

Peripheral Nerve

Carpal tunnel syndrome

Carpal tunnel syndrome is a **compression neuropathy**. It is caused by compression of the median nerve as it travels from the forearm into the hand, through the so-called carpal tunnel. Symptoms include pain, burning and/or numbness of the hand and fingers, especially at night and with driving and carrying objects and/or muscle weakness and atrophy. Treatment may be surgical or non-surgical. Surgery involves transection of the transverse carpal ligament (the roof of the tunnel).

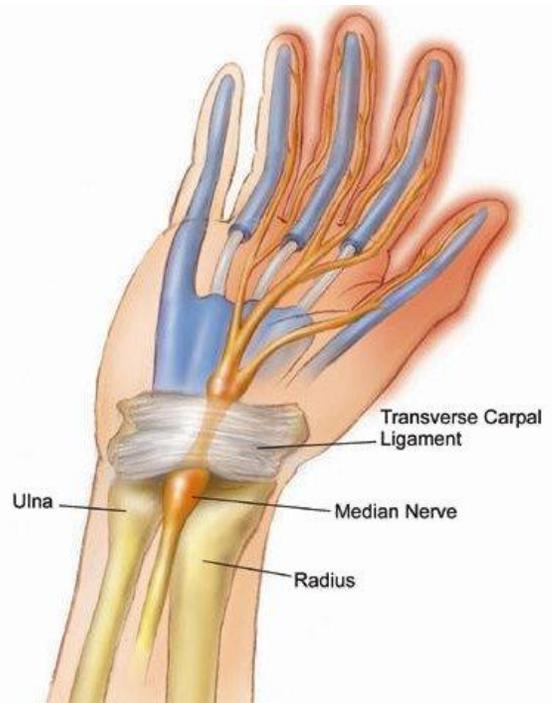


Figure 1: Drawing of carpal tunnel syndrome.

Ulnar Neuropathy or Cubital Tunnel Syndrome

Ulnar neuropathy at the elbow, or **cubital tunnel syndrome**, is another nerve compression syndrome. It is due to compression of the ulnar nerve at or just past the elbow, particularly where it runs between the heads of the flexor carpi ulnaris muscle. Symptoms include pain, burning and/or numbness in the ulnar side of the hand (smallest finger and ring finger) and/or muscle weakness and atrophy. Surgery to decompress the nerve involves either simple release of the nerve or release and transposition of the nerve.

Nerve sheath tumors

Nerve sheath tumors are uncommon, usually benign tumors of peripheral nerves. The most common are **schwannomas** and **neurofibromas**. Tumors usually present with pain, burning and/or numbness in the area innervated by the nerve, and/or muscle weakness and atrophy. Frequently the tumor is large enough to see or feel. Surgery to isolate the nerve and remove the tumor is usually curative.

Thoracic outlet syndrome

Thoracic outlet syndrome is also compression neuropathy. Compression is of the brachial plexus just behind the clavicle. The most common cause of thoracic outlet syndrome is an

accessory rib (cervical rib) projecting from the 7th cervical vertebra, above the first thoracic rib. Other causes include trauma and fibrous bands that form in the region.

There is also a vascular form of thoracic outlet syndrome in which the subclavian artery is compressed by the same mechanisms.

Symptoms include pain, burning and/or numbness in the ulnar side of the hand (smallest finger and ring finger) and/or muscle weakness and atrophy (neurogenic type) or loss of circulation to the hand with head turning (vascular type).

Surgery involves removal of the cervical rib, sectioning of fibrous bands, and/or sectioning of the anterior and/or middle scalene muscles.

Neuromuscular Disease

Neuromuscular diseases comprise a wide range of diseases that are too involved to list here. Neurosurgeons are occasionally asked to perform nerve and/or muscle biopsies for diagnostic purposes.

Pain and Spasticity

Spinal Stimulator

Spinal stimulators are used for patients with chronic, intractable pain. A battery powered electric pulse generator is implanted under the skin similar to a pacemaker. The pulse generator is connected to stimulation leads that go in the epidural space over the thoracic or cervical spinal cord. Mild electric stimulation to the spinal cord induces pain relief in parts of the body below the level of the leads.

Morphine Pump

Morphine (or fentanyl or hydromorphone) pumps are also used for with chronic, intractable pain. A pump is implanted under the skin in a subcutaneous pocket, anchored to the abdominal wall fascia. A catheter is connected to the pump and is tunneled subcutaneously to the lumbar region where it is placed into the lumbar subarachnoid space. The pump provides continuous delivery of drug into the cerebrospinal fluid. Drug delivery to the CSF is 100 times more potent than intravenous delivery, and is associated with fewer side effects.

Baclofen Pump

Baclofen is a powerful muscle relaxant. It is used in cases of severe increase of muscle tone, called spasticity, which can occur following spinal cord injury or stroke. The pump and catheter are placed in the same manner as a morphine pump.