Rheumatoid Arthritis

What it means for your patient's hands

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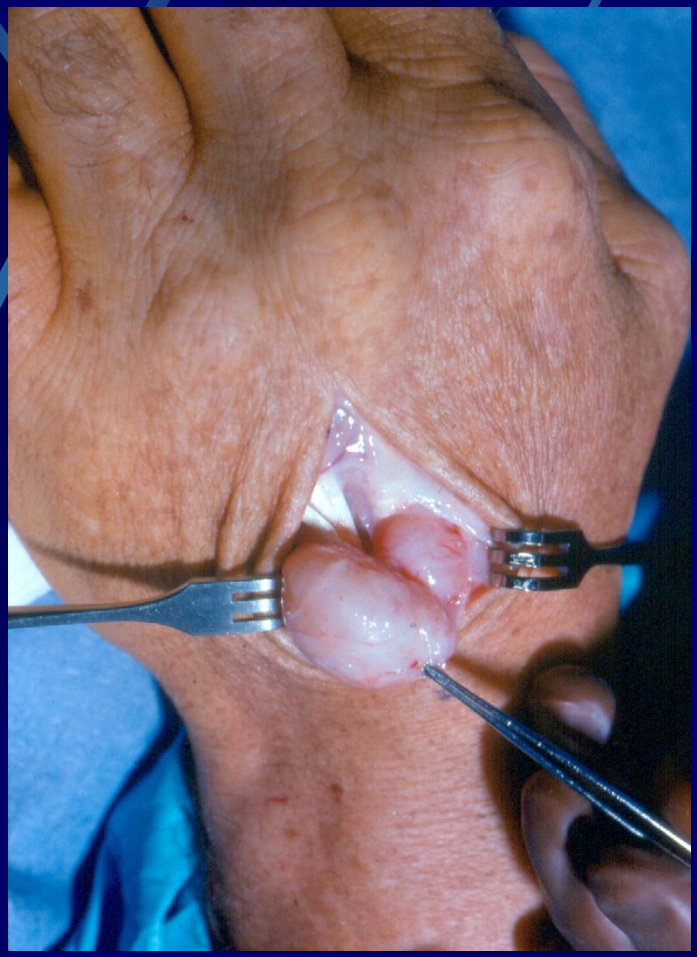
General Presentation

- 1% of the population
- Females 3X as affected as males
- Affecting the wrist,MP, PIP joints, and tendons
- Disease can manifest in a few joints with a self limited course or be global and steadily progressive
- + RF in 80% of patients, non specific

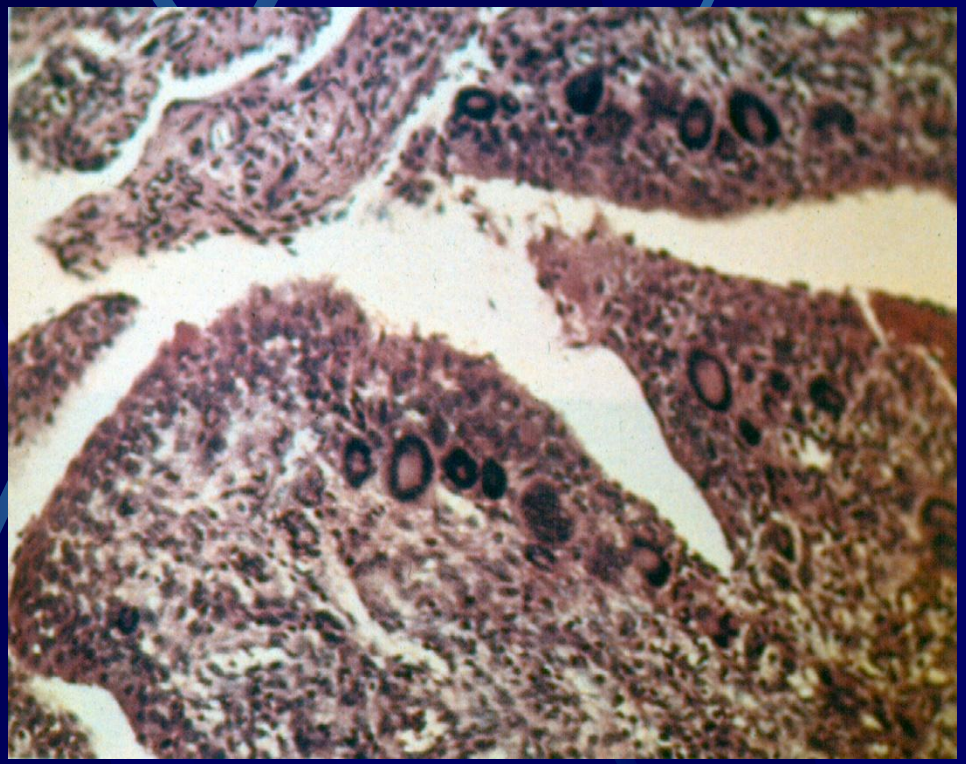
Primary Presentation



- More diffuse
- “Tendon connected”
- Can precede joint involvement by months

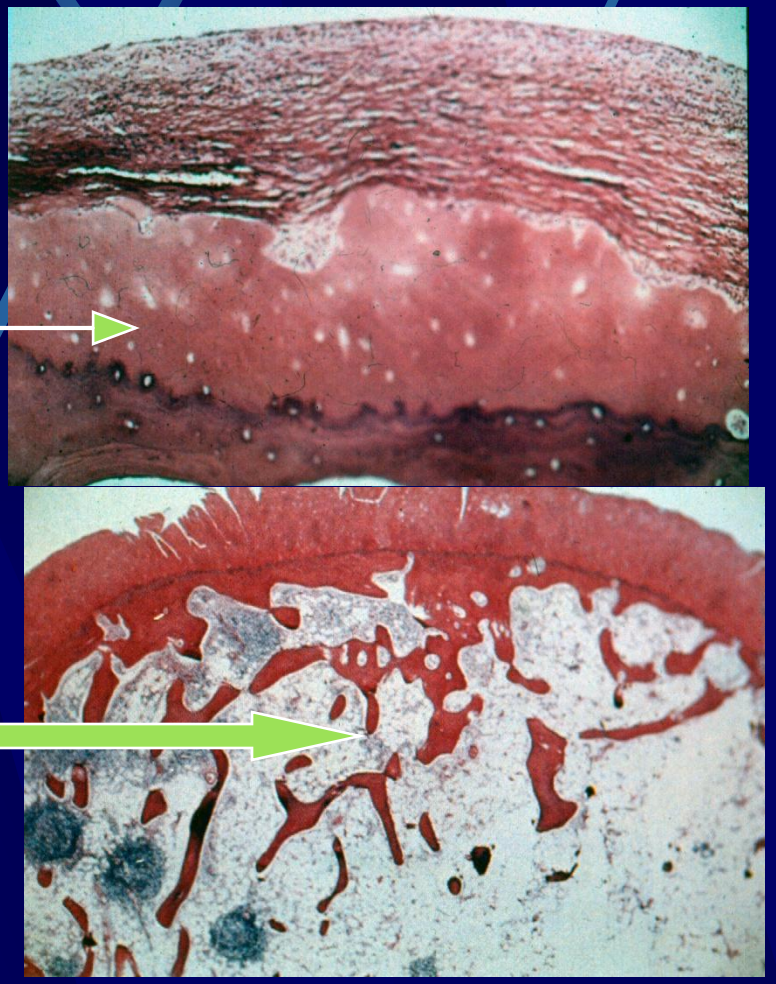
Microscopic Features

- Synovial pannus
- Sheets of histiocytes and fibroblasts, B&T cells
- Giant cells
- Secretion of lysosomal enzymes
- Enzymatic tissue degradation (prostaglandin,cytokine, interleukin-1, TNF-α)



Choking off bone and cartilage

- Hyalin cartilage breakdown deprived of synovial nutrition
- Pressure of pannus on articular cartilage
- Stretch supporting ligaments
- ↑Osteopenia, osteoclasts
- Process irreversible



Joint Destruction

- Osteopenia
- Chondrolysis
- Joint instability, subluxation
- Frank destruction
- With 6 months 40% have joint erosion and by two years have joint destruction

- Two years apart

Typical Primary appearance

- Swelling, rash, morning stiffness, pain, generalized fatigue

Medical Treatment

- Non steroidal anti inflammatories NSAID's (i.e. MOBIC)
- Disease modifying anti rheumatic drugs DMARD's initially given too late now given within 3 months in the disease process to prevent irreversible joint destruction
- Methtrexate, leflunomide, azathioprene,entanercept,infliximab
- Modifies the response to TNF- α, inhibition of clonal B-cell growth and migration,

Non Steroidal anti-inflammatory

Meloxicam in RA

- By 2002: seven studies with 2500 patients
- Limited duration 3-12 weeks
- Significant improvement in joint swelling and subjective assessment of pain and dysfunction
- No change in ESR,CRP, RF
- Effect similar to naproxen750 mg BID

Mobic Long Term in RA

- Increased withdrawals with Mobic than Naprosyn 2° to less effectiveness but these were in the first two months
- In 18 month study, effectiveness increased up to I year and then leveled off.
- 15mg > 7.5 mg, re: AM stiffness and grip strength.
- ? Role for 22.5 mg?

Hand surgical care:

almost every branch of hand surgery involved

- Teno-synovectomy, synovectomy
- Joint stabilization
- Soft tissue realignment
- Tendon repair, transfer, grafting
- Arthroplasty
- Arthrodesis

HAND SURGEONS vs. RHEUMATOLOGISTS

- **Alderman and Chung, ASSH 2002**

HS	Rheum
MP arthroplasty	
83%	34%
Tenosynovectomy	
93%	55%
Synovectomy	
53%	13%

Surgical Principles

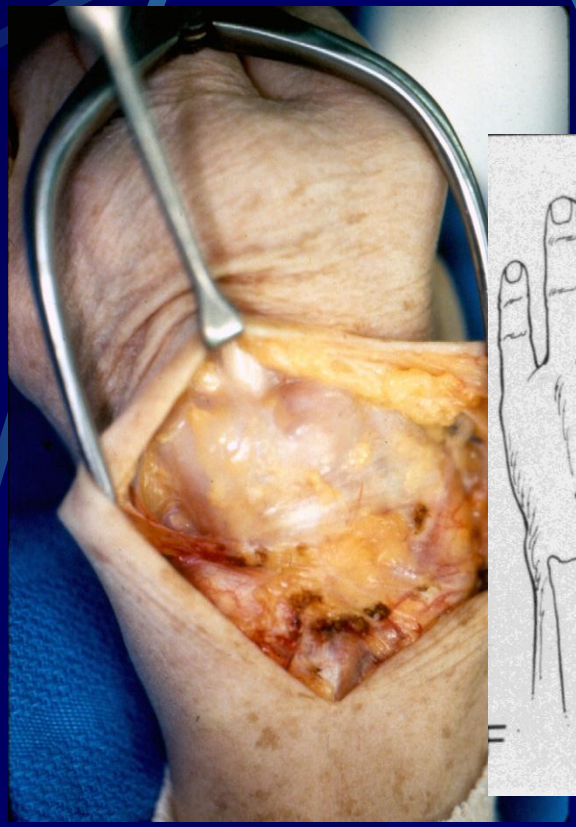
- Weakness, functional loss, ↓ADL's, pain relief, progressive deformity
- "tailor made" surgery: no cookbook
- Proximal deformities first!
- Limit surgery to that can be done in 2 hour tourniquet time

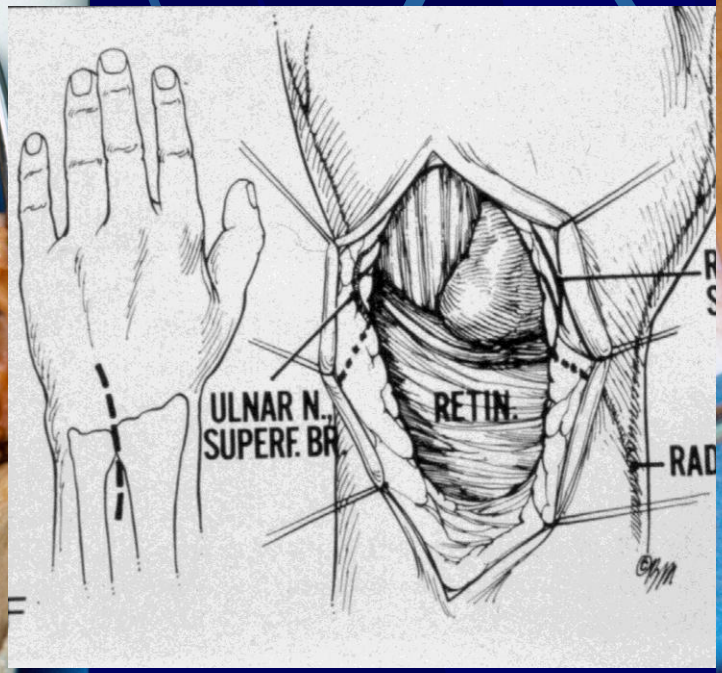
Joint and tendon failure

- DRUJ separation (TFCC rupture), loss of carpal height, carpal translocation, tendon rupture

“Prophylactic” Surgery:

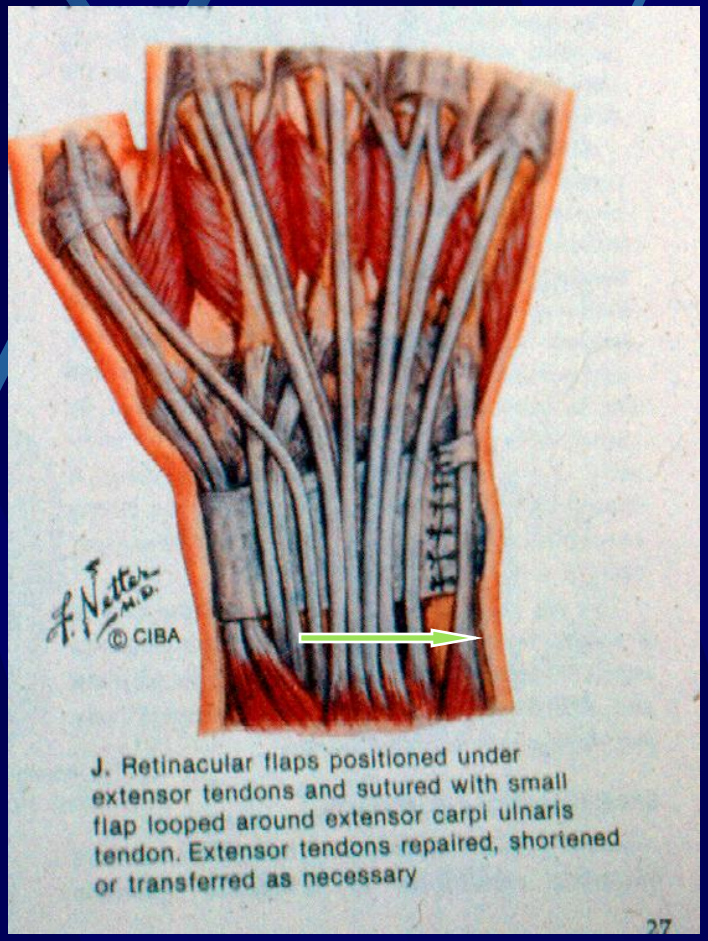
Extensor Teno-synovectomy
Dorsal Stabilization





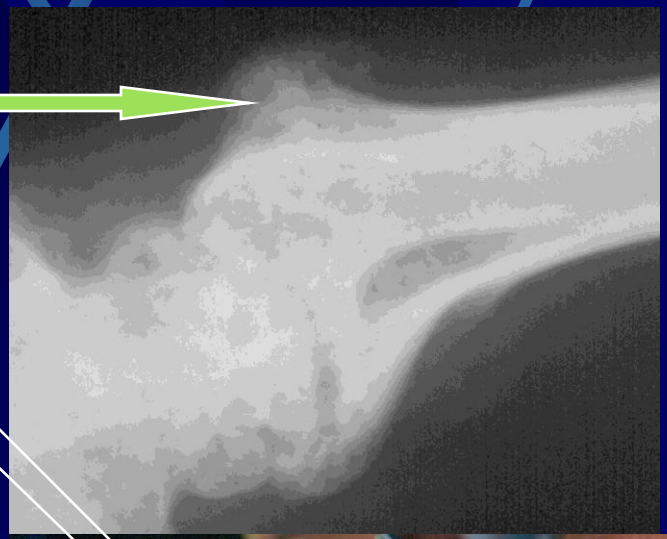
Dorsal Stabilization

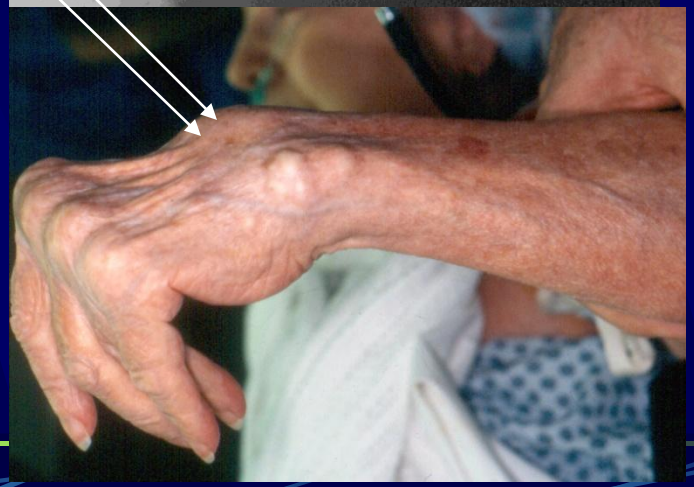
- Central 1/3 of the extensor retinaculum
- Threaded beneath the tendons
- Reinforce joint
- ECRL ECU transfer
- Prevent bowstringing: leave some retinaculum



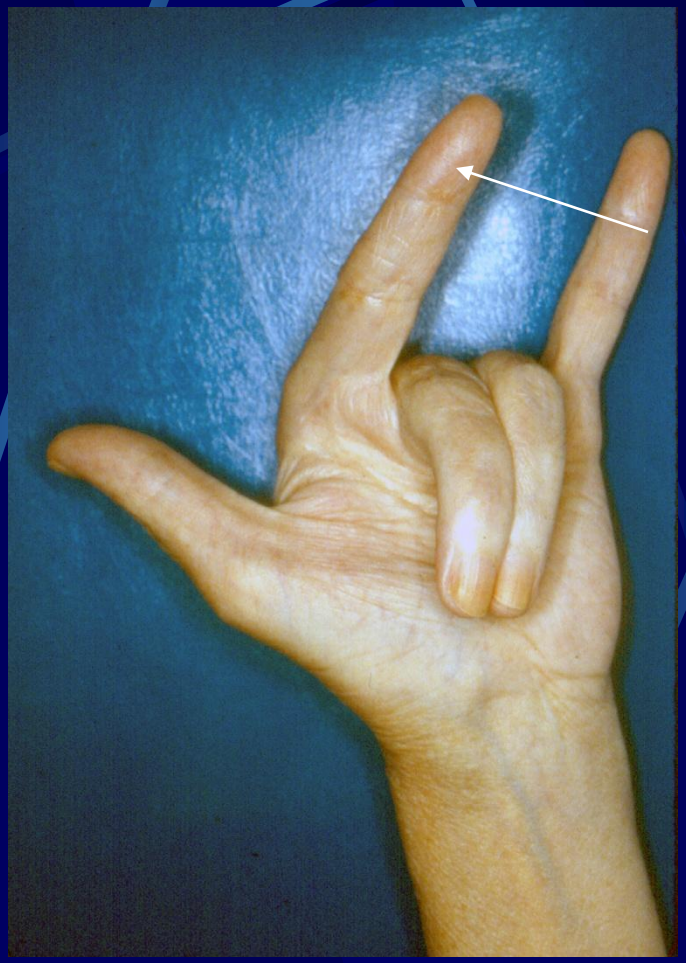
Vaughn-Jackson

- Carpal supination
- Proud caput ulnae
- Volar carpal subluxation
- DRUJ synovitis, TFCC attrition,ECU sublux
- Extensor tendon shift over the ulnar head
- Attritional ext. tendon rupture
- R/O radial nerve palsy (tenodesis test)

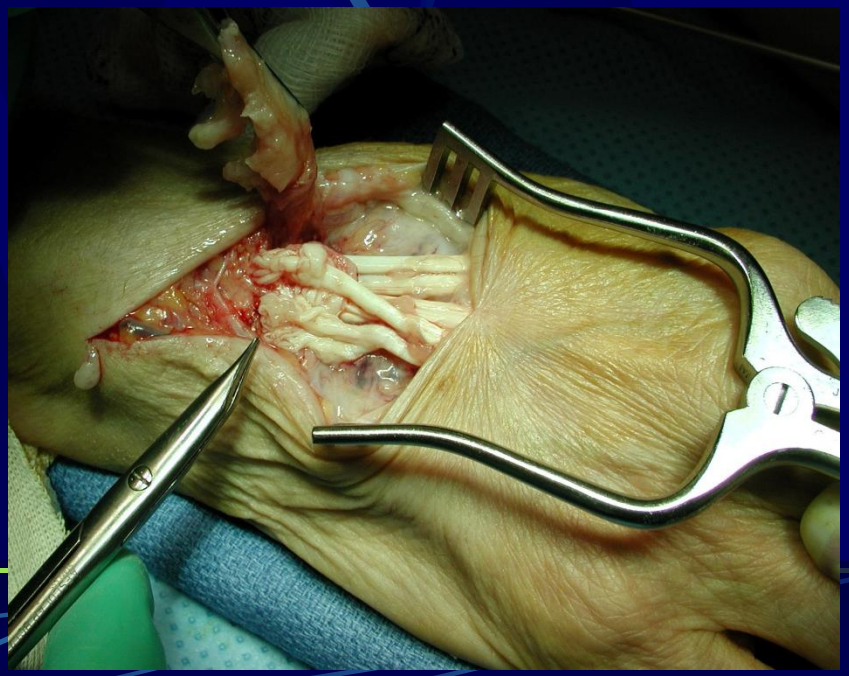




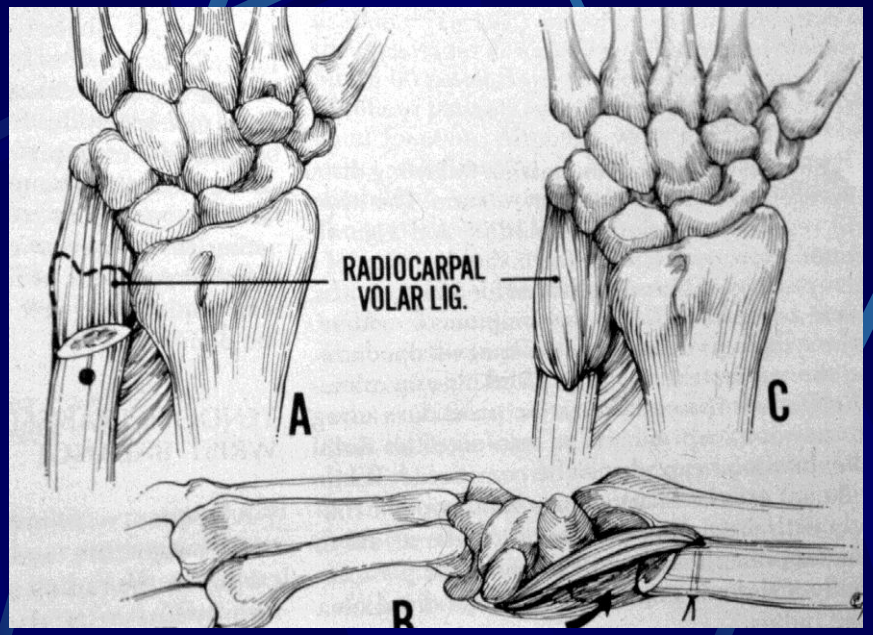
Extensor Tendon Rupture

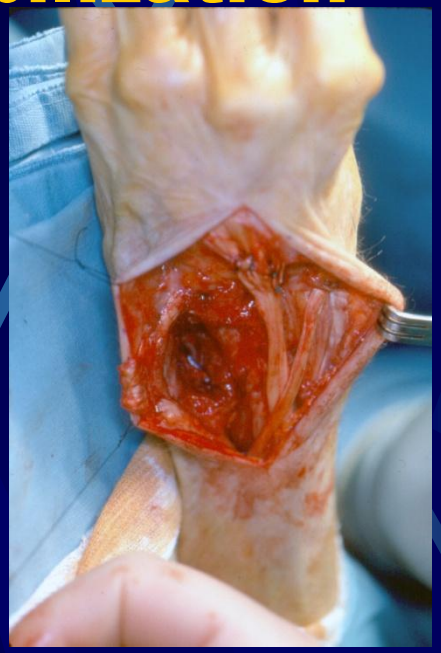


- Lysosomal enzymes
- Sharp bone edges
- Ischemic changes
- Ulnar to radial progression



Darrach
DRUJ stabilization

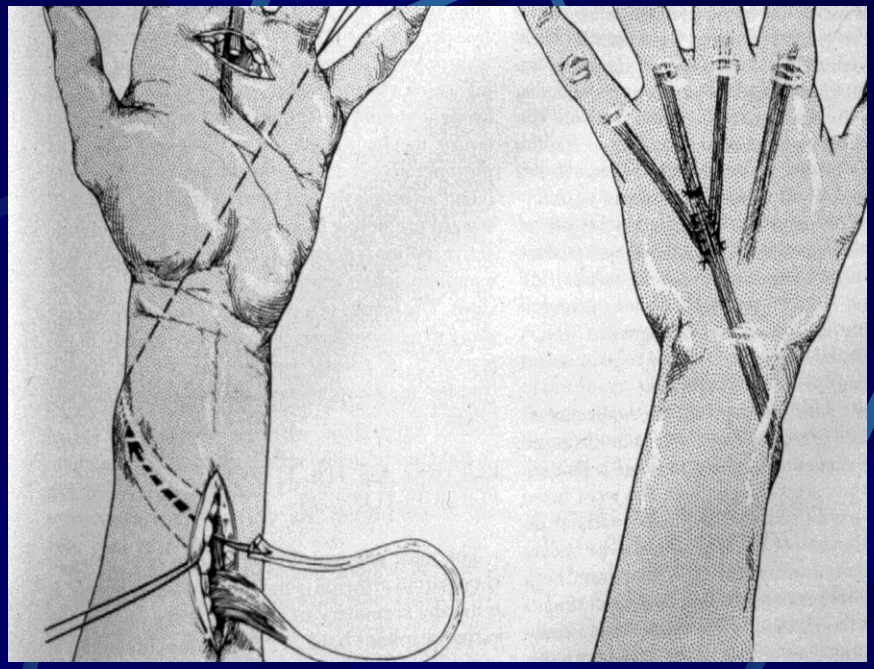




- DRUJ synovectomy
- Capsule, tendon stabilization
- Suave-Kapandji

- 86% g→e results in RA
- 36% g→e results in trauma

Extensor Tendon Reconstruction



FCU → EDC II→V

+/-tendon graft

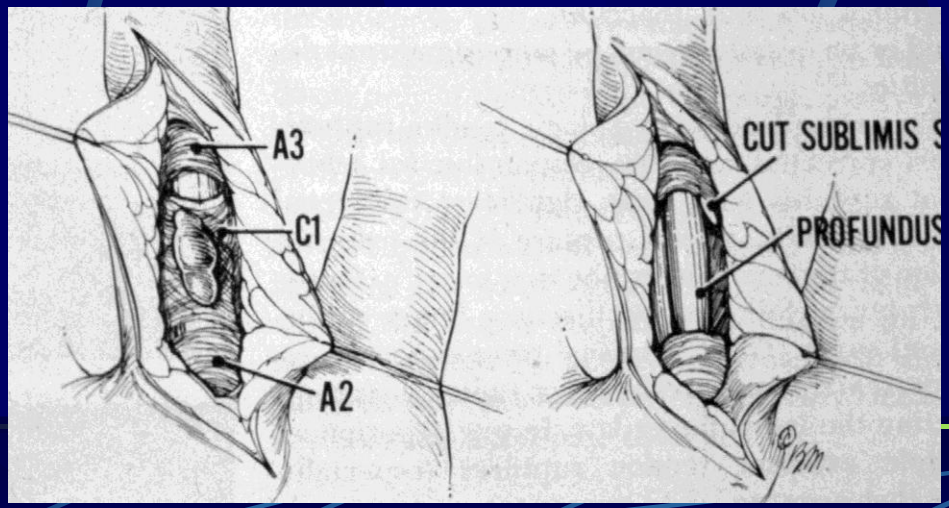
EIP ⟶ EPL

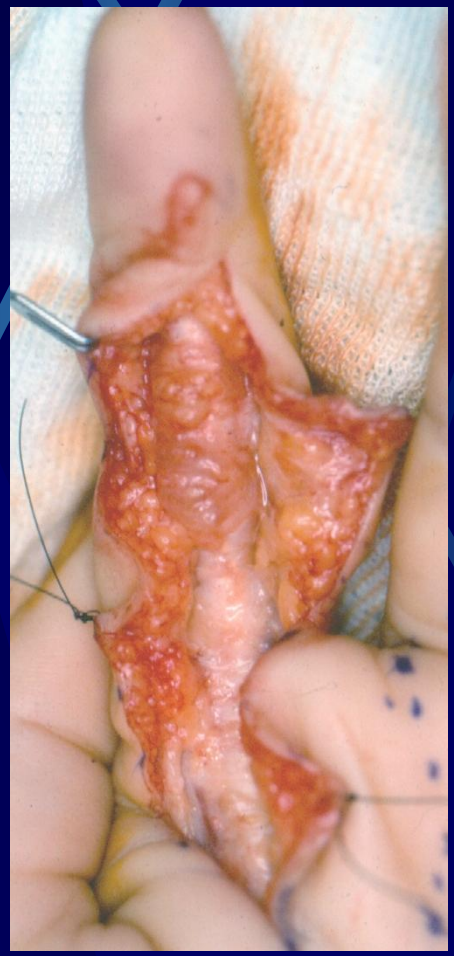
EDC IV,V → EDC II,III

Flexor Tenosynovitis

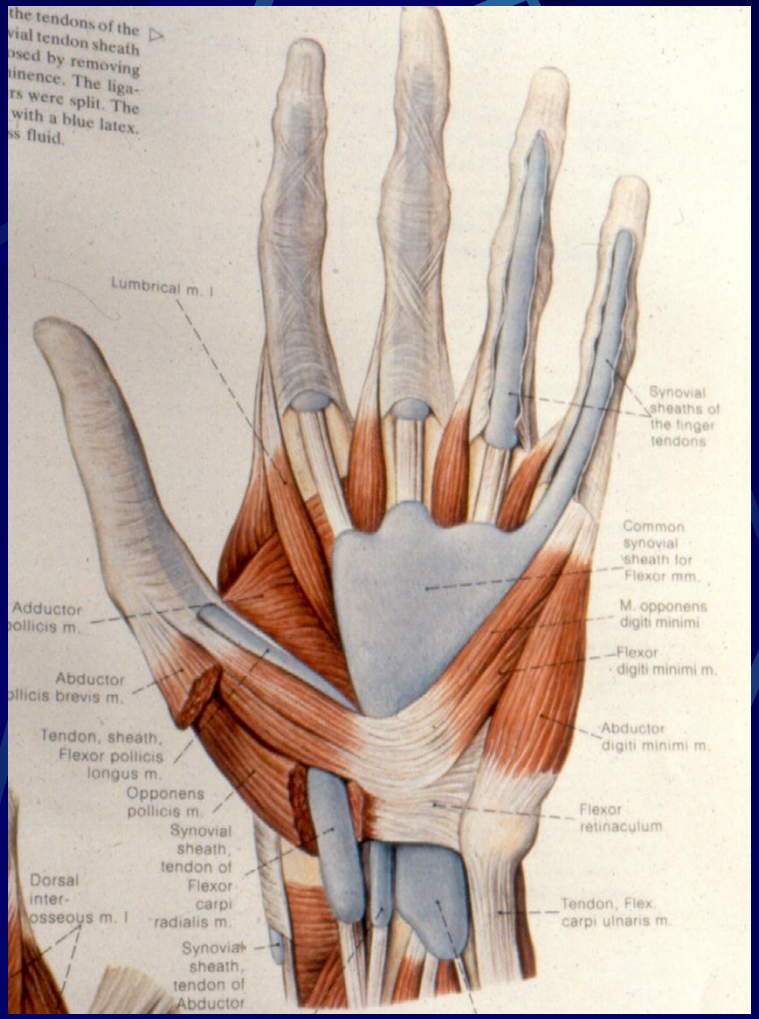
This is <u>not</u> a trigger finger !!

- The stenosis can be at the A-1, A-2 & A-4
- Teno-synovectomy, FDS excision
- No pulley release (bowstringing)

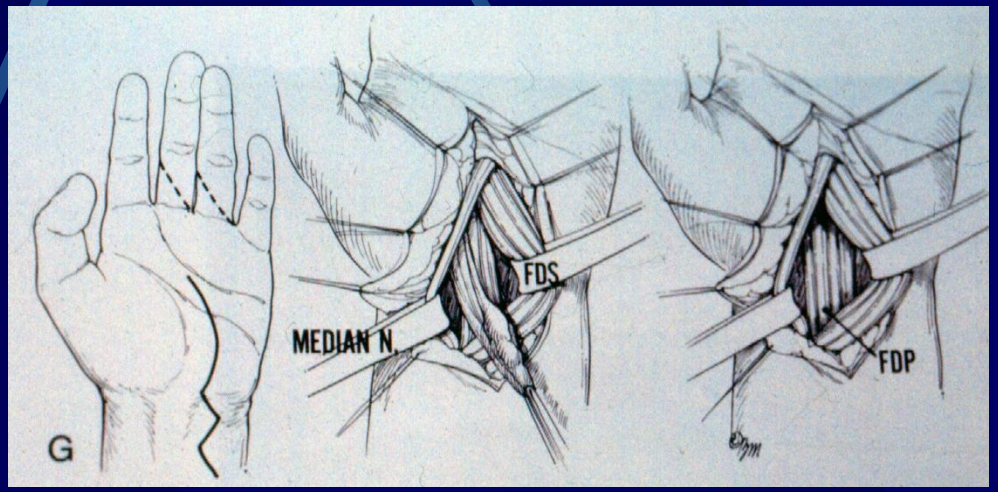




Carpal Tunnel Syndrome

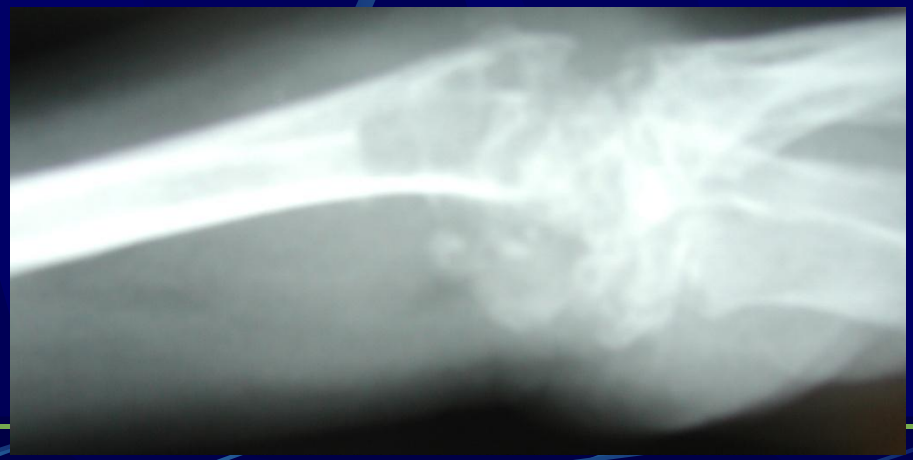


- Flexor Tenosynovitis
- Severe median neuropathy



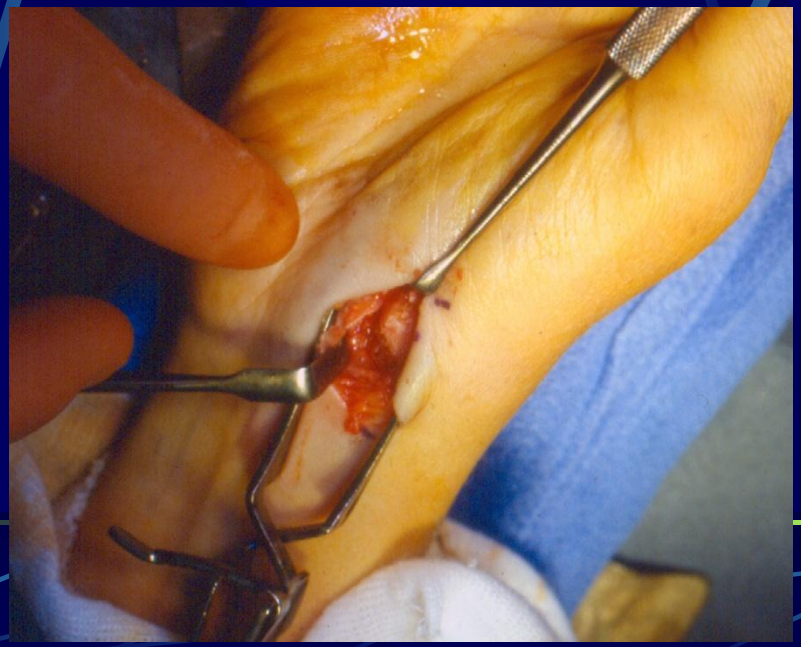
Mannerfelt Syndrome

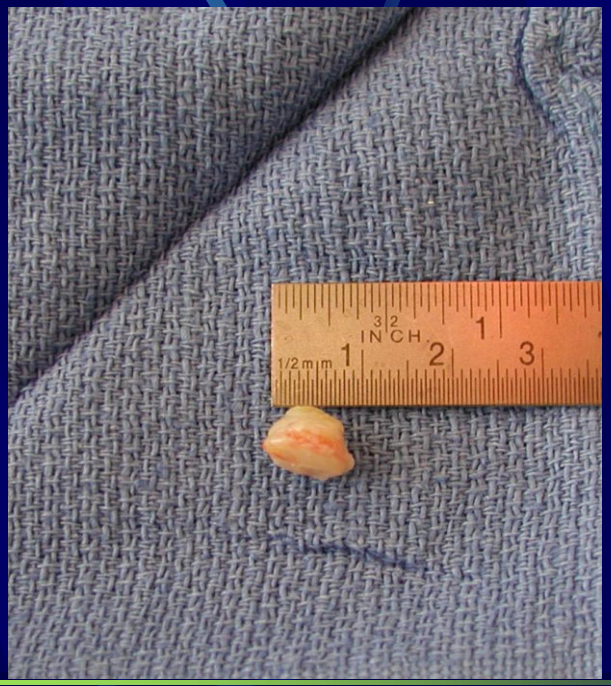
- Attritional rupture of the FPL and FDS and FDP to the index finger
- Teno-synovitis and friction over scaphoid tubercle



“Prophylactic” Surgery

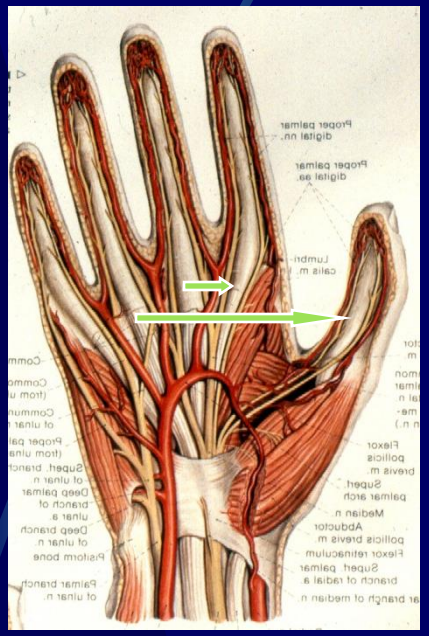
- Shaving down the scaphoid tubercle
- Periosteal repair
- Teno-synovectomy

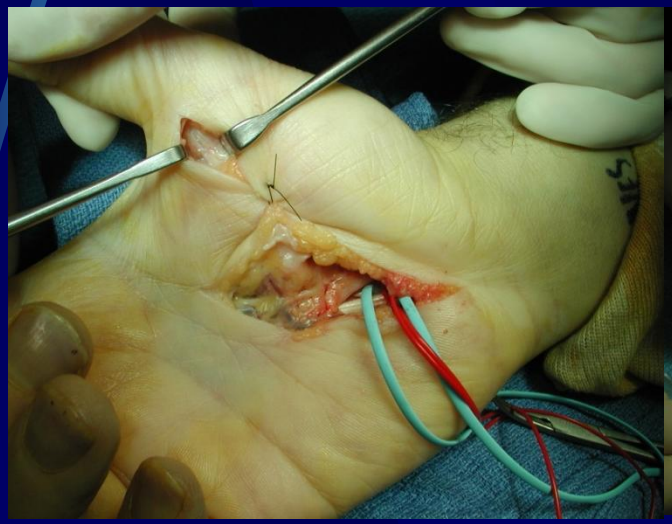


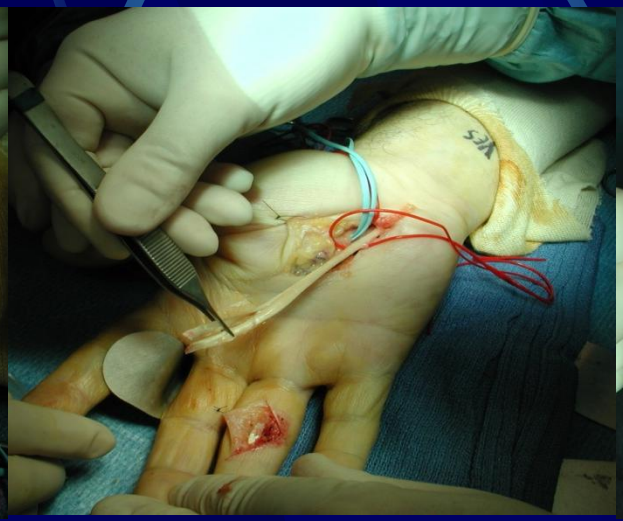


Reconstruction

- FDP-3 ⟶ FDP-2 (side to side)
- FDS-4⟶ FPL







Wrist Pathology

- Chronic synovitis
- Ligament, bone destruction
- Ulnar head dissolves
- Ulnar carpal drift
- Carpal bone,distal radius destruction
- Zig-zag deformity

- SL dissociation
- Rotatory subluxation
- Loss of carpal height
- Palmar/ulnar carpal sublux

Wrist synovectomy
open vs arthroscopic

Wrist synovectomy

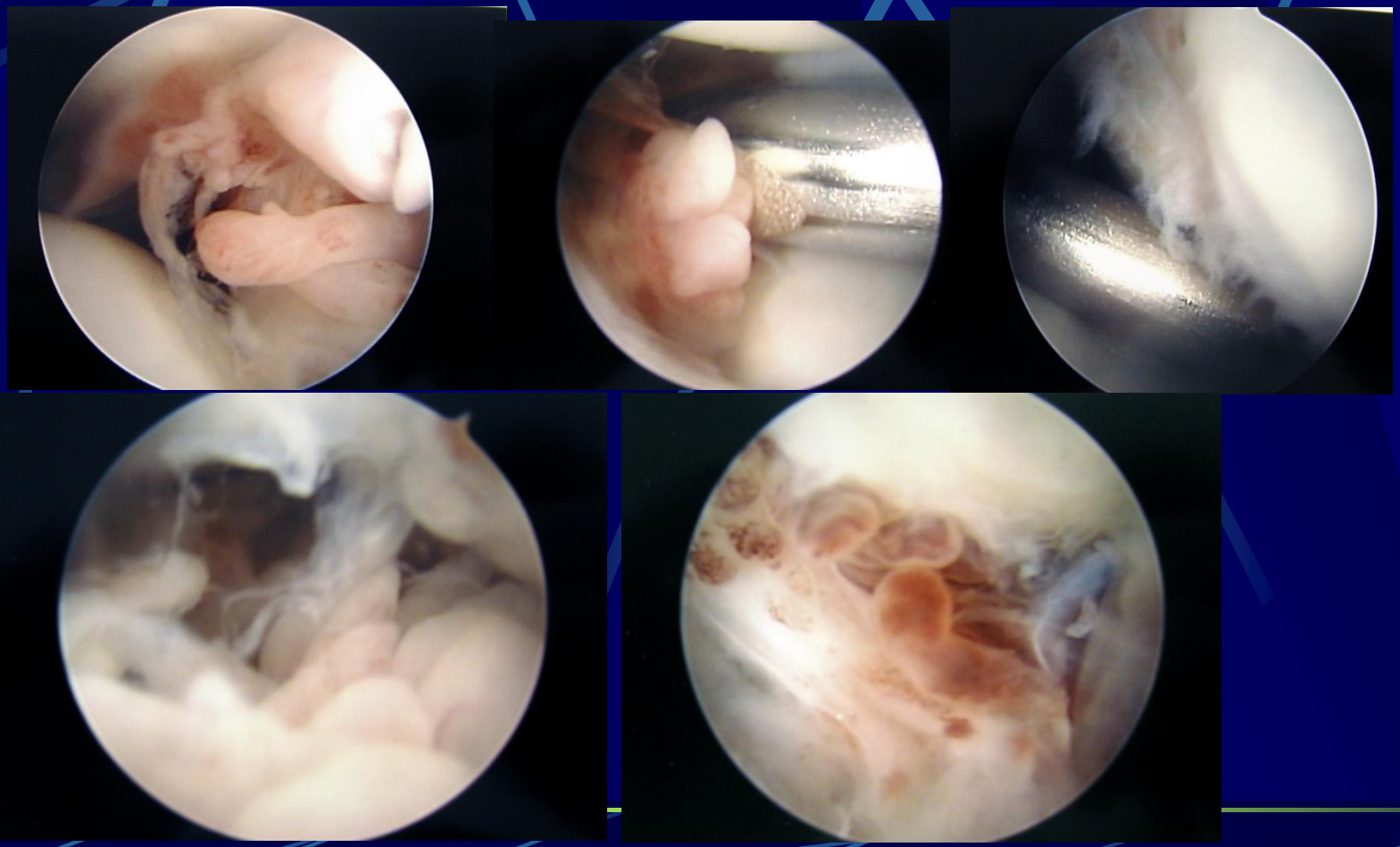
Open

- Pain relief
- Grip strength preserved
- Wrist stiffness
- Carpal collapse not prevented

Arthroscopic

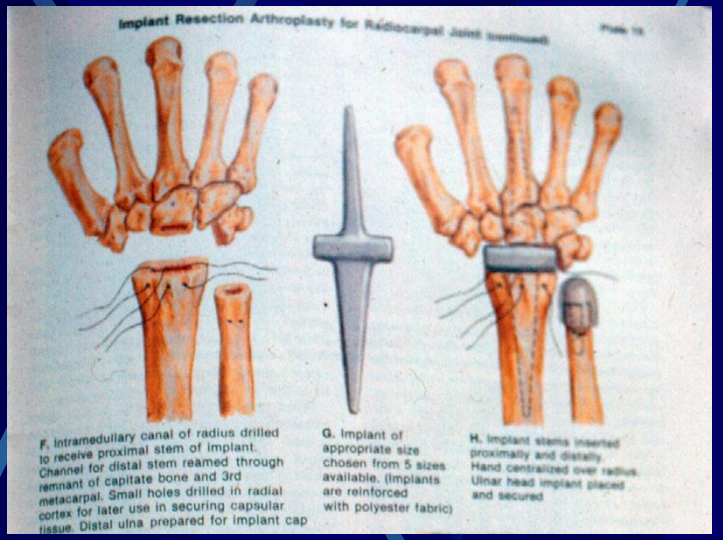
- Pain relief @ 4 years
- Grip strength preserved
- No wrist stiffness
- Can be repeated
- Can be very useful early in the disease

Arthroscopic images: Wrist

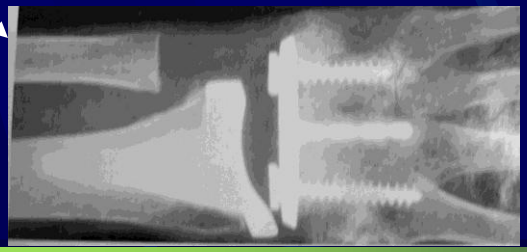


Total wrist arthroplasty

- Low demand patients
- Bilateral involvement
- Titanium and polyethelene (Biaxial)
- Loosening, subsidence (25%)
- Athrodesis salvage



- "Swanson" silicone
- 40% failure rate @ ten years
- Wear particles-synovitis, implant breakage,



TWA contraindications

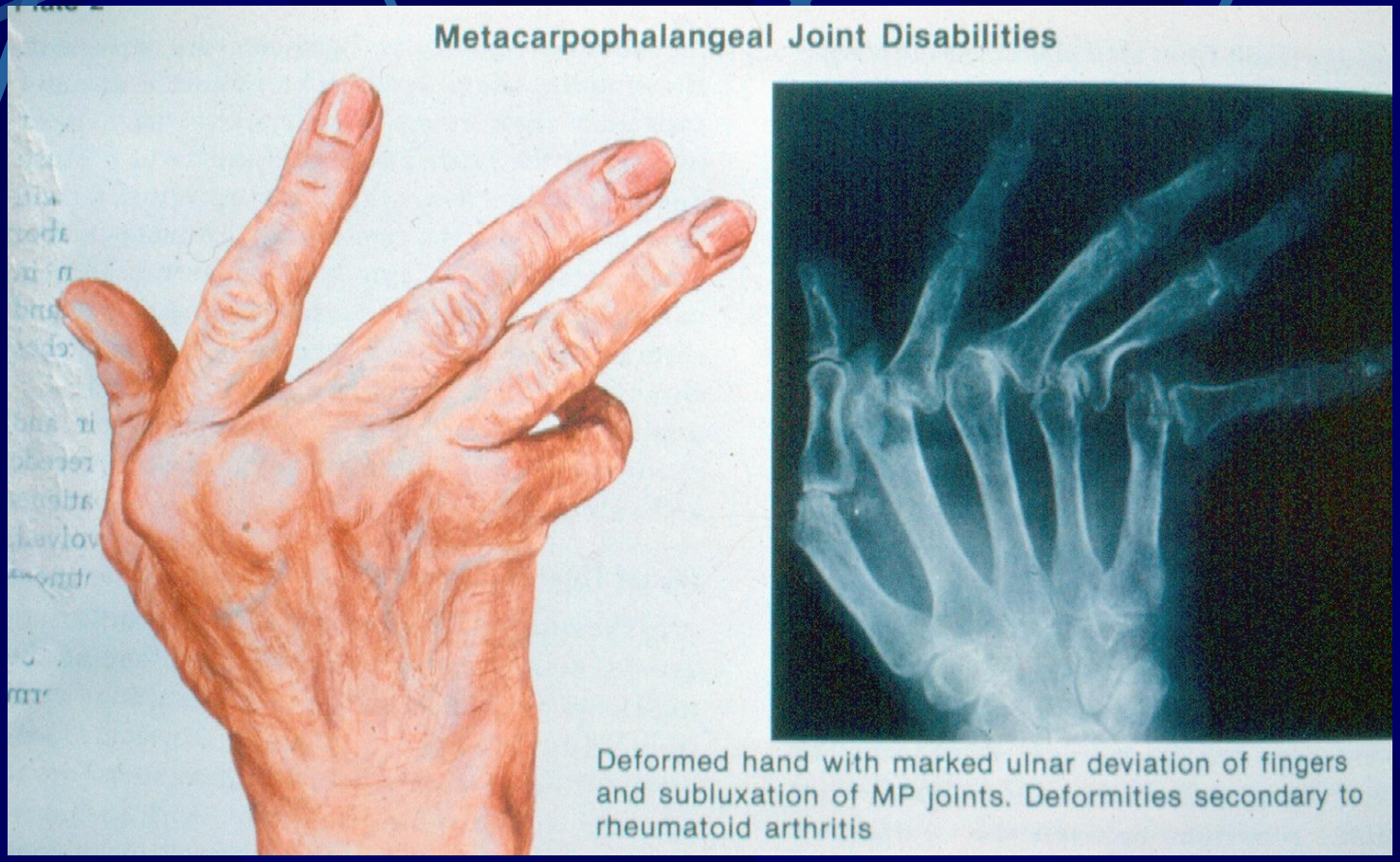
- Upper extremity weight bearing
- Prior sepsis
- Severe loss of bone stock
- Dislocation
- Extensor tendon ruptures
- Failed prior arthroplasty unless custom prosthesis used

Wrist arthrodesis

- One or two rods
- Trans/intermetacarpal
- w/wo tension band
- Plate if not osteopenic
- Can do partial fusion: radiolunate or radioscaphocapitate (can preserve 30° ROM)
- Bilateral fusions don’t affect function

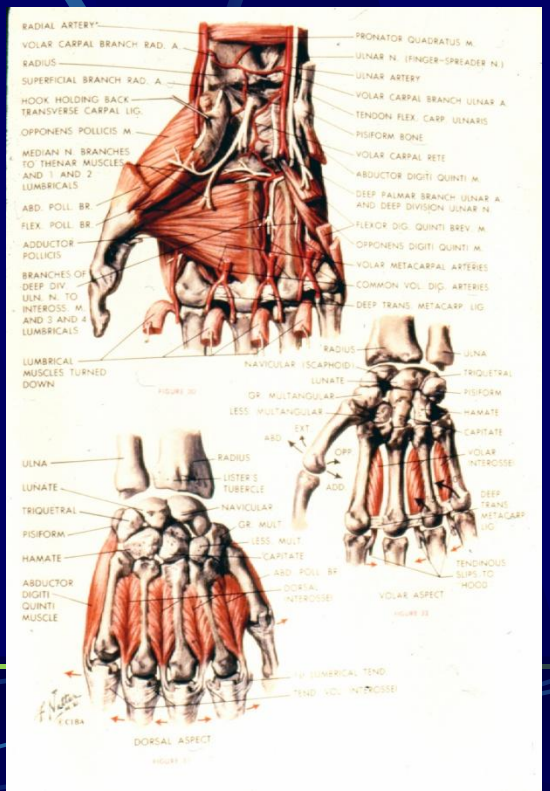
- 90-95% fusion rate

Metacarpophalangeal deformities



Pathomechanics

- Synovial inflammation- joint laxity
- Destruction primarily at the collateral ligament insertion
- Ulnar EDC sublux
- Volar MP subluxation



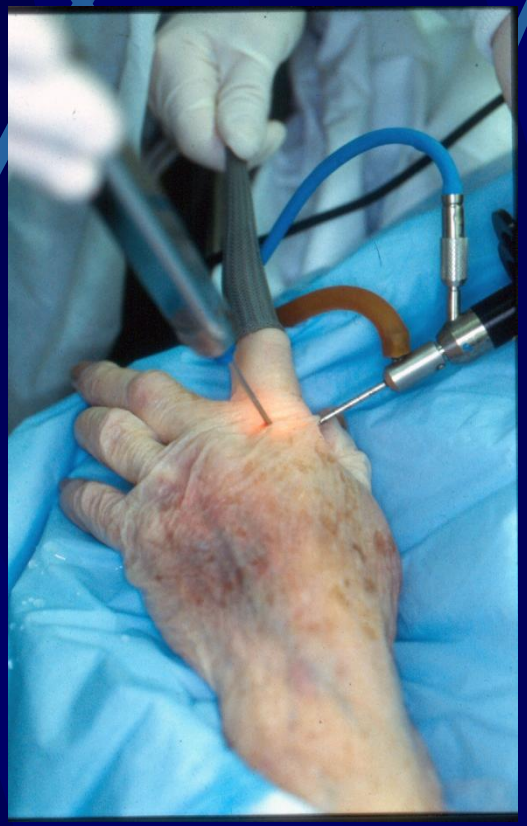
Clinical picture

- Divergent pattern late early

MP synovitis

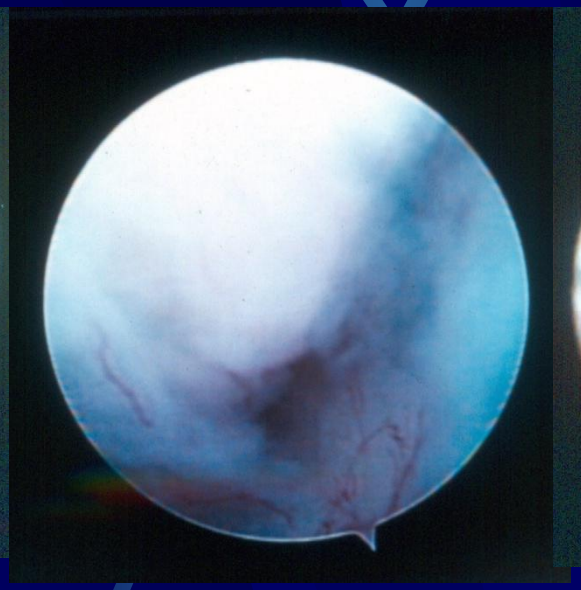
- Can be isolated
- Or diffuse
- Joint space maintained

MP Synovectomy open vs arthroscopic



Arthroscopic images

MP view

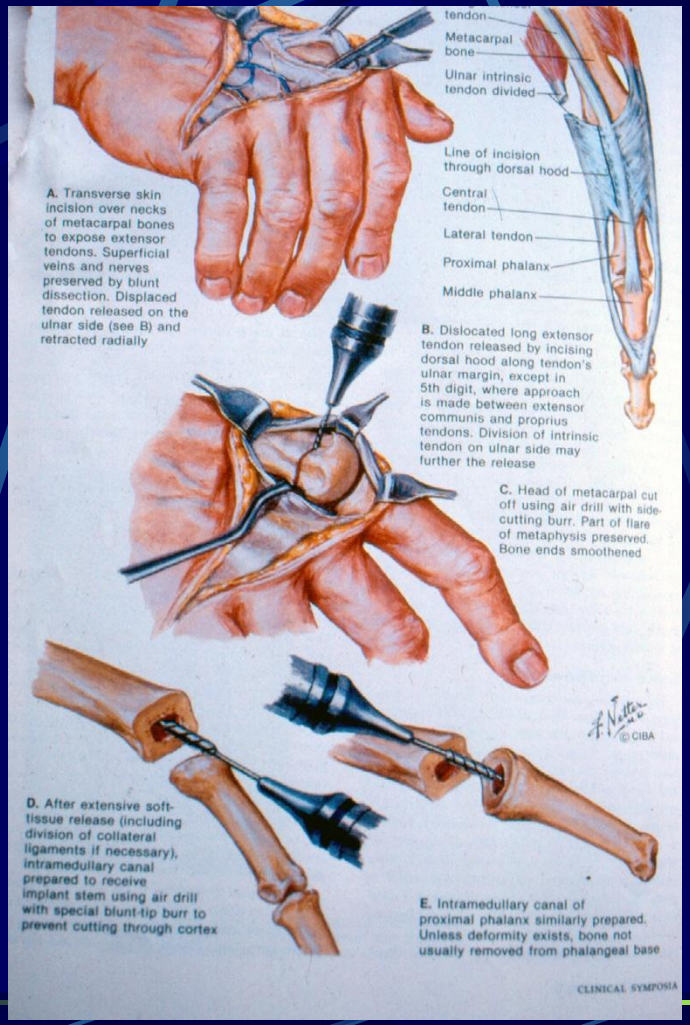


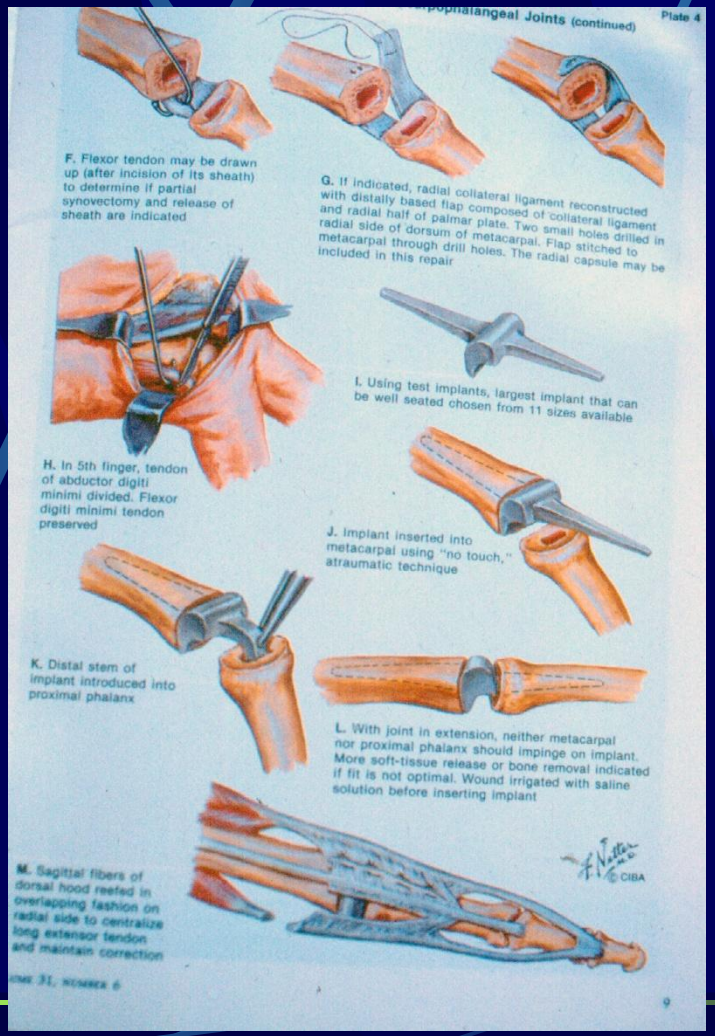
Dorsal recess synovitis

Soft tissue repairs

- Extensor tendon centralization
- Radial sagittal band imbrication
- Rerouting of extensor slip
- Crossed intrinsic transfer (stiffness)

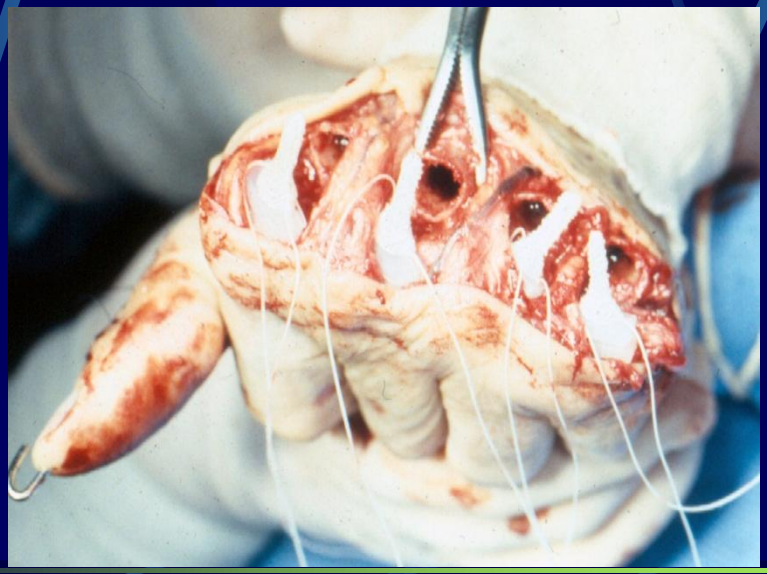
MP Arthroplasty

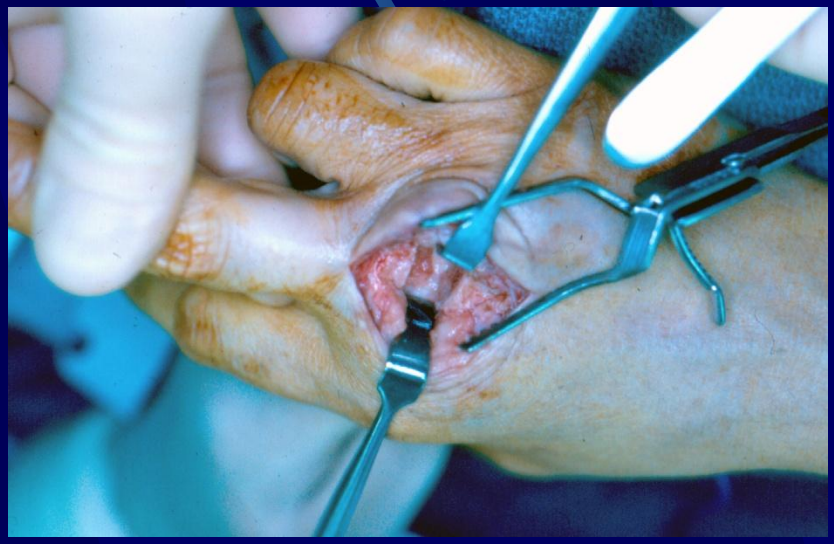




Clinical images

- Intra-operative
- Transverse or longitudinal incisions
- Post-operative
- Early protected motion





Pyro-carbon Arthroplasty

- Contraindicated if there's joint instability

Post op care

- Begin dynamic splinting day 4-5
- Remove for active ROM often, early
- Night splinting
- D/C @ 4 wks

Follow-up correction

preop postop

@10 years, 100% pain relief, 75% ↑function

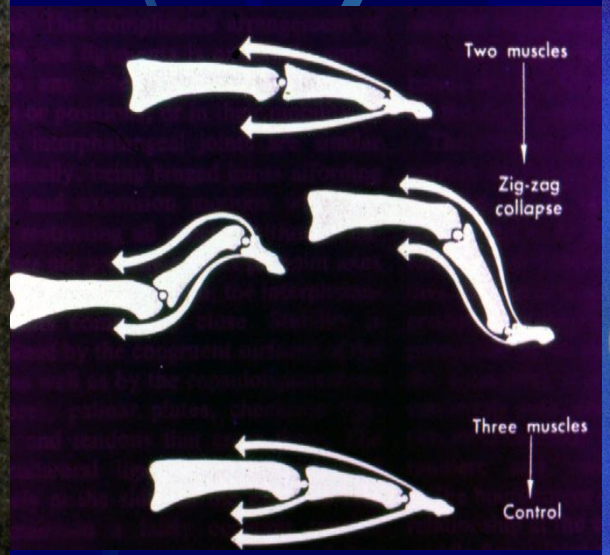
↓ MP flexion ↑ extension

- 28% implant breakage
- 89% osteolysis

PIP Deformities

Boutonniere

Swan- neck



Swan neck deformity

- Hyperextension PIP, flexion DIP
- Attenuation of volar plate @PIP
- FDS rupture
- Dorsal lateral band displacement
- FDP tension, extensor insertion ↑erosion : mallet DIP

Swan neck defrormity : 4 types

- Type 1: supple active PIP motion 2° to DIP mallet.

  Rx: DIP fusion

  Sublimis tenodesis

  ORL reconstruction for ↑DIP extension

  ulnar lateral band rerouting

  volar to axis of rotation

Swan-neck deformity

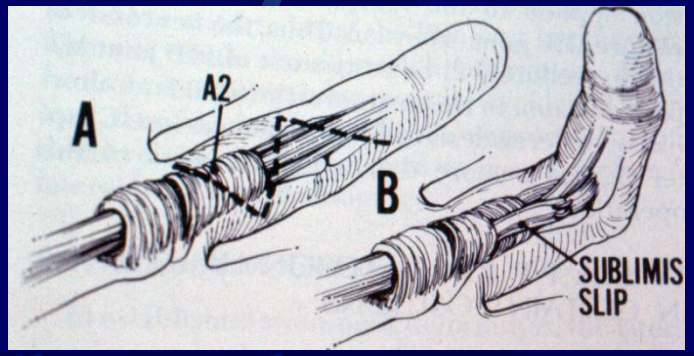
- Type 2: DIP mallet, intrinsic tightness (no PIP flexion when MP extended) MP volarly subluxed and ulnarly deviated

  RX: DIP arthrodesis

  ulnar intrinsic release

  sublimis tenodesis

  MP arthroplasty PIP pin at 20° x 3 wks.



Swan neck deformity

- Type 3: PIP extension contracture, ↓pROM, lateral band scarring, flexor tenosynovitis.

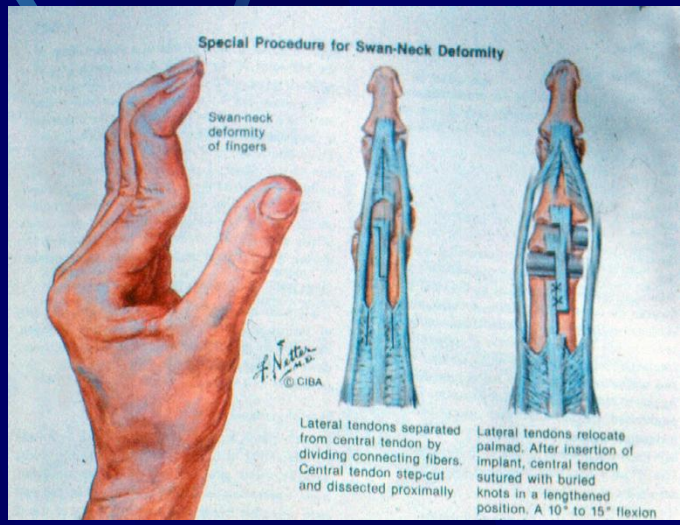
  Rx: EUA manipulation

  PIP arthroplasty, fusion

  lateral band mobilization

  central slip lengthening

  flexor teno-synovectomy



Swan neck deformity

- Type 4: Severe DJD PIP joint
  Rx: PIP fusion

Boutonniere deformity

- PIP flexion DIP extension
- PIP synovitis
- Central slip attenuation
- Lateral band displacement volarly
- Transverse retinacular ligament contraction

Boutonniere deformity: 3 types

- Type 1: >15° extensor lag PIP joint, passively correctible
- DIP flexion passively OK

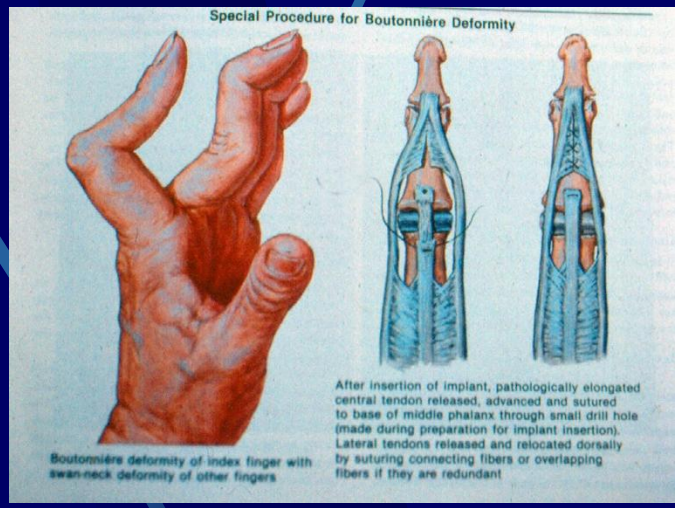
Rx: Night splinting PIP extension

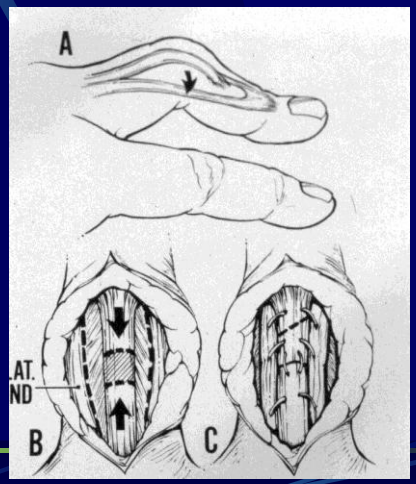
Fowler extensor tenotomy (beyond PIP)

Boutonniere deformity

- Type 2: PIP flexion >30°
- MP hyperexpension
- Passively correctable PIP joint

Rx: central slip imbrication
TRL tenotomy
lateral band relocation
pin PIP x 3 wks. in extension
passive DIP flexion





Boutonniere deformity

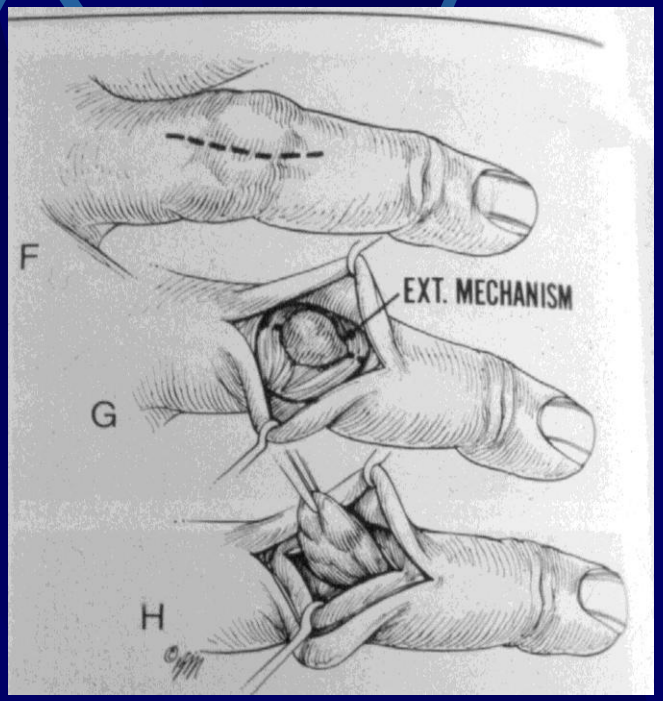
- Type 3: Significant PIP articular destruction

  Rx: PIP arthroplasty with soft tissue reconstruction

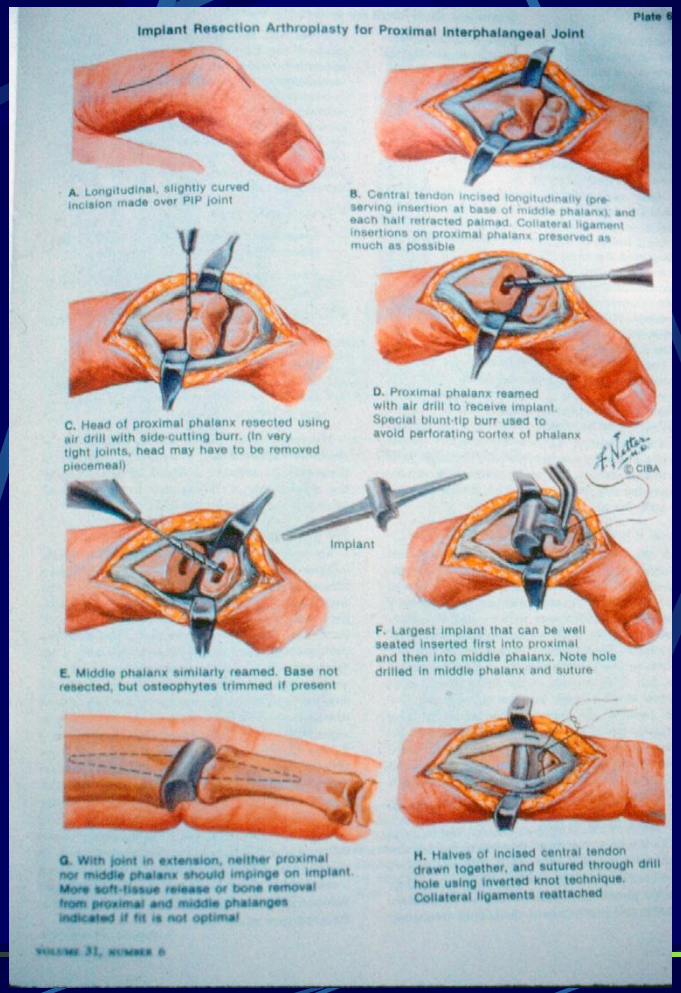
  PIP arthrodesis

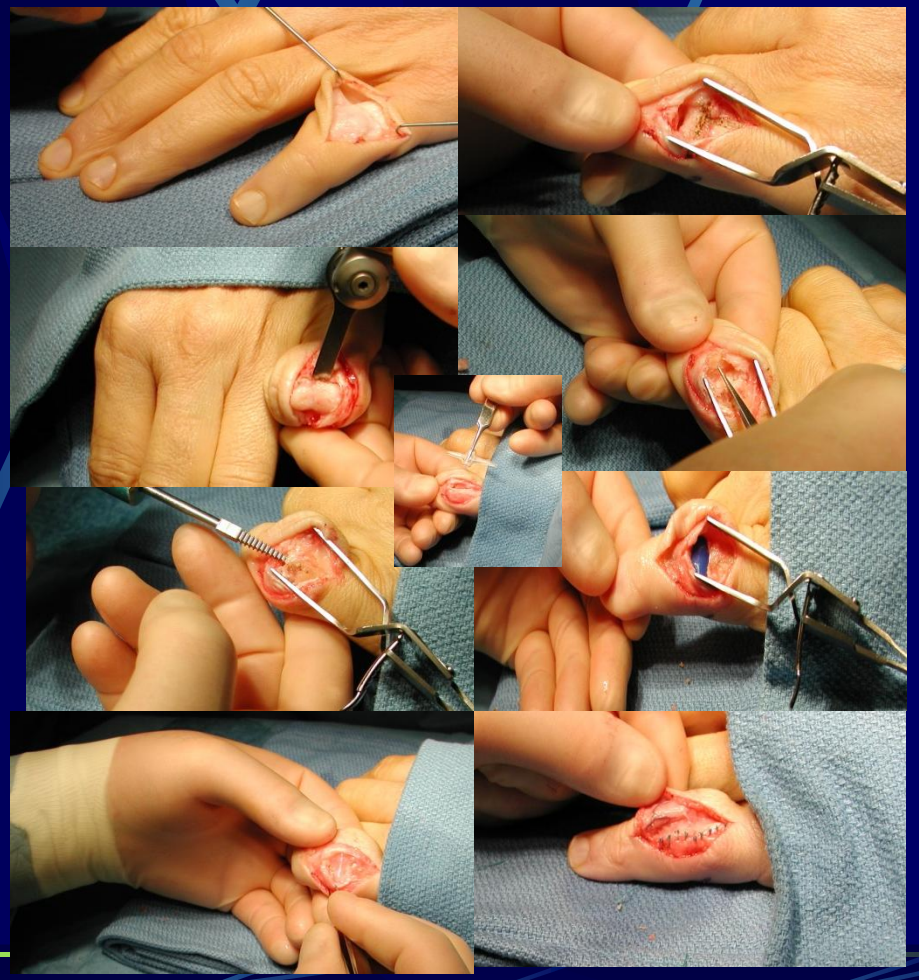
PIP Synovectomy

or RA nodule excision



PIP Arthroplasty





Pre/post op x-rays

pre-op

post-op

Post –op images

“Opera- Glass” Hand

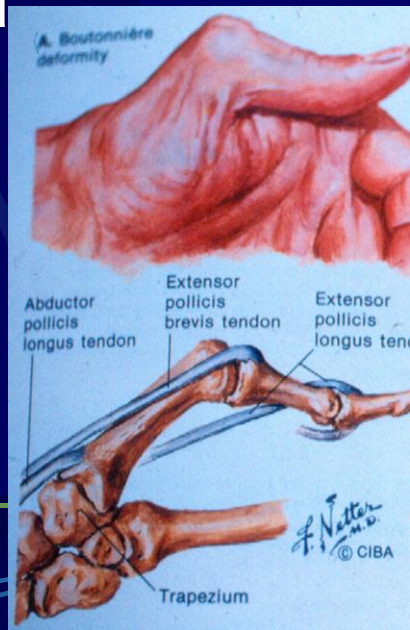
Distal interphalangeal joint

- Joint destruction will require arthrodesis
- 25° flexion, neutral rotation, cascade effect

Rheumatoid thumb deformities

Deformity patterns: 5 types

- Type 1 Boutonniere deformity
- MP flexion, IP hyperextension
- MP synovitis,dorsal capsular distension
- Attenuation of EPB,extensor hood
- EPL displacement volar,ulnar
- Can start from IP with FPL rupture=hyperextension



Boutonniere

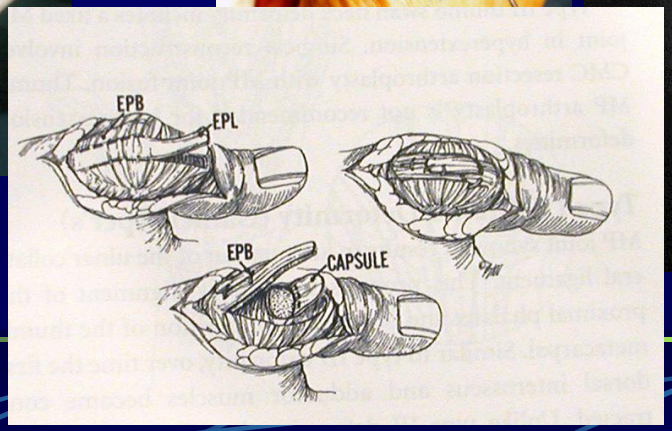
- Rx: If MP &IP passively correctible then
  extensor reconstruction and synovectomy.
  EPL rerouting
  Distal EPL tenotomy and capsular augmentation

If MP joint stiff then → MP fusion

If IP joint stiff the IP fusion or arthroplasty

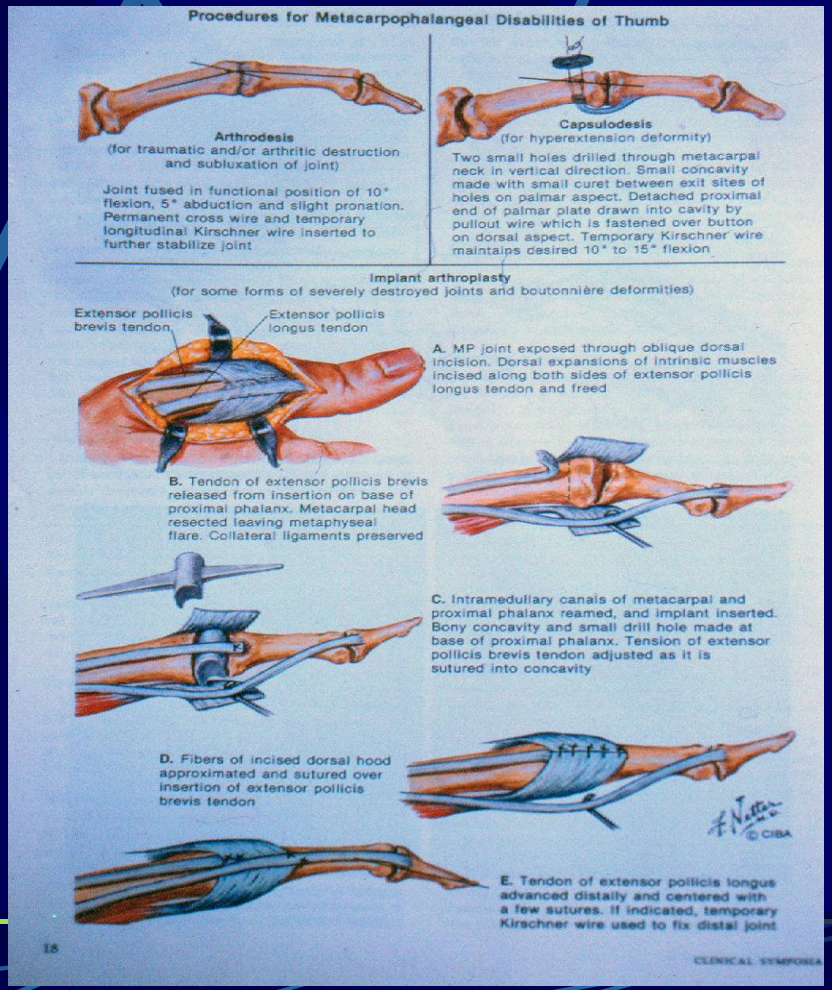
Boutonniere repair

soft tissue reconstruction
EPL tenodesis



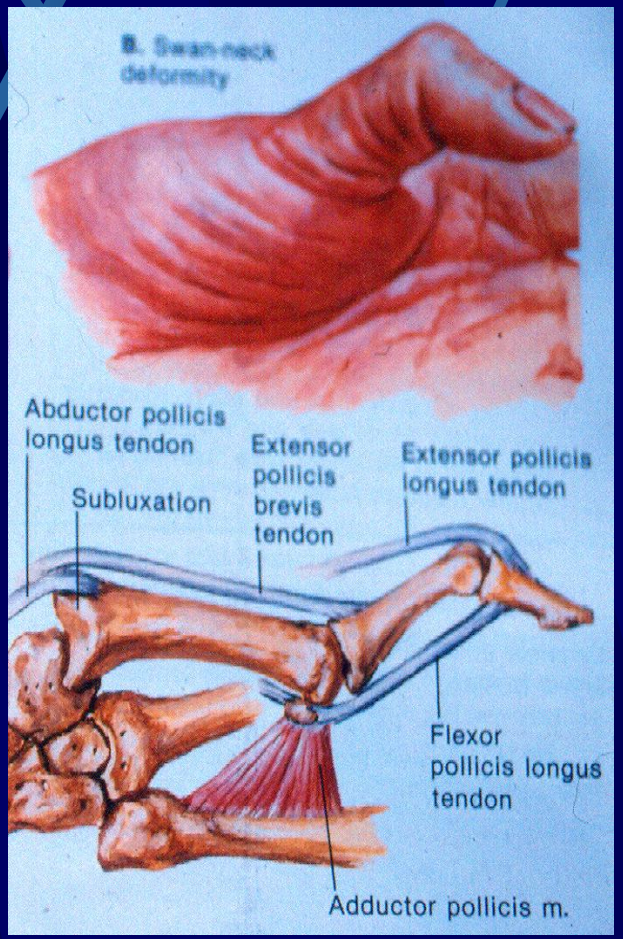
Boutonniere repair: arthroplasty

- ligament rebalancing
- Central slip advancement
- EPL, EPB rerouting



Swan neck deformity type 3

- Starts at CMC joint
- Synovitis instability
- Metacarpal adduction
- MP volar plate laxity-hyperextension
- IP flexion



Swan neck deformity Type 3

- Splinting
- Adductor tenotomy
- MP arthrodesis/
  no arthroplasty
- CMC arthroplasty/
  arthrodeses

Deformity patterns:
IP Joint




Thank You for your attention !