Hand and Wrist Tendinopathies

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Hand & Wrist Tendinopathy

- Etiology – idiopathic, not inflammatory
- Onset – spontaneous, not post-traumatic
- Pathophysiology – degenerative changes related to mechanical forces
- Terminology – tendinosis or epicondylosis, not tenosynovitis or epicondyritis

Tendinosis

- Defined as non-inflammatory intratendinous collagen degeneration
- Angiofibroblastic hyperplasia – hypertrophic fibroblasts, vascular hyperplasia, disorganized collagen
- Areas of focal necrosis, calcification
- No acute inflammatory cells

Semantics?

- “Tendinosis” implies an intrinsic degenerative condition, determines therapeutic goals, sets reasonable outcome expectations
- “Tendinitis” implies an inflammatory condition, is misleading, allows misguided treatment & unreasonable expectations

Corticosteroid Injections

- Mainstay of nonsurgical rx (deQ, trigger digit)
- Mechanism of action is unknown since these are not inflammatory conditions
- In most studies, injection follow-up is short
- Are we just delaying inevitable surgery?
- How many injections? Data suggest two injections, then surgery most cost effective

de Quervain Disorder

- Fritz de Quervain, Swiss surgeon, 1895
- Stenosing tendinosis, 1st dorsal compartment
- Attritional, degenerative tendon changes and retinacular thickening
- Finkelstein, physical exam maneuver, 1930
- Affects women 6 times more often than men
- Middle age, dominant side, repetitive lifting

de Quervain Tendinosis is Clinical Diagnosis

- Radial-sided wrist pain, localized swelling
- Aggravated – thumb abd, wrist ulnar deviation
- Tenderness – radial styloid, 1st compartment
- Provocative tests – Finkelstein, Eichhoff
- Thumb pseudo-triggering, retinacular cyst
- Distinguish from basal thumb arthrosis
9 Provocative Tests
- Finkelstein
- Eichhoff
- WHAT – Wrist Hyperflexion and Abduction Thumb
- Staged Finkelstein

10 Anatomic Considerations
- APL and EPB in 1st dorsal compartment
- APL is radial-volar and has multiple slips (2–7)
- EPB is dorsoulnar and usually one small slip
- Vertical septum often separates APL & EPB
- Subcompartment occurs in 20–40% cadavers, in 70–90% patients requiring surgical release

11 Anatomy 1st Dorsal Compartment
- Vertical septum
- Proximity SRN
- Proximity radial a.
- Variable slips
- Variable insertions

12 de Quervain Treatment
- NSAIDs and splinting are palliative
- Injection effective only if in tendon sheath, in EPB subcompartment if vertical septum
- 1st DC release if wrist pain persists
- Sufficient to decompress only EPB in septated compartments (Yuasa, JHS, 1998)

13 Surgical Complications of 1st Dorsal Compartment Release
- Radial sensory nerve injury
- Incomplete decompression
- Volar subluxation of APL, EPB
- Painful hypertrophic scar
- Complex regional pain syndrome
- Persistent pain, incorrect diagnosis

14 Intersection Syndrome
- APL, EPB muscle bellies cross ECRL, ECRB
- “Cross-over tendinitis” or “APL bursitis”
- “Intersection syndrome” coined by Dobyns
- Tendinosis of 2nd dorsal compartment
- Repetitive wrist motion (rowing, weight-lifting)
- Majority improve with 2nd DC injection
- Injection failures require 2nd DC release

15 Stenosing EPL Tendinosis
- Occurs rarely – few case reports
- Mismatch in size – EPL, 3rd compartment
- Wrist pain with active thumb extension
- “Snapping” or “triggering” with thumb motion
- Tenderness, swelling near Lister’s tubercle
- Inject 3rd dorsal compartment with caution

16 EPL Release / Transposition
• Low threshold for surgery
• EPL at risk for ischemic rupture
• Seen more often in distal radius fx
• May need EIP to EPL transfer

17 Digital Extensor Tendinosis
• Extremely rare – few case reports
• Dorsal snapping with digital motion
• Extensor impingement on the retinaculum, leading or trailing edge
• Nodular tendinosis, anomalous tendon slips or compartment septae
• Surgical treatment directed at pathology

18 Extensor Tendinopathy in Rheumatoid Arthritis
• Painless swelling dorsal wrist, DRUJ
• Pain on resisted digital extension
• Mannerfelt lesion (EPL rupture on dorsal spur)
• Caput ulnae syndrome (prominent distal ulna)
• Loss of digital extension (extensor ulnar subluxation or Vaughan–Jackson lesion)
• Involves tendons of the 3rd, 4th, 5th DCs

19 Surgical Options for Extensor Tendinopathy at Wrist
• Extensor tenosynovectomy
• Darrach resection +/- stabilization
• Extensor realignment
• Extensor tenodesis
• Tendon transfer (EIP donor)
• Tendon segmental graft

20 Extensor Tendon Ruptures – Prodrome Snapping Tendons
• Distal radius fracture (EPL)
• Caput ulnae syndrome (EDC, EDQ)
• Scaphoid osteophyte (ECRB)
• Prominent CMC boss (Index EDC, EIP)

21 ECU Tendinopathy
• 2nd most common site of dorsal tendinopathy
• Uncommon cause of ulnar–sided wrist pain
• Spectrum of pathology – tendinosis, subluxation, tear (partial, complete)

22 ECU Tendinosis
• Majority from direct blow or twisting injury, some from repetitive motion or overuse
• Pain and swelling along ECU tendon sheath
• Exam shows tenderness, bogginess along ECU
• Pain reproduced on resisted wrist DF and UD
• Injection is effective first line treatment
• Release of 6th compartment if injection fails

23 ECU Synergy Test
• For ECU tendinosis
• ECU contracts on resisted thumb abduction with wrist in neutral, forearm supinated
• Distinguishes from intra-articular process

24 ECU Subluxation
• Anatomy – ECU subsheath, distal ulnar groove
Injury mechanism – wrist supination, VF and UD
Racket or stick sports – baseball, golf, tennis
Patient c/o painful tendon snapping w/motion
ECU subluxes ulnar and volar to groove with supination, reduces with pronation
Diagnosis is made on clinical grounds

25 Treatment of ECU Subluxation
- Acute – immobilize in pronation, dorsiflexion, RD
- Chronic – stabilize ECU with retinacular flap
- Chronic – stabilize ECU subsheath to linea jugata (ulnar border of groove)

26 Sagittal Band Ruture
- SBs centralize EDC over the metacarpal head
- SBs function to extend the proximal phalanx
- Attenuation or rupture of SBs may occur
- Most often radial SB, traumatic, middle finger
- Cause may be trivial such as flicking finger
- Painful EDC snapping w/MCPJ flexion, weak extension, ulnar deviation of affected digit

27 Rayan-Murray Classification
- Type 1 – Mild – No EDC subluxation
- Type 2 – Moderate – EDC subluxation
- Type 3 – Severe – EDC dislocation

28 Non-Operative Treatment Acute SB Rupture
- Acute (within 2 weeks) flexion–block splint

29 Operative Treatment of Radial SB Rupture
- Release ulnar sagittal band
- Reef or repair radial SB
- Reconstruct with EDC slip +/- junctura around RCL

30 FCR Tendinosis
- Rare entity – 1994 Mayo report of ten cases
- Average age 44 yrs, symptomatic 16 months
- Causes – Strenuous work, scaphoid fx or cyst, TMCJ or STT or pantrapezial arthrosis
- Radial–sided wrist pain aggravated by VF & RD
- Diagnosis confirmed by lidocaine injection

31 FCR Anatomy
- Narrow fibro-osseous tunnel
- Inserts on index and middle metacarpal bases and trapezial crest
- Close proximity to carpal canal, superficial arch and PCB median nerve

32 Treatment of FCR Tendinosis
- Release of FCR sheath, debridement
- 4/10 patients had attritional FCR wear
- Results – 5/10 residual pain, 7/10 tenderness, one had + Tinel’s over PCB median nerve
- Risk–reward analysis is not favorable
- If FCU intact, then simple FCR tenotomy, since FCR is expendable (used as autograft)

33 Use Caution in Golfers
• FCR loads club head at start of back swing
• Provides balanced resistance during return to neutral at impact (Putnam)
• For golfers, release FCR sheath and excise trapezial ridge/tubercle
• Swing doctor may help more than surgery
• Operate only if diagnosis certain (Bowers)

34 Flexor Tendon Ruptures
• Rare – 50 reported cases over 50-year period
• Spontaneous snap, sudden sharp pain or cramp
• Most common in small finger (62%), FDP (82%)
• 92% ruptures occur in palm, lumbrical origin
• 90% in men with demanding occupations
• Dominant hand more often than non–dominant

35 Multifactorial Etiology
• Repetitive microtrauma (manual laborers)
• Vascular ischemia (lumbrical watershed zone)
• Adjacent local pathology (arthrosis, DRFx, hook of hamate nonunion, lunate dislocation)
• Tendinopathy (calcific or gouty infiltration, tendon anomalies)

36 Flexor Tendon Ruptures
• Dx – Clinical Exam
• Confirmation, preop planning – MRI or US
• Rx – Individualize per operative findings

37 Flexor Tendon Rupture After Volar Plating DRFx
• Incidence <1%, not related to specific system
• Involves rupture of FPL and/or index FDP
• Rupture occurs > 6 months postoperative
• Cause – plates placed distal to watershed line or that lose reduction from volar surface
• Tendon ischemia, attritional wear & failure

38 Volar Distal Radius Plating Recommendations
• Plates > +2 mm from VCL or within 3 mm volar rim increase chance of rupture
• Remove prominent plates after 6 months, especially if symptomatic

39 Flexor Reconstruction Surgical Options
• Index & middle FDP tenodesis
• FPL rupture: (1) FPL advancement & repair, (2) Segmental tendon autograft, (3) Ring FDS transfer to FPL, (4) Thumb IPJ arthrodesis

40 Linburg–Comstock Syndrome
• Young patients with vague forearm pain
• Anomalous FPL tendinous slip to index FDP
• Present in 31% extremities, 14% bilateral
• Onset – spontaneous, trauma, repetitive use
• Provocative test – Restricting index DIPJ flexion during thumb IPJ flexion
• Resection of anomalous FPL slip is curative

41 FCU Tendinosis
• Rare clinical entity
• Series 6 cases (Budoff, 2005)
• Middle-aged men
• Localized tenderness
• Positive injection test
• Intratendinous debridement
• All patients improved

42 Calcific Peritendinitis
• Any tendon, but often FCU
• Acute pain, swelling
• Rapid onset, like infection
• Calcium deposition near the tendon, not intratendinous
• Rx with immobilization, NSAIDs, injection

43 Trigger Digit – Stenosing Tenosynovitis
• Described by Notta 1850
• Released by Schonborn 1889
• Peak incidence – middle age (40–60 yrs)
• Up to 6X more frequent in women
• Prevalence – 3% general population
• Ring finger, then thumb most common
• Often multiple digits, bilateral

44 Pathophysiology
• Stenosis of digital tendon sheath at A1 pulley
• Repetitive friction causes tendon nodule formation proximal to A1 pulley
• Fibrocartilagenous metaplasia of inner gliding layer, hypertrophies 2–3X normal thickness
• Fraying and degenerative tendon changes
• No acute inflammatory cell present

45 Diagnosis
• Intermittent clicking particularly in morning
• Progresses to locking, difficulty with flexion
• Pain at MCPJ or mistakenly referred to PIPJ
• Associated w/RA, DM, CTS, deQ, Dupuytren’s
• Tenderness A1 pulley, palpable Notta’s node, demonstrable triggering, flexion contracture
• Discrete node or diffuse fullness of sheath

46 Quinnell’s Classification
• Grade 0 – Mild crepitus in non-triggering digit
• Grade 1 – Uneven digital motion
• Grade 2 – Clicking without locking
• Grade 3 – Intermittent locking, correctable (actively or passively)
• Grade 4 – Locked digit, flexion contracture

47 Flexor Tendon Sheath Injection
• Primary treatment
• Lidocaine w/betamethasone
• Palmar vs mid-axial
• Intra-sheath vs extra-sheath
• No intratendinous injection
• Avoid multiple injections
• Caution in diabetics
48 | Corticosteroid Injection in Diabetic Patients with Trigger Finger  
Baumgarten et al., JBJS 2007; 89A: 2604–11  
- Prospective, randomized, controlled, blinded  
- 30 diabetic patients, 29 non-diabetic patients  
- In diabetics, injection did not relieve symptoms or decrease surgery rate vs placebo  
- Diabetics w/systemic pathology needed surgery  
- Therapeutic Level I study  

49 | Trigger Finger: Prognostic Indicators of Recurrence After Injection  
Rozental et al., JBJS 2008; 90A: 1665–72  
- 124 trigger digits injected w/triamcinolone  
- 56% recurrence rate one year post-injection  
- Young age, IDDM, multiple digits, other tendinopathies – predictive of recurrence  
- Duration, severity symptoms – not predictive  
- Prognostic Level I study  

50 | Confirm Triggering Resolved  
If not, then consider other causes for triggering, such as  
- A0 pulley  
- Thick palmar fascia (Dupuytren’s)  
- Adhesive tenosynovitis  
- Flexor tendon nodule  
- Rheumatoid tenosynovitis (preserve A1)  
- Check Camper’s chiasm  

51 | Flexion Contracture  
- Quinnell Grade 4 lesion  
- Attritional wear FDS  
- Sheath stenosis A1 & A2  
- Resect ulnar slip FDS  
- Remove at A3 window  

52 | Percutaneous A1 Pulley Release by Needle Technique  
- Office procedure  
- 18-gauge needle  
- Imprecise technique  
- Incomplete A1 release (in 19 of 25 cases)  
- FDS scoring, injury  
- Not for thumb, index  

53 | Prospective Randomized Trial of Open vs Percutaneous Surgery for Trigger Digits  
Gilberts et al., JHS 2001; 26A: 497–500  
- Prospective study 96 patients, 100 trigger digits  
- 98% success rate for open, 100% percutaneous  
- One in open group had scar requiring revision  
- OR time 11 min open, 7 min percutaneous  
- Therapeutic Level I study  

54 | Surgical Complications of Trigger Digit Release  
- Persistent triggering (incomplete release)  
- Recurrent triggering (adhesions, scar)
• Digital nerve injury (traction, severance)
• Digital stiffness, PIPJ contracture
• Flexor bowstringing (partial A2 release)
• Infection (wound dehiscence, fistula) may occur as late as 3 weeks postoperative

55  Adverse Events of Open A1 Pulley Release for Trigger Finger
Bruijnzeel et al., JHS 2010; 37A: 1650–56
• Retrospective review 1598 releases
• 5% incidence of complications (suture abscess, wound dehiscence, triggering)
• DM – wound problems, stiffness, recurrence
• 1% (14 patients) required revision surgery
• Therapeutic Level IV study

56  Every Case is a Real Case
• Obtain informed consent
• Discuss potential complications
• Always sign your site
• Time-out before you start
• Approach every case with requisite care