Clinical Integration of Osteopathic Manipulative Medicine

Family Medicine – Carpal Tunnel Syndrome

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Intro: Carpal tunnel syndrome (CTS) is a common disorder. The estimated prevalence is 1-5% and it is more prevalent in women than men in a ratio of 3 to 1.1,2,3 It is known to have a significant cost on healthcare in terms of both dollars and productivity.4,5,6 The clinical course tends to follow a pattern of remission and exacerbation7 causing patients to be looking for a variety of solutions over time. While conservative therapies are effective in an estimated 80% of patients, the symptoms recur in 80% of that group after 1 year. 8 After failure of conventional therapy, the most common course includes local anesthetics and corticosteroid injections.9 If these prove ineffective, the next step is to look at surgical options. An option that is frequently overlooked in these cases is osteopathic manipulative therapy (OMT).

Differential diagnosis:

CTS is a clinical diagnosis, with the most important symptoms being nocturnal pain or paresthesia in the distribution of the median nerve. It is often described as burning pain, numbness, and paresthesia in the hands, however symptoms can radiate to the entire hand, forearm, elbow and shoulder. CTS is due to changes in the anatomy of the carpal tunnel leading to increased pressure and compression of the median nerve.

- The risk factors and causes of CTS can be grouped in three categories, anatomic, occupational and systemic:
  - Anatomic
    - Lunate dislocation or ganglion cyst occupying space in the tunnel
    - Smaller cross sectional area of the proximal carpal tunnel, as found in women compared to men10
    - Obesity
  - Occupational
    - Repetitive occupational stress with resulting in:
      - Sustained wrist or palm pressure
      - Prolonged wrist extension and flexion
      - Repetitive hand and wrist use
    - Conflicting data exists regarding the role of workplace factors in the development of CTS
Most studies do not find evidence that the use of computers and clerical duties increases the risk of developing CTS (etiopathogenesis of CTS).

- **Systemic**
  - Rheumatoid arthritis 2 times more likely\(^{11}\)
  - Diabetes 2 times more likely
  - Hypothyroidism 1.4 times more likely
  - Pregnancy – most likely due to accumulation of fluid\(^{12}\)
  - Use of aromatase inhibitors\(^{13}\)

**Clinical pearls and diagnostic tools:**

- **Standard symptoms**
  - Dull, achy discomfort in the hand, forearm, or upper arm
  - Paresthesia in the hand
  - Burning pain in the hand
  - Worse at night
  - Diminished grip strength

Thenar muscle atrophy with progression

- **Important pieces of the physical exam include:**
  - Inspection of the hand and upper extremity
  - Sensory testing in all regions of the hand, forearm, and upper arm
    - These should involve median-innervated fingers but spare the thenar eminence
  - Motor testing of the hand, forearm, and upper arm
    - Weakness of the thenar eminence, thumb abduction and thumb opposition

- **Provocative maneuvers:**
  - Phalen’s test
    - The patient fully flexes the palms at the wrist with the elbow in full extension.
    - Alternatively the backs of the hands are placed against each other with the elbows flexed.
    - Positive is defined as pain and/or paresthesia in the median innervated fingers within one minute.
    - Sensitivity of 68%, specificity of 73%
    - May correlate with CTS severity\(^{14}\)
  - Tinel’s test for the median nerve
    - Firm percussion over the course of the median nerve just proximal to or on top of the carpal tunnel.
    - Positive is defined as pain and/or paresthesia of the median innervated fingers
    - Sensitivity 50%, specificity 77%
  - Manual carpal compression test
    - Apply pressure over the transverse carpal ligament
    - Positive is defined as paresthesias occurring within 30 seconds of applying pressure
    - Sensitivity 64%, specificity 83%
- Electrodiagnostic testing:
  - Standard part of CTS evaluation, and are used to diagnose, assess severity, and rule out other abnormalities
  - Nerve conduction studies
    - Used to demonstrate impaired median nerve conduction across the carpal tunnel as compared to elsewhere
  - Electromyography
    - Most useful in excluding other conditions like polyneuropathy and radiculopathy
  - Is there social or psychological distress that may contribute to chronic, disabling pain?
- Imaging studies:
  - Not routinely used in CTS

**OMM Integration:** Several studies have been done to investigate the effects of OMT on carpal tunnel syndrome. A study that looked at 20 subjects with CTS and 20 without showed that the subjects with CTS had a greater degree of restriction in the hand and forearm (at least grade 2) and those without (grade 0-1). In addition, 16 of the subjects with CTS who were treated with OMT had an improved range motion and decreased symptoms. While these results were not statistically significant, they do show the potential for OMT to improve quality of life for these patients.¹⁵ A review article published in 2012 found that older studies done in 1993-1995 demonstrated that OMT was able to widen the transverse carpal arch and lengthen the transverse carpal ligament.¹⁶ While these studies have been criticized for a variety of reasons, another study with a structured research method showed that carpal bone mobilization decreased patients’ pain rating (p<0.01%).¹⁷

**Osteopathic Structural Examination:** The focus will be on somatic dysfunction in the hand, wrist, and upper limb.

- The carpal tunnel can be examined modified range of motion procedures as described Sucher (43)
- Carpal and metacarpal bones should be assessed for restricted in range of motion as any displacement can disrupt carpal tunnel anatomy
- Distal radius and ulna position and movement
- Anterior forearm muscles and interosseous membrane should be palpated. A right fibrous band may be found

**Treatments options:**

The goals of our treatment are to stretch soft tissues, release tissue adhesions, eliminate restricted motion of carpal and metacarpal bones, increase the length of the transverse carpal ligament, increase range of motion, strengthen muscles, and reduce edema (Siu).

- Myofascial release of the wrist flexor retinaculum
- Opponens roll maneuver
- ART/HVLA to dysfunctional carpal bones
- ART/HVLA to dysfunctional metacarpophalangeal joints
- HVLA for a posterior radial head (pronation dysfunction)
- Muscle energy for supination or pronation dysfunctions
• Myofascial release of the interosseous membrane

**Related evidence based medicine articles:**


• Tal-Akabi A, Rushton A. An investigation to compare the effectiveness of carpal bone mobilisation and neurodynamic mobilisation as methods of treatment for carpal tunnel syndrome. Man Ther. 2000; 5(4):214-222.

**Citations for paper:**


