

CARPAL TUNNEL SYNDROME

The Problem

Numbness and tingling to your hand can be the result of a number of problems. The most common cause of tingling and numbness to the thumb, index and middle finger is carpal tunnel syndrome. Carpal tunnel syndrome refers to a problem related to compression of the median nerve at the level of the wrist. Compression of the median nerve will cause tingling and numbness in the sensory distribution of the median nerve (thumb, index, middle and half of the ring finger) and occasionally motor disturbance in the muscles at the base of the thumb.

Anatomy

There are 8 carpal bones at the wrist joint, the carpus. A thick ligament called the carpal ligament that goes from one side of the carpus to the other side forms the roof of the carpal canal. Nine of the flexor tendons and the median nerve run through the carpal canal. Increased carpal canal pressure produced by thickening of the tissues in the carpal canal or by wrist movements or finger bending can increase pressure on the median nerve. Increased compression on the median nerve will cause alteration in the sensory and motor function of the nerve; sensation to the thumb, index and middle finger and to half of the ring finger. The most important muscle function supplied by the median nerve is to provide the power for the thumb to lift away from your hand and to reach over to touch the other fingers.

Nerve Compression

Compression on a nerve can alter both sensation and muscle function. You have probably felt the effects of nerve compression before; when your foot falls “asleep” or when you hit your “funny bone”. The changes in the nerve produced by compression will progress with increased force of compression and/or length of time of compression. Positions that place increased tension or pressure on the nerve

will increase the compressive forces on the nerve. This progression of changes to the nerve will occur slowly, likely months and possibly years and you may notice that your symptoms get worse over time.

The changes that occur in the nerve will be reflected in the symptoms that you feel in your hand. Therefore in the early stages of nerve compression when there is little alteration in the nerve function, your symptoms will be relatively mild and occur only occasionally. It will take more pressure on the nerve for a longer period of time before you feel any symptoms. For example, at the beginning you may only feel tingling and/or numbness at night after you have been sleeping with your wrists bent. Then as the nerve compression progresses the tingling and/or numbness to your hand will occur more often with less time in irritating positions. When the nerve compression is severe, the numbness will be fairly constant and you may have weakness or wasting in the muscles supplied by that nerve.

The median nerve at your wrist can be exposed to increased pressure when the wrist is bent down (flexion) or extended up (extension). The least amount of pressure is placed on the median nerve when the wrist is straight but unfortunately most of the activities that we do place the hand in wrist flexion or extension. Even the functional position of the hand places the wrist in 30 degrees of extension. Some conditions like pregnancy can give temporary symptoms of carpal tunnel syndrome; the symptoms usually go away after the pregnancy. Other conditions like diabetes, hypothyroidism, rheumatoid arthritis, alcoholism and obesity can increase your risk of developing carpal tunnel syndrome. Some people have a hereditary tendency toward developing nerve compression.

Treatment – Nonoperative

The first strategy of treatment is to understand the activities and positions that irritate your symptoms and then try to avoid these positions. By changing how you do things, you will take pressure off the median nerve. Positions that place the wrist in flexion or

extension will increase pressure on the median nerve and wrist straight positions will decrease the pressure. Most people sleep with their wrists and hands in a curled position and therefore usually the first step of nonoperative treatment is to wear a splint that holds your wrist straight at night. We do not recommend wearing splints during the day. Wearing a splint during the day will essentially give you a “stiff” wrist in a neutral position and therefore limit the activity that you can do during the day. This limitation of motion may cause you to change how you do things with the rest of your arm and create another problem at another place in your arm. Our recommendation is to wear a splint at night in a wrist neutral position and then try to alter your activities during the day to avoid long periods of time in the extreme of wrist extension and wrist flexion. Some doctors may prescribe vitamin B6 in addition to the splinting. A cortisone injection is sometimes recommended to decrease inflammation but if it is successful in relieving your symptoms, the tingling/numbness will likely return within a few months.

If nonoperative treatment is going to be successful in relieving symptoms, you will notice a decrease in your symptoms within 4 to 6 weeks. If you do not notice any relief, then it is unlikely that nonoperative treatment is going to be successful and surgical release of the carpal ligament will be recommended.

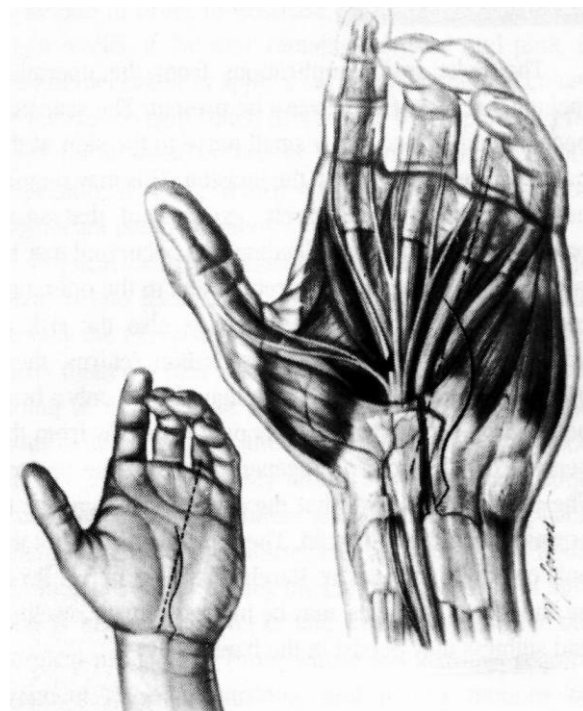
Treatment – Operative

The surgery for carpal tunnel syndrome consists of taking pressure off the median nerve by dividing the carpal ligament. If surgery is not performed the pressure on the median nerve will continue and slowly even over years, cause more numbness to your thumb, index finger, middle finger and part of the ring finger. Eventually, the muscle that allows you to lift your thumb away from your hand will become weaker. These more severe changes will take many months and probably years to develop. Therefore there is no urgency to have surgery for carpal tunnel syndrome unless you have had a trauma to your arm with a sudden onset of symptoms.

The operation to release the carpal tunnel and to decompress the median nerve involves an incision in the palm and it is usually

done as an outpatient with an anesthetic only to your arm. Some surgeons will do an endoscopic release of the ligament. This technique is associated with less early incisional pain but appears to have a higher incidence of nerve injury. After the incision is closed, a bulky dressing is placed on your arm to keep your wrist in a neutral position for 2-3 days.

As with any surgery there are risks and complication that can occur with carpal tunnel surgery. There will be a scar on your hand and in some cases this may extend into your forearm. Occasionally some patients will develop scar sensitivity or stiff swollen hands. If this occurs, you will be referred to therapy for instruction in desensitization exercises and other exercises to try to decrease the pain, sensitivity and swelling. You may have excessive bleeding that may result in a hematoma (collection of blood underneath the skin). In most cases, this will reabsorb without any treatment, but sometimes it may be necessary to aspirate or to evacuate the hematoma. There is a risk of infection. There is also the risk of injury to the median nerve or one of the surrounding nerves.



Postoperative Management

Your hand and wrist will be placed in a bulky dressing that goes from your hand to your forearm, leaving your thumb, fingers and elbow free to move. Bending and straightening your fingers will help to keep the soft tissues gliding smoothly, to decrease the swelling and to keep your joints from becoming stiff. If you are given a sling, you should only use it for comfort for the first 24 hours or you may get more stiffness to your elbow and shoulder. At your first postoperative visit, 2 to 3 days following surgery, the bulky dressing will be removed and you will be instructed in range of motion exercises for your hand, wrist, elbow and shoulder. You may now shower and wash your hands with soap and water (however, do not soak your hand in water until the stitches have been taken out). A light dressing will be placed over the stitches and you will be given a wrist splint to wear at night. During the day, we encourage you to regain your active range of motion and to use your hand for light activities, avoiding activities that require strength of your operated hand. The stitches will be removed about 2 weeks after surgery. Gentle massage of the incision region with cream will help to soften this area. In some patients however, this area may remain swollen and hard for many months. Until you have regained full range of

motion of your wrist and hand, you will likely be more comfortable and get a better night's sleep wearing the wrist splint at night (about 2-4 weeks).

In the majority of cases, patients can do the range of motion and strengthening exercises on their own. Patients, who are returning to work that requires a lot of strength or who are progressing slowly with their movement, may be sent for therapy. This will help to regain your range of motion and strength more quickly. It is anticipated that the majority of patients will regain full function of their hand within a couple of months, although the incision may remain tender for many months while the scar tissue at the incision matures.

Return of sensation to the hand will vary in the time it takes to come back. Some or all of the tingling will likely be relieved fairly soon after the surgery. If however, you have had symptoms for a very long time and had severe numbness to your fingers and weakness to your thumb muscles, these improvements will take a much longer period of time, at least 1 year. The nerve will regenerate at the rate of 1 inch per month. As the feeling comes back, you may notice more pins and needles, burning or crawling feelings to your hand and this is normal sensory nerve regeneration.

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