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The effectiveness of low-level laser therapy for nonspecific chronic low back pain: a systematic review and meta-analysis

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Abstract

Background: In recent decades, low-level laser therapy (LLLT) has been widely used to relieve pain caused by different musculoskeletal disorders. Though widely used, its reported therapeutic outcomes are varied and conflicting. Results similarly conflict regarding its usage in patients with nonspecific chronic low back pain (NSCLBP). This study investigated the efficacy of low-level laser therapy (LLLT) for the treatment of NSCLBP by a systematic literature search with meta-analyses on selected studies.

Method: MEDLINE, EMBASE, ISI Web of Science and Cochrane Library were systematically searched from January 2000 to November 2014. Included studies were randomized controlled trials (RCTs) written in English that compared LLLT with placebo treatment in NSCLBP patients. The efficacy effect size was estimated by the weighted mean difference (WMD). Standard random-effects meta-analysis was used, and inconsistency was evaluated by the I-squared index (I^2).

Results: Of 221 studies, seven RCTs (one triple-blind, four double-blind, one single-blind, one not mentioning blinding, totaling 394 patients) met the criteria for inclusion. Based on five studies, the WMD in visual analog scale (VAS) pain outcome score after treatment was significantly lower in the LLLT group compared with placebo (WMD = -13.57 [95 % CI = -17.42, -9.72], $I^2 = 0$ %). No significant treatment effect was identified for disability scores or spinal range of motion outcomes.

Conclusions: Our findings indicate that LLLT is an effective method for relieving pain in NSCLBP patients. However, there is still a lack of evidence supporting its effect on function.

Keywords: LLLT, Low-level laser therapy, Nonspecific chronic low back pain, NSCLBP, Pain relief

Background

Low back pain (LBP) is one of the most common musculoskeletal disorders [1, 2] and the leading cause of disability worldwide [3]. It affects more than two-thirds of the population during their lifetime and one in four people seek medical help for LBP in a 6-month period [4]. Musculoskeletal disorders account for 6–8 % of total disability-adjusted life years (DALYs) and of this large

total, low back pain accounts for nearly half [5]. The majority of the symptoms resolve spontaneously within 1–3 months. However, 3–10 % of patients develop chronic symptoms lasting more than 6 weeks [6]. The underlying etiology of most low back pain is currently unclear. Thus, the one term, nonspecific chronic low back pain (NSCLBP), is used to refer to this condition [7]. Annually, \$91 billion in medical expenses are spent for back pain with an additional \$50 billion indirect costs incurred due to loss in productivity and disability benefit payments [8, 9].

The main goal of NSCLBP therapy is rarely the complete eradication of pain. Different strategies are currently utilized including surgery and drug therapy,

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