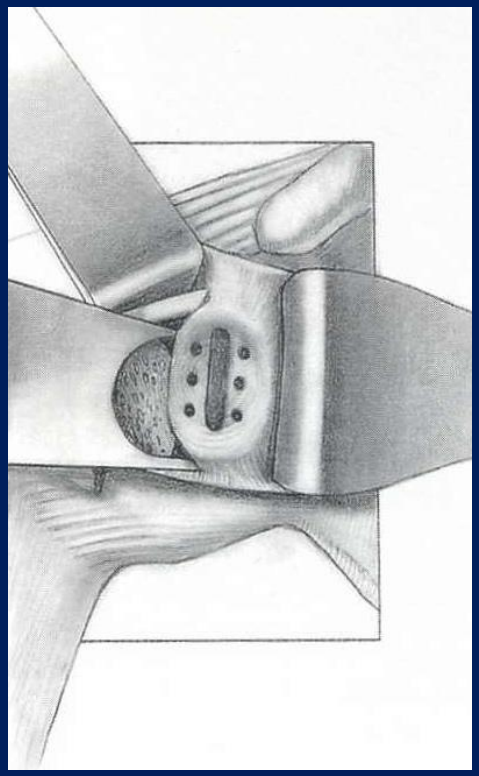

Subscapularis

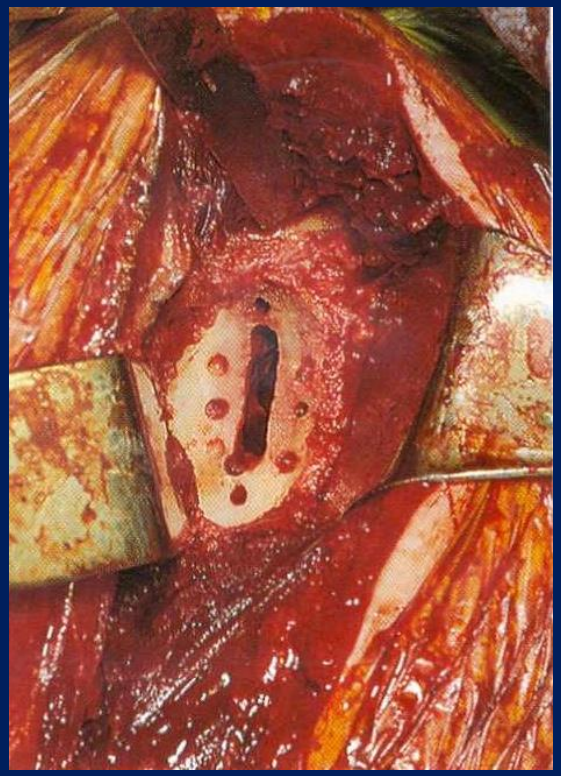


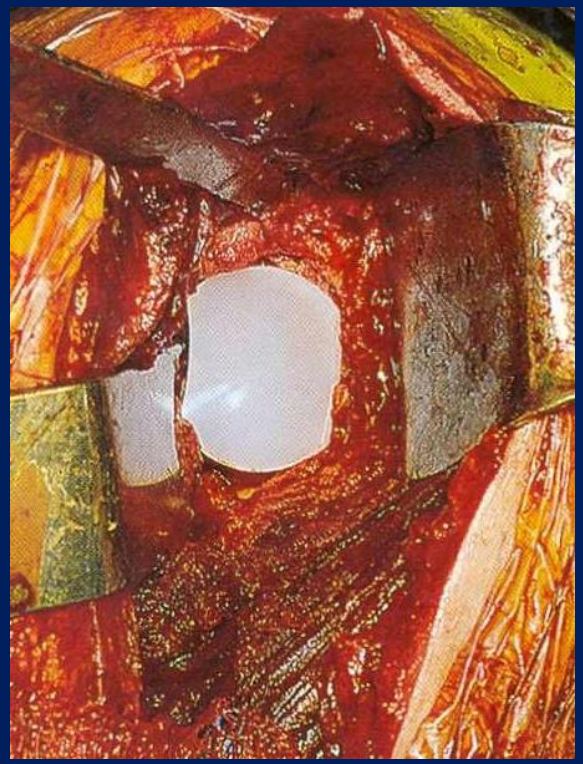


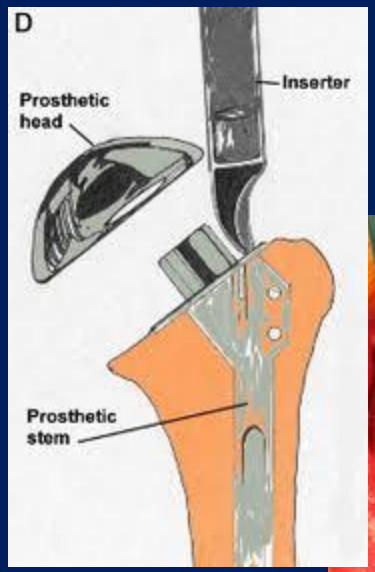


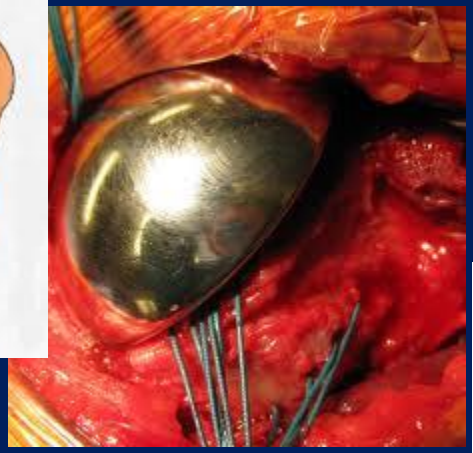


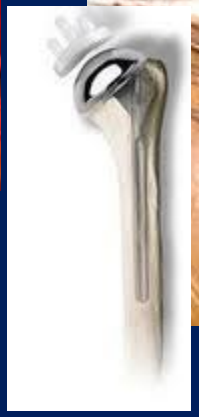


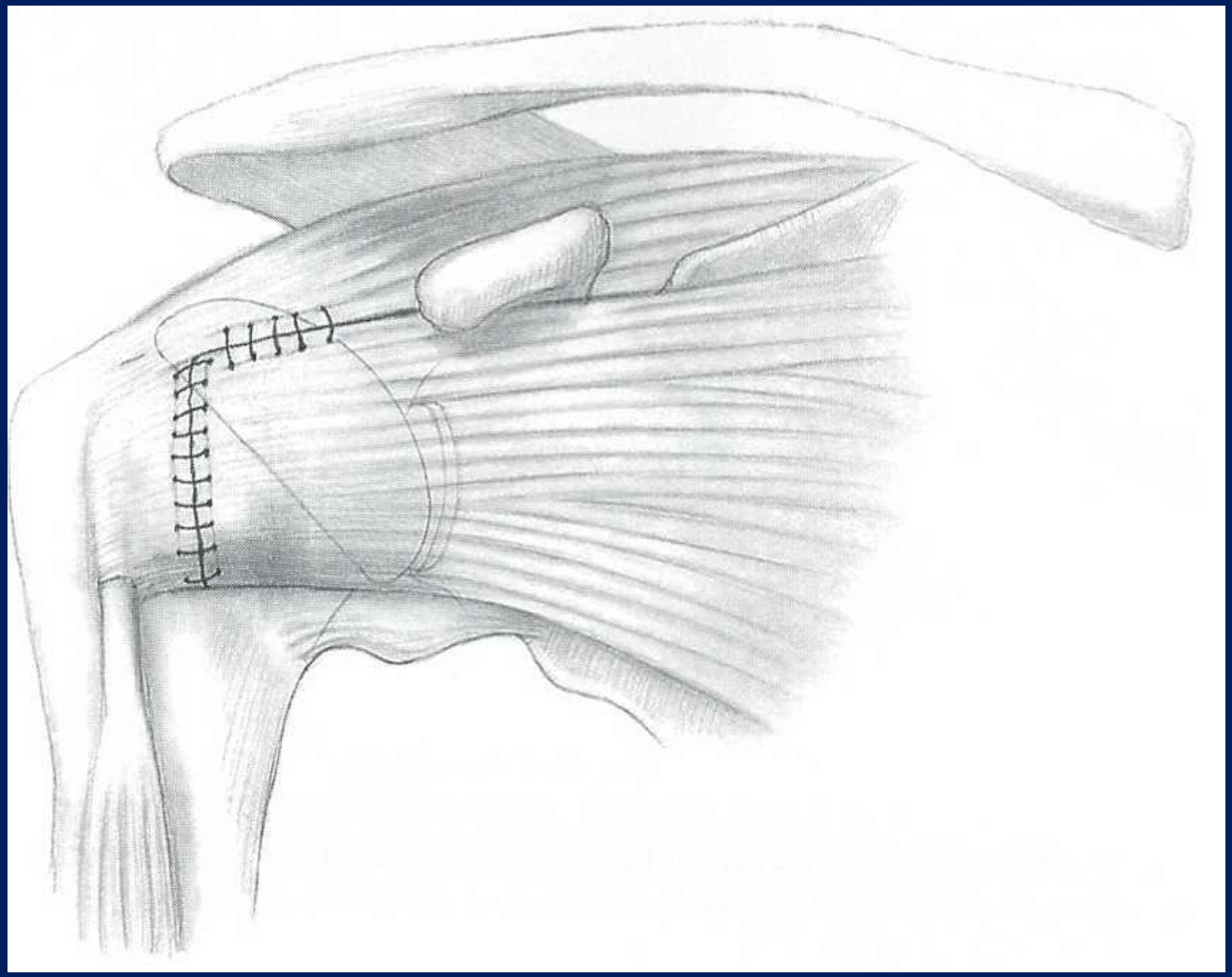





D
Inserter
Prosthetic head
Prosthetic stem







Complications

Early:

- periprosthetic fracture – humerus/glenoid
- dislocation
- infection
- nerve injury

Late:

- stiffness
- glenoid loosening – 8-10 years

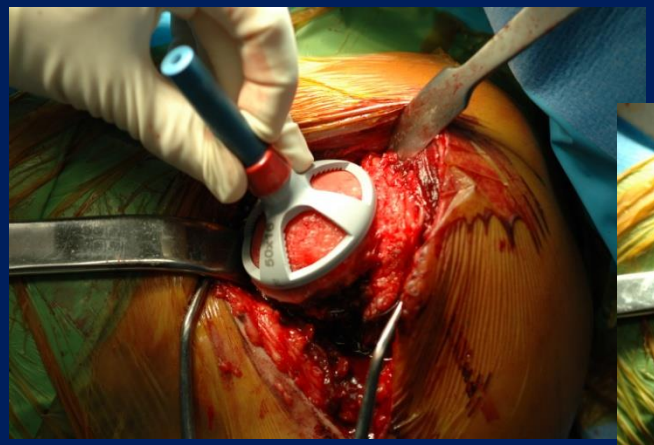
Resurfacing hemiarthroplasty:

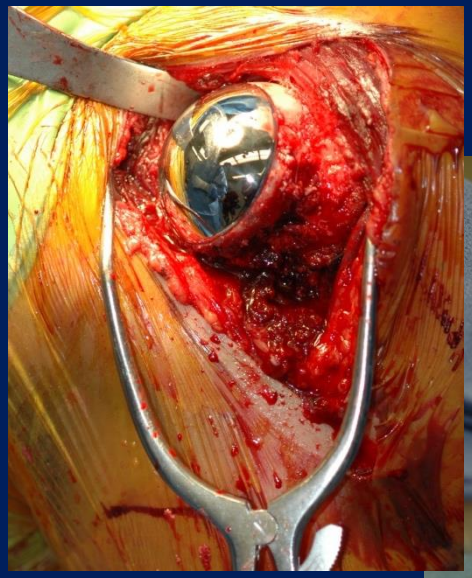
Indications:

- relatively young – no weight restrictions
- very old – less pulmonary issues
- smaller quicker surgery
- less pain, easier rehab

Contraindications:

- large glenoid erosions
- severe glenoid retroversion
- biconcave glenoid
- poor humeral bone – AVN, fracture*
- usual – infection, BP etc



Does work cause shoulder arthritis?

- 2007
  - 20 males, laborers, overhead work
  - Anthropometric, ergonomic measurements, labs etc
  - 3 inflammatory arthritis
  - No difference to control

Clinical and ergonomic factors in prolonged shoulder pain among industrial workers.
ANDERS BJELLE, M.D.,1 MATS HAGBERG, M. D.,2 and GUNNAR MICHAELSSON, M.D.3
Scand. j. work environ. & health 5 (1979) 205-210

"Bone and joint disorders in the upper extremities of chipping and grinding operators."

Int Arch Occup Environ Health1987;59(2):189-98.
Bovenzi, M, Fiorini A, Volpe C.

Foundry workers

67vibration + manual labor

X-rays

No difference in x-ray changes

pain related to vibrational exposure

Does work cause shoulder PAIN?

Physical factors:

- heavy labor
- unilateral work
- overhead work
- repetitive
- cold and damp environment

Psychological factors:

- stress
- monotonous work

- Fact:
  - work will NOT change the outcome of arthritis

  Does NOT:
    - speed up arthritic process
    - affect outcome of surgery

  - heavy work (manual labor) may make the condition more symptomatic – painful.

  - may need adaptive strategies

Treatment of shoulder OA in the workforce.

- Same conservative treatment
- Surgical options depend of type of work:
  - desk job – same. TSA – 10lb restriction
  - less aggressive surgery – resurfacing
    no restrictions
    might need a second surgery