EXTENSOR CARPI ULNARIS TENDINOPATHY

Amanda Cooper
OVERVIEW

- Anatomy
- Biomechanics
- Injury Pathology
- Assessment
- Treatment
Anatomy

- **Origin:**
  - Middle third of the posterior border of ulna
  - Lateral epicondyle of humerus

- **Insertion:**
  - Dorso-ulnar aspect of the base of the 5\textsuperscript{th} metacarpal

- **Innervation:**
  - Posterior interosseous nerve (C7 & C8), the continuation of deep branch of radial nerve

- **Main Action:**
  - Wrist extension and ulnar deviation. It also assists to provide stability at the wrist.
Anatomy

- Fibro-osseous tunnel
  - Distal ulna - ulnar groove
  - 1.5 to 2cm length band of connective tissue (ECU subsheath)
- Stabilises the tendon at the level of the distal ulna
- ECU subsheath lies deep to the extensor retinaculum
- The overlying extensor retinaculum courses over the ECU and distal ulna to attach to the pisiform and triquetrum. Does not play a role in stabilising the ECU tendon.
- Linea jugata provides dynamic stability
Anatomy

• Linea Jugata
Anatomy

- Linea Jugata
Anatomical Variations

- Shallow osseous groove

- Anomalous tendinous slips (EDM)
Biomechanics

- **Pronation**
  - Straight course
  - Minimal force on subsheath

- **Supination**
  - ECU radially translates forming ulnar directed obtuse angle
  - This angle is further increased with wrist flexion and ulnar deviation
  - Maximal force on subsheath
Injury Pathology

1. ECU Subluxation

2. ECU Tenosynovitis

3. ECU Rupture
Differential Diagnosis

- Associated Injuries / Differential Diagnosis
  - TFCC injury
  - Lunotriquetral instability
  - DRUJ injury
  - Ulnar styloid non-union
ECU Subluxation

• Requires an injury to the ECU subsheath

• ECU tendon is no longer maintained within its fibro-osseous groove

• Usually occurs as a result of acute injury
  – Forceful supination, flexion and ulnar deviation
    • Tennis, golf, weight lifting, rodeo
    • Cricket, forceful twisting of a drill

• Can develop into a chronic injury if left untreated
ECU Subluxation

Injury is classified into three groups:

A. Stripping injury
B. Ulnar sided rupture of subsheath
C. Radial sided rupture of subsheath
ECU Subluxation

A. Stripping injury
- ECU subsheath is stripped at its ulnar attachment, forming a false pouch into which the ECU tendon can sublux (supination)

Normal subsheath preventing subluxation

Stripping of subsheath at ulnar attachment resulting in subluxation during supination
**ECU Subluxation**

**B. Ulnar sided rupture of subsheath**
- Likely most common pattern of injury
- Subluxes in supination with relocation of tendon upon pronation

**C. Radial sided rupture of subsheath**
- Tendon is more likely to relocate lying above the ruptured subsheath.
- Functional healing of the tendon is prevented
ECU Tenosynovitis & Tendinosis

• Insidious onset
• Chronic stress is placed upon the tendon resulting in inflammation of its synovial lining, causing tenosynovitis
  – Office workers, Boiler maker, Chicken Treat
• Over time, stress may also lead to tendon degeneration and altered collagen content, resulting in tendinosis with or without partial tears.
• Second most common site of wrist tendinopathy in athletes
  – Racquet sports, golf, rowing
• Frequent early finding in patients with RA
ECU Tenosynovitis & Tendinosis

- Yellow asterisk = Normal ECU tendon
- Red arrow = ECU subsheath
- Blue arrow = extensor retinaculum

T1 Weighted axial image

STIR axial image

- Blue arrow = fluid surrounding the ECU tendon
- Red asterisk = reactive marrow oedema
ECU Rupture

- Rare
- Characteristic cascade of events
  - Initial acute luxation event
  - Low grade persistent pain (often with accompanying tenosynovitis)
  - Local steroid injections (may have provided temporary relief)
  - Increasing pain limits wrist activity, and subsequent imaging reveals the tendon rupture
- Decreased grip strength
ECU Rupture

- Tendon is absent
- Red arrow = subsheath is thickened
- Red arrowhead = chronically torn from radial aspect
Assessment

• Location of pain &/or swelling
  – Dorso-ulnar wrist

• Onset of symptoms
  – Acute vs. gradual onset

• Mechanism of injury
  – Forceful supination, flexion, ulnar deviation
  – Repetitive ulnar deviation
Tendon stability
- Painful snapping or clicking sensation of the ECU tendon during provocative testing
  - Active supination
  - Passive supination
  - Active supination, flexion and ulnar deviation

MMT
- Resisted wrist extension and ulnar deviation
- ECU synergy test (*Ruland & Hogan 2008*)
ECU Synergy Test

1. Elbow flexed 90°; forearm in full supination; wrist neutral; fingers in full extension

2. Examiner grasps patients thumb and middle finger and palpates the ECU tendon with the other hand. The patient then abducts the thumb against resistance

3. Presence of both ECU and FCU muscle contraction is confirmed

4. Re-creation of pain along the dorsal ulnar aspect of the wrist is considered to be a positive test for ECU tendonitis
Imaging

- MRI (supination)
- Dynamic ultrasound (pronation & supination)
Conservative Management

• Rest
• NSAIDs
• Immobilisation (splinting or casting)
• Ergonomic assessment
• Activity modification
Conservative Management

- ECU Subluxation
  - Maintain forearm in pronation. Wrist in slight extension and radial deviation
  - 6-12 weeks
  - Mixed results in literature
Conservative Management

- ECU Tenosynovitis
  - Ulnar gutter to prevent ulnar deviation
  - Advise patient to avoid forearm rotation
  - 3-6 weeks
Activity Analysis & Modification

- **Activity Analysis**
  - Identification of tasks involving repetitive ulnar deviation
  - Ergonomic assessment

- **Activity Modification**
  - To enable the person to continue with activity
    - Use other hand
    - Alternative grip
    - Assistive devices or equipment
Ergonomic Equipment

• Avoid ulnar deviation
  – Whale mouse: designed to promote a relaxed hand position and neutral deviation at the wrist
  – Split keyboard: maintains neutral alignment
Medical Management

- Indications:
  - ECU tenosynovitis/tendinosis who remain symptomatic despite conservative treatment
  - Torn subsheath ends widely separated
  - Tendon lies outside the torn subsheath (radial sided tears)
  - ECU rupture
Medical Management

- Corticosteroid injection (with caution)
Medical Management

• Surgery
  – Direct repair
  – Subsheath reconstruction
    • Radially based extensor retinacular flap
    • Free retinacular graft
  – Sulcus deepening
  – Tenosynovectomy (+/- tendon debridement)
  – Tendon graft from palmaris longus for ECU ruptures

• Immobilisation in extension & pronation for 4 weeks post surgery
Conclusion

• Important to have an understanding of the different types of injuries that can occur as this will affect your treatment plan
  – ECU subluxation versus ECU tenosynovitis
  – Start by looking at the mechanism of injury
Conclusion

- ECU subluxation
  - Acute injury – forceful supination, flexion, ulnar deviation
  - Focus is on limiting supination
  - Sugar tong versus wrist gauntlet
  - Need for further study into the effectiveness of splinting for ECU subluxation
    - Does the location of the tear have an impact i.e. ulnar versus radial sided subsheath tears
    - Importance of the linea jugata
Conclusion

- ECU tenosynovitis
  - Gradual onset – repetitive ulnar deviation
  - Focus is limiting ulnar deviation
  - Importance of OT role in activity analysis and modification.
  - ECU synergy test
Thank you
References


