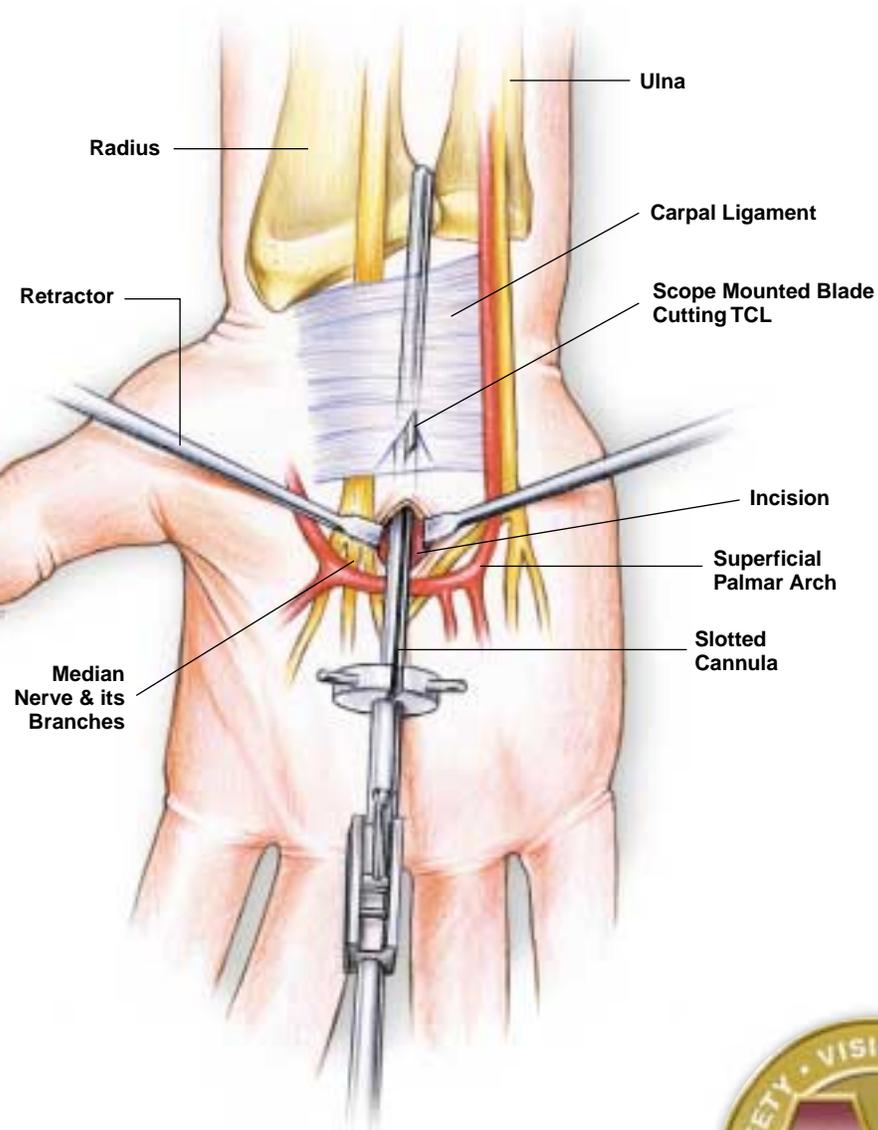


A.M.ECTR

ENDOSCOPIC CARPAL TUNNEL RELEASE

Distal Single-Incision, Scope-Assisted Carpal Tunnel Release

Surgical Technique





Our mission is to develop and produce medical/surgical products that are unsurpassed in quality, safety, and simplicity – products that are intuitive for the medical professional, while providing the patient with the benefits of minimally invasive techniques and rapid recovery times.

Our goal is to be recognized as a leader in developing innovative solutions that are successful in the medical field.

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ENDOSCOPIC CARPAL TUNNEL RELEASE

Distal Single-Incision, Scope-Assisted Carpal Tunnel Release *Surgical Technique*

Ather Mirza, MD

Chief of Hand and Microsurgery
St. Catherine of Siena Medical Center
Assistant Clinical Professor
SUNY at Stony Brook
Chairman of the Board
North Shore Surgery Center

Indications

Carpal tunnel release is indicated in the majority of those patients who fail to respond to conservative treatment of carpal tunnel syndrome.

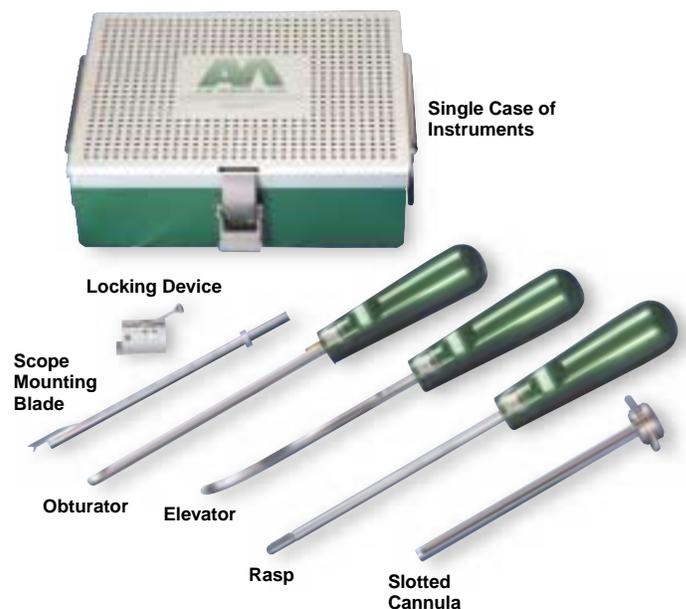
Contraindications

Surgeons should follow the general contraindications applicable to open carpal tunnel release when considering a patient for endoscopic carpal tunnel release. In addition, patients with stiff wrists, suspected space-occupying lesions, or other anatomical abnormalities should be excluded.

Training

For safe and effective use, surgeons must possess a thorough knowledge and understanding of wrist anatomy and endoscopic technique using this instrumentation. Instructional videotapes and cadaver workshops are available through A.M. Surgical.

Warning: Failure to follow the surgical technique may result in permanent injury to the patient. If, while performing this technique, any problem should arise, such as anatomical anomalies, inadequate visualization, inability to identify anatomy, or questions concerning technique or instrumentation, the surgeon should abandon the endoscopic carpal tunnel release and convert to an open carpal tunnel release.



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Introduction

The advantages of endoscopic carpal tunnel release (ECTR) have been well documented. They include smaller incision(s) with less pain, early recovery and early return to work. Concerns with the various endoscopic techniques include potential complications, as well as steeper learning curves versus open carpal tunnel release.

The Distal Single-Incision, Scope-Assisted CTR technique addresses these concerns. The one small incision in the palm permits direct visualization of key anatomy, while the instrument design allows for endoscopic visualization of the median nerve, flexor tendons, and transverse carpal ligament (TCL). This technique is less likely to injure the vital structures. The release of the TCL is performed with a distal-to-proximal pass of the patented scope mounting blade which mounts onto a standard endoscope. (See page 7 for instrumentation required for this procedure.)

Operative Technique

1 Positioning of Patient

The hand is secured to the hand table with the wrist in neutral position (*Figure 1*). (For use of A.M. Surgical Hand Table, see diagram on page 9.)

2 Marking the Skin

Two lines are drawn in the palm: one longitudinal and in line with the third web space; the other, transversely across from the fully abducted thumb (*Figure 2*).

The 1.5 cm incision is outlined 0.5 cm proximal to the intersection of these two lines, preferably in a palmar skin crease (*Figure 2*). A larger incision can be made while the surgeon is gaining experience with this technique.

Two lines are then drawn in the distal forearm to identify the location of the *palmaris longus* and *flexor carpi ulnaris* tendon. An "x" is placed midway between these two lines. This is done to aim the cannula between the median and ulnar neurovascular structures (*Figure 2*).

Fig. 1



Fig. 2



3 Incision

The skin is incised using the previously marked line, and the skin edges are undermined slightly (*Figure 3*). The subcutaneous fat is spread using blunt dissection. Ragnell retractors are placed in either side of the incision. The palmar fascia is carefully divided longitudinally, since key anatomy may lie just dorsal to the palmar fascia. Once the divided palmar fascia is retracted, the mid-palmar fat is exposed (*Figure 3A*).

4 Identification of Key Anatomy

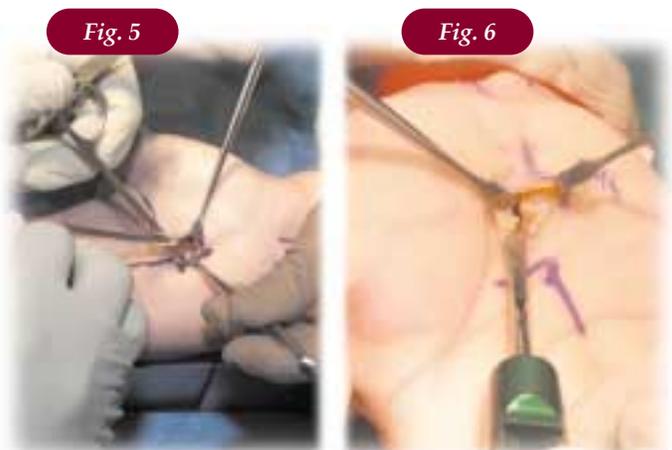
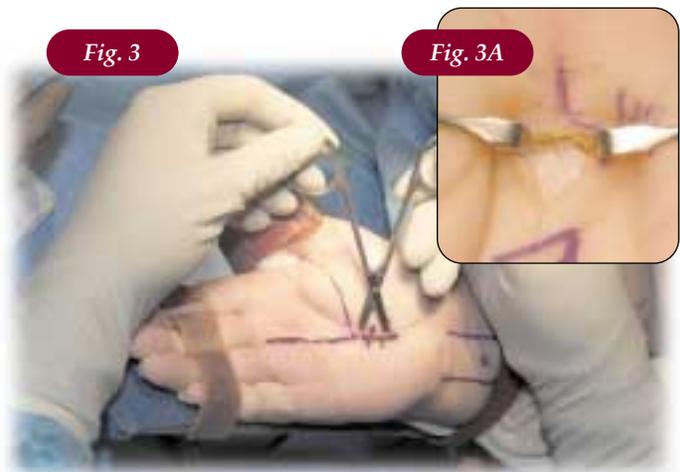
The median nerve, superficial palmar arch, and distal edge of the transverse carpal ligament can now be identified (*Figure 4*). If the distal edge of the transverse carpal ligament is not clearly visible, the incision should be slightly extended in the proximal direction.

Care should be taken throughout the procedure to observe for and protect key anatomy, as well as any anatomical variations, such as the recurrent motor branch of the median nerve.

5 Creating Extrabursal Path

As the assistant lifts up on the Ragnell retractors, the clamp is introduced on the ulnar side of the TCL, staying against the dorsal surface of the TCL. Care should be taken to stay superficial to the flexor tendons, median nerve, and ulnar bursa. Spread the clamp gently to create your path (*Figure 5*).

Using the A.M. Surgical Hand Table, the forearm is elevated and the wrist is dorsiflexed. The dissector is introduced into the carpal canal and a pathway is created by advancing the dissector, aiming towards the "x" previously drawn, while staying against the undersurface of the TCL. Move the dissector back and forth to clear the synovial membrane from the underside of the TCL (*Figure 6*).



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ENDOSCOPIC CARPAL TUNNEL RELEASE

6 Introduction of Dissecting Cannula

Once the pathway is created and the dissector is removed, the dissecting Cannula/Obturator is then introduced into the same pathway. The cannula tip should always stay against the under surface of the TCL and superficial to the flexor tendons and ulnar bursa. The cannula slot should face slightly towards the ulnar side (*Figure 7*).

When the cannula tip is palpable through the skin beneath the "x", the obturator should be removed, leaving the cannula in place with the slot facing slightly towards the ulnar side.

Note: Throughout the procedure, whenever necessary, sterile absorbent swabs may be used to remove fluid from within the cannula.

7 Endoscopic Visualization of Anatomy

A 4 mm, 30° endoscope, oriented towards the slot, is then introduced into the cannula to visualize the transverse fibers of the TCL (*Figure 8 and Figure 9*). If most of the transverse fibers are visible with a small amount of tenosynovium remaining, this tissue can be removed using the rasp. Do not use the rasp if the nerve or tendons are visible. If the transverse fibers of the TCL are not clearly seen, the cannula must be removed using the obturator and the procedure repeated, as outlined in "Introduction of Dissecting Cannula" step 6.

The median nerve is brought into view by rotating the cannula towards the radial aspect of the hand (*Figure 10*). The flexor tendons may also be visualized by rotating the cannula towards the ulnar side of the hand (*Figure 11*). Once the proper placement of the cannula is verified, rotate the cannula slightly to the ulnar side so that the transverse fibers of the TCL are again visualized (*Figure 9*).

Fig. 7



Fig. 8



Fig. 9

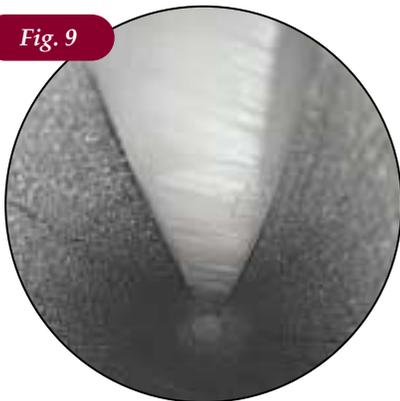
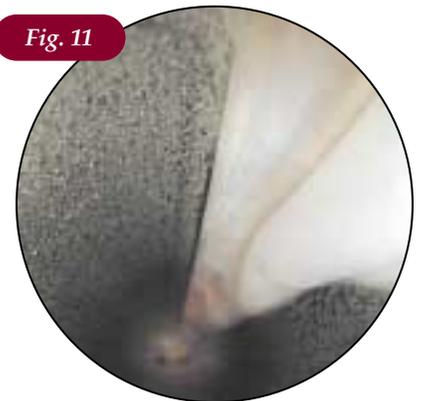


Fig. 10



Fig. 11



8 Division of Transverse Carpal Ligament

With a clear view of the transverse fibers and no other intervening structures the endoscope is then removed from the cannula. The scope mounting blade is attached to the endoscope using the locking device (see diagram on page 8), with the viewing angle of the endoscope oriented towards the blade (*Figure 12*).

The scope mounted blade is introduced into the cannula and, as the surgeon observes the monitor, the TCL is divided by advancing the scope mounted blade through the cannula in a proximal direction (*Figure 13* and *Figure 14*).

To ascertain the proximal extent of the division, the scope mounted blade may be palpated through the skin in the distal forearm. The scope mounted blade should be located proximal to the wrist flexion skin crease.

Warning: The disposable scope mounting blade is designed for *one-time use only*. Reesterilization may result in blade detachment, potentially causing harm to the patient.

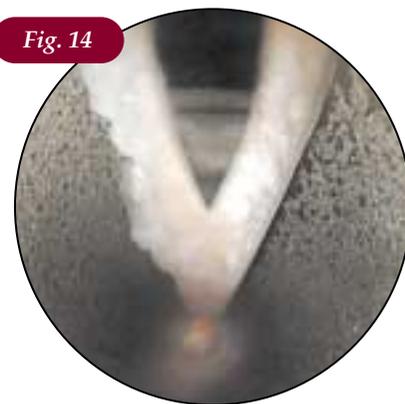
Fig. 12



Fig. 13



Fig. 14



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9 Verification of Division

The scope mounted blade is removed from the endoscope and the endoscope is reintroduced into the cannula. The divided edges of the TCL should now be visualized along its entire length (*Figure 15*). The median nerve can once again be brought into view by rotating the cannula towards the radial aspect of the hand. In addition, the flexor tendon(s) can be visualized by rotating the cannula towards the ulnar aspect of the hand.

If preserved, the interthenar fascia will be visible above the divided edges of the TCL.

Remove the endoscope from the cannula and introduce the obturator. Only when the obturator is inserted should you remove the assembly together.

Inspect the median nerve or the common digital nerve to the third web space with a blunt hook.

10 Skin Closure/Postoperative Care

The wound is irrigated and then closed using a running subcuticular technique (*Figure 16*).

A soft non-compressive dressing is applied, which is removed 7 to 10 days following the surgery (*Figure 17*).

The patient is encouraged to perform finger range-of-motion exercises postoperatively.

Fig. 15



Fig. 16



Fig. 17



Instrumentation

A.M. Surgical Instrumentation is designed for both the surgeon and patient benefit. The instruments are intuitive in design and simple in orientation, providing excellent performance. The instruments are engineered to provide favorable patient outcomes that feature minimal scarring and rapid recovery.

Locking Device
9600-04



Scope Mounting Blade
3310-B



Obturator
9600-01



Elevator
3300-06



Rasp
9600-03



Slotted Cannula
9600-02



Table Pad
9501-B



Hand Table
9500



Single Case of Instruments
9600-50

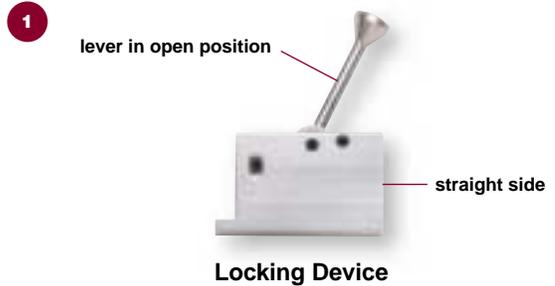


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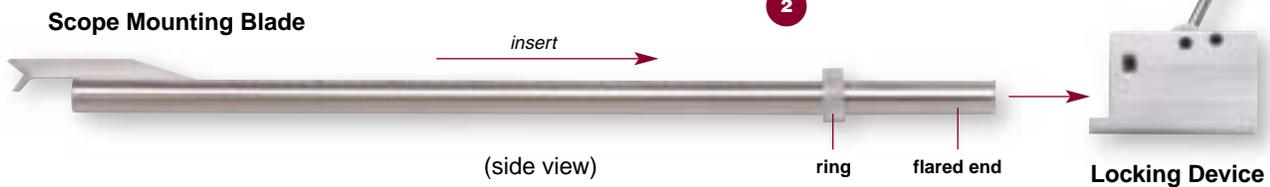
ENDOSCOPIC CARPAL TUNNEL RELEASE

Use of Locking Device (use with 4 mm, 30° Scope)

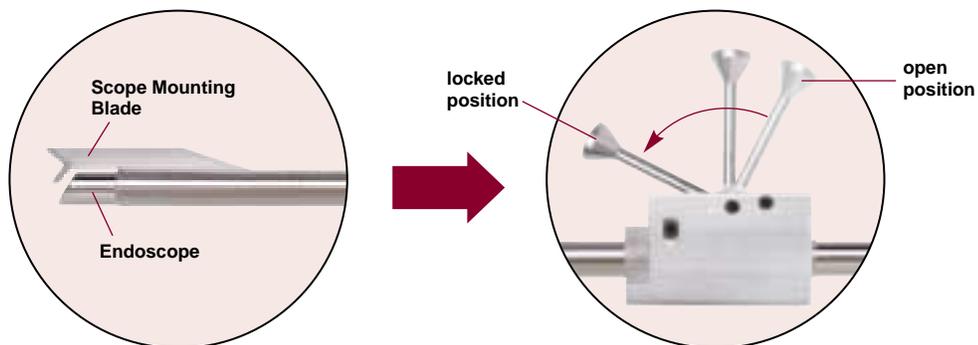
1 Before attempting to insert scope mounting blade into locking device, be sure the lever is positioned toward the straight side of the device, which is the "open" position (as shown).



2 Gently insert the flared end of the scope mounting blade into the angled side of locking device, aligning the flat side of the scope mounting blade's ring with the bottom of locking device. A click will be heard when the scope mounting blade is properly engaged.



3 Insert scope mounting blade onto the 4 mm, 30° endoscope. When the endoscope is almost touching the scope mounting blade, gently push the lever forward until finger tight. **DO NOT OVERTIGHTEN LEVER (TO AVOID DAMAGING ENDOSCOPE).**

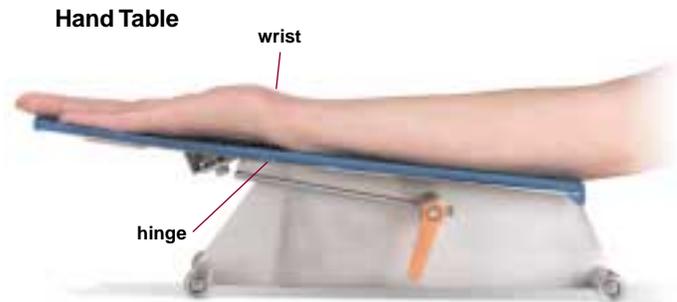


Use of A.M. Surgical Hand Table

- 1** Apply pad to top of hand table.

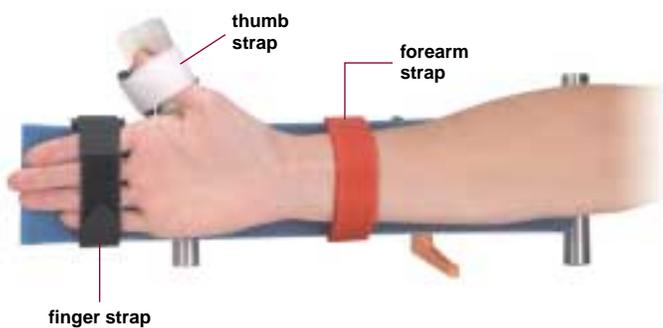


- 2** Place patient's arm on hand table with the wrist positioned at the hinge of hand table.

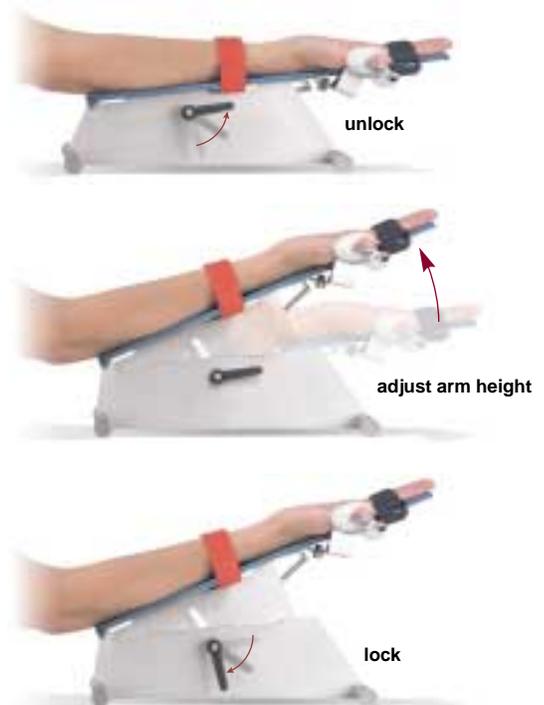


- 3** Use forearm, finger, and thumb straps to secure the patient's arm to the hand table.

Hand Table (top view)



- 4** Forearm and hand elevation can be changed by loosening black lever in a counterclockwise direction. Once desired height is reached, tighten the black lever in clockwise direction to lock the arm in that position.



- 5** Wrist position can be changed by loosening the orange lever in a counterclockwise direction. Once the desired angle is reached, tighten the orange lever in clockwise direction to lock the wrist in that position.



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Scope Mounting
Blade
3310-B



Obturator
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Elevator
3300-06



Rasp
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Slotted Cannula
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A.M. SURGICAL

290 East Main Street

Suite 200

Smithtown, NY 11787

800-437-9653

www.amsurgical.com