Dupuytren’s Disease

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Outline

• History
• Basic Science
• Anatomy
• Diagnosis
• Treatment
• Complications

Dupuytren’s Disease

• Unsolved Issues of the 21st Century
  – Cause
  – Cure

History of Dupuytren’s

• Disease of the Vikings
• Felix Plater- 1614
• Cline/ Cooper- 1777
• Baron Dupuytren-1832
  – “Napoleon of Surgery”
  – “First among surgeons, last among men”

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Basic Science

- DD is a fibroproliferative disorder affecting the palmar fascia.
- Shortening of the palmar fascia can be attributed to fibroblasts and myofibroblasts present in diseased tissue.
- These cells lead to the formation of a nodule followed by a cord that are the hallmark findings in DD.


- Myofibroblast - cell responsible for tissue contraction
- Fibronectin
  - migration
  - differentiation
  - adhesion
- TGF-B1

Dupuytren’s Is Progressive

Progression of Dupuytren’s*

- Nodule formation
- Cord formation
- Digital contracture begins
- Contracted cord
- Flexion deformities

Epidemiology

- Northern European descent- “disease of the Vikings”
- prevalence 2- 42%
- Mikkelsen's study- 9.4% men/ 2.8% women
- Low prevalence in Blacks and Asians
- Autosomal dominant with incomplete penetrance
**Epidemiology**

- Autosomal dominant with incomplete penetrance
- Gender issues
  - Men: Women - 6:1
    - JHS Volume 32, Issue 9, November 2007, 1423-1428
  - Men - peak onset about 10 years before women
  - Women - Flare rxn after surgery more common (7-20%)
Anatomy

- Longitudinal fibers:
  - Pretendinous bands
  - Spiral bands
  - Lateral digital sheets

- Transverse fibers
  - Transverse ligament of PA (Skoog's fibers)
  - Natatory ligament
  - Grayson's ligament
  - Cleland's ligament

- Vertical fibers
  - Superficial vertical bands
  - Septa of Legueu and Juvara

Anatomy of the Palmar Fascial Complex

- Pre-tendinous Bands
- Transverse fibers
- Vertical Fibers
  - superficial connect skin to fascia
  - deep fibers: Septa of Legueu and Juvara which form 7 distinct compartments

Anatomy of the Palmar Fascial Complex

- Radial Aponeurosis
- Ulnar Aponeurosis
- Palmar (central) Aponeurosis
  - Retinaculum for flexor tendons
  - Stabilize the metacarpals
  - Supports and anchors palmar skin

Anatomy of the Palmo-Digital Fascial Complex

Spiral Band
Natatory ligament
Anatomy of the Digital Fascial Complex

• Digital Fascia
  – Lateral digital sheath
  – Cleland's ligament (dorsal)
  – Grayson's ligament (volar)
  – Retrovascular Fascia

Pathoanatomy of the Palmar Fascial Complex

• Palmar Cords-
  – from pretendinous band
• Vertical cord
  – from vertical fibers of Legueu/Javara
• Abductor Digiti Minimi Cord

Patho-anatomy

• Nodules tend to form between the distal palmar crease and the PIP flexion crease.
• Cords form along the pathways of normal fascial anatomy.
• Normal bands become pathologic cords.
• The NV bundle becomes intertwined with diseased tissue.
• As the cords contract, the encircling pathway becomes more linear causing the NV bundle to spiral.

Fascial structures NOT involved in Dupuytren’s disease

– Transverse Ligament of Palmar Aponeurosis (Skoog)
– Cleland’s ligament
– Transverse retinacular ligament
– Oblique retinacular ligament
Treatment Options

- Surgical options
  - Open (fasciotomy, fasciectomy)
  - Closed (needle aponeurotomy)

- Non-surgical options
  - In February 2010, the FDA approved XIAFLEX®, a nonsurgical treatment option for adults with Dupuytren's contracture with a palpable cord
• When do I use Collagenase now
  – Isolated single digit MPJ contracture >30 degrees with a DISTINCT pre-tendinous cord with associated PIP contracture less than 30 degrees.
  – Isolated single digit PIPJ contracture between 20-40 degrees with DISTINCT raised cord

**Indications for Surgery**

- MCPJ contracture > 30°
  - McFarlane RM, In McCarthy’s: Plastic Surgery 1990
- PIPJ contracture > 30°
  - McFarlane RM, In Green’s: Operative Hand Surgery, 1993
- Hueston’s Table Top Test

**Treatment- Fasciotomy**

- May be useful in patients with limited life expectancy
- As a prelude to more definitive mgmt

**Treatment- Fasciectomcy**

- Limited (Moereman, Gonzalez)
  - Disease likely to progress
  - May not require additional surgery
- Regional (partial)
  - most commonly done procedure
  - removes only the diseased tissue
- Extensive (radical)
  - Removes all palmar fascia
  - increased complicaion/ stiffness
Treatment - Incisions

- Originally proposed by Dupuytren
- McCash popularized
- Lubahn (JHS, 9A: 1984)
  - Retrospective comparison of open vs close palm
  - Open palm did better
  - Better ROM, no hematomas
  - Recurrence rate similar for both groups

Treatment - Skin Grafting

- Thought to prevent recurrence of disease
- “Firebreaks”
- Dermofasciectomy with FTSG
- Risks: Hematoma, graft loss, stiffness
- May be indicated in young person with diathesis

Treatment - Joint Contracture

- MPJ- usually corrects with fasciectomy
- PIPJ
  - Tight structures: skin, flexor sheath, palmar plate adhesion, accessory collateral ligament, intra-articular changes
  - Attenuation of the central slip
  - Secondary ctx release less predictable (Weinzweig, JHS, 1996)
  - Gentle passive manipulation (Breed, et al. JHS, 1996)
Cost Analysis

- Societal standard for cost effective treatment: $50,000/QALY
  - Open partial palmar fasciectomy: $820,114/QALY
  - Percutaneous Needle Aponeurotomy: $96,474/QALY
  - Without anesthesia: $49,631/QALY
- Collagenase
  - @ $250.00: $31,856/QALY
  - @ $945.00: $49,995/QALY
  - @ $3250.00: $166,268/QALY

Complications

- Overall complication rate – 20% McFarlane RM, 1990
  - Nerve – spiral nerve
  - Arterial injury – redo contractures
  - Hematoma formation
  - Flap necrosis
  - Infection
  - Loss of flexion/ decrease ROM
  - Reflex sympathetic dystrophy “flare”
    - 4% males
    - 8% females
    - Rate of 58% noted with simultaneous carpal tunnel release 2007
      - McFarlane RM, Dupuytren’s Disease: Biology and Treatment 2000
  - Recurrence
    - 2% to 74%
      - McFarlane RM, Dupuytren’s Disease: Biology and Treatment 1998

Rehabilitation

- Begin AROM and AAROM at 3 days
- Extension night time splint beginning 3 days for 6 months
- Scar mgmt
- Edema Control
- MOTION is LOTION!!

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Rehabilitation

SCIENTIFIC ARTICLE

• The Effect of Night Extension Orthoses Following Surgical Release of Dupuytren Contracture: A Single-Center, Randomized, Controlled Trial
• Julie Collis, MSc (Hons), Shirley Collocott, BSc, Wayne Hing, PhD, Ekd Kelly, MSc (Hons)
• JHS. 38A 2013
  – randomized, controlled trial
  – No difference at three months
    • therapy and nighttime splinting
    • therapy alone

Questions?

Basic Science

• Theory of local microvascular ischemia which stimulates proliferation of fibroblasts and related cell types.
• Related growth factors – myofibroblast proliferation:
  – TGF-β, TGF-β2
  – PDGF
  – bFGF
• Cytokines responsible for myofibroblast contraction:
  – PGF2 alpha
  – LPA
  – Angiotensin II
  – Serotonin
  – ratio of type III to type I collagen increased
• IFN-γ, Cat + Channel blockers counter effect of TGF-β
Surgical intervention is first indicated for DD when which of the following findings is present?

- MCPJ contracture > 60° and a PIPJ contracture of any degree
- MCPJ contracture and a PIPJ contracture > 40°
- MCPJ contracture > 30° or PIPJ contracture of any degree
- MCPJ contracture of any degree and a PIPJ contracture > 30°
- Any contracture of the MCPJ or PIPJ

When performing palmar fasciectomy for DD, which of the following should not be performed at the same time?

- Trigger finger release
- Intra-operative digital nerve laceration repair
- Knuckle pad excision
- PIPJ arthrodesis
- Carpal tunnel release

Cellular Structure

- Myofibroblast - cell responsible for tissue contraction
- Fibronectin
  - migration
  - differentiation
  - adhesion
- TGF-B1