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Ultrasonographic and electrophysiological outcomes of carpal tunnel syndrome treated with low-level laser therapy: A prospective randomized sham-controlled double-blind study

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Objective: Low-level laser therapy (LLLT) is a physical therapy modality used in the conventional, non-surgical treatment of mild to moderate CTS and studies have both proven and disproven LLLT as an effective treatment modality. Purpose of this study was to investigate the therapeutic effects of LLLT on clinical, ultrasonographic and electrophysiologic findings in CTS.

Materials and methods: Forty-two patients with mild to moderate CTS were randomly assigned to one of two groups; active LLLT (therapy group, n=22) 0.8 Joule/painful point and sham LLLT groups (n=20). Both groups wore neutral wrist orthoses. Patients were evaluated before and after 15 sessions of therapy (670nm, 4 Joule/session over the carpal tunnel). Follow-up parameters included the Boston Carpal Tunnel Syndrome Questionnaire Symptom Severity Scale (SSS), Functional Status Scale (FSS), nerve conduction studies and ultrasound (US) evaluation of the median nerve cross-sectional area (CSA), vascularisation (via power doppler), flattening ratio (FR) and palmar bowing of the flexor retinaculum.

Results: Night paresthesia improved in both groups however, pain and patients with a positive Phalen's test reduced only in the therapy group ($p=0.031$ ad $p=0.031$ respectively). FSS and SSS scores also improved only in the therapy group ($p<0.001$). Electrophysiologically, median sensory nerve conduction velocities showed significant improvement only in the therapy group ($p=0.008$). Furthermore CSA, FR and vascularisation of the median nerve showed significant improvement in the therapy group alone ($p<0.001$, 0.048 and 0.021 respectively).

Conclusions: Improvements in the signs and symptoms of CTS as well as hand function, alongside improvements in sensory nerve conduction studies and reduction in median nerve CSA, FR and vascularity in the LLLT group, may be attributed to the anti-inflammatory and analgesic effects of LLLT. This study provides new ultrasonographic data demonstrating efficacy of LLLT together with clinical and electrophysiological improvement. LLLT may be considered as an easily applied, non-invasive treatment option.

Recent Publications

1. Werner RA, Andary M. Carpal tunnel syndrome: Pathophysiology and clinical neurophysiology. Clin Neurophysiol 2002;113:1373-81.

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3. McDonagh C, Alexander M, Kane D. The role of ultrasound in the diagnosis and management of carpal tunnel syndrome: A new paradigm. Rheumatology (Oxford) 2015; 54:9-19.

4. Cartwright MS, Hobson-Webb LD, Boon AJ, Alter KE, Hunt CH, Flores VH, et al. Evidencebased guideline: Neuromuscular ultrasound for the diagnosis of carpal tunnel syndrome. Muscle Nerve 2012;46:287-93.

Biography

Oya Umit Yemisci, MD is a Professor of Physical Medicine and Rehabilitation, and is currrently working at the Department of Physical Medicine and Rehabilitation, Baskent University Hospital, Ankara, Turkey. She is actively involved in education, residency training, research and clinical treatment at the inpatient rehabilitation hospital especially in the field of musculoskeletal disorders, arthtitis, osteoporosis, rehabilitation medicine including serebrovascular events and spinal cord injury. She is also currently performing electrodiagnosis and involved in research and residency training at the electroneuromyography (ENMG) laboratory.

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