

The Double Crush in Nerve-Entrapment Syndromes

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FROM ABSTRACT:

A comprehensive electromyographic study has been made of 115 patients with carpal-tunnel syndromes and lesions of the ulnar nerve at the elbow.

In 81 cases there was electrophysiological evidence, often supported by clinical symptoms, of associated neural lesions in the neck.

This association is not thought to be fortuitous, but rather the result of serial constraints of axoplasmic flow in nerve fibers.

THESE AUTHORS ALSO NOTE:

In carpal tunnel syndrome, fibers of the median nerve are compressed beneath the transverse carpal ligament.

At surgery the median nerve can be seen:

- 1) to be flattened or narrowed
- 2) to be swollen and pink
- 3) have thickened synovial sheaths around the wrist flexor tendons

Precipitating factors to developing carpal tunnel syndrome include:

- 1) heavy manual work
- 2) increasing obesity
- 3) diabetes
- 4) rheumatoid arthritis
- 5) prior wrist injury

However, many patients who develop carpal tunnel syndrome have no classical precipitating factors.

"Many patients with clinical and electromyographic evidence of a carpal tunnel syndrome feel some pain in the forearm, elbow, upper arm, shoulder, and front and back of the chest." These authors make an argument for why these symptoms may not be referred from the wrist, as they are commonly believed to be.

“Not all patients lose the numbness in their fingers or regain strength in their thenar muscles after surgical decompression of the median nerve” even though the diagnosis was correct and the surgical decompression was adequate.

At times, the severity of symptoms is not proportional to the compressive pathology seen at surgery.

The authors cite a surgical study of carpal tunnel syndrome where 29% (61/212) of the nerves showed no evidence of compression.

In this study, “in no fewer than 81 (70%) of the 115 patients with an electrophysiological-proven entrapment neuropathy there was evidence of a cervical root lesion.”

The evidence for cervical root lesion included:

- 1) Radiological evidence of cervical spondylosis.
- 2) Complaints of neck pain and stiffness.
- 3) “A previous history of neck injury, commonly of the hyperextension ‘whiplash’ type sustained in a rear-end motor vehicle accidents.”
- 4) “Clinical evidence of a sensory abnormality corresponding to a dermatomal rather than a peripheral nerve distribution.”
- 5) Electromyographic evidence of denervation of other muscles that are supplied by the nerve root.

“Most patients with carpal tunnel syndromes or ulnar neuropathies not only have compressive lesions at the wrist or elbow, but they also have evidence of damage at the level of the cervical roots.” **[Important]**

A cervical lesion would explain the presence of pain in the shoulder and upper arm, the variable nerve pathology seen at the wrist, and the surgical failure of cases with adequate wrist nerve decompression.

Neural function is impaired because “single axon compression at one region becomes especially susceptible to damage at another site.”

Slight degrees of nerve compression may cause no symptoms, but reduce the axoplasmic flow of trophic substances, so that a slight distal compression may add to the reduction of axoplasmic flow of trophic substances, causing symptoms.

Even though these authors refer to such a phenomenon as a “double crush,” they “accept” that “in some patients, especially those with a history of neck injury, the proximal lesion may have been excessive stretch, rather than compression, of the nerve fibers.” **[Important]**

“Treatment, rather than being directed at a single site, should be applied to all vulnerable points along the course of the nerve—i.e., to both the neck and to the wrist or elbow, depending on the nerve involved.” **[Important]**

KEY POINTS FROM DAN MURPHY

- 1) The DOUBLE CRUSH SYNDROME is, serial constraints of axoplasmic flow in nerve fibers increasing the susceptibility of distal axons of that nerve to compression syndromes and symptomology.
- 2) Surgical decompression of the wrist clearly does not fix all the patients with carpal tunnel syndrome.
- 3) In this study 70% of the patients with an electrophysiological-proven entrapment neuropathy had evidence of a cervical nerve root lesion.
- 4) The most common history for those with a double crush syndrome is that of “A previous history of neck injury, commonly of the hyperextension ‘whiplash’ type sustained in a rear-end motor vehicle accident.”
- 5) The most common non-local complaint for those with a double crush syndrome is neck pain and stiffness.
- 6) The most common examination finding for those with a double crush syndrome is evidence of cervical spondylosis.
- 7) “Most patients with carpal tunnel syndromes or ulnar neuropathies not only have compressive lesions at the wrist or elbow, but they also have evidence of damage at the level of the cervical roots.” **[Important]**
- 8) Even though these authors refer to such a phenomenon as a “double crush,” they “accept” that “in some patients, especially those with a history of neck injury, the proximal lesion may have been excessive stretch, rather than compression, of the nerve fibers.” **[Important]**
- 9) In the treatment of peripheral neuropathies (such as carpal tunnel syndrome) “treatment, rather than being directed at a single site, should be applied to all vulnerable points along the course of the nerve—i.e., to both the neck and to the wrist or elbow, depending on the nerve involved.” **[Important]**