# 5Nerve Compression Syndromes

*Authored by A/Prof Lim Beng Hai*

The hand is a unique organ of the human body. It is made up of bones, joints, ligaments, tendons, muscles, nerves, skin, and blood vessels. It has many functions including the mechanical functions of grasp, hook grip, and pinch, as well as dynamic fine manipulate our environment, employing the finest of motor skills. The hand can actively and accurately move furthest away from the body. In addition, the hands are eyes for the blind serving as a powerful communication tool. They further serve as a key means of expression.

Due to these very unique capabilities, the hand is in constant contact during every-day use with the environment – be it benign or hostile. It is therefore not surprising that hand injuries naturally become a common phenomenon in a person's lifetime.

**Nerve Compression Syndromes**

Nerve(s) can be compressed in many parts of the body. This results in a feeling of pins and needles in the area that is supplied by the nerve. The most common nerve compression syndrome is carpal tunnel syndrome. Another nerve that is commonly compressed is the ulnar nerve at the elbow. This results in the loss of sensation over the pinky and ring fingers.

**What is Carpal Tunnel Syndrome (CTS)?**

Carpal Tunnel Syndrome is a chronic painful condition of the wrist area. The main cause of the condition is thought to be due to swelling of wrist tendon linings resulting in overcrowding of the carpal tunnel. The nerve is the most vulnerable structure and is not able to function normally when it is squeezed. Other conditions that can cause the median nerve to be squeezed at the carpal tunnel area, or make the nerve more vulnerable to carpal tunnel syndrome, are a tumor in the carpal tunnel canal, diabetes mellitus, hypothyroidism, menopause, pregnancy, renal failure, Raynaud's Disease (a condition that the blood vessels in the hand and feet overreact to cold temperatures or stress), a repetitive strain injuries and Double Crush Syndrome Osterman (where certain medical conditions like hypothyroidism or compression of a nerve at one area makes the same nerve more vulnerable to compression at another site).

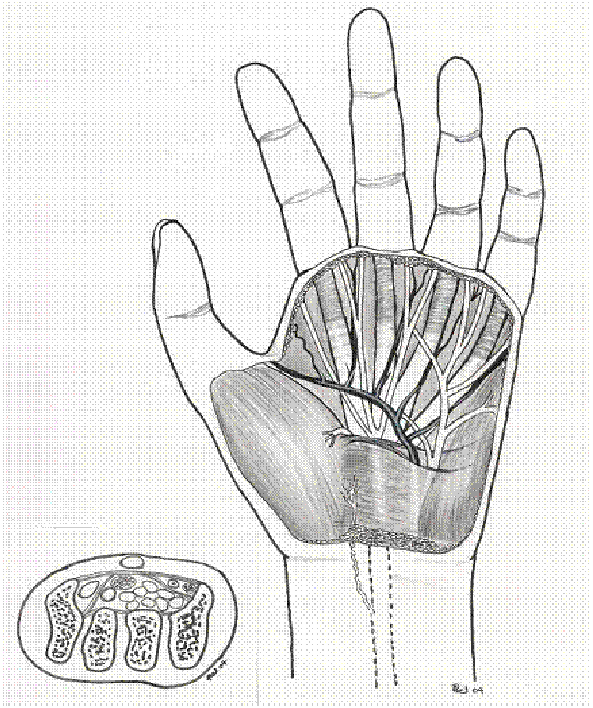


Figure showing the median nerve (dotted lines) deep to the carpal tunnel ligament

## What are the Signs and Symptoms?

Patients usually experience a sensation of 'pins and needles' or numbness at the fingertips, particularly to the thumb, index, and middle finger. There may be associated tightness at the wrist area. In more severe cases, patients may have more pronounced numbness (decreased sensation) and pain. Repetitive activities of the wrist, such as computer typing, driving, reading the newspaper, holding the telephone receiver and using eating utensils can sometimes bring on these sensations. Night symptoms can disturb the patient's sleep. Clumsiness of the hands, such as dropping cups, difficulty in buttoning, and weakness in pinch and grip activities are seen in more severe cases.

## Diagnosis

An accurate medical history and clinical examination are usually sufficient to make the diagnosis. X-rays may be considered if a bone problem is thought to be a possible cause. Nerve conduction studies, either alone, or with electromyography (EMG), may be necessary in severe cases, or when there is suspicion that there is more than one area of the nerve that is being squeezed.

## What are the Treatment Options?

Conservative treatment usually involves taking anti inflammatory medication, nerve vitamins, splinting and physio-therapy.

There are three surgical options available - the Traditional Open Carpal Tunnel Release procedure, the Endoscopic Carpal Tunnel Release, and the Limited Open Carpal Tunnel (LOCTR) release using special instrumentation. A brief discussion of each follows.

In the Traditional Open Carpal Tunnel Release, the skin incision is made over the transverse carpal ligament to allow access to the ligament to divide it. This generally requires a bigger scar, as opposed to the endoscopic or the LOCTR techniques.

In the Agee Endoscopic Technique, the incision is made at the wrist crease line and then the endoscopic blade is tunneled into the carpal tunnel canal. The blade is then deployed under endoscopic guidance. The transverse ligament is divided by withdrawing the deployed blade through the transverse carpal ligament.

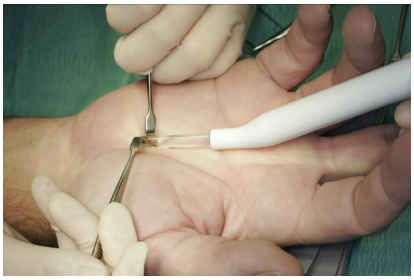
The Limited Open (LOCTR) procedure involves making a small skin incision at the palm area and identifying the transverse carpal ligament which is compressing on the median nerve. A special instrument is used to divide the ligament and the carpal tunnel canal is inspected to ensure complete release. The skin is usually closed with absorbable sutures.

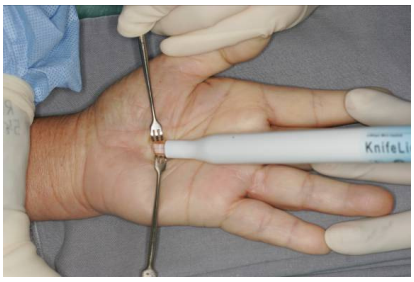
Post-operative care is relatively simple. Most patients will be able to start using their hand for activities of daily living the next day. The wound typically heals by 10 days post-surgery.

Heavier activities, like gripping, can usually be done at about two to three weeks post-surgery. One should expect mild pain to accompany activities during the first few post-operative days. Pillar pain, persistent pain at the palm of the hand, is seen in 20% of the patients and this resolves with time.

While the minimally invasive techniques in carpal tunnel surgery (endoscopic and LOCTR) have advantages over open release of reduced tissue trauma and postoperative morbidity, a study done by doctors in Hong Kong showed that the LOCTR over the endoscopic techniques is easier to perform, safer and has comparable results.

Making a small skin crease incision and identifying the transverse carpal ligament

 Insertion of the special knife to divide the ligament

 Division of the ligament

 Inspection of the carpal tunnel canal and its contents

**About the author**

Dr. Beng-Hai Lim obtained his basic medical degree from the National University of Singapore (NUS) in 1985. He obtained his Master of Medicine (Surgery) Singapore and the Fellow Royal College of Surgeons (Edinburgh) in 1990. He was accredited as a Specialist in Hand Surgery in 1998.

Dr. Lim has served as a Consultant Hand Surgeon at Singapore General Hospital and as Chief of the Department of Hand and Reconstructive Microsurgery at NUS. Currently he is an Adjunct Associate Professor in the Department of Orthopaedic Surgery with NUS and Director & Senior Consultant Hand Surgeon, Centre for Hand and Reconstructive MicroSurgery (CHARMS) at Mount Elizabeth Medical Centre. He is also the Chairman for the Chapter of Hand Surgeons, College of Surgeons, Singapore as well as a committee member in the Specialist Training Committee (Hand Surgery) for Singapore.