

## **Median Nerve Compression Pathologies**

By Whitney Lowe, LMT

The most researched and well-defined upper extremity nerve-entrapment problem is carpal tunnel syndrome (CTS). CTS involves compression of the median nerve at the base of the hand in a region called the carpal tunnel.

Because this condition is studied so often, we have a very good understanding of how it occurs; however, because it has become such a "popular" condition, clinical practitioners may be too eager to assume the presence of CTS simply because their patient/client experiences median nerve compression symptoms.

This article will look at the entire length of the median nerve where there are numerous locations that median nerve entrapment may occur. We will follow the nerve's course from the spinal cord to its termination in the hand and describe common locations of compression pathology. It is essential to thoroughly evaluate the problem before coming to a conclusion about the presence of the ever-popular CTS.

The median nerve carries both motor and sensory fibers. Therefore, compression of the nerve may create both sensory and motor deficit. The sensory symptoms are located primarily in the palm (See Figure 1). They include pain (often described as sharp, shooting, or electrical in nature), paresthesia ("pins and needles" sensations), and numbness. The median nerve and its branches innervate primarily the flexors of the wrist and fingers, as well as several muscles of the thumb. Motor problems from median nerve compression usually show up as weakness in grip strength or atrophy of the thenar eminence (fleshy part of the palm near the base of the thumb).

The first location where median nerve compression may occur is at the cervical nerve roots. The median nerve is derived from the C5-T1 nerve roots. Intervertebral discs, bone spurs, small tumors, or other obstructions may press on these nerve roots and produce symptoms that affect the median nerve. Since the nerve roots also contain fibers for other peripheral nerves, symptoms of compression at the nerve root level

may extend outside the commonly mapped area for median nerve sensory involvement illustrated in Figure 1.

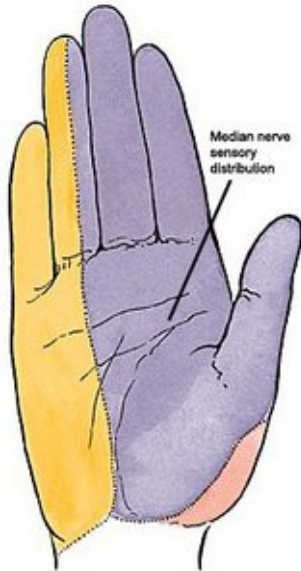


Figure 1

Mediclip image copyright (1998) Williams & Wilkins. All Rights Reserved. After leaving the cervical region, the next several locations of potential entrapment are all part of what is commonly called thoracic outlet syndrome.

Thoracic outlet syndrome is not consistently defined in the medical literature, so there is a great deal of confusion about it. Fibers of the median nerve can get compressed against a pathological bony extension of the C7 transverse process, called a cervical rib. This is called true neurological thoracic outlet syndrome. Other thoracic outlet syndrome variations that may compress the median nerve include the region between the anterior and middle scalene muscles, between the clavicle and first rib, and underneath the pectoralis minor muscle.

Moving distally after leaving the axillary region, the next location where median nerve entrapment is likely, is just proximal to the elbow. This location is only a possible source of nerve entrapment in a small percentage of the population. A ligament called the ligament of Struthers is present in 1 percent to 3 percent of the population. It runs between the medial epicondyle and the shaft of the humerus, and has no function. The median nerve passes underneath it and can get compressed here although it is not very common.

While the biceps brachii attaches primarily to the radius, there is a fibrous attachment to the ulna through a slip of fascia called the lacertus fibrosus, which is also called the bicipital aponeurosis. The median nerve

runs underneath the lacertus fibrosus at the elbow and can get compressed by it here. If symptoms are aggravated during strong elbow flexion movements (when the biceps brachii is contracting strongly) there is a good likelihood that compression exists here.

After leaving the elbow, the median nerve runs between the two heads of the pronator teres muscle. This is a common region of median nerve compression and is commonly mistaken for CTS. The sensory and motor signals are almost identical, making it difficult to distinguish these two regions of entrapment without more specific physical examination, such as orthopedic special tests and nerve conduction studies.

The last common location of median nerve entrapment is within the carpal tunnel. While this region is the most common site of median nerve entrapment, it is not the only one. There are a large percentage of failed carpal tunnel treatments; this could very well be due to improper identification of the precise location of median nerve entrapment.

Keep in mind that compression may occur at several sites simultaneously. Therefore, you may have a problem that is not in just one of these locations, but in two or more.

One of the great benefits for using massage to treat nerve compression problems is that massage treatments are frequently applied to the whole length of the nerve and can easily work on multiple sites of compression at the same time.

A summary of the locations for median nerve entrapment are:

- Cervical nerve root level
- Against a cervical rib
- Between the anterior and middle scalene muscles
- Between the clavicle and first rib
- Underneath the pectoralis minor muscle
- Underneath the ligament of Struthers
- Passing by the bicipital aponeurosis (lacertus fibrosus)
- Between the two heads of the pronator teres
- Compression in the carpal tunnel

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