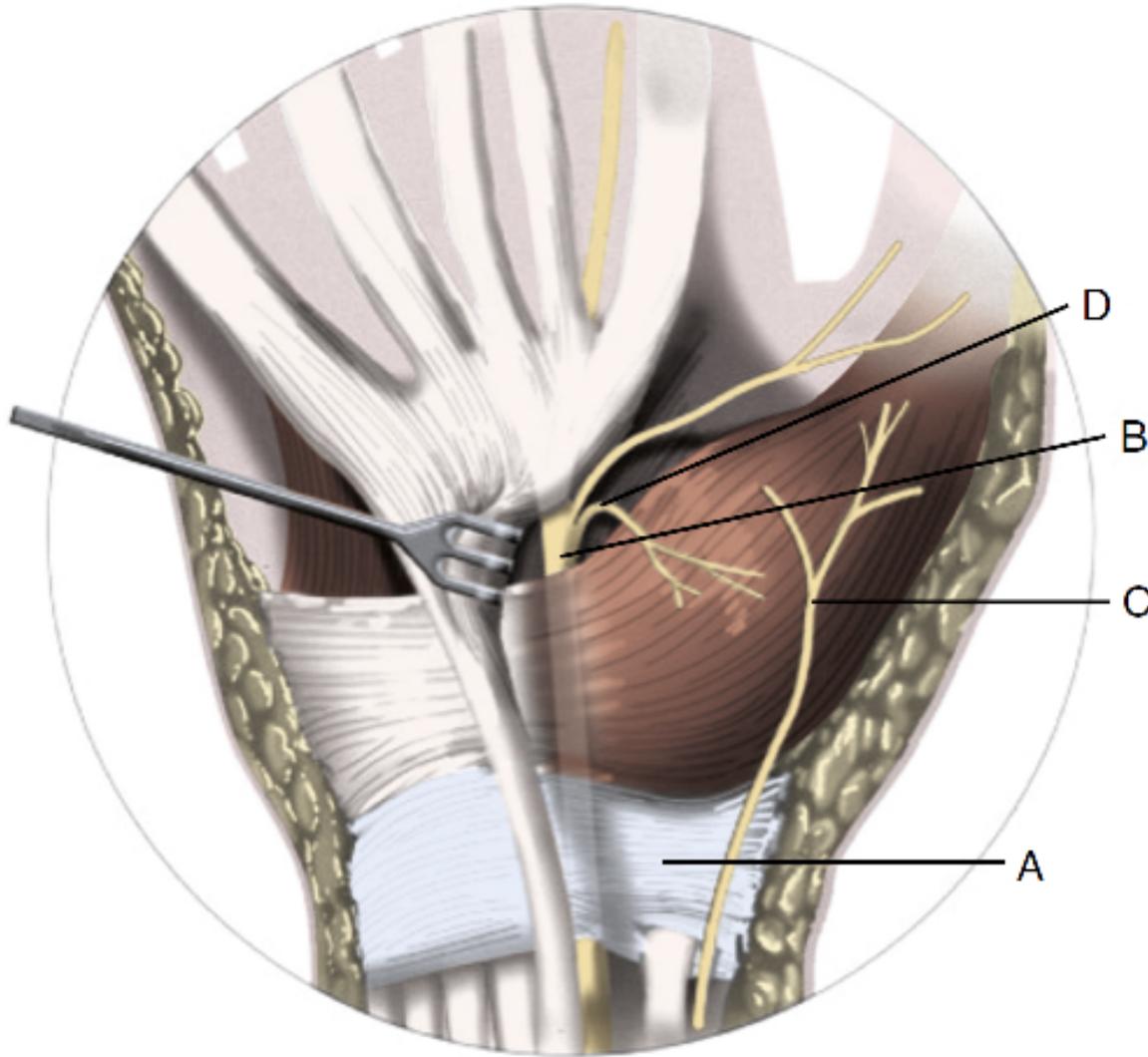


SURGICAL APPROACHES FOR CTS

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Winter 1402

SURGICAL ANATOMY



(A) Flexor retinaculum.

(B) Median nerve.

(C) Palmar cutaneous branch.

(D) Recurrent motor branch.

OPEN CARPAL TUNNEL RELEASE

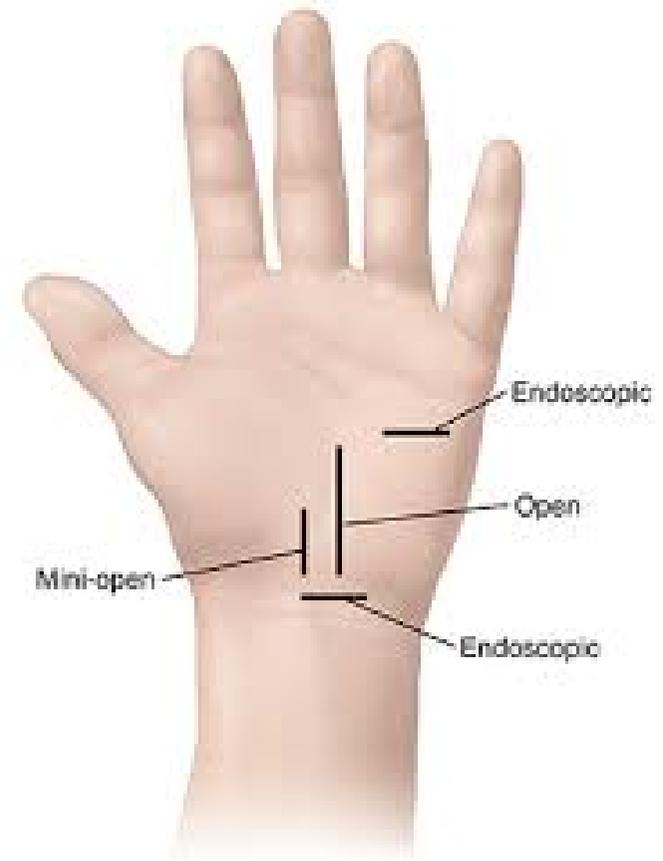
- **Randomized clinical trial:** Surgical decompression of the carpal tunnel is superior to both wrist splinting and steroids in terms of relief of symptoms and neurophysiologic outcome.

Ref:

1. Gerritsen AA, de Vet HC, Scholten RJ, et al. Splinting vs surgery in the treatment of carpal tunnel syndrome: a randomized controlled trial. J Am Med Assoc. 2002; 288(10):1245–1251.
2. Trumble TE, Diao E, Abrams RA, Gilbert-Anderson MM. Singleportal endoscopic carpal tunnel release compared with open release: a prospective, randomized trial. J Bone Joint Surg Am. 2002;84-A(7):1107–1115.

CONVENTIONAL OPEN CARPAL TUNNEL RELEASE (OCTR)

- Indication: any type of pathology, such as CTS due to any space occupying lesion, deformity or even in revision surgeries.
- a longitudinal incision of **3.5 cm** was performed alongside **the median palmar crease** in a proximal direction and stopped **0.5 cm distally to the wrist crease**.



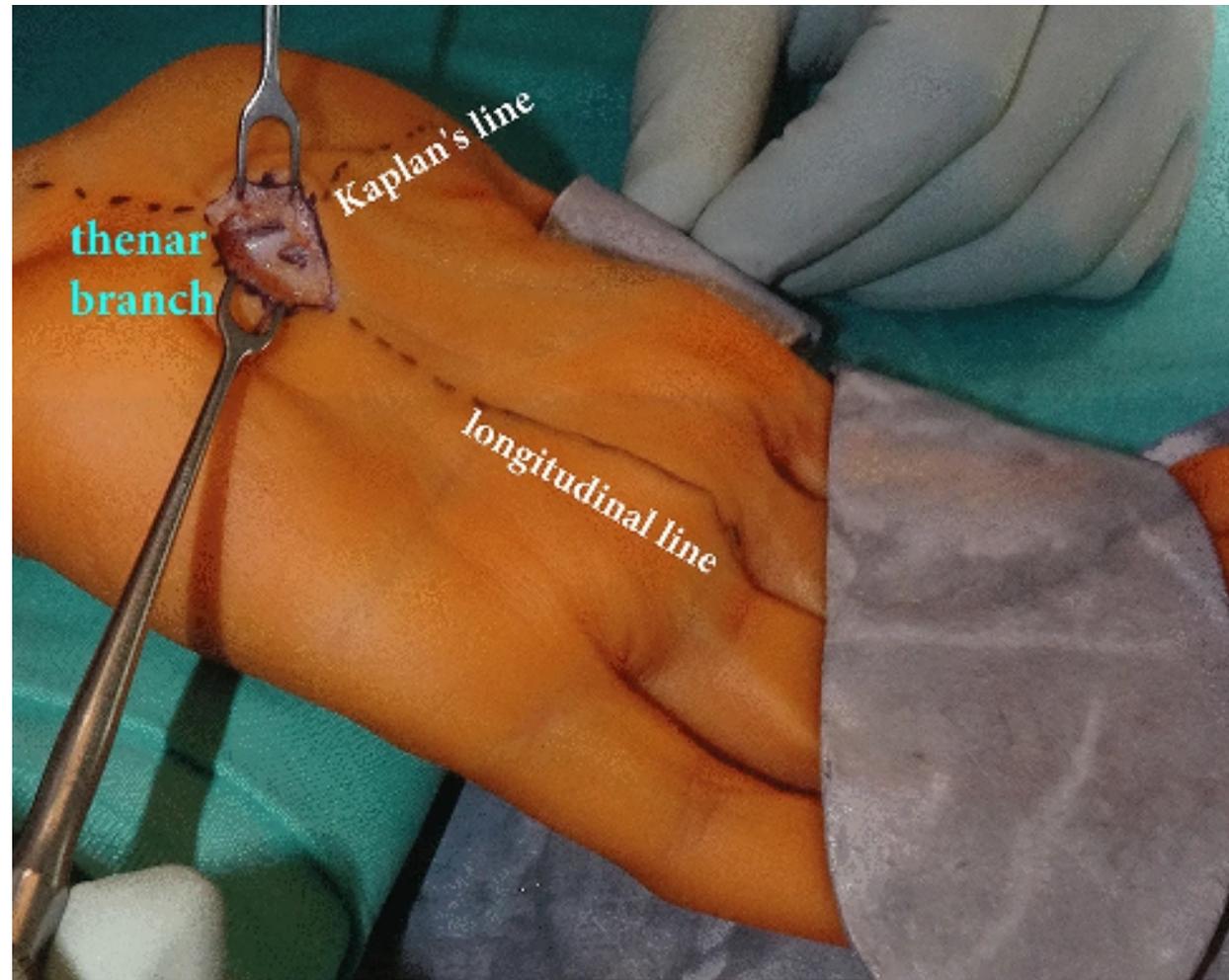
CONVENTIONAL OPEN CARPAL TUNNEL RELEASE (OCTR)

➤ Technical notes:

1. preservation of the palmar cutaneous and recurrent motor branches of the median nerve.
2. The recurrent motor branch of the median nerve may be transligamentous or subligamentous and must be carefully avoided and protected.
3. The distal TCL release → deep palmar fat pad
4. avoid any sensory or ulnar motor branches that may be encountered just distal to the ligament.

MINI-OCTR

- ❖ Incision 2cm distal wrist crease and ending at a point intercepting an imaginary line (the Kaplan line) drawn from the distal border of the extended thumb to the pisiform prominence, in line with the long axis of the radial side of the ring finger.



MINI-OCTR

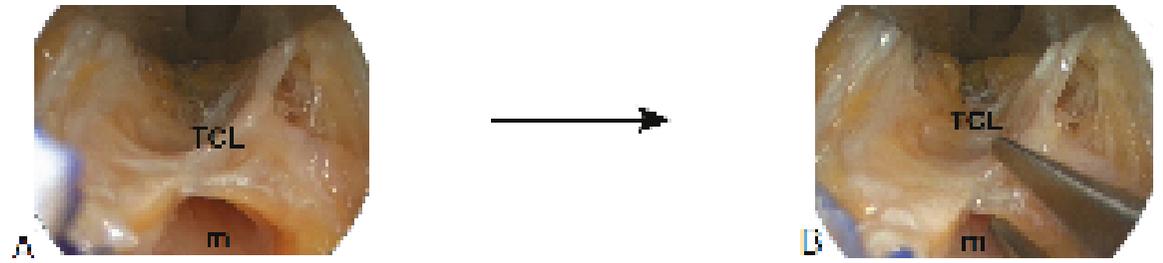
- **Postoperative splinting is not usually recommended** because splinting has not been shown to improve wound healing, reduce postoperative pain, or diminish scar tenderness.¹

Ref: Huemer GM, Koller M, Pachinger T, et al. Postoperative splinting after open carpal tunnel release does not improve functional and neurological outcome. *Muscle Nerve*. 2007;36(4): 528–531.

ENDOSCOPIC CTR

- **Uniportal approach:** A small incision → proximal to the distal wrist crease on the ulnar side of the palmaris longus tendon. An elevator is placed deep to the antebrachial fascia and superficial to the flexor tendons. The endoscope camera follows the blade. No attempt is usually made to visualize the median nerve.
- **Biportal method:** the obturator and cannula are brought through the skin approximately 4 cm distal to the distal wrist crease, the obturator is removed, and an endoscope is placed through the distal opening.

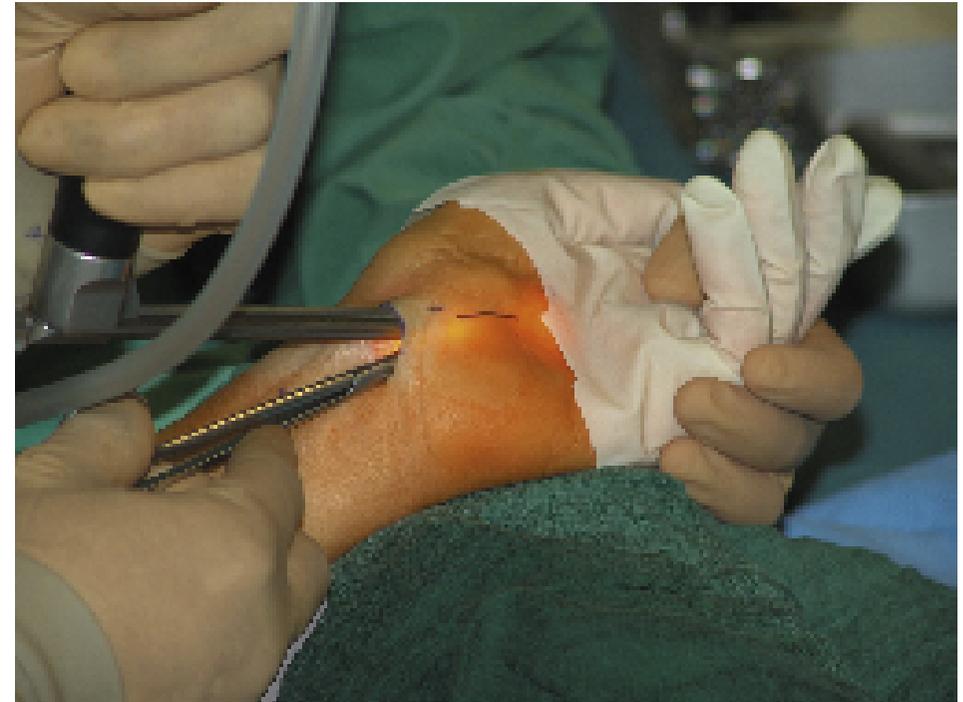
(A) The retractor is seen inserted above the plane of the **transverse carpal ligament (TCL)**. Both the TCL and the **median nerve** are clearly visualized.



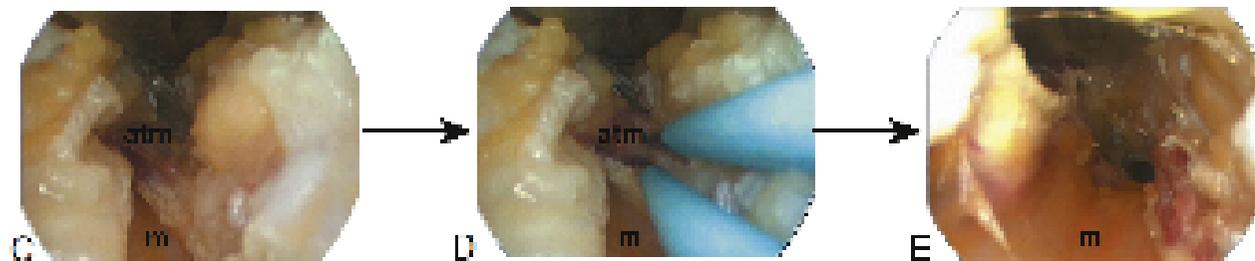
(B) Transection of the TCL is done .

(C) Transection of the TCL proceeds more distally.

(C–D) Anomalous structures such as **an accessory thenar muscle** can be identified



(E) Complete decompression of the carpal tunnel is shown. The farthest dark circle in the middle of the picture is the **entry point into the palm**.



ENDOSCOPIC CTR

Pros:

- less postoperative pain
- Reduced wound complications
- shorter recovery time: an average return-to-work time of 54 days in OCTR and 25 days in ECTR

Cons:

- steep learning curve
- Less visibility → incomplete sectioning of the TCL
- increased nerve injury risk to both median recurrent and distal ulnar elements
- increased cost associated with endoscopic instruments
- the significant setup time and effort required

■ OCTR Vs. ECTR (Cochrane review)

■ 33 studies included

1. **return to work** or normal daily activity : mean difference of **0 to 25** days in favor of the endoscopic approach.
2. Complications:
 - ECTR → more **transient nerve dysfunction** such as neurapraxia, numbness, and paresthesias
 - OCTR → more **wound complications**
3. revision surgery : higher in the endoscopic group.
 - 12 of 513 ECTR procedures versus 5 of 370 OCTR procedures (**relative risk, 1.2**; 95% confidence interval, 0.5 to 3.1)

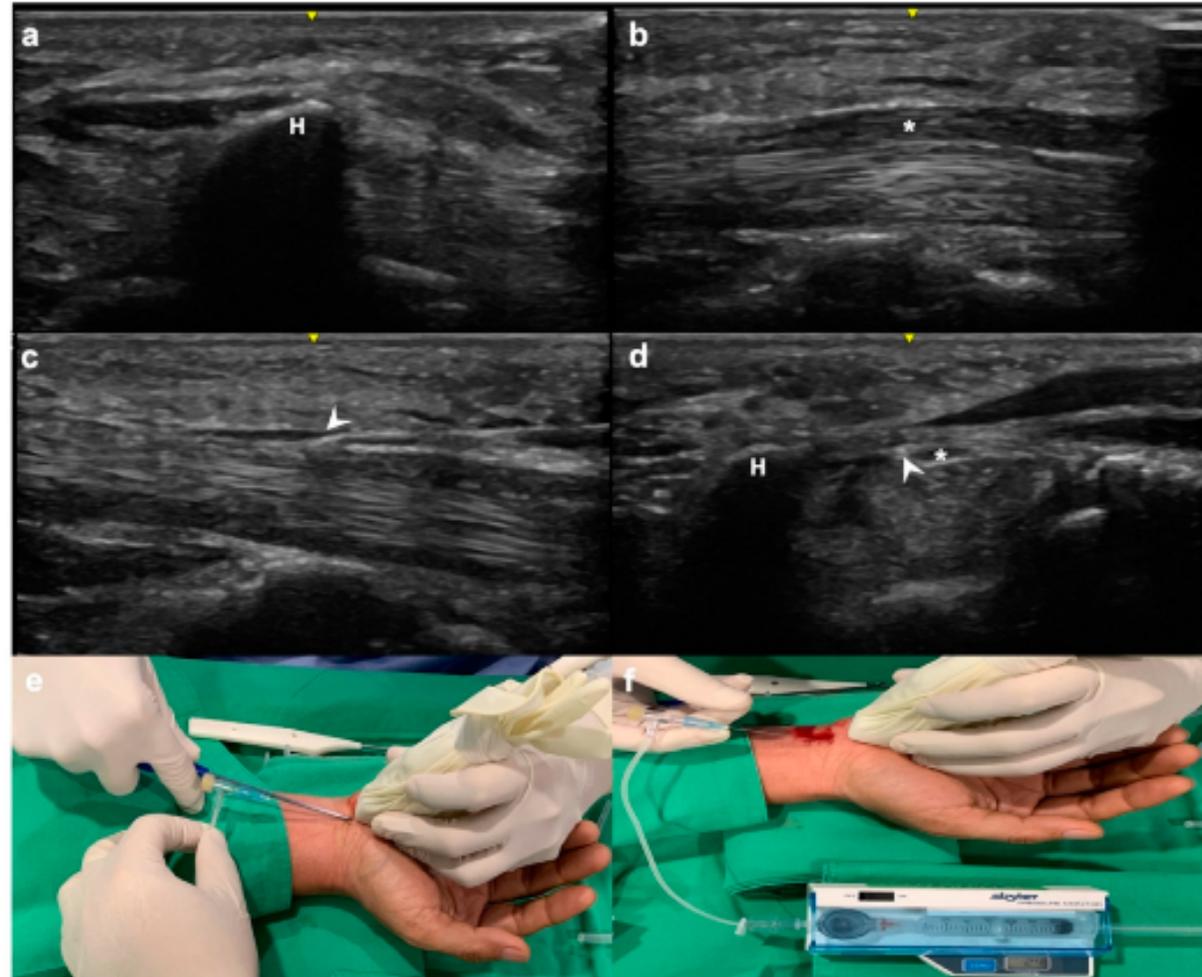
ULTRASOUND-GUIDED TECHNIQUES

Ultrasound-guided percutaneous release:

- The proximal wrist is then pierced through the deepest fibrous layer using a scalpel.
- A hook knife can then be advanced through the longitudinal safe zone, allowing for the transection of the ligament in a retrograde fashion.

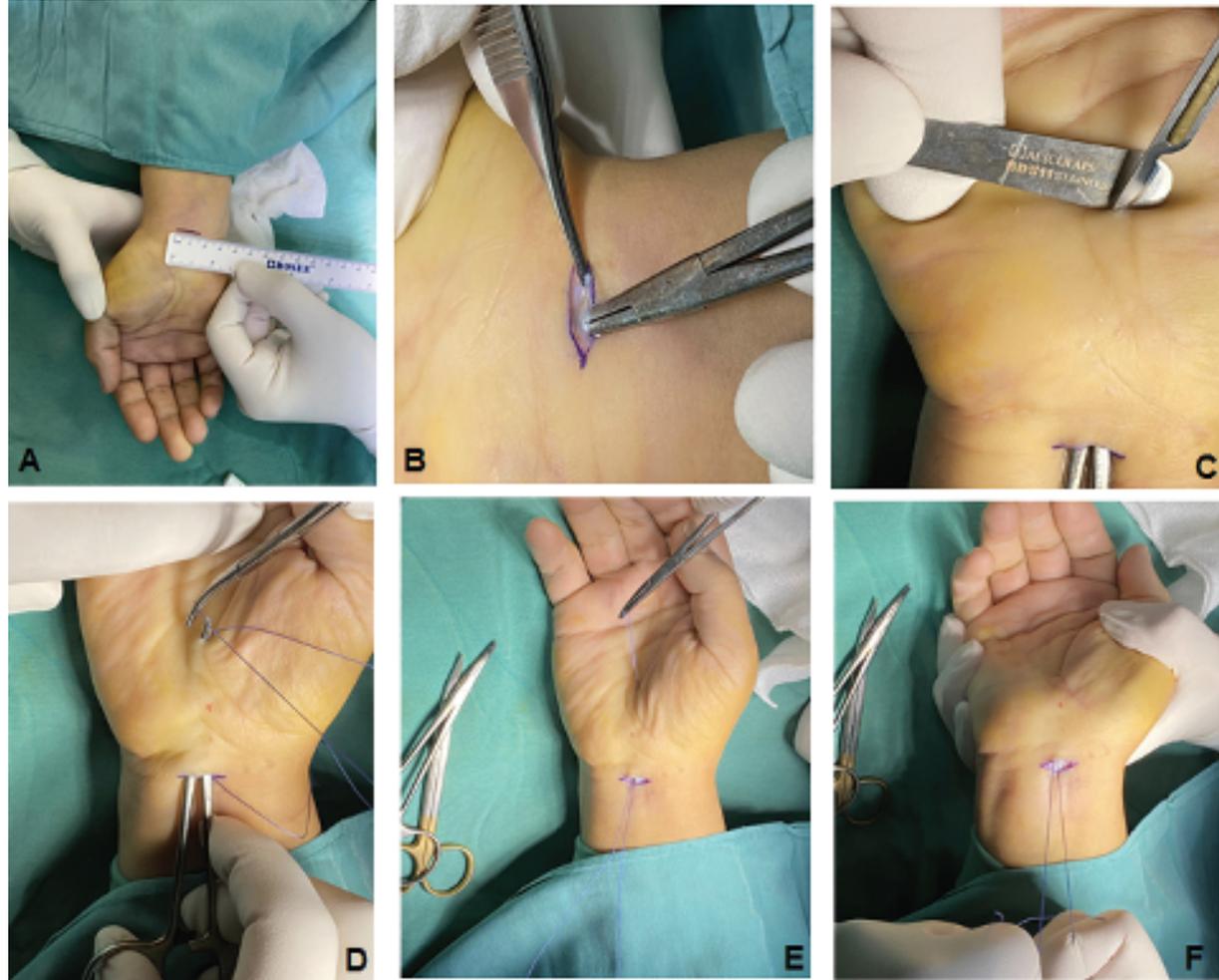
Ref:

1. McShane JW, Slaff S, Gold JE, Nazarian LN. Sonographically guided percutaneous needle release of the carpal tunnel for treatment of carpal tunnel syndrome: preliminary report. *J Ultrasound Med.* 2012; 31(9):1341–1349.
2. Petrover D, Silvera J, De Baere T, Vigan M, Hakimé A. Percutaneous Ultrasound-Guided Carpal Tunnel Release: Study Upon Clinical Efficacy and Safety. *Cardiovasc Intervent Radiol.* 2017;40(4): 568–575.
3. Chern TC, Kuo LC, Shao CJ, Wu TT, Wu KC, Jou IM. Ultrasonographically Guided Percutaneous Carpal Tunnel Release: Early Clinical Experiences and Outcomes. *Arthroscopy.* 2015Dec; 31(12):2400–2410.



THREAD CARPAL TUNNEL RELEASE (TCTR)

- Ultrasound-guided anesthetic injection to **hydro-dissect** the TCL from the median nerve and the interthenar fascia from the superficial surface of the TCL.
- A piece of **thread** can then be looped around the TCL via these tracts.
- Protective tubing is placed over the strings to minimize soft tissue injury as the string is pulled in and out of the wound in a motion similar to how a Gigli saw is used.



Ref: Akhoondinasab, Mohammad-Reza, et al. "Aesthetic and Functional Outcomes of Open Carpal Tunnel Release and Thread Carpal Tunnel Release: A Randomized Clinical Trial." *Indian Journal of Plastic Surgery* (2024).

THANK YOU



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