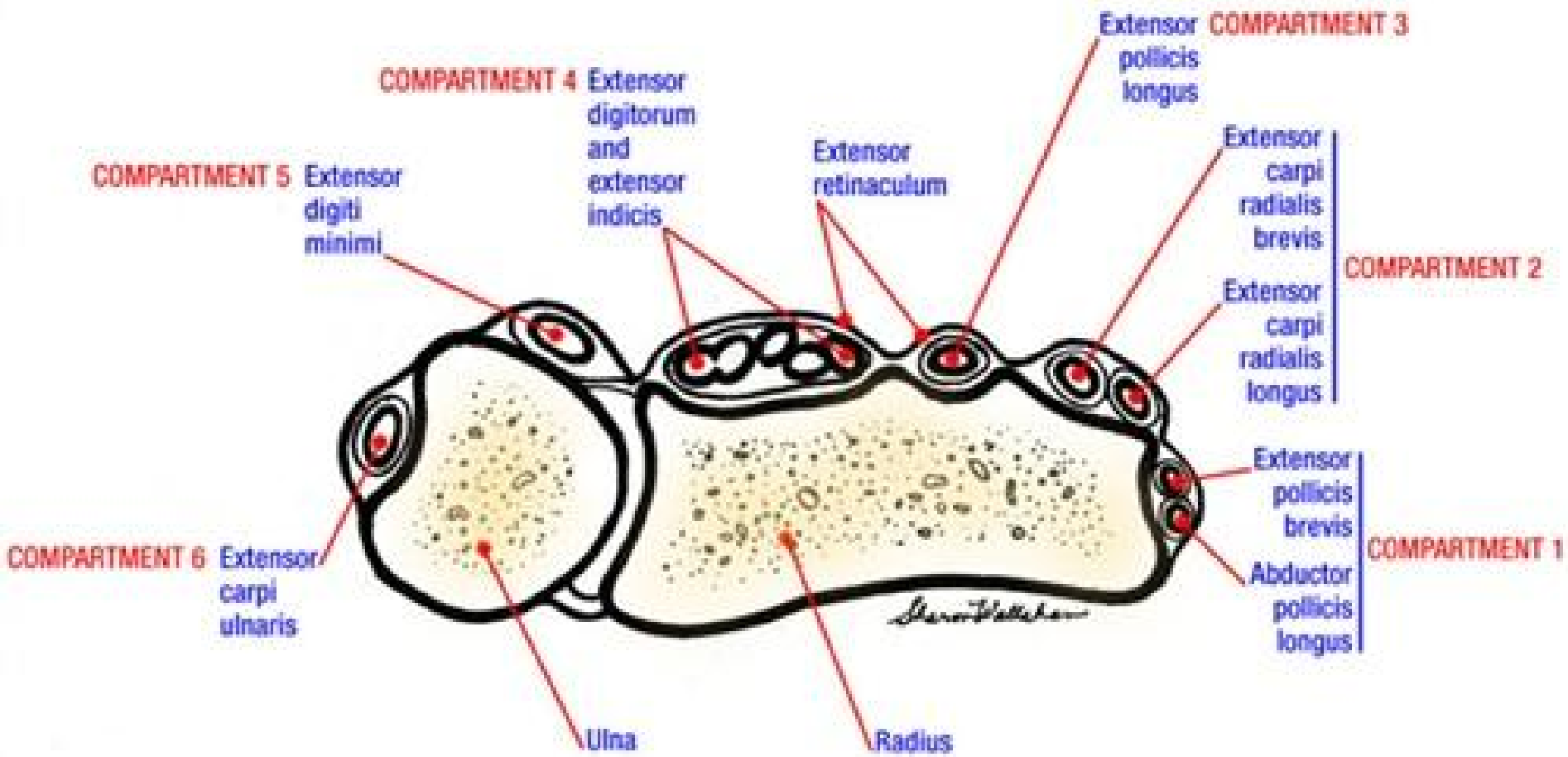
Extensor tendon imbalance

KOÇ
UNIVERSITY

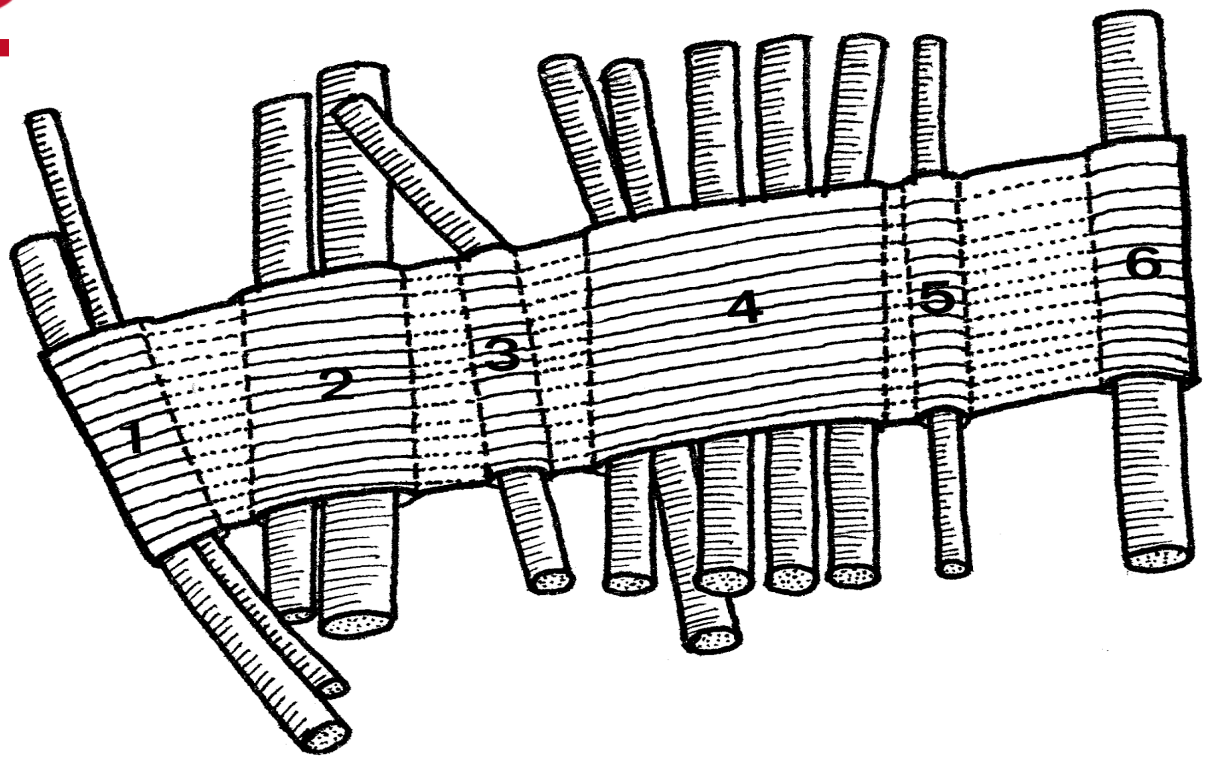
E Melikyan, FRCS
European Diploma of Hand Surgery
Associate Professor
KU School of Medicine

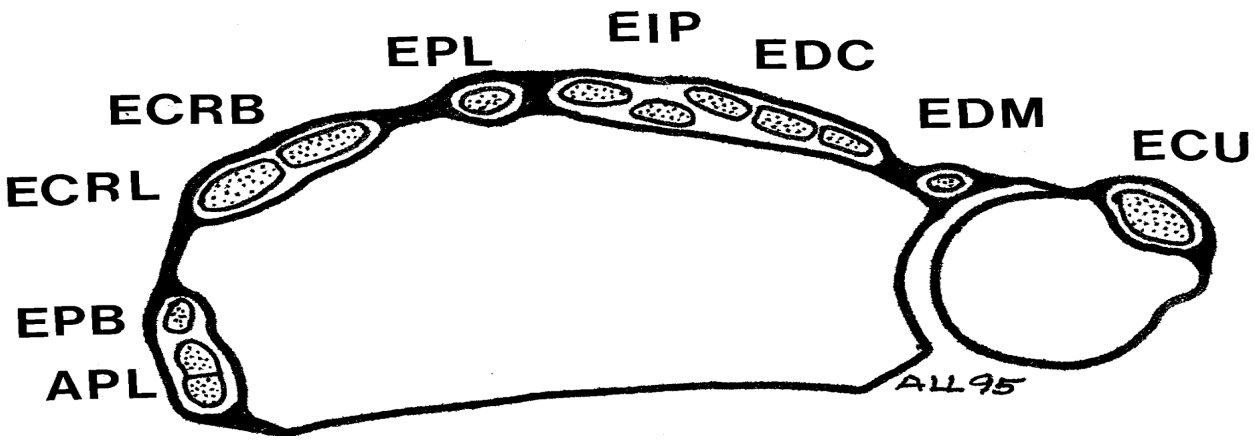
Extensor anatomy at the wrist and hand

Extensor anatomy at the wrist

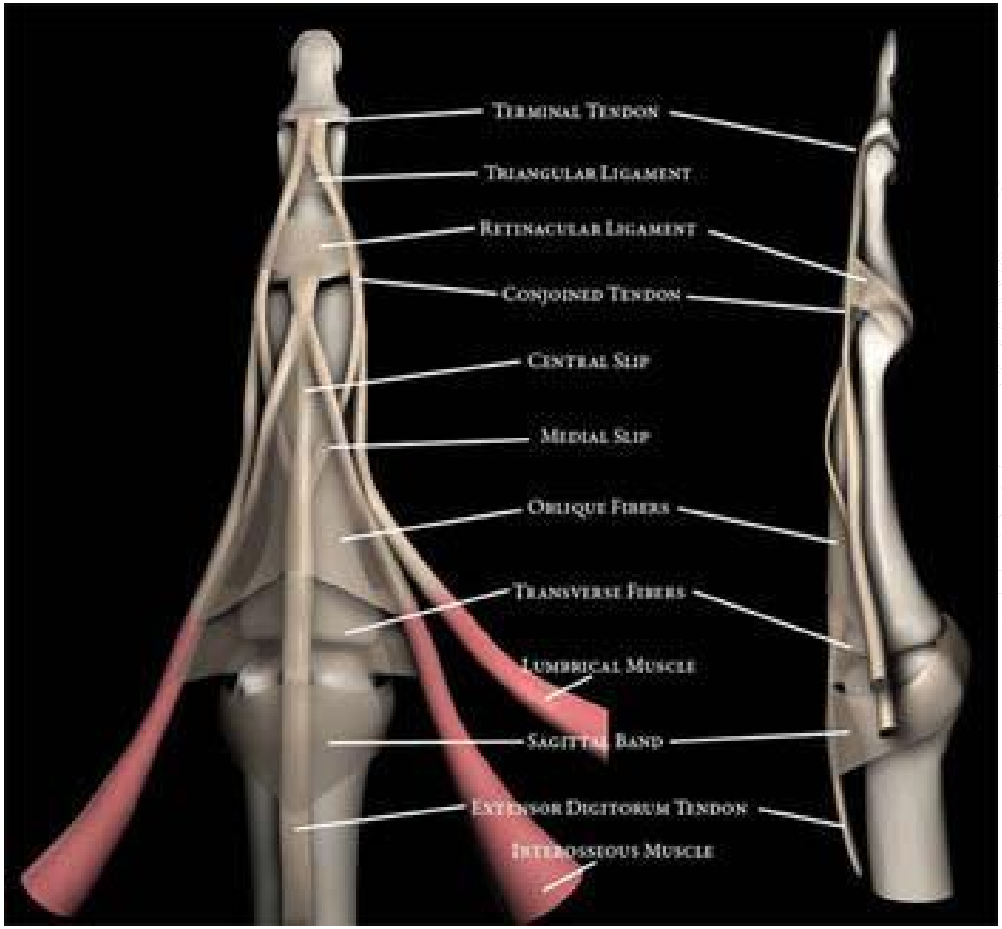


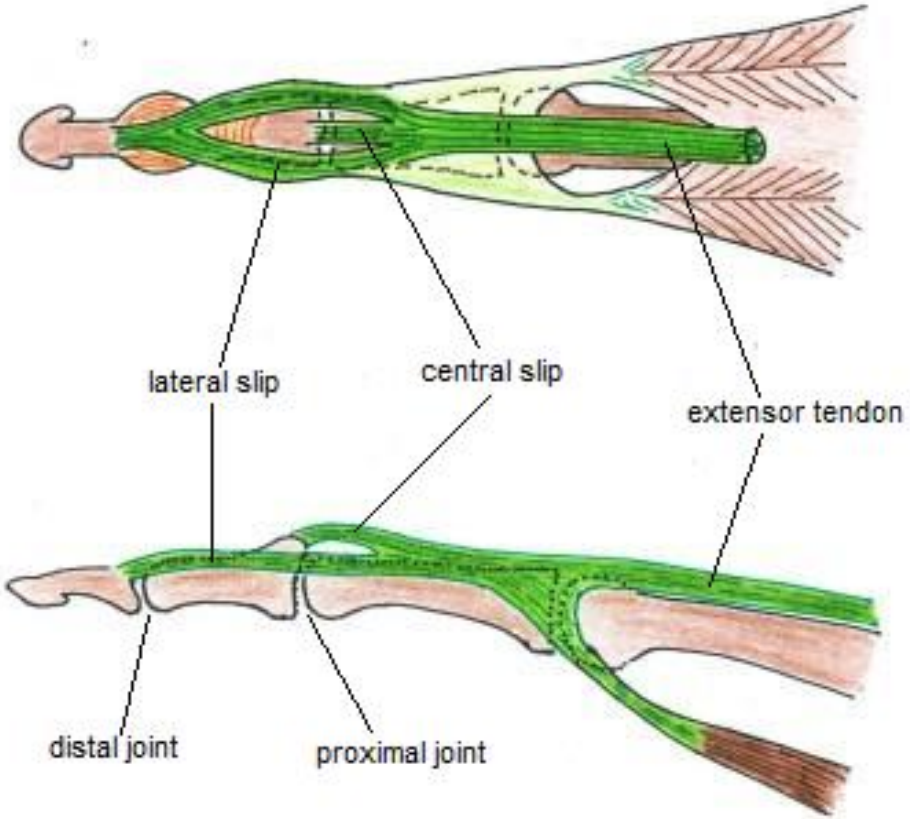
Extensor anatomy at the wrist



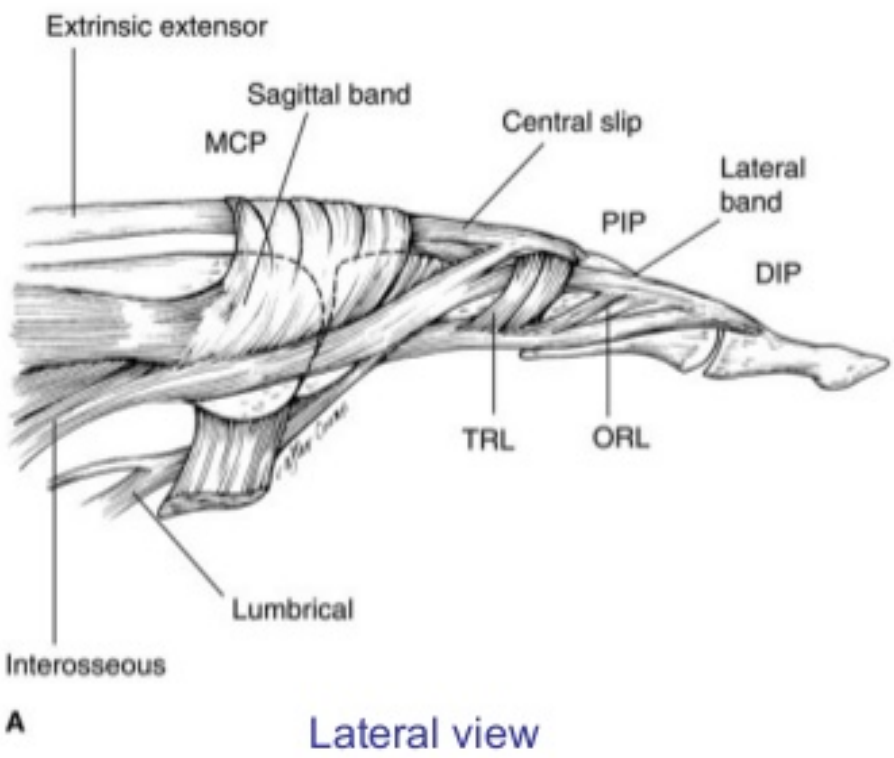


Extensor tendon anatomy in the finger

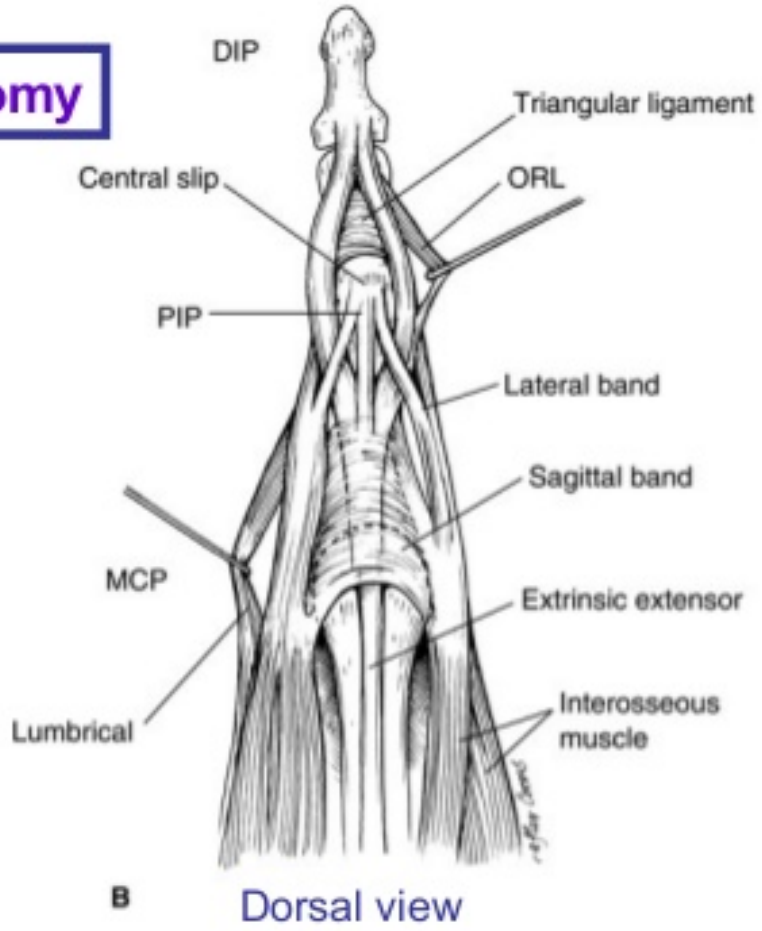




Finger extensor mechanism anatomy



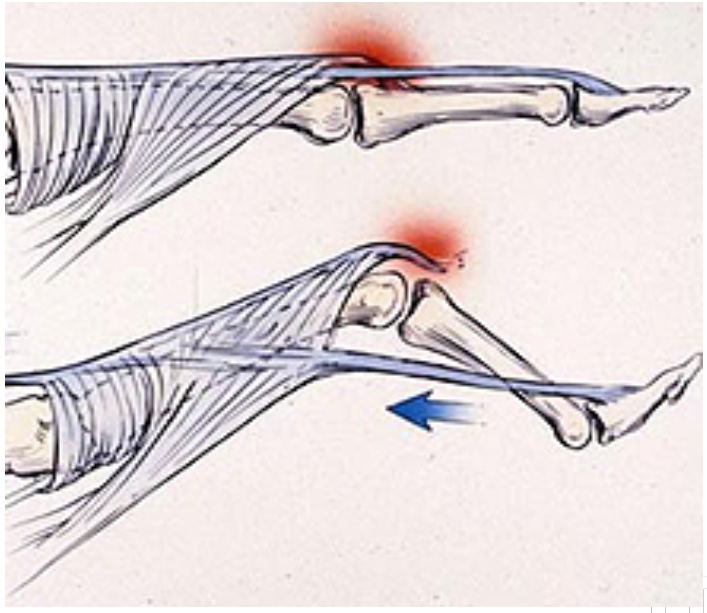
Lateral view

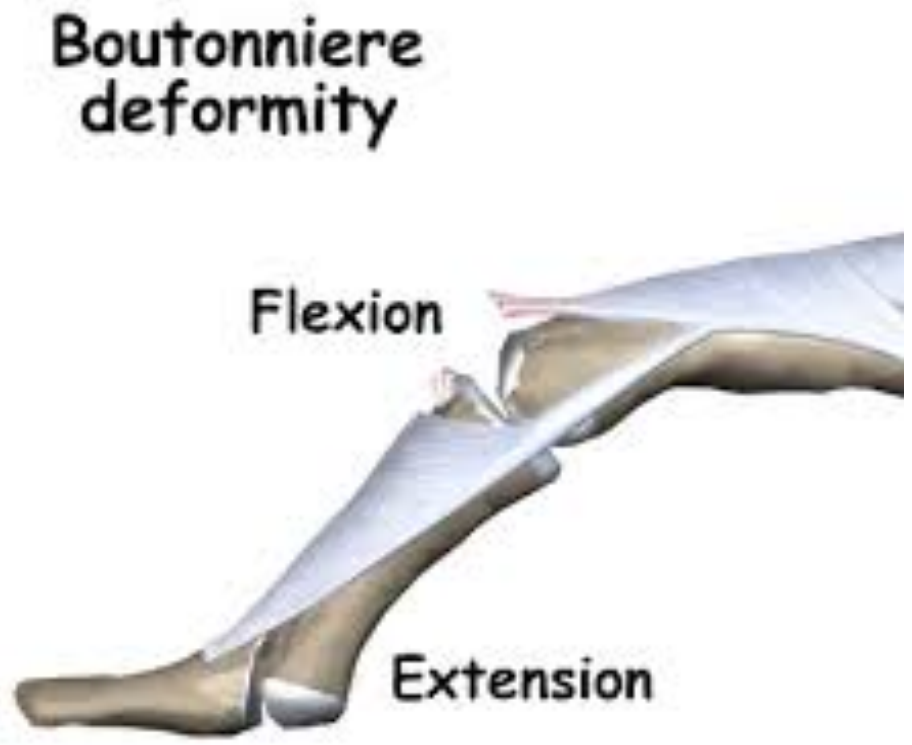


Dorsal view

DIP = distal interphalangeal joint
MCP = metacarpophalangeal joint
ORL = oblique retinacular ligament
PIP = proximal interphalangeal joint
TRL = transverse retinacular ligament.

Central slip injury





Boutonniere - Clinical diagnosis

- ELSON's Test

- Place the finger in 90 degrees of flexion at the PIP joint
- Ask patient to extend the PIP joint against resistance.
- The ability to extend against resistance is an indication of central slip continuity

Boutonniere deformity- Etiology

- Untreated Zone III injuries over the PIP joints
- Disruption of the central slip from the base of the middle phalanx
- If untreated these injuries can give rise to the characteristic boutonniere deformity
- PIP joint becomes flexed
- DIP joint becomes hyperextended as a result of volar migration of the lateral bands.

Causes of Boutonniere

- Laceration to central slip of the extensor
- Blunt injury to the dorsum of middle phalanx
- Arthritis

Boutonniere - Pathogenesis

- Tendon laceration or
- Closed avulsion of the tendon
- The injury may not be immediately evident
- It can present as late as 3 weeks after trauma

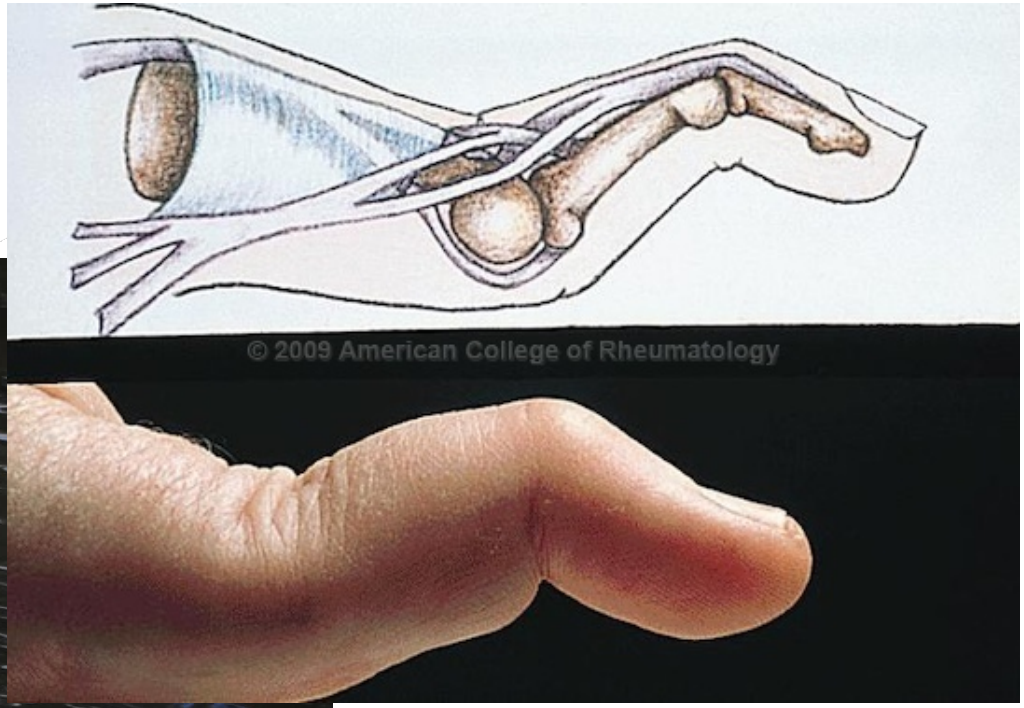
Boutonniere - Treatment

- Conservative for most
- Open reattachment for avulsion fragments
- SPLINTAGE
- For conservative closed treatment or after open repair
- First 3 weeks: Static splintage
- Subsequent 5 weeks: Dynamic extension splint (Capener's)
- Afterwards: Night splintage as required

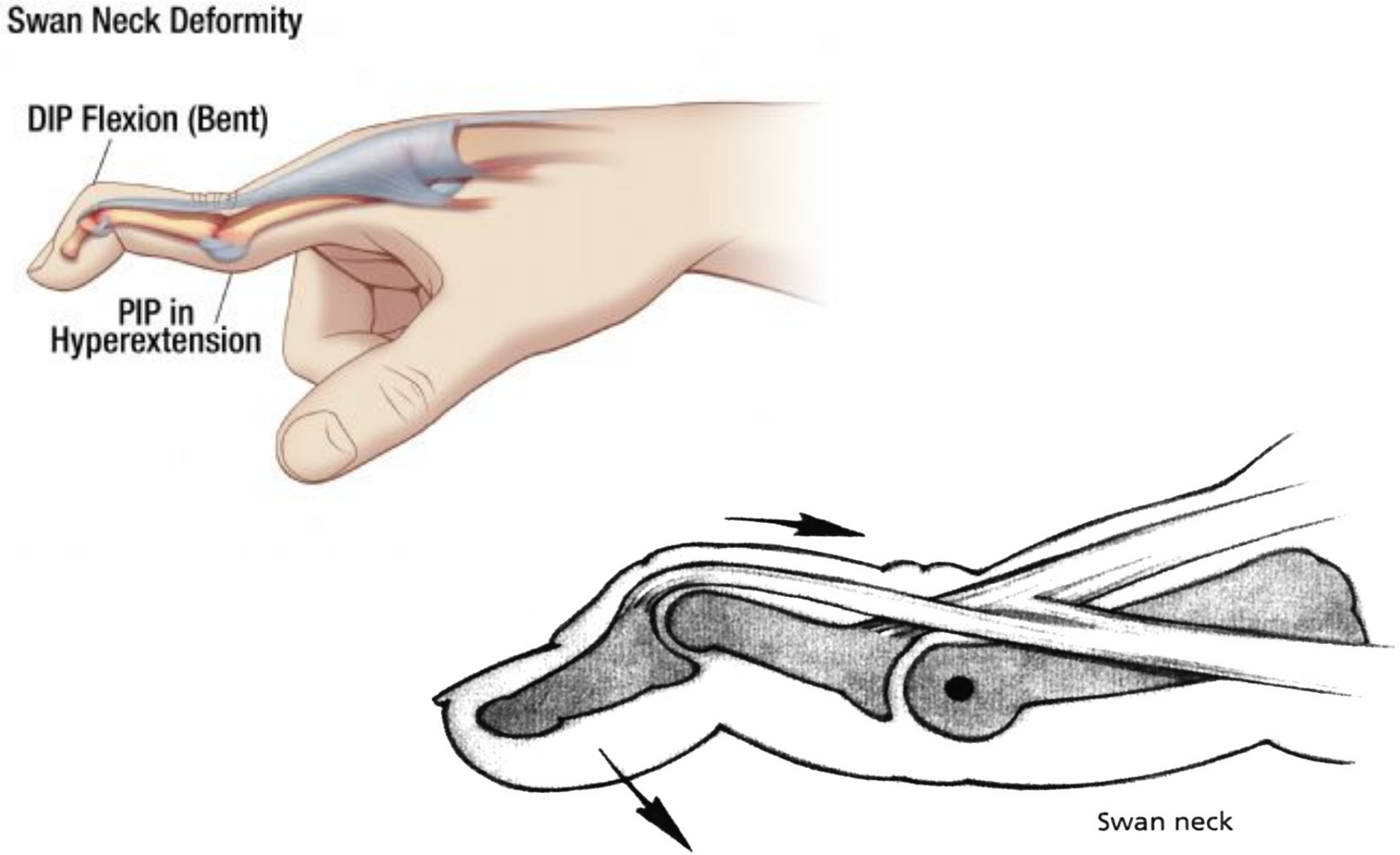
Boutonniere - Treatment options

- **Early**
  - Treat central slip injury properly (conservative or operative)
  - Keep arthritis under control (DMD's etc)
- **Chronic**
  - Fowler’s tenotomy (central slip division)

Swan neck deformity



Swan neck deformity



Rheumatoid swan-necking

Causes of swan necking

- Rheumatoid Arthritis
- Untreated mallet finger
- Joint laxity
- Chronic muscle spasticity
- Neuromyotonia

Development of swan necking

Deformities leading to swan neck may begin at any joint causing swan neck deformities in the remaining joints

MP Joint Pathology

- Intrinsic and extrinsic tendon tightness leading to MP joint subluxation
- Once the MPJ subluxation develops (MPJ flexion deformity), there will be secondary PIP hyperextension deformity as a result of altered balance

PIP Joint Pathology

- PIP Joint hyperextension from lax volar capsule secondary to synovitis
- Missing FDS action (loss of dynamic PIP Joint stabilization)

DIP Joint Pathology

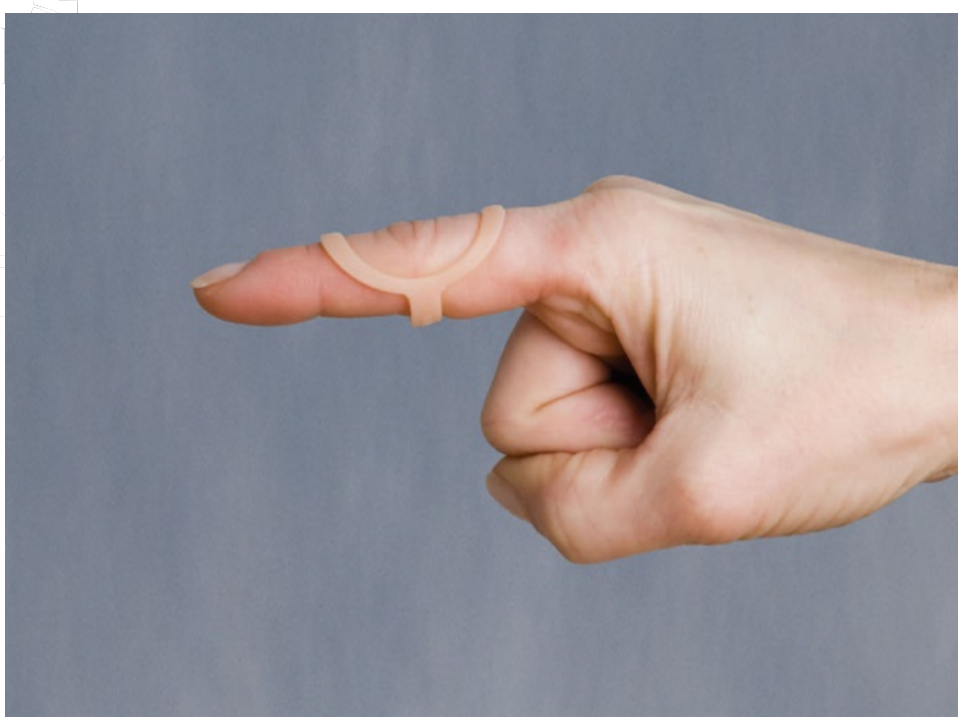
- **Mallet deformity (common cause)**

  as a result of the mallet deformity, there will be eventual PIP hyperextension deformity (the DIP will therefore show more advanced deformity than PIP)

- **Rheumatoid arthritis**

  stretching or disruption of the distal extensor mechanism, resulting in mallet deformity

Swan neck splints



Operative treatment (Swan neck)

FDS Sling (Urbaniak)

FDS transsected in the palm and brought over the A2 pulley and sutured back to itself. This acts as a check-rein against PIP hyperextension

Operative treatment (Swan neck)

Hemitenodesis of FDS

one slip of the FDS is separated from the other and is divided about 1.5 to 2 cm proximal to the PIP joint. The tendon slip can be sutured into the flexor tendon sheath with the finger held in slight flexion

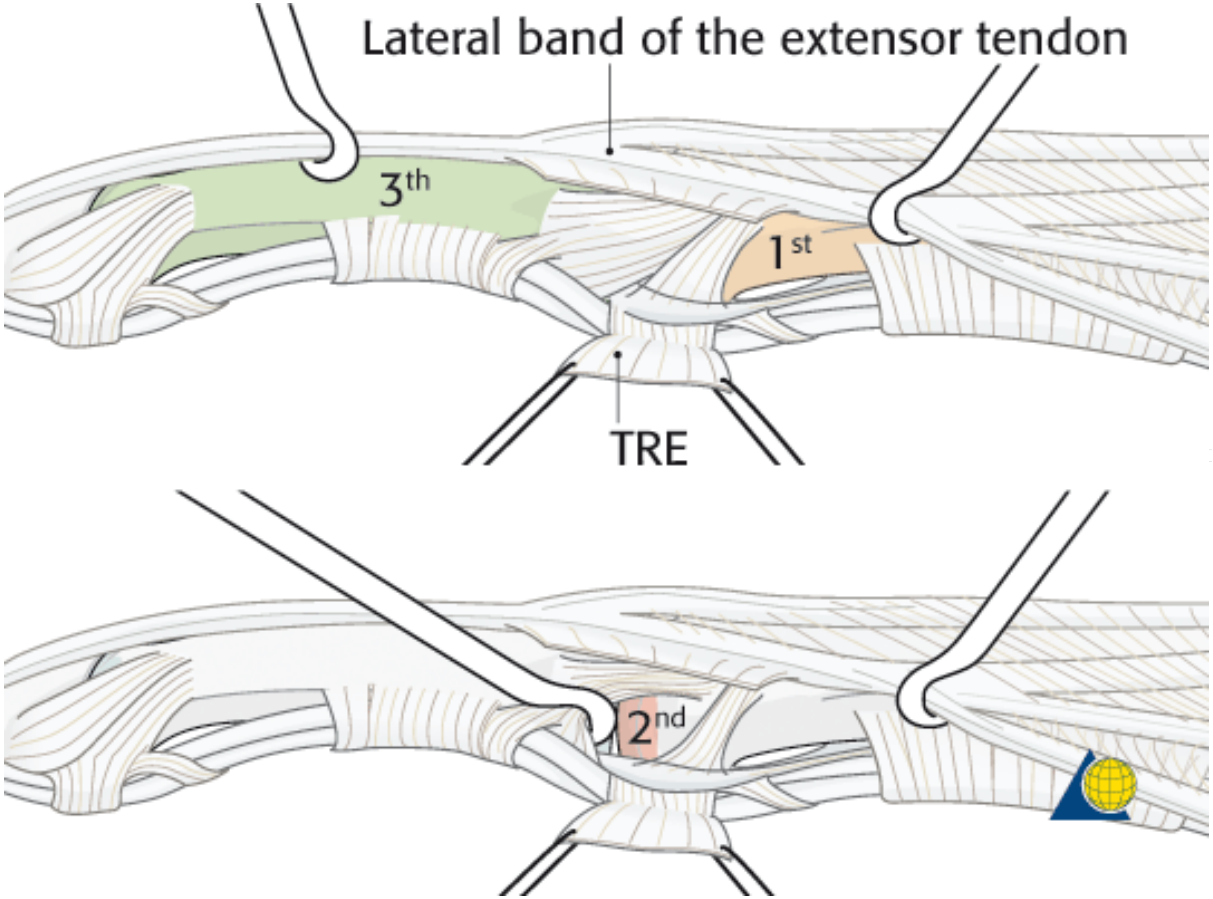
Chronic swan neck treatment

- **Zancolli lateral band transfer (+modification)**
- **Littler procedure (ORL reconstruction) Creation of an oblique retinacular ligament using a lateral band**

▪**one lateral band is transsected distally It is mobilized & transferred volar to Cleland's ligament, so that it is volar to the axis of motion at the PIP joint**

▪**Arthrodesis**

Lateral band transfer



Take home messages

- Prevention better than cure
- Early treatment better than late treatment
- Sometimes no treatment is better than all

Thank you

KOÇ
UNIVERSITY