PIP Stiffness

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Causes of PIP stiffness

- **Injured posture**
  - PIP flexed
  - MP extended
- **Joint pathology**
  - Intra-articular injury
  - Palmar plate injury
  - Joint pain
  - Arthritis
- **Tendon Pathology**
  - Extensor tendon adhesion
  - Fracture
  - Surgery
  - Tendon imbalance
    - Boutonniere
    - Swan neck
  - Flexor tendon adhesion
- **Other pathology**
  - Dupuytren's
  - Scleroderma

Summary

- **Causes**
- **Management**

Scleroderma, Psoriasis, Secretans

RhA, CP, OA, DD
Causes of PIP J Stiffness

Iatrogenic

- Poor splintage
- Inadequate instructions to Therapist
- Ham-fisted surgery
- Large metal plates
- Poorly positioned k-wires or external fixator pins

Management

Avoidance

- Flexion contracture
- Extension contracture
- Joint Incongruency or pain
- Tendon adhesion

Avoidance of PIP stiffness

- Anatomical restoration of joint
  - Dislocations
  - Fracture fragments
- Secure fixation of fractures
- Early mobilisation
- Splintage
  - Static
  - Dynamic
- Early competent analgesia
- Avoid swelling
  - Exercise
  - Elevation
  - Coban

- Avoidance
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  - Extension contracture
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Management

- Avoidance
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- Extension contracture
- Joint incongruency or pain
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Flexion Contracture

- Non-operative management
- Check rein ligament release
- Percutaneous accessory collateral release
- Total collateral excision
- Total anterior tenoarthrolysis (TATA)
- Distraction arthroplasty

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Non-operative treatment of flexion contracture

- Exercise
  - Active
  - Passive
- Static splints
  - Zimmer
  - Thermoplastic
- Serial Casting
- Dynamic splints
  - Capener
  - Joint Jack

Surgical release

Indications

- Loss of functional extension
  - good flexion
  - congruous pain free joint
  - no extensor tendon pathology
    - adhesion
    - Boutoniere

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Collateral ligaments of PIPJ

Isometric

Palmar plate anatomy

- Fixed length
- Very strong
- Avulsion vs tear
- Secured distally
- More mobile proximally
- Large excursion
- Flexion-extension

Check rein ligaments

- Pathological
- Between lateral- proximal palmar plate and sheath-ridge of P1
- Communicating transverse artery of vincular system passes beneath check rein

Check rein release

- Technique
  - Straight-Z plasty
  - Elevate A3
  - Retract FDS
  - Divide check rein
  - Excise block of check rein, volar plate and A3 pulley
  - Preserve vincular artery
- Post-operative
  - Avoid splinting if possible
  - Active and passive exercises

Check rein release

Results are very impressive- 96% achieve full correction

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Percutaneous release


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Total collateral ligament excision

- Diao and Eaton JHS 1993 18A:395-402
- N=16
- From 38° to 78°
- No instability
- Ligaments seem to regenerate (MRI)

Total anterior tenoarthrolysis

Flexion Contracture

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Distraction Arthroplasty

- Indications
  - post op arthrolysis

Distraction for Proximal Interphalangeal Joint Contractures: Long-Term Results

- 94 patients
- Average time from injury 48 ms
- Mean follow up 54 ms
- Distraction 10 days
- Improvement
  - 40 degrees extension
  - 25 degrees flexion

J Hand Surg (Am) 2013;38A:1951-56

Management

- Avoidance
  - Flexion contracture
  - Extension contracture
  - Joint incongruency or pain
  - Tendon adhesion

Extension contracture

- Usually associated with more widespread adhesion of extensor hood
  - Plate
  - Wires
  - Vast tendon
- Non-operative
  - Flexion strap
  - Stretching active and passive
- Surgery
  - Dorsal tenolysis
  - Capsulotomy

Management

- Avoidance
  - Flexion contracture
  - Extension contracture
  - Joint incongruency or pain
  - Tendon adhesion
Hemi Hamate arthroplasty

Silicone Joints
do not have to be perfectly placed
they are forgiving

Palmar plate arthroplasty

Eaton et al
JHS 1980;5:260-268
N=24

Bilos et al
JHS 1994;19A:189-195
N=11

Stable, good ROM
Management
- Avoidance
- Flexion contracture
- Extension contracture
- Joint incongruency or pain
- Tendon adhesion

Extensor Tendon Adhesion
- Predisposition
  - Crush injury
  - Tendon injury
  - Surgery
  - Plates, wires, poor technique
- Examination
  - Restricted MP flexion passively
  - Limited active extension
  - Passive extension satisfactory

Passive tenodesis

Extensor Tenolysis
- Creighton et al.
- N=56, retrospective
- May need dorsal capsulotomy
- Results not influenced by delay

Flexor tendon adhesion
- Less common than extensor tendon

Diagnosis
- Poor active pull-through in flexion
- Passive flexion not affected
- Differential position of MP

Treatment
- Flexor tenolysis
  - Gentle surgery
  - High magnification
  - Preserve pulleys
- Two stage repair
  - Damaged tendon and pulleys
Treatment
Tendon adhesion
- Early mobilisation, stable finger
- Intensive hand therapy
  - Active
  - Passive
  - Splints?
    - Static
    - Dynamic

Role of gels
Evidence
- RCT n=45
- Better outcome with gel

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