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# Effectiveness of Photobiomodulation Therapy in the Treatment of Myofascial Pain Syndrome of the Upper Trapezius Muscle: A Systematic Review and Meta-Analysis

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## Abstract

**Objective:** This systematic review aimed to investigate the efficacy of photobiomodulation therapy (PBMT) on pain and pressure pain threshold (PPT) in patients with myofascial pain syndrome (MPS) of the upper trapezius muscle.

**Materials and methods:** A total of 17 studies (944 patients) were included; data regarding participants, intervention parameters, outcome measures, time of measurement, and follow-up were extracted. Evaluation of the methodological quality was performed by Physiotherapy Evidence Database (PEDro) scale. Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system was used to assess the quality of evidence. A meta-analysis was performed on 16 studies, and standardized mean difference (SMD), corresponding 95% confidence interval (CI), and overall effect size (ES) were calculated.

**Results:** Meta-analysis using a random-effect model was performed to evaluate the effects of PBMT alone or PBMT plus exercise (EX) compared with placebo, medical treatment, physical therapy (PT) modality, manual therapy, or complementary PT. Assessment according to the PEDro scale revealed 12 high-quality, 3 fair-quality, and 2 low-quality studies. According to the GRADE system, studies exhibited low to medium quality of evidence, with medium ES [SMD  $-0.54$  (95% CI  $-1.05$  to  $-0.02$ )] for studies using PBMT alone and large ES [SMD  $-0.80$  (95% CI  $-1.35$  to  $-0.26$ )] for PBMT+EX.

**Conclusions:** The present systemic review revealed that PBMT is an effective PT modality for reducing pain and increasing PPT in patients with MPS of the upper trapezius. PBMT, when combined with EX, had more significant effects in reducing pain and increasing PPT compared with controls. The low-quality studies with low to moderate quality of evidence limit the confidence in the effect estimate and recommend further high-quality studies for standardization of treatment protocols and irradiation parameters.

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**Keywords:** myofascial pain syndrome, photobiomodulation therapy, pain, pressure pain threshold

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