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Effectiveness of high-intensity laser therapy in the treatment of musculoskeletal disorders
A systematic review and meta-analysis of randomized controlled trials

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Abstract

Background: Although high-intensity laser therapy (HILT) has been used for the management of musculoskeletal disorders (MSD), studies examining the effectiveness of HILT have been limited. We investigated the effectiveness of HILT in MSD using a systematic review and meta-analysis.

Methods: We searched the ovid MEDLINE, ovid Embase, Cochrane CENTRAL library, and Web of Science until January, 2018. Relevant studies concerning the effectiveness of HILT in patients with MSD were included. Both placebo and active controls were considered as comparators and only randomized controlled trial (RCT) design studies were included. Risk of bias (ROB) was used for the quality assessment of the RCT. For continuous variables, a meta-analysis was conducted using an inverse variance random effects model. The mean difference (MD) for visual analog scale pain and standardized mean difference (SMD) for disability were applied.

Results: Twelve studies were selected for this systematic review. In 11 studies, comprising 736 patients, pain was significantly improved by HILT compared with a control group (MD: −1.01; 95% confidence interval [CI]: −1.28 to −0.74). From the analysis of 688 patients from 10 studies, the pooled standardized mean difference (SMD) of HILT showed a significant improvement in disability scores compared with those in the control group (SMD, −1.09; 95% CI −1.77, −0.41). In subgroup analysis by treatment regions, the mean difference (MD) in neck pain was the highest at −1.02 (95% CI: −1.45, −0.58) than in controls, followed by back pain (MD, −0.91; 95% CI: −1.24, −0.59).

Conclusions: The results of this study show that HILT treatment for back and neck pain significantly improved pain and disability scores compared with controls. The ROB of the included studies was moderate; however, significant heterogeneity existed. Thus, additional well-designed studies involving larger samples with long-term follow-up are needed to further assess each laser application, treatment region, and comparator.

Abbreviations: CI = confidence interval, CMS = Constant Murley Scale, DASH = Disabilities of the Arm Shoulder and Hand questionnaire, GDP = gross domestic product, HILT = high-intensity laser therapy, HILT = high-intensity laser therapy, LLLT = low-level laser therapy, MD = mean difference, MSD = musculoskeletal disorders, NDI = Neck Disability Index, NSAIDs = nonsteroidal anti-inflammatory drugs, ODI = Oswestry Disability Index, PRTEE = Patient-related Tennis Elbow Evaluation, RCT = randomized controlled trial, ROB = risk of bias, SD = standard deviation, SMD = standardized mean difference, SPADI = Shoulder Pain and Disability Index, TENS = transcutaneous electrical nerve stimulation, VAS = visual analog scale, WMD = weighted mean difference.

Keywords: high-intensity laser therapy, musculoskeletal disorder, pain, systematic review meta-analysis

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