

The Continuous Elongation Technique in Dupuytren's Disease

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Introduction

The difficulty of programming surgical treatment in very severe Dupuytren's disease (some surgeons have classified it as "inoperable" because it is impossible for seriously retracted fingers to attain functional recovery) has induced us to search for an indirect surgical solution that avoids necrosis, loss of vascularity, and functional impairment resulting from classical operations (Fig. 1). The continuous elongation technique (TEC) aims to achieve the extension of the retracted fingers, the correction of the deformity, and some functional reconstruction (Fig. 2).

The contracture of the pathological fascia in Dupuytren's disease sometimes progresses without interruption, sometimes rapidly, and sometimes very slowly; the disease can also display a stop-and-go development with alternating periods of inactivity and progress. All this has convinced us that a valid and

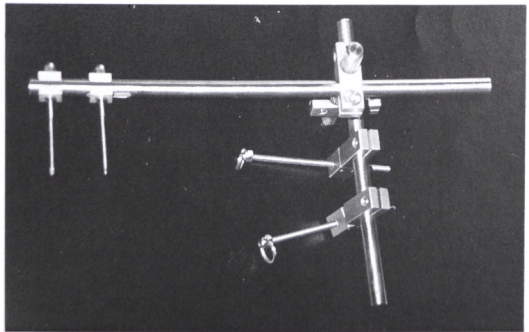


Fig. 1. Last prototype (190g) for the extension of retracted fingers in severe Dupuytren's contracture treated by TEC. Since 1986 we have temporarily utilized other devices made of available steel materials in 30 patients (Fig. 3); meanwhile, however, the weight and size have been reduced

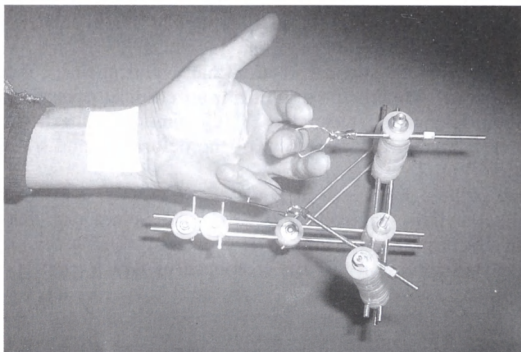


Fig. 2 (above). Patient with severe bilateral Dupuytren's disease asked to have the left little finger, which is flexed and retracted with joint ankylosis and skin loss, amputated

Fig. 3 (below). We suggested applying the TEC device in order to extend the little and middle finger of the left hand

correspondingly exact method of extending these retracted fingers might consist of elongating them "naturally" by applying *continuous* pressure at a *constant intensity*, as can now be carried out by TEC (Messina 1989).

This physiological elongation technique is atraumatic and painless; in a biological way, it induces the retracted tissues to return to the first anatomic stage of the disease (Fig. 3).

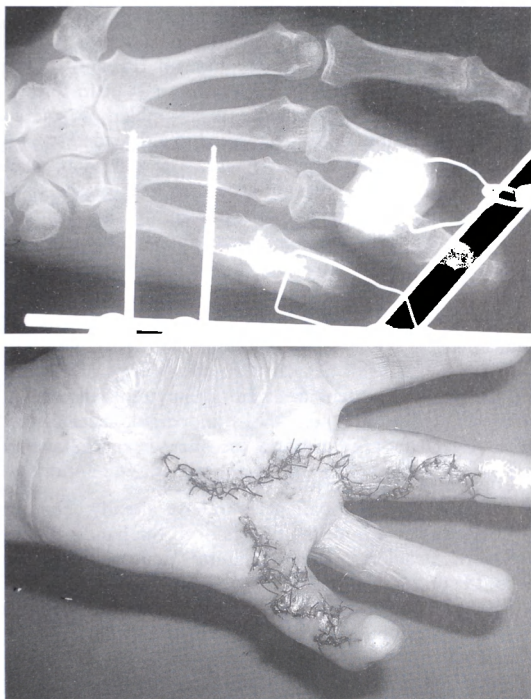


Fig. 4 (above). X-rays of metacarpal pins.

Fig. 5 (below). Elongation that was incomplete but sufficient for carrying out a conservative operation to achieve finger functioning. With TEC, the operation is quite simple and short, with a very easy surgical approach

Technique

Two self-drilling pins with continuous threads are inserted on the cubital side of the hand through the skin without an incision (the recommended pin sizes are 2.5, 3.0, and 3.5 mm in diameter). The pins are inserted transversally and orthogonally through the fifth and fourth metacarpal bones at the proximal and distal metaphyses. Clinical and X-ray control of the length and position of the inserted pins confirms that they have completely penetrated both cortices of the fourth and fifth metacarpal bones. In this way, we obtain a very stable and painless assembly which supports the TEC device in order to induce the continuous elongation of the retracted fingers (Messina 1989, 1991).

A Kirschner wire is then inserted transversally either through the distal metaphysis of P2, through the proximal metaphysis of P3 if this is also retracted, or through both metaphyses if IPP and IPD are flexed together in severe contracture. The Kirschner wire is bent to form a traction loop. After skin dressing, the TEC device is assembled on metacarpal pins, and the phalangeal traction loop is connected to a threaded screw, allowing a 2 mm/day lengthening of the retracted finger. The device is regulated with regard to adequate direction and height according to the respective extent of flexion and direction until the complete extension of the retracted finger has been achieved. The pins and Kirschner wire are then removed on an outpatient basis.

Indications

TEC can be indicated in severe Dupuytren's disease (i.e., when maximally retracted fingers are held to be inoperable because of the impossibility of achieving secondary functional recovery) in the following cases:

- Long-term retracted joint stiffness (Fig. 2)
- Advanced stages in patients who have already been operated on
- Loss of volar skin of the fingers or of the hand palmar surface (Fig. 5)
- Severe problems with collateral neurovascular bundles in prolonged contracture of the fingers
- Systemic illnesses (e.g., severe and unstable diabetes, immunodeficiency, or serious cardiopulmonary illnesses)
- Old age
- Indication of amputation of the retracted finger
- Severe recurrence and extension of advanced Dupuytren's contracture (Messina 1991)

TEC can also be indicated in posttraumatic retraction scars accompanying flexion deformity of the fingers (caused by burns, tendon and osteoarticular trauma, skin loss, etc.). In this way, TEC not only circumvents plastic surgery, it also avoids joint interventions such as arthrotomies and capsulotomies as well as sections of retracted collateral ligaments, of check-reins, and of the retracted palmar plate of finger joints.

Advantages

This technique is a *preparatory step* for pathological palmar fascia exeresis in severe and inveterate Dupuytren's contracture. TEC is also an alternative to amputation for severely retracted fingers (Fig. 2). In addition, TEC:

1. Facilitates surgical intervention, greatly reducing trauma and the complexity, length, and difficulties of the operation

2. Simplifies the skin incision and surgical approach; it avoids complementary articular interventions such as capsulotomy and arthrolysis as well as the surgical release of check-reins, of collateral ligaments, and of retracted lateral digital fascia (Fig. 3)
3. Avoids the sudden surgical extension of the retracted finger and the stretching and tearing of collateral neurovascular bundles, which cause devascularisation and trophic problems in fingers that have been retracted for many years in complete flexion (Fig. 2)
4. Is an alternative to plastic surgery for correcting digital or palmar skin loss; this applies particularly to patients requiring a flap or skin graft, to certain cases of severe Dupuytren's contracture, and to some patients with posttraumatic retraction of the finger
5. Surpasses the McCash "open-palm" technique both in theory and in its practical applications (Fig. 5)
6. Provides the option of conserving severely retracted fingers and restoring their functionality; this had previously strained the technical limits of classical operations or been downright impossible
7. Might be a possible solution in some cases of inveterate Dupuytren's contracture; this is confirmed by the disappearance of the pretendinous cord and of the palmar nodule
8. Might benefit posttraumatic retraction scars accompanying flexion, ankylosis, and deformity of the fingers (caused by burns, tendon and osteoarticular trauma, skin loss, etc.)

Summary

The Continuous Elongation Technique (TEC) represents an alternative to finger amputation in severe cases of Dupuytren's disease, as a means of avoiding necrosis, loss of vascularity, and functional impairment resulting from classical operations. This technique is an advanced method and a preparatory step for the excision of pathological palmar fascia in severe and inveterate Dupuytren's contracture. TEC always achieves the extension of fascia of very contracted fingers and, in a very simple way, enables the retracted tissues to revert to the first stage of Dupuytren's disease.

Until now, this type of retraction has been thought to be irreversible. The TEC method, however, has shown that the histomorphologic process can in fact be reversed (Messina 1989). We have named this process the "stop-go back" process, because the retracted collagen tissue returns to the original cellular state of the first stage of the disease.

TEC is a painless technique for treating severe contractures by means of physiological and atraumatic elongation; it is performed with a device fixed on the fourth and fifth metacarpal bones using two self-drilling pins. Finger elongation simplifies the surgical approach and skin incision methods; it avoids plastic surgery to correct skin loss, complementary articular interventions such as arthrolysis (i.e., the surgical release of palmar plate, of check-reins, and of

collateral ligaments), as well as the danger of immediate extension of inveterate contracted fingers. This technique may also be used to treat posttraumatic retraction scars in cases of flexion, ankylosis and deformity of the fingers (caused by burns, tendon and osteoarticular trauma, skin loss, etc.).

References

- Messina A (1989) La TEC (tecnica di estensione continua) nel morbo di Dupuytren grave. Dall'amputazione alla ricostruzione. Riv Chirurg Mano 26(2-3):253-257
- Messina A, Messina J (1991) The TEC treatment (continuous extension technique) for severe Dupuytren's contracture of the fingers. Ann Hand Surg 10(3):247-250