



# Dupuytren Disease (DD)

Hand Therapy Training Programme 2015

YanShan Lu

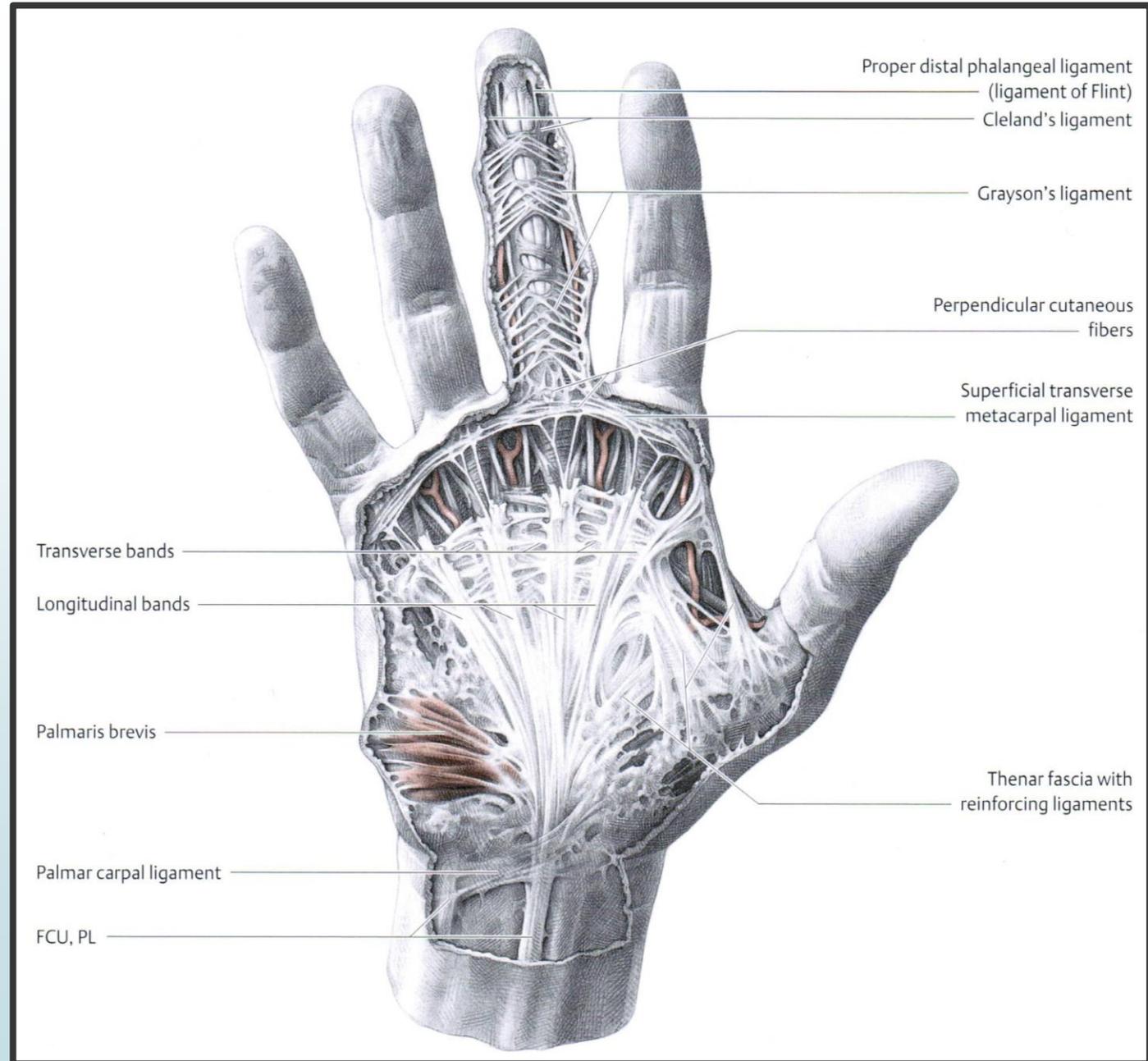
Acknowledging Julie Collis

# Overview

- ▶ Pathologic anatomy
- ▶ Aetiology
- ▶ Epidemiology
- ▶ Functional implications
- ▶ Outcome measures
- ▶ Management
  - ▶ Conservative
  - ▶ Surgical
- ▶ Postoperative hand therapy

# Pathologic anatomy

- ▶ Fibroproliferative disorder of the palmar fascia
- ▶ 3-D aponeurotic structure lies between the dermis and deep flexor tendons
- ▶ Tethers skin to deep structures
- ▶ Allows free gliding of flexor tendons and conformation of the hand to the shape of objects during grasp
- ▶ Fibres orientated in longitudinal, transverse and vertical planes
  - ▶ Transverse natatory cord in the distal hand
  - ▶ Longitudinal cords: pretendinous in palm, central in fingers
- ▶ Diseased cords shorten, become nodular and cause flexion contractures



# Pathologic anatomy

## ► Proliferative phase

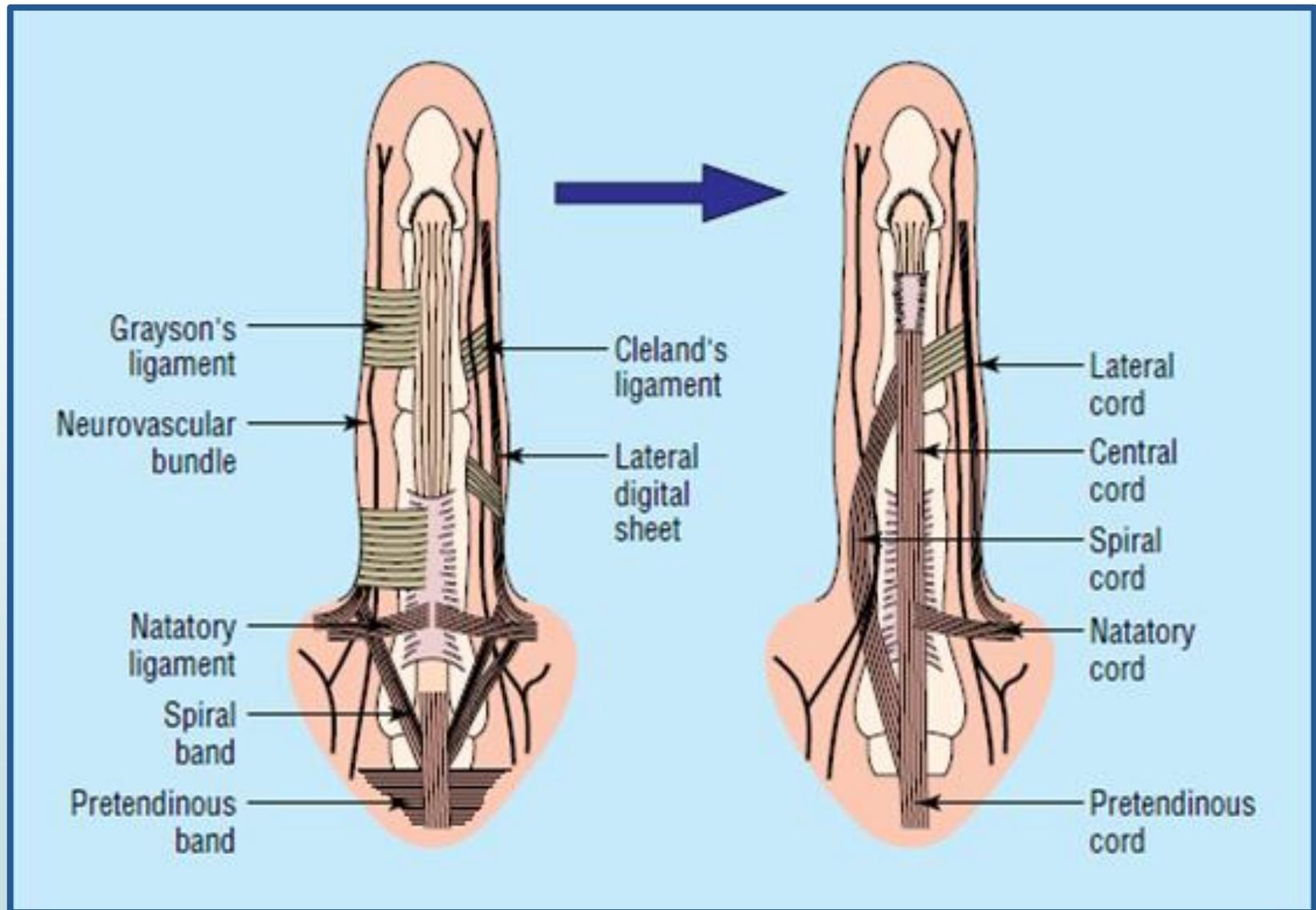
- loss of normal skin architecture; pits, dimpling, rippling
- Random proliferation of immature fibroblasts in whorl patterns

## ► Involutional phase

- nodules and cords; raised, rigid tendon like appearance

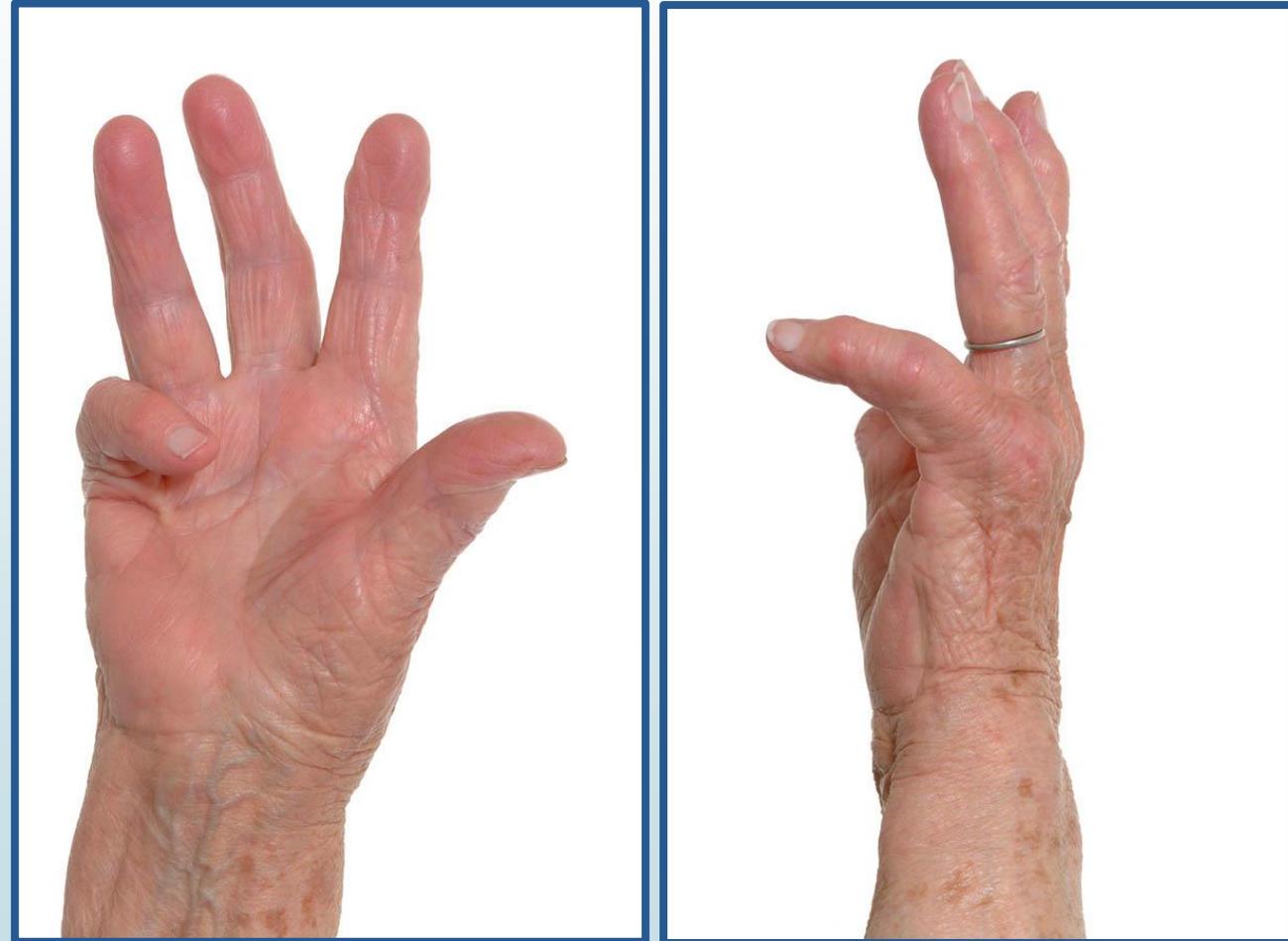
## ► Residual phase

- finger flexion contractures, Initially MCP, later PIP
- Inflexible scar-like tissue
- Acellular composition due to deposition of dense type 1 collagen
- Knuckle pads; firm cutaneous masses that lie beneath the skin
- Pain not a common feature



# Aetiology

- Uncertain
- Current model suggests DD is a reactive over-response to cellular level mechanical forces (Eaton, 2014)
- Known risk factors

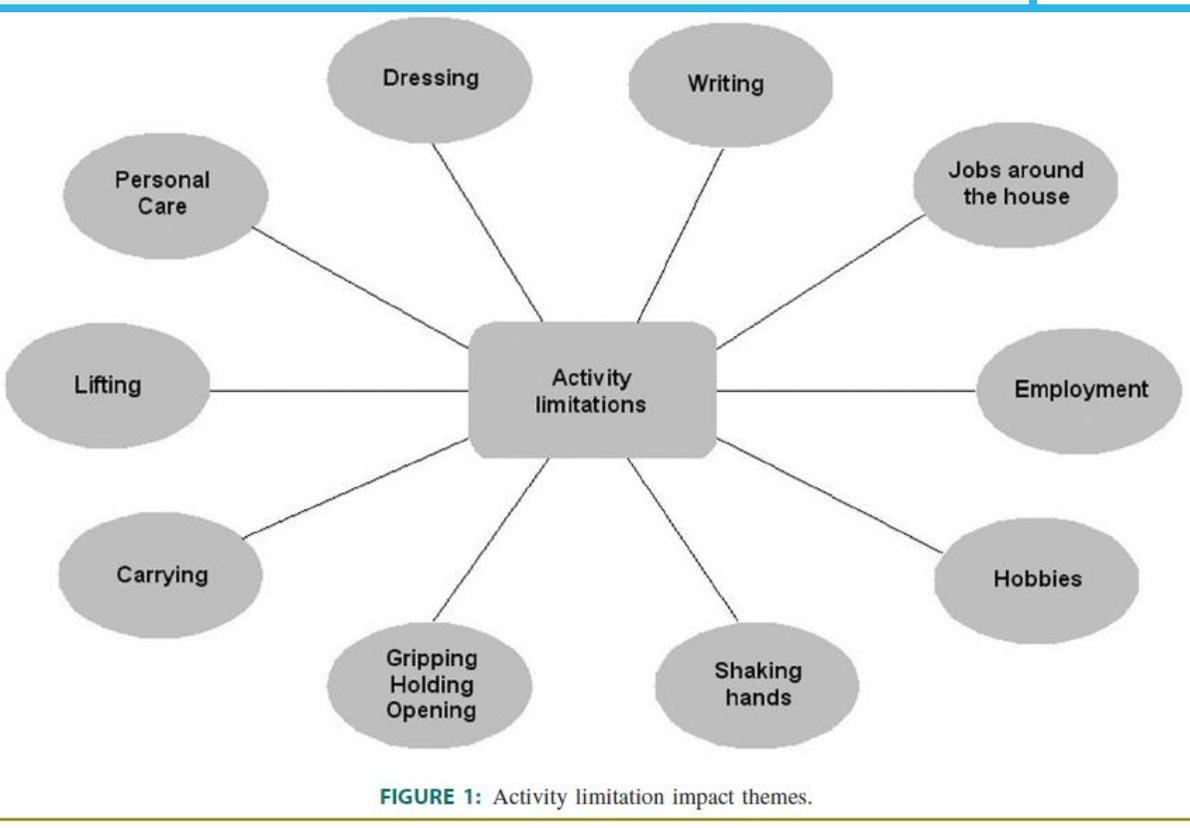


# Epidemiology

- ▶ Men:women 6:1
- ▶ 4-6% of population in northern Europe
- ▶ Men 50+
- ▶ Women 60+
- ▶ Risk factors
  - ▶ No longer considered a 'Nordic disease'
  - ▶ Caucasian/European condition – strong heritability
  - ▶ Manual labour from repetitive trauma/vibration
  - ▶ High alcohol consumption
  - ▶ Smoking, diabetes

(Hindocha, 2009; Descatha, 2011)

# Impacts on function and quality of life (QOL)



Physiological needs	Safety/security needs	Social needs	Affection needs	Esteem needs	Cognitive needs
Rest	Physical strength	Greeting (shaking hands)	Intimacy	Self-confidence	Concentration
	Hygiene	Participation with family / friends	Relationships	Emotional stability	Interests / hobbies
	Physical confidence (lifting)	Social interaction		Appearance	Reading
	Dexterity	Communication		Independence	
	Limited/slow activities	Planning			
		Handling money			

**FIGURE 2:** Impact of Dupuytren disease on quality of life.

Wilburn, 2013

# Dupuytren outcome measures

- Goniometry
- Grip and pinch strength
- Patient rated outcome measures (PROM): function and QOL
  - disease specific PROMs considered desirable (Ball, 2013)
  - go beyond obsession with joint angles
  - prior to 2011 no Dupuytren specific PROM, generic tools only (DASH, Quick DASH, MHQ, PEM)
  - DASH criticised as not sensitive enough for DD (Ball, 2013; Jerosch-Herold, 2011)
  - Quick DASH, Health Utilities Index Mark 3 (HU13) Michigan Hand Questionnaire (MHQ) recently validated on Dupuytren population (Budd, 2011; Thoma, 2014)

# Unite Rhumatologique des Affections de la Main (URAM) Scale

- ▶ Introduced in 2011 as a DD specific tool (Beaudreuil, 2011)
  - ▶ 9 questions; validated
  - ▶ Items generated by 9 patients and 7 medical experts about functional restrictions
  - ▶ excluded activities not representative in general population (music, sports, DIY)
  - ▶ most commonly performed tasks selected
  - ▶ tested and validated on Dupuytren population
- ▶ Validity and specificity questioned
  - ▶ doesn't address quality of life (Wilburn, 2013)
  - ▶ Perhaps DD doesn't causes as much functional limitation as we think (Davis, 2015)
  - ▶ Fails to capture broad range of functional problems (Rodriquez, 2014)
- ▶ 2014 study to test psychometric properties of URAM (Bernabe, 2014)
  - ▶ Highly recommended for measuring Dupuytren disability

# URAM

Can you ...	Without difficulty (0)	With very little difficulty (1)	With some difficulty (2)	With much difficulty (3)	Almost impossible (4)	Impossible (5)
1. Wash yourself with a flannel, keeping your hand flat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Wash your face?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Hold a bottle in one hand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Shake someone's hand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Stroke something or caress someone?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Clap your hands?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Spread out your fingers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Lean on your hand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Pick up small objects with your thumb and index finger?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# Conservative management

- ▶ Traditionally held that splinting not effective preoperatively
- ▶ Recent studies suggest ability to prevent or delay contracture
- ▶ Cross-frictional massage and stretching; single case study (Christie, 2012)
  - ▶ 2 minute multi-planar massage + 2 minute extension stretch
  - ▶ Mild contracture, improved post-Rx
- ▶ Night splinting for contracture: case series of 6 (Ball, 2002)
  - ▶ All patients maintained or improved extension
- ▶ Night-time splinting, stretch and friction massage for early contracture; case series of 13 (Larocerie-Salgado & Davidson, 2011)
  - ▶ Improved extension over 13 months

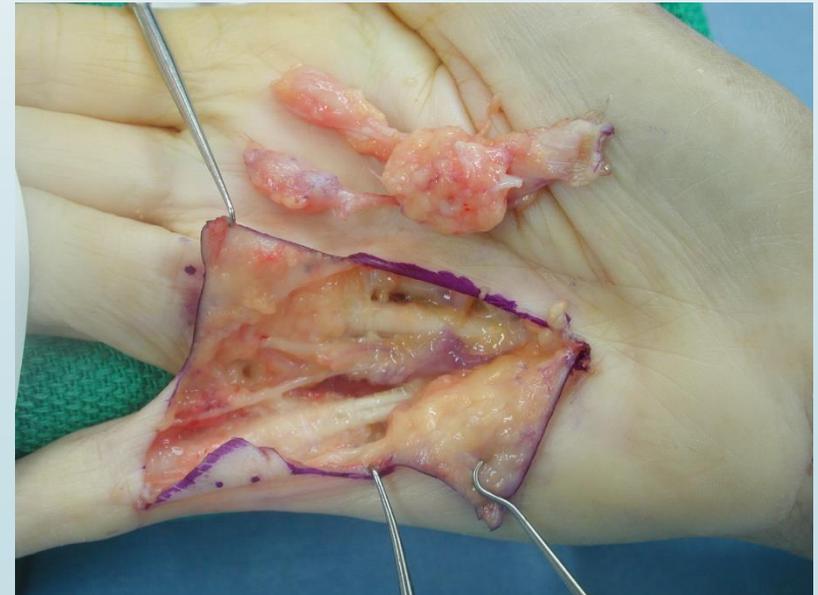
# Surgical management

- ▶ Mainstay of treatment for DD
- ▶ Fasciectomy
  - ▶ Standard treatment; removal of diseased fascia
- ▶ Dermofasciectomy
  - ▶ Removal of diseased fascia and overlying skin with or without skin grafting

(Cheung, 2015)



<http://www.eatonhand.com/img/18924.htm>



# Minimally invasive procedures

## Collagenase injections

- ▶ Injection of clostridium histolyticum directly into a Dupuytren cord
- ▶ Enzyme digests and weakens collagen
- ▶ Patient returns subsequent day for manual rupture of cord
- ▶ Most effective for MCP cord
- ▶ Risks of bruising, oedema, pulley rupture, disease aggravation

## Needed aponeurotomy / Percutaneous fasciotomy

- ▶ cord divided by multiple shallow perforations and division of cord

(Eaton 2014)

# Postoperative hand therapy

## Goals

- ▶ Maintain intra-operative extension correction
- ▶ Restore pre-operative flexion
- ▶ Control oedema
- ▶ Wound care and minimisation of scar formation
- ▶ Functional restoration

# Postoperative complications

- ▶ Oedema
- ▶ Loss of flexion
- ▶ Haematoma
- ▶ Wound complications; dehiscence, flap necrosis, skin fissures
- ▶ Infection
- ▶ CRPS – 5.8% occurrence (range 1.3-13%)
- ▶ Paraesthesia as a result of nerve traction or intraoperative injury
- ▶ Recurrence of contracture
- ▶ Difficulty maintaining extension particularly at the PIPJ
  - ▶ 47% lost PIP extension (mean loss;15°) (Collis et al, 2013)

(Cheung, 2015; 2013; Sweet, 2013)

# Hand Therapy: night extension splinting

- ▶ Traditionally splinted in extension at night  $\pm$  day for 3-6/12
  - ▶ Little evidence to support routine use
- ▶ Three experimental studies show no benefit of night extension splinting over therapy alone (Collis, 2013; Kemler, 2012; Jerosch-Heorld, 2011)
- ▶ Current evidence: majority of patients do not benefit from routine night-time splinting
  - ▶ Subgroups may benefit from splinting but as yet undetermined (Jerosch-Herold, 2011)
  - ▶ Splinting may be better directed at PIPJ (Collis et al., 2013)
- ▶ Literature varies on recommendations for splinting postoperatively
  - ▶ On indication only (Collis, et al, Eaton, 2012; Huisstede, 2013; Jerosch-Herod 2011)
  - ▶ Routinely; 6/12 at night, 4-6/52 cylinder during day (Skirven, 2013; Sweet, 2013)
  - ▶ Avoiding wound tension for 3/52 reduces complications (Evans, 2002)

# CMDHB postoperative Rx

- ▶ Night extension splints not provided routinely
- ▶ Splints provided
  - ▶ When clinically justified (previous poor outcome, delayed wound healing, preoperative contracture  $>60^\circ$ , skin grafts)
  - ▶ If a  $20^\circ$  extension loss occurs at MCP or PIP compared with baseline (1<sup>st</sup> post-op appointment)





**A**

**B**

**FIGURE 1:** **A** Dorsal, hand-based extension orthosis for the involved finger, holding the PIP joint at the end range of extension. The dorsal aspect of the orthosis does not conform to the residual contracture. **B** The hook-and-loop straps can be tightened to gradually increase PIP joint extension to the limit of the orthosis correcting the residual flexion contracture.

# Hand Therapy

- ▶ Oedema management
- ▶ Wound care
  - ▶ Avoid disturbance of wound; rest/avoid over-zealous motion or force
  - ▶ Appropriate dressings
  - ▶ Moist healing environment, silicone oil, chlorhexidine hand wash,
  - ▶ Delay start of AROM for FTSG
  - ▶ Debridement especially over joint creases
- ▶ Functional use
  - ▶ Until wound healing light activities only that do not disturb wound healing
  - ▶ Increase as tolerated

(Midgley, 2010)

# ROM

- ▶ Should start early; within 0-7 days
  - ▶ Gently, initially in restricted range to avoid wound disruption
  - ▶ Extensor strengthening essential
  - ▶ Long lever, short lever, blocked PIP extension, ORL stretch (Skirven, 2013)
  - ▶ Limit flexion to avoid further attenuation of central slip (Skirven, 2013)
  - ▶ Flexor TGEs (stabilise wrist to avoid wrist flexion)
  - ▶ 3-5x/day for 15-25 minutes (Huisstede, 2013)
  - ▶ 1-2 hourly / 10 repetitions each exercise (Skirven, 2013)
  - ▶ End range flexion and extension and stretch after wound healed
- ▶ Re-establish extrinsic flexion pattern; “hook and roll”, MCP blocking splint
- ▶ Intrinsic muscle stretches
- ▶ Long flexor stretching

## Blocked Middle Extension



Using your good hand, block movement at your knuckle. From a flat fist position, slowly straighten your fingers  
**HOLD** for 5 seconds

## Short Lever Finger Extension



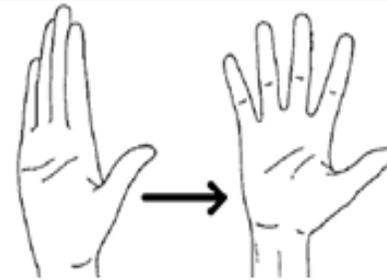
Place your hand, with your fingers over the edge of a table, keeping your fingers bent. Lift your fingers up.  
**HOLD** 5 seconds.

## Long Lever Finger Extension



Place your hand flat on the table. Slowly lift your straight finger off the table.  
**HOLD** for 20 seconds.  
Repeat with all fingers

## Finger Abduction



Spread your fingers apart, then bring them together.  
**HOLD** 5 seconds.



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# Scar management

- ▶ Active motion promotes normal remodelling of scar tissue and may be sufficient to offset forces of scar contraction (Collis et al, 2013)
- ▶ Silicone contact media
  - ▶ Elastomer moulds
  - ▶ Cica-care
  - ▶ Silicone oil
- ▶ Plaster of paris

# PIP contracture

- ▶ Difficult to treat
- ▶ Dynamic PIP extension
- ▶ Plaster of paris serial casting
- ▶ CMMS casting (Midgley, 2010)

# Secondary PIPJ joint changes

- ▶ Central slip attenuation
- ▶ Lateral band subluxation volar to axis of rotation
- ▶ volar plate and collateral ligament shortening
- ▶ ORL shortening
- ▶ Adaptive shortening of interossei
- ▶ Digital nerves entwined in cord
- ▶ Changes in sensory motor cortex, motor planning deficits
- ▶ Long muscle-tendon unit tightening

(Sweet, 2013)



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Figure 1 Dominant intrinsic plus pattern of motion and digital flexion following 11 weeks of traditional therapy



Figure 2 Cast design to block metacarpophalangeal joints in extension while allowing active interphalangeal joint flexion to elongate the intrinsic muscles

Midgley, 2010

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