CARPAL TUNNEL SYNDROME

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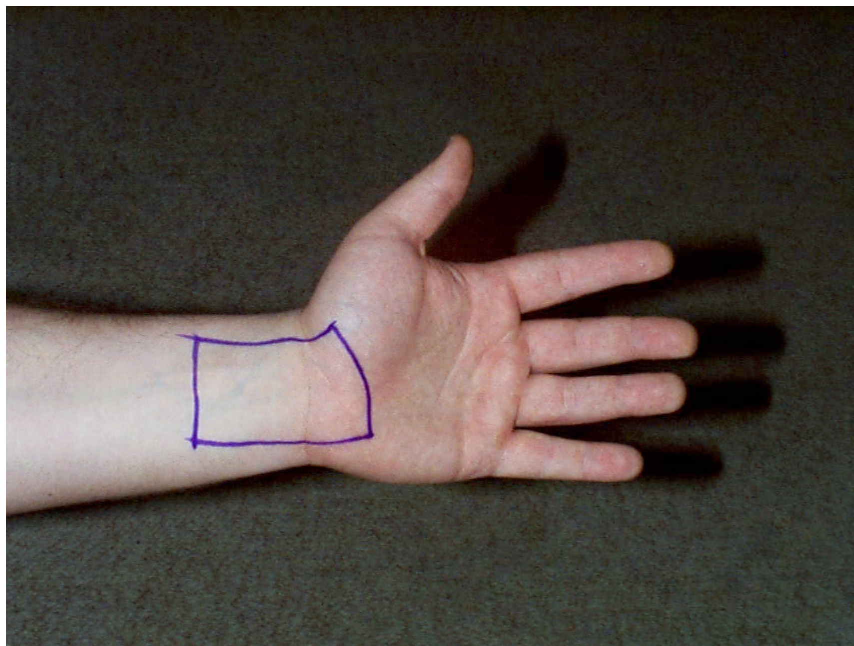
The ***median nerve*** and the long flexor tendons traverse the wrist through an arch formed by the carpal bones and the ***transverse carpal ligament***, which spans the arch. The structure thus formed is called the ***carpal tunnel***. Compression of the median nerve or its blood supply may occur within this inelastic tunnel from fibrosis (***adhesion formation***) of the flexor tendon sheaths, edema following a Colle's or Smith's fracture, a dislocated carpal bone, tumor formation within the tunnel, rheumatoid arthritis in associated joints, or swelling produced by synovitis or tenosynovitis of the finger flexor tendons or sheathes within the tunnel. Should ***compression*** of the median nerve actually occur, a common form of ***neuropathy*** might result which produces symptomatology collectively called the ***carpal tunnel syndrome***. ***Motor weakness*** of the abductor pollicis brevis, opponens pollicis, flexor pollicis brevis, and the first and second lumbricales may result, as may ***numbness***, ***burning***, and ***tingling*** in the first three digits. ***Cyanosis*** of the first three digits is a frequent symptom.

Symptoms of the ***carpal tunnel syndrome*** are noted to have the unusual trait of ***ascending*** the arm, thus imitating the ***cervical dorsal outlet*** or ***radiculitis*** syndromes. Symptoms most frequently occur or intensify at night or in the early morning, often waking the sufferer from sleep. Victims of this syndrome frequently complain of being "***clumsy***" with the involved hand and being prone to drop things.



The DSR zone associated with the Carpal Tunnel Syndrome

Objective evidence of ***carpal tunnel syndrome*** includes (1) ***loss*** of temperature, light touch and position sensations in the involved hand and fingers, (2) ***insensitivity*** to pinprick in the index and middle finger, (3) increased ***paresthesia*** or numbness of the index and middle fingers when the wrist is forcefully sustained in flexion or extension, (4) increased paresthesia or numbness of the index and middle fingers when manual compression is applied to the radial and ulnar arteries at the wrist, and (5) ***slowing*** of nerve conduction velocity distal to the wrist. If muscle ***atrophy*** in the hand is apparent (denoting severe or prolonged involvement), it is usually of the ***abductor pollicis brevis***.

The ***carpal tunnel syndrome*** is generally a unilateral phenomenon, occupationally linked to jobs that require repetitive motion of the hands and wrists, and is specifically associated with repeated wrist dorsiflexion and simultaneous contraction of finger flexors. Victims commonly include ***butchers***, assembly workers, and ***hand-workers*** in the sewing and knitting industry. The largest group of both unilateral and bilateral victims is computer ***keyboard operators***, who allow their wrists to rest on the table, or supporting surface, while utilizing a mouse (or trackball) or typing for extended periods of time.

The ***carpal tunnel syndrome*** occurs most frequently among ***women***.

Treatment

Most ***carpal tunnel syndrome*** symptoms are produced from pressure resulting from ***swelling*** associated with inflammation of the tendons or tendon sheaths as they pass through the ***carpal tunnel*** (as demonstrated by differential skin resistance survey). That being the case, clinical efforts should be directed at ***reducing*** the inflammation process and the consequent swelling. Additionally, ***adhesions*** (fibrosis), produced as a result of the soft tissues being subjected to prolonged exposure to ***prostaglandins***, must be eliminated through ***soft tissue manipulation***, for a complete and rapid elimination of the ***carpal tunnel syndrome***.

Treatment Steps:

- ***Electrical stimulation*** of the involved ***carpal tunnel***, with the electrical stimulation unit set to deliver a medium frequency current with a duty cycle of 10-seconds on and 10-seconds off. The ***negative electrode*** should be placed over the ***carpal tunnel***, the positive over the wrist extensor muscles. The amplitude should be sufficient to produce a visible, near ***tetanic contraction*** of the forearm muscles. Electrical stimulation should continue for a ***15-minute period***. This procedure is designed to soften the adhesions (collagen fibrils) in preparation for the next step.

- ***Soft tissue manipulation*** of the ***carpal tunnel***, to eliminate any adhesions that may be present.

- ***Phonophoresis*** (ultra high frequency sound used to push in a chemical) of the ***carpal tunnel***, utilizing an effective ***topical anti-inflammatory*** (topical ibuprofen is favorite)

as the coupling agent, with the ultrasound unit set to deliver a ***1 Mhz, pulsed waveform***, at ***1.5 W/cm²***, for six minutes.

- ***Electrical stimulation*** of the ***carpal tunnel*** with the electrical stimulation unit preset to deliver a ***7 Hz***, wide-pulsed galvanic current, for ***20 minutes***. The ***positive electrode*** should be placed over the ***carpal tunnel***, and the negative electrode over the wrist extensor muscles. The amplitude should be strong enough to produce visible ***rhythmic contractions***. This serves to help ***decrease*** swelling in the carpal tunnel as well as increase capillary circulation in the forearm.

In most cases, this treatment provides almost immediate relief of the ***carpal tunnel syndrome***, usually requiring only ***one or two sessions*** for full resolution, if the previous sufferer is able to ***avoid*** the causes of the problem. If the ***carpal tunnel syndrome*** is caused by activities that require prolonged wrist dorsiflexion and simultaneous finger flexion (gripping), and is not caused by space-occupying lesions or masses, the subject is best served by having the wrist ***soft-splinted*** in the neutral ranges, with a wrist ***soft-wrap*** that permits free finger function but limits extreme wrist motion (a ***neoprene universal wrist wrap*** is highly recommended). ***Hard splinting*** of the type that supports the wrist on the palmar surface with a "***metal spoon***" or other platform should be ***avoided***. This type of splint may direct ***constant pressure*** into the ***carpal tunnel*** as the subject unconsciously fights the support to perform finger function, thereby ***compounding*** the problem.

If the ***carpal tunnel syndrome*** was caused by having the wrist on the table while typing on a computer board or using the mouse, the subject should be given the instruction: "***Do not keep the wrists on the table while performing computer functions.***" A quick solution is to place the keyboard on the edge of the supporting surface so that the wrists ***can't*** touch the table; alternatively, the forearm can be supported by a ***gel-pad*** proximal to the ***carpal tunnel*** (the same applies to "***mouse work***").

Trigger Points:

The ***following trigger point formations*** with their referred pain patterns may, singly or in combination, imitate or contribute to the pain associated with the ***carpal tunnel syndrome***: Scalenus, Infraspinatus, Latissimus dorsi (upper portion), Serratus posterior superior, Serratus anterior, Subclavius, Subscapularis, Pectoralis major (sternal portion), Pectoralis minor, Medial triceps (deep fibers), Brachialis, Middle finger extensor, Palmaris longus, Flexor carpi radialis, Flexor carpi ulnaris, Brachioradialis, Pronator teres, Flexor digitorum sublimis (radial head), Flexor digitorum sublimis (humeral head), Flexor pollicis longus, Opponens pollicis, Adductor pollicis, and First dorsal interosseus.

[See TRIGGER POINT REFERRED PAIN]

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