Dupuytren’s Disease

- Applied Anatomy
- Pathogenesis

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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 (entrap digital nerve)
- Digital fascia
Palmar Fascia

- Longitudinal fibres
- Transverse fibres
- Vertical fibres
- 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

- MCP
- PIP
- COMBINED
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

![Histological image of myofibroblast](image1)

![Clinical image of Dupuytren's Contracture](image2)
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
- Lysophosphatidic 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

Adenosine Triphosphate (ATP)

Hypoxanthine

Xanthine dehydrogenase

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 Lysophosphatidic acid (LPA)
Increases intracellular calcium aiding contracture

Phenobarbitone
Increase in Lysophosphatidic 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