Peripheral Nerve Carpal tunnel syndrome (CTS) is one of the most frequent nerve compression syndromes of the upper extremity, often associated with pain. The etiology is pathologically increased pressure within the carpal tunnel leading to compression of neural structures and subsequent neuropathic pain. Several causes for median nerve compression exist, such as thickened carpal tunnel roof, lipoma, or tendon calcifications. In this report, we present a case of severe pain following carpal tunnel release caused by an atypical running tendon within the carpal tunnel.

**CASE REPORT**

A 44-year-old male patient showed typical symptoms of bilateral CTS. Clinical nerve compression signs initiated 2 years prior due to the use of crutches. At physical examination, the patient displayed the following symptoms: positive Hoffmann-Tinel sign over the carpal tunnel, paresthesia in the first three digits, nocturnal brachialgia, and anamnestic reduced fine motor skills in both hands. Two-point discrimination was 4–6 mm in digits one through three. A nerve conduction velocity test revealed a moderate bilateral CTS with distal motoric latency of 6.4 meters per second. Due to increased symptomatology, carpal tunnel release of the left hand was scheduled.

Surgery was performed in a wide-awake manner with a median nerve block and local anesthesia at the palm. The carpal tunnel roof was opened via a central open approach, approximately 4 cm in length at the palm, for adequate overview of the operating field.

Within the carpal tunnel, small tendinous fibers adjacent to the median nerve were encountered. The fibers originated from within the proximal part of the carpal tunnel and inserted distally into the palmar fascia. The structure was identified as a palmaris profundus muscle. It was then meticulously dissected off the median nerve and partially resected. Intraoperatively, movements of all fingers could be performed freely, and no traction on the nerve was evident. Hence, no continuing exploration was conducted. The patient was discharged the same day with a light dressing.

In the morning hours the following day, the patient was admitted to our emergency department by ambulance due to severe disseminated pain in the left hand. Analgesia with opioids showed no sign of pain reduction; thus, an upper arm plexus anesthesia was installed. Thereafter, the patient’s symptoms ceased, which enabled further diagnostics. A sonographic examination showed a severe traction on the median nerve by the palmaris profundus tendon could be observed at revision. The resection of the palmaris profundus tendon instantly eased the patient’s severe pain. At preoperative examination and planning of surgery, the palmaris profundus was not detected. As there is no test for the detection of anatomic variations of the palmaris longus muscle at physical examination, discovering such anomalies is not possible without imaging tools. Ultrasonographic examinations aid in preoperative planning of carpal tunnel release, especially at revision surgeries.

**Summary:** The palmaris longus muscle is one of the most variant muscles in the human body. Its variations such as the palmaris profundus can cause nerve compression symptoms. Here, we present a case of severe nerve affection due to a palmaris profundus muscle. The palmaris profundus tendon was partially resected at intervention. Pain symptoms started immediately after wearing off of the local anesthetic, and revision surgery had to be performed. Severe traction on the median nerve by the palmaris profundus tendon could be observed at revision. The resection of the palmaris profundus tendon instantly eased the patient’s severe pain. At preoperative examination and planning of surgery, the palmaris profundus was not detected. As there is no test for the detection of anatomic variations of the palmaris longus muscle at physical examination, discovering such anomalies is not possible without imaging tools. Ultrasonographic examinations aid in preoperative planning of carpal tunnel release, especially at revision surgeries.

*From the *Karl Landsteiner University of Health Sciences, Dr. Karl-Dorrek-Straße, Krems, Austria.; †Department of Plastic Aesthetic and Reconstructive Surgery University Hospital St. Poelten, St. Poelten, Austria.; and ‡Clinical Department of Neurology University Hospital St. Poelten, St. Poelten, Austria.*

Received for publication December 5, 2020; accepted December 14, 2021.

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DOI: 10.1097/GOX.000000000004118

**Disclosure:** The authors have no financial interest to declare in relation to the content of this article.
sickle-shaped, echogenic structure along the superficial border of the median nerve, 2 cm proximal to the distal wrist crease (Fig. 1).

The foreign body significantly compromised the median nerve at a length of 1 cm, dragging the need for revision surgery. Secondary, a minor hematoma of a few millimeters was encountered yet excluded as origin of the symptoms due to its small size.

At revision, the initial incision was extended proximally for proper median nerve exploration. Along the nerve, a tendinous structure, concordant with the prior resected tendon was encountered proximally to the distal wrist crease. This tendon pulled the nerve’s epineurium in a proximal direction, resulting in severe stretching of the nerve (Fig. 2).

The tendon was then precisely dissected off the nerve until reaching the palmaris muscle belly and was consequently resected at a length of 6 cm (Fig. 3).

Thereafter, no traction on the nerve was observed while the remaining epineurium could be preserved. The patient’s symptoms immediately passed after the nerve was released. No further analgesia was needed. At follow-up examination 6 months after revision surgery, the patient showed no functional impairment of hand and wrist movements (Fig. 4).

**DISCUSSION**

The palmaris longus muscles is one of the most variable muscles in the human body.\(^1,2,4,5\) It is a long, narrow, fusiform muscle, mainly tendinous and aids in wrist flexion. It typically travels above the carpal tunnel and inserts onto the palmar fascia. Several anatomical variants of the palmaris longus have been described, yet most are limited to morphological features.\(^5,6\) The variation seen in this patient was classified as palmaris profundus, as previously described by Browne et al.\(^7\) We assume that the atypical running tendon caused the patient’s symptoms, as its resection resolved the pain.

Open carpal tunnel release helps create an adequate overview of the carpal tunnel and assists in identifying
unexpected sources of compression. As the palmaris profundus muscle is functionally nonessential, it should be resected, especially if it is the source of compression, as relapse prevention.

Sonographic examinations are not mandatory for the diagnosis of a CTS yet are beneficial in detecting compression sources and for preoperative planning. If no palmaris longus tendon is encountered at physical examination, an ultrasound examination could detect anomalies such as reversed, profound, or occult palmaris longus tendon and others.

We propose that if the palmaris profundus is encountered at carpal tunnel release, its resection should be considered to ease exploration, reduce pressure within the carpal tunnel, and for recurrence prophylaxis. Importantly, tenotomy alone may be insufficient, as in this case. Thus, resection might be necessary to adequately treat the underlying pathology.

Tonatiuh Flores, MD
Department of Plastic, Aesthetic and Reconstructive Surgery
University Hospital St. Poelten, Dunant-Platz 1
A-3100 St. Poelten
Austria
E-mail: t.flores@gmx.net

ACKNOWLEDGMENT
We acknowledge support by the Open Access Publishing Fund of the Karl Landsteiner University of Health Sciences, Dr. Karl-Dorrek-Straße 30, 3500 Krems, Austria.

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