

5 COMMON UPPER EXTREMITY COMPLAINTS

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LEARNING OBJECTIVES

- ▶ Understanding the signs/symptoms, diagnosis, and treatment of rotator cuff impingement syndrome
- ▶ Understanding the signs/symptoms, diagnosis, and treatment of lateral epicondylitis
- ▶ Understanding the signs/symptoms, diagnosis, and treatment of cubital tunnel syndrome
- ▶ Understanding the signs/symptoms, diagnosis, and treatment of carpal tunnel syndrome
- ▶ Understanding the signs/symptoms, diagnosis, and treatment of trigger finger

5 Common Upper Extremity Complaints

- ▶ Rotator Cuff Impingement Syndrome
- ▶ Lateral Epicondylitis (Tennis Elbow)
- ▶ Cubital Tunnel Syndrome
- ▶ Carpal Tunnel Syndrome
- ▶ Trigger Finger

Rotator Cuff Impingement Syndrome

- ▶ Differentiate from:
 - ▶ Glenohumeral instability
 - ▶ Cervical radiculitis
 - ▶ Calcific tendonitis
 - ▶ Adhesive capsulitis
 - ▶ DJD
 - ▶ Acromioclavicular (AC) osteoarthritis

History

- ▶ Meyer - 1931
 - ▶ RCT results from friction on supraspinatus by undersurface of acromion
- ▶ Codman - 1934
 - ▶ Critical zone: 1 cm medial to insertion on greater tuberosity where most RCT occur

History

- ▶ Armstrong - 1949
 - ▶ Supraspinatus syndrome
 - ▶ Acromionectomy
- ▶ Neer - 1972
 - ▶ Rotator cuff impinged by anterior 1/3 of acromion, CA ligament, and AC joint
 - ▶ Impingement zone

Impingement syndrome

- ▶ Neer - 1972
 - ▶ Treatment
 - ▶ Anterior acromioplasty & bursectomy
- ▶ Ellman - 1987
 - ▶ Arthroscopic acromioplasty

Anatomy

- ▶ Subacromial space
 - ▶ Height 1-1.5 cm
 - ▶ Contents:
 - ▶ Supraspinatus
 - ▶ Biceps tendon
 - ▶ Bursa
 - ▶ CA ligament

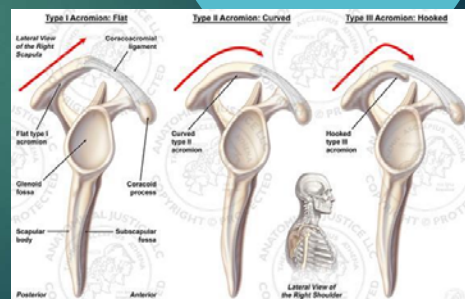


Pathoanatomy

- ▶ Intrinsic theory
 - ▶ Tension overload with arm overhead
 - ▶ Eccentric contraction supraspinatus
 - ▶ Throwing, swimming, manual labor
 - ▶ Overuse

Pathoanatomy

- ▶ Extrinsic theory
 - ▶ Acromial morphology
 - ▶ Bigliani
 - ▶ Type 3
 - ▶ Rockwood
 - ▶ Anterior prominence



Diagnosis

- ▶ **History**
 - ▶ Pain
 - ▶ Repetitive overhead use
 - ▶ Position of max pain
 - ▶ Insidious, can begin with trauma
 - ▶ Previous tx
 - ▶ > 40 yo
 - ▶ < 40 yo – differentiate from instability

Diagnosis

- ▶ **Physical Exam**
 - ▶ C-spine exam
 - ▶ ROM
 - ▶ Strength testing
 - ▶ Apprehension/relocation

Diagnosis

- ▶ **Physical Exam**
- ▶ Neer impingement sign
 - ▶ passive forward flexion $>90^\circ$ causes pain
- ▶ Neer impingement test
 - ▶ a subacromial injection relieves pain associated with passive forward flexion $>90^\circ$
- ▶ Hawkins test
 - ▶ internal rotation and passive forward flexion to 90° causes pain
- ▶ Jobe test
 - ▶ pain with resisted pronation and forward flexion to 90° indicates supraspinatus pathology

Imaging

- ▶ Plain films
- ▶ True AP of the shoulder
 - ▶ useful in evaluating the acromiohumeral interval
 - ▶ normal distance is 7-14 mm
- ▶ 30° caudal tilt view
 - ▶ useful in identifying subacromial spurring
- ▶ supraspinatus outlet view
 - ▶ useful in defining acromial morphology

Imaging

- ▶ Plain films
- ▶ Common radiographic findings associated with impingement
 - ▶ proximal migration of the humerus as seen in rotator cuff tear arthropathy
 - ▶ traction osteophytes
 - ▶ calcification of the coracoacromial ligament
 - ▶ cystic changes within the greater tuberosity
 - ▶ Type III-hooked acromion
 - ▶ os acromiale

Imaging

- ▶ MRI
- ▶ Diagnostic of rotator cuff pathology
- ▶ Indications
 - ▶ Suspicion for pain or weakness attributable to a rotator cuff tear
- ▶ Findings
 - ▶ size, shape, and degree of retraction of tear
 - ▶ degree of muscle fatty atrophy (best seen on sagittal image)
 - ▶ medial biceps tendon subluxation
 - ▶ indicative of a subscapularis tear
 - ▶ cyst in humeral head on MRI seen in almost all patients with chronic RCT
- ▶ In asymptomatic patients 60 yrs and older, 55% will have a RCT

Imaging

- ▶ **Ultrasound**
- ▶ Indications
 - ▶ suspicion of rotator cuff pathology
 - ▶ need for dynamic examination
- ▶ advantages include
 - ▶ allows for dynamic testing & inexpensive
 - ▶ readily available at most centers
 - ▶ helpful to confirm intraarticular injections
- ▶ disadvantages include
 - ▶ highly user dependent
 - ▶ limited ability to evaluate other intraarticular pathology
- ▶ sensitivity/specificity
 - ▶ similar sensitivity, specificity, and overall accuracy for diagnosis of rotator cuff disease as compared to MRI
 - ▶ 23% of asymptomatic patients had a rotator cuff tear on ultrasound in one series

Treatment

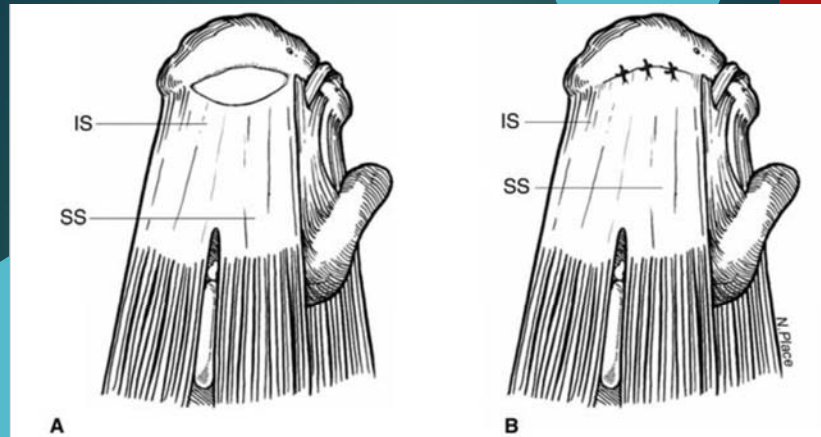
- ▶ Nonoperative
 - ▶ physical therapy, oral anti-inflammatory medication, subacromial injections
- ▶ Indications
 - ▶ subacromial impingement syndrome
- ▶ Techniques
 - ▶ aggressive rotator cuff strengthening and periscapular stabilizing exercises
 - ▶ Rehab program is indicated in the presence of scapular dyskinesia which aims to regain full shoulder range of motion and coordinate the scapula with trunk motion

Treatment

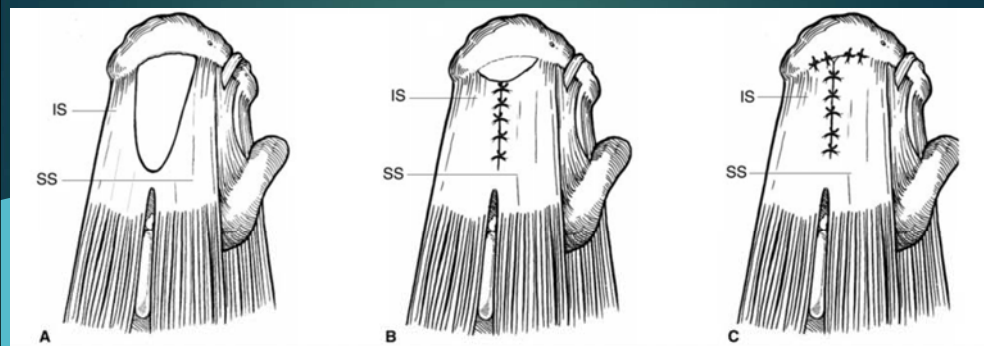
- ▶ Operative
 - ▶ Anterior acromioplasty with CA ligament resection
 - ▶ Open vs. arthroscopic
 - ▶ Biceps tenodesis if symptomatic
 - ▶ Distal Clavicle Resection if indicated
 - ▶ Indicated in patients that have failed 4-6 months of nonoperative treatment
- ▶ Outcomes
 - ▶ Poor subjective outcomes observed after acromioplasty in patients with workers' compensation

Treatment

- ▶ Arthroscopic / open rotator cuff repair
- ▶ Indications
 - ▶ Acute full-thickness tears
 - ▶ Bursal-sided tears >25% in depth
 - ▶ Partial articular-side tears >50%
 - ▶ Partial articular-side tears <50% treated with debridement alone
 - ▶ Younger patients with acute, traumatic tears
 - ▶ In situ repair leave bursal sided tissue intact
 - ▶ Older patients with degenerative tears
 - ▶ Tendon release, debridement of degenerative tissue and repair



A, Superior view of a crescent-shaped rotator cuff tear involving the supraspinatus (SS) and infraspinatus (IS) tendons. **B**, Crescent-shaped tears demonstrate excellent mobility from a medial-to-lateral direction and may be repaired directly to bone.



A, Superior view of a U-shaped rotator cuff tear involving the supraspinatus (SS) and infraspinatus (IS) tendons. **B**, The first step in repair is done with side-to-side sutures using the principle of margin convergence. **C**, The free margin is then repaired to bone in a tension-free manner.

Treatment

- ▶ Post operative (Rotator Cuff Repair)
- ▶ Rate-limiting step for recovery is biologic healing of RTC tendon to greater tuberosity
 - ▶ Believed to take 8-12 weeks
- ▶ Peribursal tissue and holes drilled in greater tuberosity are major source of vascularity to repaired rotator cuff
- ▶ Vascularity can increase with exercise
 - ▶ Postop with limited passive ROM (no active ROM)

Lateral Epicondylitis

Lateral Epicondylitis

- ▶ Overuse injury involving eccentric overload at origin of common extensor tendon
- ▶ Leads to tendinosis and inflammation at origin of ECRB
- ▶ Incidence
 - ▶ most common cause for elbow symptoms in patients with elbow pain
- ▶ Demographics
 - ▶ Up to 50% of all tennis players develop
- ▶ Mechanism
 - ▶ Occurs in activities with repetitive pronation and supination with elbow in extension
 - ▶ Common in tennis players (backhand implicated)
- ▶ Pathoanatomy
 - ▶ Usually begins as a microtear of the origin of ECRB
 - ▶ Angiofibroblastic hyperplasia and disorganized collagen

Lateral Epicondylitis

- ▶ Symptoms
 - ▶ Pain with resisted wrist extension and gripping activities
 - ▶ Decreased grip strength
- ▶ Physical exam
 - ▶ Point tenderness at ECRB insertion into lateral epicondyle
 - ▶ Few mm distal to tip of lateral epicondyle
 - ▶ May have decreased grip strength
 - ▶ Neurological exam helps to differentiate from entrapment syndromes
 - ▶ Provocative tests
 - ▶ resisted wrist extension with elbow fully extended
 - ▶ resisted extension of the long fingers
 - ▶ maximal flexion of the wrist
- ▶ Diagnosis
 - ▶ Diagnosis is primarily based on symptoms and physical exam

Lateral Epicondylitis

- ▶ Elbow Radiographs
 - ▶ AP/Lateral of elbow
 - ▶ Findings usually normal
- ▶ MRI
 - ▶ Increased signal intensity at ECRB tendon may be seen
 - ▶ Not necessary for diagnosis

Lateral Epicondylitis

- ▶ **Nonoperative**
 - ▶ Activity modification, ice, NSAIDs, physical therapy, ultrasound
 - ▶ First line of treatment
- ▶ Techniques
 - ▶ Tennis modifications (slower playing surface, more flexible racquet, lower string tension, larger grip)
 - ▶ Counter-force brace (strap)
 - ▶ Steroid injections (up to three)
 - ▶ Stretching of extensors
- ▶ Outcomes
 - ▶ Up to 95% success rate with nonoperative treatment
- ▶ **Operative**
 - ▶ Open or Arthroscopic release and debridement of ECRB origin
- ▶ Indications
 - ▶ If prolonged nonoperative (9-12 months) fails

Cubital Tunnel Syndrome

Cubital Tunnel Syndrome

- ▶ A compressive neuropathy of the ulnar nerve
 - ▶ 2nd most common compression neuropathy of the upper extremity
- ▶ Sites of entrapment
 - ▶ Between the two heads of FCU
 - ▶ Most common site
 - ▶ Within arcade of Struthers
 - ▶ Hiatus in medial intermuscular septum
 - ▶ Between Osborne's ligament and MCL
 - ▶ Medial epicondyle nonunions
 - ▶ Osteophytes
 - ▶ Heterotopic ossification
 - ▶ Ganglion cysts

Cubital Tunnel Syndrome

- ▶ Symptoms
 - ▶ Paresthesias of small finger, ulnar half of ring finger, and ulnar dorsal hand
- ▶ Exacerbating activities include
 - ▶ Cell phone use (excessive flexion)
 - ▶ Occupational or athletic activities requiring repetitive elbow flexion and valgus stress
- ▶ Night symptoms
 - ▶ Caused by sleeping with arm in flexion

Cubital Tunnel Syndrome

- ▶ Physical exam
 - ▶ Interosseous & first web space atrophy
 - ▶ Ring & small finger clawing
 - ▶ Ulnar nerve subluxation over the medial epicondyle as the elbow moves through a flexion-extension arc
 - ▶ Tinel sign positive over cubital tunnel
- ▶ Sensory
 - ▶ Decreased sensation in ulnar 1-1/2 digits
- ▶ Motor
 - ▶ Weakened grasp
 - ▶ Weak pinch
 - ▶ From loss of thumb adduction (70% of pinch strength)
 - ▶ Froment sign
 - ▶ Compensatory thumb IP flexion by FPL (AIN) during key pinch
 - ▶ Compensates for the loss of MCP flexion by adductor pollicis (ulna n.)

Cubital Tunnel Syndrome

- ▶ Association with **Medial Epicondylitis**
 - ▶ Overuse syndrome of flexor-pronator mass (Golfers, Pitchers)
 - ▶ Dominant Extremity in 75% of cases
 - ▶ Micro-trauma to Pronator Teres > Flexor Carpi Radialis
 - ▶ Physical exam
 - ▶ Tenderness 5-10mm distal and anterior to medial epicondyle
 - ▶ Soft tissue swelling
 - ▶ Pain with resisted forearm pronation and wrist flexion
 - ▶ Treatment
 - ▶ Rest, ice, activity modification (stop throwing x 6-12wks), PT (passive stretching), bracing, NSAIDS
 - ▶ First line of treatment
 - ▶ Technique
 - ▶ Counter-force bracing / kinesiology taping
 - ▶ Ultrasound shown to be beneficial
 - ▶ Multiple corticosteroid injections should be avoided

Cubital Tunnel Syndrome

- ▶ EMG / NCV
- ▶ Helpful in establishing diagnosis and prognosis
- ▶ Threshold for diagnosis
 - ▶ Conduction velocity <50 m/sec across elbow
 - ▶ Low amplitudes of sensory nerve action potentials and compound muscle action potentials

Cubital Tunnel Syndrome

- ▶ Nonoperative
 - ▶ NSAIDs, activity modification, and nighttime elbow extension splinting
 - ▶ First line of treatment with mild symptoms
- ▶ Technique
 - ▶ Night bracing in 45° extension with forearm in neutral rotation
- ▶ Outcomes
 - ▶ Management is effective in 50% of cases

Cubital Tunnel Syndrome

- ▶ Operative
 - ▶ In situ ulnar nerve decompression without transposition
- ▶ Indications
 - ▶ When nonoperative management fails
 - ▶ Before motor denervation occurs
- ▶ Technique
 - ▶ Medial approach open release of cubital tunnel retinaculum
 - ▶ Endoscopically-assisted cubital tunnel release
- ▶ Outcomes
 - ▶ Meta-analyses have shown similar clinical results with significantly fewer complications compared to decompression with transposition
 - ▶ 80-90% good results when symptoms are intermittent and denervation has not yet occurred
 - ▶ Poor prognosis correlates most with intrinsic muscle atrophy

Carpal Tunnel Syndrome

Carpal Tunnel Syndrome

- ▶ Most common compressive neuropathy
- ▶ Pathologic (inflamed) synovium most common cause of idiopathic CTS
- ▶ Risk factors
 - ▶ Female sex
 - ▶ Obesity
 - ▶ Pregnancy
 - ▶ Hypothyroidism
 - ▶ Rheumatoid arthritis
 - ▶ Advanced age
 - ▶ Chronic renal failure
 - ▶ Smoking or alcoholism
 - ▶ Diabetes Mellitus
 - ▶ Repetitive motion activities

Carpal Tunnel Syndrome

- ▶ Branches of median nerve
- ▶ Palmar cutaneous branch
 - ▶ Lies between PL and FCR at level of the wrist flexion crease
- ▶ Recurrent motor branch
 - ▶ 50% are extraligamentous with recurrent innervation
 - ▶ 30% are subligamentous with recurrent innervation
 - ▶ 20% are transligamentous with recurrent innervation

Carpal Tunnel Syndrome

- ▶ Symptoms
 - ▶ numbness and tingling in radial 3-1/2 digits
 - ▶ clumsiness
 - ▶ pain and paresthesias that awaken patient at night
 - ▶ self administered hand diagram
 - ▶ the most specific test (76%) for carpal tunnel syndrome

Carpal Tunnel Syndrome

- ▶ Physical exam
 - ▶ Inspection may show thenar atrophy
 - ▶ Carpal tunnel compression test (Durkan's test)
 - ▶ Most sensitive test
 - ▶ Phalen test
 - ▶ Wrist volar flexion for ~60 sec produces symptoms
 - ▶ Less sensitive than Durkin compression test
 - ▶ Tinel's test
 - ▶ Tapping the median nerve over the volar carpal tunnel

Carpal Tunnel Syndrome

- ▶ EMG and NCV
- ▶ Not needed to establish diagnosis (diagnosis is clinical) but recommended if surgical management is being considered
- ▶ NCV
 - ▶ increase latencies (slowing) of NCV
 - ▶ distal sensory latency of > 3.2 ms
 - ▶ motor latencies > 4.3 ms
 - ▶ decreased conduction velocities less specific than latencies
 - ▶ velocity of < 52 m/sec is abnormal
- ▶ EMG
 - ▶ test the electrical activity of individual muscle fibers and motor units
 - ▶ potential pathologic findings
 - ▶ sharp waves, fibrillations, fasciculations

Carpal Tunnel Syndrome

- ▶ Nerve histology characterized by:
 - ▶ Edema
 - ▶ Fibrosis
 - ▶ Vascular sclerosis
 - ▶ Scattered lymphocytes

Carpal Tunnel Syndrome

- ▶ Nonoperative
 - ▶ NSAIDS, night splints, activity modifications
 - ▶ First line of treatment
- ▶ Steroid injections
 - ▶ Indications
 - ▶ Adjunctive conservative treatment
 - ▶ Outcomes
 - ▶ 80% have transient improvement of symptoms
 - ▶ 22% remain symptom free at 1 year
 - ▶ Failure to improve after injection is poor prognostic factor
 - ▶ Surgery is less effective in these patients

Carpal Tunnel Syndrome

- ▶ Operative
 - ▶ Carpal tunnel release
- ▶ Indications
 - ▶ Failure of nonoperative treatment (including steroid injections)
 - ▶ Temporary improvement with steroid injections
 - ▶ Good prognostic factor that the patient will have a good result with surgery
 - ▶ Acute CTS following ORIF of a distal radius fx
- ▶ Outcomes
 - ▶ Pinch strength return in 6 week
 - ▶ Grip strength is expected to return to 100% preop by 12 wks postop
 - ▶ Rate of continued symptoms at 1+ year is 2% in moderate and 20% in severe CTS

Trigger Finger

Trigger Finger

- ▶ Stenosing tenosynovitis caused by inflammation of the flexor tendon sheath
- ▶ Epidemiology
 - ▶ more common in diabetics
 - ▶ ring finger most commonly involved
- ▶ Mechanism
 - ▶ caused by entrapment of the flexor tendons at the level of the A1 pulley
 - ▶ fibrocartilaginous metaplasia of tendon and pulley found in pathology

Trigger Finger

Green Classification

- ▶ Grade I Palm pain and tenderness at A-1 pulley
- ▶ Grade II Catching of digit
- ▶ Grade III Locking of digit, passively correctable
- ▶ Grade IV Fixed, locked digit

Trigger Finger

- ▶ Symptoms
 - ▶ finger clicking
 - ▶ pain at distal palm near A1 pulley
 - ▶ finger becoming "locked in flexed position"
- ▶ Physical exam
 - ▶ tenderness to palpation over A1 pulley
 - ▶ a palpable bump may be present near the same location

Trigger Finger

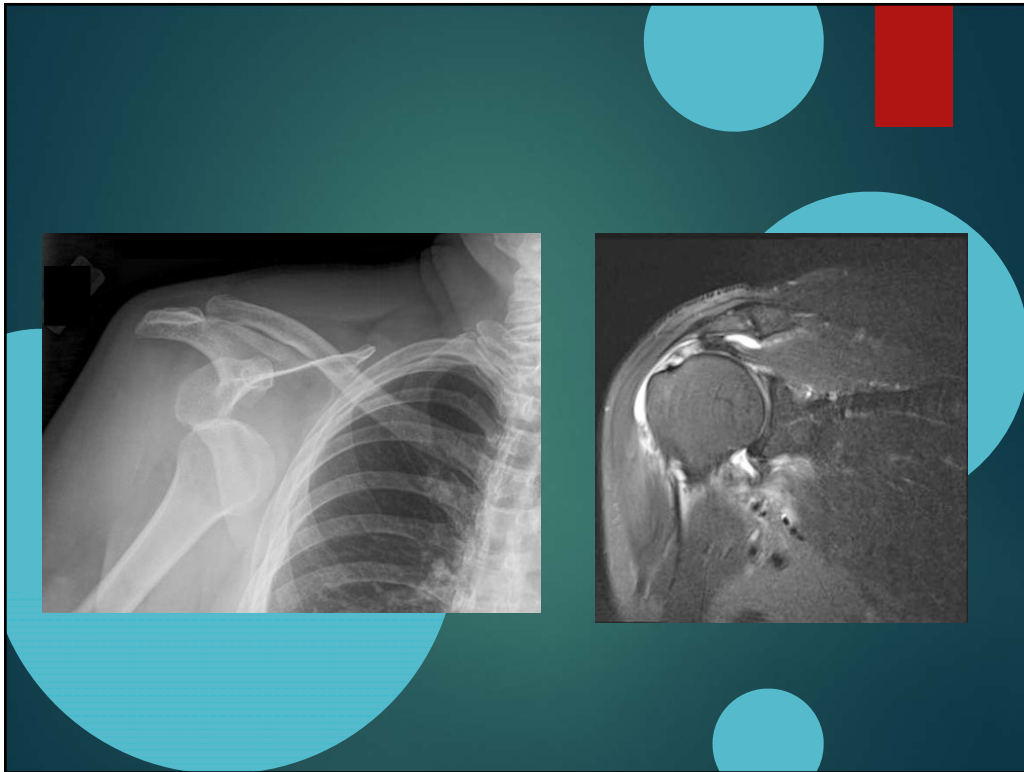
- ▶ Nonoperative
 - ▶ night splinting, activity modification, NSAIDS
 - ▶ first line of treatment
- ▶ Steroid injections
 - ▶ Indications
 - ▶ Best initial treatment for fingers (not for thumb)
- ▶ Technique
 - ▶ Give 1 to 3 injections in flexor tendon sheath
 - ▶ Diabetics do not respond as well as non-diabetics

Trigger Finger

- ▶ Operative
 - ▶ Surgical debridement and release of the A-1 pulley
- ▶ Indications
 - ▶ Cases that fail nonoperative treatment
- ▶ Release of A1 pulley and 1 slip of FDS (ulnar slip)
- ▶ Indications
 - ▶ Pediatric trigger finger
 - ▶ Presents with Notta's nodule (proximal to A1 pulley), flexion contracture, and triggering
 - ▶ May need to release remaining FDS slip and A3 pulley

Question 1

- ▶ A 45-year-old man sustained the injury seen in Figure 130a 6 weeks ago. He denies any prior injury to his shoulder. After treatment of the injury in the emergency department, he was noted to have significant weakness with empty can testing and external rotation at the side. He has full passive range of motion with forward flexion, abduction, and internal and external rotation, but has difficulty initiating abduction with his arm at his side. He has negative apprehension and relocation signs. A detailed neurologic examination shows no deficits. A coronal image from a follow-up MRI scan is seen in Figure 130b. Follow-up radiographs reveal no fractures. What is the most appropriate next step in his treatment?
 - ▶ 1. Coracoid transfer
 - ▶ 2. Rotator cuff repair
 - ▶ 3. Reverse total shoulder arthroplasty
 - ▶ 4. Arthroscopic anteroinferior labral repair
 - ▶ 5. Physical therapy for range of motion and strength improvements



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Question 2

All of the following are predictive findings for correctly diagnosing carpal tunnel syndrome EXCEPT:

- ▶ 1. Abnormal hand diagram
- ▶ 2. Abnormal Semmes-Weinstein testing in wrist-neutral position
- ▶ 3. Positive median nerve compression test (Durkan's sign)
- ▶ 4. Presence of night pain
- ▶ 5. Loss of small digit adduction (Wartenberg sign)

Question 2

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Question 3

A 50-year-old man complains of numbness and tingling along his right small finger. Physical exam is notable for the finding demonstrated in Figure A. Elbow flexion reproduces the numbness and tingling. Physical therapy and splinting have failed to relieve the symptoms. Which of the following is the most appropriate surgical intervention to alleviate the symptoms while minimizing complications?

- ▶ 1. Simple ulnar nerve decompression at the cubital tunnel
- ▶ 2. Ulnar nerve decompression at the cubital tunnel with anterior submuscular transposition
- ▶ 3. Ulnar nerve decompression at the cubital tunnel with anterior subcutaneous transposition
- ▶ 4. Open carpal tunnel release
- ▶ 5. Endoscopic carpal tunnel release



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Question 4

A 50-year-old carpenter has chronic pain over the lateral aspect of the elbow. He notes pain when using a hammer. On exam, he has pain with resisted wrist extension while the elbow is fully extended. Which muscle attachment is likely to be involved?

- ▶ 1. Distal biceps brachii
- ▶ 2. Brachioradialis
- ▶ 3. Extensor carpi radialis brevis
- ▶ 4. Extensor carpi radialis longus
- ▶ 5. Supinator

Question 4

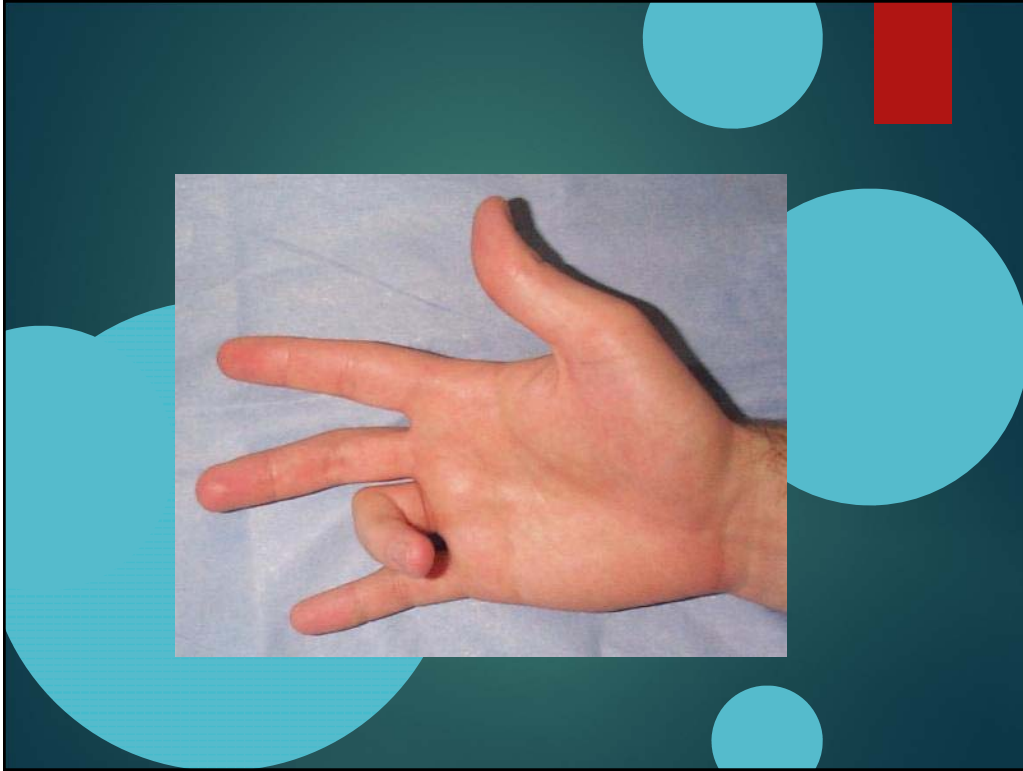
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Question 5

A 64-year-old diabetic female presents with sudden catching and locking of her ring finger when trying to extend it. Attempts at finger extension are painful, and she notes tenderness in her distal palm. A clinical photo is shown in Figure A. Which of the following structures are implicated in the pathogenesis of this condition?

- ▶ 1. Extensor digitorum tendon
- ▶ 2. Grayson's ligament
- ▶ 3. Oblique retinacular ligament
- ▶ 4. A1 pulley
- ▶ 5. Transverse carpal ligament



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- ▶ 3. Oblique retinacular ligament
- ▶ **4. A1 pulley**
- ▶ 5. Transverse carpal ligament



THE END



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