WIDE AWAKE HAND SURGERY

Hand Surgery Operations

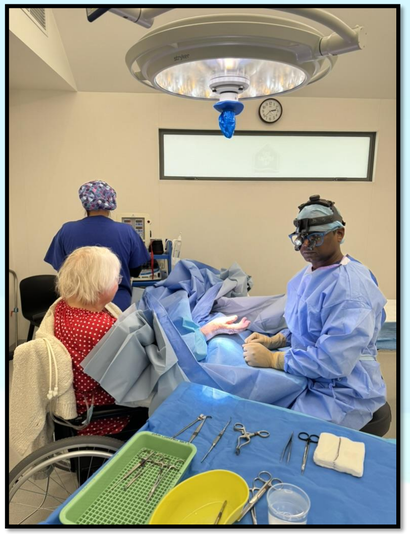
- Hand surgery: ~20% of general orthopaedic operations.
- Traditionally done with regional or general anaesthesia

Local Anaesthesia Advantages

- Reduces time for anaesthesia and recovery.
- Allows muscle tightening/relaxation during surgery.
- Minimal bleeding; no tourniquet needed.
- Cost-effective: no anaesthetist or preoperative testing; quick discharge.

Study Details

- One-year study, 122 patients.
- Local anaesthesia (lidocaine with adrenaline) used.
- Evaluations by surgeons and patients on a 0-10 scale



Wide awake surgery is acceptable to most patients & offers multiple benefits

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Wide Awake Hand Surgery

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Patient Feedback

- General care: 0.1
- Pain during injection: 2.4
- Pain during surgery: 0.9
- Other discomfort: 0.5
- 93% preferred wide awake surgery

Theatre Time

- Non-surgical theatre time
  - Wide awake: 46 minutes
  - Regional/general: 55 minutes
- Surgery time slightly longer for wide awake

Surgeon Feedback

- Bleeding: 1.6
- Oedema: 0.4
- General advantages: 6.5
- Highest advantage for tendon suture: 9.9

WIDE AWAKE PROCEDURES PERFORMED AT DCH

INCLUDE, BUT NOT LIMITED TO…

- Carpal Tunnel Release
- Cubital Tunnel Release
- Ganglion cyst/Soft tissue swelling excision
- Trigger finger/ thumb release
- Dupuytren’s fasciectomy
- Simple Fracture – Surgical Fixation
- Tennis/Golfer’s Elbow
- Tendon Injuries & Reconstruction

HAND AND WRIST ARTHROSCOPY

Definition

- Wrist arthroscopy is the **reference standard for diagnosing intra-articular pathology** following a detailed history and physical examination

Diagnostic Uses

- It confirms articular wear, capsular, interosseous ligament issues, and changes in the triangular fibrocartilage complex (TFCC)

Therapeutic Uses

- Indications include synovial debridement, removal of loose bodies, ganglion–cyst excision, SL ligament + LT ligament TFCC tear debridement/ repair,
- Adjunct at scaphoid /wrist fracture fixation, wrist fusion, endoscopic treatment of bone lesions

Surgical Decision Making

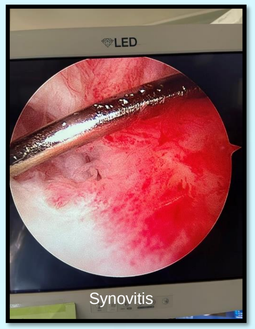
- Useful in deciding if a patient needs soft tissue repair, reconstruction, or salvage procedures

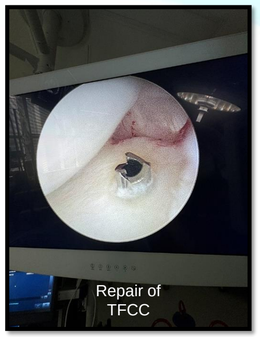
Detection of Degenerative Changes

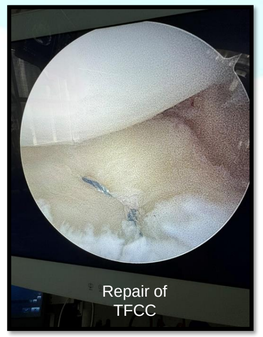
- Identifies degenerative changes that may or may not relate to a patient's symptoms

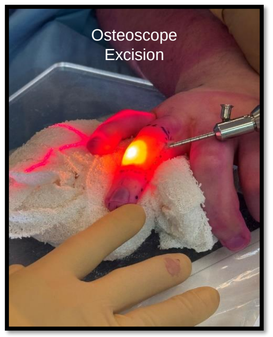
Contextual Use

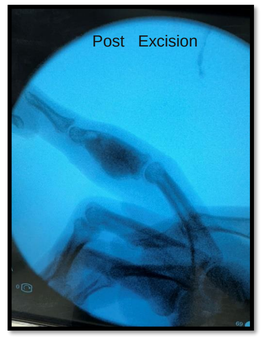
- Arthroscopic findings should be interpreted alongside patient clinical history and exam findings to choose the most appropriate treatment





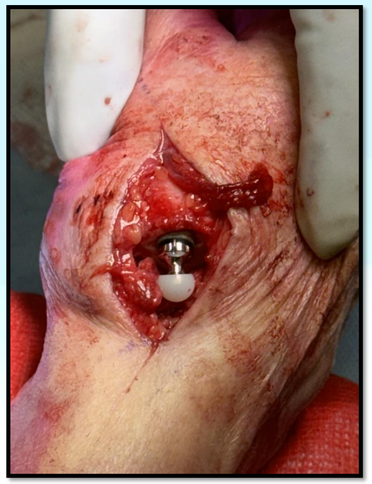


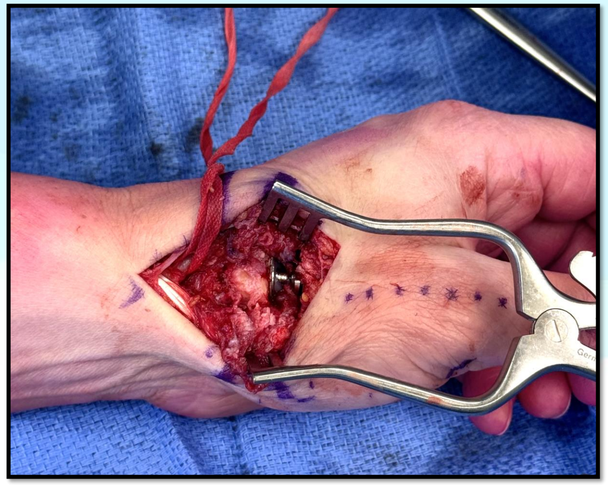


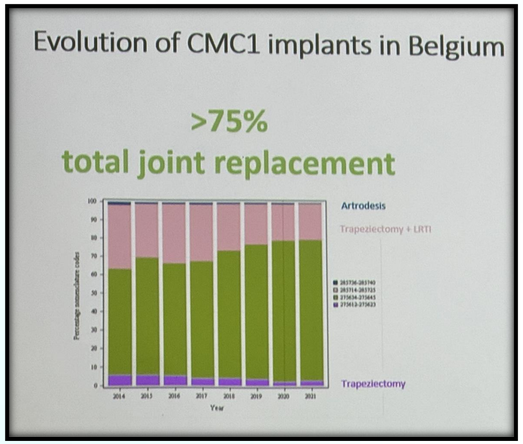


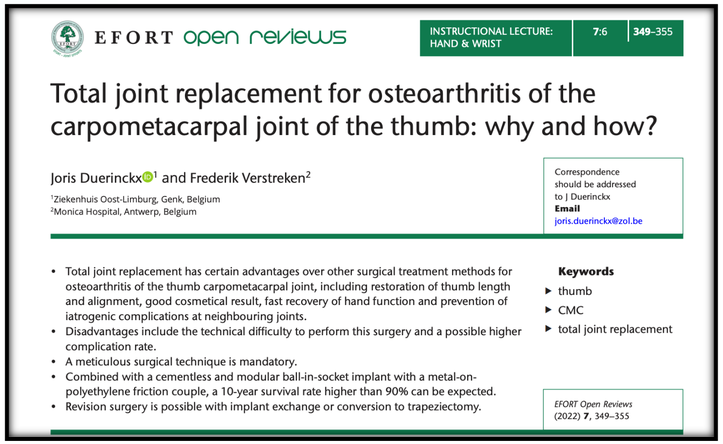
TOTAL JOINT REPLACEMENT FOR 1st CMC JOINT THUMB ARTHRITIS

- Arthritis of 1st CMC thumb joint requires surgical intervention when conservative measures fail and patient in pain.
- Trapeziectomy - Suspensionplasty is a common surgical recommendation.
- Joint replacement is gaining interest* due to faster recovery, better thumb alignment, cosmesis, prevention of carpal instability & higher patient satisfaction.
- **Cons** - Technical complexity, longevity and increased cost.
- 5th generation **Dual Mobility - Prosthesis** have shown promising durability with high survival rates at 10 years.
- TJA offers benefits but requires careful surgical technique and patient selection to achieve optimal outcomes.









EFORT open reviews

INSTRUCTIONAL LECTURE: HAND & WRIST | 7:6 | 349–355

Total joint replacement for osteoarthritis of the carpometacarpal joint of the thumb: why and how?

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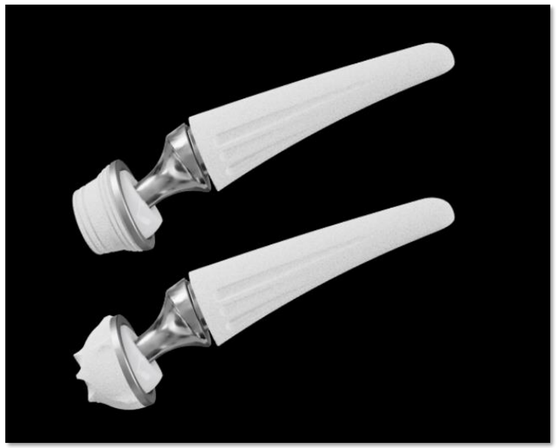
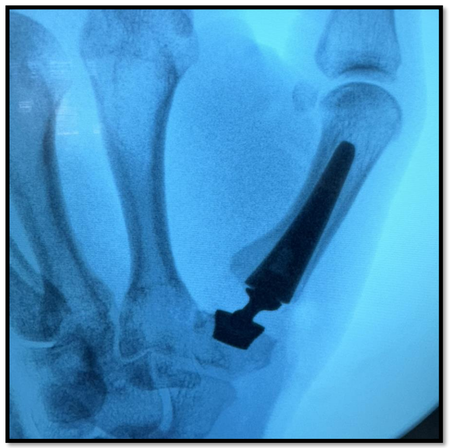
- Total joint replacement has certain advantages over other surgical treatment methods for osteoarthritis of the thumb carpometacarpal joint, including restoration of thumb length and alignment, good cosmetical result, fast recovery of hand function and prevention of iatrogenic complications at neighbouring joints.
- Disadvantages include the technical difficulty to perform this surgery and a possible higher complication rate.
- A meticulous surgical technique is mandatory.
- Combined with a cementless and modular ball-in-socket implant with a metal-on-polyethylene friction couple, a 10-year survival rate higher than 90% can be expected.
- Revision surgery is possible with implant exchange or conversion to trapeziectomy.

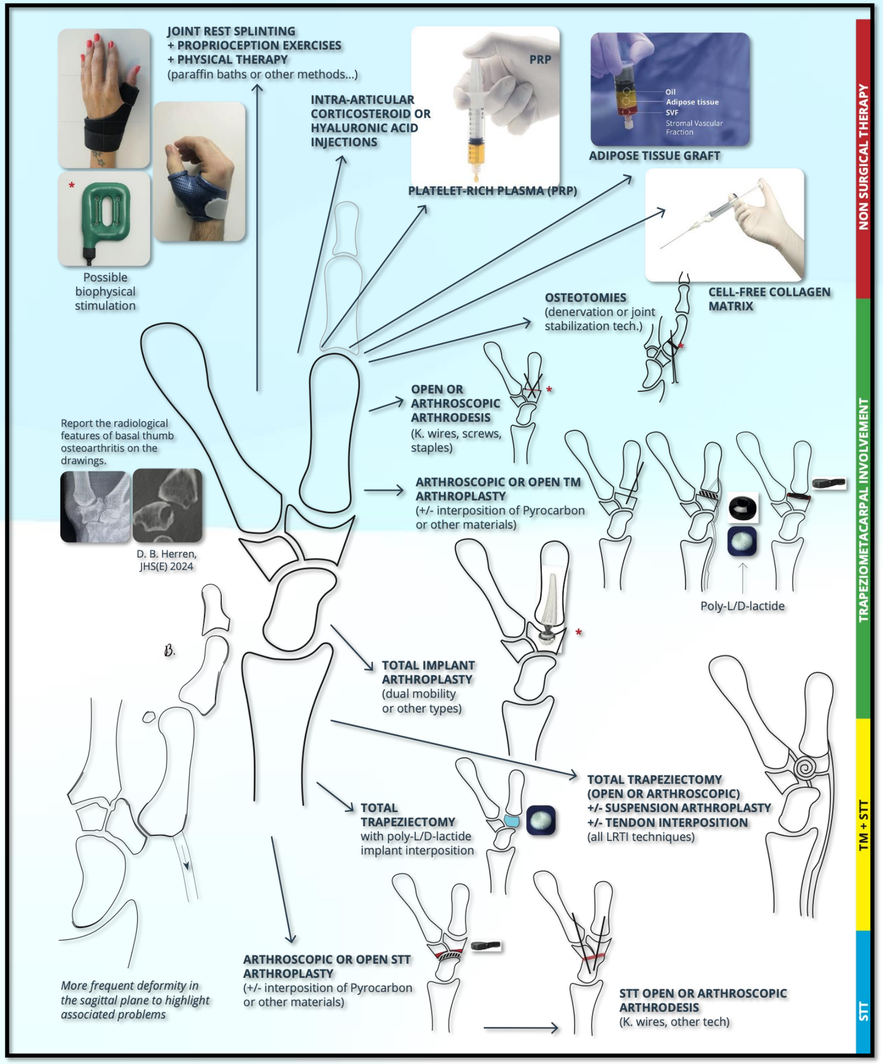
Keywords
- thumb
- CMC
- total joint replacement

EFORT Open Reviews (2022) **7**, 349–355





TREATMENTS FOR BASAL THUMB JOINT ARTHRITIS



Conservative	Injection Therapy	Surgery
• Hand Therapy • Splinting • Paraffin Wax	• Steroid • PRP • Fat Graft • Cell Free Collagen Matrix	•Arthroscopic Debridement •Osteotomies, Trapeziectomy & Suspensionplasty •Arthrodesis •Interpostion Arthroplasty with Pyrocarbon •Total Joint Replacement with Dual mobility Prosthesis

DUPUYTREN'S DISEASE

Epidemiology

Incidence
- Common, ~30 per 100,000 annually

Demographics
- Male to female ratio: 2:1.
- More severe and occurs earlier in men (men ~55 years, women ~65 years)
- Common in Caucasian males of Northern European descent.

Genetics
- Autosomal dominant with variable penetrance; sporadic cases more common

Pathophysiology

Mechanism

- Cytokine-mediated transformation of normal fibroblasts into abnormal myofibroblasts, forming pathological cords
- Abnormal contractile properties; increased ratio of type III to type I collagen

Risk factors

- Male gender
- Onset before age 50
- Bilateral disease
- Sibling/parent involvement
- Dupuytren's Diathesis (early onset, family history, Garrod's pad etc.)

Anatomy

- Pathologic Structures Nodules and cords, starting as nodules before contractile cords
- Cords: Palmar and digital cords

Classification (Luck)

- **Proliferative stage** Hypercellular with myofibroblasts, vascular
- **Involutional stage**: Dense myofibroblast network, increased collagen ratio
- **Residual stage**: Acellular, leaving dense collagen-rich tissue

Presentation

History
- Palpable nodules in the palm, progressing to cords, usually painless

Symptoms
- Decreased ROM affecting activities of daily living (ADL)

Physical Exam
- Painless nodules, cords in the palmar fascia, positive Hueston's tabletop test

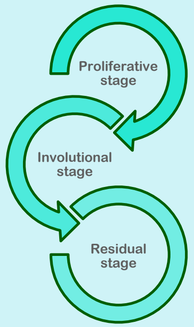
Imaging and Differential Diagnosis

Imaging
- Radiographs and ultrasound typically unnecessary but can help rule out other causes

Differential
- Locked trigger finger, pulley rupture, intrinsic minus/claw hand, trauma.

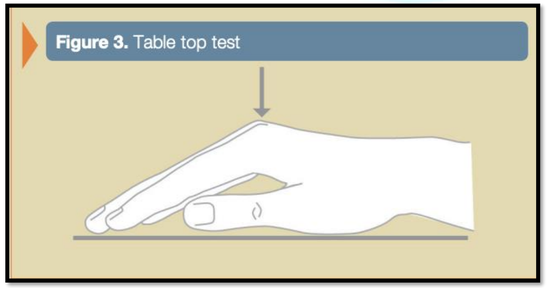
Diagnosis

- Clinical, based on history and physical exam



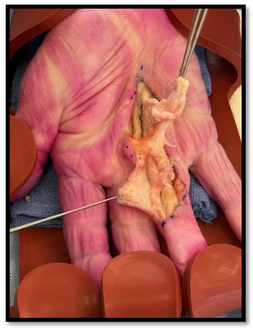
Treatment

- Observation for nodules with no functional impairment
- **Needle aponeurotomy -** Office-based, followed by manipulation and orthosis
- Partial palmar fasciectomy for severe contractures or pain
- Radical procedures for recurrent or severe disease with partial skin grafting



Complications

- Wound complications, Incisional scar pain, CRPS, Haematoma, Skin tearing, Flare reaction
- Neurovascular injury risks during surgery
- Recurrence varies with treatment method, higher with non-operative method
- Infection risks, higher with surgery



GANGLION CYSTS

Epidemiology

- **Incidence:** Common (most frequent hand mass, 60-70%)
- **Locations**
  - Dorsal carpal (70%, from SL articulation)
  - Volar carpal (20%, from radiocarpal or STT joint)
  - Volar retinacular (10%, from herniated tendon sheath fluid)
  - Dorsal DIP joint (mucous cysts, with Heberden's nodes)
  - Occurs in the lower extremity, often around the knee

Etiology

Mechanism

- Trauma, mucoid degeneration, synovial herniation

Pathophysiology

- Fluid from tendon sheath/joint, lacks true epithelial lining

Associated Conditions

- Median or ulnar nerve compression, hand ischemia from vascular occlusion

Presentation

Symptoms

Usually asymptomatic, issues with appearance (cosmesis)

Physical Exam

- **Inspection:** Transilluminates
- **Palpation:** Firm, well-circumscribed, fixed to deep tissue
- **Vascular Exam:** Allen's test for volar wrist ganglions

WALANT seed ganglion cyst excision underway

Dorsal wrist ganglion excision underway

View at arthrocoscopic wrist ganglion Cyst excision - neck origin visible from within the joint

Imaging

- **Radiographs** Typically normal
- **MRI:**
- Indicates well-marginated mass with fluid
- **Ultrasound** Differentiates cyst from vascular aneurysm, aids in aspiration

Histology

Biopsy

- **Indications** Not routinely needed
- **Findings** Mucin-filled sac with no true epithelial/ synovial lining

Complications

- **With Aspiration** Rare infection, neurovascular injury
- **With Excision** Infection, radial artery injury, scapholunate interosseous ligament injury, stiffness

Nonoperative Treatment

- **Observation** First line for adults, 76% resolve in pediatric patients
- Closed Rupture/Home Remedy: High recurrence
- **Aspiration** Second line for adults, avoided in volar wrist (near radial artery). Higher recurrence (50%) but low risk

Operative Treatment

Surgical Resection

- **Technique**: Identify origin, resect stalk and part of capsule. At dorsal DIP: resect underlying osteophyte
- **Results**: Volar ganglions have a 15-20% recurrence rate

THUMB COLLATERAL LIGAMENT INJURY

EPIDEMIOLOGY

Incidence
- UCL injuries 10 X more common than RCL injuries
- UCL injuries make up 86% of athletic thumb injuries

Demographics
- Acute injuries: Common in contact and non-contact sports (football, soccer, skiing)
- Chronic injuries: Due to repeated stress, known as Gamekeeper's thumb

ETIOLOGY

Mechanism
- Radially-directed force causing hyper-abduction of the thumb MCP

Pathoanatomy
- Stener lesion: Avulsed ligament displaced dorsally and superficially, requiring surgical repair

CLASSIFICATION

UCL/RCL Instability Grading

- **Grade 1:** Sprain, no instability
- **Grade 2:** Asymmetric laxity, endpoint present
- **Grade 3:** Instability without endpoint, joint space opening

PRESENTATION

- **History:** Falls on outstretched hand, ball/racquet strikes
- **Symptoms**
- Pain at ulnar MCP for UCL tear, radial MCP pain for RCL tear
- **Physical Exam:** Tenderness, radial-ulnar stress exam, anterior/posterior drawer test

IMAGING

- **Radiographs:** PA, lateral, oblique views; optional stress views
- **MRI:** Highly sensitive and specific
- **Ultrasound:** Operator-dependent accuracy

DIAGNOSIS

- Based on history, physical exam, and confirmed with MRI

NON-SURGICAL TREATMENT

- Immobilisation for 4 - 6 weeks
- Indicated for Grade 1 and 2 tears with <15° varus/ valgus instability

SURGICAL TREATMENT

- Repair for Grade 3 injuries with >15° instability or Stener lesion
- reconstruction for chronic injuries
- Abductor advancement and MCP fusion for chronic injuries or failed repairs

TECHNIQUES

- Immobilization – Splint or cast, active/passive motion and strengthening at 4-6 weeks
- **RCL/UCL repair** - sutures/anchors & temporary K-wire
- **Tendon reconstruction** - palmaris longus autograft
- **Adductor advancement** - repair of adductor aponeurosis to UCL

COMPLICATIONS

Stiffness
Most common

Persistent Instability
15% of Grade 3 injuries

Superficial Radial Neurapraxia
Numbness distal to incision

PROGNOSIS

- **Radiographs:** PA, lateral, oblique views; optional stress views
- **MRI:** Highly sensitive and specific
- **Ultrasound:** Operator-dependent accuracy

TENNIS ELBOW

(LATERAL EPICONDYLITIS, COMMON EXTENSOR ORIGIN TENDINOPATHY)

Injury Overview

- Overuse injury resulting in tendinosis and inflammation of the ECRB
- Diagnosed by tenderness over the lateral epicondyle with resisted wrist extension
- Primarily nonoperative treatment: NSAIDs, activity modification, bracing. Surgery is rare

Epidemiology

- Common cause of elbow pain, affecting 1-3% of adults annually
- Commonly affects dominant arm and about 50% of tennis players
- Risk factors include poor technique, heavy racket, incorrect grip, high string tension, labor-intensive jobs
- Most common between ages 35-50; affects both genders equally

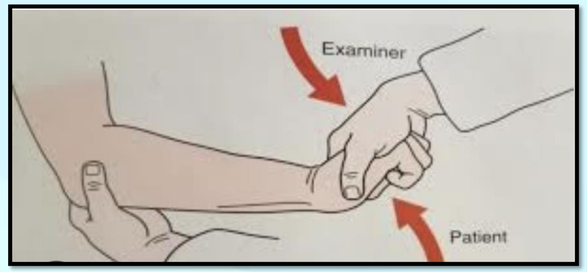
Etiology

- Caused by repetitive wrist extension and forearm pronation
- Pathology includes microtears at the ECRB origin and possibly ECRL and ECU
- Histology shows disorganized collagen and angiofibroblastic hyperplasia without inflammatory cells

Presentation

Symptoms

- Pain with wrist extension and gripping, decreased grip strength
- **Physical Exam**
  Tenderness at the ECRB insertion, tests exacerbating pain include wrist extension and Maudsley's test



COZEN'S TEST

Patient seated, elbow extended forearm pronated slightly radial deviated The clinician stabilizes the patient's elbow with one hand, and thumb is on lateral epicondyle the patient should make a fist and extend it against resistance

Pain in the area of the lateral epicondyle indicates a positive test

Imaging and Diagnosis

- Radiographs usually normal; MRI shows changes in the ECRB tendon origin
- Ultrasonography effective with experienced operators
- Diagnosis primarily through symptoms and physical exam

Treatment

Nonoperative

- NSAIDs, physical therapy, bracing, activity modification
- Other options: steroid injections, platelet-rich plasma, shock wave therapy

Operative

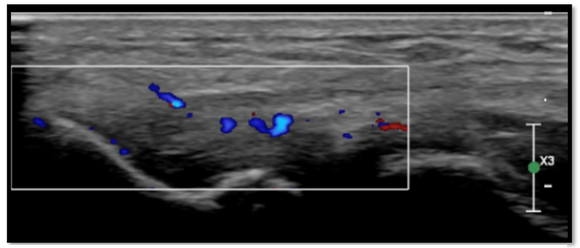
- **Indicated if nonoperative treatment fails after 6-12 months**
- Techniques: release and debridement of the ECRB origin, either open or arthroscopic

Complications

- Latrogenic LUCL injury
- Radial nerve entrapment
- Infection
- Stiffness
- Missed concomitant pathology

Prognosis

- **Nonoperative treatment** successful in up to 95% of cases
- **Operative** management may be required for patients with depression, anxiety, poor coping, or radial tunnel syndrome



ULTRASOUND IMAGING OF TENNIS ELBOW

CUBITAL TUNNEL SYNDROME

EPIDEMIOLOGY

- **Incidence** - Common~30 per 100,000 annually
- Second most common upper extremity neuropathy
- **Gender**: males > females - often present earlier
- Incidence increases with age

ETIOLOGY

- Compression and traction on the ulnar nerve
- Entrapment sites: Commonly at FCU heads, Struthers' arcade, Osborne's ligament & MCL
- Less commonly Triceps head, medial epicondyle, fractures, tumours

PRESENTATION

- **Symptoms**
  Paraesthesias in small/ring fingers, worsened by elbow flexion, night symptoms
- **Physical exam**
  Atrophy, clawing, ulnar nerve subluxation
- **Tests**: Positive Tinel's sign, elbow flexion test, positive Froment's sign

DIAGNOSIS

- EMG/NCS
  Useful adjunct for diagnosis and prognosis

TREATMENT

Nonoperative

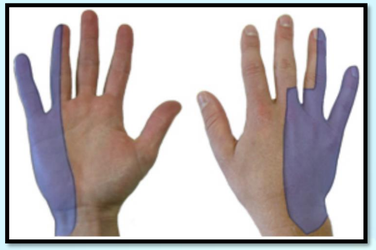
- NSAIDs, activity modification, nighttime splints-Night bracing in 45° extension

Operative

- In situ decompression or decompression with transposition

COMPLICATIONS

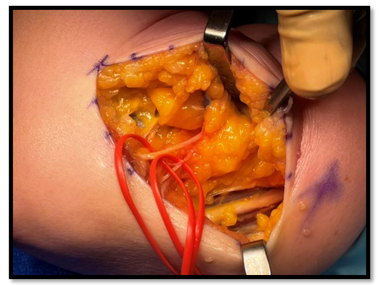
- Recurrence
- Inadequate decompression or nerve tethering
- Neuroma from iatrogenic injury to medial antebrachial cutaneous nerve



1st webspace wasting with
Ulnar clawing little & ring fingers

Wartenberg's sign

Positive Froment's sign



PRONATOR SYNDROME

Epidemiology

Incidence
Most likely underreported at 1 per 100,000 annually

Demographics Common in females, in the 5th decade

Risk Factors Associated with well-developed forearm muscles (e.g. weightlifters)

Aetiology

Pathoanatomy
- Five potential sites of entrapment:
  - Supracondylar process
  - Ligament of Struthers
  - Bicipital aponeurosis (lacertus fibrosus)
  - FDS aponeurotic arch
- **Associated Conditions**
  Commonly linked with medial epicondylitis

Presentation

Symptoms
- Paresthesias in the median nerve distribution of hand
- Exacerbated by repetitive pronation & supination
- Differs from carpal tunnel syndrome (CTS) by proximal volar forearm ache, sensory disturbances, absence of night symptoms

Physical Exam

- Provocative tests for different entrapment sites
- Positive Tinel sign proximal anterior forearm
- Resistance tests can indicate specific sites of compression
- Possible coexisting medial epicondylitis

Imaging & Studies

Radiographs

Electromyography (EMG) and Nerve Conduction Velocity (NCV)
- Often inconclusive; could exclude other nerve compressions

Differential Diagnosis

- AIN compressive neuropathy
- Carpal tunnel syndrome
- Pronator teres strain

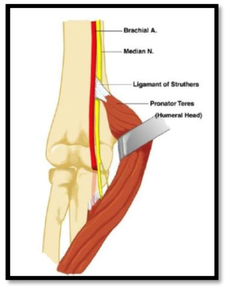
Nonoperative Treatment

- Rest, splinting, and NSAIDs for 3-6 months
- Indicated for mild to moderate symptoms
- Splint should avoid forearm rotation

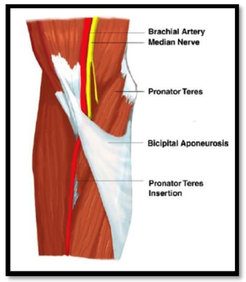
Operative Treatment

- Surgical decompression if nonoperative management fails after 3-6 months
- Involves decompression at all five potential sites
- Outcomes vary; about 80% patients experience symptom relief

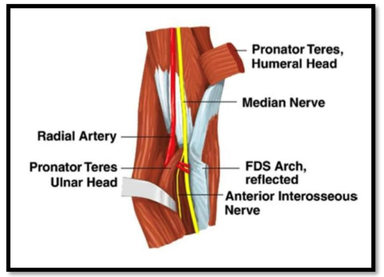
Supracondylar Process



Ligament of Struthers



Bicipital Aponeurosis



FDS arch & 2 Heads of pronator teres

REFERENCE
Orthobullets.com

RADIAL TUNNEL SYNDROME

EPIDEMIOLOGY

- **Incidence**
  Rare (~3 per 100,000 annually)
- **Demographics** Males > females

ETIOLOGY

- **Pathophysiology**
  Compression at sites similar to PIN syndrome (fibrous bands, leash of Henry, ECRB, arcade of Frohse)
- **Risks**
  Constant prono-supination, especially with 1kg force and elbow flexed 0°-45°
- **Associated Conditions**
  Lateral epicondylitis; may coexist in 5% of patients

PRESENTATION

Symptoms

Deep aching pain in dorsoradial proximal forearm, pain with forearm rotation and lifting, muscle weakness due to pain

Physical Exam

- Tenderness over mobile wad, maximal tenderness 3-5 cm distal to lateral epicondyle
- provocative pain tests (resisted long finger extension, supination)

IMAGING

- **MRI**
  Usually negative; can show muscle changes, compression sites, or rare causes of entrapment
- **Studies**
  EMG/NCV inconclusive; diagnostic injections helpful

DIAGNOSIS

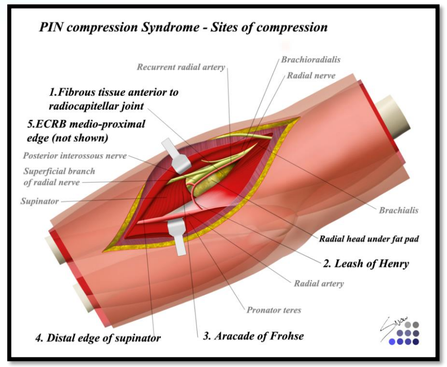
Made clinically with history and physical examination

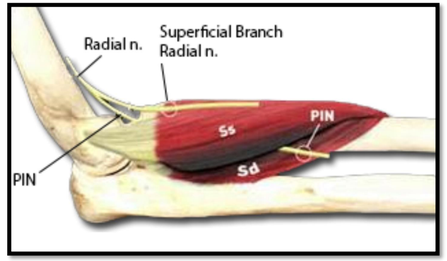
TREATMENT

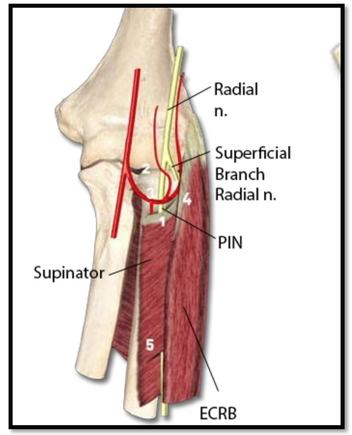
- **Nonoperative:** Activity modification, splinting, NSAIDs least one year, HC injections (70% improvement at 6 weeks, 60% pain-free at 2 years)
- **Operative:** Radial tunnel release if nonoperative treatment fails (50-90% success rate, up to 9-18 months for maximal recovery)
- **Techniques:** Release of arcade of Frohse, distal edge of supinator, and fibrous bands superficial to radiocapitellar joint

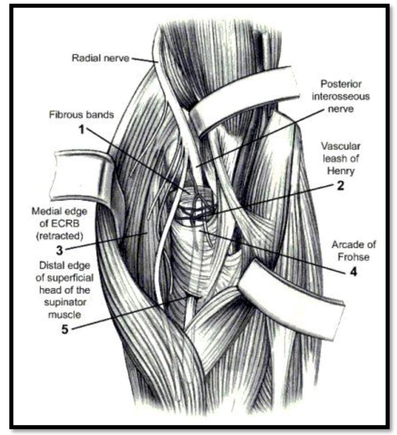
SURGICAL OUTCOMES

Variable, delayed recovery and lower success in specific patient groups









PIN COMPRESSION SYNDROME

EPIDEMIOLOGY

Incidence
~3 per 100,000 annually, diagnostic challenge, likely underreported

Demographics
Common in manual labourers, males, and bodybuilders

ETIOLOGY

Pathophysiology
Caused by microtrauma, trauma, space-filling lesions, inflammation, or iatrogenic factors

Compression Sites
Radiocapitellar joint, between brachialis & brachioradialis, leash of Henry, ECRB edge, & arcade of Fröhse

PRESENTATION

Symptoms
Insidious onset, forearm & wrist pain, weakness in finger, wrist, & thumb movements

Physical Exam
May have atrophy, weakness in extension, and pain with resisted supination

EVALUATION

Radiographs & MRI Not commonly needed, but identifying compression sites & aid surgical planning

EMG
Useful to pinpoint nerve compression and rule out other neuropathies

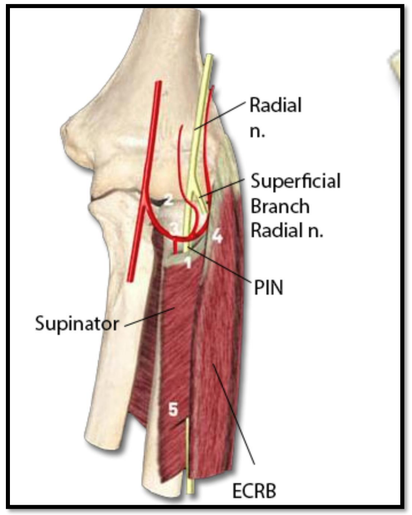
TREATMENT

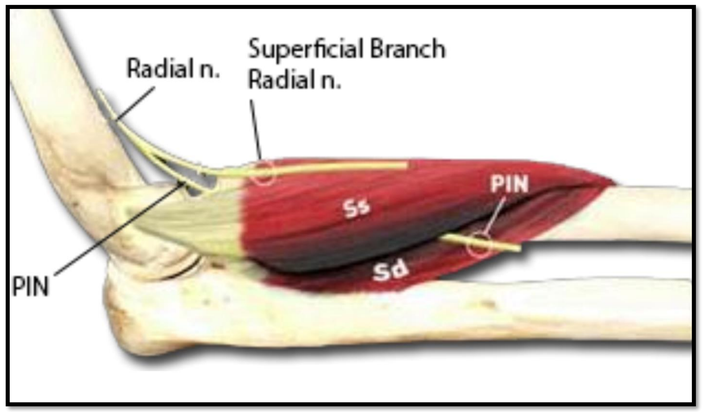
Nonoperative
Rest, activity modification, stretching, splinting, NSAIDs, and possible lidocaine/corticosteroid injection

Surgical Decompression
Indicated if symptoms persist > 3 months or mass detected. Recovery varies, with possible long-term improvement

COMPLICATIONS

- **Chronicity may lead to muscle fibrosis and chronic pain, requiring tendon transfer procedures for function restoration**





CARPAL TUNNEL SYNDROME (CTS)

EPIDEMIOLOGY

- 0.1-10% of the general population
- more common in adults (40-60 years), (3:1 female to male ratio), often bilateral (70%)

RISK FACTORS

- Female sex, obesity, pregnancy, hypothyroidism, rheumatoid arthritis, trauma, repetitive motion activities, & diabetes

ETIOLOGY AND PATHOPHYSIOLOGY

- Increased pressure in the carpal tunnel compromises the median nerve
- Pressure changes can lead to nerve damage, especially with repetitive activities or certain athletic endeavours

ASSOCIATED CONDITIONS

- Conditions like diabetes, hypothyroidism, rheumatoid arthritis, and pregnancy are commonly associated with CTS

ANATOMY

- Carpal tunnel is bordered by carpal bones and the transverse carpal ligament
- Contains the median nerve and several tendons

CLINICAL PRESENTATION

- History of hand overuse, particularly with tools or computer use
  - Symptoms include numbness, tingling, clumsiness and pain, especially at night
  - Physical exam signs include thenar atrophy and positive provocative tests like Durkan's, Phalen's, & Tinel's & Scratch collapse tests

IMAGING AND STUDIES

- Diagnosis is often clinical
- EMG and NCV can provide objective evidence but are not always necessary
- Ultrasound can measure increased cross-sectional area of the median nerve

TREATMENT

- **Nonoperative:** Night splints, NSAIDs, activity modification, and corticosteroid injections
- **Operative:** Reserved for patients who do not respond to conservative treatment or have severe symptoms. Includes open, endoscopic, ultrasound-guided carpal tunnel release

TECHNIQUES

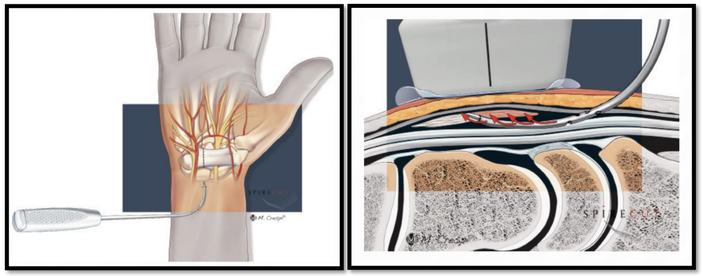
- **Open Carpal Tunnel Release -** Standard surgical technique with a high success rate
- **Endoscopic Release** Less invasive with quicker recovery time but a steeper learning curve
- **Ultrasound-Guided Percutaneous Release** Minimally invasive with potential for shorter recovery times

COMPLICATIONS

- Common issues include scar tenderness, pillar pain, recurrence, and nerve injuries
- Complications vary depending on the technique used and can often be managed with therapy or surgical intervention

PROGNOSIS

- Generally good, especially if symptoms are relieved by initial treatments like steroid injections
- Long-term outcomes are usually favorable, with a low rate of complications and recurrence



No-incision US guided carpal tunnel release

Images
spirecut.com

WARTENBERG'S SYNDROME " *Cheiralgia Paraesthetica*"

Epidemiology

- **Incidence**
  - < 1 per 100,000 annually, ? under reported
- **Demographics**
  - More common in women (male:female ratio 1:4).. Affects ages 20-70 years

Etiology

- **Pathoanatomy**
  - Compression by brachioradialis & ECRL tendons with forearm pronation or by fascial bands
- **Associated Conditions**
  - De Quervain's disease (20-50%)

Presentation

- **History**
  - May involve trauma or tight wristwear
- **Symptoms**
  - Pain, paraesthesias, and numbness dorsoradial hand
  - Worsened by repetitive wrist flexion and ulnar deviation
- **Physical Exam**
  - Positive Tinel's sign over superficial sensory radial nerve
  - Increased symptoms with wrist flexion, ulnar deviation, pronation, and Finkelstein test

Imaging and Studies

- **Radiographs**
  - Of limited value
- **Electrodiagnostics**
  - EMG and NCV limited value
- Diagnostic Injection: can temporarily relieve pain

Diagnosis

- Clinical - on history and physical examination

Treatment

- **Nonoperative**
  - Rest, activity modification, NSAIDs, wrist splints
  - Avoid aggravating activities and remove inciting factors
  - Limited evidence for corticosteroid injections
- **Operative**
  - Surgical decompression if symptoms persist after 6 months

Surgical Technique

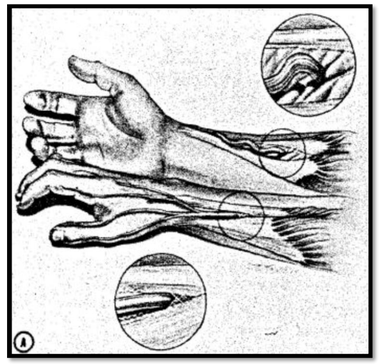
- **Decompression**
  - Longitudinal incision volar to Tinel's sign
  - Neurolysis and release of fascia between brachioradialis and ECRL

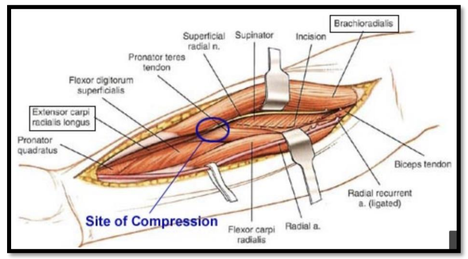
Complications

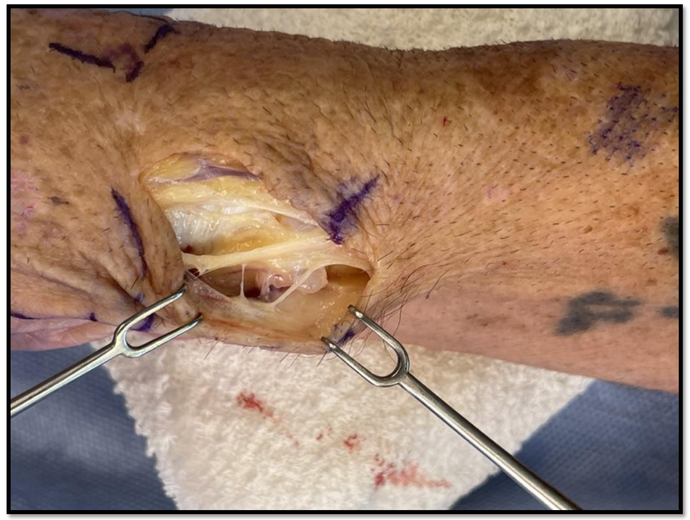
- Failed decompression
- Persistent pain and numbness

Prognosis

- **Spontaneous Resolution**
  - Symptoms often resolve on their own
- **Treatment Outcomes**
  - 74% success rate after surgical decompression







ARTHRITIS OF DISTAL & PROXIMAL INTERPHALANGEAL JOINTS

EPIDEMIOLOGY

Incidence

- Very common
- Most common - DIP arthritis > thumb CMC > PIP > MCP

ETIOLOGY

Primary osteoarthritis

- High joint forces in DIP, leading to wear and tear
- Heberden's nodules, mucous cysts, nail ridging

Erosive osteoarthritis

- Self-limiting but destructive
- Predominantly affects DIP
- More prevalent in middle-aged women (10:1 female to male ratio)

PRESENTATION

Symptoms

- Pain and deformity in primary osteoarthritis
- Intermittent inflammatory episodes and joint destruction in erosive osteoarthritis

IMAGING

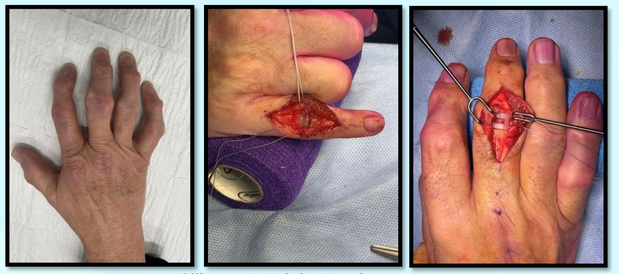
Radiographs

- **Views**: AP, lateral, and oblique of the hand
- **Findings**: Cartilage destruction, osteophytes, subchondral erosion (gull wing deformity)

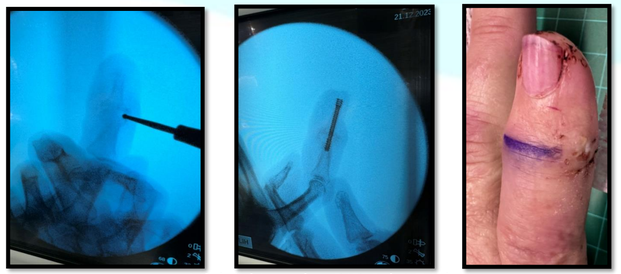
DIAGNOSIS

Radiographic Confirmation

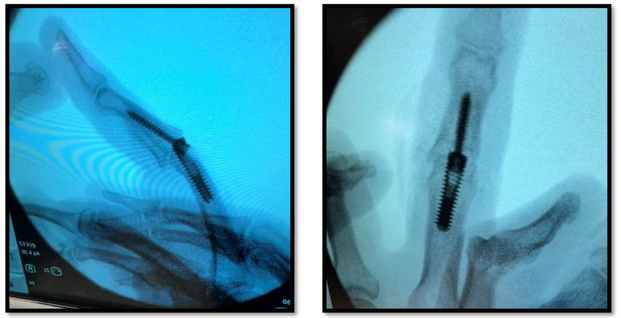
- Based on history, physical exam, and radiographs



Silicone PIP joint Replacement



Minimal Invasive DIP Joint Fusion



PIP Joint Fusion

DIP ARTHRITIS

Nonoperative Treatment

- Observation, NSAIDs for mild symptoms

Operative Treatment

- Fusion for debilitating pain/deformity
  - Headless screw for highest fusion rate

MUCOUS CYST

Nonoperative Treatment

- Observation, as 20-60% may resolve spontaneously

Operative Treatment

- Cyst excision + osteophyte resection for impending rupture

PIP ARTHRITIS

Nonoperative Treatment

- Observation, NSAIDs for mild symptoms

Operative Treatment

- Options: Collateral ligament excision, volar plate release, osteophyte excision for contracture
- Fusion for severe deformity/instability
  - Headless screw fixation preferred
- Silicone arthroplasty for select cases

EROSIVE OSTEOARTHRITIS

Nonoperative Treatment

- Splints, NSAIDs for tolerable symptoms

Operative Treatment

- Fusion for intolerable deformity

PHALANX FRACTURES

Epidemiology

- **Incidence**
  - Most common fracture , accounts for 10% of all fractures
- **Demographics**
  - More prevalent in males (2:1 ratio)
- **Location**
  - Distal phalanx most common
  - Small finger is the most commonly affected digit (38% of hand fractures)
- **Associated Conditions**
  - Nail bed injuries are common with distal phalanx fractures

Anatomy

- **Distal Phalanx -** Tuft, shaft, base
- **Middle and Proximal Phalanx -** Head, neck, shaft, base
- Fractures cause specific displacements based on location related to FDS (flexor digitorum superficialis) insertion
- Collateral ligament avulsion injury to base proximal phalanx

Presentation

History

- Hand dominance, baseline function, occupation, hobbies, injury mechanism

Physical Exam

- Inspection for swelling, ecchymosis, deformity, wounds
- Motion assessment for rotational deformities
- Neurovascular evaluation including two-point discrimination and cap refill

Imaging

Radiographs

- Recommended views: PA, lateral, oblique
- CT scan for articular involvement

Diagnosis

- Corroborative history, physical exam, and orthogonal radiographs

Complications

Loss of Motion

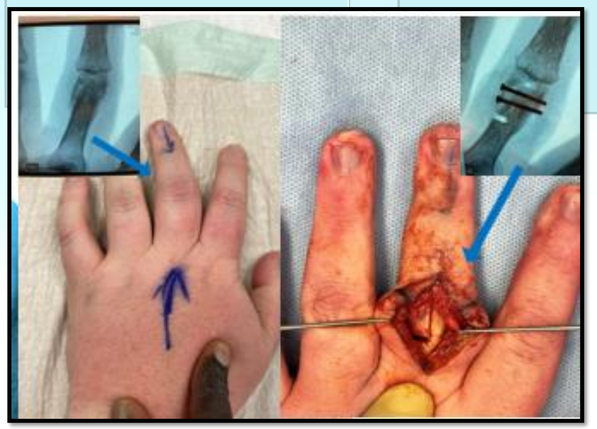
- Risk factors: Prolonged immobilization, intra-articular fracture, extensive surgery
- **Treatment**: Hand therapy, possible surgical release

Malunion

- Types: Malrotation, angulation, shortening
- **Treatment**: Corrective osteotomy, metacarpal osteotomy

Nonunion:

- Rare, but treated with resection, bone grafting, plating, or amputation if severe



PHALANX MALUNION CORRECTION

Proximal Phalanx Fractures

NonoperativeTreatment

- Budd taping/splinting for stable fractures

- **Operative Treatment** CRPP or ORIF for unstable fractures

Middle Phalanx Fractures:

Nonoperative Treatment

- Buddy taping/splinting for stable fractures

Operative Treatment

- CRPP or ORIF for unstable fractures

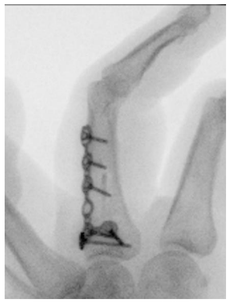
Distal Phalanx Fractures

Nonoperative Treatment

- Closed reduction/splinting for most cases

Operative Treatment

- Nail repair and CRPP/ORIF for complicated fractures



PROXIMAL PHALANX FRACTURE FIXATION

MCPJ COLLATERAL LIGAMENT AVULSION FRACTURE FIXATION

PYOGENIC FLEXOR TENOSYNOVITIS

WARRANTS URGENT EMERGENCY DEPARTMENT REFERRAL FOR PROMPT ASSESSEMENT AND SURGICAL DEBRIDEMENT

EPIDEMIOLOGY

Incidence
- 2.5 to 9.4% of all hand infections

Risk Factors
- Diabetes
- IV drug use
- Immunocompromised patients

ETIOLOGY AND PATHOPHYSIOLOGY

Mechanism
- Penetrating trauma to the tendon sheath
- Direct spread from felon, septic joint, or deep space infection

Microbiology
- Staph aureus (40-75%), MRSA (29%)
- Common skin flora: staph epidermidis, beta-hemolytic strep, pseudomonas aeruginosa
- Other: Eikenella (human bites), Pasteurella multocida (animal bites)

Associated Conditions
- "Horseshoe abscess" from spread via connections between thumb & little finger sheaths

ANATOMY

Function
- Protect and nourish tendons

Anatomy variations
- Index, middle, and ring fingers: DIP to proximal A1 pulley
- Thumb (flexor pollicus longus): IP joint to radial bursa (wrist)
- Little finger: DIP joint to ulnar bursa (wrist)

PRESENTATION

Symptoms
- Pain and swelling, typically delayed (24-48 hours)
- Localized to palmar aspect of one digit

Physical Exam - Kanavel Signs

NOT ALL 4 SIGNS MAY BE PRESENT AT EARLY ONSET

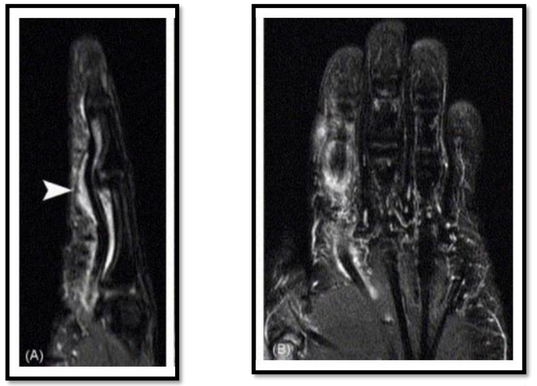
1. Flexed posturing of the involved digit
2. Tenderness over the tendon sheath
3. Marked pain with passive extension of the digit
4. Fusiform swelling, increased warmth, and erythema

IMAGING

- **Radiographs**
  May rule out foreign objects
- **MRI**
  helps determine the extent of infection

DIAGNOSIS

- Based on careful history and physical examination with Kanavel signs



NONOPERATIVE TREATMENT(RARE)

- Hospital admission, IV antibiotics, hand immobilization, observation
- Indicated for early presentation
- Splinting
- If improved within 24 hours, no surgery required

OPERATIVE TREATMENT

- I&D (Incision and Drainage) followed by culture-specific IV antibiotics
- Indicated for suspected cases (orthopaedic emergency)
- Inate presentation, or when no improvement after 24 Hrs of nonop treatment

COMPLICATIONS

- Stiffness, tendon or pulley rupture, spread of infection, loss of soft tissue, osteomyelitis

REFERENCES
Images-
Orthobullets.com

SCAPHOID FRACTURE

Epidemiology

Incidence
- 15% of acute wrist injuries
- Most common carpal fracture (60%)
- Fall onto outstretched hand

Demographics
- 2:1 male to female ratio
- Most common in the third decade of life

Anatomic Location
- Waist: 65%
- Proximal third: 25%
- Distal third: 10%

Anatomy

Osteology
- Complex, twisted peanut shape
- 75% covered by articular cartilage

Blood Supply
- Proximal 80% via retrograde perfusion via dorsal branch of radial artery
- Distal 20% supplied via the volar branch of the radial artery

Biomechanics
- Links the proximal and distal carpal rows

Presentation

Symptoms
- Variable pain over the wrist
- Swelling, rarely bruised or deformed
- Pain worsens with circumduction

Provocative Tests
- Anatomic snuffbox tenderness dorsal
- Scaphoid tubercle tenderness volar
- Scaphoid compression test

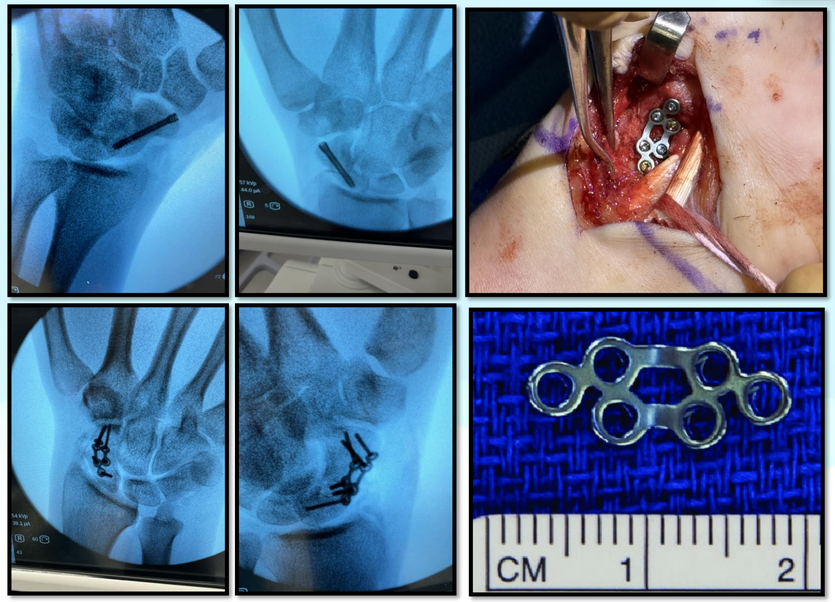
Imaging

Radiographs
- Best for waist fractures
- Dedicated scaphoid views; repeat in 14-21 days if negative (or CBCT)

CBCT/CT Scan

Best for diagnosing and evaluating fracture location, displacement, and post-surgery progression.

MRI
- Most sensitive for occult fractures



Nonoperative Treatment

- Cast immobilization for stable, nondisplaced fractures
- Reevaluate in 12 to 21 days if suspicion remains high

Operative Treatment

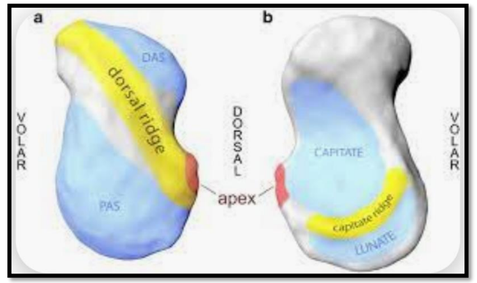
- Percutaneous screw or plate and screw fixation for unstable fractures and faster recovery
- Open reduction internal fixation +/- Bone graft for displaced fractures or complex patterns

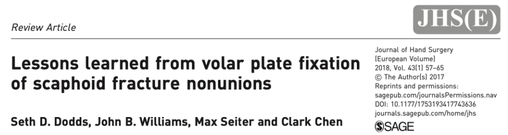
Complications

- **Scaphoid Nonunion**
  - 5-10% following immobilization; higher for proximal pole
  - **Avascular necrosis**
  - Incidence: 13-50%
  - Proximal fifth fractures: up to 100%
- **Malunion**
  - Flexion deformity treatment not clearly defined
- **Subchondral Bone Penetration**
  - Decreased incidence with fluoroscopy use; requires revision surgery or hardware removal
- **SNAC Wrist**
  - Advanced collapse due to nonunion

Prognosis

- Incidence of AVN directly correlates with proximity to proximal pole
  - Proximal fifth: 100% AVN rate
  - Proximal third: 33% AVN rate




Review Article

JHS(E)

Lessons learned from volar plate fixation of scaphoid fracture nonunions

Seth D. Dodds, John B. Williams, Max Seiter and Clark Chen

Journal of Hand Surgery (European Volume) 2018, Vol. 43(1) 57–65 © The Author(s) 2017 Reprints and permissions: sagepub.com/journalsPermissions.nav DOI: 10.1177/1753193417743636 journals.sagepub.com/home/jhs

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Turow A, Bulstra AE, Oldhoff M et al. 3D mapping of scaphoid fractures and comminution. Skeletal Radiol. 2020 Oct;49(10):1633-1647. doi: 10.1007/s00256-020-03457-1. Epub 2020 May 16. PMID: 32417943.

TRIANGULAR FIBROCARTILAGE COMPLEX (TFCC) INJURY

Cause

- Trauma or degenerative changes leading to ulnar-sided wrist pain

Diagnosis

- **Clinical**
  Ulnar wrist pain worse with ulnar deviation, positive "fovea" sign
- **MRI** – Aids in diagnosis

Types of TFCC Tear

Etiology

- **Type 1 Traumatic**: Fall on an extended wrist with forearm pronation, traction injuries
- **Type 2 Degenerative**: Positive ulnar variance, ulnocarpal impaction

Anatomy

- **Components**
  Dorsal/volar radioulnar ligaments, deep ligament (ligamentum subcruentum),
- Central articular disc, meniscus homolog, ulnar collateral ligament, ECU subsheath
- **Blood Supply**
  Well vascularized periphery, avascular central portion.

Classification

- **Class 1 (Traumatic)**
  Central perforation/tear, ulnar avulsion, distal avulsion, radial avulsion
- **Class 2 (Degenerative)**
  TFCC wear, lunate/ulnar chondromalacia, TFCC perforation, ligament disruption, arthritis

Presentation

- **Symptoms**
  Wrist pain, pain turning a door key
- **Physical Exam** Positive "fovea" sign, pain with ulnar/radial deviation

Imaging

- **Radiographs**: Usually negative, evaluate ulnar variance, dynamic views may show pathology
- **MRI**: Replaces arthrography, identifies tears, sensitivity 74-100%
- **Arthroscopy**: Most accurate, for symptomatic patients after conservative treatment failure

Treatment

Nonoperative HT/Splint Immobilization, NSAIDs, steroid injections

Operative

- **Arthroscopic Debridement**
- **Arthroscopic/Open Repair**
- **Ulnar Diaphyseal Shortening**: For Type II with >2mm variance, tightens ulnocarpal ligaments

TRIGGER FINGER

Anatomy

- **Muscles**
  - Flexor digitorum profundus: may develop a pathologic nodule
  - Flexor digitorum superficialis: often unaffected
- **Ligaments**
  - First annular ligament (A1 pulley)

Classification

- **Green's Classification**
  - Grade I: Palm pain and tenderness at A1 pulley
  - Grade II: Catching of digit
  - Grade III: Locking of digit, passively correctable
  - Grade IV: Fixed, locked digit

Presentation

Symptoms

- Progressive pain at A1 pulley level, clicking, catching, locking of the finger in flexed position

Physical Exam

- Tenderness at A1 pulley, palpable nodule, triggering with digit flexion/extension

Imaging

- Radiographs
  -Generally not required

Diagnosis

- Clinical diagnosis based on history and physical exam

Treatment

- **Nonoperative**
  - Splinting, NSAIDs, corticosteroid injections
- **Operative**
  - Open Surgical Debridement
  - Incision for A1 pulley release, intraoperative assessment with local anesthesia

Complications

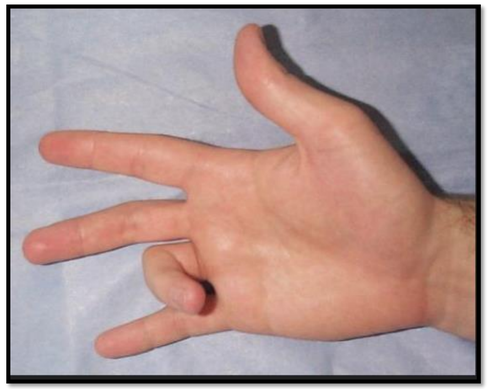
- Radial digital nerve injury
- Tendon bowstringing
- Wound dehiscence
- Scar tenderness, stiffness

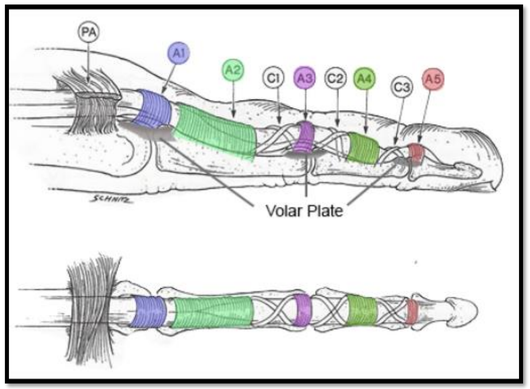
Prognosis

- Progressive if untreated
- Better prognosis for non-diabetics
- High success rates (90%+) with injections or surgery in non-diabetics

Associated Conditions

- Orthopaedic: rheumatoid arthritis, calcific tendinitis, carpal tunnel syndrome
- Medical: diabetes, amyloidosis, hypothyroidism, sarcoidosis, gout, pseudogout





GUYON'S CANAL SYNDROME (HANDLEBAR PALSY)

EPIDEMIOLOGY

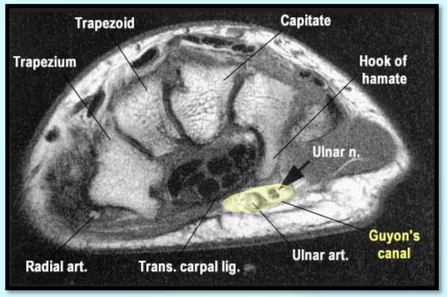
- Incidence: less common than cubital tunnel syndrome
- Risk Factors: cyclists ("handlebar palsy")

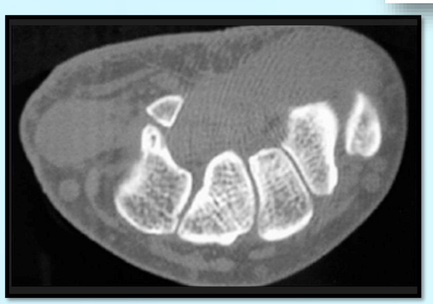
ETIOLOGY

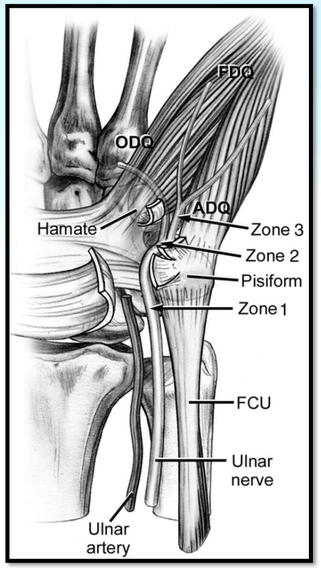
- Common causes: ganglion cyst (80%), lipoma, repetitive trauma, ulnar artery thrombosis/aneurysm , fractures or dislocations
- Inflammatory arthritis, anatomical anomalies, idiopathic

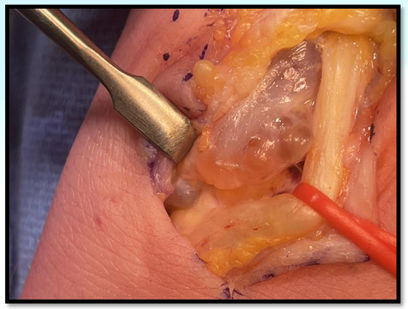
PRESENTATION

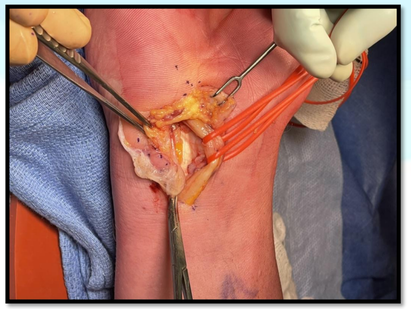
- **Symptoms** pain/paresthesias in ulnar digits, intrinsic weakness, clawing of ring/little fingers, weakened grip, weak pinch
- **Physical exams** Allen test, neurovascular exam, Tinel's sign, Froment, Jeane's, Wartenberg signs











IMAGING

- Radiographs and CT: evaluate hook of hamate fractures
- MRI: detect ganglion cysts, ulnar artery aneurysm
- Doppler US/arteriogram: diagnose ulnar artery thrombosis/aneurysm

ANATOMY

- Zone 1: Proximal to bifurcation, mixed motor and sensory symptoms
- Zone 2: Surrounds deep motor branch, motor symptoms only
- Zone 3: Surrounds superficial sensory branch, sensory symptoms only

STUDIES

- NCS and EMG
- Diagnose and prognosticate

DIAGNOSIS

- Clinical exam and EMG/NCS, MRI for confirming compressive lesions

TREATMENT

- Nonoperative: modification, NSAIDs, splinting for mild symptoms
- Operative: decompression for severe cases, tendon transfers for claw correction, power pinch restoration,
- + carpal tunnel release if CTS is present

COMPLICATIONS

- Recurrence

WRIST ARTHRITIS

Types of Wrist Arthritis by Location

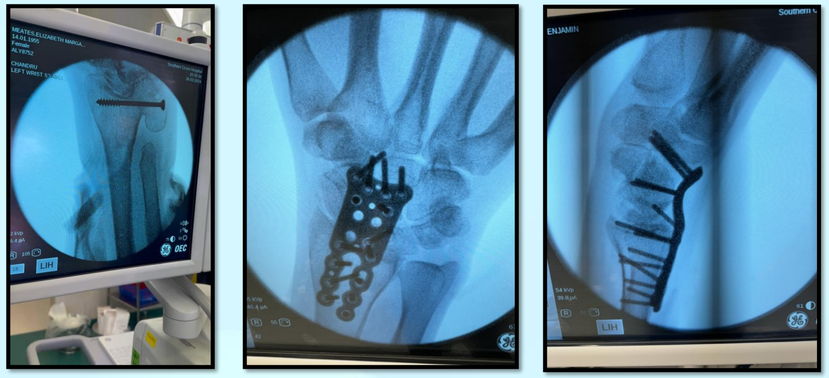
- **SLAC Wrist (Scapholunate Advanced Collapse)**: Most common
- **SNAC (Scaphoid Nonunion Advanced Collapse)**
- **DRUJ Arthritis**
- **STT Arthritis**
- **Pisotriquetrial Arthritis**
- **Hamolunate Arthritis**

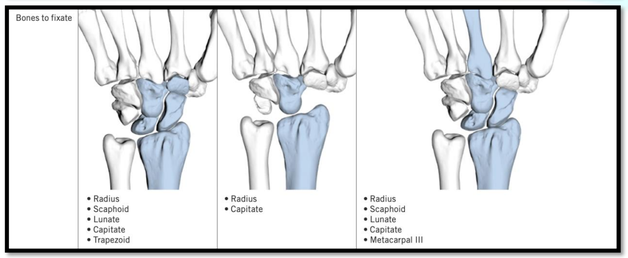
Etiology

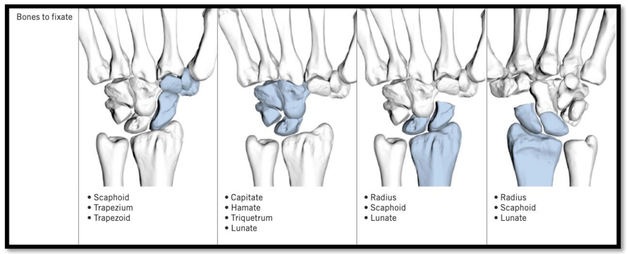
- **Mechanisms**:
  - **Degenerative**: Leads to SLAC/SNAC/DRUJ
    - Primary Osteoarthritis (OA)
    - Posttraumatic
  - **Inflammatory**: Rheumatoid arthritis
  - **Congenital**: May be secondary to Madelung's deformity
  - **Idiopathic**: May be secondary to Kienbock's or Preiser's disease

Pathoanatomy

- **SLAC/SNAC**:
  - Injury to SL ligament or Scaphoid nonunion → Palmar rotary subluxation of scaphoid → Joint surface incongruence → Arthritis of radiocarpal and capitolunate joints (radiolunate joint typically spared)
- **Rheumatoid Arthritis**:
  - Wrist becomes supinated, palmarly dislocated, radially deviated, and ulnarly translocated
  - Early DRUJ disruption leads to dorsal subluxation of ulna (Caput-ulna)





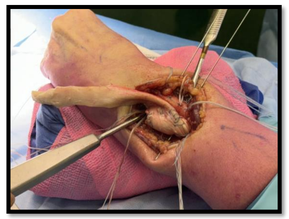


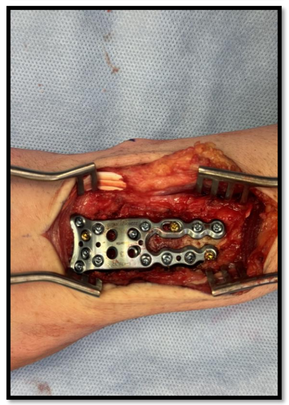
Anatomy

- Wrist ligaments and biomechanics
- **Imaging**
- **Radiographs**:
  - Standard hand series with additional views for specific joints
  - Lateral view in 30 degrees of supination for pisotriquetral joint

Treatment

- **Nonoperative**
  - NSAIDs, Bracing, Intra-articular steroid injections
  - Indicated for mild to moderate symptoms
- **Operative**
  - SLAC/SNAC – Partial/Total wrist Fusion
  - Pisotriquetrial arthritis: Pisiform excision for refractory cases
  - DRUJ Arthritis:
    - Distal ulna resection (Darrach procedure + Tendoachilles tendon allograft interposition)
    - Sauvé-Kapandji procedure + Tendoachilles tendon allograft interposition
    - Ulnar head replacement.





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ANTERIOR INTEROSSEOUS NERVE (AIN) COMPRESSIVE NEUROPATHY

Epidemiology

- Rare (<1% of median nerve compressive neuropathy)

Etiology

Common causes

- Transient neuritis, various compression sites

Pathoanatomy

- Compression at tendinous edge of pronator teres, fibrous arch of FDS, Gantzer's muscle, etc.

Anatomy

- Median nerve courses between the biceps and brachialis
- AIN arises about 4cms distal to the medial epicondyle
- AIN innervates FDP (index and middle fingers), FPL and pronator quadratus

Presentation

Symptoms

- Motor deficits without sensory loss, deep forearm pain may be present

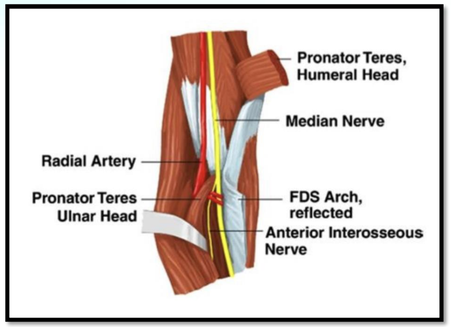
Physical Exam

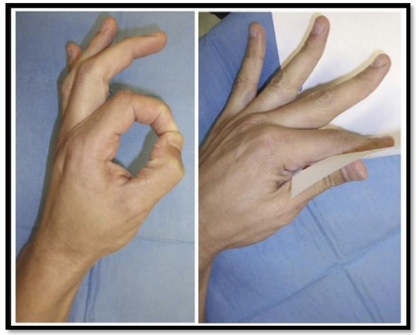
- Severe cases might show forearm atrophy
- Weakness in grip and pinch, unable to make OK sign

Studies

EMG/NCS: Aid to assess severity and recovery

- Abnormalities in FPL, FDP index and middle finger
- MRI – Used for compressive mass lesions, shows increased signal intensity in relevant muscles





Nonoperative treatment

- Observation, rest, physical therapy-observation, massage, forearm stretches
- First line for all patients without space-occupying lesions
- Symptoms improve in 3-12 months, full recovery may take up to 18 months

Operative treatment

- Surgical decompression if nonoperative treatment fails, or if mass present
- Over 75% success rate
- Lazy-S incision over proximal volar forearm
- Release of pronator teres, lacertus fibrosus, FDS, Gantzer's muscle (accessory FPL)

Complications

- Persistent motor deficit, may indicate tendon transfer

Prognosis

- Recovery starts 3-12 months after symptom onset, full resolution by 18 months
- Faster recovery noted in patients under 40

SCAPHOLUNATE LIGAMENT INJURY

Scapholunate ligament tear could be an isolated injury or associated with intra-articular distal radius/ carpal fracture. If Left untreated may progress to Scaphoid Lunate Advanced Collapse (SLAC) wrist arthritis.

Epidemiology

Incidence

- ***Acute injury: 10-30% in intra-articular distal radius/carpal fractures***
- ***Commonest Intercarpal Lig. Injury***
- Degenerative injury: tears in >50% of individuals over 70

Anatomy

Scapholunate Interosseous Ligament:

- C-shaped structure connecting scaphoid & lunate, with the dorsal component being the strongest

Presentation

- **History**:
  - Acute FOOSH injury or Acute on Chronic
- **Symptoms**:
  - ***Dorsal/radial wrist pain, increased pain with loading, clicking or catching sensations***
- **Physical Exam**:
  - Swelling, tenderness in anatomical snuffbox, pain with wrist extension/radial deviation
  - **Positive Watson test** indicating ligament insufficiency

Imaging

- **Recommended Views**
  - PA and lateral wrist X-rays; additional clench fist views for diagnosis
- **Findings**
  - SL gap > 3mm; DISI angle > 70° on lateral view
- **Other Modalities**
  - MRI

Treatment

Operative

- Repair for acute injuries without malalignment and reconstruction for chronic cases

Technique

Repair: (Acute)

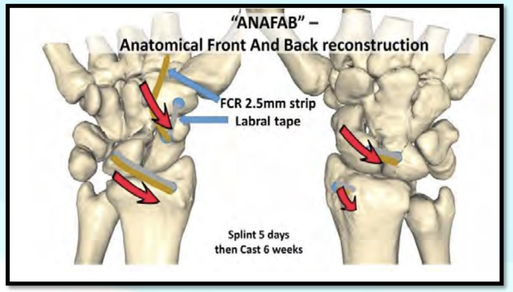
- K-wire and suture anchors

Reconstruction

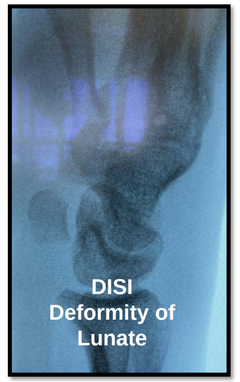
- ***ANAtomic Front And Back (ANAFAB)*** FCR tendon transfer through bone tunnels for stabilization (One of the reconstruction technique)

Complications

- Risk of disease progression, arthritis, post-op pain/stiffness, and reduced grip strength



SL Lig. Reconstruction using tendon graft



Figures C1, C2, C3

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Images