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Review articles

Effect of shock wave therapy on nerve conduction Velocity of the median nerve in carpal tunnel syndrome patients: Review Article

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Abstract

Background: Carpal tunnel syndrome (CTS) is a common medical condition, which causes pain, numbness, and tingling in the hand and arm of the affected individual. Carpal tunnel syndrome occurs when the median nerve is squeezed or compressed as it travels through the wrist, in the previous articles there is a recommendation for searching the long-term effect of shockwave therapy in CTS patients. Shock wave therapy, a new therapeutic method for the treatment of mild-to-moderate CTS, has recently attracted more attention and can be used to improve median nerve function in patients with CTS. **Purpose:** This review aimed to illustrate the long-term effect of shockwaves on the nerve conduction velocity of the median nerve in CTS patients. **Material and Methods:** We searched Google Scholar, Web of Science, and Cochrane for shockwave therapy and carpal tunnel syndrome. The authors also reviewed references from pertinent literature; however, only the most recent or comprehensive studies from December 2015 to November 2024 were included. the studies in languages other than English were excluded due to a lack of translation-related sources. Papers such as unpublished manuscripts, oral presentations, conference abstracts, and dissertations not part of larger scientific studies were excluded.

Keywords: **Shock waves ; High Energy Shock Waves Compression Neuropathy ; Entrapment Neuropathy**

Introduction:

Carpal tunnel syndrome is the most common entrapment condition affecting one or more peripheral nerves and resulting in numbness or weakness in the affected . On average, at least 3.8% of people who complain of aching, unresponsiveness, and an itchy feeling in their hands have CTS reported by Ibrahim et al.**(1)** and Jenkins et al. **(8).** The symptoms of CTS may vary across patients. As such, they are classified differently into mild, moderate, and severe. The syndrome is characterized by pain in the hand, numbness, and tingling in the distribution of the median nerve. These sensations may be felt in the

thumb, index finger, middle finger, and the radial side of the ring finger reported by Burton et al. **(2)**

The painful feelings may result in a reduction in grip strength and hand function. The occurrence of CTS over a long time may also result in the muscles at the base of the thumb wasting away. An estimated 4% and 5% of people suffer from CTS worldwide, with the most susceptible population being elderly individuals aged between 40 and 60 years reported by Burmann et al. **(3)**

Carpal tunnel syndrome is also more prevalent among women as compared to men. For instance, the UK General Practice Research Database 2000 evaluated that CTS prevalence was 88 per 100,000 in males, while in the incidence was 193 per 100,000 reported by Burton et al. **(2)**

More frequent evaluations of the incidence of CTS note its occurrence to be higher for women aged between 45 and 54 years, while the risk is higher for men aged between 75 and 84 years reported by Blumenthal et al. **(4)**

CTS is a musculoskeletal disorder associated with work activity in the affected individuals, which is caused by strain and repetitive activity, making it a common problem across manual laborers.

Effect of carpal tunnel syndrome on nerve conduction study of median nerve

There are several reports describing the natural course of CTS based on the findings from these untreated patients. Regarding the natural course of the disease, some patients experienced worsening of electrophysiological parameters with time; however, most remained stable over time or improved spontaneously both clinically and electrophysiologically. Electrophysiological CTS severity was classified according to the following grades: 1) normal (normal findings on all studies); 2) mild CTS (reduced sensory conduction velocity with a normal distal motor latency; 3) moderate CTS (reduced sensory conduction velocity with delayed distal motor latency with a normal CMAP amplitude in the APB muscle severe CTS (absence of sensory response with delayed distal motor latency or absence of the CMAP amplitude in the APB muscle).

Treatment of carpal tunnel syndrome

Treatment should provide satisfactory pain relief and protection of the median nerve from further deterioration. Electrodiagnosis testing provides information on focal median mononeuropathy at the wrist that could be used to classify carpal tunnel syndrome from mild to severe. The information obtained can help patients to understand and choose treatment in a patient-centered fashion Wang et al. **(5).** The diagnosis of carpal tunnel syndrome is based on the characteristic complaints, confirmed preferably by abnormal electrophysiological tests. Depending on the degree of impact on daily functioning, treatment for carpal tunnel syndrome may be expectative, conservative, or surgical.

Effect of Shockwave Therapy on electrophysiological parameters

A systematic review study by Kim et al. **(6)** reported that shockwaves can improve subjective symptoms and electrophysiological parameters of the median nerve in patients with CTS. Atthakomol et al. (28) demonstrated that radial shockwave can have long-term positive therapeutic effects (at least six months) in these patients.

Radial shockwave is an effective noninvasive treatment for mild-to-moderate carpal tunnel syndrome that produces greater and longer-lasting results than conventional physiotherapy alone. There were no differences observed between utilizing radial shockwave on the carpal tunnel or median nerve pathways on the palmar surface of the hand, in terms of clinical and electrophysiological measurements reported by Habibzadeh et al. **(29)**

Conclusion

The use of the shockwave for treatment of CTS may provide further advantages for CTS patients. It can alter nerve conduction. There is a significant difference in using shockwave for

CTS treatment, so further primary and secondary research are needed to establish sufficient evidence for using shock wave therapy in managing CTS.

Conflict of interest: None
Fund: None

References:

1. **Ibrahim I, Khan WS, Goddard N, Smitham P.** Suppl 1: carpal tunnel syndrome: a review of the recent literature. Open Orthop J. 2012;6:69.
2. **Burton C, Chesterton LS, Davenport G.** Diagnosing and managing carpal tunnel syndrome in primary care. Br J Gen Pract. 2014;64(622):262-3.
3. **Chammas M, Boretto J, Burmann LM, Ramos RM, Santos Neto FC, Silva JB.** Carpal tunnel syndrome-Part I (anatomy, physiology, etiology and diagnosis). Rev Bras Ortop. 2014;49(5):429-36.
4. **Blumenthal S, Herskovitz S, Verghese J.** Carpal tunnel syndrome in older adults. Muscle Nerve. 2006;34(1):78-83.
5. **Wang L.** Guiding treatment for carpal tunnel syndrome. Phys Med Rehabil Clin N Am. 2018;29(4):751-60.
6. **Kim JC, Jung SH, Lee SU, Lee SY.** Effect of extracorporeal shockwave therapy on carpal tunnel syndrome: A systematic review and meta-analysis of randomized controlled trials. Medicine (Baltimore). 2019;98(33):e16870.
7. **Skandalakis LJ, Skandalakis JE.** Carpal Tunnel. In: Skandalakis LJ, Skandalakis JE, editors. Surgical Anatomy and Technique: A Pocket Manual. New York: Springer; 2013. p. 703-14.
8. **Jenkins PJ, Watts AC, Duckworth AD, McEachan JE.** Socioeconomic deprivation and the epidemiology of carpal tunnel syndrome. J Hand Surg Eur Vol. 2012;37(2):123-9.
9. **Uzun A, Seelig LL.** A variation in the formation of the median nerve: communicating branch between the musculocutaneous and median nerves in man. Folia Morphol (Warsz). 2001;60(2):99-101.kib.ki.se+9Wikipedia+9Wikipedia+9
10. **Geoghegan JM, Clark DI, Bainbridge LC, Smith C, Hubbard R.** Risk factors in carpal tunnel syndrome. J Hand Surg Br. 2004;29(4):315-20.
11. **Ghasemi-Rad M, Nosair E, Vegh A, Mohammadi A, Akkad A, Lesha E, et al.** A handy review of carpal tunnel syndrome: From anatomy to diagnosis and treatment. World J Radiol. 2014;6(6):284-300.
12. **Solomon DH, Katz JN, Bohn R, Mogun H, Avorn J.** Nonoccupational risk factors for carpal tunnel syndrome. J Gen Intern Med. 1999;14(5):310-4.
13. **Becker J, Nora DB, Gomes I, Stringari FF, Seitensus R, Panosso JS, et al.** An evaluation of gender, obesity, age, and diabetes mellitus as risk factors for carpal tunnel syndrome. Clin Neurophysiol. 2002;113(9):1429-34.
14. **Werner RA, Andary M.** Carpal tunnel syndrome: pathophysiology and clinical neurophysiology. Clin Neurophysiol. 2002;113(9):1373-81.
15. **Uchiyama S, Itsubo T, Nakamura K, Kato H, Yasutomi T, Momose T.** Current concepts of carpal tunnel syndrome: pathophysiology, treatment, and evaluation. J Orthop Sci. 2010;15(1):1-13
16. **Burke FD, Ellis J, McKenna H, Bradley MJ.** Primary care management of carpal tunnel syndrome. Postgrad Med J. 2003;79(934):433-7.
17. **Ke MJ, Chen LC, Chou YC, Li TY, Chu HY, Tsai CK, et al.** The dose-dependent efficiency of radial shock wave therapy for patients with carpal tunnel syndrome: a prospective, randomized, single-blind, placebo-controlled trial. Sci Rep. 2016;6:38344.
18. **Xie Y, Zhang C, Liang B, Wang J, Wang L, Wan T, et al.** Effects of shock wave therapy in patients with carpal tunnel

syndrome: a systematic review and meta-analysis. Disabil Rehabil. 2022;44(2):177-88.
19. **Wu YT, Ke MJ, Chou YC, Chang CY, Lin CY, Li TY, et al.** Effect of radial shock wave therapy for carpal tunnel syndrome: A prospective randomized, double-blind, placebo-controlled trial. J Orthop Res. 2016;34(6):977-84.
20. **Raissi GR, Ghazaei F, Forogh B, Madani SP, Daghaghzadeh A, Ahadi T.** The effectiveness of radial extracorporeal shock waves for treatment of carpal tunnel syndrome: a randomized clinical trial. Ultrasound Med Biol. 2017;43(2):453-60.
21. **Padua L, Coraci D, Erra C, Pazzaglia C, Paolasso I, Loreti C, et al.** Carpal tunnel syndrome: clinical features, diagnosis, and management. Lancet Neurol. 2016;15(12):1273-84.
22. **Romeo P, Lavanga V, Pagani D, Sansone V.** Extracorporeal shock wave therapy in musculoskeletal disorders: a review. Med Princ Pract. 2014;23(1):7-13.
23. **Wang CJ, Chen HS.** Shock wave therapy for patients with lateral epicondylitis of the elbow: a one-to two-year follow-up study. Am J Sports Med. 2002;30(3):422-5.
24. **Rompe JD, Decking J, Schoeller C, Nafe B.** Shock wave
25. **Ortiz-Corredor F, Enríquez F, Díaz-Ruíz J, Calambas N.** Natural evolution of carpal tunnel syndrome in untreated patients. Clin Neurophysiol.2008;119:1373-8. doi:10.1016/j.clinph.2008.02.012
26. **Nathan PA, Keniston RC, Myers LD, Meadows KD, Lockwood RS.** Natural history of median nerve sensory conduction in industry: relationship to symptoms and carpal tunnel syndrome in 558 hands over 11 years. Muscle Nerve. 1998;21:711-21. doi:10.1002/(SICI)1097-4598(199806)21:6<711::AID-MUS2>3.0.CO;2-A
27. **Küçük EB, Taşkıran ÖÖ.** Evaluation of Duruöz Hand Index in diagnosis and staging of Carpal tunnel syndrome. J Clin Neurosci. 2020;82:111-4.
28. **Atthakomol P, Wongsiri S, Vathana T, Piyapromdee U.** Endoscopic versus open carpal tunnel release: a randomized controlled trial. J Med Assoc Thai. 2018;101(1):53–8.
29. **Habibzadeh A, Mousavi-Khatir R, Saadat P, Javadian Y.** The effect of radial shockwave on the median nerve pathway in patients with mild-to-moderate carpal tunnel syndrome: a randomized clinical trial. J Orthop Surg Res. 2022;17(1):46.