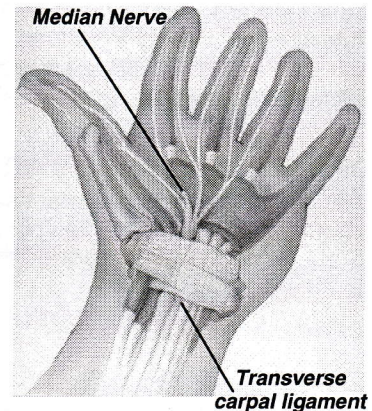


## Carpal Tunnel Syndrome

Ouch! Pins 'n' Needles! WHY?

Carpal Tunnel Syndrome (CTS) is the result of median nerve compression in a narrowed carpal tunnel<sup>2, 3, 4</sup>. It is a fairly common entrapment syndrome, seen most frequently in women between 40 and 60 years of age. Nevertheless, this incident may also occur at an earlier age<sup>3</sup>.

The median nerve originates from the forearm and passes through a tunnel before attaching itself in the hand. The structure of this 'tunnel' is formed by wrist bones at the sides and bottom while a thick fibrous tissue called the transverse carpal ligament, overlays the top of this tunnel<sup>1</sup>. This tunnel also houses nine other tendons that connect muscles to bones, and bend the fingers and thumb<sup>1</sup>. These tendons are enveloped by the synovium membrane, which may enlarge and swell under certain circumstances<sup>1</sup>.



### Symptoms of CTS:

- Nocturnal pain & numbness, & burning sensation
- Weakness & Clumsiness in holding small objects
- Paresthesia over median nerve distribution in the hand

Increased pressure in the carpal tunnel can be a result of repetitive movements; wear and tear; trauma or fracture resulting in acute inflammation and swelling; arthritis; diabetes; and hypothyroidism, which will eventually lead to the occurrence of carpal tunnel syndrome<sup>3, 5, 6</sup>. It can also occur during pregnancy!<sup>6</sup>


### Investigations

A positive Tinel sign at the wrist and a Phalen sign, often indicate CTS<sup>2</sup>. Early CTS can also be recognised by an electrodiagnostic test i.e. nerve conduction study<sup>3, 5</sup>. A delayed median nerve conduction time diagnoses this syndrome<sup>3</sup>.

**Tinel's Test:** light percussion of the median nerve at the wrist.



 A positive Tinel's sign: tingling & paresthesia over the median nerve distribution<sup>3</sup>.

**Phalen's Test:** performed with patient's arms upheld vertically & wrists dropped into flexion, fingers & thumbs extended for 60 seconds.

 A positive Phalen's sign: Numbness & paresthesia in the median nerve distribution within 60 seconds of sustained flexion<sup>3</sup>.

### Treatment Options

Patients with CTS respond to conservative measures of treatment<sup>3</sup>. Relief from symptoms of CTS varies from patient to patient depending on the cause and also response to treatment<sup>5</sup>. Carpal tunnel syndrome can be treated if it is detected early. It is important that patients comply with the treatment regime and modify their activities in order to shorten recovery time and prevent further injury. Treatment options may include one or a few of the followings in combination:

<u>Medication</u>	<u>Cold Therapy</u>	<u>Splinting</u>
<p>Anti-inflammatory medication may be prescribed to relief pain and other medication to aid the healing of the median nerve. In some cases, Vitamin B<sub>6</sub> also has been helpful in treating CTS<sup>2, 3</sup>. These medications, however, are to be taken as recommended by the physicians.</p>	<p>Application of cold therapy to the wrist can help to reduce pain and inflamed tendons<sup>4</sup>. One should apply cold therapy as many times as possible in a day. Each session should last approximately 20 minutes.</p>  <p>Alternative to conventional ice packs- Cold Hot Pack</p>	<p>It is necessary to immobilize painful joints during the acute inflammatory phase<sup>2, 3, 4</sup>. This is to allow proper rest and also support so that the patient can resume their activities as independent as possible. The wrist is positioned in a neutral position.</p>  <p>Prefabricated wrist supports &amp; custom made wrist splints</p>

### Surgical Intervention

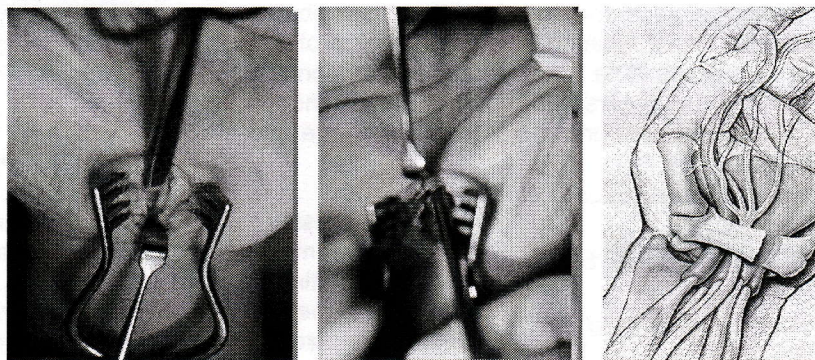
If conservative methods do not provide relief, it may be necessary to release the transverse carpal ligament through surgery<sup>2,3</sup>. Indications for surgery include long term persistence of nerve symptoms, thenar atrophy, steroid injections with relief lasting only a few weeks, positive electrodiagnostic tests results, and impaired function in daily activities<sup>3</sup>.

**Joint Protection Techniques & Activity Modification:**

- ① Avoid prolonged positions of the wrists & hands
- ① Use the larger joints of your upper limb to carry weights (e.g. shoulder, elbow, palm of hand)
- ① Proper time management to pace oneself in between of activities

### Open carpal tunnel release

This is one of the most prevalent surgical procedure, which is, making an incision to the transverse carpal ligament in front of the median nerve<sup>3,4</sup>.



Step by step Procedure (fr. L to R): Incision at the thumb crease, thick ligamentous tissue is released; carpal tunnel release completed

### Endoscopic Surgery

A new variation of the surgical procedure of CTS to relieve compression on the median nerve, is the endoscopic carpal tunnel surgery<sup>2,3</sup>. In this procedure, one or two incisions are made on the palm of the hand. A scope and other surgical tools are inserted under the transverse carpal ligament<sup>4</sup>.

Symptoms	Treatment Protocol
<b>Mild to Moderate Symptoms</b>	<ul style="list-style-type: none"> <li>⊙ Anti-inflammatory medication</li> <li>⊙ Cold therapy using cold packs or icing</li> <li>⊙ Wrist splint to be worn 24 hours a day until symptoms subside</li> <li>⊙ Ultrasound therapy</li> <li>⊙ Patient Education : Activity Modification Joint Protection Techniques</li> </ul>
<b>Severe Symptoms</b> - when pain is recurrent or persisting; induced by blunt trauma	Surgery : Open carpal tunnel release Endoscopic release

Table 1 Summary of treatment protocol for Carpal tunnel syndrome

### Prognosis

Soon after patients who have undergone surgery, it is important that they follow up with their doctor regularly. They may need to undergo a course in rehabilitation in order to maximize the range of motion and strength<sup>2,3</sup>. Most patients' symptoms will improve with appropriate treatment.

### Reference:

1. Carpal Tunnel Syndrome (1995). American Academy of Orthopaedic Surgeons.
2. Brotzman, S.B. (1996). Clinical Orthopaedic Rehabilitation. Mosby. pp. 35-37.
3. Hunter, J.M; Mackin, E. J.; Callahan, A. D. (1995). Rehabilitation of the Hand: Surgery and Therapy (4<sup>th</sup> Edition). Mosby. pp 628-630, 909-912.
4. McCarroll, H.R. (1999). Carpal Tunnel Syndrome: Relieving the Pressure in Your Wrist. Staywell.
5. Pedretti, L.W. (1996). Occupational Therapy: Practice Skills for Physical Dysfunction (4<sup>th</sup> Edition). Mosby. pp 680-683.
6. Rouzier, P. (1999) The Sports Medicine Patient Advisor. Sports Medicine Press.

