CARPAL TUNNEL SYNDROME

What is carpal tunnel syndrome?

Carpal tunnel syndrome (CTS) is a common condition that affects the hand, wrist and occasionally the entire upper extremity. The tunnel itself is a narrow canal at the base of the palm that is defined by the bones of the wrist and the overlying transverse carpal ligament. The canal acts as a rigid conduit through which the nine flexor tendons to the fingers and thumb, and the median nerve pass. This nerve provides sensation to the thumb, index and long fingers, as well as a portion of the ring finger. It also provides strength to the muscles at the base of the thumb. CTS is a constellation of symptoms resulting from compression or adherence of the median nerve at the base of the palm.
What are the symptoms of carpal tunnel syndrome?

Characteristic early symptoms include numbness at night, tingling or pain in the fingers (especially the thumb, index and long fingers). The patient will often awaken with these symptoms and attempt to shake the hand or hold it in a dependent position to relieve symptoms. As the problem worsens, the symptoms become more prominent during the daytime, especially while driving, brushing hair and holding the phone or a book. Patients also may begin to experience weakness and may occasionally drop objects, often without realizing they’re losing their grip until it is too late.

What causes carpal tunnel syndrome?

Carpal tunnel syndrome is a disorder that can potentially affect many patients because of the demands placed on the hands through life. The cause of CTS is multifactorial and may include the following:

- Inflammation and swelling around the tendons
- Fluid retention (e.g. during pregnancy)
- Wrist fracture and dislocation
- Degenerative and rheumatoid arthritis
- Hypothyroidism
- Diabetes
- Tumor
- Aberrant anatomy

Occupational factors that seem to contribute to the onset of CTS include repetitive finger use associated with high force, long duration, and extremes of wrist motion and vibration.

Computer keyboard use is a factor; however, it is not solely responsible for the onset of CTS.

How is carpal tunnel syndrome diagnosed?

One of the tests most frequently utilized to diagnose CTS was developed during the 1950s by Dr. George S. Phalen, retired Chief of Hand Surgery at The Cleveland Clinic. The Phalen's test (or wrist flexion test) is performed while resting the elbows on a table and allowing the wrist to fall freely forward. Individuals with CTS experience numbness and tingling in the fingers supplied by the median nerve within 60 seconds. Other diagnostic methods include:

- **Tinel’s sign** — The physician taps over the median nerve at the wrist to produce a tingling sensation in the involved digits.
- **X-rays** — These help rule out other conditions such as arthritis.
- **Electrical studies (EMGs)** — These studies are used to quantify median nerve conduction and severity of CTS.

How can carpal tunnel syndrome be prevented?

Because the cause of carpal tunnel is multifactorial, it is very difficult to prevent the development of this syndrome. Ergonomic modifications at work can help minimize some of the occupational factors, which seem to contribute to CTS. The workstation should be physically accommodating and comfortable. Proper lighting, seating, keyboard or conveyor height are all important design factors to keep in mind. The following list of preventive measures applies to factory workers and hobbyists alike:

- Keep your wrists straight when working with tools
Avoid repeatedly flexing, extending or twisting your wrist
Minimize repetitive, strong grasping or forced wrist flexion and extension
Rest your hands often
Perform conditioning exercises

How is carpal tunnel syndrome treated?
Treatment begins with job and activity modifications as outlined above. Night wrist splints can help prevent wrist hyperflexion, which naturally occurs during sleep. That may rest the nerve and lessen night awakenings, as well as improve daytime symptoms. Sometimes, anti-inflammatory medications either taken orally or injected into the carpal tunnel can help diminish swelling around the median nerve and lessen symptoms. Generally, cortisone injections provide only temporary relief.

Surgery is recommended when CTS does not respond to these conservative measures or has already become severe, as judged by physical exam and EMG tests. The goal of surgery is to decrease pressure on the nerve by enlarging the carpal canal. This is accomplished by dividing the ligament that covers the carpal tunnel at the base of the palm—the transverse carpal ligament—through an incision approximately one inch in length.

Surgery for CTS is an outpatient procedure that is usually performed under local anesthesia. Brief surgical discomfort lasts 24 to 72 hours, however patients often experience complete resolution of their nighttime symptoms even the night after surgery. Sutures are removed 10 to 14 days after surgery, and hand and wrist use for everyday activities is gradually restored using progressive exercise.

Heavier activities with the operated hand are restricted for four to six weeks. Recovery times vary depending on the patient’s age, general health, severity of CTS and the length of time the symptoms have been present. Strength and sensation continue to improve over the ensuing year.

Although the great majority of patients who undergo carpal tunnel release experience virtually complete relief of all symptoms, some individuals with severe CTS may be left with some residual numbness. Recurrences can occur, however they are highly unusual.

TRIGGER FINGER AND TRIGGER THUMB

What are trigger finger and thumb?
Trigger finger and thumb are painful conditions that cause the fingers or thumb to catch or "lock in a bent position." Rarely, the fingers are locked in a straight posture. The problems often stem from inflammation around tendons located within a protective covering (termed the tendon sheath) or from nodularity of the tendons themselves.

The affected tendons connect the muscles of the forearm to the bones in the fingers and thumb. Together, the tendons and muscles allow the patient to bend and extend the fingers and thumb, (e.g., when making a fist).

A tendon usually glides quite easily through its sheath, thanks to a lubricating membrane and fluid. Occasionally, a tendon may become
inflamed and swollen or nodular. This tendon may "catch" on thickenings in the flexor sheath known as pulleys. When this occurs, bending the finger or thumb may result in a snap or pop, which is often painful.

What are the symptoms of trigger finger and thumb?

One of the most common symptoms of trigger finger is soreness at the base of the finger or thumb. Often, the discomfort may be localized to the smaller knuckle halfway up the finger. The most striking symptom in most patients is a painful clicking or snapping when attempting to bend or extend the involved digit. In severe cases, the finger or thumb may become locked in a bent or in an extended position and must be gently straightened with the other hand. Without appropriate treatment, joint contractions and stiffness may eventually develop.

What are the causes of trigger finger and thumb?

Trigger finger and thumb may be caused by highly repetitive or forceful use of the digits. Medical conditions that cause changes in tissues, such as rheumatoid arthritis and diabetes, may also cause this problem.

Prolonged forceful grasping of power tools, for instance, aggravates the condition. Farmers, industrial workers and musicians (to name just a few) who rely on their fingers or thumbs for multiple repetitive movements are among those most frequently affected. In some cases, no clear cause or particular aggravating activity can be found.

How are trigger finger and thumb treated?

The majority of patients with this diagnosis respond to conservative medical treatment. This includes job and activity modifications and, when necessary, cortisone injection into the tendon sheath. Occasionally, nighttime splinting, to restrict motion of the joint, and anti-inflammatory pills may be helpful.

If the condition does not respond to these conservative measures or if the condition recurs, surgery may be recommended for the patient with pain and clear physical findings.

Surgery is performed on an outpatient basis under local anesthesia. The pulley at the base of the finger is cut through a one-inch incision, eliminating the constricting band and allowing the tendon to again pass freely through its sheath. After surgery, patients are encouraged to move their fingers but not overuse the hand. After 10 to 14 days, sutures are removed and activities increased although heavier activities are discouraged for several weeks.

Although hand function for most patients improves with conservative treatments or simple surgical release, some trigger finger and trigger thumb conditions require more complex surgery, particularly when joint stiffness has developed and in patients with rheumatoid arthritis.

De QUERVAIN’S DISEASE

What is de Quervain’s disease?

De Quervain's disease is an inflammation of two specific tendons to the thumb. These ten-
Dons must pass through a tight sheath or tunnel at the level of the wrist, which can result in friction and eventual pain and inflammation.

De Quervain’s disease is named after the Swiss surgeon who first described the condition in 1895 and is one of the most common types of tendon inflammation.

**What are the symptoms of de Quervain’s disease?**

Pain at the base of the thumb, the thumb side of the wrist and occasionally radiating up the forearm is typical of this condition. The pain is worsened with use, especially with attempts at deviation of the wrist and extension or deviation of the thumb.

**What causes de Quervain’s disease?**

De Quervain’s disease results from the overuse of the two tendons described above. This can occur with a variety of workplace tasks, as well as with activities such as gardening, racquet sports and lifting a baby. Inflammatory conditions, fluid retention and a direct blow to the area can all trigger the disease. Often, the cause is unknown, however women are more often affected than men.

**How is de Quervain’s disease diagnosed?**

The diagnosis is based on the patient’s history and physical examination. The tendons are extremely tender to the touch and swollen at the level of the wrist. The physical test most frequently used to diagnose de Quervain’s disease is the Finkelstein’s test. This is performed by asking the patient to make a fist with the thumb in the palm. When the wrist is suddenly bent toward the small finger side, the swollen tendons are stretched and pulled through the tight space. If this maneuver is very painful, the diagnosis is likely to be de Quervain’s disease.

**How is de Quervain’s disease treated?**

Conservative treatment involves resting the inflamed tendons. This is accomplished by job and activity modification together with splinting. In most cases, the patient will wear a splint full-time (except for showers) for approximately three weeks then use the splint for activities that cause pain for another several weeks. After this initial period of full-time splinting, stretching will be started, eventually leading to a strengthening program.

Other methods to help decrease the inflammation include icing (20 minutes, two to three times per day) and cortisone injection directly into the sheath. Sometimes, oral anti-inflammatory medication may be helpful. When these conservative treatment options are employed, most patients experience relief of symptoms.

Surgery is recommended for those patients who do not respond to these conservative medical treatments. The procedure is performed under local anesthesia. The tight compartment is cut, eliminating friction and restoring smooth gliding of the tendons. The incision required is usually two inches in length.

Following surgery, a splint is applied and sutures are removed 10 to 14 days later. Recovery times vary depending on age, general health, and duration of symptoms.