

EFFICACY OF LOW-FREQUENCY WHOLE-BODY ELECTROMYOSTIMULATION IN NONSPECIFIC CHRONIC BACK PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and Aims

Nonspecific chronic back pain (NSCBP) is a prevalent global condition, significantly contributing to disability and impacting quality of life worldwide. Its management is often limited by conventional exercise barriers, such as time constraints and comorbidities. Whole-body electromyostimulation (WB-EMS) offers a promising alternative, being a time-efficient and joint-friendly intervention. This systematic review evaluates the effectiveness of low-frequency WB-EMS in alleviating pain and enhancing function in NSCBP patients.

Methods

Following PRISMA guidelines, PubMed and PEDro databases were systematically searched for clinical trials involving adults with NSCBP, focusing on RCTs or CCTs with WB-EMS interventions. Two independent reviewers extracted data and assessed quality using the PEDro Scale. A narrative synthesis and meta-analysis pooled standardized mean differences (SMD) with 95% confidence intervals, evaluating heterogeneity via I^2 .

Results

Six studies ($n = 677$; WB-EMS: 278, controls: 329), including four RCTs, one CCT, and one meta-analysis (2017-2023), were analyzed. LF WB-EMS (20-minute weekly sessions, 8-16 weeks, 50-85 Hz) significantly reduced pain (-0.60 to -1.58 NRS/VAS) and improved function ($+7.19$ kg trunk strength to -15.8 ODI). Meta-analysis revealed a pooled pain reduction of -0.87 (95% CI $[-1.02, -0.72]$, $I^2 = 70\%$) and functional SMD of 0.84 (95% CI $[0.68, 0.99]$, $I^2 = 76\%$). Compared to passive controls ($n = 15/\text{group}$), effect sizes were 0.75 for pain and 0.85 for function; against active controls, pooled effects were 0.33 (pain, $I^2 = 96\%$) and 0.28 (function, $I^2 = 92\%$).

Conclusion

LF WB-EMS effectively mitigates NSCBP symptoms, showing strong within-group effects and competitive outcomes against controls, suggesting potential superiority over some therapies. Its efficiency and safety make it also suitable for patients with joint problems. However, small passive control sample sizes and high active control heterogeneity necessitate larger, standardized trials. Further research on medium-frequency WB-EMS and comparisons with LF-EMS is needed to optimize protocols and long-term outcomes.

Keywords: Whole-Body-Electromyostimulation, Stimulation, Back-Pain, Rehabilitation