Recent Trends In Management Of Carpal Tunnel Syndrome

Study for Completion of Master Degree
In
Orthopedic Surgery

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Abstract

It’s a study of the new techniques in management of carpal tunnel syndrome other the standard open technique and to compare the postoperative results of the minimal invasive techniques to the endoscopic techniques and those of the conventional open technique.

Key Words

Carpal tunnel syndrome

Median nerve entrapment

Recent trends in management of carpal tunnel syndrome

Carpal tunnel release

Conservative management of carpal tunnel syndrome

Endoscopic release of the carpal ligament

Okutsu technique for carpal tunnel release

Agee technique for carpal tunnel release

Chow technique for carpal tunnel release

Open technique for carpal tunnel release

Minimal invasive techniques for carpal tunnel release

Flexor retinaculum reconstruction

Complications of carpal tunnel release

List of Abbreviations

APL ..... Abductor Pollicis Longus

CL ..... Carpal Ligament

CT ..... Carpal Tunnel

CC……..Carpal Canal

CTR..... Carpal Tunnel Release

OCTR….Open Carpal Tunnel Syndrome

ECTR….Endoscopic Carpal Tunnel Syndrome

CTS ..... Carpal Tunnel Syndrome

PL …… Palmaris Longus

FR..... Flexor Retinaculum

MCP ..... Metacarpophalangeal joint

MRI ..... Magnetic Resonance Imaging

NSAID.. Non Steroidal Anti-inflammatory

TCL ..... Transverse Carpal Ligament

U/S ..... Ultrasound

T.E.N.S…**T**ranscutaneous Electric Nerve Stimulation

FESSH….**F**ederation of European Societies for Surgery of the Hand

IFSSH…...**I**nternational Federation of Societies for Surgery of Hand

MN……**M**edian Nerve

Aim of the Study

To study the new techniques in management of carpal tunnel syndrome other than the standard open technique and to compare the postoperative results of the minimal invasive techniques to the endoscopic techniques and those of the conventional open technique.

CHAPTER 1

Relevant Anatomy

The carpal tunnel provides passage of the finger and thumb flexor tendons as well as the median nerve from the forearm to the hand, it is an inelastic fibro-osseous tunnel defined by the carpal bones and the flexor retinaculum. [1]

Robbins reported that the carpal canal was narrowest in its midportion, however the narrowest portion of the carpal canal varies with the wrist position. [1]

The osseous components of the carpal tunnel form an arch, defined by four bony prominences – proximally by pisiform and tubercle of scaphoid and distally by hook of the hamate and tubercle of trapezium. [1]

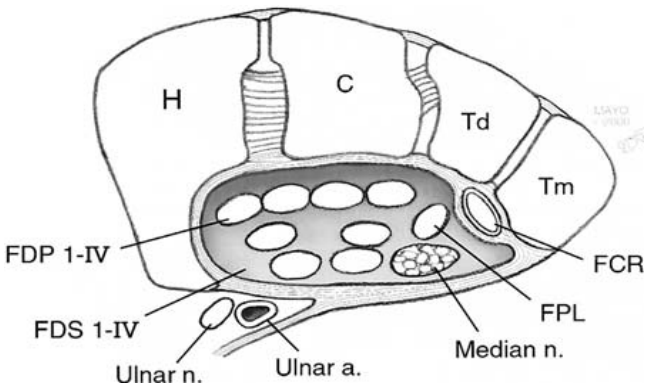
Superficially the palmaris longus tendon passes anterior to the flexor retinaculum to become continuous with the palmar fascia. Deep to the palmar fascia, a thick ligamentous band forms the superficial border of the carpal tunnel, also referred to as the transverse carpal ligament.[1]

The flexor retinaculum and the transverse carpal ligament are considered by authors synonymous terms.

The anatomic zone of the flexor retinaculum extends from the distal radius to the proximal metaphysis of the third metacarpal. It is firmly attached to the hook of the hamate and pisiform bones on the ulnar (medial) side of the carpal tunnel and the tubercle of the trapezium and distal pole of the scaphoid on the radial (lateral) side of the carpal tunnel.[1,Fig 1]

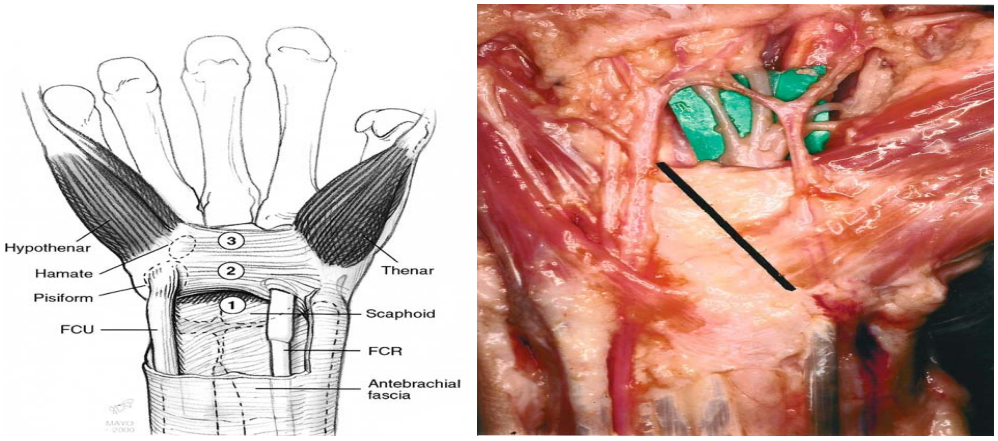
The radial side of the flexor retinaculum splits to Form a separate tunnel for the tendon of the flexor carpi radialis muscle, forming in essence a superficial and deep layer of the retinaculum. This tunnel is directly continuous with the fibro-osseous tunnel for the flexor carpi radialis tendon that forms anterior to the distal pole of the scaphoid and continues distally dorsal to the trapezial ridge.[1,fig 2]

Although the carpal tunnel appears to be in open communication with the flexor compartment of the forearm proximally and the midpalmar space of the hand distally, it behaves like a closed compartment and maintains its own tissue fluid pressure levels.[1]



The transverse anatomy of the carpal tunnel, through the level of the distal carpal row.

Figure 1 [1]



The anterior (palmar) anatomy of the carpal tunnel. (1) demonstrates the exposed proximal entrance into the carpal tunnel between the tendons of flexor carpi ulnaris (FCU) and flexor carpi radialis (FCR). The thickest region of the flexor retinaculum is shown as (2), but it continues distally to the level of the carpometacarpal joints as a thinner structure (3)

Figure 2 [1]

The principle contents of the carpal tunnel are the median nerve and nine extrinsic flexor tendons.

The flexor pollicis longus muscle is the most radial structure of the group and emerges between the superficial and deep heads of the flexor pollicis brevis muscle where it inserts into the proximal phalanx of the thumb.

The flexor digitorum superficialis muscle divides into four independent muscle bellies in the mid-forearm, and passes through carpal tunnel only as deep as the flexor retinaculum into middle phalanges of index, long ring, and small fingers.

Within the carpal tunnel, the tendons of the flexor digitorum Superficialis muscle to the long and ring fingers are central and anterior relative to the index and small finger tendons.[1]

The flexor digitorum profundus muscle radial half forms the flexor digitorum profundus to the index finger and the ulnar half of the muscle forms the profundus tendons to the long, ring, and small fingers.

These four tendons pass through the carpal tunnel at the most dorsal aspect, dorsal to the tendons of the flexor digitorum superficialis muscle.[1]

The lumbrical muscles originate from the tendons of the flexor digitorum profundus beyond the level of the carpal tunnel.[1]

The median nerve becomes more superficial, coursing between the tendons of flexor digitorum superficialis ulnarly and flexor carpi radialis radially, dorsal or dorso radial to the palmaris longus tendon.[1]

Approximately 5 cm proximal to the wrist crease, the palmar cutaneous branch of the median nerve diverges, it parallels the median nerve for 1.6–2.5 cm and then courses separately under the antebrachial fascia between the tendons of palmaris longus and flexor carpi radialis. The palmar cutaneous branch of the median nerve then pierces the deep antebrachial fascia, becoming superficial to the flexor retinaculum, approximately 0.8 cm proximal to the wrist crease.[1]