Dupuytren's Disease

- Applied Anatomy
- Pathogenesis

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Hand Term Teaching
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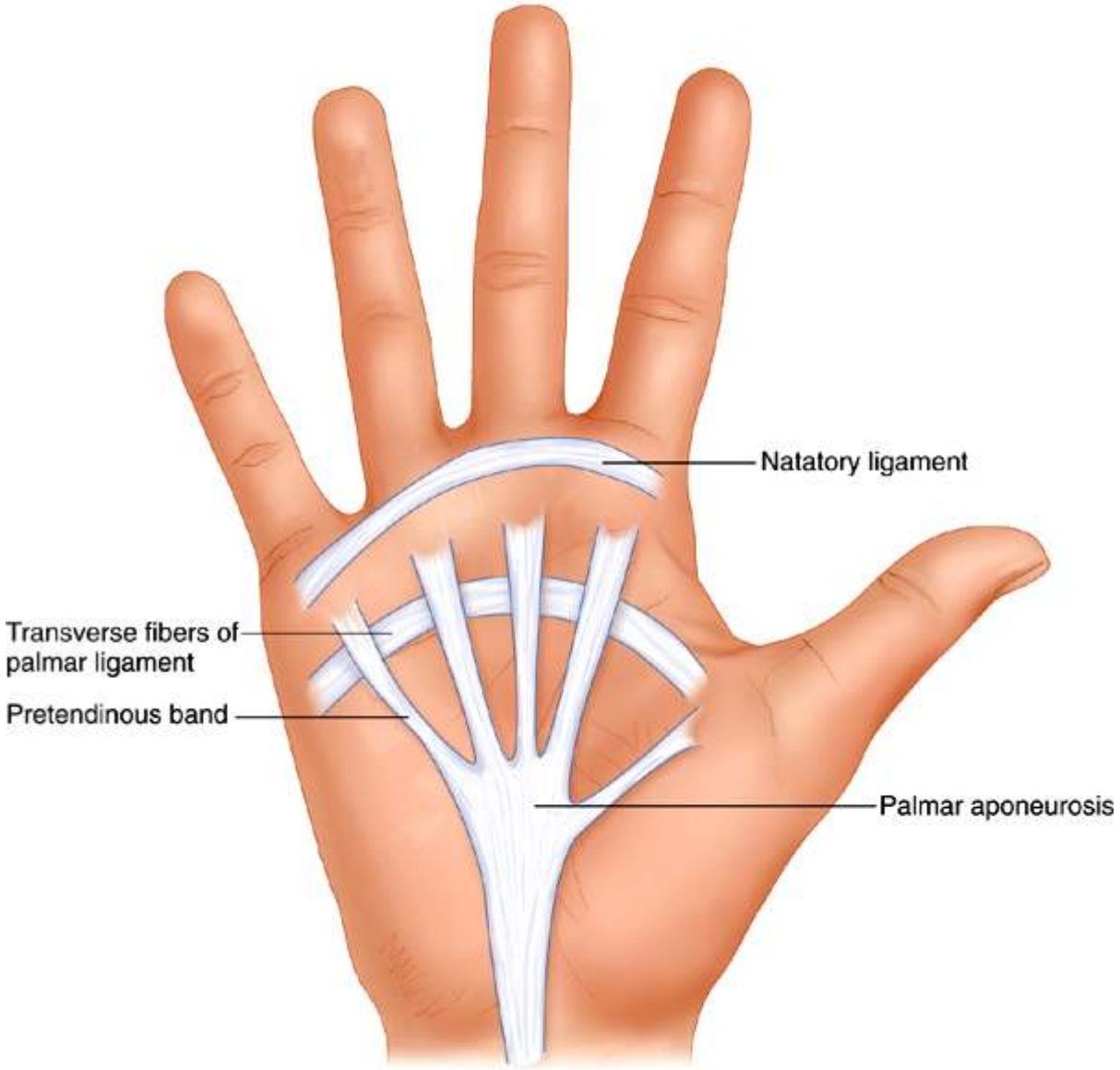
Anatomy

- Bands – Normal tissue
- Cords – Abnormal tissue

Knowledge of normal fascial anatomy is crucial to safe surgery

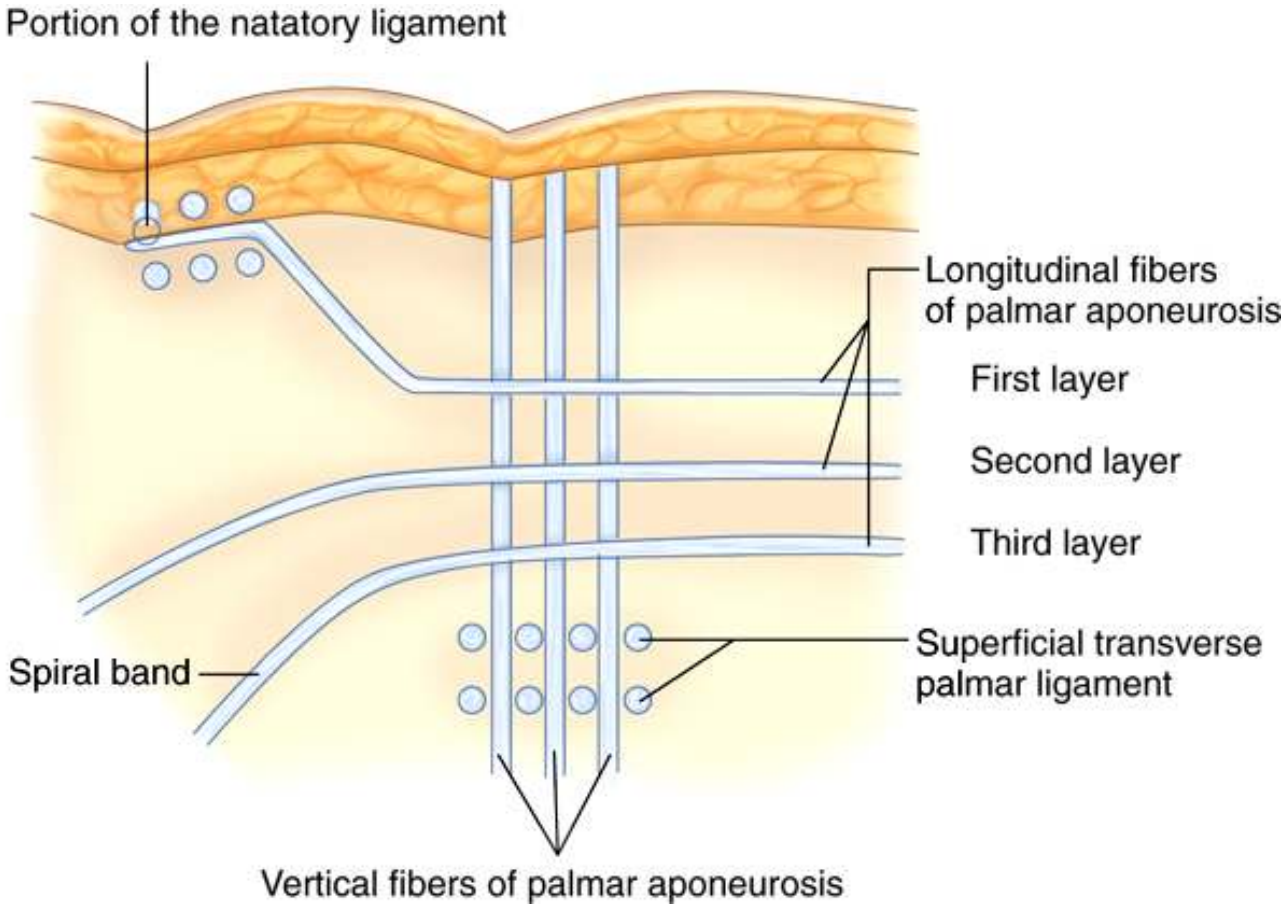
Fascias

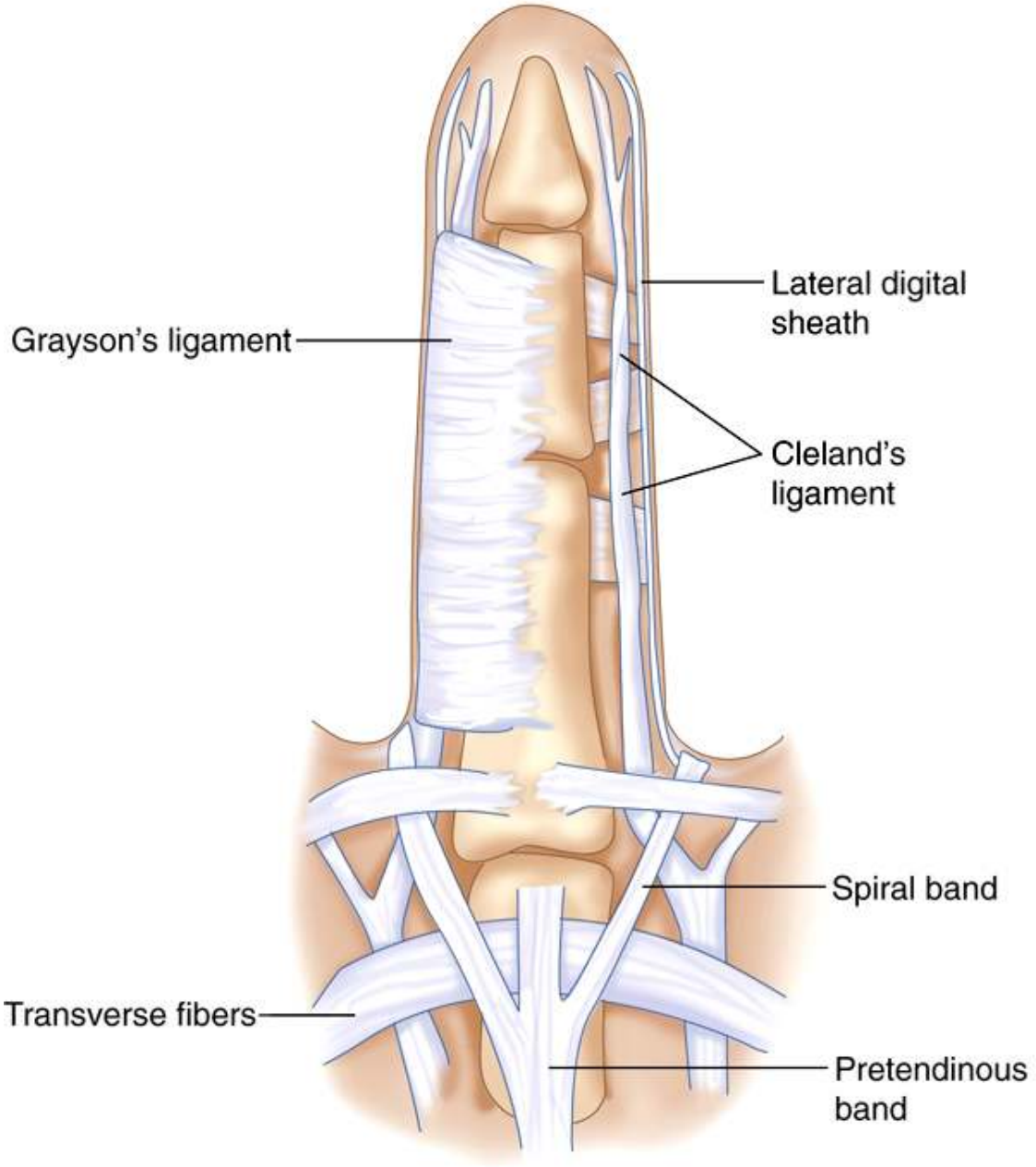
- Thenar aponeurosis
- Ulnar aponeurosis
- Palmar aponeurosis
- Palmodigital fascia (entraps digital nerve)
- Digital fascia

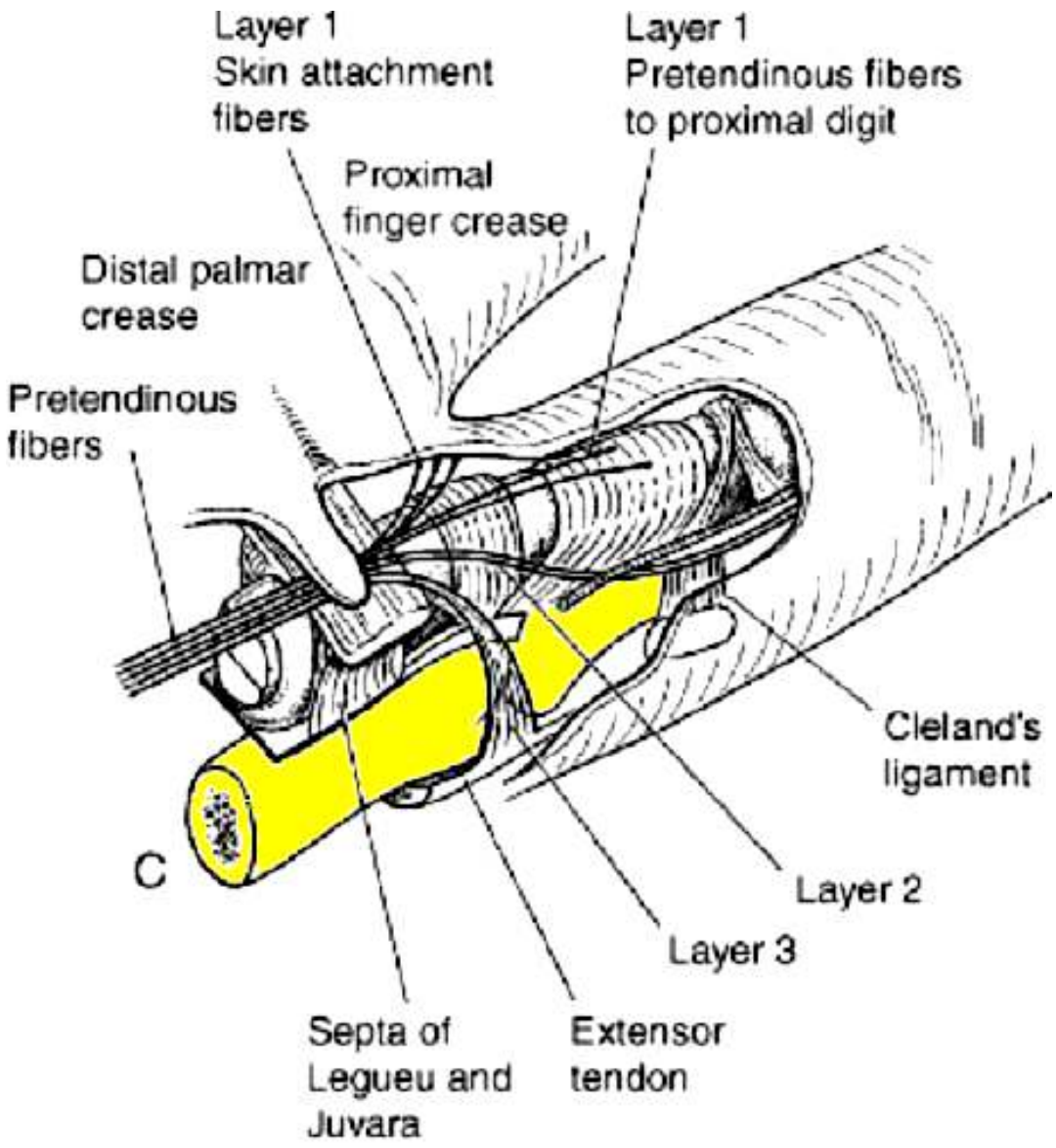

Natatory ligament
Transverse fibers of palmar ligament
Pretendinous band
Palmar aponeurosis

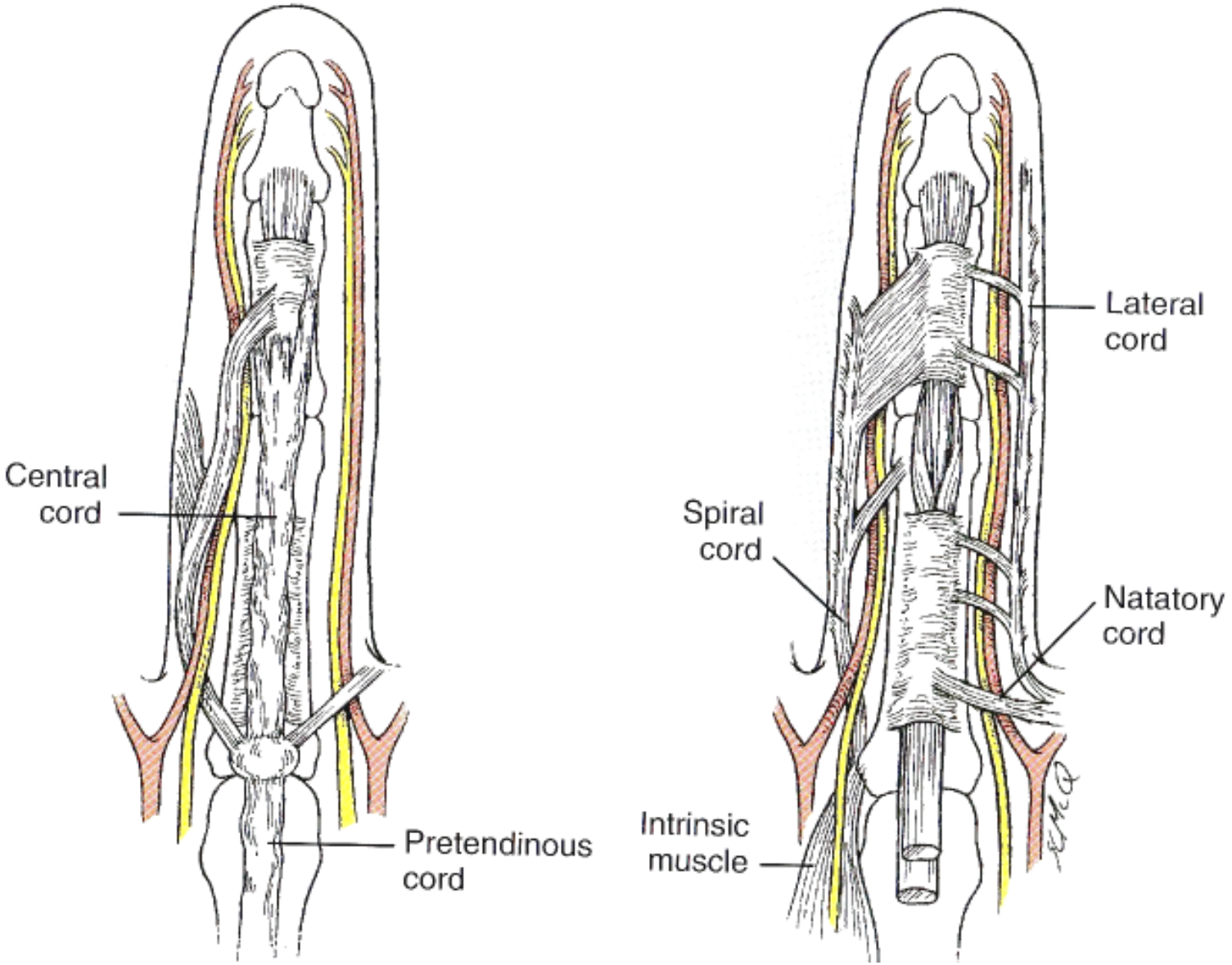
Palmar Fascia

- Longitudinal fibres
- Transverse fibres
- Vertical fibres


Portion of the natatory ligament
Longitudinal fibers of palmar aponeurosis
First layer
Second layer
Third layer
Superficial transverse palmar ligament
Spiral band
Vertical fibers of palmar aponeurosis

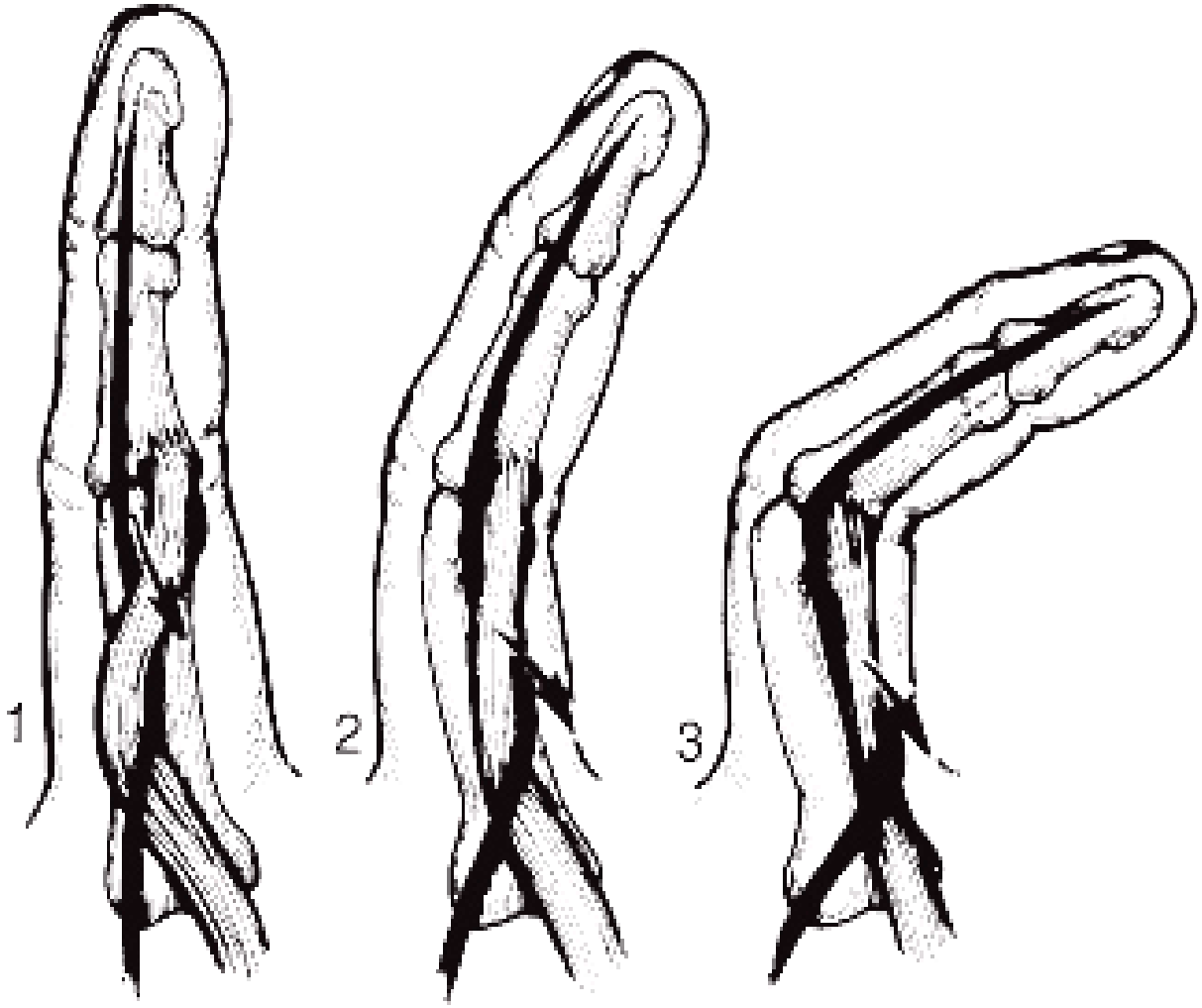

Lateral digital sheath
Grayson's ligament
Cleland's ligament
Spiral band
Transverse fibers
Pretendinous band


Layer 1
Skin attachment
fibers
Layer 1
Pretendinous fibers
to proximal digit
Proximal
finger crease
Distal palmar
crease
Pretendinous
fibers
Cleland's
ligament
C
Layer 2
Layer 3
Septa of
Legueu and
Juvara
Extensor
tendon

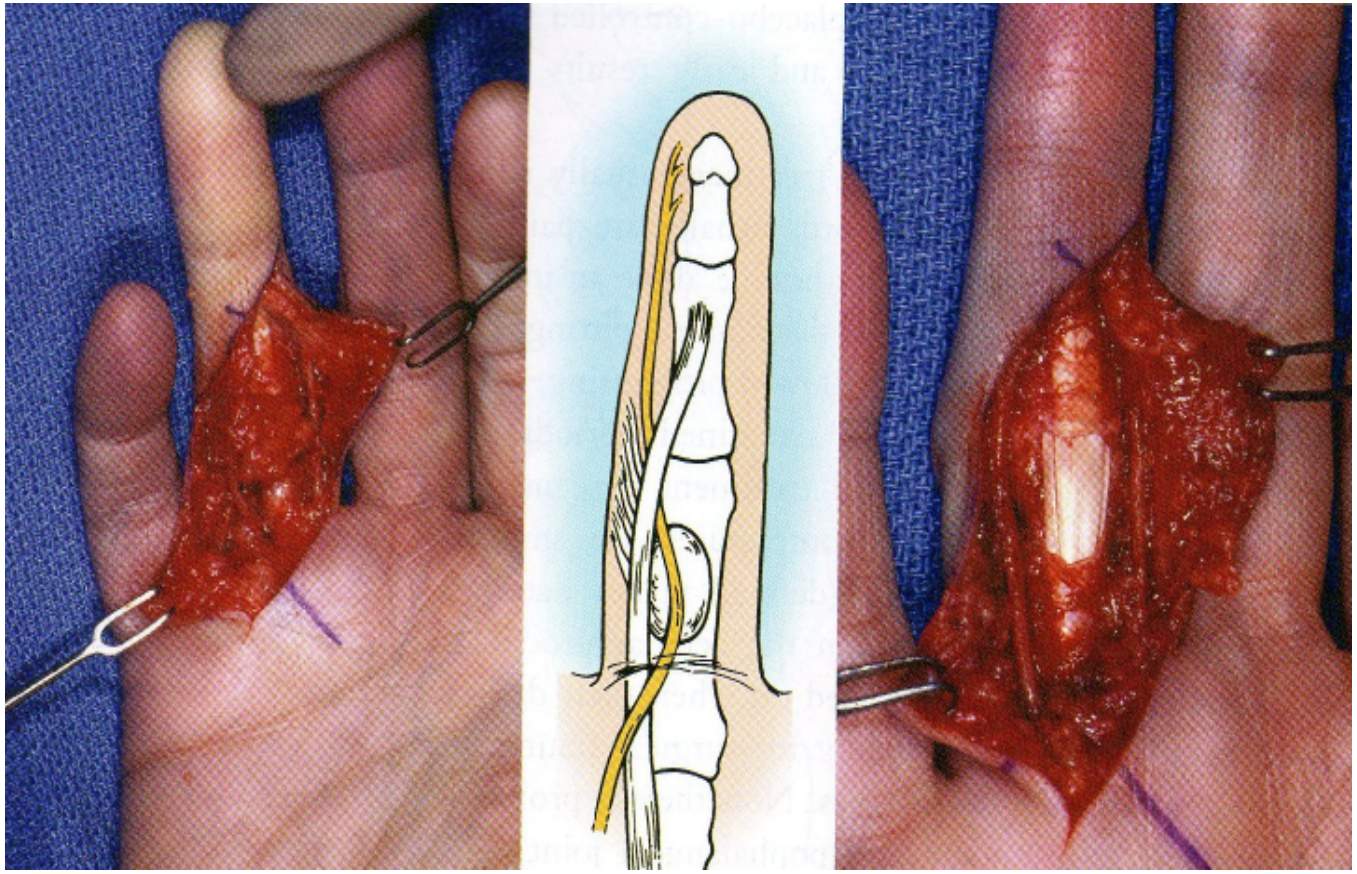

Central
cord
Pretendinous
cord
Lateral
cord
Spiral
cord
Natatory
cord
Intrinsic
muscle

- Cleland's ligament (dorsal to NVB) is not involved in Dupuytren's disease
- Grayson's ligament (palmar to NVB) contributes to the spiral cord
- Spiral cord has contributions from the pretendinous band, spiral band, lateral digital sheet and Grayson’s ligament

Spiral cord and Digital nerves

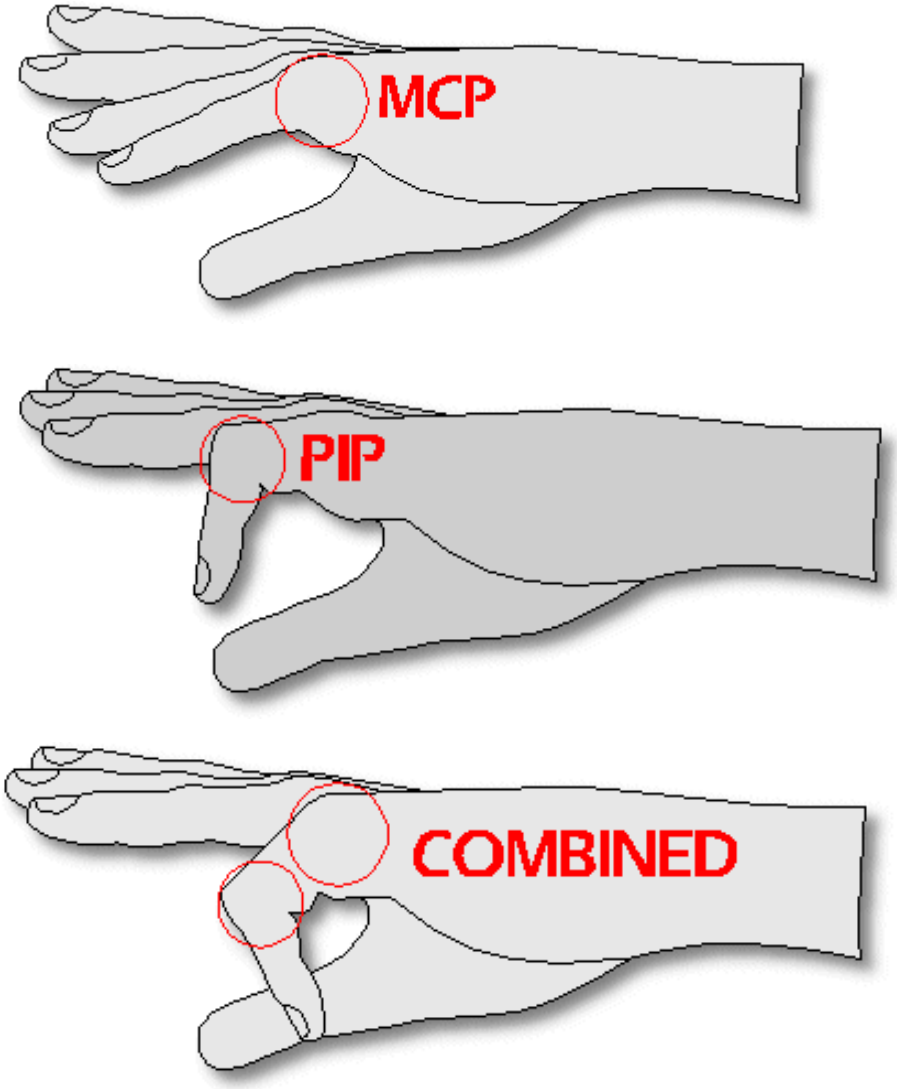


The spiral cord pushes the NVB toward the skin & midline of the finger

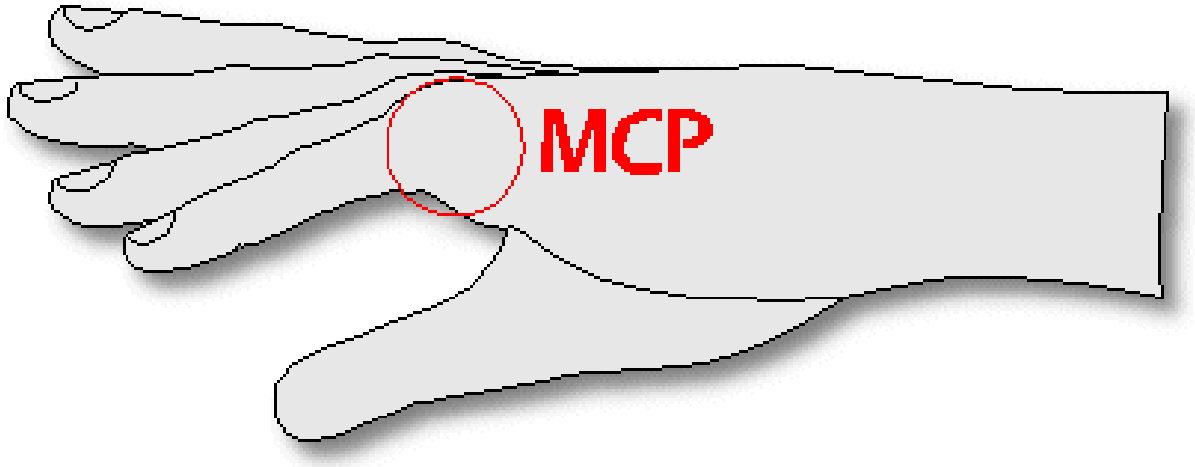


Dissection to show spiral cord pushing the NVB toward the midline of the finger

Anatomy

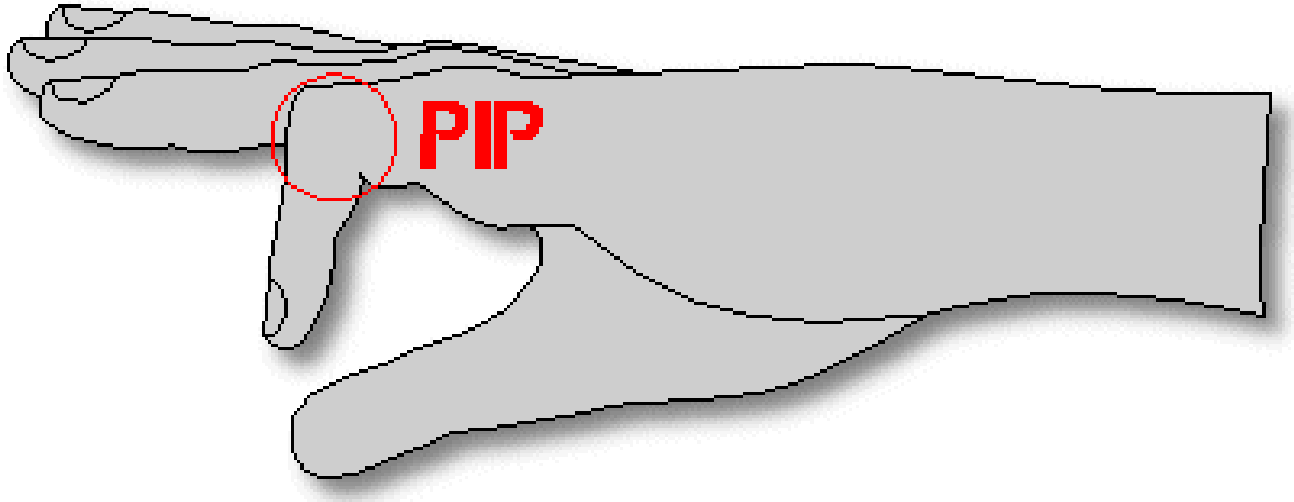


Anatomy



Pretendinous cord causes MCPJ contracture

Anatomy



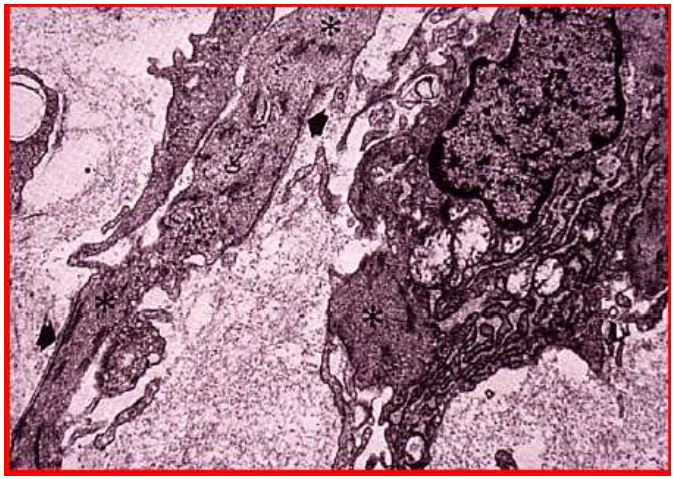
Central and Spiral cords causes PIPJ contracture

- Superficial transverse ligament is not involved in the disease process
- Natatory ligament causes web space contractures
- In the index finger, Natatory ligament becomes the distal Commisural ligament and causes contracture between the index finger & thumb

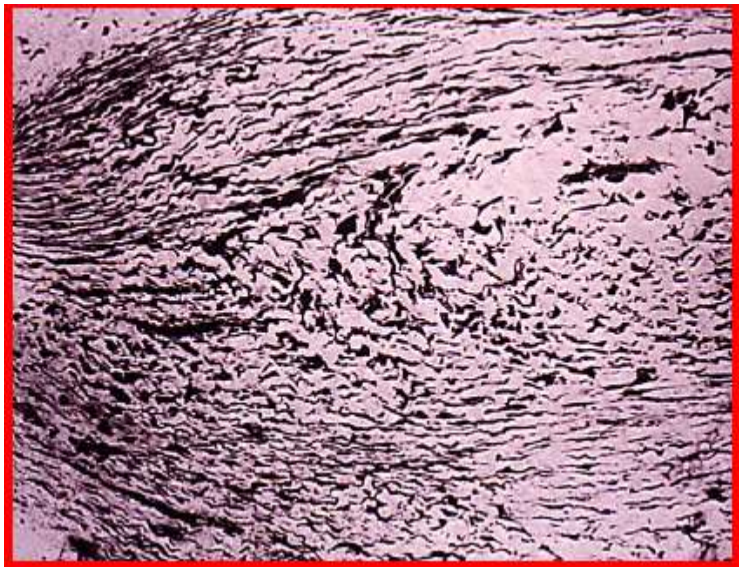
Pathogenesis

Myofibroblast -

- Offending cell in Dupuytren's Disease
- Metaplasia of fibroblast into myofibroblast
- Features of smooth muscle cell and fibroblast
- Contains actin microfilaments



Pathogenesis



Collagen -

- Normal palmar fascia
  - Predominantly type I collagen
  - Lesser extent type III collagen
- Dupuytren fascia
  - Increased ratio of type III to type I collagen

Similar Fibromatosis

- Garrods pads
- Ledderhose disease
- Peyronies disease
- Dupuytren's diathesis

Stages

- Proliferative
  - Large myofibroblasts
  - Very vascular
- Involution
  - Dense network of myofibroblasts
  - Increased ratio of type III to type I collagen
- Residual
  - Myofibroblasts disappear
  - Predominantly fibrocytes

Control factors

- TGF-β2 - most significant proliferative effect
- Mechanical stress
- Lysophophatidic acid (LPA) - contraction effect
- IL-1 - Reduces apoptosis, stimulates langerhans cells, stimulates production of growth factors (TGF-β2)

- Trauma

  Micro ruptures in palmar fascia triggers IL-1

  Vasomotor disturbance following swelling in hand causing secondary Ischaemia

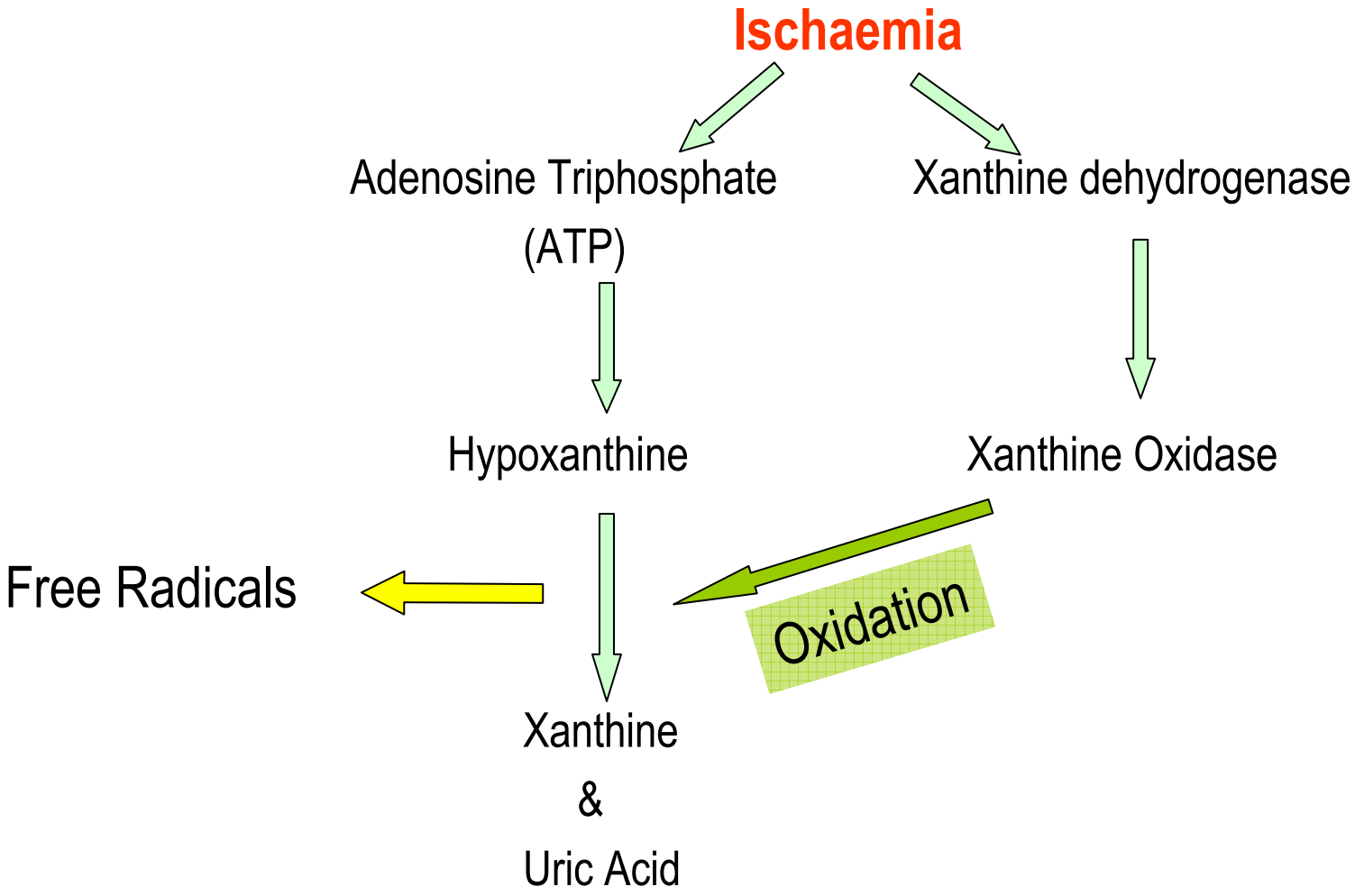
- Ischaemia

  Increase in free radicals

  Decrease in antioxidant enzyme activity

  Microangiopathy with narrow vessels seen in Dupuytren's

Ischaemia


Ischaemia
Adenosine Triphosphate
(ATP)
Xanthine dehydrogenase
Hypoxanthine
Xanthine Oxidase
Free Radicals
Oxidation
Xanthine
&
Uric Acid

- ## Reduced Apoptosis

  IL-1 and TGF-β reduces the apoptosis of damaged and inflamed cells

- ## MMPs and TIMPs

  Normal levels of MMPs

  Increased levels of TIMPs-1

  Abnormally low MMP:TIMPs ratio

  Dupuytren's disease and frozen shoulder

- Alcohol

  Conversion of Xanthine dehydrogenase to Xanthine oxidase

  Increases in free radicals

  Increase in Lysophospatidic acid (LPA)

  Increases intracellular calcium aiding contracture

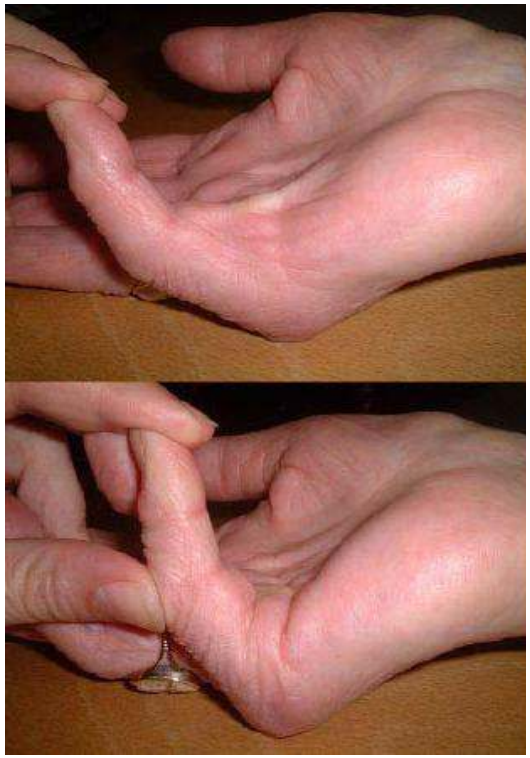
- Phenobarbitone

  Increase in Lysophospatidic acid (LPA)

  Increases intracellular calcium aiding contracture

Summary

- Bands – Normal tissue, Cords – Abnormal tissue
- The spiral cord pushes the NVB to midline and skin
- Myofibroblast is the offending cell
- Role of TGF-β2, Free radicals, Interleukin
- Collagen I replaced by collagen III



Which of the following is not involved in Dupuytren's disease?

- Cleland's ligament
- Grayson's ligament
- Spiral band
- Pretendinous band

Which of the following displaces the neurovascular structures to midline in Dupuytren's disease ?

- Spiral cord
- Lateral cord
- Central cord
- Natatory cord

Which of the following collagen type is increased in Dupuytren's disease ?

- Type I
- Type II
- Type III
- Type IV

Which is the main offending cell in Dupuytren's disease ?

- Fibroblast
- Myofibroblast
- Macrophage
- Lymphocyte