# Dupuytren's Contracture: Current Treatment Methods

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**ABSTRACT:** Dupuytren's disease is a common benign fibromatosis of the palmar and digital fascia. The exact pathophysiology and epidemiology of this condition have not been entirely identified. Pathologic fibrous bands cause a flexion contracture of the metacarpal phalangeal joints and proximal interphalangeal joint. Treatment includes fasciectomy, needle fasciotomy, and enzymatic fasciectomy.

*IMAJ* 2017; 19: 648–650

**KEY WORDS:** contracture, collagenase, Dupuytren's disease

Dupuytren's disease is a common benign fibromatosis of the palmar and digital fascia. The disorder typically presents with a fibrotic nodule over the palmar fascia. The most common location is the 4th or 5th fingers. As the disease progresses, the nodule grows in size, sometimes over the course of years, and creates fibrous pathologic bands, which extend to the longitudinal palmar bands. These bands have the capacity to contract, thereby causing a flexion contracture of the small hand joints known as Dupuytren's contracture. The most common joints are the metacarpal phalangeal joints (MCP) and proximal interphalangeal joint (PIP) [1].

The exact pathophysiology and epidemiology of this condition have not been entirely identified. Dupuytren's disease is an autosomal condition with variable penetrance. The current belief is that a combination of risk factors can influence gene regulation in genetically predisposed patients. These include diabetes, cigarette smoking, older age, menopause, alcohol consumption, and Western European ancestry. Male gender is also considered as a risk factor, most probably due to heavy labor with repetitive micro-trauma [2,3].

**Dupuytren's disease is a pathologic condition in which pathologic fibrous bands cause a flexion contracture of the metacarpal phalangeal joints and proximal interphalangeal joint. This contracture can lead to varying degrees of disability**

## HISTOPATHOLOGY

Pathologic fibrous cords arise at the point of maximal stress between the dermis and fascia in this area. Local fibroblasts, situated under mechanical stress plus exposure to transforming growth factor beta 1 (TGF-β1), transform into myofibroblasts [4]. These cells can build tenacious intercellular junctions and connect to collagen fibers located in nearby fascia, most commonly in individuals with a high percentage of collagen type III [5]. When stress is felt by these myofibroblasts, they contract and eventually produce Dupuytren's contracture. Contraction usually evolves at a rate of one centimeter per month. In a healthy, non-predisposed individual, once stress has been resolved, this cycle will be halted by normal apoptosis of myofibroblasts due to lack of stimuli. Unfortunately, and for unknown reasons, in people suffering from Dupuytren's disease, pathologic myofibroblasts do not go through apoptosis and continue to grow and contract after the source of the stress has disappeared [6].

## SIGNS AND SYMPTOMS

Initially, skin tightness and contour changes, such as wrinkles and dimples, may arise. These are commonly overlooked and ignored by the patient. Seeking medical attention will be the result of later findings, such as nodules that can be itchy, painful, or just displeasing from a cosmetic point of view. A common scenario is presentation with fully developed Dupuytren's contracture [Figure 1] [6].

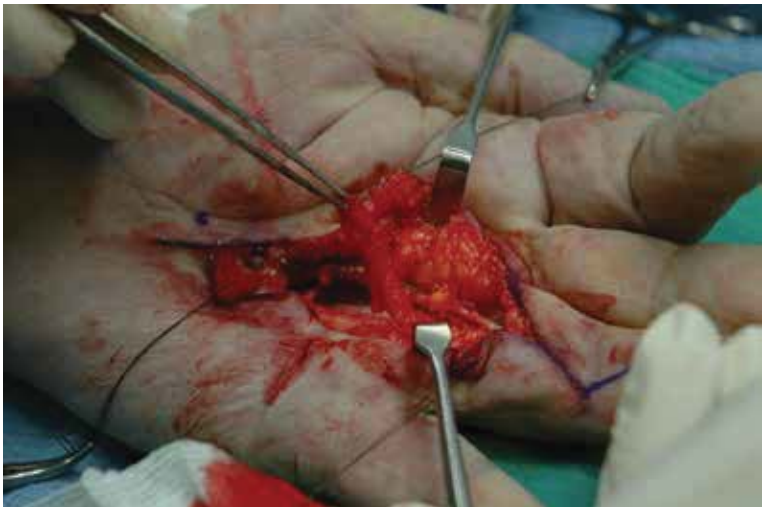
One can compensate for initial contraction by flexing the carpometacarpal joints, but patients will eventually report problems such as putting their hand inside their pocket. An unknown percentage of individuals with Dupuytren's disease will not complain of any symptoms. The disease will not always progress. There are reports that nodules and even contractions can naturally regress [7]. Dupuytren's disease has a wide symptomatic variance or biologic severity, ranging from mild unnoticed disease to a devastating, rapidly evolving situation.

Signs of severe biology include presentation at a young age and involvement of more than one finger. Dorsal nodules (not to be confused with dorsal cutaneous pads) are also related to the aggressiveness of this condition [8].

The more aggressive the disease process, the higher the recurrence rate after treatment and the likelihood of a disabling Dupuytren's contracture. Regardless of treatment, recurrence can appear at any time throughout a lifetime. Iatrogenic recurrence is not uncommon and can be the result of an incorrect

**Figure 1.** Dupuyteren's contracture of the fourth finger

**Figure 2.** Open fasiectomy of Dupuytren's cord



treatment modality choice, badly executed fasciotomy, or hyperlaxity of extensor mechanism. Multiple pathologic cords are often missed during the operative treatment and present a major surgical challenge [9].

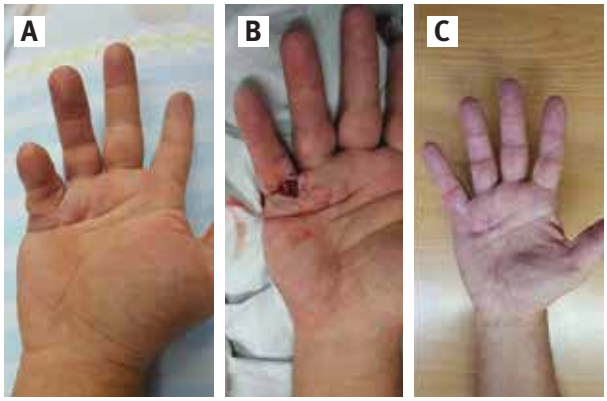
## TREATMENT

Fasciotomy, executed in various surgical modalities, is still the standard of care in many centers [6]. During the last few years, a new attitude has emerged regarding treatment of the inciting events that lead to Dupuytren's contracture. Research focused on finding TGF-β1 suppressors is underway. Staging and success quantification of Dupuytren's disease treatment is complicated. Most studies regarding Dupuytren's contracture have mainly used contraction correction as a mode of measuring success. A lack of documented, generalized, patient satisfaction criteria has led to a problem in selecting the treatment of choice. Optimum time of surgery is still debated. Some studies suggest operating when PIP has reached 40 degrees of contraction or when it is disabling for the patient [10]. There are three procedures for primary Dupuytren's disease currently described with similar outcomes in terms of initial correction of deformity, each with its own benefits and risks [10-12]:

**Dupuytren's disease and Dupuytren's contracture are a result of multifactorial etiology, which is still not fully understood. The exact pathophysiology, evaluation, and treatment are under continuous evaluation**

- **Fasciectomy:** Segmental, regional, or radical. Using an open approach through "zigzag" incisions over the contracture, the pathologic bands are dissected on sight [Figure 2]. Although this procedure has a lower recurrence rate of 5–10%, it entails a long recuperative period that can last months and has substantially higher costs and complication potential, including iatrogenic injury to the neurovascular bundle due to distorted anatomy, pulley rupture, skin tear, and scarring. Postoperative flare reaction, which presents as severe local pain and swelling with a drastic recurrence of Dupuytren's contracture, is a dreaded complication [6,13].
- **Needle percutaneous fasciotomy:** Currently considered as a the most cost-effective treatment with rapid return to activity. The procedure can be completed in the physician's office under local anesthesia using the tip of a conventional syringe needle to dissect the pathologic bands. Multiple sites can be treated in one session. This technique is considered to be safe with a possible complication of flexor tendon rupture or digital nerve injury. This method presents a relative high recurrence rate of up to 80% for metacarpophalangeal joint in young patients [14,15].
- **Collagenase fasciotomy:** Since its approval in the United States in 2010, synthetic collagenase derived from clostridium hystolyticum bacteria has become an emerging first-line treatment for Dupuytren's contracture. This minimally invasive procedure can be conducted in the physician's office without the need for an operating room. First, collagenase is injected locally into the contracted cord. The next day, external passive extension is completed by the practitioner, causing the pathologic cord to rupture. This unique operative method has been extensively studied with

**Figure 3.** Dupuyteren's contracture of the fifth finger treated with collagenase. **[A]** 1 day after injection **[B]** Skin tear after manipulation **[C]** 5 weeks after manipulation




good results in several Phase 3 clinical studies. In a double-blind, placebo-controlled trial, a mean of 1.4 injections was required to normalize affected joints, and clinical success, defined as less than 5 degrees of extension deficit in at least one joint, was achieved in 1 to 29 days. Recurrence did not occur until 6 months after successful joint treatment [16]. In a prospective, double-blind study involving 308 individuals, the effect of collagenase was compared to placebo. Efficacy was significantly higher when the patients were injected with collagenase than when injected with a placebo ($P \leq 0.002$). Resolution of the contracture was shown in 76.6% of Dupuytren's contracture involving the MCP and in 40% involving the PIP. Some degree of improvement was shown in 94% of contractures of the MCP and 67% of the PIP [17]. Another large prospective, randomized trial, reported that clinical success was achieved in 150 of 248 individuals treated with local injection of collagenase. The same study reported only mild adverse reactions, such as occasional pain, swelling, bruising, or pruritus at the injection site with no allergic reactions. More serious, although extremely rare, adverse reactions included flexor tendon ruptures and chronic regional pain syndrome [18].

In another open label, multi-center, prospective trial including 715 individuals with a minimum of two contractures per hand showed a reduction of Dupuytren's contracture in 74% of patients, from 98 to 27 degrees. Mean total range of motion increased from 90 to 156 degrees. Also in this statistically significant study, most adverse reactions were mild. The most common were swelling of the treated extremity (77%), pain in the extremity (50%), and post-reduction skin lacerations (22%). The majority did not require further intervention [19].

Scant research has been conducted regarding the long-term effects of this procedure. According to one small, low power study involving only eight patients throughout an 8 year period, recurrence within the study time was 67% and 100% of MCP and PIP, respectively [20]. In most of the subjects, the recurrent contracture was significantly milder. The average recurrence was approximately 10% for MP joints and 20% for PIP joints at the 5 year follow-up [6].

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