

Nerve Entrapment Syndromes

Entrapment neuropathy simply means that the nerve is pinched. Our bodies are designed to protect our nerves by routing them through areas surrounded by bone, ligaments, fibrous bands of tissue and muscles. There are potentially tight areas that are predictable and sometimes nerves become pinched in these areas. A nerve compression is a serious problem. If the nerve remains pinched for a long enough period of time, depriving blood flow and nourishment to the nerve's cells, then the nerve cells begin to die and there will be permanent injury. The permanent injury can take the form of permanent loss of sensation or permanent loss of function. Depending on the nerve and the point of compression, the loss of function can be devastating. For example, a so-called "ulnar claw hand deformity" may develop following ulnar nerve compression at the elbow.

Although there are those that advocate an approach of watchful waiting and so-called "conservative treatment" with anti-inflammatory medications, we think this is usually ill-advised and is not "conservative" at all. Rather, it is highly risky and unnecessarily subjects the patient to a potentially devastating outcome. The decision as to whether or not to recommend surgery needs to be made by a highly experienced, competent hand surgeon who is able to assess the relative risk of that individual patient's problem without making generalities. We feel very strongly that a third party

insurance reviewer in another city who has never seen the patient is not at all suitable to attempt to make those decisions, assuming care for the patient. Some of the most heartbreaking cases we've seen are those that have easily treatable nerve compression problems but their treatment was delayed for non-medical reasons which resulted in severe, permanent, life-long disability to the hand.

Nerve compression problems may be quite difficult to diagnose or may present in unconventional ways. Nerve conduction studies are invaluable as is experience and a properly performed examination. There are three primary nerves that innervate the upper extremity and I will briefly discuss entrapment syndromes of those nerves.

MEDIAN NERVE ENTRAPMENT

Pronator Syndrome: This syndrome refers to compression of the median nerve about the elbow or forearm that can result in pain in the volar forearm particularly with increased activity as well as a sensory deficit. Often the compression occurs as the median nerve passes beneath a fibrous band of the pronator muscle in the forearm, hence the name "pronator syndrome." Treatment is straightforward with division of those tight bands of tissue in the forearm and release of other structures that might be pinching the nerve.

Anterior Interosseous Syndrome: This refers to the compression of the motor portion of the median nerve in the forearm called the anterior interosseous nerve. Loss of this nerve can result in loss of finger and thumb flexion. There is no sensory deficit. Like pronator syndrome, there is often point tenderness over the point of nerve compression in the forearm. Treatment is analogous to pronator syndrome.

Carpal Tunnel Syndrome: Carpal tunnel syndrome is compression of the median nerve at the wrist at the carpal tunnel beneath the transverse carpal ligament. Carpal tunnel is discussed in great detail earlier in this book. Carpal tunnel syndrome must be differentiated from other nerve compression problems including compression at the neck, brachial plexus and forearm. There can be anomalous connections between the ulnar and median nerves and the presentation often is not in a typical distribution but rather an atypical distribution. The experienced hand surgeon realizes this and is able to make the diagnosis by examination confirmed with nerve conduction studies. As with all nerve entrapment problems, failure to properly treat carpal tunnel in a timely fashion can result in permanent loss of sensation to the hand and function of the hand.

Nerve Entrapment Syndromes continued

ULNAR NERVE ENTRAPMENT

Cubital Tunnel Syndrome:

Cubital tunnel syndrome refers to compression of the ulnar nerve at the cubital tunnel behind or "posterior to" the elbow. If you've ever hit your funny bone you have traumatized the ulnar nerve in the cubital tunnel. This is the second most common type of nerve entrapment neuropathy in the upper extremity after carpal tunnel syndrome. It absolutely must be treated in a timely fashion because delay in treatment results in severe hand deformity called ulnar claw hand deformity. If the hand surgeon is highly experienced with excellent surgical technique and is able to perform release of the ulnar nerve, transposing the nerve anteriorly to the front of the arm beneath the muscles, then it is ill advised to undertake any other type of non-operative treatment for any significant period of time beyond a few weeks in our opinion. Once again, every case is individual and one must consider the duration of symptoms, severity of symptoms and changes on the nerve conduction study. At The Hand Center, we treat a large number of patients with ulnar nerve entrapment at the elbow, cubital tunnel syndrome, and routinely perform anterior sub-muscular transpositions with excellent results. Despite performing this operation, there will be a few patients who have already undergone irreversible changes in the nerve and will progress to ulnar claw hand deformity despite properly performed nerve release and transposition.

Ulnar Nerve Entrapment in

Guyon's Canal: The ulnar nerve can be trapped in a tunnel of bones covered by a ligament at the level of the wrist. This is called Guyon's canal. This can result in numbness and tingling in the ring and little fingers and loss of all the motor function to the intrinsic muscles of the hand also resulting in a claw hand deformity. This is seen in association with hypothenar hammer syndrome in which there is trauma to the ulnar artery by pounding with the base of the hand. The ulnar artery becomes enlarged and puts pressure on the ulnar nerve in Guyon's canal. Diagnosis is confirmed by nerve conduction study and treatment is release of Guyon's canal.

RADIAL NERVE ENTRAPMENT

Radial Tunnel Syndrome: The radial nerve may become entrapped in the radial tunnel about the elbow. It may be associated with arm fracture. Loss of sensation about the back or dorsum of the hand may be present. There may or may not be loss of the ability to extend the wrist and fingers. Release of the radial nerve at the elbow is performed to decompress the nerve and hopefully have return of sensory and motor function. Once again, if this condition is left untreated for long enough, permanent nerve injury will ensue and tendon transfers for radial nerve palsy will have to be performed.

Posterior Interosseous Nerve

Syndrome: Posterior interosseous nerve syndrome refers to compression of the motor branch of the radial nerve at the elbow. There may be point tenderness about the supinator mass in the forearm. The diagnosis may be confused with tennis elbow. Treatment is analogous to radial tunnel syndrome.

Wartenberg's Syndrome (Cheiralgia Paresthetica):

This syndrome refers to compression of the dorsal sensory branch of the radial nerve in the distal forearm at the wrist level. Often it is secondary to wearing tight jewelry on the wrist. It can result in pain and decreased sensation in the thumb, index and middle fingers. Treatment options include anti-inflammatories, therapy and ultimately if this fails, release of the sensory nerve branches.