

## CASE REPORT

# A New Palmo-Shoulder Compression Association

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## INTRODUCTION

Carpal tunnel syndrome is a most common peripheral compression neuropathy (1). It is caused by mechanical compression of the median nerve as it traverses the carpal tunnel of the wrist. Classic signs and symptoms are numbness of the lateral three digits and weakness of the thenar muscles due to atrophy (2). Important diagnostic tests include electromyography (EMG) and nerve conduction studies. The gold standard for the surgical treatment is transection of the transverse carpal ligament.

## CASE REPORT

A thirty-eight year old right-handed construction worker presented to the McGill University Health Center Plastic Surgery clinic with complaints of bilateral carpal tunnel syndrome. He had no other relevant past medical history, was not taking any medications, and had no known allergies. On further history, he complained of a ten-year period of slowly progressing symptoms of hand numbness, pain, and paresthesias in the median nerve distribution distal to the wrist.

On physical examination he demonstrated positive Phalen and Tinel Test bilaterally. He had no obvious thenar eminence wasting and his grip strength was weakened. His EMG and nerve conduction studies demonstrated moderate to severe carpal tunnel syndrome bilaterally.

A routine open carpal tunnel release was performed on his right hand and the patient had complete resolution of his carpal tunnel symptoms with no complications. Two months later he was scheduled to have the same surgery for his left

hand. At this time, he said he was having bilateral shoulder weakness for the past two years and had not sought medical attention for it since he attributed it to strenuous physical work and fatigue secondary to his occupation. He explained that he was unable to elevate and abduct his arms above his shoulder prior to his right median nerve decompression, at which point he regained full range of motion and strength of his shoulder.

Directly after his left carpal tunnel release the patient was able, with full strength, to elevate and abduct his left shoulder.

## LITERATURE REVIEW

Using PubMed and Medline database, an online search using the headings "carpal tunnel release" and "shoulder abduction" was done to determine the occurrence and frequency of the observed phenomenon presented in the case report. No results were found. Further searches with headings of "carpal tunnel release" and "shoulder weakness" also revealed no published material. The same was done with "shoulder extension" and "shoulder paralysis" and resulted in the same outcome. A search using the headings "carpal tunnel" and "shoulder flexion" demonstrated one paper by Vaught et al (3). The authors have concluded that the likelihood of patients with carpal tunnel syndrome having associated thoracic outlet syndrome (TOS) is sixteen times higher than control subjects. They have demonstrated that patients with carpal tunnel syndrome may also concomitant proximal nerve entrapment. The case presented in this manuscript reveals that a distal release of an entrapped nerve compartment, in this case the median nerve within the carpal tunnel, has relieved the weakness of a proximal muscle group, the shoulder.

## DISCUSSION

The median nerve is formed from the medial and lateral cords of the brachial plexus. The nerve roots are typically C5-C7. It courses in the arm supplying flexor muscles in the forearm and lateral muscle in the hand, and is responsible for sensation of the lateral part of the palmar surface of the hand. The typical sites of median nerve compression include the carpal tunnel, specifically, beneath Struthers' ligament at the distal humerus, and in the pronator teres muscle. This results in carpal tunnel syndrome, anterior interosseous syndrome, and the pronator syndrome respectively. The median nerve and all its sites of compression have not been shown to cause shoulder weakness and an inability to abduct the arm. This is most likely due to the fact that this maneuver is the function of the axillary nerve (C5, C6 nerve root), a branch of the posterior cord of the brachial plexus.

The only reported median and axillary nerve combined weakness occur secondarily from proximal compression or defects found in obstetrical injuries, aberrant proximal rib anatomy, and traumatic injuries to the brachial plexus for example. All the described joined median and axillary nerve syndromes are a result of proximal defects. The present case presented with complete resolution of median and axillary nerve weakness after a distal nerve compression surgical procedure. The patient in the present case appears to have an aberrant connection of his median nerve with his axillary nerve or distal compression of the common nerve roots axons that could explain his upstream nerve weakness secondary to the median

nerve compression in the carpal tunnel. Although it is known that proximal nerve compression such as those seen in TOS can be associated with carpal tunnel symptoms, it has never been shown that the distal release of the flexor retinaculum can relieve the proximal symptoms.

We have presented a unique case that likely shows a new peripheral nerve phenomenon between the axillary and median nerve. This finding is of interest to family physicians, neurologists, plastic surgeons, and orthopedic surgeons who are routinely involved in the diagnosis and management of carpal tunnel syndrome. If an association of TOS is demonstrated, further proximal nerve studies should be made to rule-out this phenomenon.

We suggest a treatment through surgical carpal tunnel release for patients that present with carpal tunnel syndrome combined with unilateral shoulder abduction weakness in the case where no other proximal injuries or abnormal anatomic or neurologic etiologies are found.

## REFERENCES

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3. Vaught MS, Brismee JM, Dedrick GS, Sizer PS, Sawyer SF. Association of disturbances in the thoracic outlet in subjects with carpal tunnel syndrome: a case-control study. *J Hand Ther*: 24: 44-51; quiz 52.

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