



The 2016 year-in-review of carpal tunnel syndrome research

By Michael Weier ■ March 3, 2017

Carpal tunnel syndrome (CTS) – pain, tingling and numbness of the hand and fingers due to nerve impingement in the wrist – accounts for the greatest median number of days of missed work among the major industrial injuries and occupational diseases.¹ Each year between three and six percent of the American workforce suffer from CTS.²

In 2016, numerous peer-review journals published worldwide research studies and systematic epidemiological literature review articles regarding CTS. The following is a brief summary of seven out of several dozen CTS studies that may be of particular interest to administrators and managers of programs for industrial safety and health, and workers' compensation.

Ultra-Minimally Invasive Ultrasound-Guided Carpal Tunnel Release: A Randomized Clinical Trial³

Eleven researchers from Spain and United Arab Emirates conducted a randomized control trial of 92 patients in an ambulatory surgical clinic to compare outcomes of ultra-minimally invasive ultrasound-guided carpal tunnel releases and mini-open carpal tunnel releases. The patient-subjects were followed for 12 months with post-surgical clinical examinations and periodic Disabilities of the Arm, Shoulder and Hand (DASH⁴) questionnaires. The results revealed the ultra-minimally invasive ultrasound-guided procedure provided equal neurologic recovery, earlier return to functional capabilities and less postoperative complications as compared to the mini-open carpal tunnel release.

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Examining the association between musculoskeletal injuries and carpal tunnel syndrome in manual laborers⁵

U.S. researchers⁶ performed a study of 512 Latino manual laborers to assess the association between musculoskeletal injuries and CTS. Each participant received a clinical examination, completed a hand diagram reporting symptoms and underwent nerve conduction studies. The data revealed a statistically significant association between rotator cuff syndrome and CTS.

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2016 carpal tunnel syndrome research (continued)

Though an association was also identified between epicondylitis and CTS, it failed to reach statistical significance.

Impact of Work Organizational Factors on Carpal Tunnel Syndrome and Epicondylitis⁷

American occupational and environmental researchers⁸ conducted a study of 1834 workers to identify relationships between organizational variables in employment (job rotation, overtime, second job and work pacing) and upper extremity health outcomes (CTS, lateral and medial epicondylitis).

The study data revealed mixed degrees of association between various work-related activities and upper extremity conditions. Significant positive association was found between job rotation and increased prevalence of CTS, and a negative association between overtime work and prevalence of lateral and medial epicondylitis. The researchers found no statistically significant associations between workers with a second job or different work pacing and any of the upper extremity conditions.

The inclusion of homemakers as an occupation amongst people with upper limb repetitive stress injuries⁹

Singapore researchers performed a retrospective cohort study of 1108 individuals referred by their physicians for outpatient upper extremity physical rehabilitation. The most common upper extremity diagnoses were flexor tendinitis of the hand and fingers, DeQuervain's tenosynovitis and CTS. The researchers obtained descriptive demographical information of the study participants, including age, gender, employment and non-employment activities.

The researchers reported the study results showed upper extremity conditions are prevalent among the general population, especially in females. Moreover, they found a statistically significant association between non-occupational housework activities and upper extremity repetitive stress conditions. Based upon the data, the researchers recommended Singapore's occupational classification systems should include homemaker as an independent category. The study results indicate housework, arguably an activity of daily living, is associated with CTS.

Prevalence and Related Characteristics of Carpal Tunnel Syndrome Among Orchardists in the Gyeongsangnam-do Region¹⁰

A group of South Korean rehabilitation medicine physicians conducted a study of 377 orchardists (fruit pickers and sorters) to assess the association between electrodiagnostic severity and physical examinations. Clinical

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2016 carpal tunnel syndrome research (continued)

examination tests included Tinel's sign¹¹, Phalen's test¹², and Durkan's carpal compression test (CCT).^{13, 14}

The prevalence of CTS among orchardists as compared to the general population was high and increased with age and hours worked. Tinel's sign, Phalen's Test and Durkan's CCT had low specificities, corresponding to significant false positives, in workers age 65 and older. Phalen's and Tinel's in men and Durkan's CCT in women showed statistically significant differences with increasing CTS severity. The researchers declared Durkan's CCT is a reasonably reliable clinical examination method for diagnosing CTS.

Personal risk factors for carpal tunnel syndrome in female visual display unit workers¹⁵

In this Italian study of 631 female video display unit workers, a diagnosis of CTS was reported in 48 cases for an incidence of 6 out of 1000 workers per year. The prevalence of CTS among the study participants was similar to the estimated rate for the general population. Among the personal risk factors considered, hormone therapy, prior upper extremity trauma, and a history of signs and symptoms of a cervical spine disorder were associated with a higher risk of CTS.

Carpal Tunnel Syndrome: Diagnosis and Management¹⁶

American researchers¹⁷ studied the efficacy of diagnostic techniques and treatments for CTS and offered recommendations. Classical symptoms included patient reports of pain and paresthesias along the distribution of the median nerve, most notably the palmar¹⁸ aspect of the thumb, index and middle fingers, and the radial¹⁹ half of the ring finger. Diagnostic clinical findings for CTS included positive flick sign²⁰, Phalen maneuver and median nerve compression test.²¹

Patients with typical symptoms and signs of CTS do not need additional testing, but ultrasonography and electrodiagnostic studies are useful to confirm the diagnosis in atypical cases and to rule out other conditions. If surgical decompression is considered, then electrodiagnostic studies should be obtained to determine CTS severity and surgical prognosis. Conservative treatment modalities for patients with mild to moderate CTS, may include splinting, corticosteroids, physical therapy, therapeutic ultrasound and yoga.

Nonsteroidal anti-inflammatory drugs, diuretics, and vitamin B6 were not effective treatments for CTS. Corticosteroid injection provided relief for more than one month and delayed the need for surgery. Patients with severe CTS or whose symptoms had not improved after four to six months of conservative therapy, however, should be offered surgical decompression. In terms of surgical intervention, endoscopic and open techniques are equally effective to

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2016 carpal tunnel syndrome research (continued)

relieve the nerve entrapment, but patients returned to work on average one week earlier with endoscopic repair.

If you have questions about carpal tunnel syndrome issues in a current claim, please call one of the Reinisch Wilson Weier PC attorneys. ■

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- ¹ U.S. Bureau of Labor Statistics. Available at <https://www.bls.gov/opub/ted/2001/apr/wk1/art01.htm>.
 - ² Centers for Disease Control and Prevention (CDC), Morbidity and Mortality Weekly Report (MMWR). Available at <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6049a4.htm>.
 - ³ Ultra-Minimally Invasive Ultrasound-Guided Carpal Tunnel Release: A Randomized Clinical Trial. Rojo-Manaute J.M., Capa-Grasa A., Chana-Rodríguez F., et al. *Journal of Ultrasound in Medicine*, 35(6):1149-1157. (April 2016).
 - ⁴ The DASH is a questionnaire, typically comprised of 30 questions regarding functional activities with five possible responses from No Difficulty to Extreme/Severe. The study utilized the QuickDASH, comprised of 11 questions to elicit descriptions of functional ability.
 - ⁵ Cartwright, M.S., Yeboah, S., Walker, F.O., et al., *Muscle Nerve*, 54(1):31-5. (June 2016).
 - ⁶ Wake Forest School of Medicine, Department of Biomedical Sciences, and Department of Epidemiology and Prevention.
 - ⁷ Bao, S.S., Kapellusch, J.M., Merryweather, A.S., et al., *J Occup Environ Med*. 58(8):760-4. (August 2016).
 - ⁸ Including three from the Washington state Department of Labor and Industries: Stephen Bao, PhD, Barbara Silverstein, PhD, and Jennifer Marcum, PhD.
 - ⁹ Yang, Z., and Cheung, TW. *Work*. 27;55(1):181-186. (September 2016).
 - ¹⁰ Jung, H.Y., Kong, M.S., Lee, S.H., Lee, C.H., Oh, M.K., Lee, E.S., Shin, H., & Yoon, C.H. *Annals of Rehabilitation Medicine*. 40(5):902-914. (October 2016).
 - ¹¹ Percuss or tap the inside of the wrist. A complaint of an electrical shock sensation is deemed positive and suggestive of entrapment of the nerve within the carpal tunnel.
 - ¹² The wrist is flexed (both wrists may be flexed in a “praying mantis” position) for one or two minutes while the patient is asked to report any symptoms. Report of numbness or tingling is a positive sign for CTS.
 - ¹³ Direct pressure is applied over the carpal tunnel with the thumb or a device designed to record the pressure. Patient complaint of numbness and tingling is a positive sign for CTS.
 - ¹⁴ John A. Durkan, MD, a Board-certified Orthopedic Surgeon in Hood River, Oregon, proposed the clinical test for CTS in 1991.
 - ¹⁵ Riccò, M., Cattani, S., Signorelli, C. *Int J Occup Med Environ Health*, 18;29(6):927-936. (November 2016).
 - ¹⁶ Wipperman, J., Goerl, K. *Am Fam Physician*. 15;94(12):993-999 (December 2016).
 - ¹⁷ University of Kansas School of Medicine, Wichita.
 - ¹⁸ Palm side of hand.
 - ¹⁹ Inside toward the thumb.
 - ²⁰ Patient reports of voluntary hand shaking or finger flicking to reduce painful symptoms in the hand.
 - ²¹ Presumably Tinel’s sign or Durkan’s CCT.

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