

Tendon transfers for ulnar nerve palsy

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Gruppo MANUS



Etiology

- Distal palsy
 - Nerve laceration at forearm & wrist
 - Neuromuscular diseases CMT, leprosy
 - Lower tetraplegia
- Proximal palsy
 - Nerve laceration at elbow and above
 - Lower brachial plexus injury
 - Iatrogenic...

Associated median-ulnar palsy

Paralysed muscles

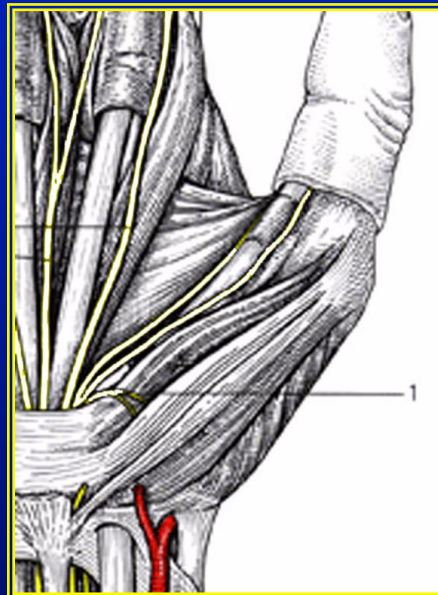
Distal palsy

- Fingers
 - All interossei
Palmar and dorsal IO
Little finger (opp, ADM, FDM)
 - All lombricals except 1st and 2nd
- Thumb
 - Adductor
 - +/- Flexor pollicis brevis

Flexor pollicis brevis nerve supply:

70%: median and ulnar nerve
→ thumb lacks only adduction

30%: ulnar nerve only
→ thumb lacks adduction and opposition



Flexor pollicis brevis testing

Forceful terminal pinch

-If MP hyperextends: FPB paralysed
(Jeanne's sign)



Flexor pollicis brevis testing

Forceful terminal pinch

- If MP hyperextends: FPB paralysed (Jeanne's sign)
- If MP flexes: FPB intact



Paralysed muscles

Proximal palsy

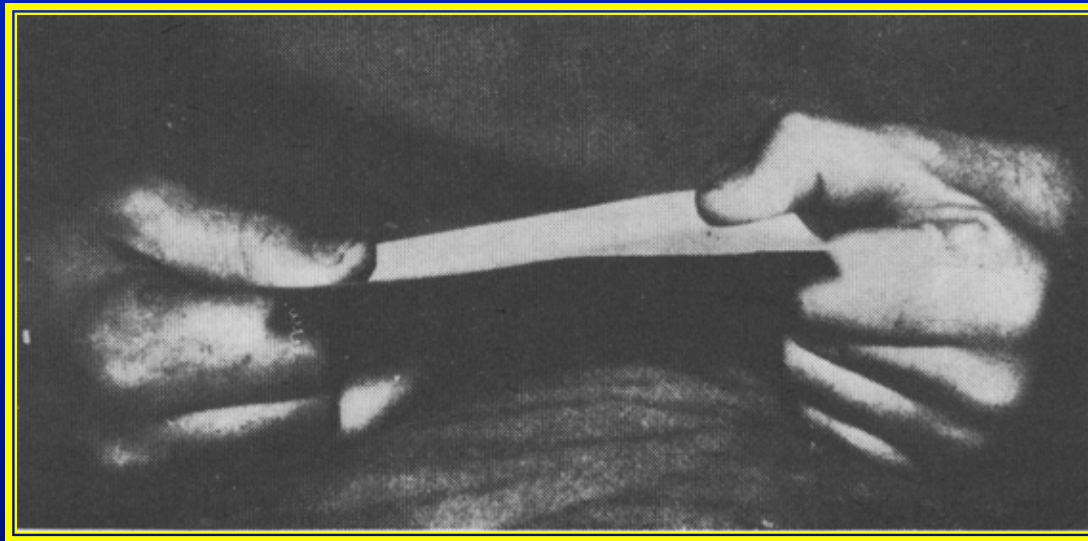
Same

+ ECU

+ Flexor Profundus 3-4-5

Clinical picture

Froment's sign



Clinical picture

Weak pinch:



Clinical picture

Weak pinch:

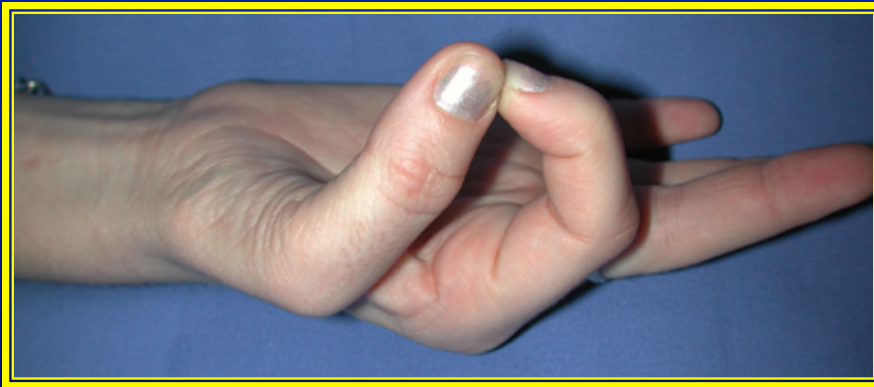
- Thumb supination (crank-handle)



Clinical picture

Weak pinch:

- Thumb supination (crank-handle)
- MP instability



Clinical picture

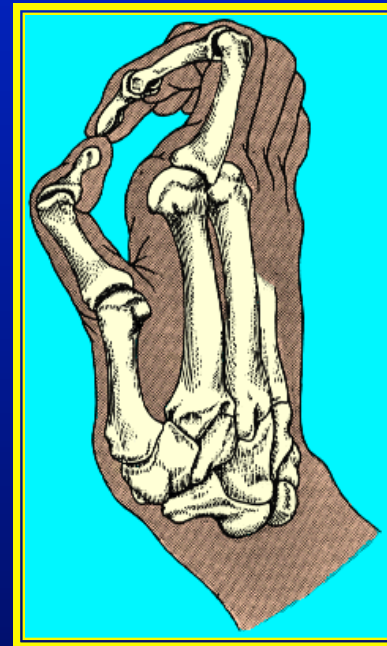
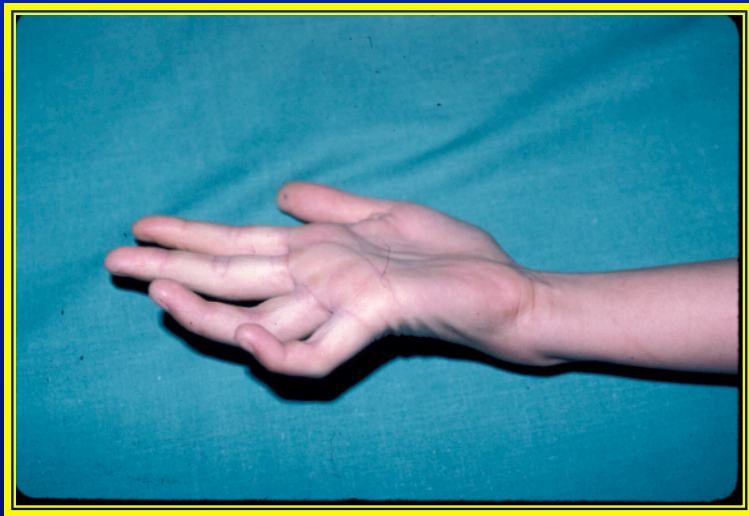
Weak pinch:

- Thumb supination (crank-handle)
- MP instability
- Index lack of abduction

Clinical picture

Ulnar clawing

Index and long fingers apparently normal, but clawing during strong grasp

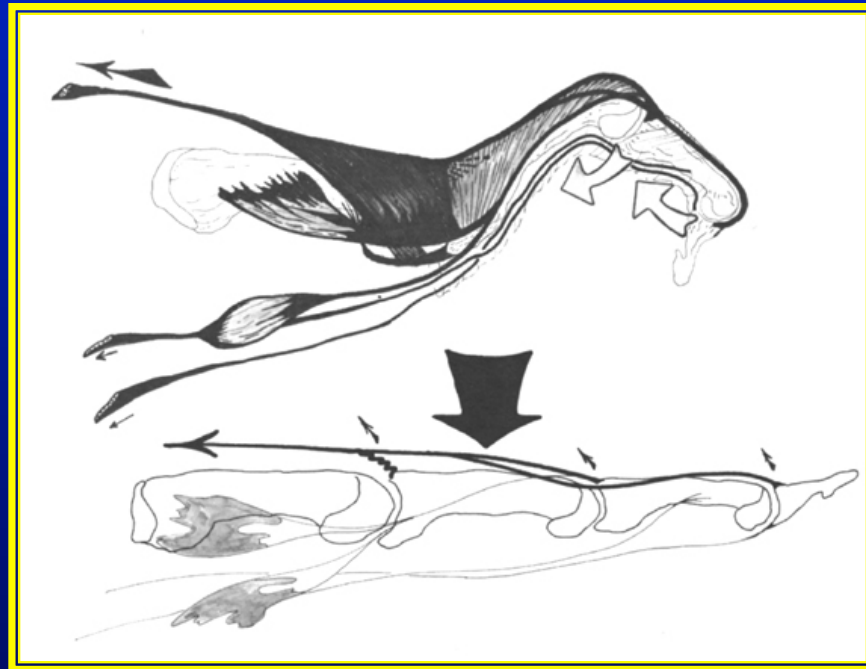


Clinical picture

Ulnar clawing

Index and long fingers apparently normal, but clawing during strong grasp

Positive Bouvier's manoeuvre

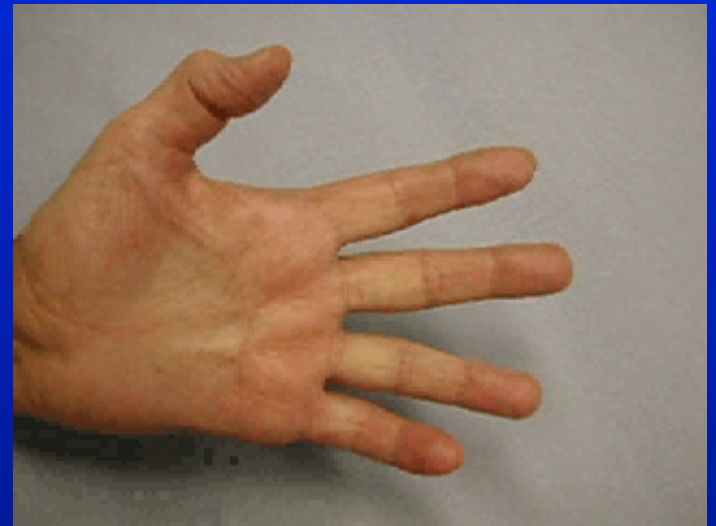
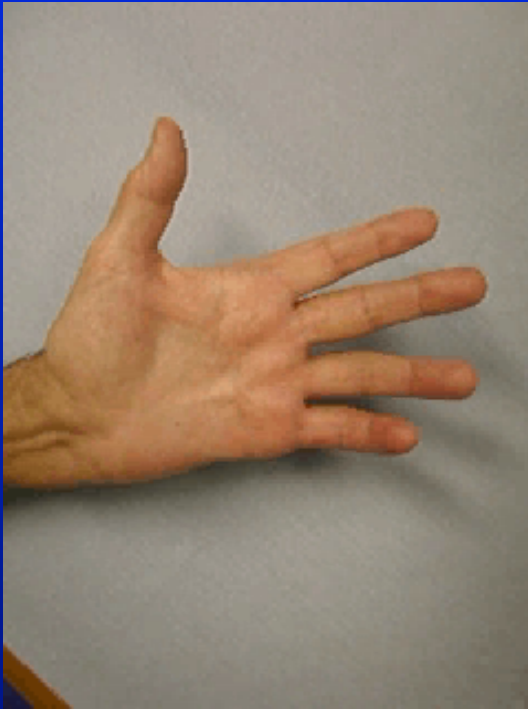


Clinical picture

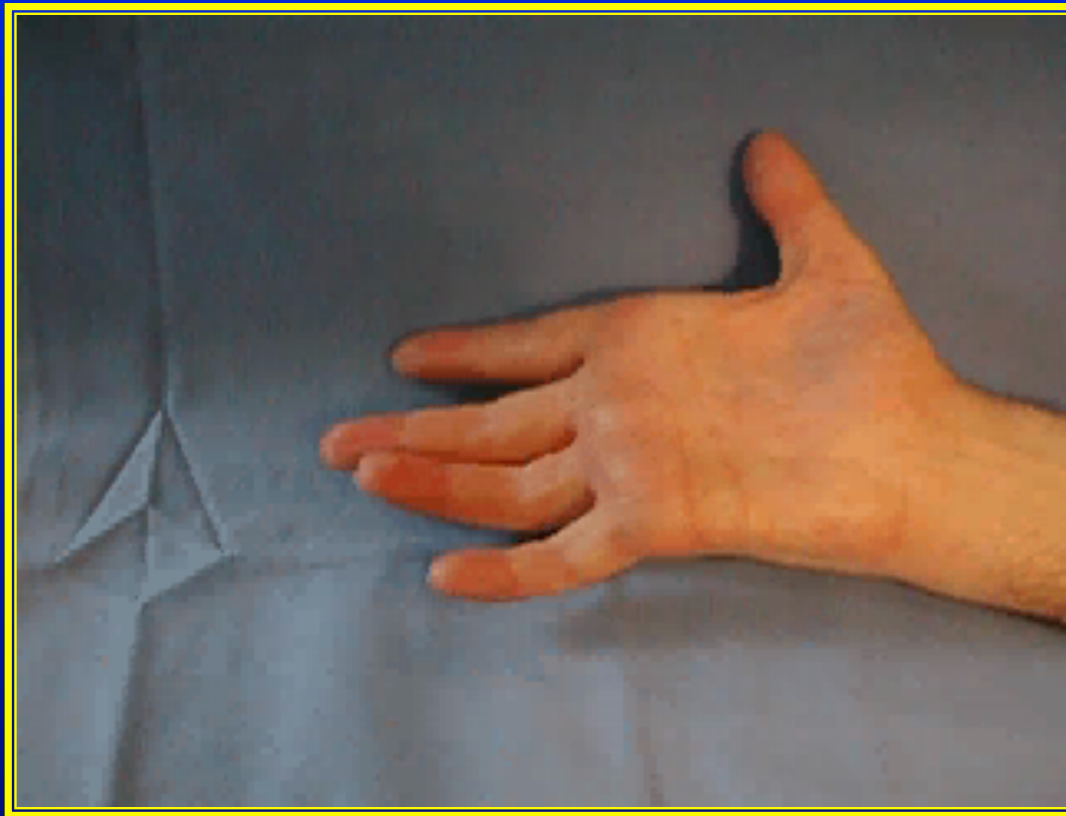
Wartenberg's sign



Clinical picture



Clinical picture



Treatment

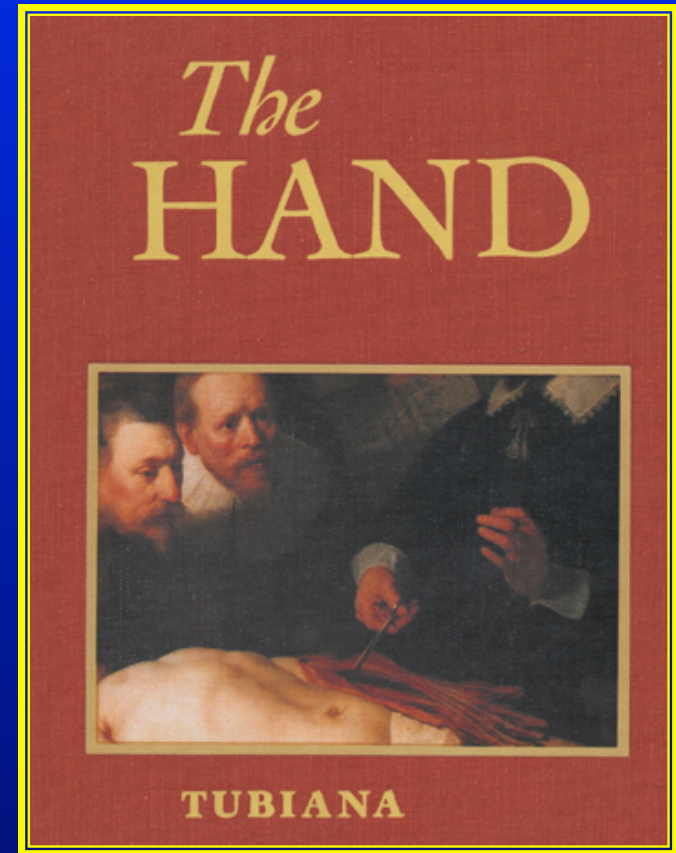
1. The thumb

2. Fingers

1- The thumb

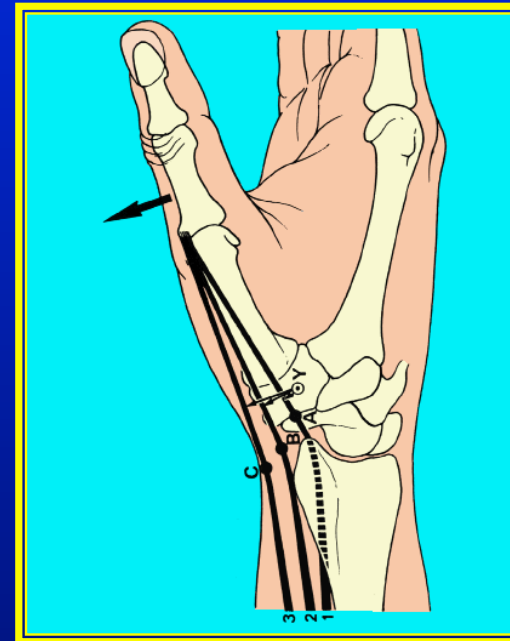
Tubiana 1973

- Lab dissections
- 250 thumb palsies



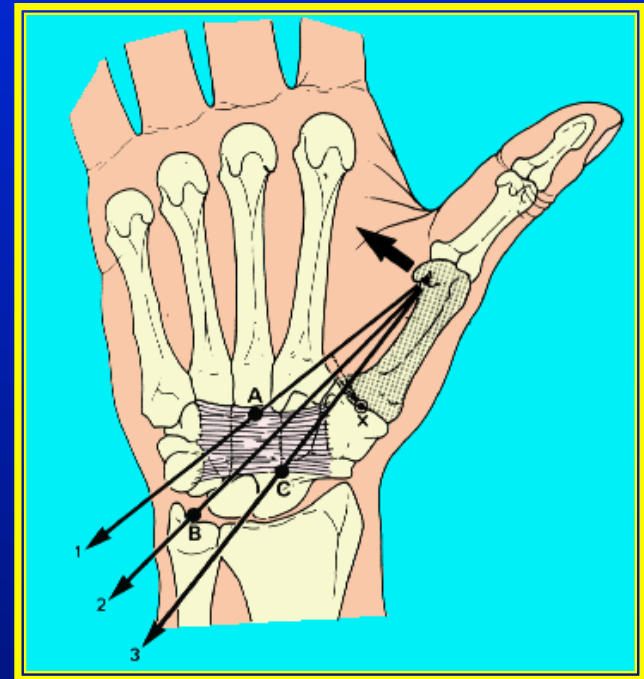
Direction of transfer and pulleys

- Superficial : anteposition
- Deep : opposition



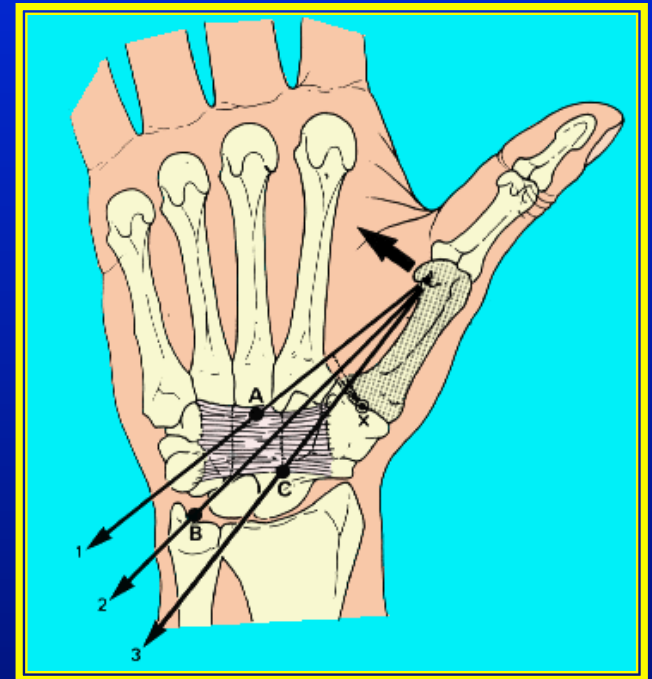
Direction of transfer and pulleys

- Superficial : anteposition
- Deep : opposition
- Radial : anteposition
- Ulnar : opposition



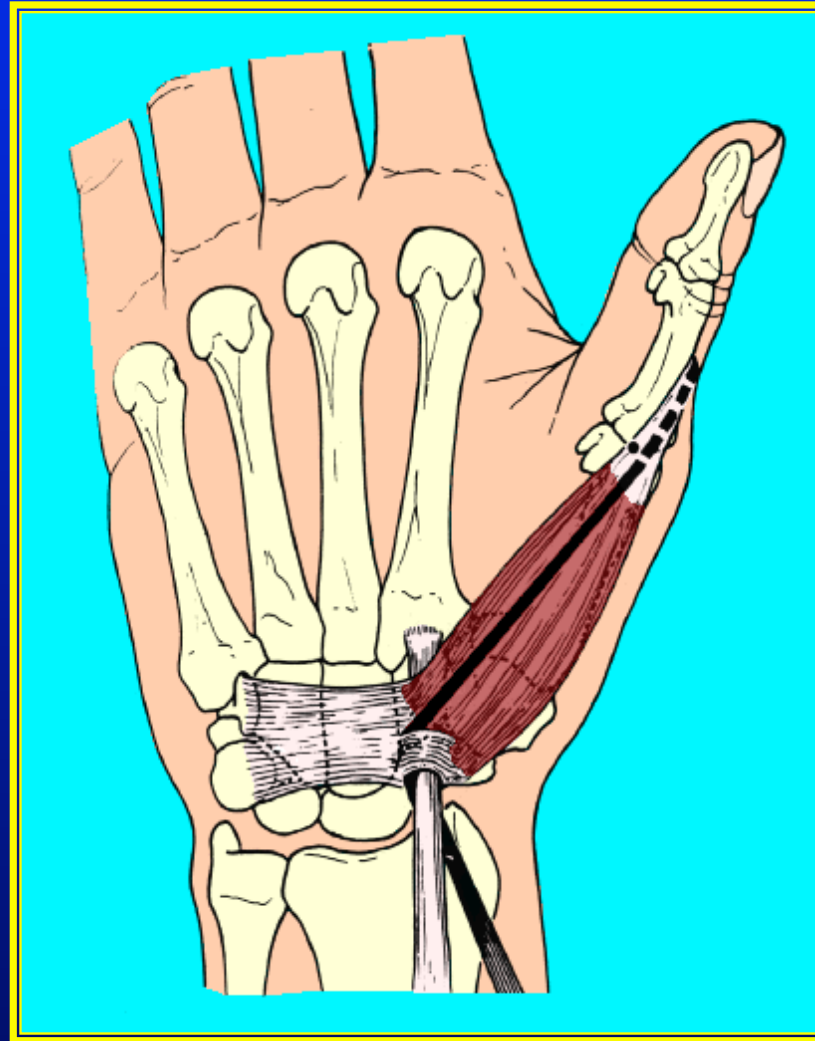
Direction of transfer and pulleys

- Superficial : anteposition
- Deep : opposition
- Radial : anteposition
- Ulnar : opposition
- Proximal : anteposition
- Distal : opposition

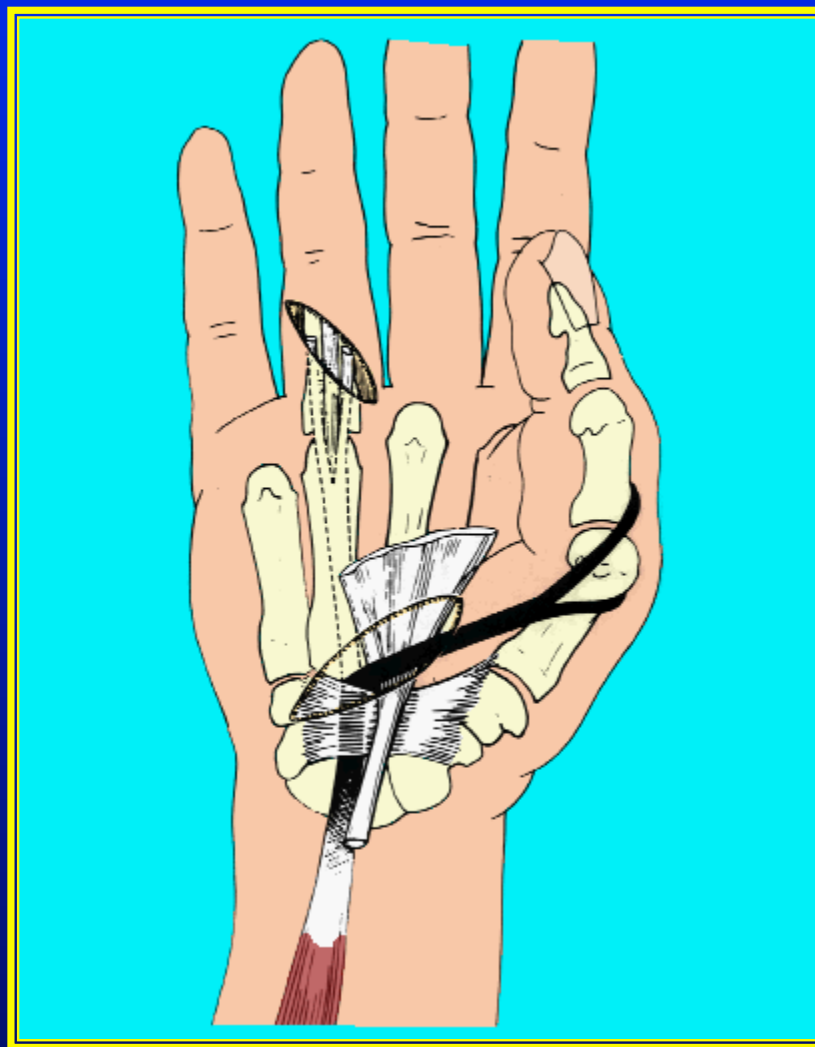


Examples

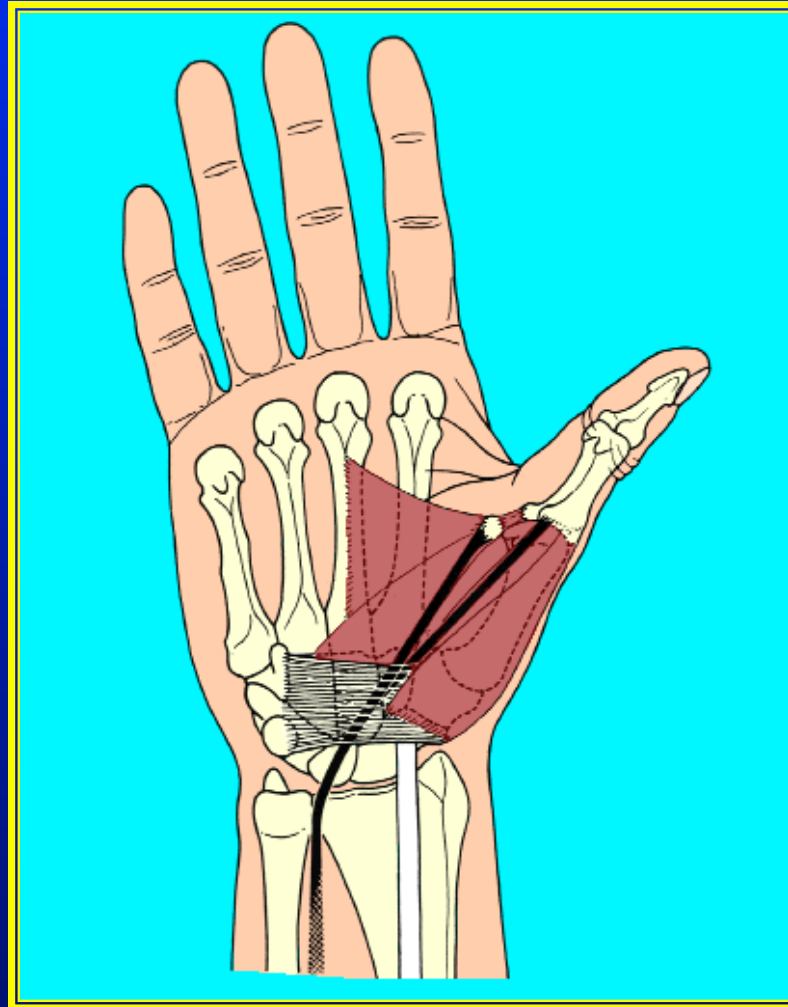
Zancolli



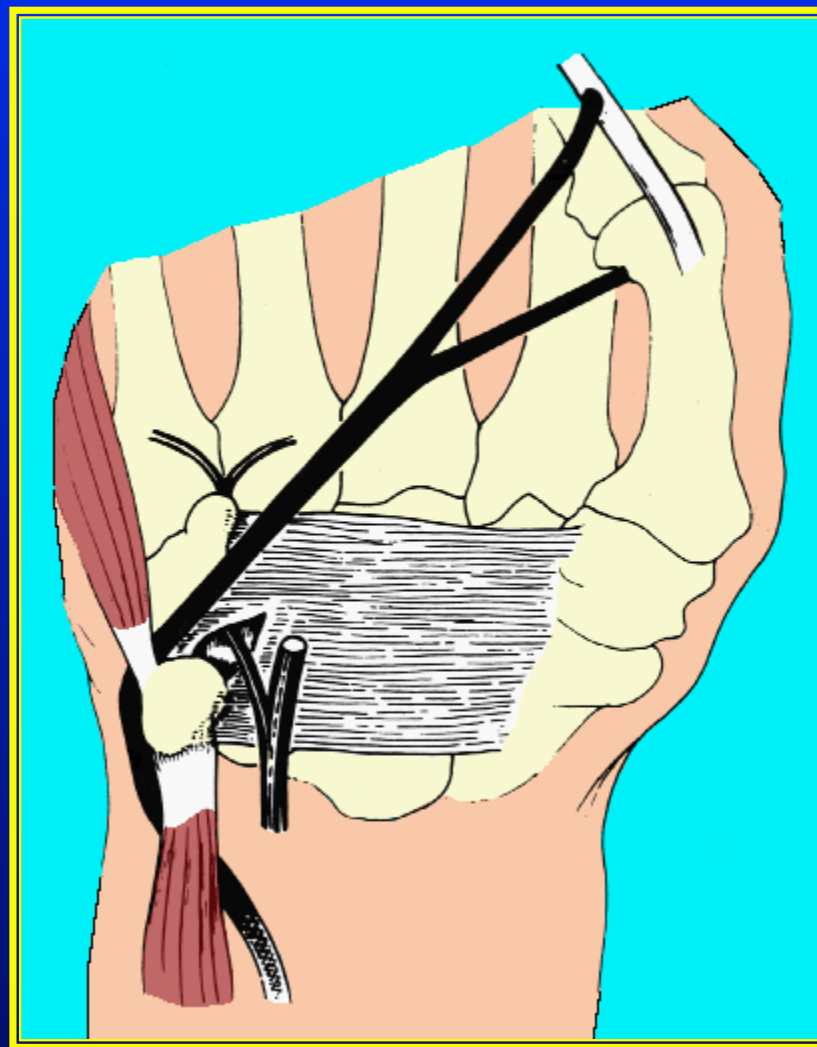
Thompson



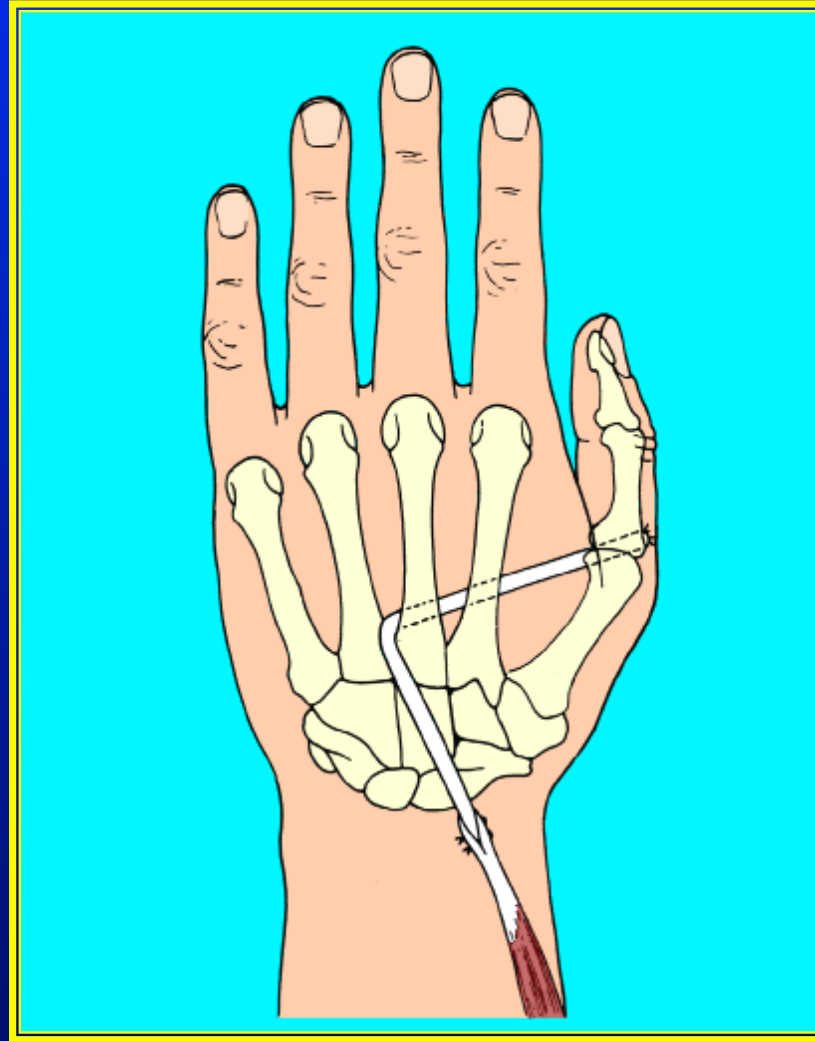
Royle-Thompson



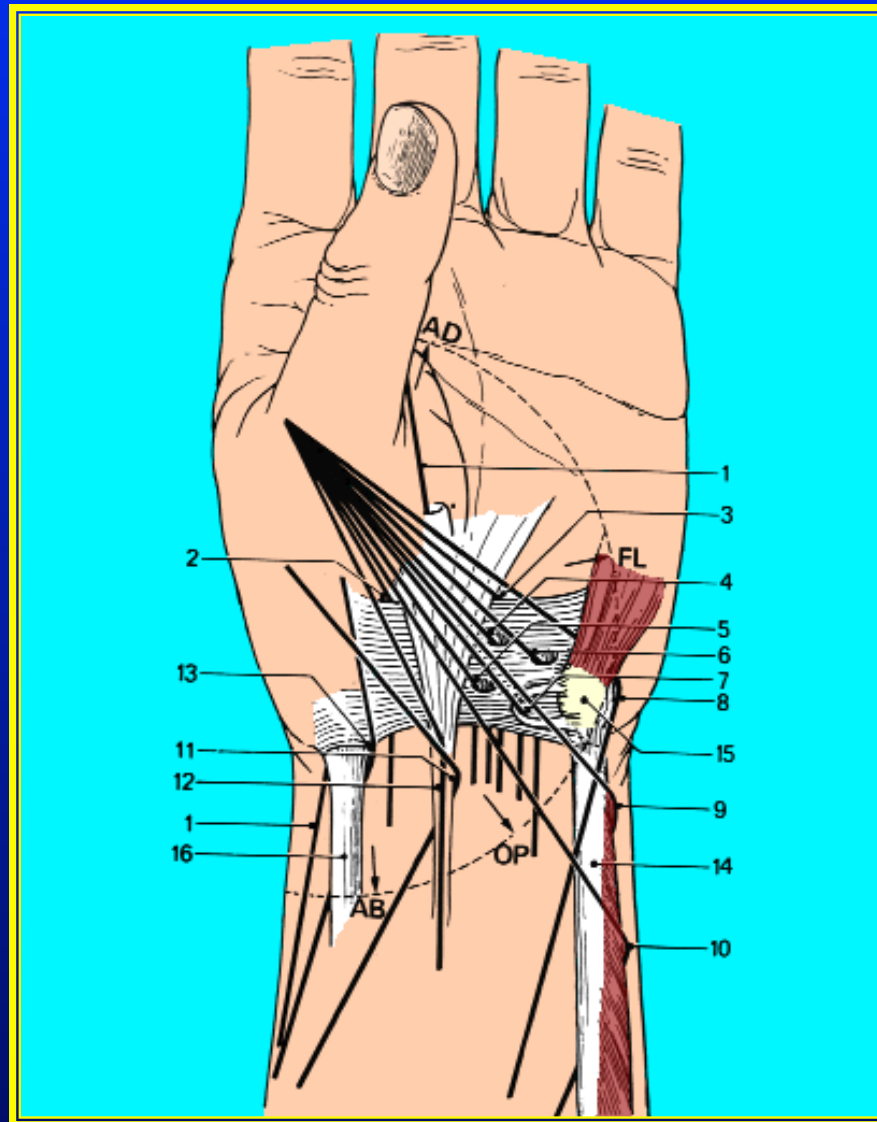
Palazzi



Alnot-Masquelet



Summary

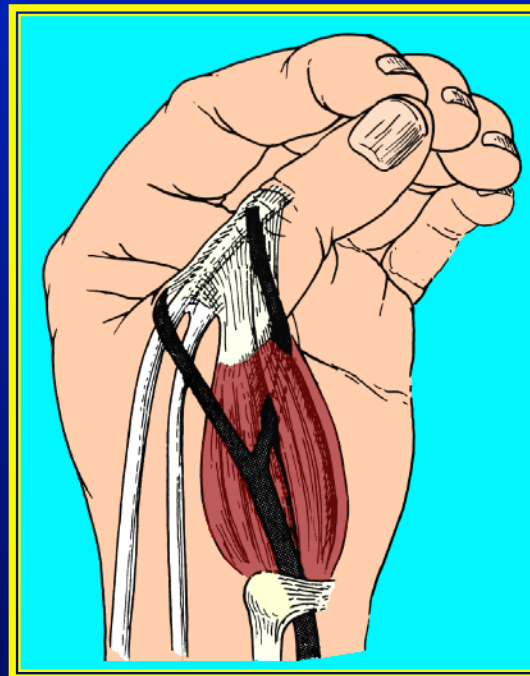


Distal fixation

- Radial aspect of thumb
 - Otherwise supination deformity

Distal fixation

- Radial aspect of thumb
 - Otherwise supination deformity
- If MP instability (FPB palsy)
 - Double fixation on each side of joint (Brand)



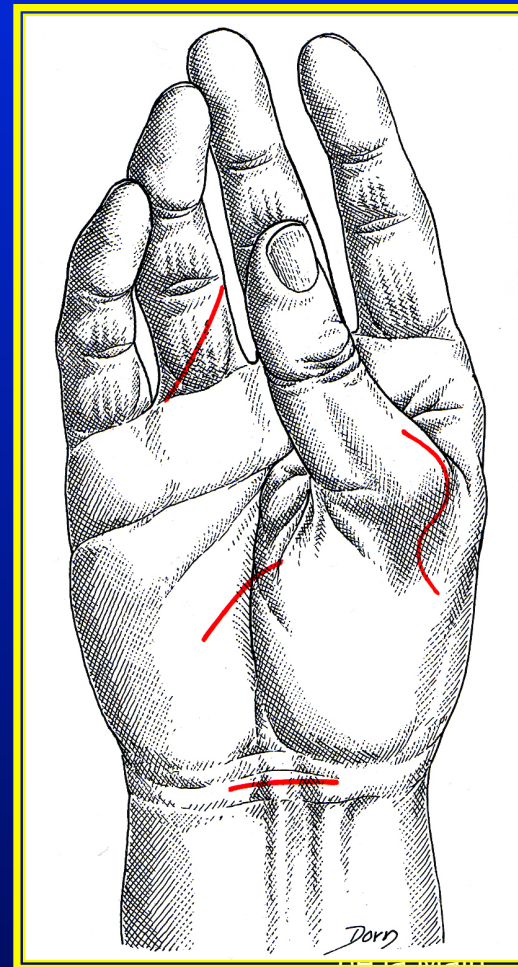
Motors

- FS ring finger (distal palsies)
- Extensor indicis proprius (EIP)
- Extensor digiti minimi (EDM)
- Extensor pollicis brevis (EPB) + MP Az
- Wrist motors +graft
- Brachioradialis

Preferred thumb transfer Distal palsy

1. FPB paralysed

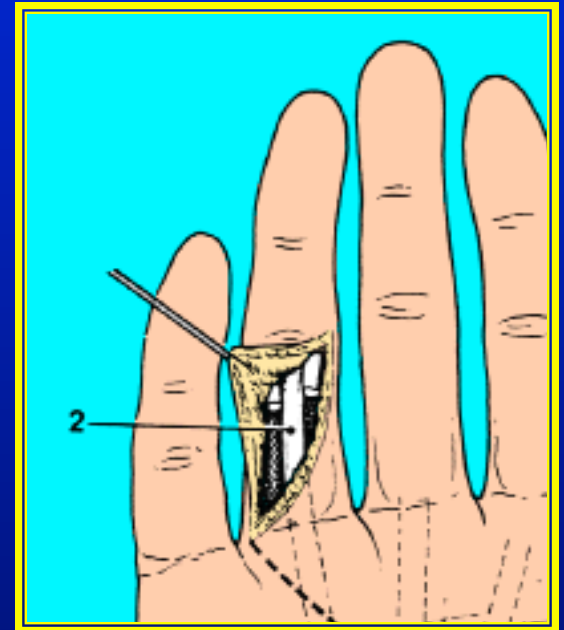
- Motor: FS4 : Royle-Thompson



Preferred method

Royle-Thompson

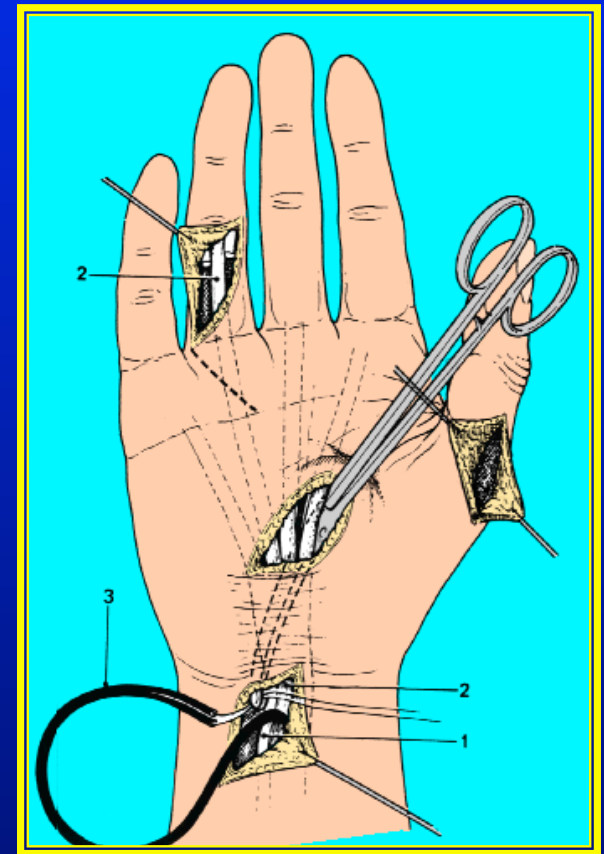
- FS 4 severed at PP



Preferred method

Royle-Thompson

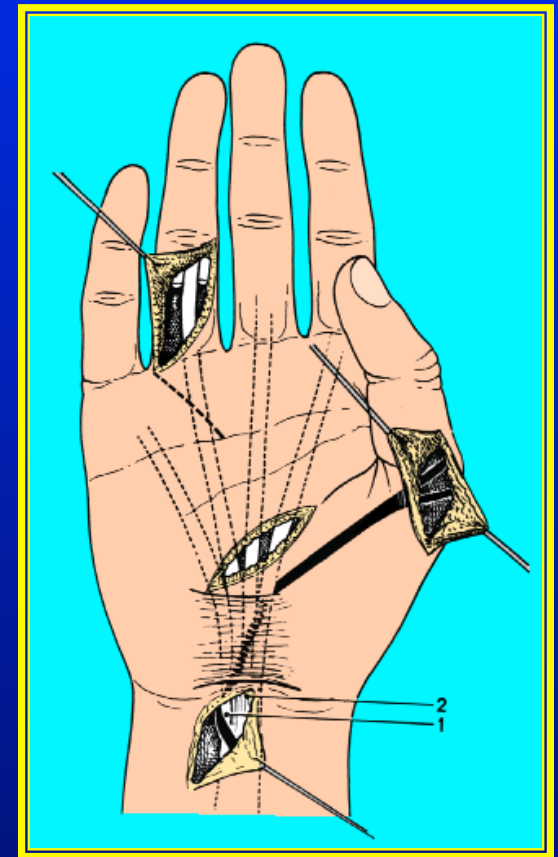
- FS 4 severed at PP
- exposed at wrist
- passed deep to flexor tendons



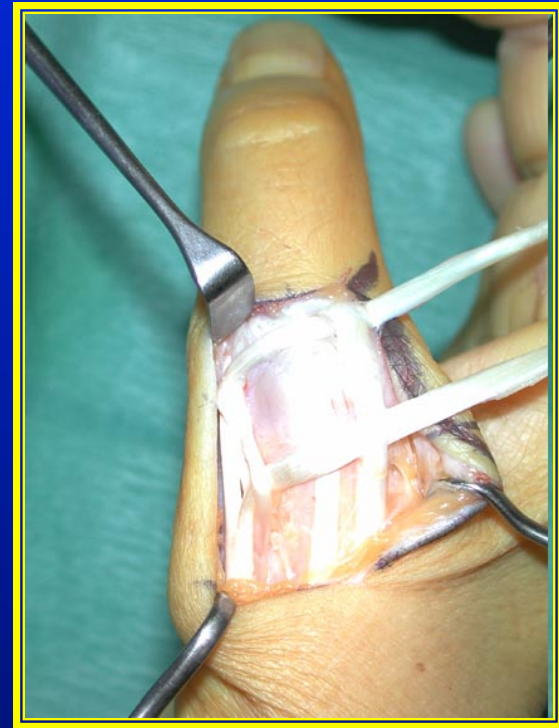
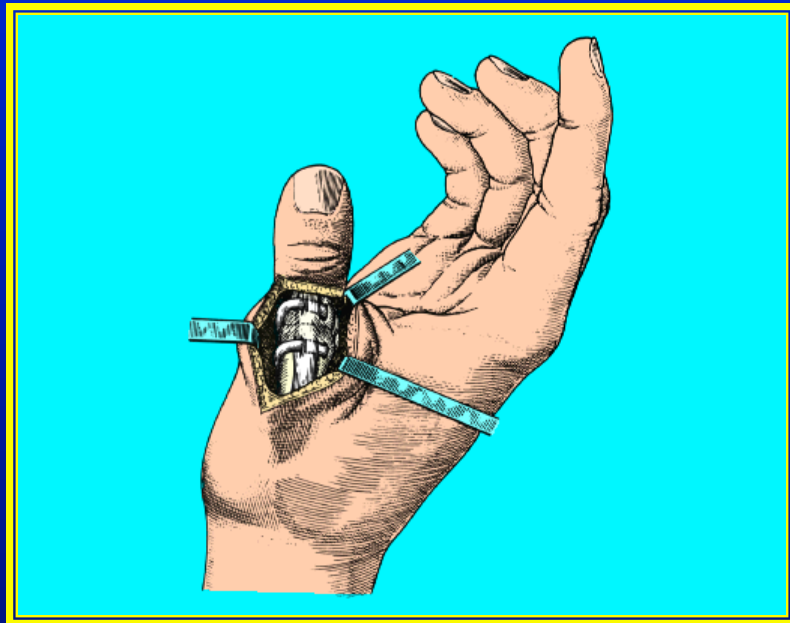
Preferred method

Royle-Thompson

- FS 4 severed at PP
- exposed at wrist
- passed deep to flexor tendons
- routed to thumb
- under neurovascular pedicles
- insertion radial aspect of MP



Distal fixation



Preferred method Royle-Thompson



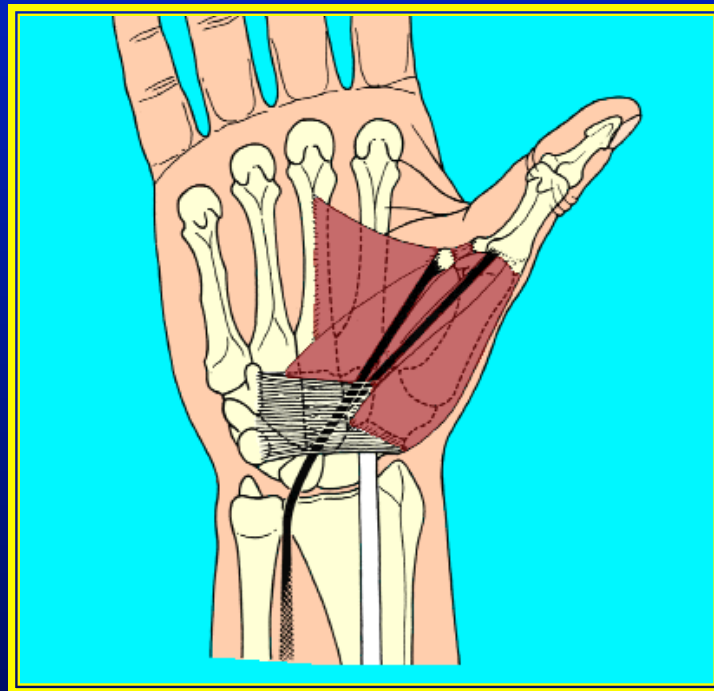


Preferred thumb transfer Distal palsy

2. FPB active

- Motor:

- FS4
- Or EIP through interosseous membrane



Preferred thumb transfer

Distal palsy

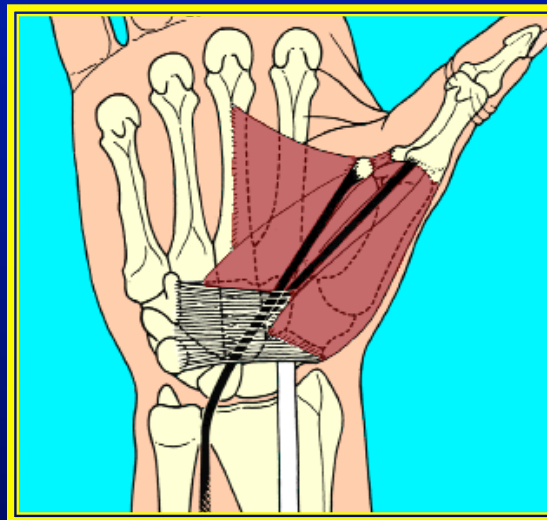
2. FPB active

- Alternative:

- EIP through interosseous membrane

- Distal fixation

- Adductor (sesamoid) and radial MP



Distal median-ulnar palsy

Clawing of all finger

Complete palsy of thumb intrinsics



Distal median-ulnar palsy

Two transfers if available

- opposition
 - FS4
- anteposition
 - EIP (EDM) around ulnar border





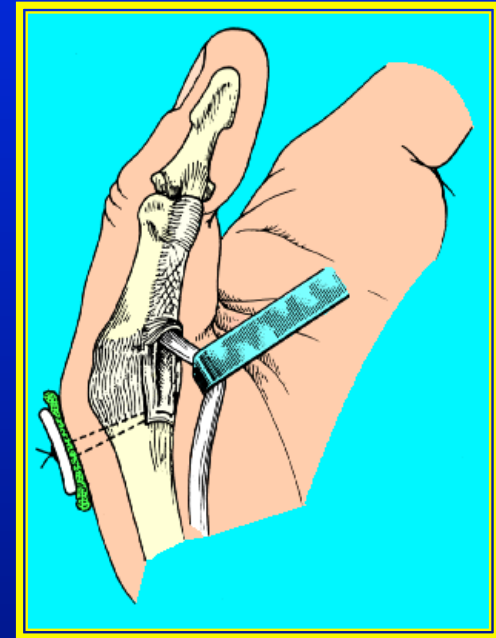
Thumb Proximal palsy

- FS4 and 5 not available
- EIP through interosseous membrane
Neither long nor strong enough for MP stabilization:
additional procedures

Thumb Proximal palsy

additional procedures

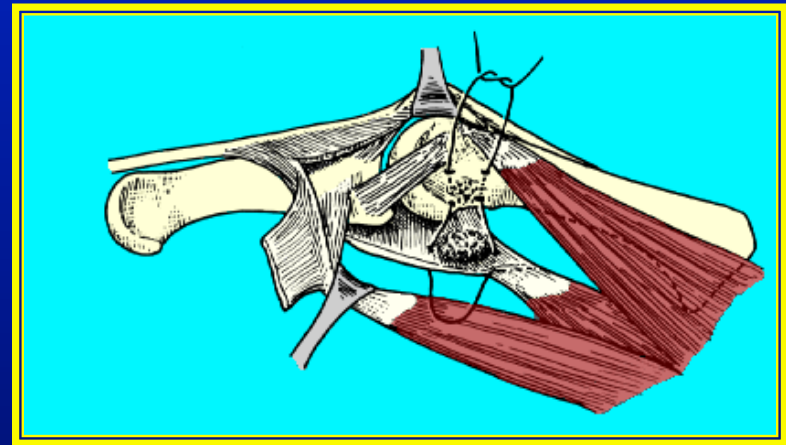
- MP capsulodesis



Thumb Proximal palsy

additional procedures

- MP capsulodesis
- sesamoido-metacarpal arthrodesis



Thumb Proximal palsy

additional procedures

- MP capsulodesis
- sesamoido-metacarpal arthrodesis
- or MP arthrodesis and EPB to 1st dorsal interosseous



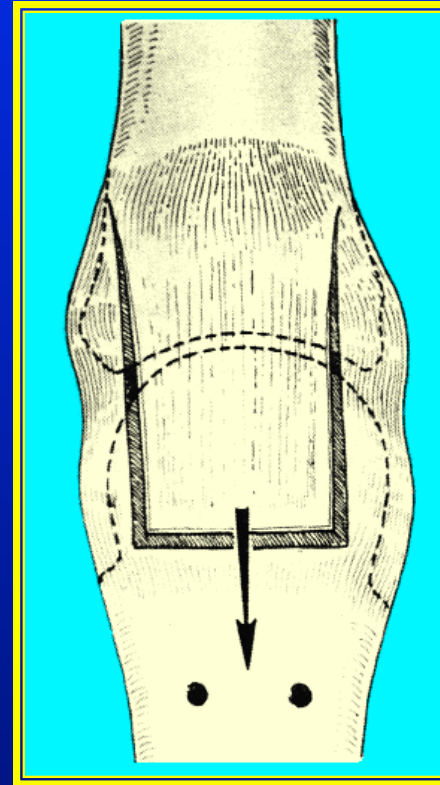
2- The fingers

Ulnar clawing

Index abduction

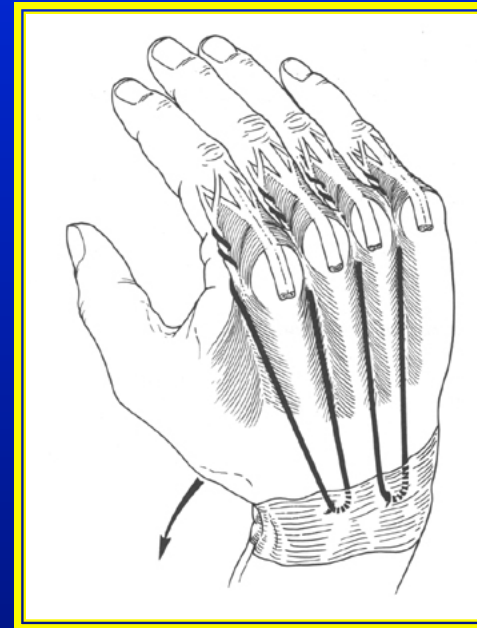
Ulnar clawing

- Capsulodeses



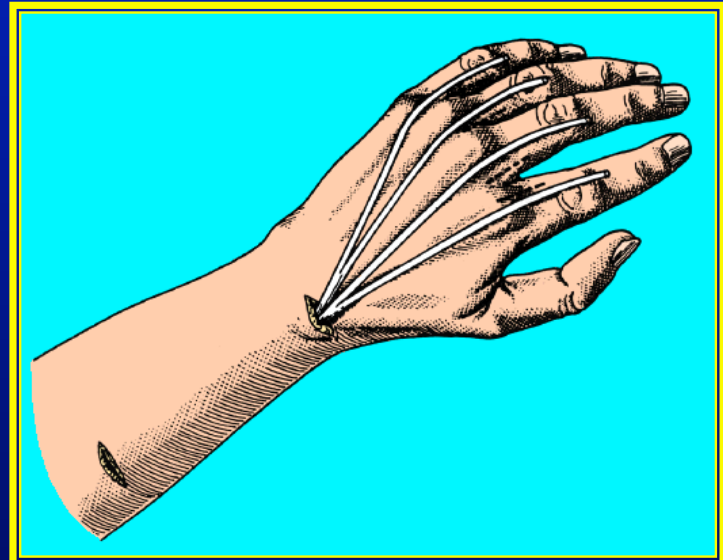
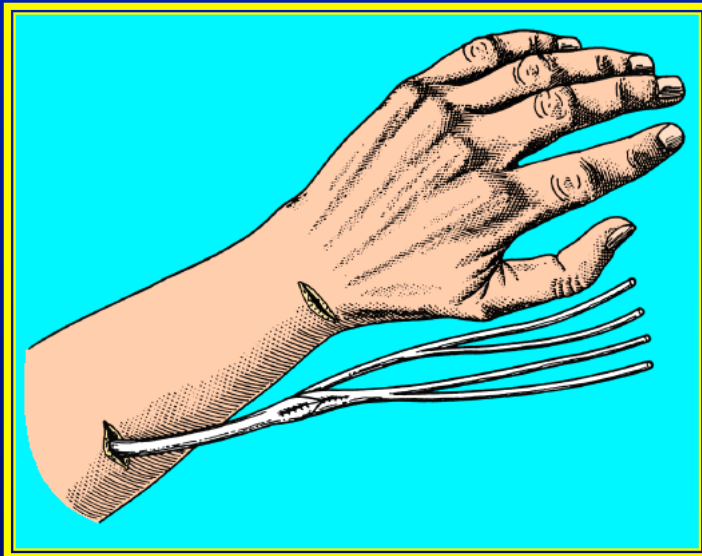
Ulnar clawing

- Capsulodeses
- Tenodeses (Fowler)



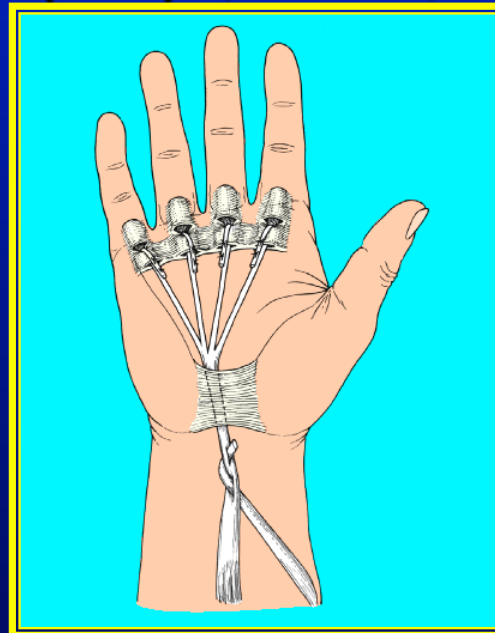
Ulnar clawing

- Capsulodeses
- Tenodeses (Fowler)
- Tendon transfers
 - Inserted dorsally (Brand)



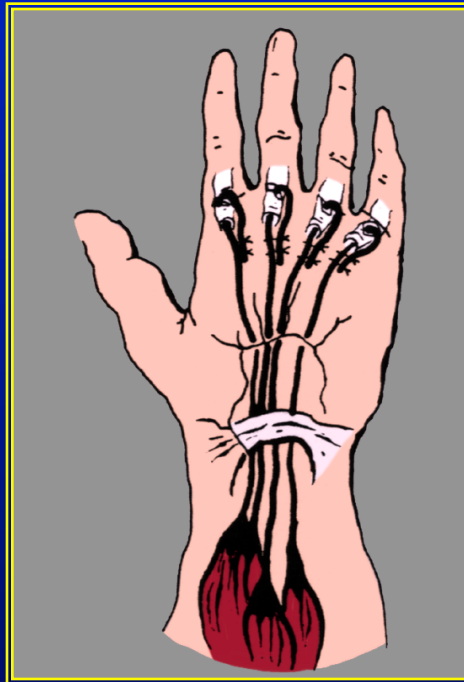
Ulnar clawing

- Capsulodeses
- Tenodeses (Fowler)
- Tendon transfers
 - Inserted dorsally (Brand)
 - Inserted palmarly A1 pulley (Zancolli)



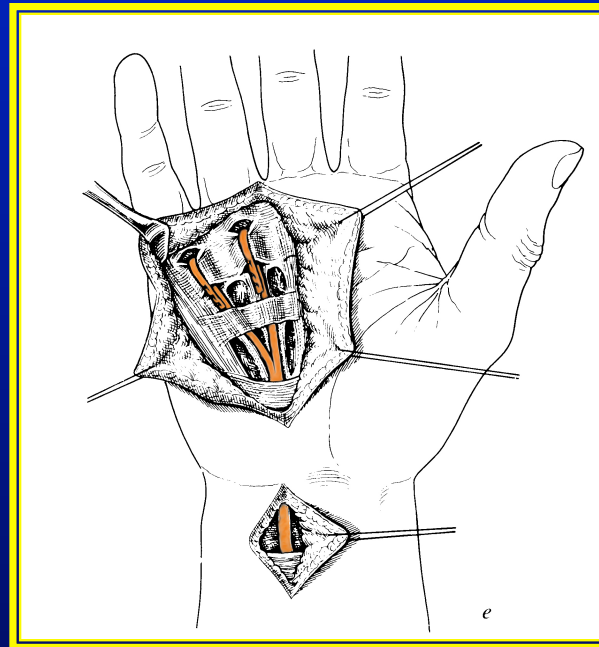
Lasso procedure Zancolli

- Direct lasso
 - With flexor superficialis FS4 / FS5
- Not an option in proximal palsies



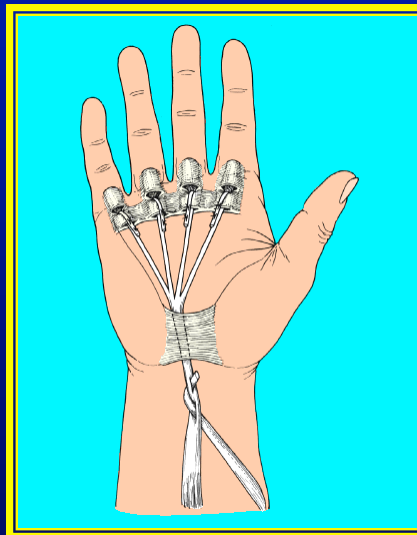
Lasso procedure Zancolli

- Direct lasso
 - With flexor superficialis
 - With tendon transfer (EIP)



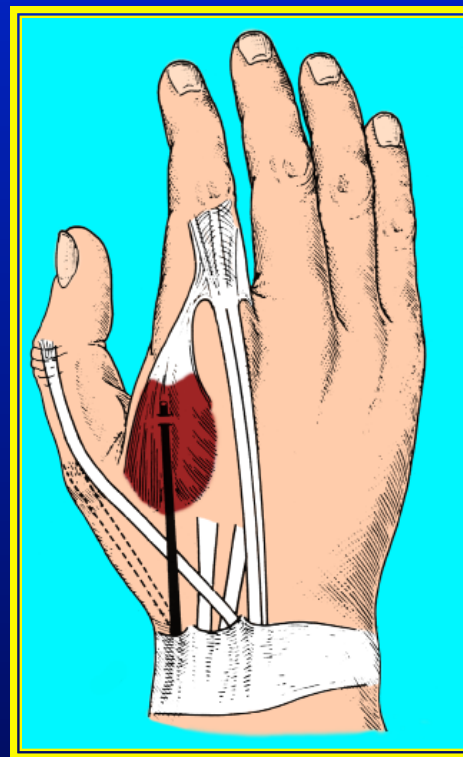
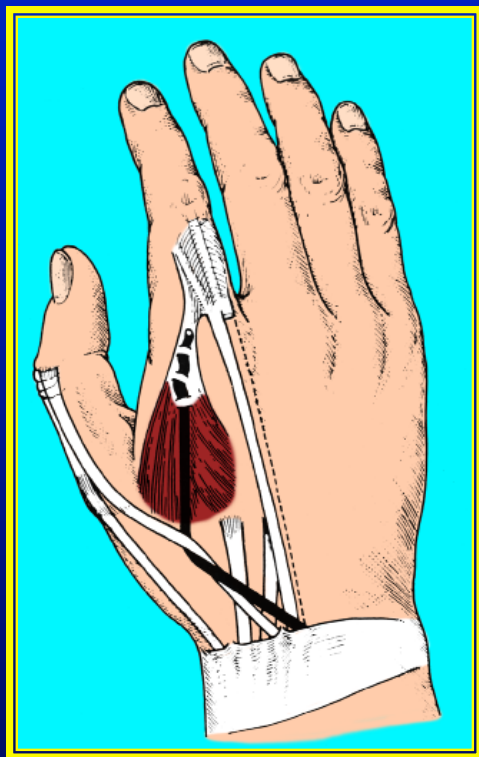
Lasso procedure Zancolli

- Direct lasso
 - With flexor superficialis
 - With tendon transfer (EIP)
- Indirect lasso
 - Paralysed flexor superficialis + transfer



Index abduction

- Rerouted EIP
- EPB + MP fusion
- APB : 1band + graft
- (FS4 : 1 band + lasso)



Summary

Preferred method

Distal palsy

- FPB paralysed

FS4: thumb

EIP: lasso 4-5

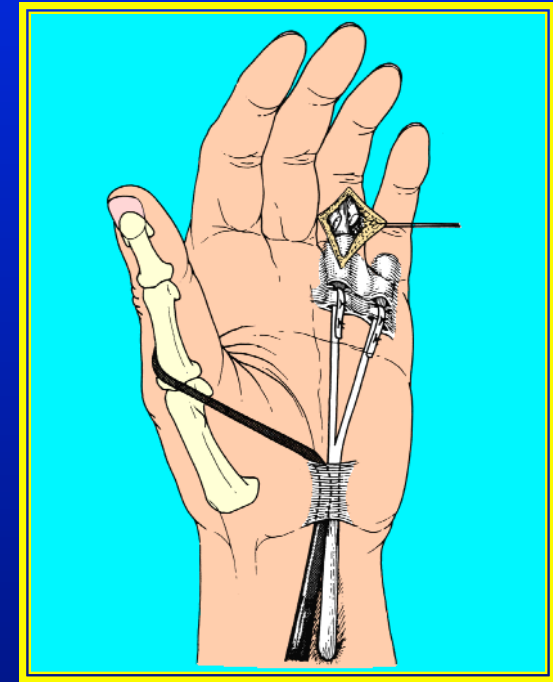
APL (1 band) + graft : 1st DIO muscle

(For stronger pinch:

FS4: thumb

FS5: lasso

EIP: 1st DIO)

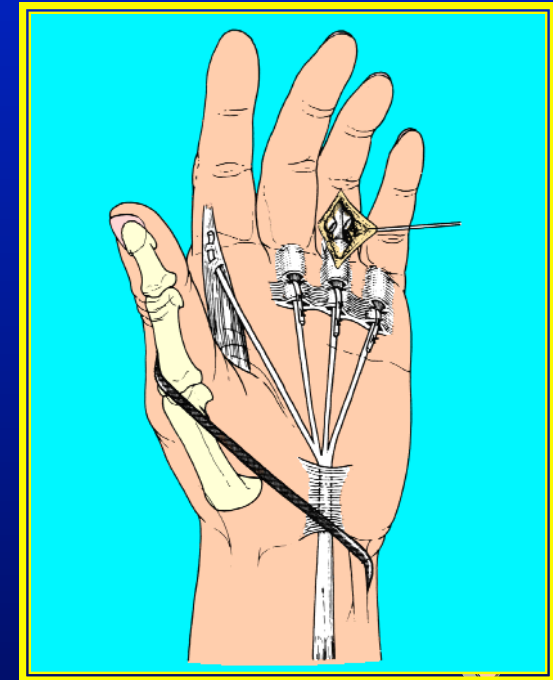


Preferred method Distal palsy

FPB active

EIP: thumb

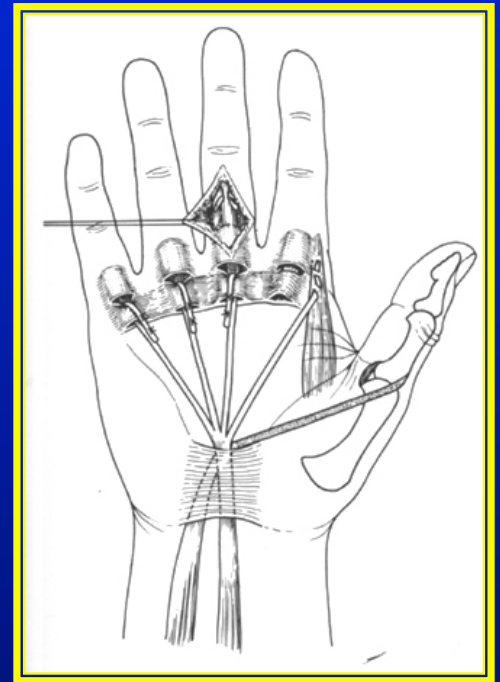
FS4 : lasso + 1st DIO muscle



Preferred method Proximal palsy

FP 4-5 : lateral suture to FP 2-3

- 1st option
 - FS3 : lasso (3)-4-5 + 1st DIO muscle
 - EIP : thumb (+stabilization MP)

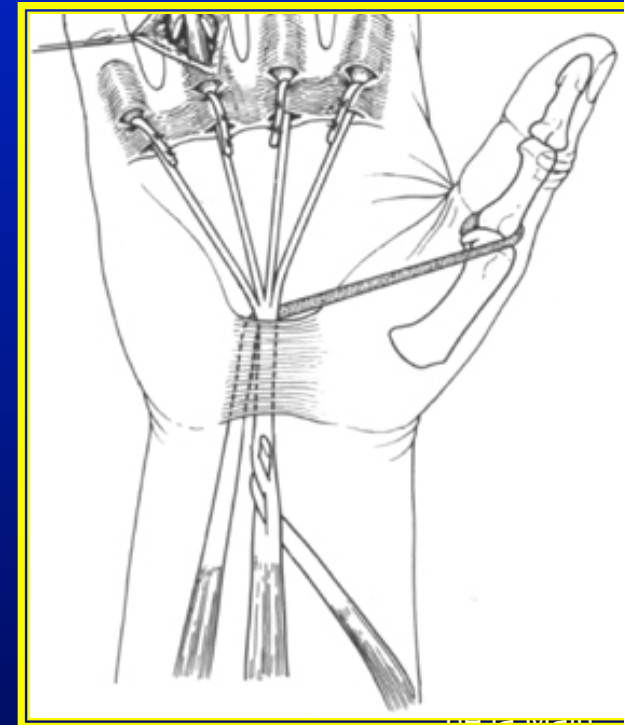


Preferred method

Proximal palsy

FP 4-5 : lateral suture to FP 2-3

- 1st option
 - FS3 : lasso (3)-4-5 + 1st DIO muscle
 - EIP : thumb (+stabilization MP)
- 2nd option (strong finger flexion)
 - ECRL : indirect lasso 2-3-4-5
 - EIP : thumb (+stabilization MP)

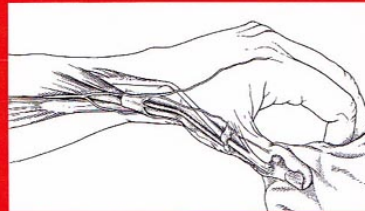
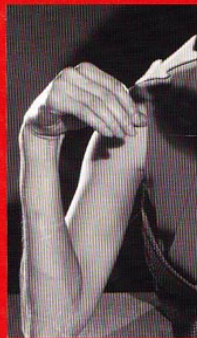


Conclusion

No standard procedure:

- Clinical examination (FPB)
- Patient's needs
- Surgeon's creativity and experience

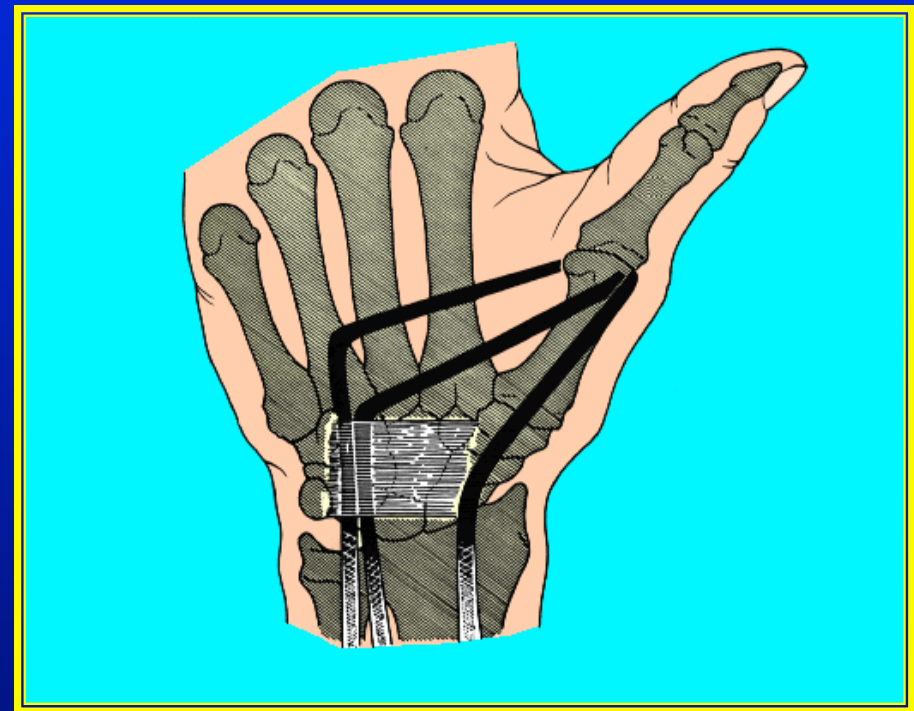
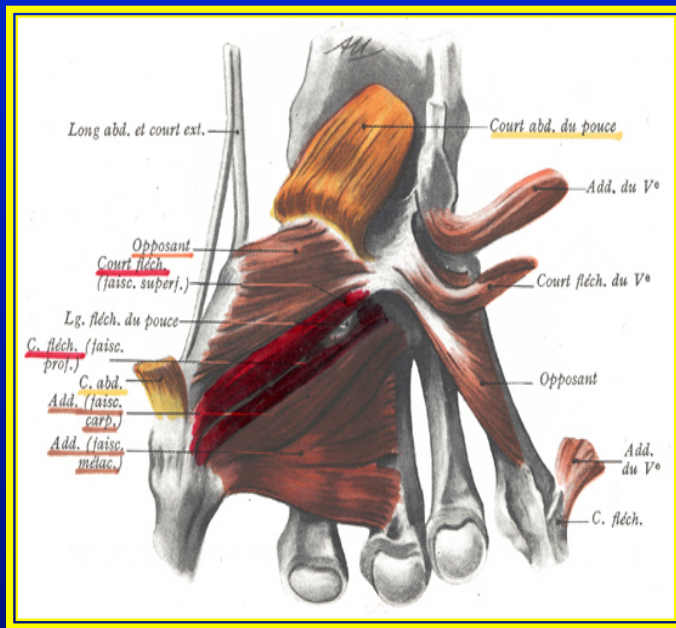
Restoration of Function in Upper Limb Paralyses and Muscular Defects



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René Malek

informa
healthcare





Alternative Distal palsy

- Fisher & Buchler

JHS A 28:28-32, 2003

- Alternative Zancolli **cf shema p 202**

FS4 + FS 5: direct lasso

EIP (through IM) : thumb

FS3: 1st and 2nd DIO muscle