

# Chapter 20:

## Dupuytren's Disease

Sharon Dickmann, PT, CHT

**Preface:** This chapter is a significant update to the 1<sup>st</sup> edition chapter by Suzanne Hale and contributing author, Janice Richburg. In addition to using several texts on the HTCC list of reference material, a literature review was conducted using Medline (PUBMED), CINAHL, the Cochrane Library (systematic reviews and some clinical research), and OTseeker to determine the most current research available. Sources follow the HTCC list of recommended texts as well as the *Journal of Hand Therapy*, *Journal of Hand Surgery*, and *Journal of Bone & Joint Surgery*. There is a paucity of research on post-procedure rehabilitation and the studies that are available are primarily case series or case-controlled. This is most likely because Dupuytren's contracture provides therapists with a limited number of research subjects, making randomized controlled studies less feasible.

### I. Dupuytren's Contracture/Disease:

A. Description:<sup>5,8,9</sup> Dupuytren's contracture is the most common genetic disorder of the connective tissue in people of northern European origin, particularly those of Celtic and Viking descent. It is inherited as an autosomal dominant trait with variable penetration. The extent of disease varies depending on the presence of certain other disorders (as listed below) and family history. It is a benign fibromatosis of the palmar fascia resulting in cords and/or nodules, which lead to flexion contractures in the digits. McFarlane (1974) initially noted that the normal palmar and digital fascial structures form the framework for the pathological structures of Dupuytren's contracture. The cause is currently unknown and it is not curable. This disease typically occurs in the 5th decade in men, and 6<sup>th</sup> decade in women. It is also much more common in men, with ratios ranging from 2:1 to 10:1, depending on the source. Women generally present with decreased severity, slower progression of the disease and a higher prevalence of complex regional pain syndrome. The genders have equal treatment results. While it occurs primarily in Caucasians of Celtic or Viking descent, patterns of emigration have led to Dupuytren's in other races. It is fairly common in Japan, but rare in other Asian countries. It is very rare in people of African descent and uncommon in Hispanics.

1. It is progressive in nature, having three recognized phases:

- i. Proliferative - intense cellularity, cells arrange in whorls
- ii. Involutional - cells align along lines of tension
- iii. Residual - tissue is largely acellular

2. Often associated with:<sup>8</sup> (note: this does not imply a cause and effect relationship)

- Diabetes
- Alcoholism
- Family history
- Epilepsy – those taking Phenobarbital
- AIDS
- Smoking
- Vascular disorders
- It is not unusual to find a patient with Dupuytren's as well as one or more of the following: carpal tunnel syndrome, trigger finger, and less often, de Quervain's tenosynovitis.

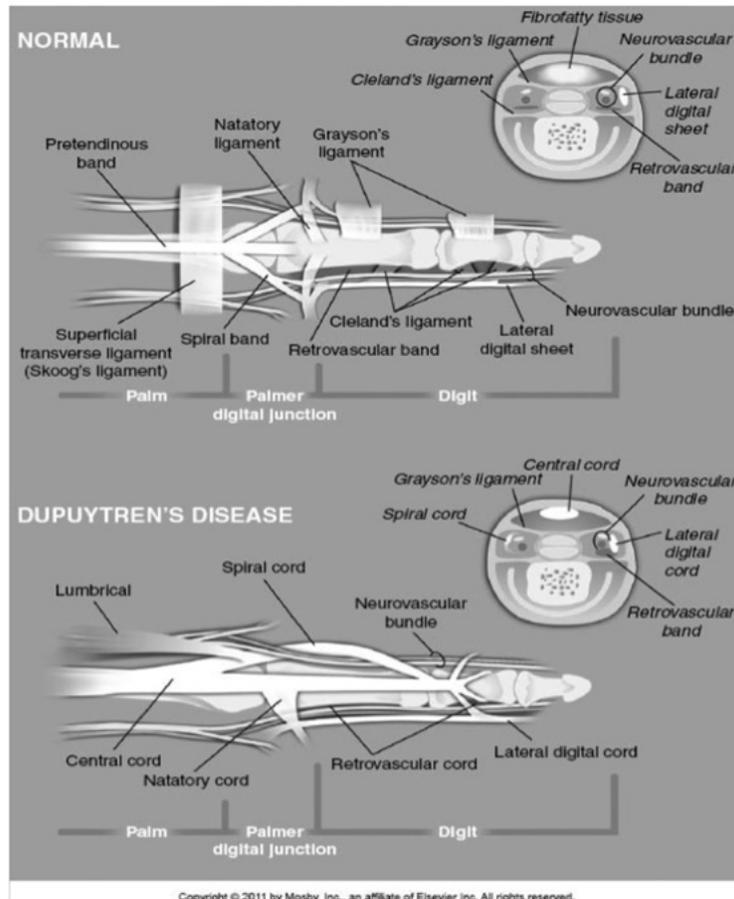
## Chapter 20: Dupuytren's Disease

Sharon Dickmann, PT, CHT

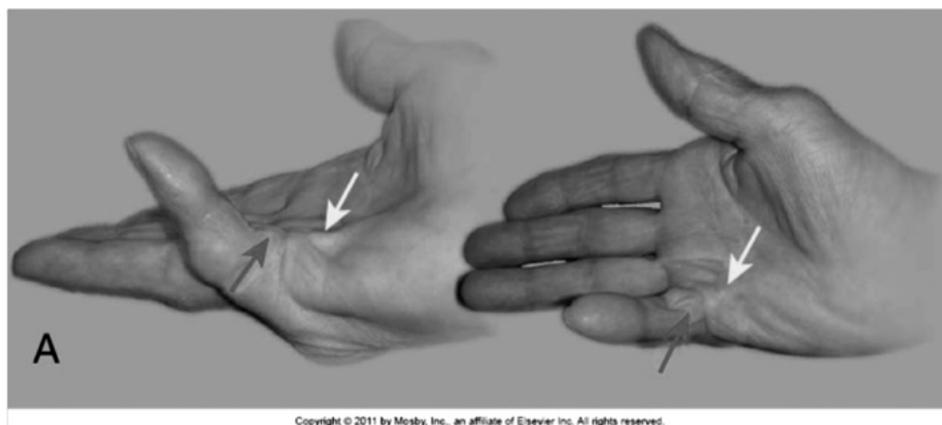
3. A person's job or a hand injury does NOT cause Dupuytren's disease. However, a hand injury in a person genetically predisposed to the disease can initiate the fibromatosis of Dupuytren's.<sup>7,8</sup>
  4. May occur with ectopic lesions (which are also a form of fibromatosis)<sup>5,6</sup>
    - Ledderhose's disease – of plantar fascia
    - Peyronie's disease – of the penis
    - Garrod's Nodes/knuckle pads – on dorsum of PIP joints; adheres to the extensor tendon, so not often resected
- B. Histological changes:<sup>7,8</sup>
1. Much higher number of fibroblasts in Dupuytren's tissue, with much higher proportion of Type III collagen (reticular type fibers found in skin and organs) formed vs Type I collagen (ligaments, tendons, bone)
  2. Local hypoxia due to fibromatosis leads to increase in transforming growth factor beta (TGF- $\beta$ ), which causes the differentiation of fibroblasts into myofibroblasts
  3. Possible involvement of metalloproteinases (MMP's) and an imbalance with their inhibitor, TIMP. Excessive TIMP slows the decay of extracellular matrix, which allows Dupuytren's to progress.
  4. Platelet-derived growth factor (PDGF) is elevated in fibromatous tissue, which leads to proliferation of fibroblasts
  5. Prostaglandins are elevated – they stimulate myofibroblast contraction
  6. Increased glycosaminoglycans (GAG's) and reducible collagen cross-links
  7. Possible involvement of oxygen free radicals, which increase fibroblast proliferation
  8. Myofibroblasts contain a contractile system composed of actin, myosin, and ATPase. As they contract, they result in the contractures of Dupuytren's disease. Higher density of myofibroblasts has been correlated with recurrence.
- C. Characteristics:<sup>7,8</sup> (Figs. 1 and 2)
1. Cords: Cords form from normal palmar digital fascial structures called bands. They are relatively cellular and the cells align parallel to collagen fibers. Up to 19% of the cells are myofibroblasts. Cords without nodules are associated with greater severity of contractures. The illustration in Fig. 1 provides an excellent overview of normal fascia vs. Dupuytren's cords and the photo shows both cords and nodules.
    - Pretendinous cords - solely responsible for contracture of MCP joint
    - Central cord - contracture of MCP and PIP
    - Spiral cord - contracture of MCP and PIP as well as displacement of neurovascular bundle towards digit midline
    - Natatory cord - digital web space contracture
    - Commissural - contracture of thumb – index web space
    - Retrovascular - contracture of PIP and DIP
    - May also occur as abductor digiti minimi and radial thumb cords
  2. Nodules: May occur in the palm or be co-localized with the MCP or PIP joint. They are volar to the flexor tendons. A nodule is the primary manifestation of Dupuytren's disease. Nodules are hypercellular and most cells are myofibroblasts. Nodules can be mildly tender or painful. The primary treatment is observation, but if pain is substantial or wakes the patient, the nodule may be treated with a steroid injection. (Fig. 2)

## Chapter 20 Figures

**NOTE:** All figures are taken from *Rehabilitation of the Hand and Upper Extremity*, 6th Edition<sup>3,8</sup>.



**Figure 1: Normal fascial anatomy (top) and pathoanatomy of the common cords (bottom) of the distal palm, palmar digital junctional area, and the digit.**



**Figure 2: Palmar and sagittal views of a hand with Dupuytren's disease of the palm and fifth finger. Note, nodules (red arrows) and cord (yellow arrows).**

## Chapter 20: Dupuytren's Disease

Sharon Dickmann, PT, CHT

3. Skin Pits: Pitting of the palmar skin is an early pathological manifestation. It is associated with nodule formation and its corresponding attachment to the overlying skin via vertical fibrous extensions.

### D. Types of Presentations:

Dupuytren's disease ranges from typical to severe. The typical disease can occur bilaterally and affects the ring and small fingers. Surgical intervention is generally effective, but recurrence ranges from 20% to 80%. The severe form of Dupuytren's disease is difficult to control; these patients present with more characteristics of the Dupuytren's Diathesis (as described by Hueston – see Ch. 22 Rehab of the Hand & Upper Extremity, 6<sup>th</sup> ed).<sup>7,8</sup>

1. Close relatives with the disease (parent(s) and/or sibling(s))
2. Caucasian
3. Bilateral disease
4. Ectopic lesions such as Ledderhose's or Peyronie's disease, or Garrod's Nodes
  - Hindocha et al. in 2006<sup>6</sup> slightly modified the Dupuytren's Diathesis, making it more specific and improving the predictive value for recurrent disease. The risk of recurrence is 71% if a patient presents with bilateral disease and Caucasian race as well as:
    - i. 1 or more affected parents/siblings
    - ii. Ectopic lesions of the knuckles (Garrod's Nodes)
    - iii. Male gender

E. History: While not the first to note palmar fibromatosis, Baron Guillaume Dupuytren (1777-1835) identified the palmar and digital fascia as the tissue responsible for contracture. He differentiated the skin and tendons from the real problem, the fascia.<sup>9</sup>

F. Flare or Chronic Regional Pain Syndrome associated with post-op Dupuytren's: "This may also be referred to as a "Pre-dystrophy" state. This flare is treated as CRPS; however, it does not as often demonstrate the severe radiological changes seen in full-blown CRPS."<sup>9</sup>

## II. Surgical Interventions:<sup>7,8,9</sup>

Surgical intervention is considered when a patient presents with a MCP or PIP joint contracture of 30 degrees or more. Surgeons may use the "tabletop test," in which the patient is asked to place the hand flat on a table. If there is significant contracture, the palm and fingers cannot simultaneously rest on the table. Patients will complain of limited ability to reach into their pocket or purse and perform other functional tasks. MCP joint contracture can be corrected regardless of duration. IP joint contracture is more difficult to correct. The IP joints collateral ligaments are relaxed in flexion and taut in extension. In a flexion contracture of the IP's, the collateral ligaments become shortened. The longer the joint has been contracted the chance of regaining and or improving extension is lessened. Correction of web space contracture is indicated to prevent infection between the fingers. According to Hurst in Green's Operative Hand Surgery (2011), surgical recurrence rates range between 8% to 54%, but probably reaches 100% for some degree of recurrence if the patient is followed long enough.

### A. Goals:

1. To significantly improve functional use of the affected hand
2. To reduce deformity and regain/improve extension of the digits

3. To delay progression of the disease
- B. Surgical procedures: Descriptions of these procedures are drawn from Hurst's chapter in *Rehabilitation of the Hand and Upper Extremity* as well as Green's *Operative Hand Surgery*. There are five contemporary surgical management techniques. The final three procedures are rarely performed:
1. *Closed Fasciotomy*: Described by Henry Cline in 1808. This procedure is usually performed when the MCP joint alone is involved, or when there may be medical contraindication to more aggressive surgery. Fasciotomy is done with a "stab" incision, which releases the "cord." No diseased tissue is removed. This is less effective and not typically done for IP joint contractures due to risk of nerve injury.
  2. *Limited Open Fasciectomy*: The most popular surgery for Dupuytren's Disease currently. The diseased fascia is removed and the rest of the fascia is left undisturbed. An open fasciectomy in the digit requires extra care from the surgeon to avoid damage to the neurovascular bundle. Also in the digit, recurrent contracture is more likely if certain fascial structures remain. The McCash procedure is a variation of limited open fasciectomy in which a transverse elliptical skin deficit is left open, avoiding skin grafts and lessening risk of hematoma. This procedure is also performed in older patients lacking adequate skin due to long-term contractures. The wound then heals via secondary intention.
  3. *Segmental Open Fasciectomy*: This is an intermediate approach combining elements of Limited Open Fasciectomy and open fasciotomy. A series of short, curved incisions are created to excise a portion of pathological cord. It has the advantage of minimizing secondary scarring. This procedure is most appropriate for older patients with significant contracture, functional compromise and significant co-morbidities.
  4. *Dermofasciectomy*: This procedure was introduced by Hueston in 1962. The surgeon excises diseased fascia and the overlying skin. The defect is reduced with skin grafting. Smaller skin grafts have been proposed by Gonzales (1971, 1985, 1990) and McGregor (1985). The benefit of this procedure has been stressed by McGrouther (2005); the skin graft creates a "fire break" between the remaining fascial tissues. This procedure does decrease incidence of recurrence. It is recommended particularly for younger patients with recurrent contracture, those with the diathesis, and those with skin shortage.
  5. *Digital Amputation/Ray Resection*: Used in severe recurrent disease and most commonly for the small finger. With ray resection, good cosmetic results are possible as well as improved hand function. Refer to the chapter on digital amputation for management information.
  6. *Open Radical Fasciectomy*: This procedure was described by McIndoe & Beare (1958). This procedure is rarely performed today. It is a radical procedure in which both the diseased and even normal-appearing fascia is excised. It is indicated more in the digits than palm. There is more scarring, increased chance of complications and morbidity. It does not significantly reduce incidence of recurrence.
  7. *Excision of Dupuytren's Nodule*: Rarely performed, but there are two instances in which a nodule should be excised:

## Chapter 20: Dupuytren's Disease

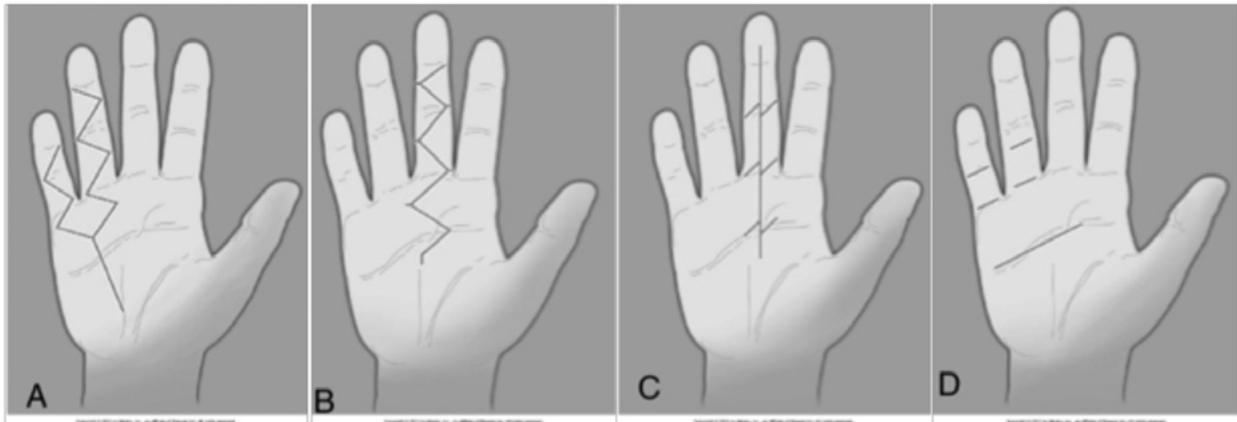
Sharon Dickmann, PT, CHT

- If the nodule is superficial to a trigger finger requiring release – in this case, if not removed it may progress rapidly into a cord and contracture
  - If the nodule is causing “unrelenting” pain, especially at night – there is an extremely rare possibility it could be a fibrosarcoma, especially in a younger person. A biopsy is required.
8. *Excision of Garrod's Nodes/Knuckle Pads*: The primary treatment is observation. Surgery is indicated if the pads are excessively large, painful, or hindering function. It may recur.
- There is no interval between the pad and the extensor tendon, so this procedure requires extra care from the surgeon to avoid a boutonnière deformity.

HINT: The suffix “-ectomy” refers to removal of tissue, while “-otomy” refers to severing the tissue, but leaving it in place.<sup>5</sup>

- C. Surgical procedures for management of skin:<sup>5,7,8,9</sup>
1. “Closed” approach where all incisions are closed which includes but is not limited to the following incisions:
    - Transverse Incisions (McCash) – (see Fig. 3 D)
    - Skin Grafts
    - Skin Flaps
    - Longitudinal Incision- Z Plasty, V-Y Plasty, Honeycomb (Fig. 3 A-C)
  2. McCash Open Palm: The palm is left open to heal by secondary intention to reduce risk of hematoma. See incision pattern (Fig. 3 D)
- D. Non-surgical procedures: There are two closed fasciotomies:
1. *Closed Needle Fasciotomy*:<sup>7,8</sup> (also called Percutaneous needle fasciotomy) This procedure was developed in the 1970's by a group of French rheumatologists. A small amount of local anesthetic is usually used to minimize discomfort. The surgeon then uses a 25-gauge needle to cut the cords, using palpation as a guide. As the cords are pierced, the surgeon progressively extends the digit. It works best with MCP contracture. In the digit, there is a much higher risk of injury to neurovascular bundles. The patient can use his/her hand relatively normally within a week. The primary complications are digital nerve injury and tendon rupture (0.05%). The recurrence rate at 3 years is 58%. This procedure is not appropriate in cases of severe contracture.
  2. *Closed Enzymatic Fasciotomy*:<sup>7,8,10,11</sup> (*Xiaflex*®) This is the newest procedure for Dupuytren's contracture, receiving FDA approval in 2010. This procedure description is taken directly from the manufacturer's instructions. The collagenase is isolated and purified from the fermentation of *Clostridium Histolyticum* bacteria. The surgeon may either perform an ultrasound to visualize depth of cords and tendons or perform detailed palpation of the cords under tension. Then, the surgeon injects small amounts of collagenase into the cords at locations in which the cord is farthest from the underlying tendon and where the skin is not intimately adhered to the cord. The collagenase dissolves the collagen bonds & weakens the cords. The patient returns the next day for manipulation into extension to rupture the cords. The tendon is protected by flexing the wrist

## Chapter 20 Figures



**Figure 3: Four basic skin incision patterns for Dupuytren's fasciectomies:**

- A, The zigzag plasty incision with its linear extension proximal to the palmar flexion crease. In the finger there can be one oblique incision between flexion creases (e.g., fifth finger) or two oblique incisions between flexion creases (e.g., fourth finger).**
- B, The Littler–Brunner incision with small transverse extensions. Watson uses these for V-Y plasty closures, Bedeschi leaves them open in the honeycomb technique.**
- C, The longitudinal incision, which is closed by Z-plasties (oblique incision lines).**
- D, The transverse incisions of McCash's open-palm technique.**



**Figure 4: Typical volar extension orthosis. It is critical that the degree of extension not compromise the neurovascular bundles. If the fingertips become pale or develop paresthesias, the orthosis must be adjusted into less aggressive digit extension.**

## Chapter 20: Dupuytren's Disease

Sharon Dickmann, PT, CHT

as the finger is extended. Complications include tendon ruptures, which are rare (3 digits out of 2600 joints in 1000 patients). Recurrence at 5 years is 10% for MCP joints and 20% for PIP joints.

- E. Postoperative complications:<sup>3,7,8,9</sup> Complications are more likely to occur in severe disease and following more extensive operations.
1. Minor complications occur in 17% to 20% of operations and can prolong the period of morbidity for 2-3 weeks
  2. Severe complications include gangrene of a digit and CRPS; both could lead to permanent disability
  3. Infection, hematoma and skin loss; a triad that usually appear together
  4. Digital nerve and artery injury that contribute to postoperative cold intolerance and joint stiffness
  5. CRPS occurs in 5 percent of operations; 2 times greater in women and more likely after extensive operation
  6. Dupuytren's Flare - increased inflammatory response
  7. Tissue Necrosis
  8. Failure to correct the contracture – for PIP contractures greater than 30° *after* cord excision, the surgeon may perform a volar release of the PIP to prevent this complication

### III. Hand Therapy

- A. Preoperative: Hand therapy treatment for Dupuytren's contractures prior to surgery does not achieve lasting results. It does, however, offer the patient potential benefit. It is advocated by several authors (Evans, Concannon & Hurov, and Weiss & Falkenstein).
1. Preoperative hand therapy for one visit may be helpful. Valuable information can be gained from documenting ROM, performing a sensory evaluation of each digital nerve, assessing FDP function and the ORL, checking for intrinsic muscle tightness, and screening for carpal tunnel syndrome and trigger finger. This is an excellent opportunity for patient education in such topics as time frames for rehabilitation and splinting, early postoperative management to minimize edema/pain/risk of flare, precautions, signs of infection, pain management strategies (may include supporting physician's recommendations for pain medications), and establishing realistic expectations of outcomes.<sup>2,3</sup>
  2. Early data from an ongoing study by Evans & Bell<sup>3</sup> (Rehab of the Hand and Upper Extremity, 6<sup>th</sup> ed., p.282) shows potential benefit for preoperative serial casting of PIP contractures. This would allow elongation of shortened structures such as neurovascular bundles. Per Evans, an average gain in PIP extension between 25° to 40° is achieved. She also notes improved FDP gliding and ORL length. It has not yet been determined whether this protocol leads to shorter length of rehabilitation or improved outcomes.
- B. Several post-op treatment protocols have been suggested. Some protocols are specific to the type of surgical technique. Individual needs and careful observation of patient response to treatment is imperative. Preoperative information (severity of contracture) is helpful in post-op management. It is also helpful to know if the full range of motion was achieved in surgery.

The following are examples of treatment protocols for postoperative care. It is important to note that there are numerous protocols by various authors. The first protocol is a generalization of the traditional protocol. The remaining protocols were extracted from two leading hand rehabilitation guides.

1. Traditional protocol:<sup>1,3,9</sup> (May be utilized following any surgical procedure in which the wounds are sutured closed)  
Goals for 1-3 days post-op to 6 weeks
  - i. Promote wound healing and avoid wound dehiscence. In patients with diabetes or unstable corner flaps, sutures are sometimes left in place for 16-17 days. (See wound care chapter for healing time frames, dressing options and debridement techniques)
  - ii. Fabricate a static extension orthosis to maintain extension gains. Maximum safe extension is the maximum extension of the digit that can be applied without compromising neurovascular bundles or inciting excessive inflammatory response.
    - Orthosis 1-3 days post-op – see Fig. 4 for an example
      - a. Orthosis can be hand based, forearm based, volar or dorsal, pan or specific to involved digits
      - b. Orthosis is removed for dressing changes as indicated and for AROM exercises only
      - c. Orthosis is worn during the day for 4-8 weeks, if extension is maintained and depending on surgeon preference. Night wear may be continued for 6-8 months. The length of time an orthosis is used will also be guided by how well extension is maintained; if the patient is losing extension, the orthosis will be continued for a longer period.
  - iii. Range of motion
    - Gentle AROM begins 1-3 days post-op; done on hourly basis. (*In presence of severe edema, large hematoma, incision splitting or hand showing signs of a flare, exercises are done less often*).
    - Isolated extension exercises are emphasized
  - iv. Edema control (Needs to be addressed immediately post-op and aggressively. Prolonged edema can lead to scar formation and will inhibit ROM and functional use.)
    - Compressive dressings
    - AROM (especially in elevation) is natural “pump” which also helps remove fluid
    - Consider use of retrograde massage to “milk” fluid out of hand or lymphatic massage
  - v. Scar management
    - Massage
    - Paper tape, silicone gel sheet, silastic elastomer, or otoform
  - vi. Strengthening
    - May be initiated when inflammation and edema are at a minimum, usually at 3-4 weeks post operative

## Chapter 20: Dupuytren's Disease

Sharon Dickmann, PT, CHT

- Since the tendons are not involved in the fasciotomy, there is no threat of tendon rupture with initiation of resistive exercise
2. Protocol following McCash procedure: (from *Diagnosis and Treatment Manual for Physicians and Therapists: Upper Extremity Rehabilitation*, 4<sup>th</sup> Ed)<sup>1</sup>

**NOTE:** The palmar wound usually requires 3-8 weeks to achieve full closure. The length of time will depend on co-morbidities (such as diabetes), the size of the wound, and the patient's own intrinsic healing ability.

    - i. Days 3-5 postoperative:
      - Bulky dressing and any drains are removed. Lighter, non-adherent absorptive dressing is applied.
      - Whirlpool or soaks if wound appears infected or has necrotic tissue
      - Full extension pan splint (maximum safe extension) to wear between exercise sessions and for sleeping
      - AROM & PROM 4-6 times daily for 10 minutes sessions
      - NMES to maximize excursion of long finger flexors
      - Composite taping or dynamic flexion splinting (not used as frequently today) starting on visit 3 or 4 if patient is slow regaining PROM
    - ii. Weeks 3-4:
      - The authors caution that patients often have more difficulty maintaining ROM during this period, so careful monitoring is necessary
      - May require increasing frequency of AROM and PROM to hourly
      - Once palmar wound is closed, aggressive scar management needed
    - iii. Weeks 6-8:
      - Decrease wear time of splint gradually to minimize recurrence of contractures
    - iv. Months 4-6:
      - Recommend use of the resting pan splint for sleeping for 6 months
      - Continued scar management – typically by the patient at home
  3. Hand therapy “No Tension”:<sup>3,4</sup> type protocol is strongly indicated for the patient with severe contracture after an aggressive fasciectomy and may be used following any surgical or closed procedure. The literature supports a lower tension approach over a more aggressive forced extension approach. The splint is in a safe position that decreases the risk of developing a flare. It is helpful when setting goals to know the pre-op and intra-operative extension because full extension may not be a realistic goal. This information is taken directly from Roslyn Evans' Chapter 23 in *Rehabilitation of the Hand and Upper Extremity*, 6<sup>th</sup> Ed, and is an update to the “No tension” protocol provided in the 1<sup>st</sup> edition of the ASHT Prep Manual.
    - i. Early phase 24 hours – day 7 (\*indicates first postoperative visit)
      - \*Wound care
      - \*Edema care – emphasis on hand elevation
      - \*Orthosis - Dorsal Blocking Orthosis with wrist neutral, MCP's in 35°-45° flexion, IP's in relaxed extension and only the operated digits are included. The thumb is positioned in mild abduction if a first web cord was excised. The orthosis will allow flexion, limit MCP & IP extension and can be removed for wound care. This DBO is used for the first 2 ½ weeks.

(See Fig. 5)

- Exercise – No exercise is permitted for either the operated hand or full body fitness for the first few days. Gentle composite digital flexion with the splint is started in 2-3 days. More aggressive motion to the end ranges of flexion and extension are strictly avoided. (See Fig. 5)
- vii. Week 2-3
- Wound management
  - Scar management – 24 hour paper taping once sutures removed to minimize wound tension. Silicon gel sheeting for sleeping if scar is hypertrophic or sensitive.
  - At 3 weeks, the anti-tension orthotic is discontinued and remade into a volar hand-based extension orthotic. (See Fig. 6)
  - Permit greater angles of flexion and extension. Gradually initiate flexor tendon gliding (hook & full fist 5x/day), stretch of intrinsic muscles, isolated DIP flexion with PIP at 0° for ORL stretch, PIP extension with MP flexed, MP extension with PIP flexed. Avoid repetitive gripping (increases pressure at A1 pulley and at carpal tunnel)
  - If wound healing is progressing well, volar digital orthoses may be applied 4-5 times a day with Micropore™ tape to improve PIP extension. If patient unable to apply these, a dynamic extension orthotic may be used beginning weeks 2-4.
  - Gentle axial distraction by therapist
  - FES with MCP's blocked and for composite extension by week 3
- viii. Week 4-6
- Scar management
  - Pain and edema management as needed
  - Composite motion
  - Splinting: composite extension, PIP digital extension, serial casting, dynamic flexion
  - Light strengthening with isometrics for gross grasp (not putty)
4. Percutaneous Needle Fasciotomy or Enzymatic Release.<sup>3,10,11</sup>
- i. These patients usually require only minimal hand therapy intervention
    - Rehabilitation follows the same principles as postoperative care. Do not exceed tolerance of neurovascular bundles. A “no tension” protocol is advocated by Evans.
    - Use of padded gloves for activities that apply stress to the palm (gardening, racquet sports, golf, for example)<sup>3</sup>
    - The manufacturer of Xiaflex® recommends that patients be fitted with an orthosis to wear for sleeping for up to 4 months. They provide a list of companies that sell prefabricated orthoses.
5. Excision of nodules or Garrod's Nodes: There are no specific protocols for these surgeries. Refer to the surgeon's recommendations.
6. Therapist Management of Complications:<sup>3</sup>
- i. Therapist should be alert for complications and act promptly if signs of infection, hematoma, inflammation, or excessive edema are noted. Send patient to physician for medical evaluation.

## Chapter 20: Dupuytren's Disease

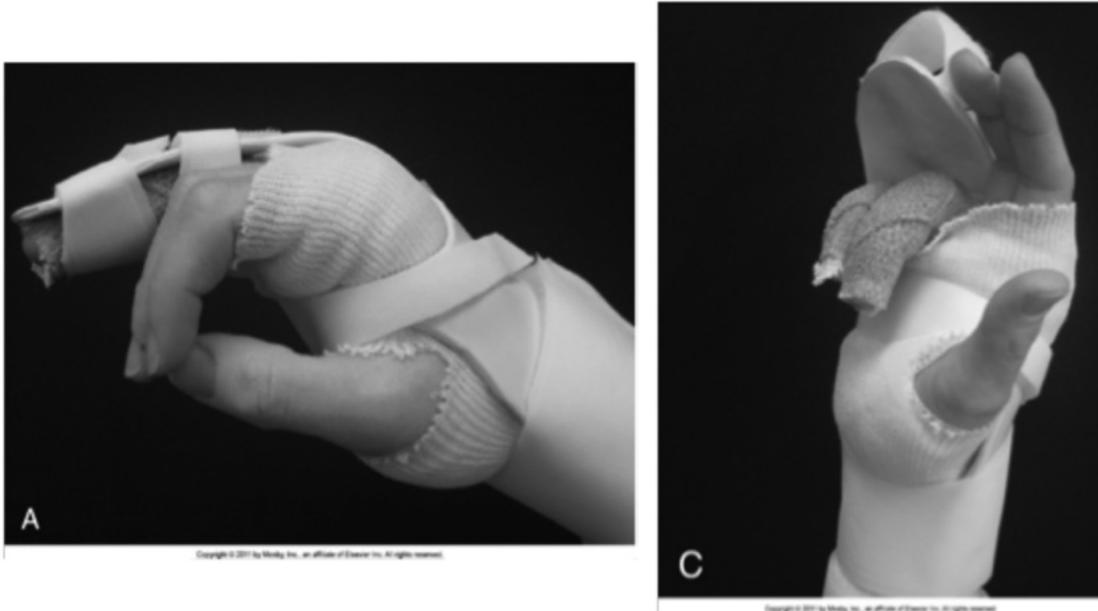
Sharon Dickmann, PT, CHT

- Sympathetic flare – requires immediate attention. Notify the physician for prompt medical intervention (often a stellate ganglion block).
- Inflammation – adjust orthotic position if necessary to lower tension, decrease frequency/intensity of exercise, possible use of HVGS and cryotherapy
- Edema – Coban wrap, elevation, Compressive (Isotoner-type) gloves, gentle fluid flushing exercises
- PIP flexion contractures – serial casting, volar digital orthoses with Transpore™ tape, dynamic digit-based orthoses. Always evaluate and treat intrinsic muscle tightness.
- Triggering – may use a hand-based MCP blocking orthosis to allow IP flexion only.
- Carpal tunnel syndrome – refer back to physician – may require surgical intervention.

**NOTE:** MCP joint extension can usually be restored because the collateral ligaments have been in the stretched position making extension attainable. PIP joint contractures, however, have an unpredictable prognosis. In the flexed posture of Dupuytren's contracture, the PIP joint collateral ligaments are in the shortened position. This results in adaptive shortening of the ligaments, thus hindering the ability to regain full extension.<sup>9</sup>

**NOTE:** All figures are taken from Rehabilitation of the Hand and Upper Extremity, 6<sup>th</sup> Edition.<sup>3,8</sup>

## Chapter 20 Figures



**Figure 5:**

**A, Dorsal static protective orthosis utilized immediately postoperatively for the no-tension applied (NTA) protocol following Dupuytren's fasciectomy. This dorsal orthotic design allows for flexion, but not MCP joint extension, in a controlled range preventing neurovascular and wound tension the first 2.5 weeks after surgery.**

**C, The patient exercises within the orthosis, strapping the interphalangeal joints to the dorsal hood between exercise sessions.**



**Figure 6: A, In the no-tension applied protocol, the dorsal orthosis is remolded to a volar hand-based extension orthosis with straps placed strategically over the metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints to maintain or improve joint extension by week three. The splint is worn at night.**

# References

1. Cannon NM. (Ed.). (2001). *Diagnosis and Treatment Manual for Physicians and Therapists: Upper Extremity Rehabilitation* (4th ed.). Indianapolis: The Hand Rehabilitation Center of Indiana.
2. Concannon MJ, Hurov J. Patient 7: A 50-year-old man with progressive finger flexion contractures. In: Concannon MJ, Hurov J, eds. *Hand Pearls*. Philadelphia, PA: Hanley & Belfus Inc., An imprint of Elsevier; 2002:20-24.
3. Evans RB. Therapeutic Management of Dupuytren's Contracture. In Skirven T, Osterman A, Fedorczyk J, Amadio P, eds. *Rehabilitation of the Hand and Upper Extremity*. 6th ed. Philadelphia, PA: Mosby Inc., and affiliate of Elsevier Inc.; 2011:281-288.
4. Evans RB, Bell PL, Fiolkowski PA. Clinical reports of the effect of mechanical stress on functional results after fasciectomy for Dupuytren's contracture. *Journal of Hand Therapy*, 2002;15 (4):331-339.
5. Falkenstein N, Weiss S. Dupuytren's Disease and Tumors. In S. Weiss, & N. Falkenstein, *Hand Rehabilitation: A Quick Reference Guide and Review*. 2nd ed. St. Louis, MO: Elsevier – Mosby; 2005:379-389.
6. Hindocha S, Stanley JK, Watson S, Bayat A. Dupuytren's diathesis revisited: Evaluation of prognostic indicators for risk of disease recurrence. *Journal of Hand Surgery*. 2006;31A(10): 1626-1634.
7. Hurst L. Dupuytren's Contracture. In Wolfe SW, Hotchkiss RN, Pederson WC, Kozin SH eds. *Green's Operative Hand Surgery*. 6th ed. Philadelphia, PA: Elsevier - Churchill - Livingstone. 2011: 141-158
8. Hurst L. Dupuytren's Disease: Surgical Management. In Skirven T, Osterman A, Fedorczyk J, Amadio P, eds. *Rehabilitation of the Hand and Upper Extremity*. 6th ed. Philadelphia, PA: Mosby, Inc., and affiliate of Elsevier Inc; 2011:266-280.
9. Hale S, Richburg J. Dupuytren's Disease and Tumors. In Kasch MC, Taylor-Mullins P, Fullenwider L, eds. *ASHT Test Prep for the CHT Exam*. USA:2006:235-246.
10. Watt AJ, Curtin CM, Hentz VR. Collagenase injection as nonsurgical treatment of Dupuytren's Disease: 8-year follow-up. *Journal of Hand Surgery*. 2010;35A:534-539.
11. Xiaflex. Xiaflex – Dupuytren's Contracture treatment for adults with palpable cord (2011)., Web site <https://www.xiaflex.com/> Accessed December 9, 2011.

## Multiple Choice Questions

1. Which statement regarding the Dupuytren's nodule is FALSE?
  - A. It is the primary manifestation of Dupuytren's contracture
  - B. The primary treatment is observation
  - C. Made up mostly of myofibroblasts
  - D. It is commonly intensely painful
2. Which digits are most commonly involved?
  - A. Ring & small
  - B. Small & thumb
  - C. Ring & long
  - D. Index & thumb
3. The Dupuytren's diathesis is a more severe presentation of the disease. These patients present with what characteristics?
  - A. Family history – parents and/or siblings with Dupuytren's, male gender, radial sided disease, & plantar fasciitis.
  - B. Family history – parents and siblings with Dupuytren's, Caucasian race, bilateral disease, & diabetes
  - C. Family history – parents and/or siblings with Dupuytren's, Caucasian race, bilateral disease, & Garrod's Nodes.
  - D. Garrod's Nodes, Caucasian race, female gender, & bilateral disease
4. The most popular surgical procedure for Dupuytren's contracture is:
  - A. Dermofasciectomy
  - B. Open radical fasciectomy
  - C. Closed fasciotomy
  - D. Limited Open Fasciectomy
5. In the "No Tension Protocol" on the patient's first postoperative therapy visit, the hand therapist should:
  - A. B and C
  - B. Provide wound and edema care and patient education
  - C. Fabricate a dorsal blocking orthosis with wrist neutral, MCP's in about 45° of flexion and IP's in relaxed extension.
  - D. Fabricate a dorsal blocking orthosis with the wrist in neutral, MCP's in about 70° of flexion and the IP's in full extension.
6. In the Percutaneous Needle Fasciotomy procedure:
  - A. The patient usually only needs a couple of hand therapy visits for splinting, education and a home exercise program.
  - B. The surgeon blindly cuts the cords, which frequently results in tendon laceration.
  - C. The patient can usually use his/her hand normally right away and has no restrictions on activity.
  - D. It works best for the PIP joint, but not as well for the MCP

## Multiple Choice Questions

7. Scar tissue management is an important part of postoperative care for Dupuytren's contracture patients. All of the following are scar tissue management techniques EXCEPT:
  - A. Silicon gel pads
  - B. Paper tape
  - C. Scar tissue mobilization/massage
  - D. Silastomer
  
8. Which statement is FALSE regarding enzymatic cord release?
  - A. This procedure received FDA approval in 2010 for use in Dupuytren's contracture.
  - B. The surgeon injects the collagenase into the cords as close to the tendons as possible
  - C. The collagenase weakens the collagen bonds in the cords, causing them to easily rupture
  - D. The 5 year recurrence rate is 10% for MCP joints and 20% for PIP joints
  
9. It is currently not common for Hand Therapists to see patients with Dupuytren's contracture preoperatively. The greatest benefits of a pre-op therapy visit include all of the following EXCEPT:
  - A. Begin treating co-existing problems such as carpal tunnel syndrome preoperatively
  - B. Document pre-op ROM, sensation, intrinsic muscle tightness
  - C. Assess function of the FDP and ORL flexibility
  - D. Educate the patient about pain and edema management, expected outcomes
  
10. The traditional protocol following a surgical procedure for Dupuytren's contracture includes which of the following:
  - A. Promote wound healing, orthosis set in maximum safe extension, gentle AROM on an hourly basis
  - B. Promote wound healing, orthosis set in maximum composite extension, aggressive AROM and PROM
  - C. The extension orthosis is worn continuously, except for dressing changes and exercise for at least 6 months.
  - D. Wound care, full composite extension orthosis, AROM on an hourly basis
  
11. Which of the following is NOT a goal of surgical intervention for Dupuytren's contracture?
  - A. To improve function in the affected hand
  - B. To prevent recurrence of the contracture
  - C. To delay progression of the disease
  - D. To reduce deformity & increase digit extension
  
12. Which statement is TRUE of the pathological cords?
  - A. The retrovascular cord causes contracture of only the DIP.
  - B. The pretendinous cord is solely responsible for the MCP flexion contracture.
  - C. The central cord causes contracture of the MCP, PIP, and DIP joints.
  - D. It is also possible to have a flexor digiti minimi cord.

## Multiple Choice Questions

13. The cord that causes displacement of the neurovascular bundle towards the volar midline of the digit is the:
- A. Natatory cord
  - B. Retrovascular cord
  - C. Spiral cord
  - D. Central cord
14. Minor complications following surgical procedures for Dupuytren's contracture occur in about 20% of cases. What is the best course of action for the hand therapist who notices signs of CRPS at today's patient visit?
- A. Begin use of contrast baths or TENS
  - B. Place the patient on hold until his/her condition improves
  - C. Notify the surgeon immediately so that proper medical intervention may be provided.
  - D. Start the patient on a more aggressive exercise and weight bearing program

**Multiple Choice Question Answer Key  
Chapter 20**

1-D, 2-A, 3-C, 4-D, 5-A, 6-A, 7-D,  
8-B, 9-A, 10-A, 11-B, 12-B, 13-C, 14-C

## **Chapter 20: Dupuytren's Disease**

*Sharon Dickmann, PT, CHT*