Hand & Wrist Treatment

Chairperson: Dr. Andrew Terrono

Monday, March 25th, 2019

11:05 – 12 pm

FOOSH Injuries (Fall On Outstretched Hand)

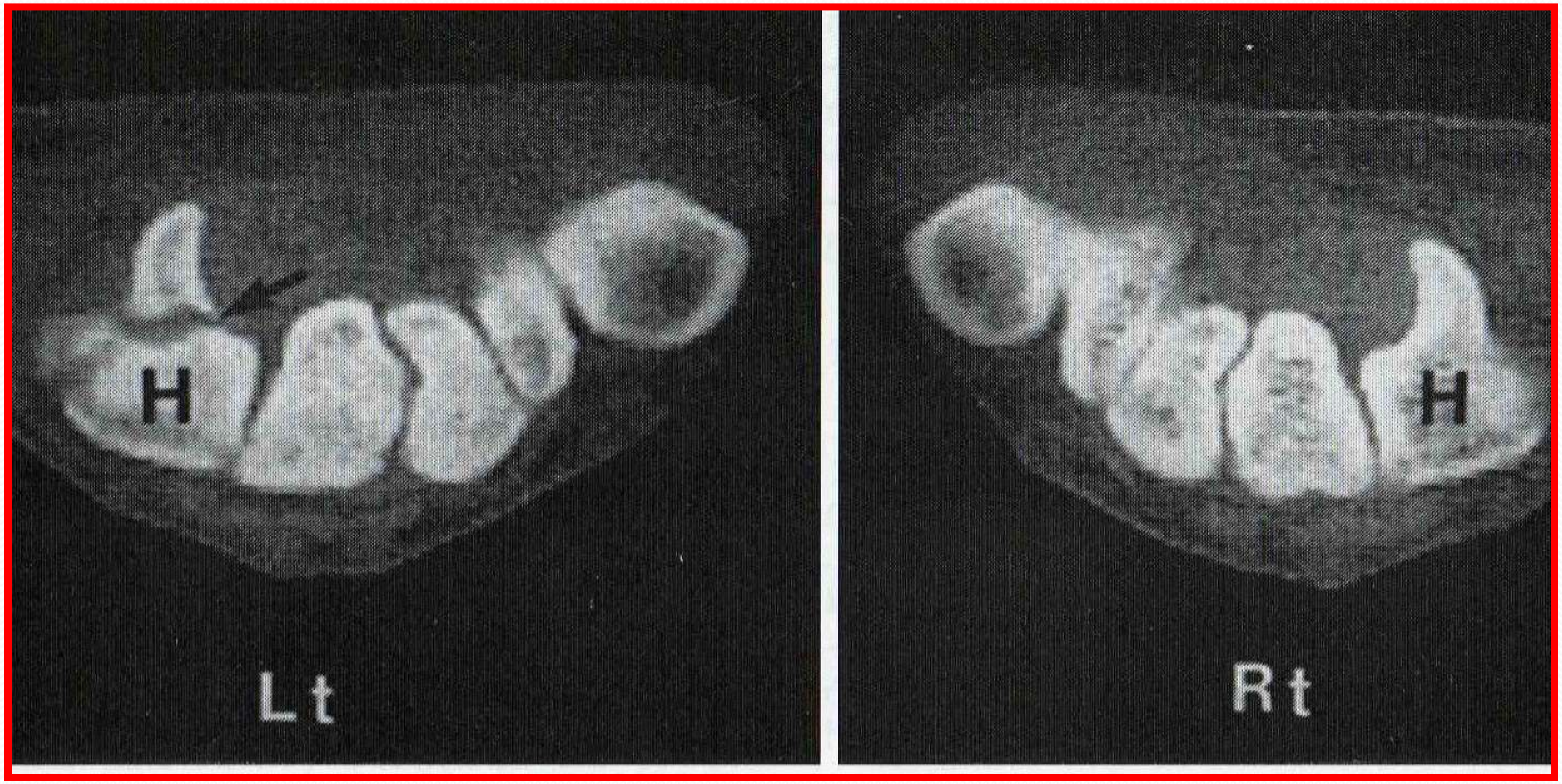
Andrew B. Stein, M.D.
Boston University Medical Center

Work Related Injuries Workshop
March 25th & 26th, 2019

Can involve injuries of Shoulder, Elbow , Wrist and Hand

Some Injuries are Obvious

Some are Not…



Diagnosis

- History
- Physical Exam
- Plain X-rays
- Advanced Imaging should generally only be obtained to confirm clinical suspicions
  - CT
  - MRI
  - Ultrasound
  - Arthroscopy

Elbow

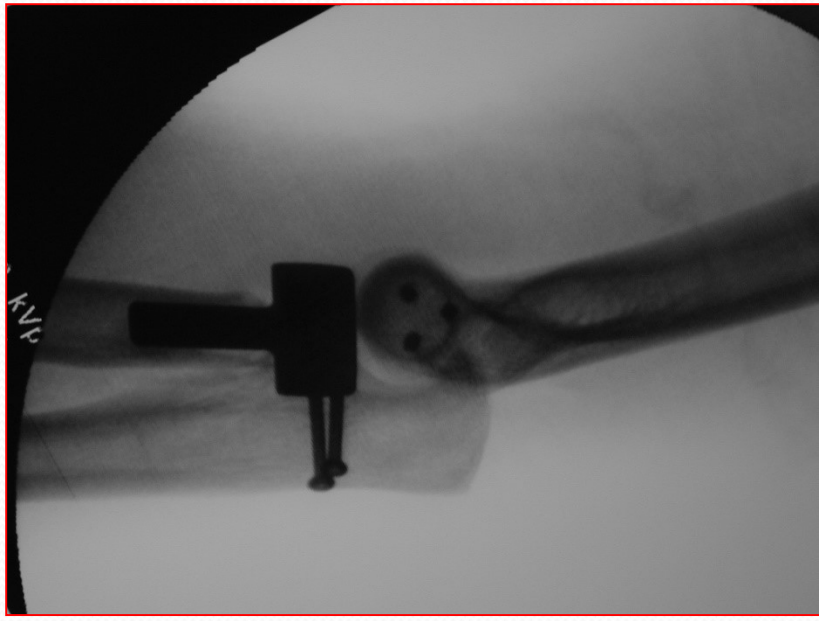
- Dislocations usually obvious
  - **Simple** (no associated fracture) –closed Treatment
  - **Complex** (associated fracture) more likely to require surgery
- Radial Head fracture most common fracture
  - May be subtle/occult
- Elbow has tendency to get *stiff* – goal is to allow AROM by 2 wks

Radial Head Fractures

- Early ROM for marginal fractures (Type 1)
- ORIF for large fragments (Type 2)
- Excision w/prosthesis for comminuted fractures (Type 3)

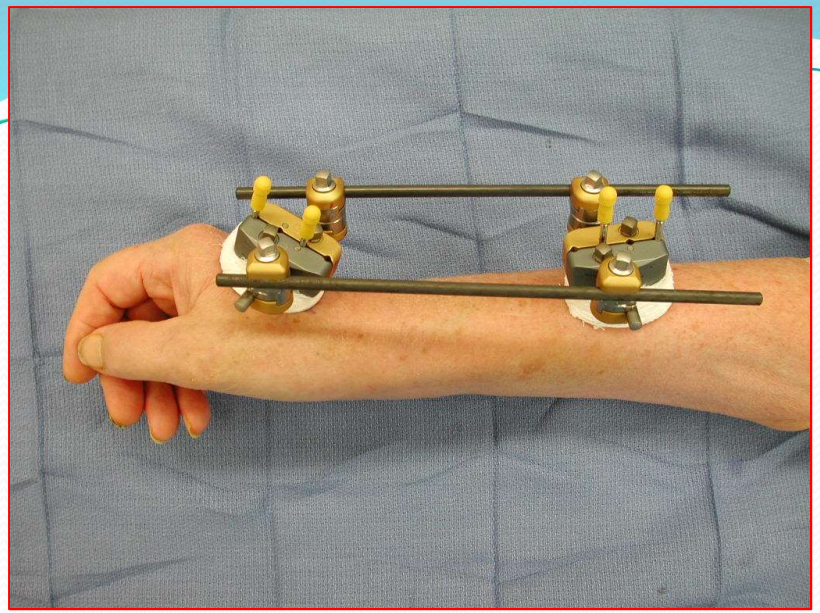
Terrible Triad

- Example of unstable Injury
  - Posterior dislocation,
  - Radial head fracture
  - Coronoid fracture
- Management is Surgical!



Wrist

- Distal radius fractures account for 15% of all fractures & 1/6 fractures seen in E.R.
- Peak incidence in 7th decade
- Higher energy injury in younger patients
- Data has shown that healing in an anatomic position will positively impact outcome and patient satisfaction
- *Best method* to maintain such a reduction remains unanswered

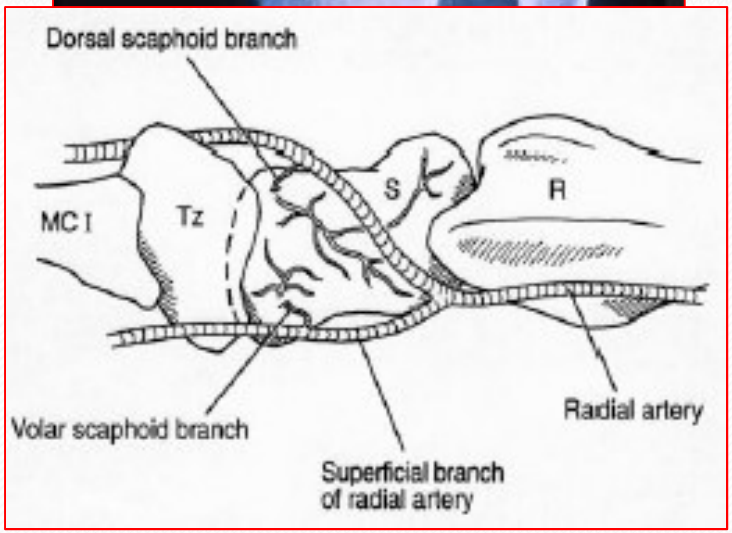


Scaphoid Fractures

- Unlike distal radius fxs diagnosis may not be obvious
- Most common carpal bone fracture
- 2nd most common wrist fracture
- Fracture of active, young patient
- Overlooked, misdiagnosed
- Potential for significant morbidity

Anatomy

- Irregular peanut shape
- 80% covered by articular cartilage
- Predisposition towards AVN & non-union



Clinical Findings

- Pain
- Reduced ROM, Pain at extremes
- Rare ecchymosis/swelling
- Tenderness
  - Anatomic snuffbox
  - Tuberosity (volar)

Physical Exam

- Snuffbox tenderness most sensitive test:
  - 87-100% sensitivity reported
- Male sex + Sports injury + tubercle tenderness + pain w/ulnar deviation:
  - 91% predictive of fracture (Duckworth et al 2012)

Radiography

- PA, Lateral
- Scaphoid view (PA with 30° ulnar deviation)

Scaphoid View

Occult Injuries

- Suspicion of fracture w/normal x-rays should prompt advanced imaging
  - MRI (98% sensitivity, 99% specificity)
  - CT (94% sensitivity, 96% specificity)
  - Bone Scan (96% sensitivity, 89% specificity)
- Earlier may be better in terms of societal cost/unnecessary immobilization

Ring et al JHS 2008; Stevenson et al JHS 2012)

Cast Treatment

- For non/min displaced waist fractures reported union rates in cast 88-100%
- Risk of non-union increases with:
  - Delayed diagnosis (>4 weeks)
  - Inadequate immobilization
  - Fracture instability/displacement
  - Associated ligamentous injury (peri-lunate)

Langhoff & Anderson *JHS Br* 1988
Dias et al *JHS Br* 1989

Closed Treatment

CONTROVERSIES

- Long arm vs. Short arm
- Thumb vs. No thumb

SCIENTIFIC ARTICLE

Cast Immobilization With and Without Immobilization of the Thumb for Nondisplaced and Minimally Displaced Scaphoid Waist Fractures: A Multicenter, Randomized, Controlled Trial

G. A. Buijze, MD, PhD, J. C. Goslings, MD, PhD, S. J. Rhemrev, MD, A. A. Weening, MD, B. Van Dijkman, MD, J. N. Doornberg, MD, PhD, D. Ring, MD, PhD, CAST Trial Collaboration

-1° outcome: extent of union by CT at 10 wks (62 pts)

-Overall union rate 98% (1 failure in thumb spica group)

-Significant difference in avg extent union (85% vs 70%) favoring cast *excluding* the thumb

Conclusions Immobilization of the thumb appears unnecessary for CT or magnetic resonance image–confirmed nondisplaced or minimally displaced fractures of the waist of the scaphoid.

Surgical Indications

- Displacement (>1mm)
- Any patient who won't tolerate a cast
- Delay in diagnosis (>1 mo.)
- Failure to heal in cast
  - No signs healing at 6-8 wks.
- Proximal Pole Fracture

Outcomes after ORIF

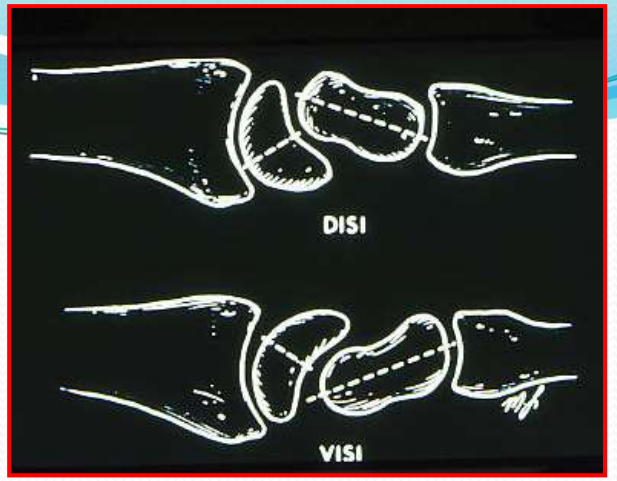
- Union rates after surgery around 95% (94-100% reported)
  - Same for open & percutaneous techniques (volar and dorsal approaches)

Chung KC. Plast Reconstr Surg. 2002
Slade JF, III, Grauer JN, Mahoney JD. Orthop Clin North Am. 2001
Chen AC, Chao EK, Hung SS, Lee MS, Ueng SW. J Trauma. 2005

Scapho-Lunate Dissociation

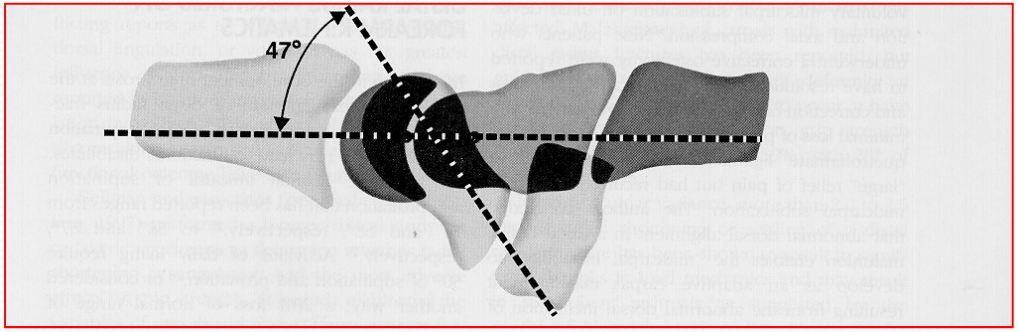
- Like occult scaphoid fxs can be easily missed
- Complete tears generally require surgical repair
- PE
  - SL tenderness
  - Scaphoid shift
- X-rays
- MRI Arthrogram
- Arthroscopy

Anatomy

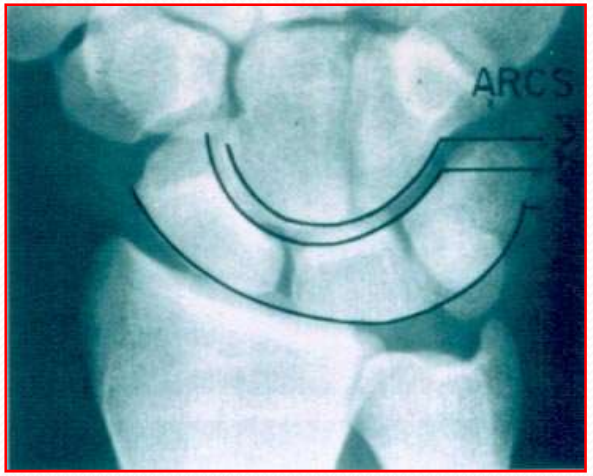


Plain radiographs:

- True lateral
  - scapholunate angle: 30º-60º
  - capitolunate/radiolunate angles <10º



- PA
  - scapholunate gap <4mm
  - parallelism of 3 arcs representing proximal & distal rows



18M Football Player

4 month F/U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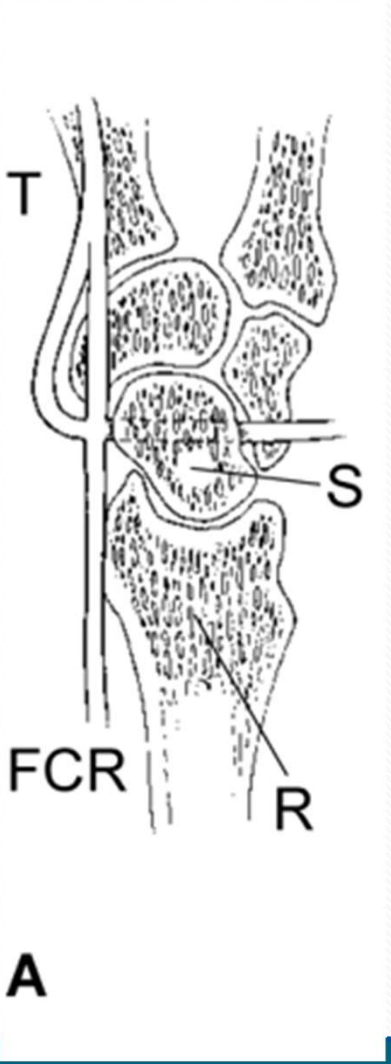
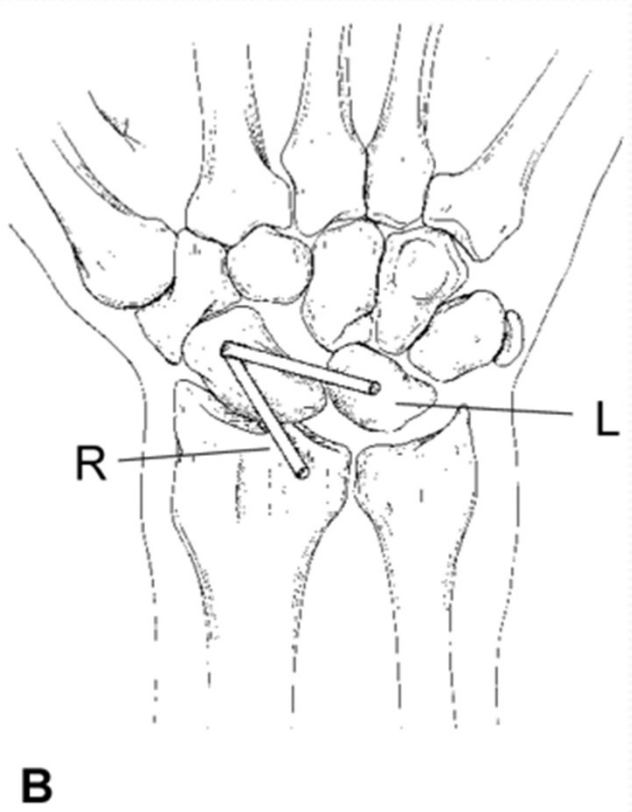
Modified Brunelli Tenodesis





Post-op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8 month F/U


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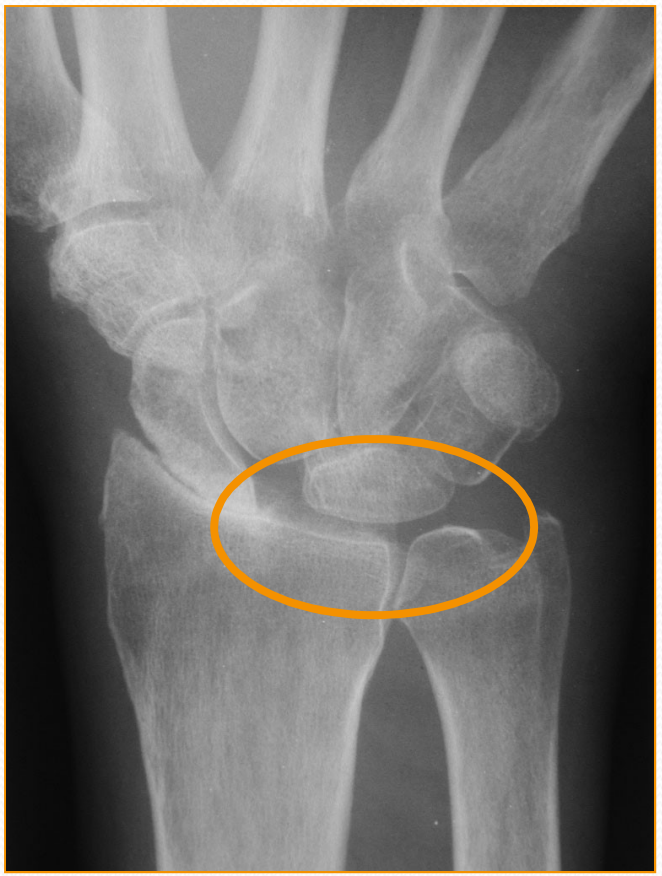
Natural History of Untreated SL Tears & Scaphoid Non-Unions: SLAC/SNAC Wrist

Untreated → Arthritis (predictable progression)

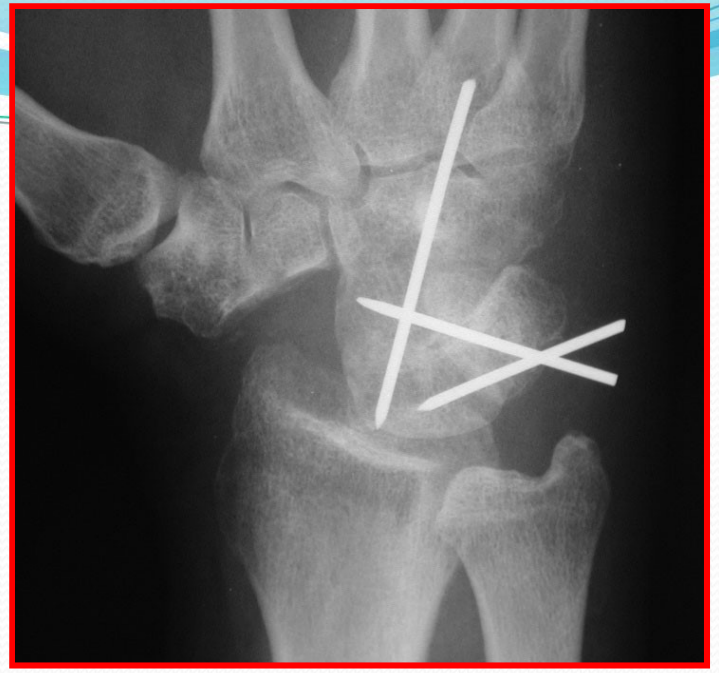
1. Styloid arthritis
2. Radioscaphoid arthritis
3. Midcarpal arthrosis

*Radiolunate joint always preserved



Salvage Procedures

- Scaphoid excision & Limited fusion
- Proximal Row Carpectomy
- Total Wrist Arthrodesis



Summary

- FOOSH Injuries extremely common
- Wide array of injuries can occur
- Beware “occult” fractures & ligament tears
- Exacerbation of pre-existing conditions also quite common…

THANK YOU!

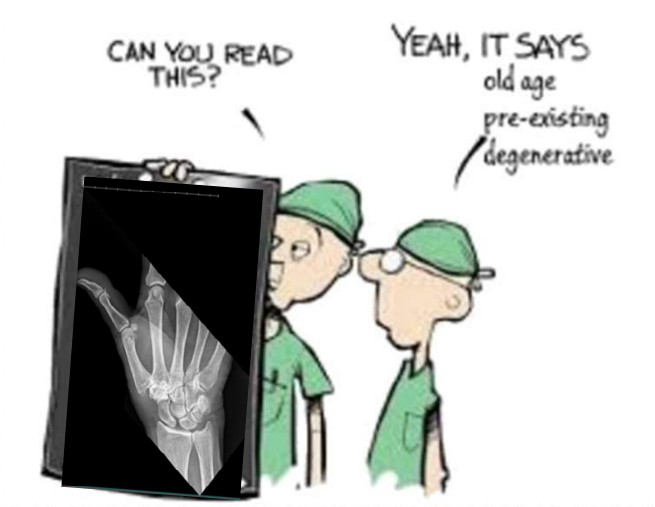
Pre-Existing Arthritis: How to Factor into Causation Analysis

Hervey L. Kimball MD, MS
New England Baptist Hospital
Boston Sports and Shoulder Center
Boston, MA

Work Related Injuries Workshop
March 25th & 26th, 2019

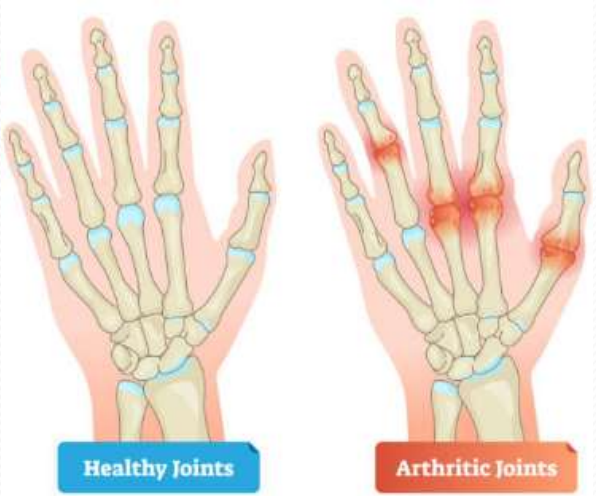
Causality

- An association between a given cause (work event)and an effect (a condition that can result from specific cause) with a reasonable degree of medical probability



Arthritidies

- Osteoarthritis
- Post Traumatic
- Inflammatory Arthritis
  - RA, psoriatic arthritis, ankylosing spondylitis, juvenile idiopathic arthritis, SLE (lupus)
- Gout
- Septic (infection)



Hand Arthritis

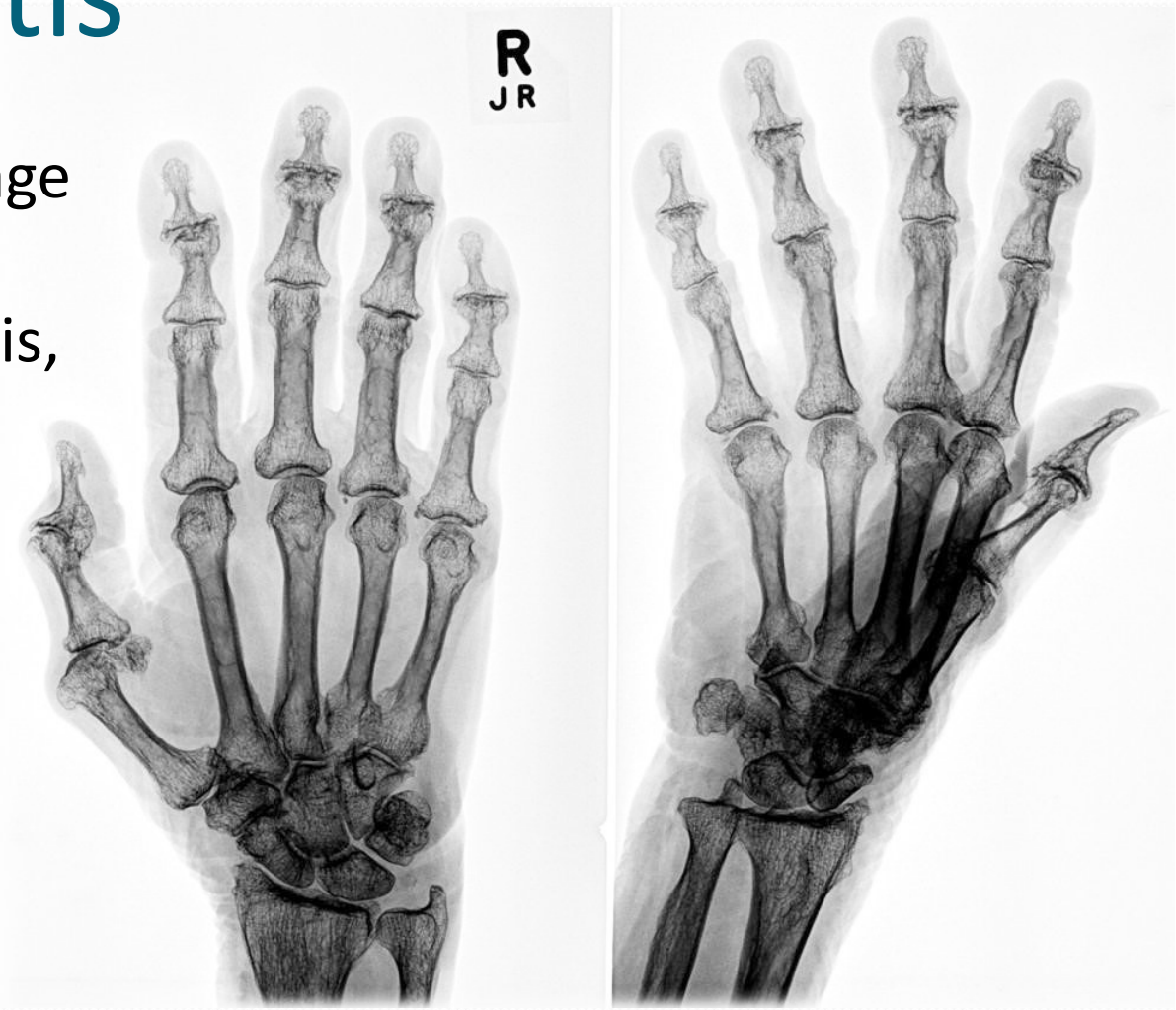
- Osteoarthritis (OA) : most common joint disease of hand prevalence increases with age.
- More than 50% of men and women over the age of 60 with hand radiographs have findings of OA.
- OA : articular cartilage narrowing, periarticular sclerosis, osteophytosis and subchondral cysts.

Haugen IK, Englund M, Aliabadi P, et al. Prevalence, incidence and progression of hand osteoarthritis in the general population: The Framingham Osteoarthritis Study.

Ann Rheum Dis 2011, 70(9):1581-1586

Hand Arthritis

- OA : articular cartilage narrowing, periarticular sclerosis, osteophytosis and subchondral cysts.



Prevalence and pattern of radiographic hand osteoarthritis and association with pain and disability (the Rotterdam study)

S Dahaghin, S M A Bierma-Zeinstra, A Z Ginai, H A P Pols, J M W Hazes, B W Koes

Ann Rheum Dis 2005;64:682–687. doi: 10.1136/ard.2004.023564

- prevalence of radiographic osteoarthritis **29–76%** in population based studies
- prevalence of ***symptomatic hand osteoarthritis*** is much lower : **4% and 6.2%**
- a discrepancy remains between structural markers of pathology and the clinical syndrome of osteoarthritis typified by joint pain and disability

Review

Scand J Work Environ Health 2014;40(2):133-145

doi:10.5271/sjweh.3409

Associations of work activities requiring pinch or hand grip or exposure to hand-arm vibration with finger and wrist osteoarthritis: a meta-analysis

by Hammer PEC, Shiri R, Kryger AI, Kirkeskov L, Bonde JP

- 19 studies included for Meta-analysis
  - limited support for the hypothesis that occupational activities involving pinch motion are causally linked to development of hand osteoarthritis.
  - Insufficient evidence that or exposure to hand grip or hand-arm vibration is linked
- Causal relation **cannot** be determined

Causation Analysis

Factors:

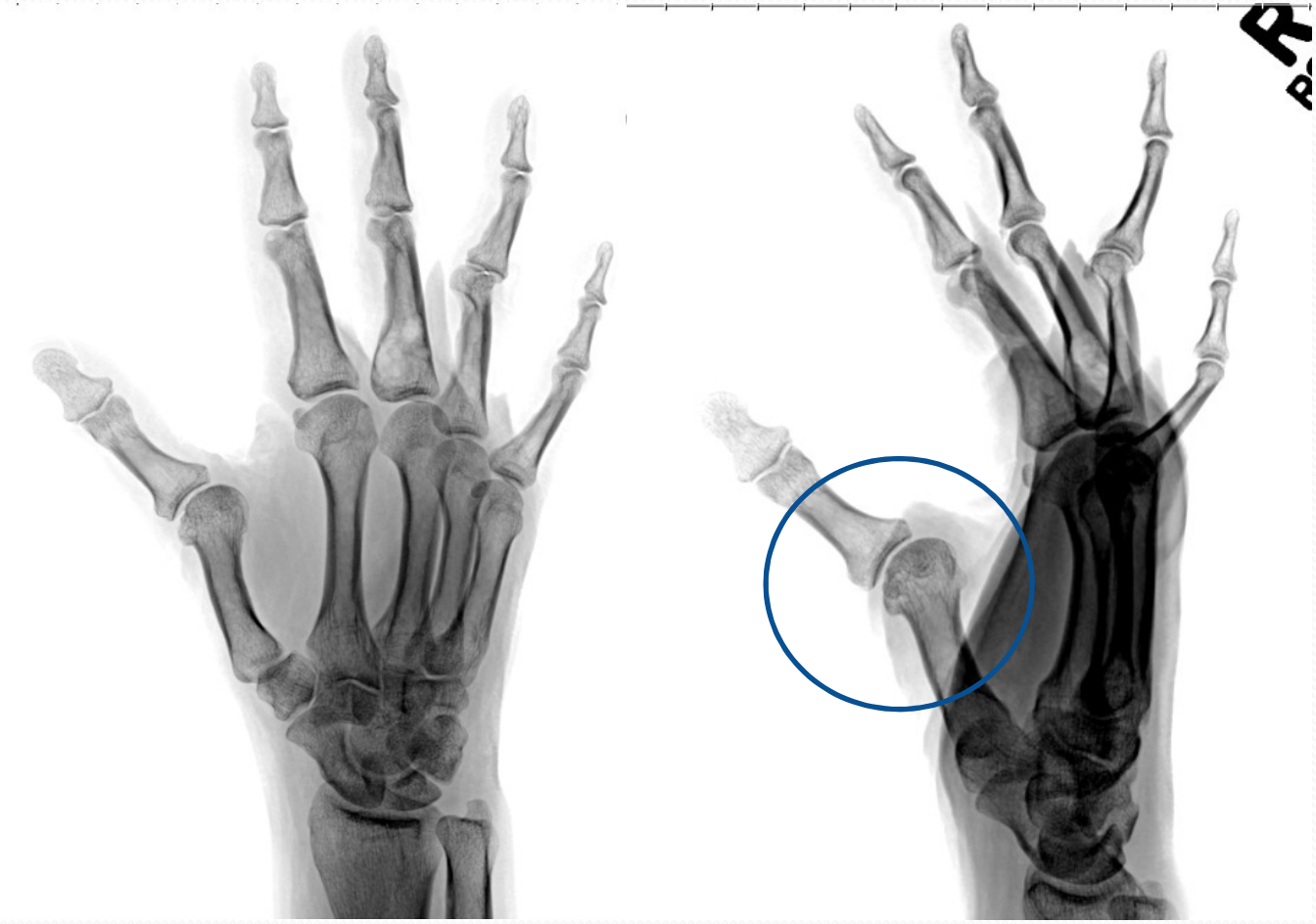
- Patient's age & medical history
- Mechanism of Injury
- Clinical findings following the Injury
- Imaging or tests

Focus on Injury / Event

- Acute Injury Examination
  - Swelling
  - Bruising
  - Limited motion/stiffness
  - Pain

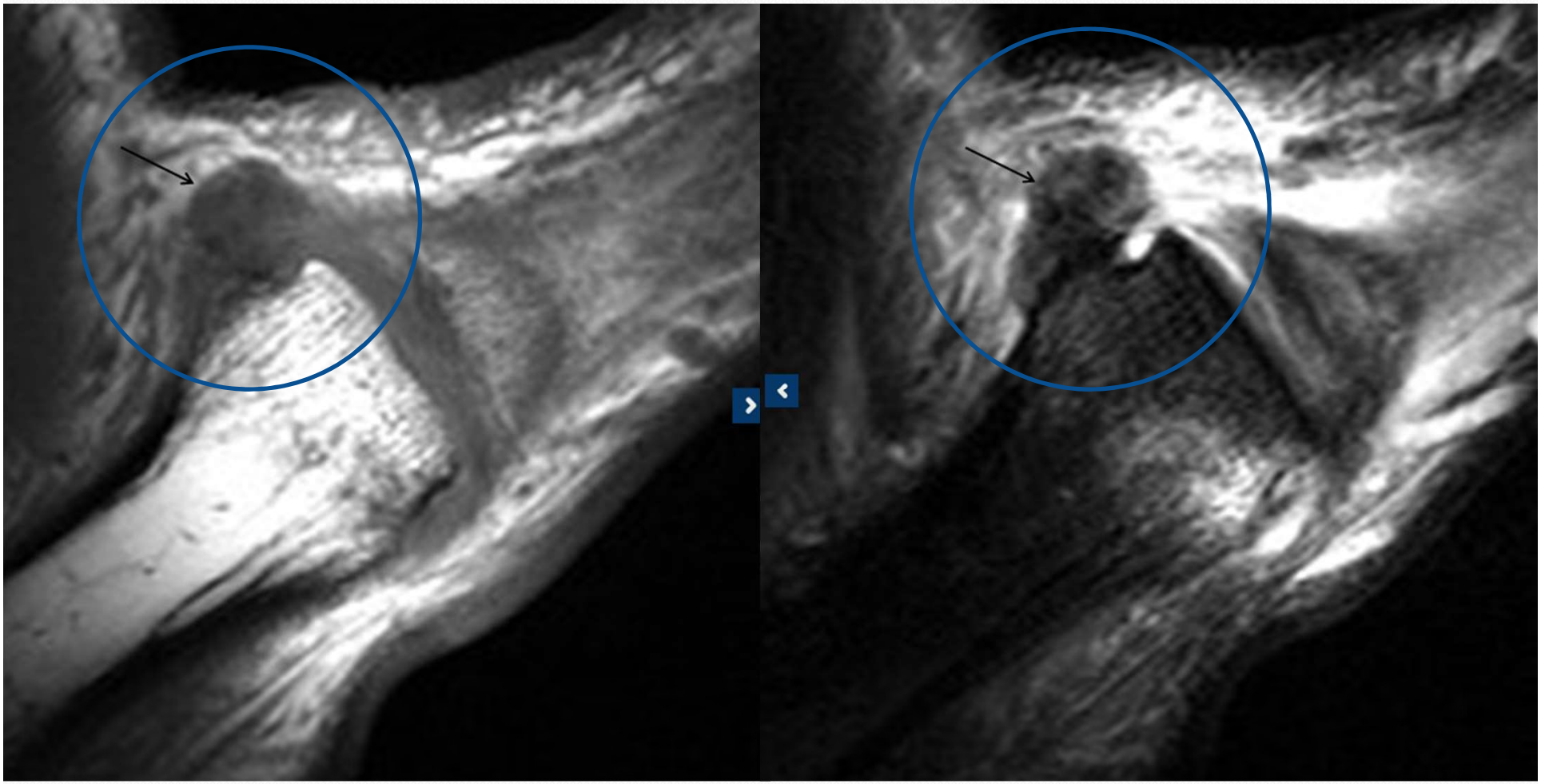
Imaging:

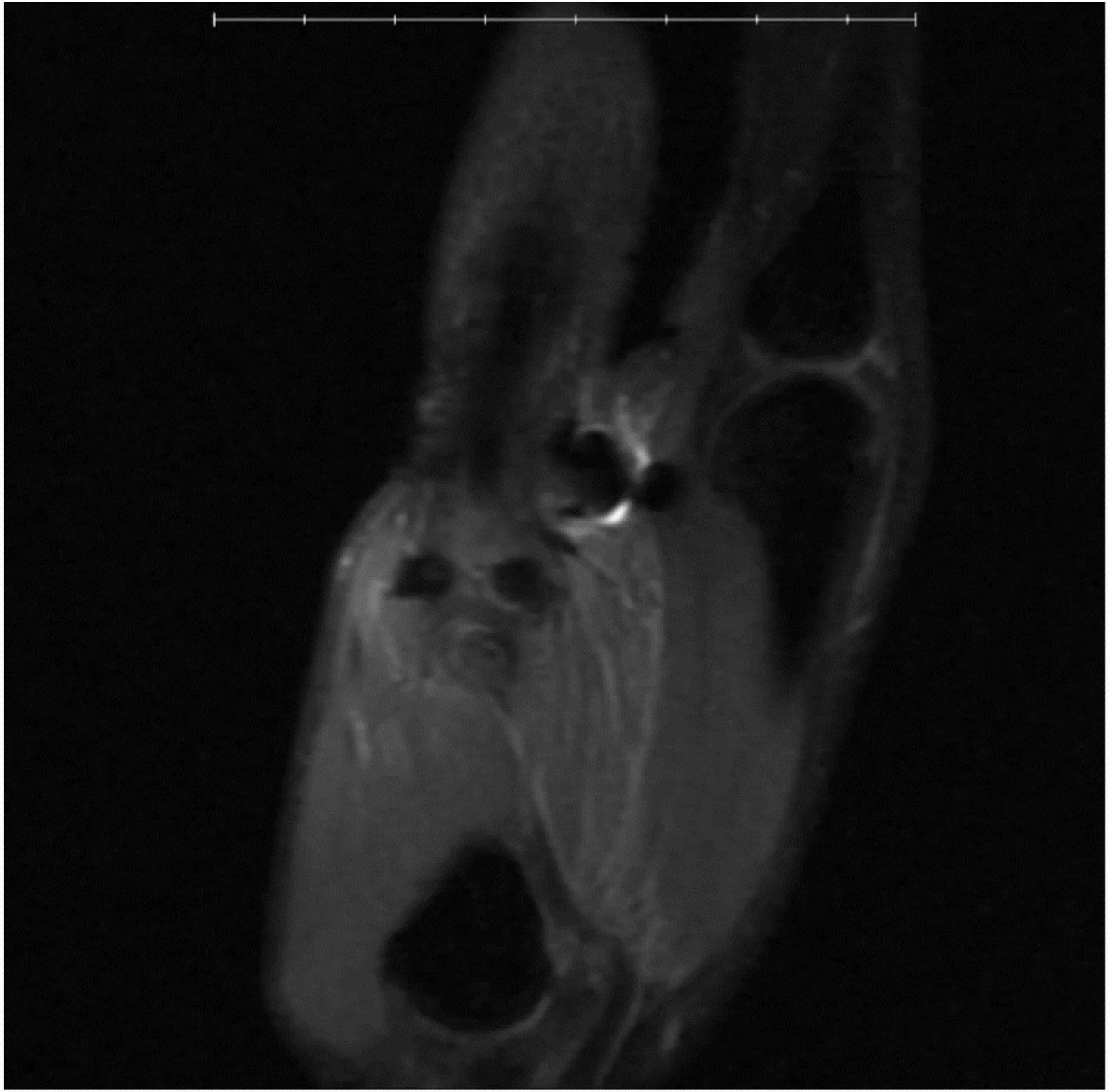
- Radiographs



Imaging:

- MRI
  - Sensitive for evidence of acute injury
  - Detect occult fractures
  - Ligament tears
  - Soft tissue edema / swelling
  - Hematoma





Imaging:

- MRI
  - Early arthritis:
    - Synovitis : abnormal T2 hyper intensity and thickening of the synovium
    - Effusion
    - Focal low T1 and high T2 marrow edema-like signal may be a precursor of erosion

Clin Orthop Relat Res (2017) 475:2704–2711
DOI 10.1007/s11999-017-5359-9

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

CLINICAL RESEARCH

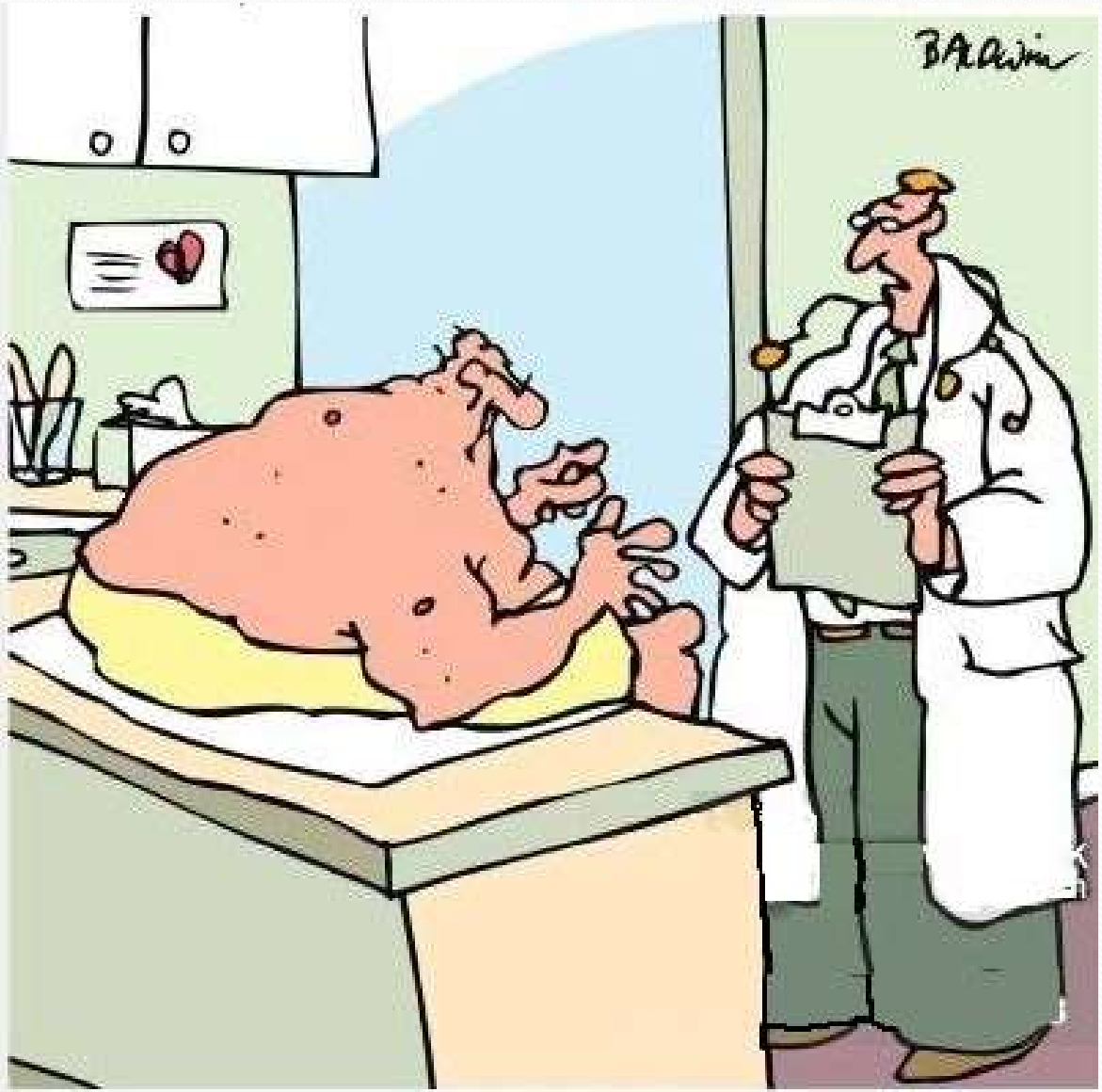
What Demographic and Clinical Characteristics Correlate With Expectations With Trapeziometacarpal Arthritis?

Lana Kang MD, MSc, Joseph Nguyen MPH, Sohaib Z. Hashmi MD, Steve K. Lee MD, Andrew J. Weiland MD, Carol A. Mancuso MD

- Patients who reported an antecedent injury and chose surgical treatment more frequently expected a return to normal.

Factoring causation

- Understand event or injury
- Patient age, medical conditions
- **Correlate with clinical examination**
- Radiographs
- Advanced imaging : MRI
  - can help confirm acute injury



“It’s arthritis. Probably caused from clinging to life..”

De Quervain's Tendinopathy

Taylor A. Horst, MD

Hand & Upper Extremity Surgeon

EXCEL ORTHOPEDIC SPECIALISTS

200 Unicorn Park Dr
Woburn, MA 01801
(781) 782-1330

Work Related Injuries Workshop
March 25th & 26th, 2019

Disclosures

- none

Goals

- The active listener should be able to
  - Identify de Quervain tendinopathy symptoms
  - Identify patient population most at risk for de Quervain tendinopathy
  - Discuss the nonsurgical treatment options available and their affect
  - Understand the surgical option available, goals of surgery and the results

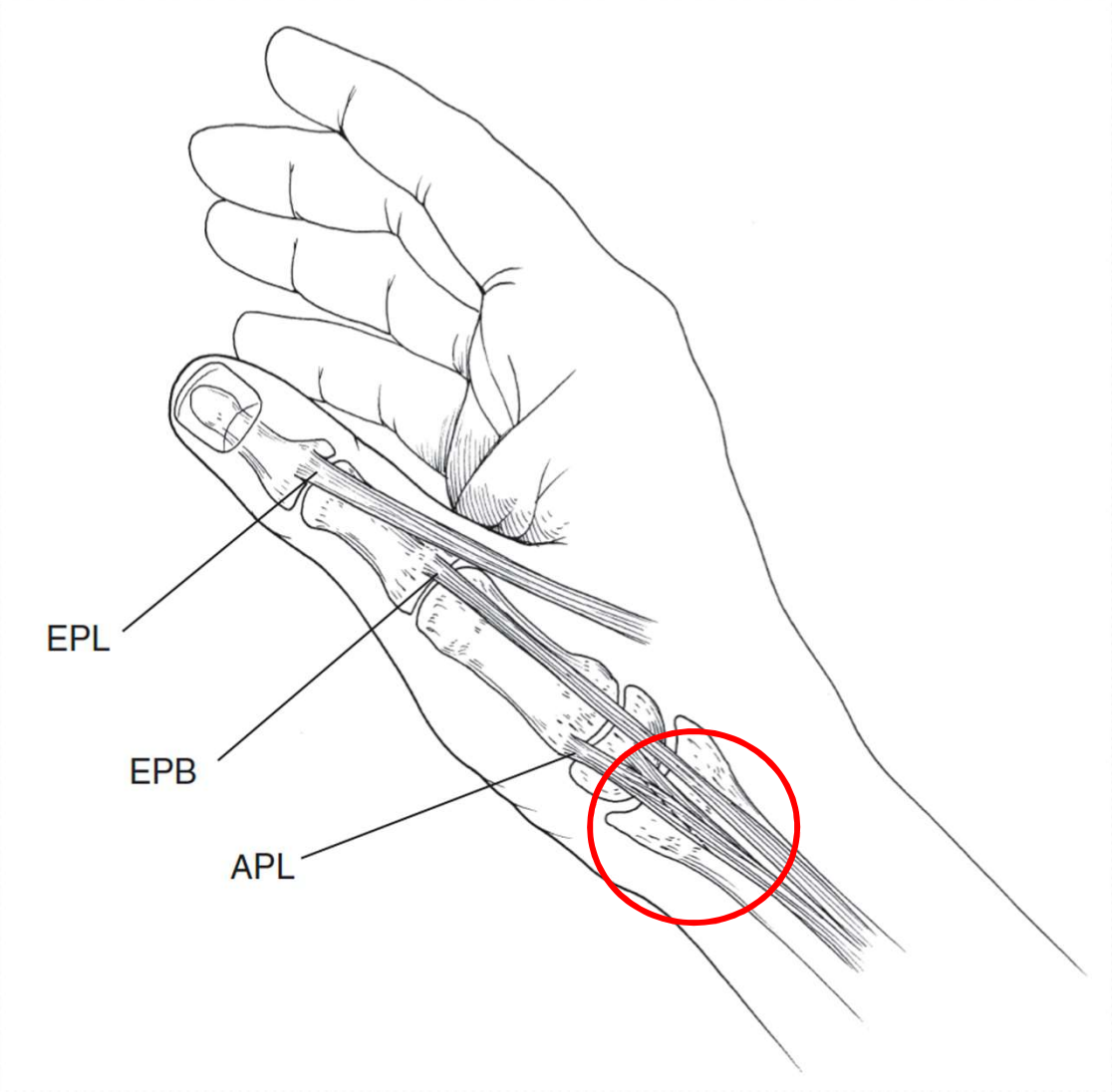
De Quervain Tendinopathy

- First described in 1895 by Fritz de Quervain
- Harry Finkelstein further described in 1930 identifying a detailed physical examination test
- Daniel Patterson first called it

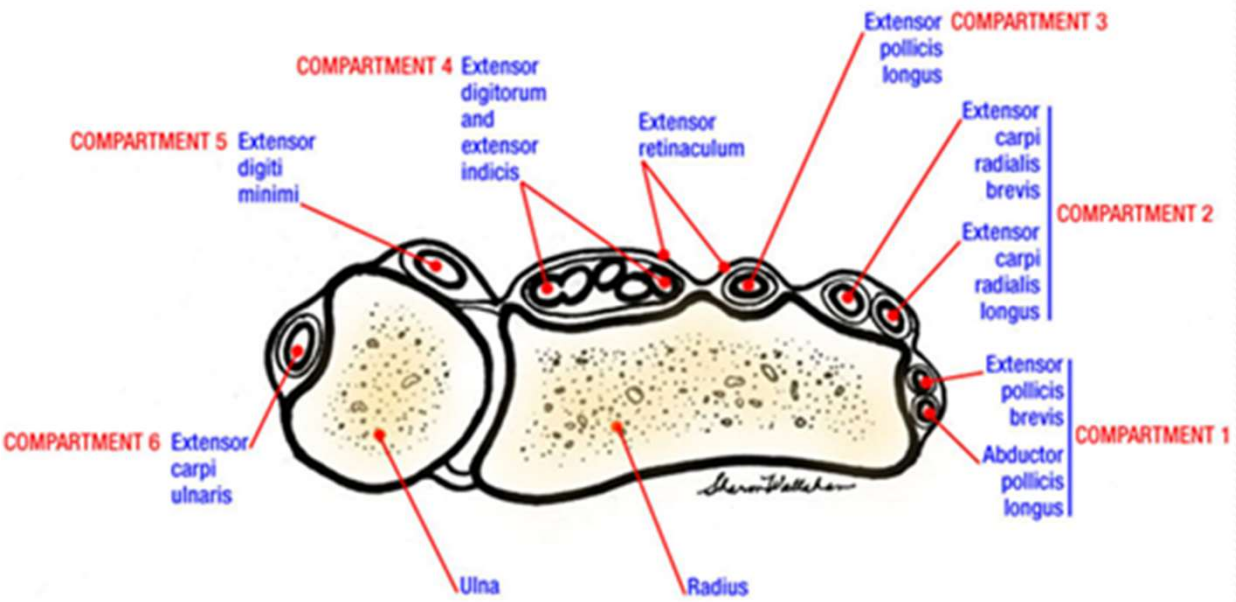
  de Quervain disease in 1936

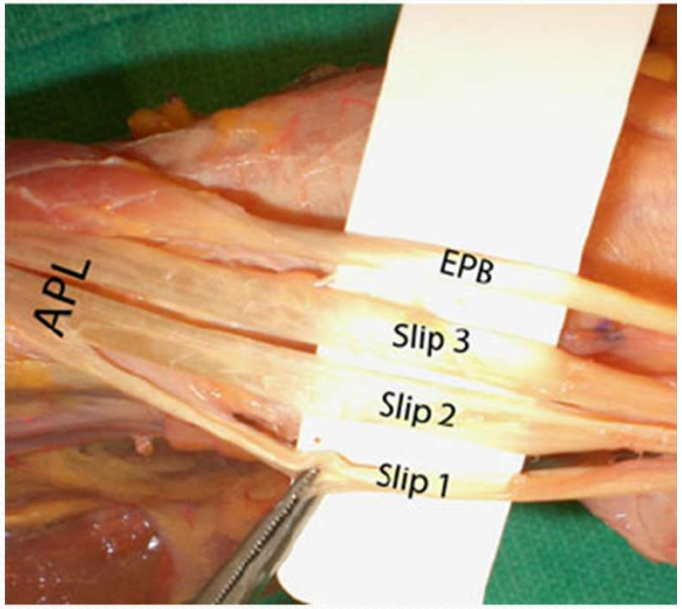
Pathology/Pathophysiology

- Originally thought to be inflammation around the tendon
  - Stenosing tenosynovitis
  - Peritendinitis
  - Styloid tenovaginitis
  - Stenosing tendovaginitis
- Later found to be attritional and degenerative


EPL
EPB
APL

Anatomy Variations





Variations in anatomy have included

- Multiple slips of APL and occasional EPB
- Division of the 1st dorsal compartment by additional septum

Potential predisposing factors

- Historically from overexertion from household duties
- Repetitive motions
- New mother's
  - Lower cribs
  - Older mothers
  - Heavier children
  - Frequent smartphone scrolling

SCIENTIFIC ARTICLE

Incidence of de Quervain's Tenosynovitis in a Young, Active Population

Jennifer Moriatis Wolf, MD, Rodney X. Sturdivant, PhD, Brett D. Owens, MD

- J Hand Surg 2009
- 11, 332 cases of de Quervain's in military patients
- **Gender:** Women had significantly higher rate
  - 2.8 cases per 1000 person-years compared to men at 0.6
- **Age:** greater than 40 sig risk factor
  - 2.0 per 1000 person-years
- **Race:** Blacks higher incidence at 1.3 per 1000 person-years

TABLE 1. Unadjusted and Adjusted Incidence Rates and Rate Ratios of de Quervain's Tenosynovitis by Gender Among U.S. Service Members Between 1998 and 2006

			Unadjusted		Adjusted	
Gender	Injuries	Person-Years	Rate	Rate Ratio (95% CI)	Rate	Rate Ratio (95% CI)
Male	6,376	10,351,762	0.6159	n/a	0.5350	n/a
Female	4,956	1,765,987	2.8064	4.5563 (4.3902, 4.7285)	2.3799	4.4487 (4.2810, 4.6231)

Rate per 1000 person-years; male referent category; adjusted for race, age, service, rank.

TABLE 2. Unadjusted and Adjusted Incidence Rates and Rate Ratios of de Quervain's Tenosynovitis by Race Among United States Service Members Between 1998 and 2006

			Unadjusted		Adjusted	
Race	Injuries	Person-Years	Rate	Rate Ratio (95% CI)	Rate	Rate Ratio (95% CI)
Black	3,168	2,417,075	1.3107	1.6080 (1.5418, 1.6770)	1.1975	1.3099 (1.2056, 1.4231)
Other	1,226	1,188,909	1.0312	1.2651 (1.1906, 1.3443)	1.1869	1.1744 (1.1047, 1.2484)
White	6,938	8,511,765	0.8151	n/a	1.0107	n/a

Rate per 1000 person-years; white referent category; adjusted for gender, age, service, rank.

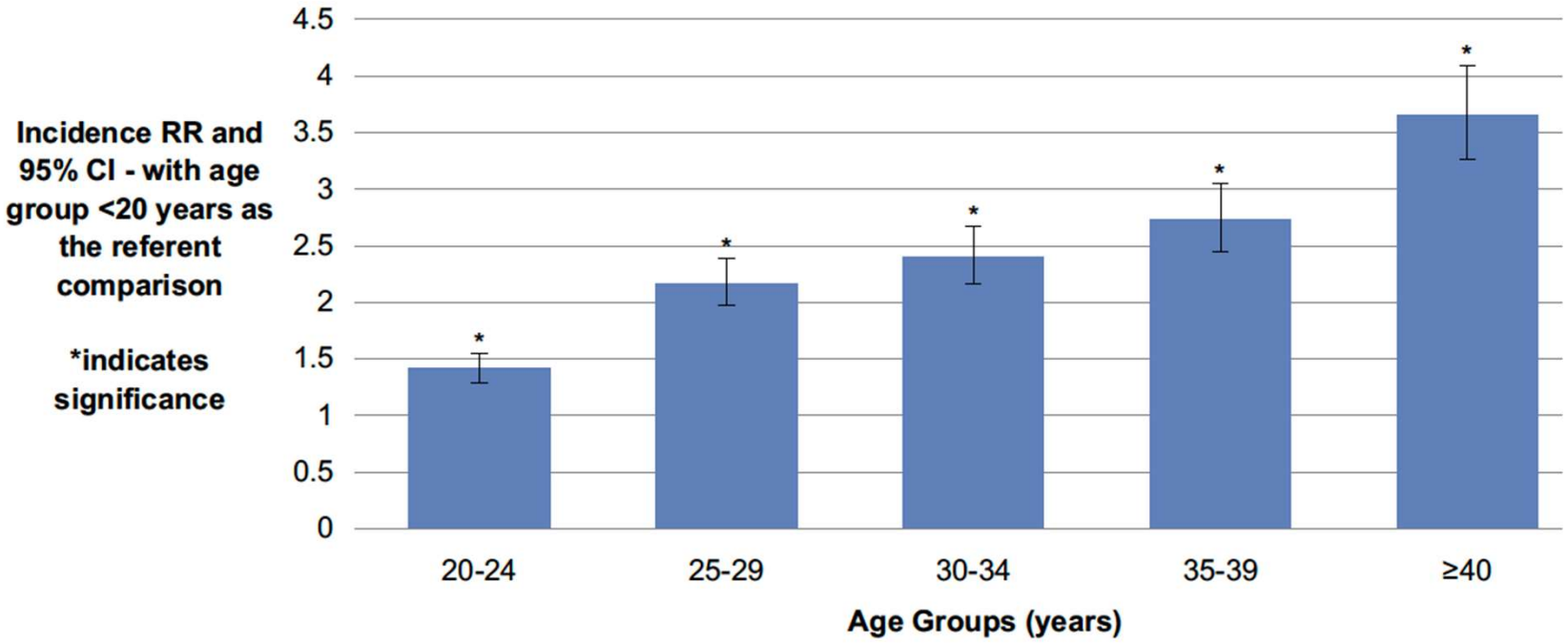


FIGURE 1: Incidence rate ratio and 95% confidence intervals by age group.

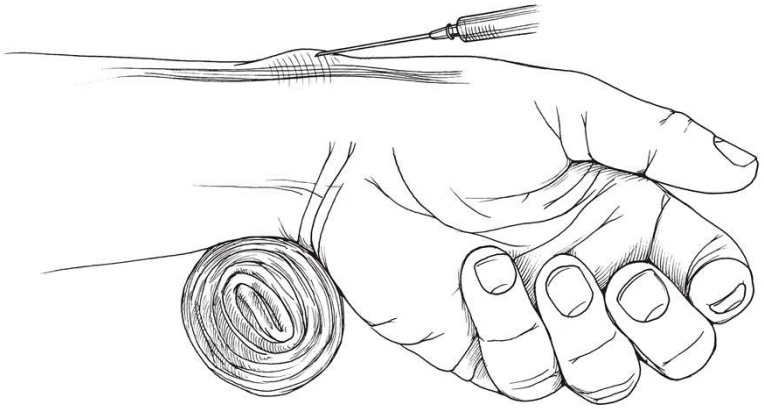
Presentation

- Gradual onset of pain localized along the radial side of the wrist
- Often experience an exacerbation of symptoms caused by grasping and raising objects with wrist in neutral rotation

Diagnosis

Nonsurgical Treatment

- Should be 1st course of action
  - Rest
  - Splinting
  - NSAIDS
  - Corticosteroid injections
- ~80% have been found to have resolution of symptoms within 1 year of onset



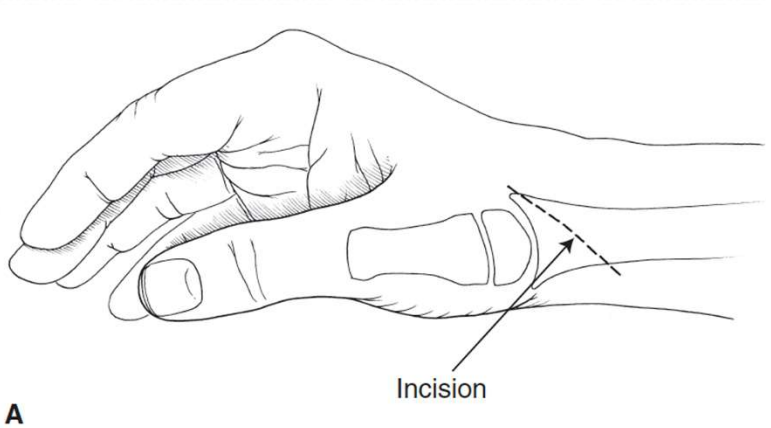
Corticosteroid Injection With or Without Thumb Spica Cast for de Quervain Tenosynovitis

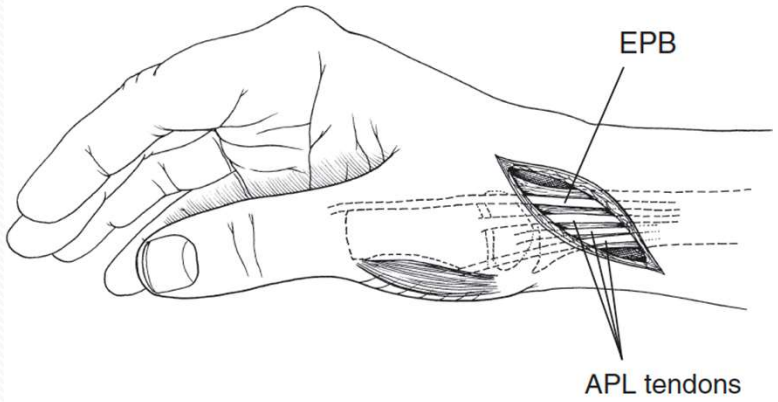
Mohsen Mardani-Kivi, MD, Mahmoud Karimi Mobarakeh, MD, Farzaneh Bahrami, MD, Kevyan Hashemi-Motlagh, MD, Khashayar Saheb-Ekhtiari, MD, Niloofar Akhoondzadeh, MD

- J Hand Surg 2014
- 67 patients randomized to corticosteroid alone or thumb spica cast + coricosteroid injection
- Treatment success = absence of radial sided wrist pain and negative Finkelstein test
- Following 3 weeks of treatment
- 93% treatment success rate in the casting + steroid group
- 69% treatment success in the corticosteroid group

Surgical Intervention

- Typically after >6 mo of failed non-operative intervention
- Psychiatric illness and Medicaid insurance have been associated with undergoing surgery[1]
- Anatomy a factor
- Fundamentals
  - Protect sensory radial nerve
  - Fully release the first dorsal compartment
    - Including any sub-compartments
- Success rate ≥ 91%





Kazmers et al., Patient- and Disease-Specific Factors Associated with Operative Management of de Quervain Tendinopathy. J Hand Surg 2017;42(11):931

Satisfaction

- Patients with longer symptoms (9 mo of longer) typically more satisfied
- Most (>80%) tend to be satisfied even with persistent symptoms for > 3 mo such as
  - Wrist pain
  - Scar tenderness
  - Numbness and tingling at surgical site
  - Restricted range of motion

Conclusion

- De Quervain's tendinopathy is a mucoid degenerative process exacerbated by motion
- Occurs in about 1%-2% of all active young adults
- Women, patients greater than 40 and non-white population with higher incidence
- Varying opinions as to optimal treatment
- Nonsurgical intervention with combination of splinting/casting/steroid injections helpful
- Surgical intervention available
  - Usually necessary in patients with separate subsheath of EPB of multiple APL tendon slips

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March 25th & 26th, 2019

Hand & wrist treatment

Andrew L. Terrono, MD- Chairperson

Andrew Stein, MD- Fall on outstretched hand

Hervey L. Kimball, MD- Pre-existing arthrosis, Causation

Taylor Horst, MD- deQuervain's tendinosis

Case Discussion

Panel additions

Manijeh Berenji, MD Occupational Medicine

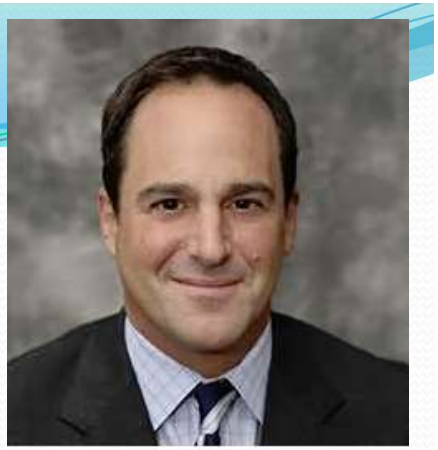
Ioana Conley- Attorney

11:05 – 12:00 p.m.	*Hand & Wrist Treatment (Chairperson: Andrew Terrono, MD)* 11:05-11:15: FOOSH: Fall On Outstretched Hand Injuries (Andy Stein, MD) 11:15-11:25: Pre-Existing Arthritis: How to Factor into Causation Analysis (Hervey Kimball, MD) 11:25-11:35: De Quervain's Injury (Taylor Horst, MD) 11:35-11:50: Case Discussion ***Panelists:*** *Andy Stein MD, Hervey Kimball MD, Taylor Horst MD, Manijeh Berenji MD, Attny Ioana Conley* 11:50-12:00: Q & A

Andrew Stein, MD

- Assistant Professor at Boston University School of Medicine
- He has extensive experience in all aspects of hand surgery, including reconstructive surgery and trauma
- Speaking today on- **Fall on outstretched hand**

Hervey Kimball, MD



- Hand and upper extremity surgeon at New England Baptist Hospital
- Boston Sports and Shoulder Center in 2018.
- Attending staff for the Tufts - NEBH combined Hand Surgery Fellowship
- Speaking today on- **Pre-existing arthrosis, Causation**

Taylor Horst, MD

- An Orthopaedic surgeon currently practicing out of Excel Orthopaedic Specialists in Woburn
- Fellowship trained in and specializes in hand and upper extremity surgery
- Speaking today on- **De Quervain's tenosynovitis**

Case Discussion- Panel

- In addition to our presenters
- Dr. Mani Berenji
- Attorney Ioana Conley
- Present case and panelists respond at decision points

Mani Berenji, MD

- Board-certified Occupational Medicine Physician in the Department of Orthopaedic Surgery at Boston Medical Center
- Focuses on optimizing patient care for injured workers

Ioana Conley, JD

- Associate at Brooks Law Firm
- Workers' compensation, personal injury and immigration cases
- Cum laude from New England Law | Boston, and
  - member of the prestigious New England Law Review
    - Associate and as Technical Editor

Case Discussion

- For discussion, educational, not exhaustive
- 55 yo woman
- Presents to Occupational medicine
- c/o radial wrist pain
- Tender

Case

- History
- Physical exam
- ? Imaging
- Work Status
- Insurance

Case- History

- Age?
- Job
  - Office worker? Assembler? Occ Health nurse?
- Injury
  - yes/no
- Prior symptoms, treatment
  - Yes/no
- Numbness tingling- document often comes up later

Case- Exam

- What is important?
- Similar presentations
  - Thumb Arthritis
  - Wrist arthritis
  - Sensory radial nerve problem

Case- Imaging

- X-ray
  - When?
    - First visit?
    - If no response?
    - If h/o injury?
- MRI
  - When?


R

Causation

Causation- de Quervain's disease

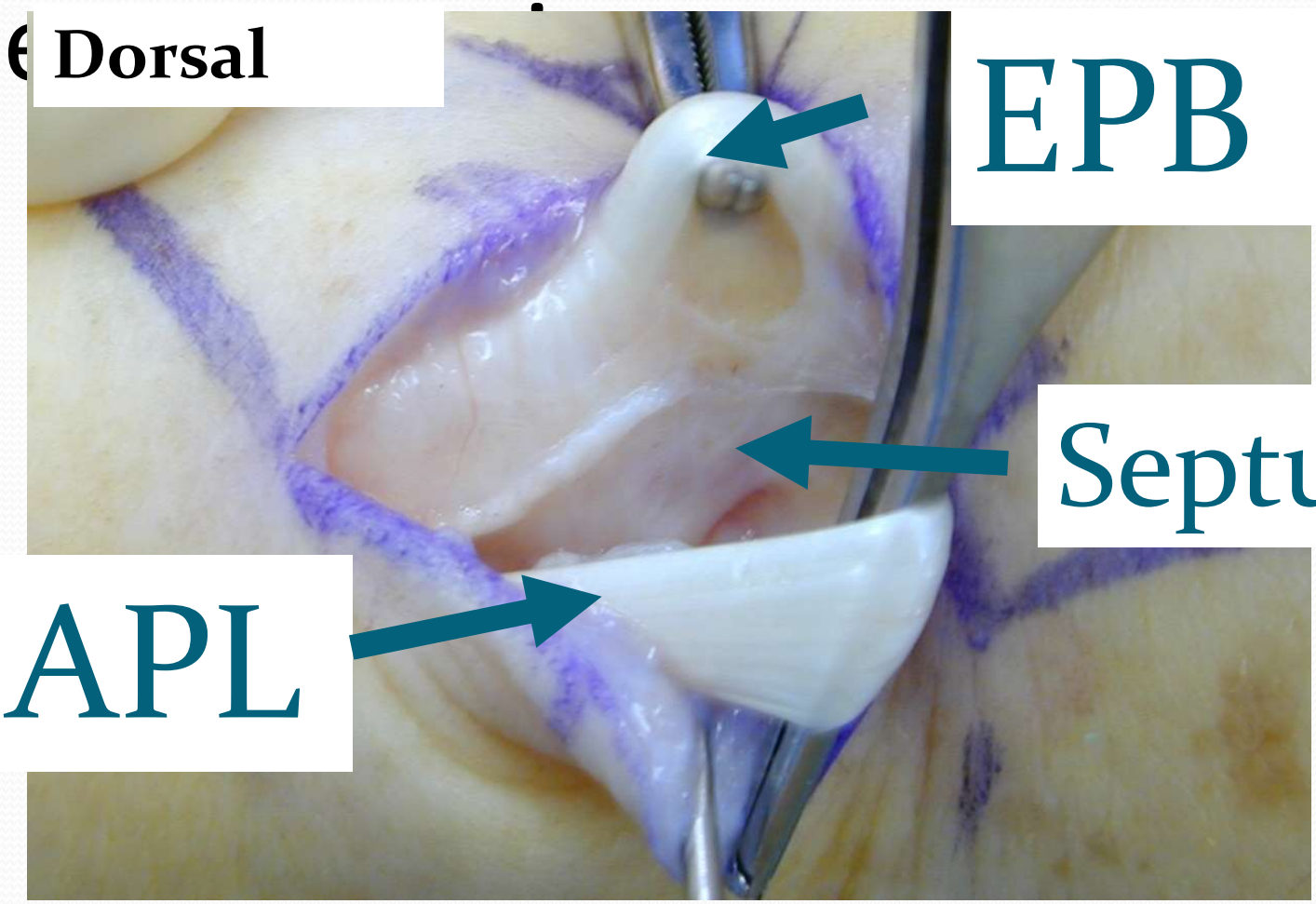
- AMA guide on Causation 2014
- Strong, some, low << 50%, insufficient evidence
- Occupational risk factor
  - None are strong
  - Best is some evidence
- Strong evidence
  - Age
  - Gender

Return to Work

- How to determine
  - Preop
  - Postop
- When
- Modified
  - What if patient states there is none
  - What if none
- Full
- I can’t do it Doc!!

deQuervains
Surgical Treatment

- De



3 mo Post op

- Not tender first compartment
- Having pain more distal


R


R

- When does it stop?
- Work status
- CMC arthritis work related
  - Hasn't been working
  - Had x-ray that showed arthritis initially

Questions ..