A Deep Tissue Laser Therapy Approach for Carpel Tunnel Syndrome

By Perry Nickelston, DC, FMS, SFMA

Carpal tunnel syndrome is often a difficult condition to treat due to overlooked dysfunction of the kinetic movement chain. It is frequently misdiagnosed and blamed as the culprit for other contributing proximal nerve entrapments, aka "double crush syndrome." In double crush, the body is afflicted with two entrapments in the nerve chain, and determining which one is the primary source is of critical importance in long-term treatment.

Invasive carpal tunnel surgeries are often unsuccessful because these other nerve entrapments are left unresolved. Treating the entire nerve path and movement system from the core out will make significant changes in helping the condition. A combination of conservative therapies using chiropractic, soft-tissue strategies, laser therapy and corrective exercise should be used in an attempt to avoid surgery. And if surgery was already performed, these protocols can still be used to help improve movement efficiency, reducing the likelihood of recurrence.

Symptoms and Etiology

Carpal tunnel syndrome is a condition in which there is pressure on the median nerve, which can lead to numbness, tingling, weakness or muscle damage in the hand and fingers. The median nerve provides feeling and movement to the "thumb side" of the hand (the palm, thumb, index finger, middle finger and thumb side of the ring finger). The tunnel is very sensitive to swelling, irritation and compression from repetitive microtraumatic movements.

Carpal tunnel syndrome is often used as a generic term, similar to the sciatica condition people suffer from with pain down the posterior leg. Many areas can contribute to a compressed sciatic nerve down the leg (lumbar, piriformis, sacroiliac) and a generic term is used as a diagnosis; sciatica. The same is true for carpal tunnel: Nerve compression from multiple places in the arm can cause hand pain. So, the lesson is, don’t be too quick to diagnose and focus on the carpal tunnel. Focus everywhere.

The syndrome is common in people who perform repetitive motions of the hand and wrist. Typing on a computer keyboard, texting and gaming are probably the most common cause of carpal tunnel today. Other
common causes include driving, painting, playing certain musical instruments, playing sports such as racquetball or handball, using tools (especially hand tools or tools that vibrate), and writing. A detailed history is critical to understand the mechanism of action in a patient’s life that may be contributing to the symptoms. Always ask why.

The condition occurs most often in people 30 to 60 years old, and is more common in women than men. There are a number of medical problems / complications associated with carpal tunnel syndrome that must be ruled out based on a patient’s history, examination and intake forms. Common serious contributors are alcoholism, diabetes, arthritis, hypothyroidism, infections, obesity, pregnancy, systemic lupus erythematosus (SLE) and scleroderma.

Other symptoms of carpal tunnel syndrome beyond tingling and numbness can be numerous, including clumsiness of the hand when gripping objects, pain radiating to the elbow, problems with fine finger movements, thenar atrophy, and weakness of grip causing an overcompensation up the chain, leading to shoulder pain and rotator-cuff trigger points.

Examination of nerve conduction studies and X-rays are the most common diagnostic methods when evaluating CTS. MRI evaluations are often done to rule out an underlying pathology or if traditional therapies are unsuccessful in resolving the pain. X-rays of the cervical spine should be part of the process to evaluate mechanical function of the vertebrae and possible arthritis contribution.

The body will take the path of least resistance to accomplish a task and do whatever it must for environmental adaptation. If pain is on board and grip is compromised, the brain will inherently make other areas of the body work more in an attempt to restore balance. Patients may start complaining of symptoms on the other hand or pain farther up the body, most often in the neck itself. Jaw clenching and breath holding are very common stability compensations for the body in reaction to pain.

**Examination / Assessment**

During your examination, focus in on key areas of movement dysfunction and altered kinetic-chain patterns. Cervical and thoracic spine ranges of motion are critical to upper extremity function. The body craves proximal stability for optimal distal mobility. If thoracic spine extension or rotation is compromised, the scapulae will lose stability, causing energy transfer from the shoulder to the elbow, wrist and hand. The lack of thoracic spine extension causes anterior shoulder rotation from poor posture mechanics with facilitation
of the pectoralis minor muscle. This tightness may compress the brachial plexus nerve bundle as part of the double crush syndrome mentioned earlier. There will be adaptation to this lack of stability, with increased fascial tissue restrictions in the "functional arm lines" of fascial chains. The sticking and glueing of fascia promote energy leaks through the joints and ligaments, leading to repetitive-motion swelling and inflammation.

Lack of proximal core strength in the transverse abdominis, psoas and quadratus lumborum will also compromise function and power exertion in the upper extremity. Always evaluate the diaphragm for proper function and altered breathing patterns in carpal tunnel cases. Chest breathers rely too much on the scalenes for breathing patterns, contributing to possible nerve entrapment in a condition known as TOS (thoracic outlet syndrome). Restorative breathing by coaching diaphragmatic breathing and manual release of the diaphragm are big players in helping carpal tunnel. The average person takes 25,000 breaths a day. Imagine how much overload that is to the accessory scalene muscles. No wonder they are always tight.

**Laser Therapy and Other Pivotal Treatment Tools**

So, where does laser fit into the program? You will find laser therapy to be a crucial player in treating carpal tunnel syndrome. Don’t just treat the symptomatic carpal tunnel region; also apply the photonic healing energy of laser light to specific fascial restrictions and nerve irritation points. Laser may be used in conjunction with ultrasound or electrical muscle stimulation.

What makes laser so special? Laser therapy aims to photobiostimulate chemically damaged cells via specific wavelengths of light. When cells are chemically damaged, they stimulate the chemical pain cycle. Laser excites the kinetic energy within cells by transmitting healing stimuli known as photons. The skin absorbs these photons via a photochemical effect, not photothermal; therefore, it does not cause heat damage to the tissues.

Once photons reach the cells of the body, they promote a cascade of cellular activities. Laser therapy light can ignite the production of enzymes, stimulate mitochondria, increase vasodilation and lymphatic drainage, promote ATP synthesis, and elevate collagen formation substances to prevent the formation of scar tissues.

Proper dosage and application of photonic laser therapy (Joules) is critical to success. Dosage is determined by Joules per cm² and tissue depth. Too little or too much laser photonic energy produces suboptimal results. According to the World Association of Laser Therapy (WALT), current recommended dosage
standards for optimal effects are 4-6 J/cm² for superficial structures, 6-8 J/cm² for intermediate, and 8-10 J/cm² for deep tissue. Taking into account the tissue structures you will be treating for carpal tunnel helps determine the optimal dosage parameters. A typical laser therapy treatment program for carpal tunnel might include the following:

- Start laser therapy from proximal to distal, stimulating the nerve roots associated with the upper extremity.
- Cervical spine 1,000J (deep structure, including scalenes and nerve roots).
- Pectoralis 1,000J (working trigger points and the anterior fascial arm line).
- Thoracic spine and scapulae 2,000J (infraspinatus and rhomboid region, and posterior fascial arm line).
- If indicated, laser the diaphragm restriction at 2,000J; include the thoracolumbar fascia, as it’s the bridge of the posterior oblique sling subsystem of movement from opposite hip to shoulder.
- Trace the nerve path down the arm for median nerve; 1,000J.
- Carpal tunnel and palmar aspect of hand, 1,000J.

Average laser therapy protocols are 6-10 total sessions, depending on the stage of the condition, prior intervention, and patient activities of daily living that may be causing recurrence. Combine laser therapy with your other treatment interventions (mobilization, therapeutic modalities and corrective exercise). Use elastic therapeutic tape to lock in stability and proprioception of body awareness. Decompression-style taping on the carpal tunnel and postural tape application will help relieve nerve tension.

Treat the site of pain, but also the underlying source of movement dysfunction. Chronic soft-tissue dysfunction develops over time due to our poor postures and habits. Movement becomes habit, which becomes posture, which becomes structure. Combining movement-based corrective exercise and deep-tissue laser therapy can play a significant role in preventing future dysfunction for CTS sufferers.

Resources


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