



# dupuytren

## statistics

- 50 % recurrence after 5-10 year
- A difference has to be made between:
  - *recurrence*: problem with Dupuytren's tissues (type III)
  - *extension*: problem with scar tissue (type I)
- results are dependent on :
- Surgery - therapy - patient motivation

## Important issues in the patient's history

- Genetic – family history
- smoking
- Diabetes, epilepsy
- Alcoholism
- Previous trauma/surgery
- Other types of collagen diseases (arthritis, bursitis)
- Lung- and liver diseases

Some can affect woundhealing postoperatively

## Woundhealing phases

Inflammatory phase	0-3 days	Inflammation Cellmigration (FB,MF) Phagocytosis cellular debris
Fibroblastic phase	3-21 days	•Start collagen synthesis •Tensile strength build up •FB predominates in area •First intra- later inter-molecular X-links
Remodeling phase	3 wks 6 mo's- 1 year	•Scar remodeling •Synthesis - lysis balance •Inter molecular X-links

	Fibroblast	Myo Fibroblast	Smooth muscle cell
rER and golgi	+++ ←	+++	+/-
<b>Myofilaments</b> (actine and myosine)	+	+++	+++ →

**Myofibroblasts and wound contraction  
what is the use?**



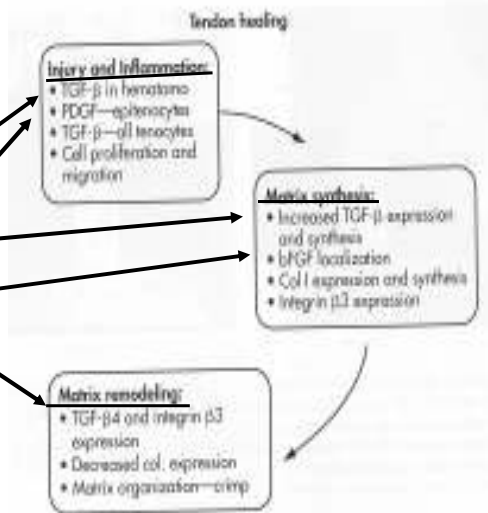
**Wound contraction pulls together wounded edges**

## Groundsubstance also contains...

### Growth factors:

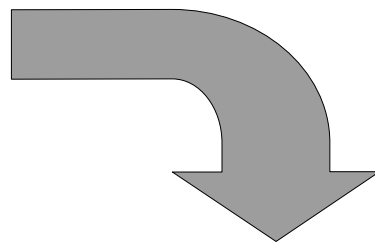
- Are released after tissue trauma (cells)
- Control healing process in all three phases
  - Transforming GF-Beta
    - TGF- $\beta$
  - Basic fibroblast GF
    - bFGF
  - Platelet-derived GF
    - PDGF

Control healing through growth factors ??



The TEC (Continuous elongation technique) for severe Dupuytren's contracture of the fingers.

Messina A., Messina J. Annals of Hand Surgery, 1991, 1993



Mechanical stress in vitro induces increased expression of MMP's 2 and 9 in excised dupuytren's disease tissue

Tarlton, Meagher, Brown, McGrouther, Bailey & Afoke

JHS (British vol) 1998, 23B:3:297-302

Casting might give short term improvement but does not last  
Custommade splints will not work!!

If surgery is the only solution



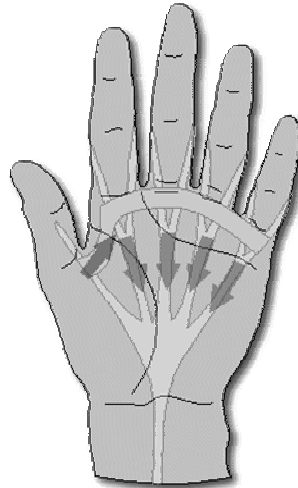
### Postoperative treatment goals

- Maintain operative gain in extension
- Minimize effects of edema and scarring
- Restore pre operative flexion
- Restore pre operative strength

## Which tissues do we treat?

after dupuytren tissue is excised.

skin:	Wound
tendon:	Glide
Circulation:	Healing
nerve:	Sensibility
joints:	capsule - ligaments



## Post operative problems

### Circulation

Neurovascular bundles are suddenly put on stretch which can cause hypoxia

Hypoxia stimulates influx of fibroblasts and myofibroblasts to wound area

Possible origin of myofibroblasts in  
dupuytren's disease???

Occluded vessels were found within  
the thickened fascia :



hypoxia



fibrosis

**Where does it go wrong..**

- post op contractures :
  - flexion *and* extension
  - skin, joint capsule, ligaments
- Edema can be cause of stiffness
- Pain
  - neuroma
  - cold intolerance
  - Dystrophy or flare?

## Postoperative treatment consists of:

### Week 1-4:

- woundcare
- Scar and edema treatment
- Splinting
- Rom exercises
- Passive mobilization
- Education !!!

### Week 4-8:

- strengthening
- .....
- Education!!!

## Week 1-4: splinting

- splint day- and night : full time
- Wrist in flexion
  - palmar rest/ tendon at slack
  - more extension for pip/mp possible without tension
- DIP sometimes in slight flexion
  - ORL can be tight and needs slow stretch
  - avoid pressure on the tip: loss of sensibility

## Week 1-4: splinting

### At length... no stretch

- Ross Evans: MP in flexion (never a big problem!)
- Joy McDermid: wrist in flexion
- Rosemary Prosser: very little splinting needed because of open palm technique!
- All three authors advocate PIP in extension if possible

### Evans – JHT oct-dec, 2002



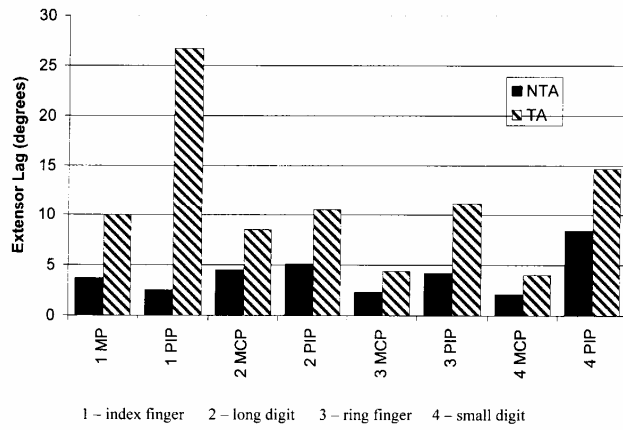
Study comparing:

No tension applied in first postop phase:  
(NTA)

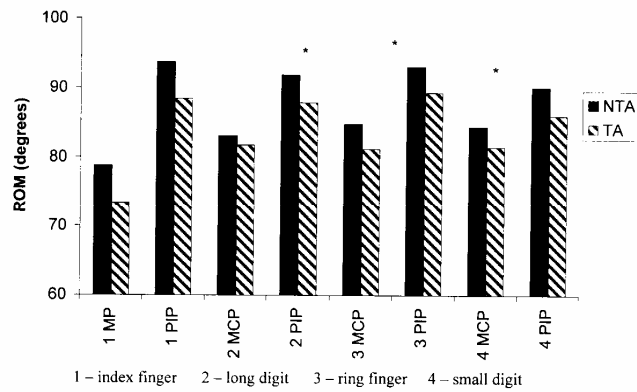


tension applied in the first postop phase:  
(TA)

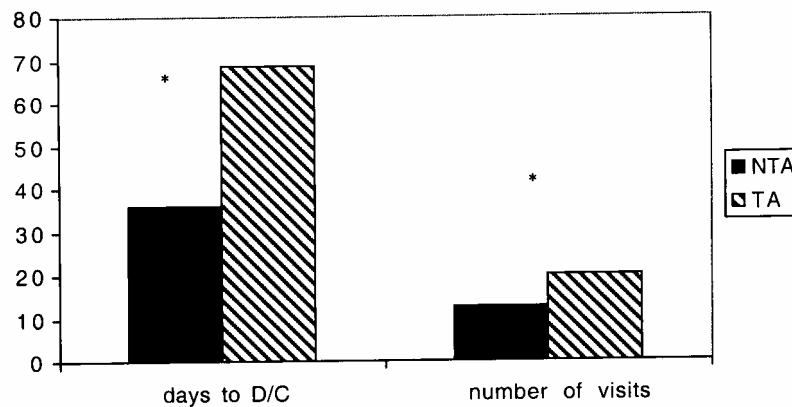
## Evans – extensor lag



## Evans – rom results



## Evans – days in therapy



## Week 1-4:exercises

- Exercises start day 4: *not too soon!*
- Emphasis on extension: *not too much*
- Watch for loss of active flexion

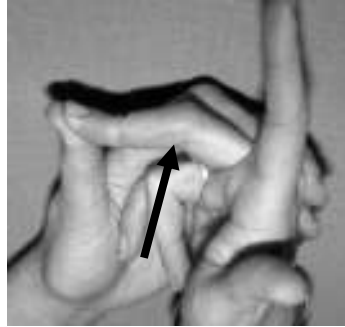
## Week 4-8:

- Splint weened off during daytime
- night time splinting continues for long period of time
- Correct deformities as needed
- Build tissue strength

## Treatment

- **exercises**
  - Passive
  - Active
  - stretch

## passive exercises



- Which structure do we want to stretch?
- How long do we want to apply the stretch?
- Patient education !!!!!

## active exercises

- Complete flexion +extension
- Tendon gliding
- Isolated DIP and PIP
- Wrist and thumb
- Intrinsic

## tendon gliding exercises



Maximum  
FDS

Maximum  
FDP

Maximum  
differential  
FDS-FDP

### Treatment

- exercises (active, passive and stretch)
- splinting

## Postoperative treatment: *splinting*

- essential
- must be fitted within 24-48 hours
- should hold the operated tissues at length but avoid overstretching!
- must provide rest for optimal wound healing
- can be necessary for several months even years post op.

### Optimal Plastic deformation



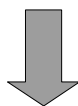
- Low load stress applied over long period of time
- The longer a joint is positioned at its end range the greater the gain in PROM

Mechanical stress on the fibroblastic cells of the Dupuytren's disease tissue result in release of enzymes (MMP) that weaken the collagen links and allow lengthening.



Provided the minimal/optimal stimulus is given

**Soft tissue contracture**



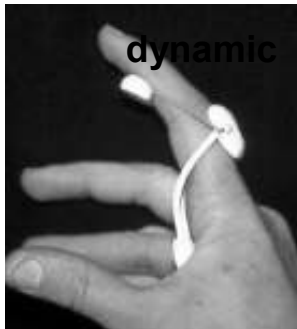
**lengthening in response to mechanical stress**



**splints**

## Splints

amount of force depends  
on status of tissue to be  
stressed



**Choose appropriate splint with the right force**

## Splint options

Post operative

volar

- Wrist included...
- no visual control of circulation in wound area
- scar treatment – silicone!!

# *Preference*

## **Dorsal**

(corrective)

Good visual control  
of wound area to  
achieve minimal  
tension

Volar fixation important

**PIP flexion  
contractures  
splints**

## **Neoprene**

Less aggressive

Helps with scar  
treatment and  
edema

**PIP flexion  
contractures  
splints**



Serial  
casting

**In conclusion**

*Results depend on:*

- Surgical management
- Therapy:
  - Type of rehabilitation program
  - (non) aggressiveness of treatment
- Patient effect:
  - Motivation
  - Patient's personal post op reaction
  - Severity of the disease
- location effect:
  - little finger (PIP) always has poor results