Overuse Injuries of the Upper Extremity
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Overuse Injuries
- Everything?
- Not - Trauma, infection, tumor, rheumatoid arthritis, osteoarthritis
- Onset of pain associated with repetitive tasks

Pediatric Overuse Sports Injuries
- Organized sports >40 million age 5-18
  - Skeletal immature
  - Year round training
  - Poor technique
  - High intensity overuse
Peds Sports

- Proximal humeral apophysitis (little league shoulder)
- Lateral epicondylar apophysitis (little league elbow)
- Ulnar collateral ligament injury (Tommy John)
- Osteochondral defect (OCD capitellum)

Compressive Neuropathies

- Carpal tunnel syndrome
- Cubital tunnel syndrome
- Pronator syndrome
- Radial tunnel syndrome

Tendonitis

- Pain and swelling
- Histology: collagen degeneration, Absence of inflammatory cells, vascular ingrowth
- Mechanical strain: microruptures
- Failed repair and accumulation of damaged tissue
Tendonitis About the Wrist

- DeQuervain's
- Intersection Syndrome
- ECU tendonitis
- FCU tendonitis
- FCR tendonitis

DeQuervains

- Stenosing tenosynovitis of the first dorsal compartment (APL, EPB)
- Pain and swelling over the radial styloid
- Degenerative changes: myxoid degeneration, fibrocartilage metaplasia, mucopolysaccharide deposition
Finkelstein Test

DeQuervain Treatment

- Splinting
- Injection
- Surgical release
Injection

- Celestone (water soluble)
- 60-100% effective
- Beware of fat atrophy and depigmentation

Complications

- Injury to radial sensory nerve
- Tendon instability
Intersection Syndrome

• Pain over the area where the EPL/APB tendons cross over the ECRL/ECRB

Intersection Syndrome

• Audible and palpable crepitation over the second dorsal compartment
• Rowers and gymnasts
• Can coexist with DeQuervains
Intersection

- Rest
- Splint
- Injection
- Surgical release

Trigger Finger

- Stenosing Tenovaginitis
  - Entrapment of the tendon in its fibrous sheath
  - Thickening of the entrance of the flexor tendon sheath
  - Accumulation of fibrocartilage
  - Swelling and degeneration of the tendon

- Women:men 6:1
- Lifetime risk 3%
- DM: 10-20%
- Gout, renal disease, hypothyroidism, RA
Symptoms

- Pain
- Clicking
- Locking
- Limited grip
- High incidence of coexisting CTS

Treatment

- Splinting
- Injection
- Surgical release

Injection

- Sato 2012, Baumgarten 2007
  - Cure rate 1-2 injections  57-97%
  - Relapse 12%  1 injection
    18%  2 injections
- Lambert 1992, Murphy 1995
  - 60-64% improvement with one injection
  - 20% placebo
Injection

Location

- Locate the steroid in sq, sheath or mixed
- No difference in efficacy
- Less painful in sq
- Risks: fat atrophy, pulley rupture, tendon rupture, elevated glucose

Epicondyles:
Muscle Anchors for FA, Wrist, Finger Motions

- Lateral Epicondyle: (extension, supination)
  - ECRB, EDC, EDQ
  - ECU, anconeus
- Medial Epicondyle: (flexion, pronation)
  - pronator teres, FCR
  - PL, FDS, FCU
lateral epicondyle much smaller than medial epicondyle

Medial Epicondyle: origin to five muscles

- PT
- FDS
- FCR
- PL
- FCU
derepintermediate superficial

muscles from medial epicondyle

- Pronator teres
- FCR
- PL
- FDS
- Flexor carpi ulnaris
Lateral Epicondyle origin to 5 muscles
- ECRB
- EDC
- EDQ
- ECU
- Anconeus

Muscles from lateral epicondyle
- Anconeus
- ECU
- EDQ
- ECRB
- EDC

Cross-Sectional Anatomy
7/23/2018

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Summary of Cross-Sectional Views

- Dense fibrous common extensor origin
- Blends with joint capsule and annular ligament
- No comparable fibrous origin medially

Tennis Elbow: Demographics

- Age 30 - 50
- Lateral:medial ~20:1
- Onset following forceful, repetitive activity
- Often not tennis
  - Carrying luggage, laptop computers, shopping bags
  - Machinists, film editors: cranking motion
- Ache in area of lateral epicondyle
  - Often poorly localized
  - Increased with resisted pronation, wrist extension
Pain centered at lateral epicondyle: tennis elbow

Pain distal to lateral epicondyle: radial tunnel syndrome

Stress tests for radial tunnel syndrome: not very specific.
Tennis Elbow: Etiology

- Mechanical overload → micro tears → mucinoid degeneration → partial tendon failure
- Tissue shows characteristics of degeneration
- Not inflammation, therefore not “-itis”
- “Tendinosis” or “Tendinopathy” preferred but meaningless

Normal tendon (light microscopy x100)
uniform parallel collagen bundles,
occasional tenocyte, no blood vessels
**Biopsy (light microscopy x100): tennis elbow**

“Angiofibrous Dysplasia”

- Normal tendon
- Randomly oriented fibroblasts
- Loose, disorganized collagen

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**Tennis Elbow Treatment: I**

- Avoid inciting activity
- Tennis elbow strap
- Heat, gentle stretching
- +/- NSAID

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**Tennis Elbow Treatment: II**

- Cortisone
  - injection
  - ionto/phonophoresis
- Wrist extension splint
- Ilfeld brace
- Blood/PRP injection
- Ultrasonic ablation
- Shock treatment +/-
Shock Treatment
- double-blinded, control group, 272 patients
- no difference between treatment/control groups

Extracorporeal Shock Wave Therapy without Local Anesthesia for Chronic Lateral Epicondylitis
- double-blinded, placebo control, 114 patients
- shocked patients did better
- blinding likely incomplete
Tennis Elbow Treatment: III: Surgery

- for the resistant 1%
- after 6-12 m non-op treatment
- multiple procedures described
  - Detachment
  - Reattachment
  - Cut ECRB
- all have in common
  - local denervation
  - acute injury
  - 4-8 month recovery
Tennis Elbow: Summary

- Stems from forceful repetitive elbow motion
- Middle age deterioration
- Degeneration of dense fibrous common extensor origin
- Avoid inciting activity, splint, rest
- Generally resolves after 6-12 months

Medial Epicondylopathy: Golf Elbow

- Much less common than lateral epicondylitis
- Avoid inciting activity
- Tennis elbow strap +/-
- Cortisone +/-
- Surgical release
- Ulnar nerve nearby