

# CASE REPORT

Nagoya J. Med. Sci. **86**. 531–535, 2024  
doi:10.18999/nagjms.86.3.531

## Intraoperative transverse carpal muscle during endoscopic carpal tunnel release: a case report

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### ABSTRACT

We encountered the aberrant muscle called transverse carpal muscle (TCM) anterior to the transverse carpal ligament (TCL) during endoscopic carpal tunnel release (ECTR) for a 56-year-old female with left carpal tunnel syndrome (CTS). Our ECTR technique started with making the distal portal and the anomalous muscle emerged in the portal. We changed ECTR to open carpal tunnel release to clarify the anatomy around TCL to avoid iatrogenic tendon and neurovascular injuries. The TCM does not necessarily exist bilaterally, and our case has also it unilaterally, because the TCM was not observed during the ECTR on the opposite side. Distal incision first ECTR technique enabled us to find the TCM which we could not encounter if conventional ECTR was performed.

Keywords: transverse carpal muscle, aberrant muscle, carpal tunnel syndrome, endoscopic carpal tunnel release, open carpal tunnel release

#### Abbreviations:

TCM: transverse carpal muscle

TCL: transverse carpal ligament

ECTR: endoscopic carpal tunnel release

CTS: carpal tunnel syndrome

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### INTRODUCTION

Chow's 2-portal technique of endoscopic carpal tunnel release (ECTR)<sup>1</sup> has been used widely for carpal tunnel syndrome (CTS). We also routinely perform our modified Chow's 2-portal technique which is unique in the aspect of starting from the creation of distal portal. The anomalous muscles of the wrist such as anatomic variants of the palmaris longus, flexor

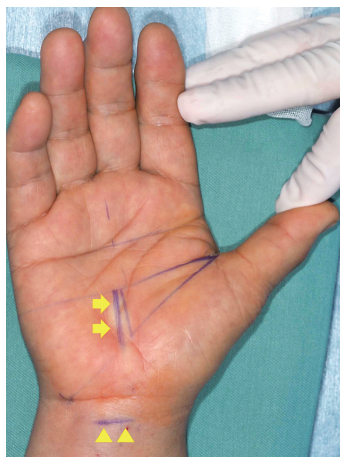
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Received: October 2, 2023; accepted: November 28, 2023

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**Fig. 1** Location of distal portal incision and proximal portal incision for our endoscopic carpal tunnel release  
arrows: distal portal incision  
arrow heads: proximal portal incision

digitorum superficialis, lumbricalis and abductor digiti minimi have been reported and the muscle anomalies are infrequently encountered during ECTR.<sup>2</sup> We report a case with anomalous muscle lying over the transverse carpal ligament (TCL) while making a distal portal to perform ECTR.

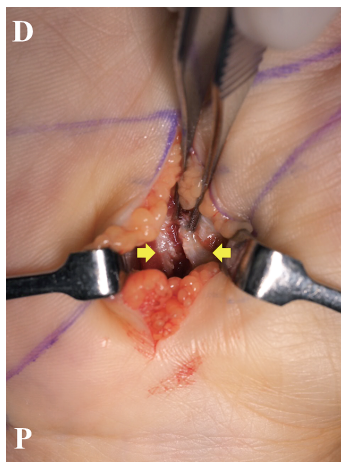
#### *Our modified Chow's 2-portal technique*

The distal portal is a 15 mm longitudinal incision proximal from the intersection of a line drawn parallel to the distal palmar crease, from the ulnar side of the base of the thumb in maximum radial abducted position and a line drawn between the middle and ring fingers (Fig. 1). The proximal portal is a 7–8 mm transverse incision just ulnar to the palmaris longus tendon on the proximal wrist crease (Fig. 1). Unlike the Chow's technique, distal incision is made at first. Palmer aponeurosis and the distal part of TCL are dissected. Then, we separate median nerve and TCL using Metzenbaum scissors. From the proximal incision, the deep fascia of the forearm is opened proximally. We insert carved dissector to dissect sufficiently sub synovial connective tissue under the TCL. Then, the cannula is inserted from the proximal incision to the distal incision. After we confirm transverse fibers of TCL with no inclusion of other structures endoscopically, the TCL is released from distal side using a retrograde knife.

## CASE REPORT

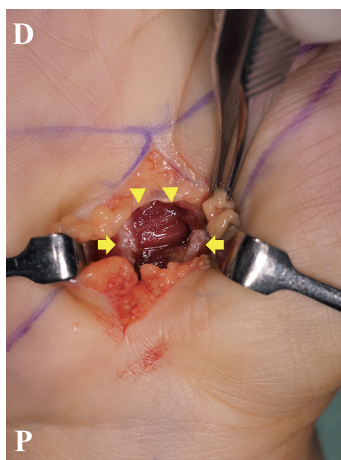
A 56-year-old right-handed female was referred to our hospital owing to bilateral hand numbness. Phalen's test and Tinel sign were positive on both sides. Distal motor latencies of her left and right abductor pollicis brevis compound muscle action potential were 7.10 and 7.56, respectively. We diagnosed the patient as bilateral CTS and performed ECTR for right CTS at first. Aberrant muscles were not identified in the surgery. Two months after the operation, ECTR for left side was planned. After making the distal incision, we opened the fascia which was initially thought to be the TCL (Fig. 2). The aberrant muscle was observed lying transversely under the fascia (Fig. 3). Obvious hypertrophy of the muscle was not found. We changed the operative procedure from ECTR to open carpal tunnel release to declare the anatomy around

the carpal tunnel with anomalous muscle. By extending the distal portal incision, the anomalous muscle on the TCL was exposed and opened (Fig. 4). Carpal tunnel release under direct vision was performed after clarification of the structures around the TCL. The anomalous motor branches to abductor pollicis brevis were not found. The patient provided informed consent for the publication of this case report and any accompanying images, and the study was approved by Niigata Hand Surgery Foundation's review board (approval no. R4-11).



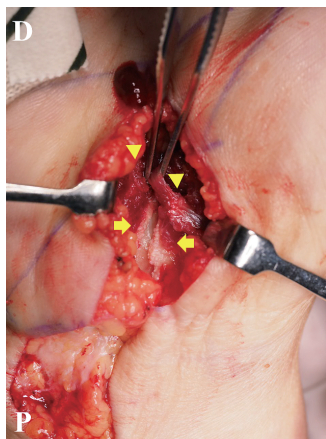
**Fig. 2** The opened ligamentous structure called volar carpal ligament

D: distal  
P: proximal  
arrows: opened volar carpal ligament



**Fig. 3** Transverse carpal muscle under the volar carpal ligament

D: distal  
P: proximal  
arrows: volar carpal ligament  
arrows heads: transverse carpal muscle



**Fig. 4** Opened transverse carpal muscle over the released transverse carpal ligament

D: distal

P: proximal

arrows: released transverse carpal ligament

arrows heads: opened transverse carpal muscle

## DISCUSSION

The anomalous muscle lied under the fascia which seemed to be TCL initially. This muscle was neither the extension of thenar muscle nor that of hypothenar muscle because both muscles existed each side of TCL in the same layer. Unlikely these muscles, the aberrant muscle we encountered exists one layer above the TCL, thenar muscle, and hypothenar muscle.

There were two case reports with the anomalous muscle found in our patient.<sup>3,4</sup> The muscle was called as transverse carpal muscle (TCM) by Ragoowansi et al.<sup>3</sup> It extends between the thenar and hypothenar eminences and exists anterior to the TCL.<sup>4</sup> The ligamentous structure above TCM is the superficial layer of the deep antebrachial fascia called the volar carpal ligament.<sup>5</sup> Iob et al reviewed 1280 operated cases of CTS and reported a similar muscle in 11% of their cases.<sup>6</sup> There are not necessarily TCM bilaterally. Magnetic resonance imaging of both wrists of the case Ragoowansi et al reported showed TCM in the right wrist only.<sup>3</sup> Similarly, in the present case, we did not find the anomalous muscle during the ECTR on the opposite side. The TCM in this case also existed superficial to TCL, thus we believe that the compression of the median nerve was not caused by this muscle. The function of the TCM is not yet clear. In a study by Tuncali et al, the TCM was cut in four cases, and no obvious postoperative functional deficits were observed.<sup>4</sup> Therefore, significant differences in postoperative outcomes are not expected irrespective of whether the TCM is preserved or dissected. In our case, no obvious functional deficits were found postoperatively.

The greatest advantage of our ECTR technique, distal incision first, is that the median nerve under the TCL can be sufficiently exposed and preformed neurolysis under direct vision. It is most important to confirm the anatomy around the distal TCL where superficial palmar arterial injury and common digital nerve transection can occur.<sup>7</sup> As the incidence of aberrant motor branches to abductor pollicis brevis of the median nerve is particularly high among patients with TCM, surgeons should identify and protect these branches, and be careful when the TCM is present.<sup>8</sup> The distal incision first ECTR technique enabled us to find TCM which we could not encounter if conventional ECTR was performed.

## ACKNOWLEDGEMENTS

### *Statement of human and animal rights*

No experiments on animals were performed for this study. No experimental procedures were performed in any human subject for this study.

### *Informed consent*

The patients provided written informed consent for publication of this study.

### *Conflict of interest disclosure*

The authors do not have any potential conflicts of interest with respect to this manuscript.

### *Declaration of funding*

The authors received no financial support for the preparation, research, authorship, and publication of this manuscript.

### *Miscellaneous acknowledgments*

We would like to thank Editage (www.editage.com) for English language editing.

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