Myofascial release of carpal tunnel syndrome

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Current treatment for carpal tunnel syndrome may be ineffective or associated with complications or recurrence. In the case reported here, a myofascial release by the physician combined with the patient's self-stretch reduced pain and numbness and improved electromyographic results. The manipulative approach releases the transverse carpal ligament, and "opens" or dilates the canal. The patient stretches the wrist, digits, and thumb, including myofascial components. An aggressive, conservative approach lessens the need for surgery in mild to moderate cases. Studies with magnetic resonance imaging may be helpful to document canal size before and after treatment.

(Key words: Carpal tunnel syndrome, myofascial release, manipulation)

The current treatment for carpal tunnel syndrome is often time consuming and cumbersome, involving orthoses, anti-inflammatory medication, local steroid injection, or surgery. Clinical experience reveals a significant lack of response to conservative treatment and patient unwillingness to receive injection. Surgery, even though considered the definitive treatment, is associated with some degree of complication and possible recurrence.1,2

This case demonstrates an alternative, adjunctive form of treatment for carpal tunnel syndrome. A vigorous, direct myofascial release technique is described. It is administered by the physician and continued to some degree by the patient as a modified self-stretching maneuver.

Report of case

A 47-year-old female computer operator was first seen on June 27, 1991, because of burning pain and numbness, of recent onset, involving digits 1 through 4 of the right hand. Phalen's test yielded positive results, and there was a 50% sensory loss to pinprick in digit 1. Carpal tunnel syndrome was diagnosed by a physiatrist (the author) and a referring rheumatologist. Electromyography revealed prolongation of the right median distal motor latency (4.0 ms). Palmar stimulation produced a response of 17 mV, with a 71% decrement in amplitude on proximal stimulation (5 mV). The median distal sensory latency was 3.6 ms, with a 50 μV amplitude.

The patient had been using a wrist orthosis for tendinitis and forearm muscle strain, as well as anti-inflammatory medication and physical medicine modalities. While prior treatment was maintained, a form of soft tissue release was introduced. The addition of this manipulation was combined with self-stretch of the carpal canal (ligament and associated myofascial structures). The patient underwent manipulation on two occasions and was stretching several times daily. By August 15, she no longer experienced burning pain or numbness, and the distal motor latency, determined on that date, was 3.2 ms, with an increase in amplitude to 8 mV (15 mV distally on palmar stimulation). The distal sensory latency had decreased to 3.2 ms with an increase in amplitude to 100 μV.

Management

The treatment involves a physician-applied manipulative procedure and a patient's self-
stretch. The manipulative procedure uses a three-phase approach:

1. “Opening” of the carpal canal with stretching and release of the transverse carpal ligament, to increase the space within the canal and thereby decrease the pressure on the median nerve. Pressure is applied centrally from the dorsal surface of the carpal bones simultaneously with pressure applied from the ventral edges of the carpal bones (Figure 1, top frame). This is a three-point opposing-pressure system approach. It has the effect of reversing the natural tendency of the “working” posture to “flex” the canal and decrease or narrow the carpal space. In effect, the canal is “extended” and opened up. Additionally, the thumbs pressing on the edges of the wrist bones slide further medially and laterally away from the center of the canal, essentially “stripping” the myofascial tissue back and enhancing the stretch or release.

2. Release of the true myofascial component of the carpal canal, the attachment of the abductor pollicis brevis muscle. One of the operator’s treating hands “catches” the patient’s thumb and pulls it back into hyperextension, with abduction, while simultaneously performing the stretch and release previously de-
scribed (Figure 1, top frame).

3. Indirect stretch of the carpal canal distally, with distension/dilation of the canal internally. The digits and wrist of the patient's involved hand are hyperextended simultaneously with the stretch and release in the first two steps (Figure 1, bottom frame). This hyperextension indirectly stretches the fascia and ligamentous structures over the canal ventrally and especially distally. In addition, the flexor tendons are pulled through the canal so that the more proximal, slightly thicker portion of the tendons (and musculotendinous regions) are actually pulled into the canal and begin to distend the canal from the inside out (Figure 2).

The patient's self-stretch involves two components:

1. The carpal component (Figure 3). The wrist and digits are simultaneously hyperextended.

2. The thenar/myofascial component (Figure 4). The thumb is simultaneously hyperextended and hyperabducted.

Both self-stretches could be performed simultaneously, by supporting the extended digits against some object such as a door frame or wall, which would free the other hand to stretch the thumb.

Discussion

The median nerve passes between the strong transverse carpal ligament and flexor tendons, ventral to the two rigid rows of carpal bones. Swelling of the tendon sheaths, trauma, repetitive motion, overuse, and vibration are among the more common causes of damage to the nerve. It is generally accepted that anything leading to decreased space within the carpal canal could compress the median nerve and thereby produce carpal tunnel syndrome. What is not so
widely acknowledged is the potential distensibility of the transverse carpal ligament\textsuperscript{6-8} or the thenar myofascial attachment (Figure 2) to the ligament.\textsuperscript{9} The manipulative approach to the ligament decompresses the carpal canal without surgical section. The thenar attachment is used as a fulcrum to assist in stretching the ligament and “opening” the canal.

Although generally considered strong or tough structures, ligaments have some flexibility and pliancy.\textsuperscript{10} Hollinshead\textsuperscript{8} noted that ligaments did not allow much stretch, and Goodgold commented that considerable force is needed to stretch the transverse carpal ligament.\textsuperscript{6} Nevertheless, these studies reflect that there is potential for at least slight release of this structure to relieve the pressure within the canal. This potential would be particularly important in carpal tunnel syndrome cases where the ligament is thickened, as some authors\textsuperscript{5,11,12} have noted.

Computed tomographic scan analysis of the cross-sectional area through the canal has demonstrated that it increases after surgical treatment, thereby correlating with clinical improvement.\textsuperscript{13} Others have assessed the canal by magnetic resonance imaging, including volume measurements, to correlate improvement.\textsuperscript{14} The decrease in size of the canal has been correlated with increased pressure\textsuperscript{15}; others have noted an “imbalance” between the size of the canal and the volume of its contents, thus implying such a pressure effect.\textsuperscript{7} Johnson\textsuperscript{16} has observed that the greater the “squareness” of the wrist, the greater the likelihood that carpal tunnel syndrome will develop. The increase in square shape probably creates a decrease in size of the canal and thus increases the pressure.

Wrist and digit position appears to be significant in relation to the pressure generated within the carpal canal.\textsuperscript{17,18} Extremes of flexion or extension increase pressure. However, R. Werner, MD, has noted that hyperextension of the digits generates the highest pressures (written communication, November 7, 1991). The reason may be the distal movement of the flexor tendons (up to 1.5 cm) into the canal, where the more proximal, thicker portion is literally “stuffed” into a narrow space.

Such an effect could be used to advantage to help dilate the canal, from inside out, as with a bougie.

Most persons actively using their upper extremities for repetitive motion are constantly flexing or “cupping” the wrist and carpal canal region, leading to a progressive decrease in the carpal space with adaptive foreshortening of the carpal ligament. This process leads to a decrease in the canal volume and increased pressure, allowed to progress because most persons do not stretch the wrist or hand into extension to counteract or reverse this phenomenon.

In the case reported here, carpal tunnel syndrome developed while the patient was undergoing treatment for tendinitis and strain. An orthosis, medication, and physical modalities were ineffective. Other mechanisms as described in the preceding paragraphs must have been involved. It is particularly relevant in that the patient continued her regular job, which involved 6 to 8 hours per day working at a keyboard, involving persistent wrist and digit flexion. When those mechanisms were addressed, with the myofascial release and stretch, she responded very rapidly. This response, in itself, lends credence to the theory proposed and the usefulness of the treatment.

This case is but one example of the author’s use of a form of myofascial release manipulation to treat carpal tunnel syndrome. Several patients have been treated similarly over the past 2 years during the development and refinement of the procedure. However, this case is most representative of the final multiphase approach, and involves documentation with limited nerve conduction studies before and after treatment.

Comment
Myofascial release of carpal tunnel syndrome should be considered a treatment of choice for mild to moderately severe cases. However, advanced cases, particularly those with evidence of denervation and atrophy, may still require surgical release to avoid additional or permanent nerve damage. Assessment of the carpal canal by magnetic resonance imaging before and after treatment could further document...
the effectiveness of this technique by demonstrating an increase in canal size and greater space for the median nerve. Ideally, more specific electrophysiologic and clinical criteria will also be developed to help categorize the degree of involvement and thereby direct the clinician to the optimal treatment regimen.

References