

The Mini-Invasive Technique for Carpal Tunnel Release: Open Approach with Converse Fiberoptic Light Retractor

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Introduction

Carpal tunnel syndrome (CTS) requires a different surgical treatment depending on the clinical stage. In the first stage, which is defined as irritative or initial, a simple release by division of the transverse carpal ligament (TCL) is indicated; in the second stage, sensory or intermediate, some cases require a flexor synovectomy in association with external neurolysis; in the third stage, paralytic or terminal, a synovectomy, an opposition transfer, and even an internal neurolysis may be necessary [1]. In the last 30 years surgical treatment of CTS

has changed because of acquired experience and availability of new technical devices. In the 1970s, when microsurgery became common in surgical practice, many surgeons suggested epineurectomy associated with internal neurolysis. This indication was then limited to fibrotic epineurium. In the 1980s, short incisions, with a simple division of the TCL became popular, with the purpose of reducing complications, followed by endoscopic division of the TCL in the 1990s. Early diagnosis was at the basis of this evolution. The endoscopic technique (ET), has the main advantages of shortening the skin incision and obtaining an early return to work; on

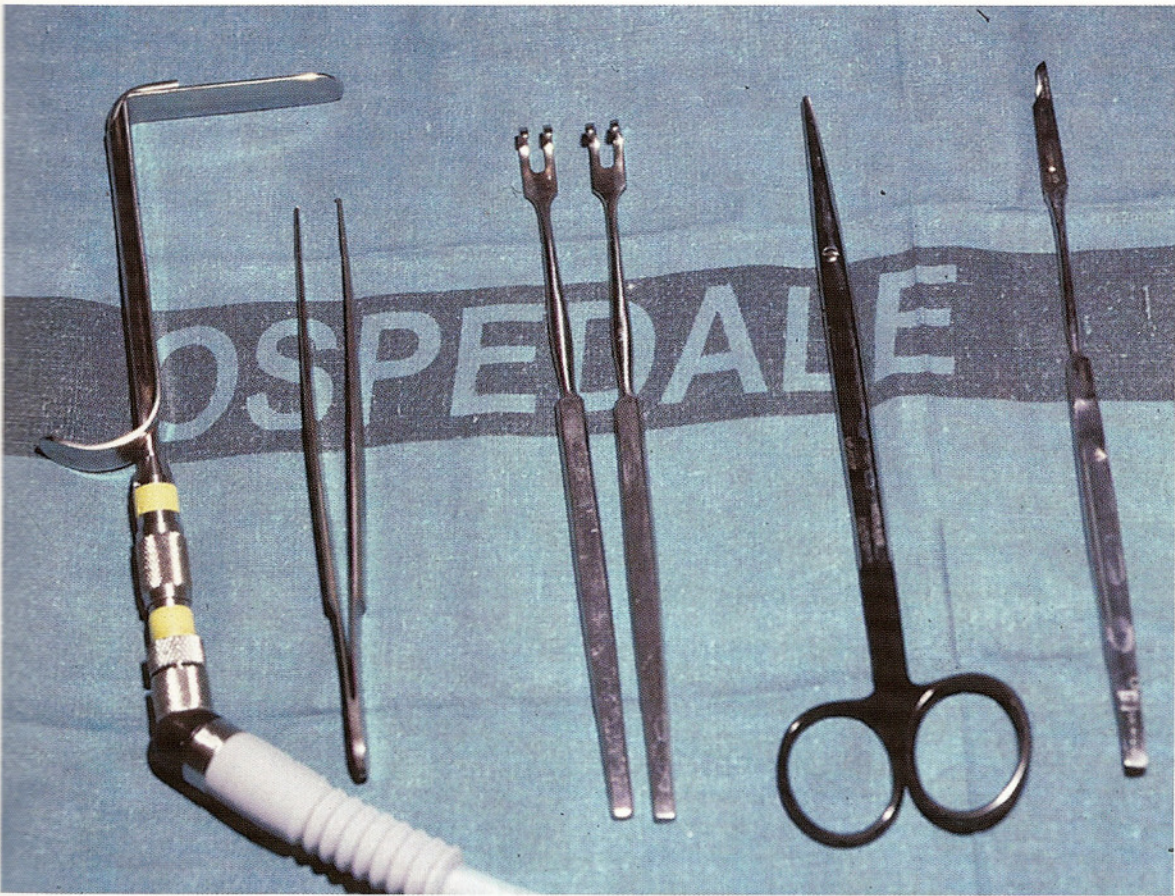


Fig. 19.1. The Converse Fiberlight retractor

the other hand, it is more expensive and implies the risk of major complications [3–5]. After the development of the endoscopic technique, a different solution has been researched [2–4].

Mini-Invasive Technique

In the 1990s a controversy developed between supporters of the open methods and supporters of the endoscopic methods [5–12]. Several nonendoscopic mini-invasive methods proposed are demonstrating the need for reducing the scar-related problems of the open methods and obtaining an early functional recovery, such as after endoscopic surgery, while still maintaining the simplicity and safety of the open methods [13]. By considering the pros and cons of these techniques, in 1993 I looked for an alternative mini-invasive method, through a short incision, like that used in ET, but with the possibility of a traditional division of the TCL with an ordinary scalpel, with the benefit of direct viewing of the median nerve (MN).

This was possible thanks to a particular retractor with fiberoptic light, designed by Converse for maxillofacial surgery (Fig. 19.1). The technique and first clinical series observations were presented at the 6th Congress of the IFSSH in Helsinki (July 1995) [1] and first results during the 3rd FESSH Congress in Paris (April 1996).

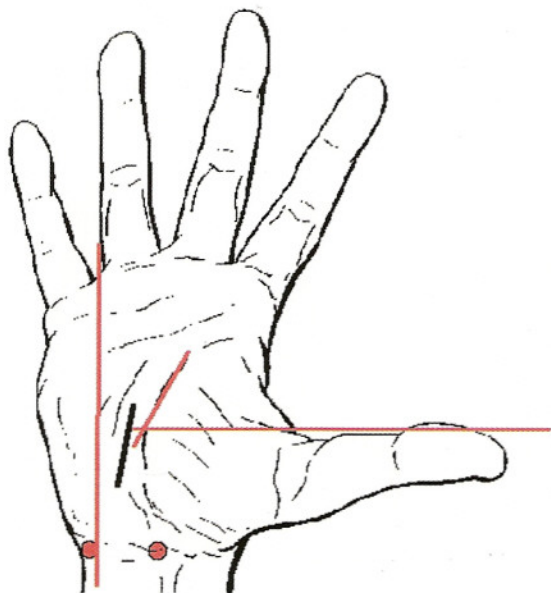


Fig. 19.2. Landmarks of the carpal tunnel and outline of the cutaneous incision

Operative Technique

The following points are marked on the skin to define the carpal tunnel (Fig. 19.2):

- The two proximal bone pillars: the scaphoid tubercle and the pisiform.
- The bisection of the opposition skin crease and the edge of the thenar eminence, marking the origin of the MN motor branch and the distal radial side of the tunnel.
- The ulnar side of the fourth finger, as ulnar limit of the tunnel.
- The ulnar edge of the palmaris longus tendon for the subcutaneous tunnel to protect the palmar branch of the MN.
- The incision, 2 cm long, is placed centrally to the tunnel, parallel to the opposition crease, starting from the distal limit of the tunnel.

Under tourniquet control the skin is incised, and the distal part of the TCL is approached and transected (Fig. 19.3), while directly viewing the underlying MN. The division of the exposed part of the TCL has to be completed under direct viewing. Then a subcutaneous tunnel on the ulnar side of palmaris gracilis tendon has to be made using Metzenbaum scissors (Fig. 19.4), 5 cm long and large enough to insert the retractor. After placing the retractor with fiberoptic light (Fig. 19.5), the proximal part of the TCL and antebrachial fascia is divided in continuity in a distal-to-proximal direction, as in the open technique, using a no. 15 blade. We can see the TCL and the MN almost as in the open tech-

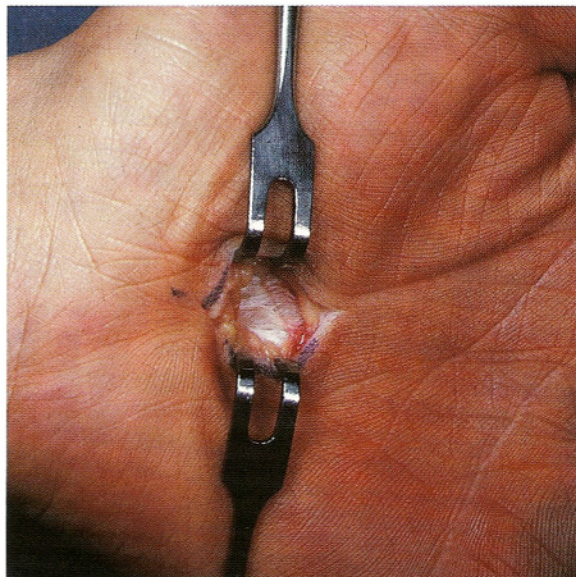


Fig. 19.3. Skin incision. Direct view of the distal part of the ligament

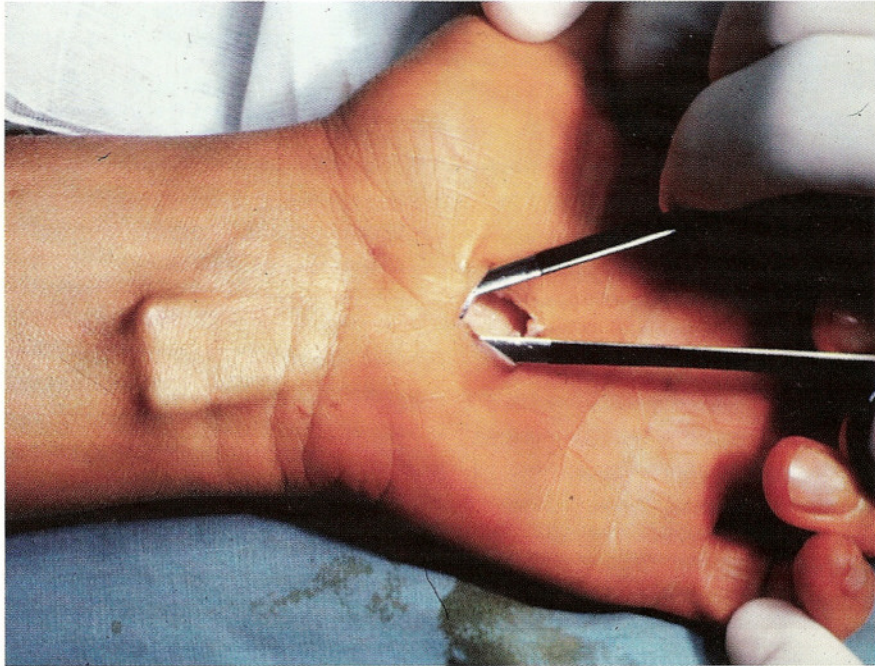


Fig. 19.4. Subcutaneous tunnel, made by blunt dissection with scissors

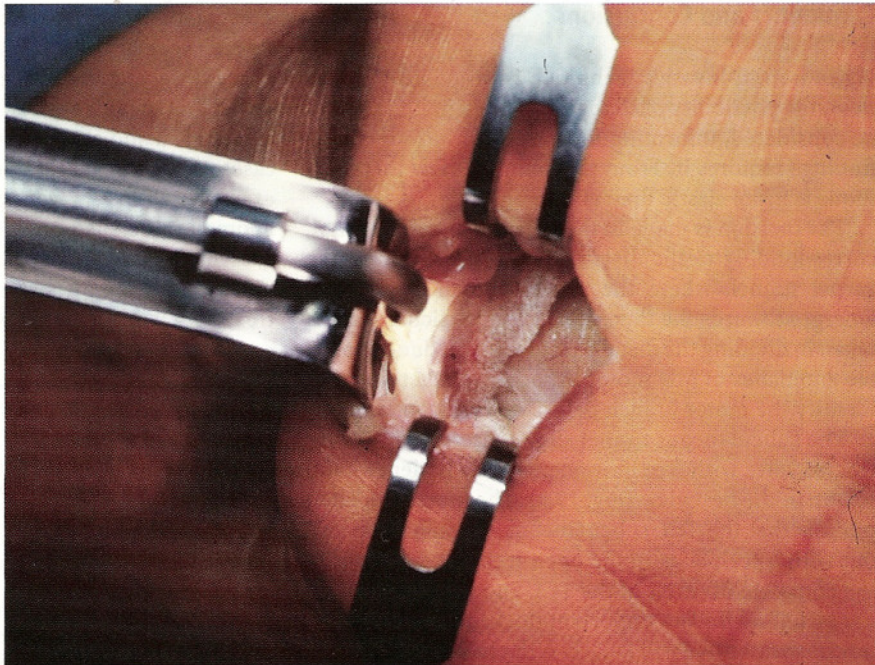


Fig. 19.5. The retractor with fiberoptic light is inserted in the subcutaneous tunnel to obtain the best view

nique (Fig. 19.6). We complete the division of the distal part of the antebrachial fascia with scissors, paying attention to separate, by blunt dissection, the underlying nerve. We carry out an external neurolysis of the MN with the same scissors and we verify the complete MN release. After removing the tourniquet, we check hemostasis and insert a drain. It consists of a sheaf of four threads draining by capillarity. For bandages we use dry soft gauzes and a cotton-padded gauze to absorb

any possible hematic drainage and protect the hand from traumas. The bandages have to be comfortable with the wrist kept in light extension to prevent carpal tunnel inner structure from subluxation between the edges of the divided TCL. The bandages have to be slightly elastic to help hemostasis. The splint placed on the dorsal face of the wrist allows free finger movement just after the operation. The surgical procedure takes 10–15 min.

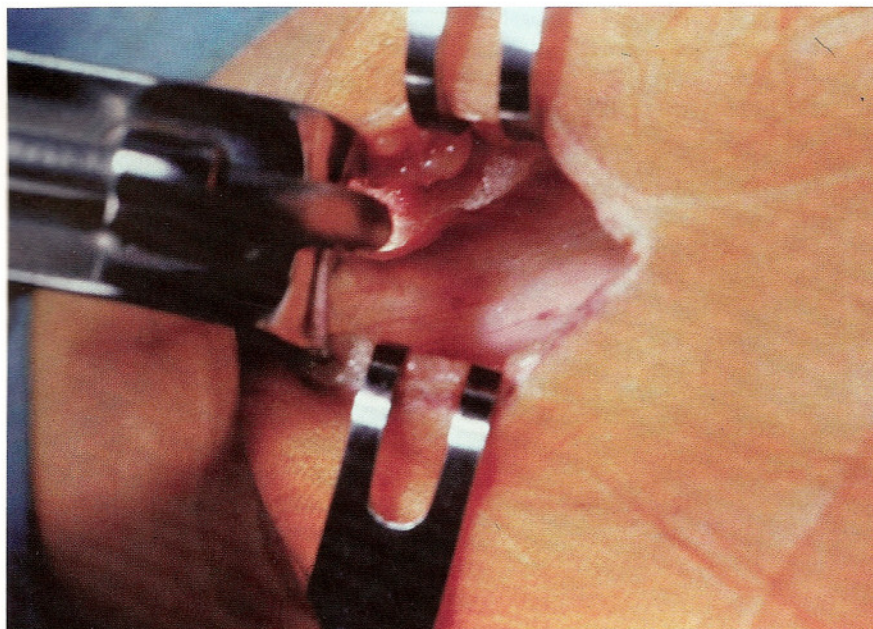


Fig. 19.6. Checking the nerve after the ligament has been completely divided. External neurolysis is possible

Comments and Conclusions

When a mini-invasive technique is proposed to a patient, the possibility of changing to open method has to be considered, informing the patient, if intraoperative findings requires it. From this point of view this technique is more elastic than endoscopic ones.

The incision is made in the central part of the palm, corresponding to the distal, narrowest portion of the carpal tunnel, where the motor branch of the MN emerges towards the thenar muscles. Particular care is taken in dividing the distal part of the TCL due to possible anomalies of MN motor branch. We must find and identify the motor branch before carrying on surgery.

The subcutaneous tunnel allows insertion of the retractor valve with free movement of the patient's hand to obtain the best view (Fig. 19.5). The most important point is that the TCL subcutaneous division is carried out with a scalpel as in the open technique. We verify the complete division of the TCL and the condition of the MN. If we find an important thickening of flexor synovial sheaths, we will lengthen the incision and practice the traditional open technique, because our mini-invasive technique allows only a partial synovectomy.

The mini-invasive open technique with fiberoptic light allows a short palmar incision (2–2.5 cm long, depending on skin elasticity); it is safe, allowing the TCL section and MN motor branch control under direct vision with just a subcutaneous dissection to insert the retractor, so that the carpal tunnel itself is not instrumented. Moreover, being similar to the open technique, it does not require particular training, and allows MN external neurolysis, inspection of flexor synovial

sheaths, and the option of using the open technique where necessary. It takes about 5 min of ischemia.

It is important to pose the right indication, that is, a CTS in the irritative or early sensitive stage, on the basis of a clinical and electromyographic diagnosis. In some cases, I believe a larger open approach is indicated, for example: with very young patients, when anatomical anomalies are suspected, when expanding masses are present, in case of late paralytic stage or recurrence, in patients affected by rheumatoid arthritis or in dialysis treatment, and finally in posttraumatic cases.

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