

# *Low-Level Laser Therapy and Exercise for Patients with Shoulder Disorders: A Systematic Review and Meta-Analysis*

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**Background:** Low-level laser therapy (LLLT) with exercise is one of the treatment options in a routine physiotherapy treatment of shoulder-related injuries. There is no clear-cut clinical importance of LLLT in shoulder disorders. Findings from recent trials showed that LLLT may be effective for treating shoulder disorders, however there still need to do a rigorous systematic review.

**Objective:** The review assessed the effects of LLLT with exercise compared to exercise alone in the treatment of shoulder disorders.

**Methods: Search strategy:** We searched CENTRAL (1996-2016), MEDLINE (1996-2016), CINAHL (1996-2016), PEDro (1997-2016), Science Direct (1996-2016), Scopus (1996-2016) and Physiotherapy Choices (1996-2016) for trials published in English. We also hand searched for subject-specific journals (PhotoMedicine and Laser Surgery, Lasers in Surgery and Medicine and Journals of Lasers in Medical Science) and conference proceedings of World Association of Laser Therapy for 2012 and 2014 respectively.

**Selection criteria:** Randomized Controlled Trials (RCTs) measuring the effects of LLLT with exercise and exercise alone in participants who are 18 years and above, with a clinical or radiological diagnosis of various shoulder pathologies.

**Data collection and analysis:** Two review authors independently screened, selected studies, extracted data and assessed the risk of bias based on priori criteria. Disagreements were resolved either through discussion or consultation with a third review author. Meta-analysis was performed for five clinically homogeneous studies.

**Main results:** We included 12 RCTs (651 participants) published in Turkey, Egypt, Iran, and South Korea among

patients with rotator cuff tendinitis/sub-acromial impingement syndrome, frozen shoulder, and shoulder myofascial trigger pain. All 12 RCTs met the inclusion criteria for this review and 11 of these studies contributed data for meta-analysis. Majority of the studies included in this review lacked information on random sequence generation, allocation concealment, and blinding. In addition, because of smaller sample sizes, most studies lacked adequate power. LLLT probably reduces the overall pain score (10cm-VAS) (7 RCTs, GRADE quality moderate) compared to placebo-LLLT (WMD: -1.04; 95% CI: -1.52 to -0.56). It may slightly reduce rest pain (WSMD: -0.42; 95% CI: -0.74 to -0.11) and night pain (WMD: -1.28; 95% CI: -1.65 to 0.92) (GRADE quality low), and may make no difference in reducing shoulder disability (SMD: 0.19; 95%CI: -0.18 to 0.57), improving shoulder function (WMD: 4.07; 95%CI: -1.93 to 10.06) and increasing shoulder ROMs (GRADE quality low). No study reported adverse reactions to LLLT.

**Conclusions:** Based on moderate quality evidence, LLLT may probably reduce the overall pain over placebo LLLT in people with various shoulder disorders. Low-level laser therapy may also slightly reduce rest pain and night pain over placebo LLLT. However, LLLT makes no difference over placebo LLLT in reducing shoulder disability, improving shoulder function, and increasing shoulder ROM. Physiotherapists should use LLLT with caution, and until robust findings are available on the benefit of LLLT, exercise therapy still remains the mainstay of treatment in patients with shoulder disorders.

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