



# Central Slip Rehabilitation

10<sup>th</sup> Wessex Instructional Hand Course For Surgeons And  
Therapists

15<sup>th</sup> May 2015

Chilworth Manor, Southampton



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- 1995 Establishment of the association
- 620 members
- Member of „European Federation of Societies for Hand Therapy“ (EFSHT) and „International Federation of Societies for Hand Therapists“ (IFSHT)
- Cooperation partner of German Society of Hand Surgery (DGh)





# Annual Congress DGH and DAHTH

**20. Jahrestagung**  
der Deutschen Arbeitsgemeinschaft für Handtherapie (DAHTH) e.V.  
mit dem 56. Kongress der Deutschen Gesellschaft für Handchirurgie

**24. bis 26. September 2015 in Ludwigsburg**  
Infos unter: [www.dahth.de](http://www.dahth.de) und [www.intercongress.de](http://www.intercongress.de)

[www.dahth.de](http://www.dahth.de)



# Rehabilitation after extensor tendon injuries at the PIP joint

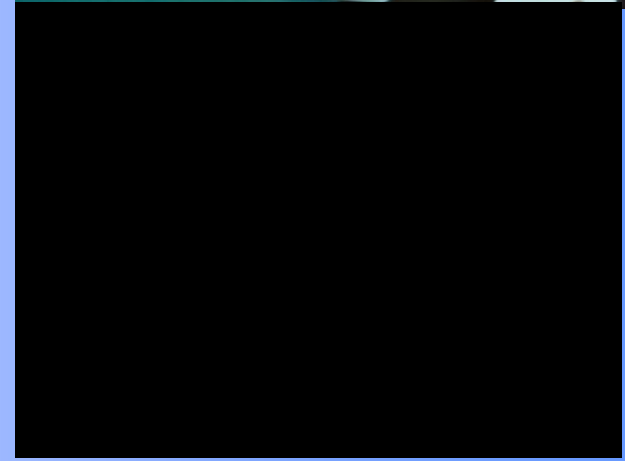
- **Problem**
  - **Immobilization**
    - Adhesions
  - **Mobilization**
    - Insufficiency of Ext. Tendon
    - Risk of rupture



Skylla und Charybdis

# Post-treatment methods after extensor tendons injuries

- **Immobilization**
- **Dynamic mobilization**
  - passive stretching
  - active bending
  - „reversed Kleinert-regime“
- **Active Mobilization**
  - SAM (Early active **S**hort **A**rc **M**otion ) protocol



# Extension of the PIP- joint

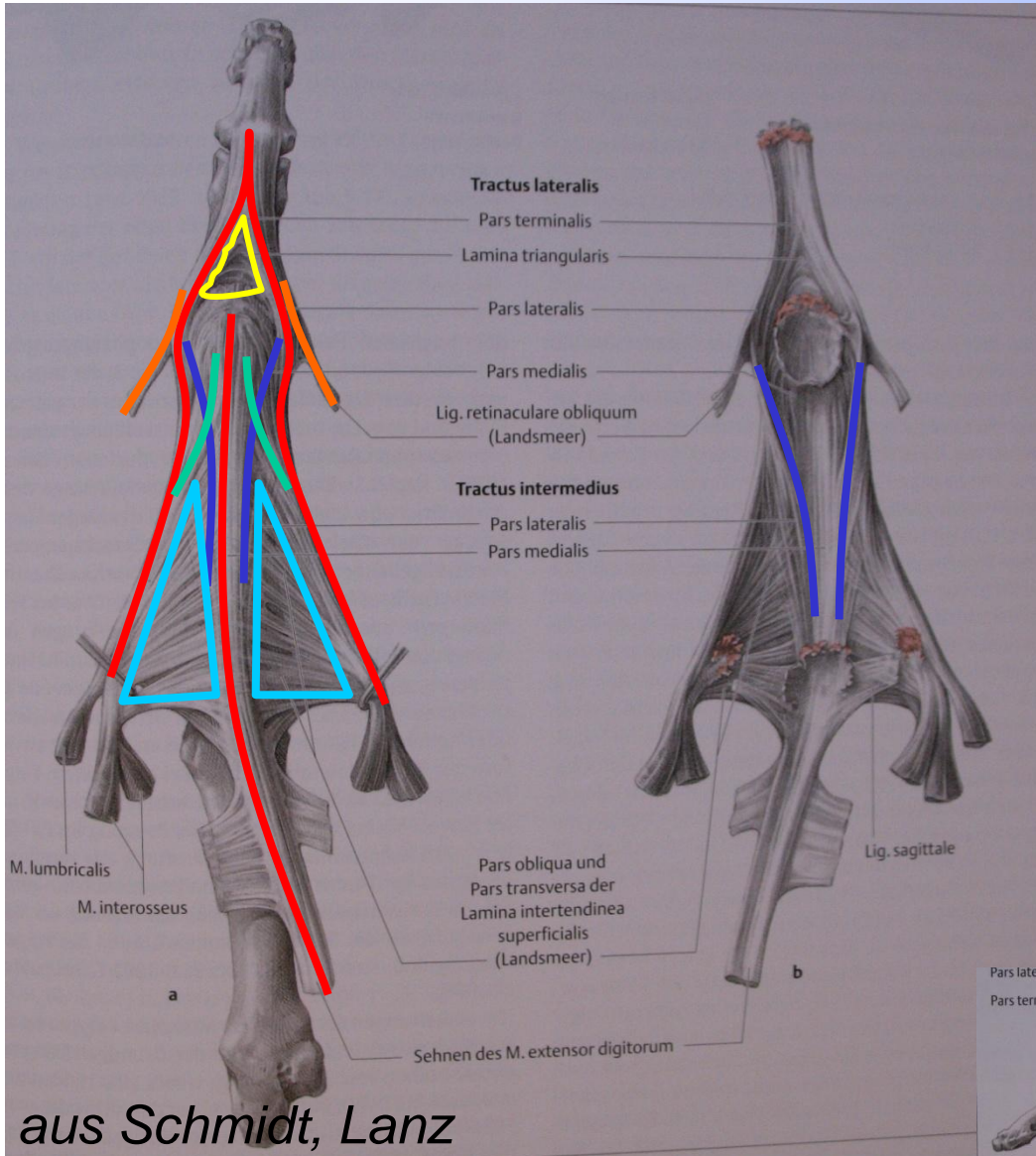


Extrinsic muscles



Intrinsic muscles





Extrinsic Extensors  
Intrinsic Extensors  
Dorsal aponeurosis

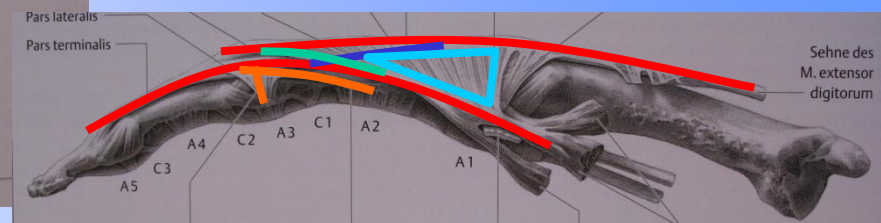
Pars lateralis des Tr. intermedius

Pars medialis des Tr. lateralis

Lamina triangularis

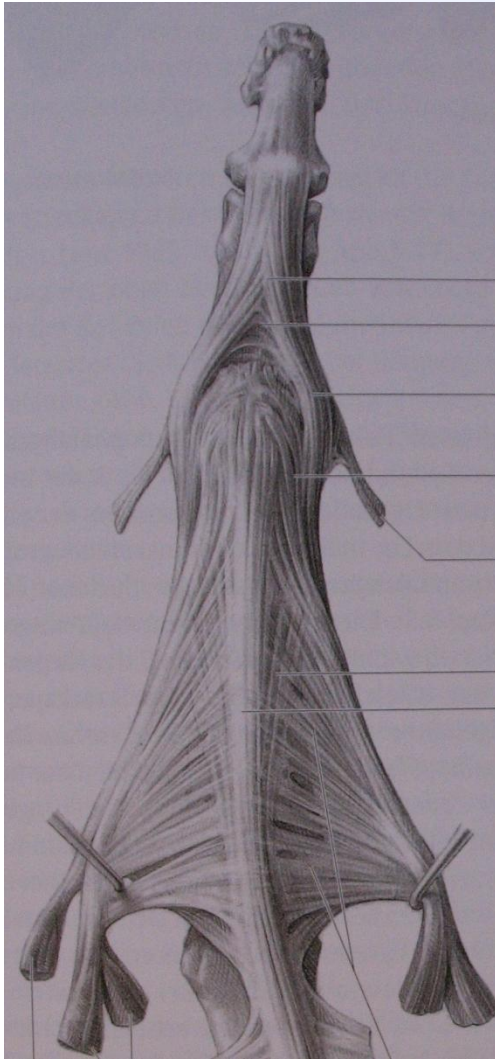
Lamina intertendinea

Ligg. retinaculare obliquum and transversum (Landsmeer)





# Anatomy



worse

8-10 weeks

small, 3mm

static

Blood flow

Immobilization period

Tendon sliding amplitude

Post-treatment principle

better

4-6 weeks

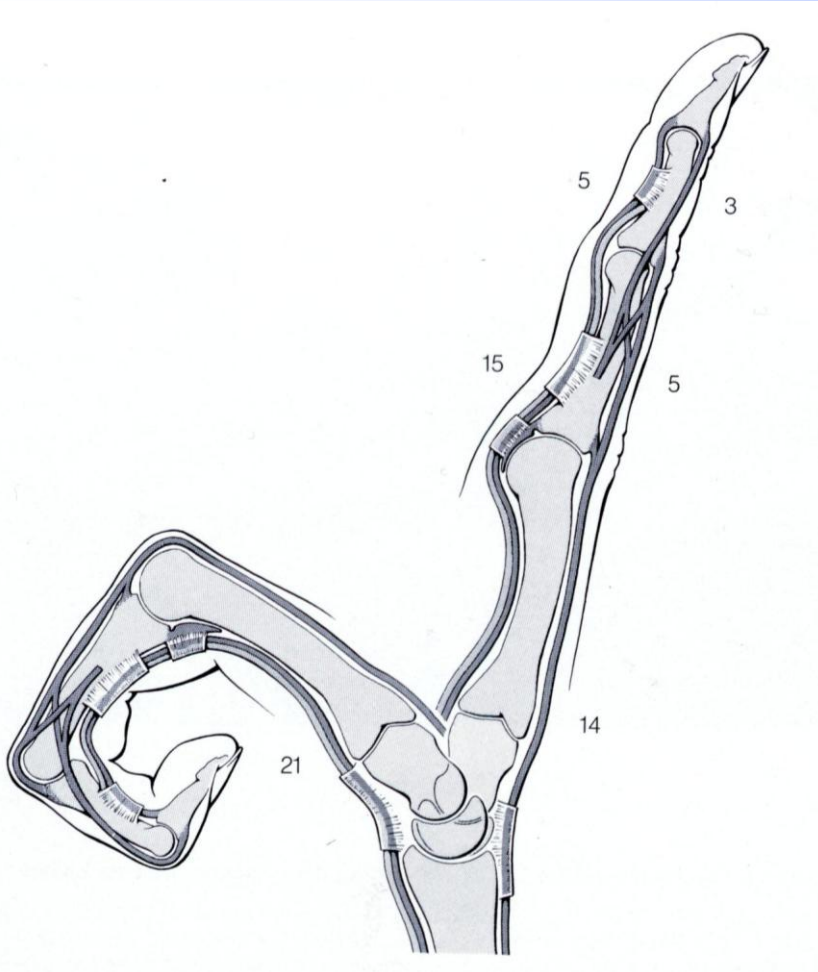
big, 40mm

dynamic

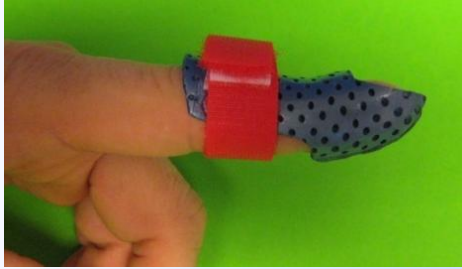


# Extrinsic Extensors

The higher the glide amplitude, the greater the restriction of movement because of adhesions



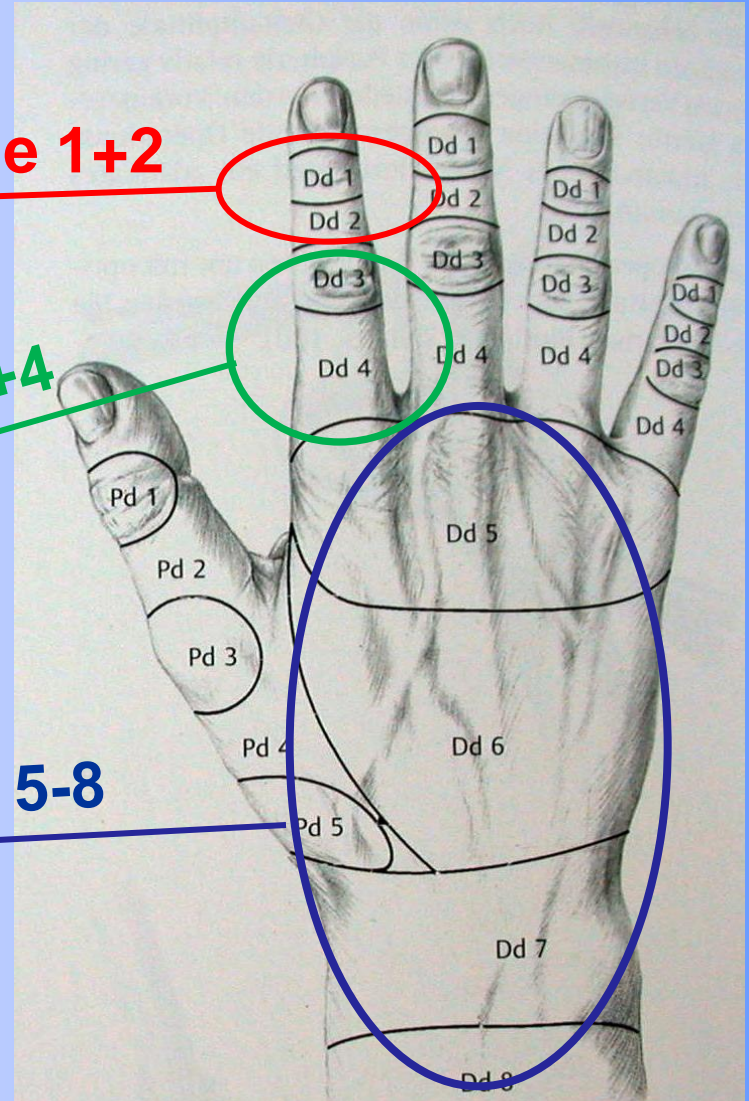
# Zones



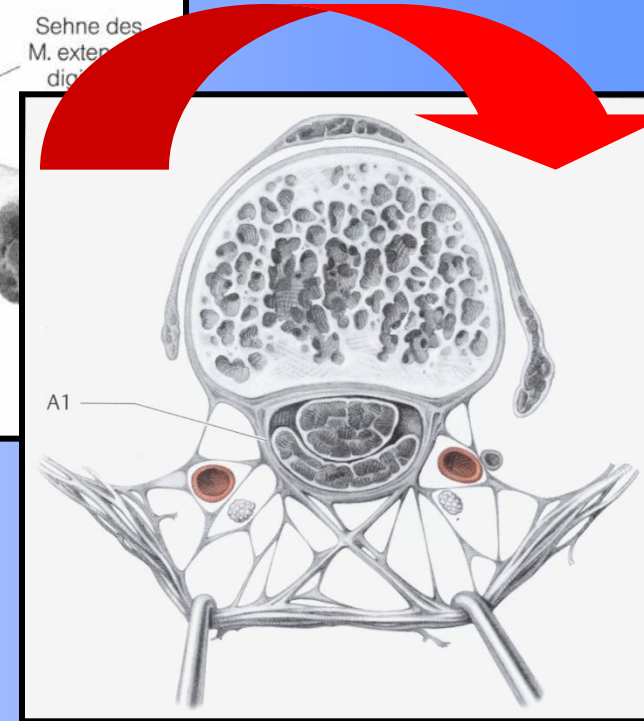
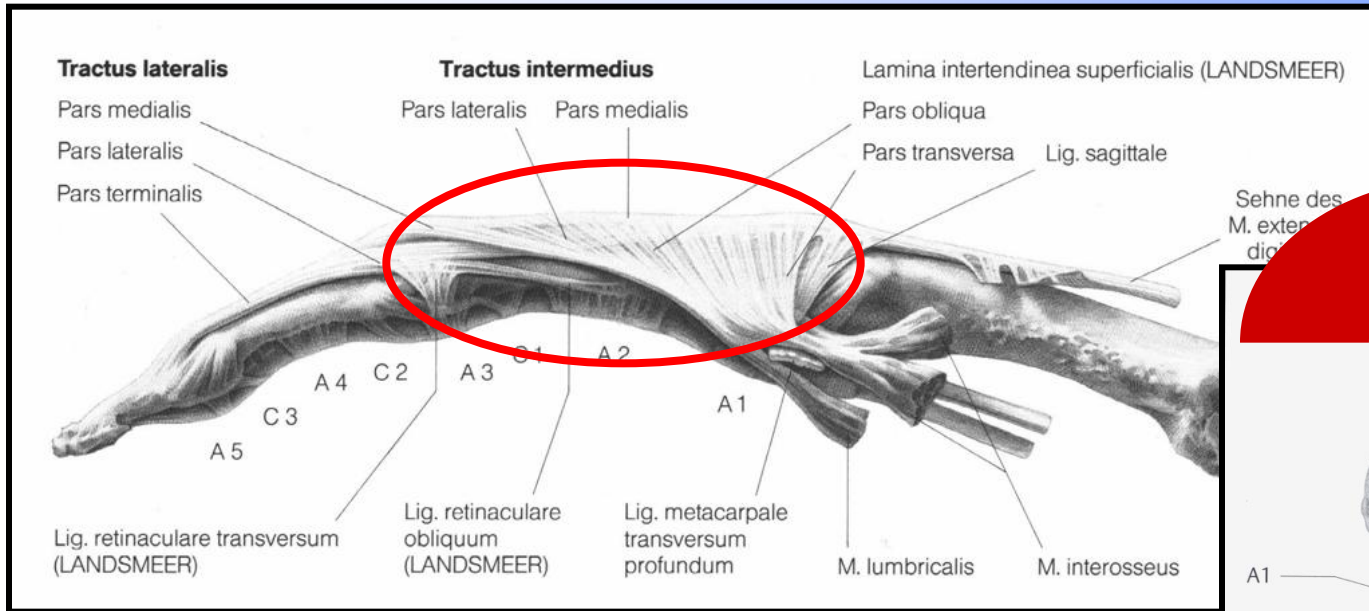
zone 1+2

zone 3+4

zone 5-8



Verdan

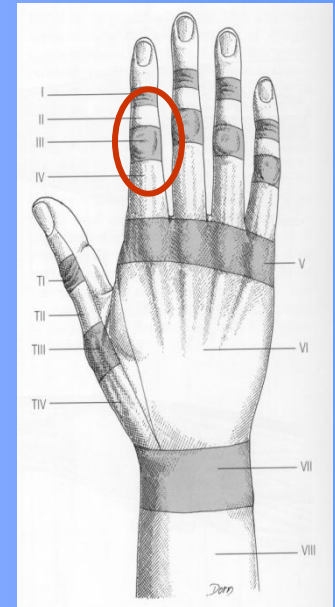


**Wide contact zone  
between bone and  
tendon**

Schmidt H.-M., Lanz U.  
(2003)



- Fresh isolated injuries of the zones 3 and 4
- Fresh combined injuries of the zones 3 and 4, mobilization according to the SAM-protocol, associated injuries permitting
- Reconstructions of the extensor tendons of the zones 3 and 4
- Surgically treated bony avulsions of the Tractus intermedius



## Zone 3

Closed injuries

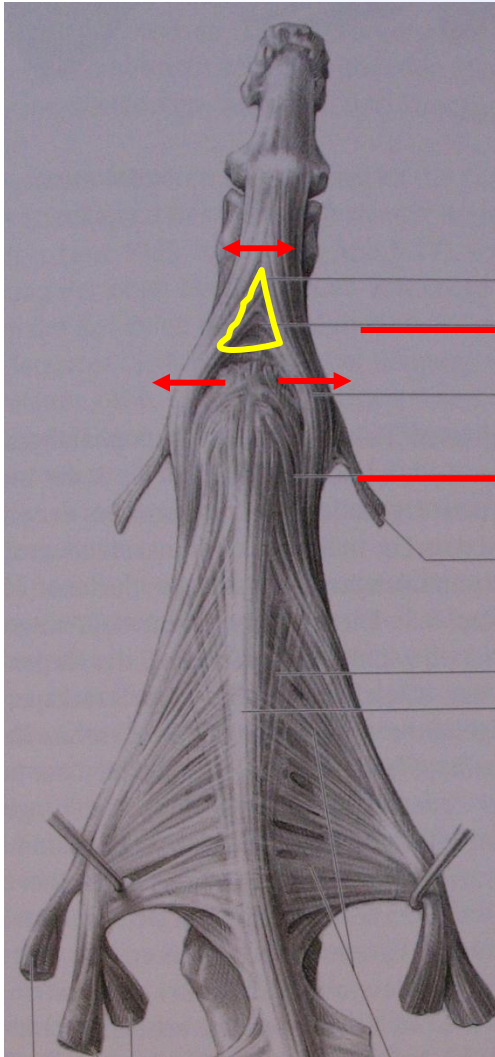
-> difficult to diagnose

Clinical evidence test:

Incomplete PIP joint extension

„Table edge test“

MRI?



# Zone 3

Mechanism of injury:

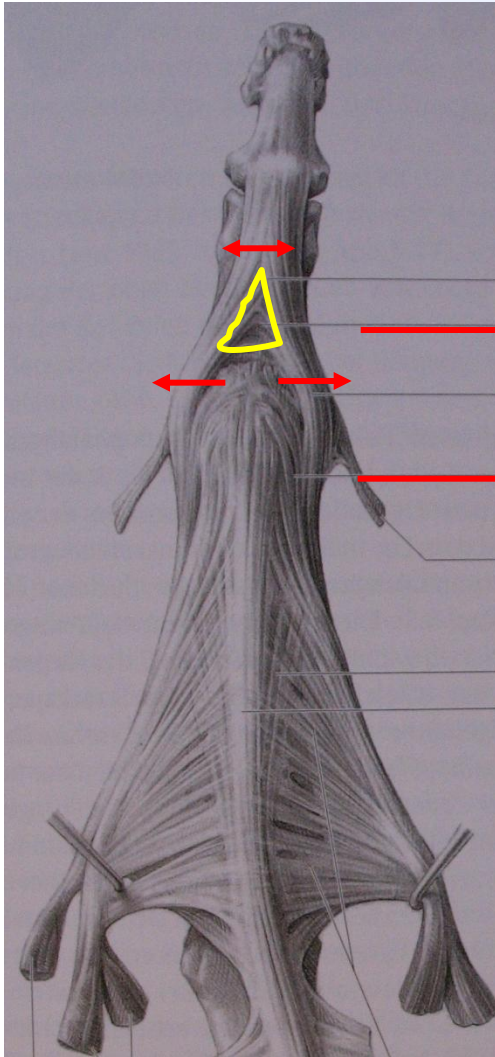
- Closed injuries
- Open violation
- Defect injury



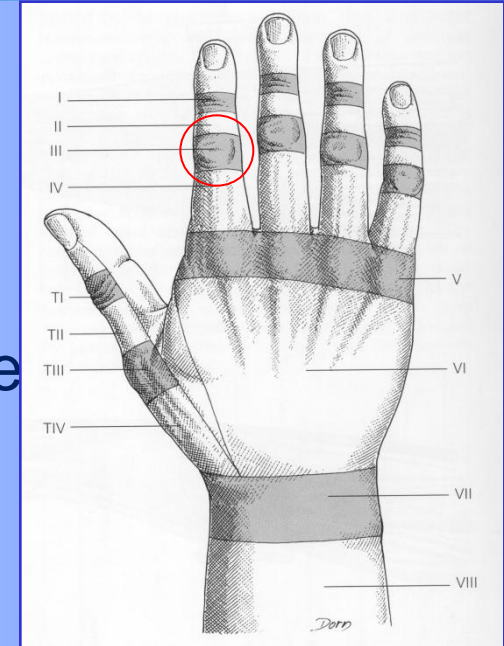
Clinical evidence:

Lack of PIP joint extension

In older injuries the development of a boutonniere deformity is possible



# Zone 3



Therapy:

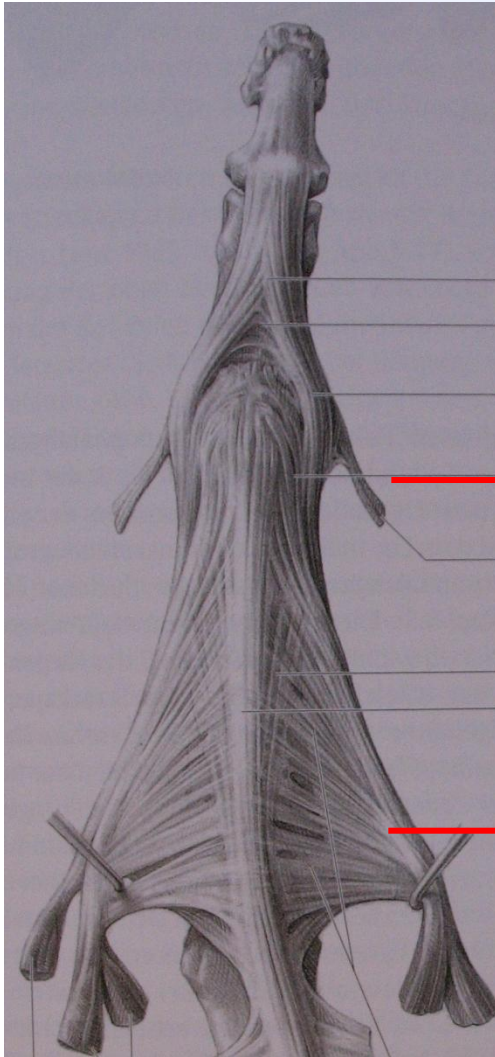
- with fresh closed injuries
- with boutonniere deformity without contracture

**➔** 8 weeks PIP joint in extension with free DIP joint



# Zone 4

- Usually incomplete transection after laceration injuries
- Often only slight extension deficit



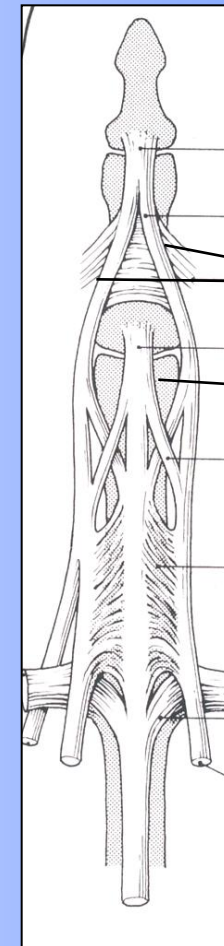




# Follow-up treatment zone 3 and 4

## SAM – Protocol Short Arc Motion

= standardized treatment concept



Lateral bands

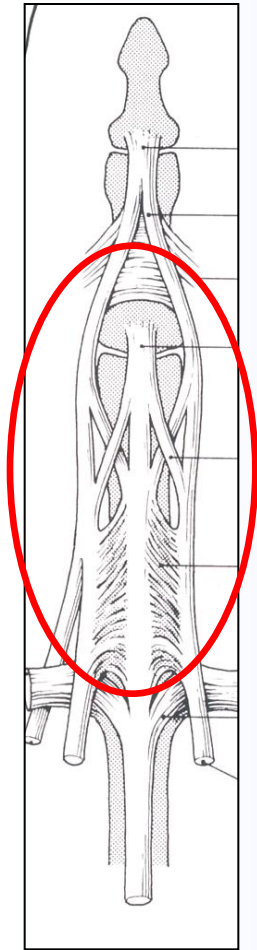
Central slip



Evans R.B.-1995

Quelle: [www.indianriverhandrehab.com](http://www.indianriverhandrehab.com)

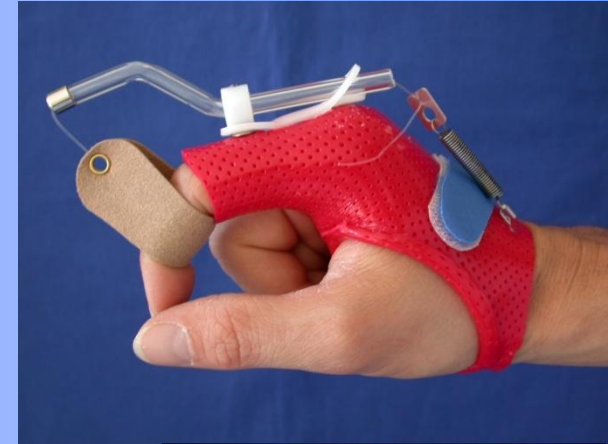
# Aims



- Protection of the tendon suture
- Avoiding of tendon adhesions  
by allowing of the early active mobilization in  
a small, slowly increasing range of motion
- Prevention of PIP- contractures

# Requirements

- Good patient compliance
- Willingness to attend regular follow-up appointments
- No associated injuries early post-operative treatment contraindicated
- pre-operative: passive extension of PIP joint



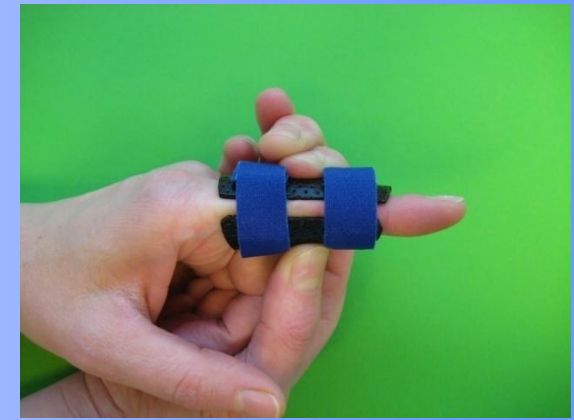
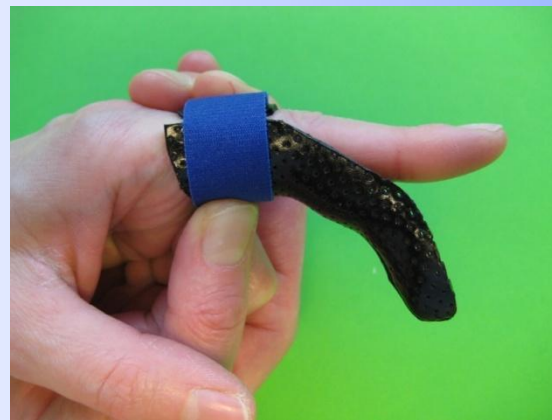
# Splint treatment

- Starts from the 2<sup>nd</sup> post-operative day
- Over a period of 6 weeks
- Using 3 different splints

## 1 resting splint



## 2 exercise splints



# Resting splint

**Purpose:** maintain the PIP- and DIP joint in 0° extension to protect the suture

**Wearing time:** full-time, remove for exercise only  
6 weeks day and night



# Exercise splint 1

- Blocking
  - PIP- joint at 30° Flex
    - (weekly increase 10°!)
  - DIP-joint at 20-25° Flex
- Exercise frequency
  - 20x / waking hour
- Position to train
  - wrist in 30° flexion
  - MP-joint at 0°



Evans R.B., Early short arc motion for the repaired central slip.  
J Hand Surg 1994, 19A: 991 - 997

# Exercise splint 2

- Immobilization
  - PIP at 0°
- Blocking
  - DIP at 30 – 35° Flex,  
But only when lateral bands  
were repaired
  - Otherwise DIP – joint free
- Exercise frequency
  - 20x / waking hour
- Position to train
  - Wrist at 30° Flexion
  - MP-joint at 0°

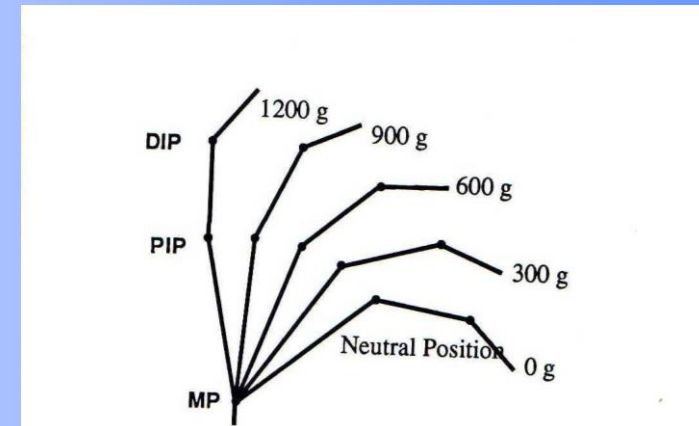


# SAM – increase movement

- Reducing the blocking for the flexion of the PIP-joint
  - Up to 40° after 2 weeks
  - Up to 50° after 3 weeks

**!** Requirement:  
Full active extension of the PIP- joint

- Exercise splints worn for 4 weeks
- Exercises without resistance, starting position: **wrist 30° flexion, MP joint in extension**
- Resting splint worn in full-time in exercise-free time for 6 weeks



Evans RB, Thompson DE (1993)





# SAM-Protocol

!! Often no further treatment necessary !!

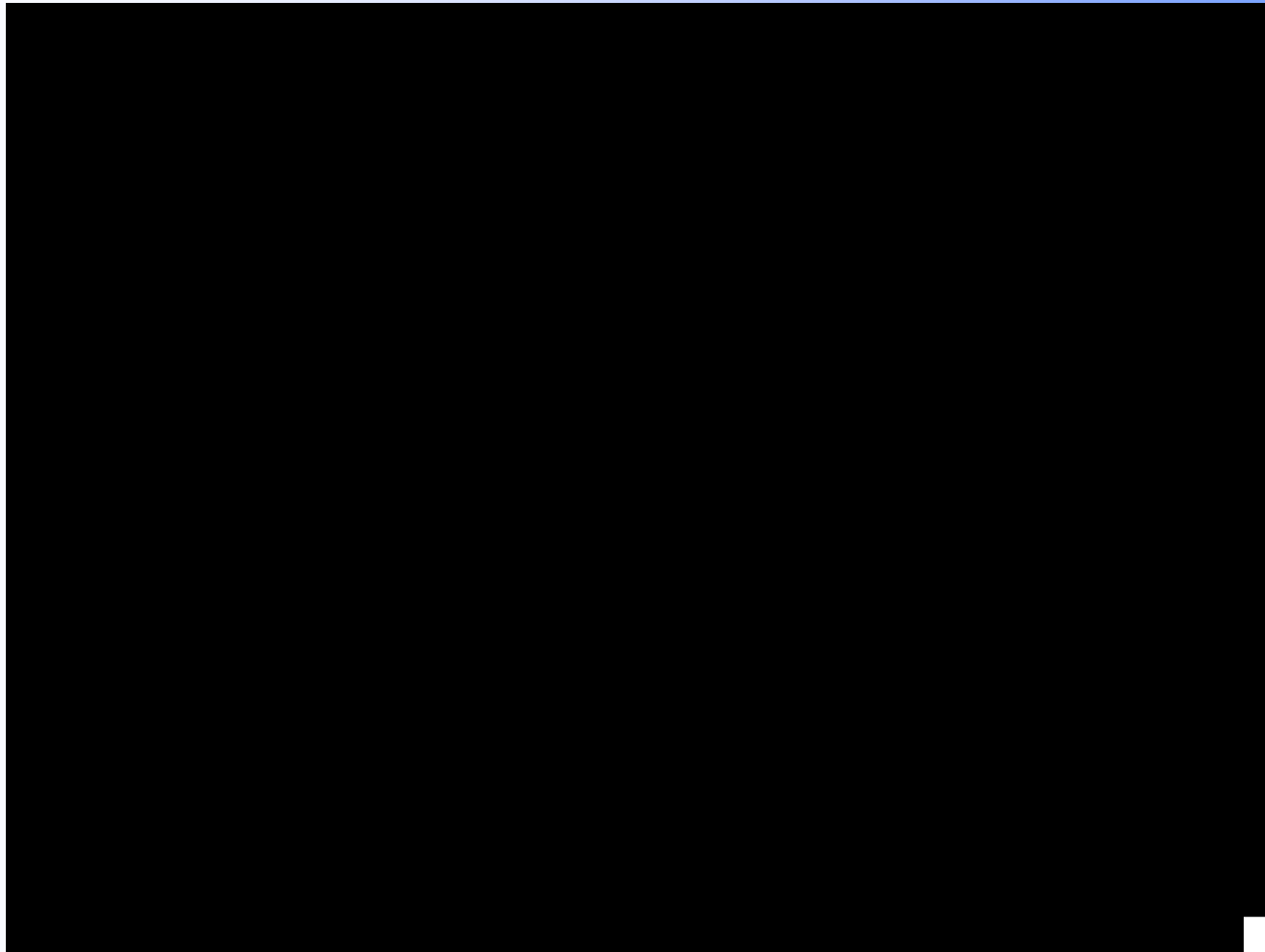
After 6 weeks:

- Mobilization multi-joint
- Enhance tendon gliding
- Work for full fist-circuit
- Conserving the extension
- Stress only after 12 weeks





# Result after 6 weeks



# After 2 weeks... if needed



**Dynamic splint when not reaching a full active extension at the PIP- joint**



# Conclusion

**SAM – Protocol  
is a convincing concept**

- Consideration:
  - High compliance of the patient and
  - Special expertise of the therapy team and
  - Monitoring with regular and frequent follow-up appointments are

**absolutely necessary!**



# World congress 2019 in Berlin





**Thank you**