

PROTOCOLOS DE INVESTIGACIÓN - MEDICINA

EFFECTS OF PHOTOBIMODULATION ON THE RELAXATION OF LARYNGEAL MUSCULATURE IN INDIVIDUALS WITH FUNCTIONAL LARYNGEAL HYPERFUNCTION: RANDOMIZED CONTROLLED CLINICAL TRIAL PROTOCOL

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The voice is increasingly recognized as both an expressive and functional resource, and the rapid growth of digital media has further heightened the demand for specialized vocal health care, particularly among professional voice users. Functional laryngeal hyperfunction is a leading cause of vocal disorders in this population, with standard treatment involving targeted exercises to promote relaxation of the laryngeal musculature. Despite their proven effectiveness,

patient adherence to such exercises is often limited, potentially compromising clinical outcomes. Light-based therapies, including photobiomodulation (PBM), have been explored for muscle relaxation in various clinical contexts, showing promising physiological effects. This study hypothesizes that PBM can also facilitate relaxation of the laryngeal musculature, thereby supporting and potentially enhancing the treatment of functional laryngeal hyperfunction.

Objective: To investigate the effect of PBM on laryngeal muscle relaxation in individuals with functional laryngeal hyperfunction, using surface laryngeal electromyography (sEMG) as an objective measure.

Methodology: This randomized controlled clinical trial will enroll eighty participants, allocated into two groups: the PBM Group (n = 40), receiving PBM combined with a standardized vocal relaxation exercise, and the Control Group (n = 40), performing the same exercise with sham PBM. The primary outcome will be laryngeal muscle activity measured by sEMG. Secondary outcomes will include acoustic and spectrographic voice analysis, Voice Handicap Index-10 (VHI-10), Vocal Tract Discomfort Scale (VTDS) and/or Visual Analogue Scale (VAS), maximum phonation time (MPT), harmonic-to-noise ratio (HNR), fundamental frequency (f₀), perceptual-auditory voice evaluation (GRBAS scale), presence of pain or discomfort, and time to perceived clinical improvement. Assessments will occur at baseline, one hour post-intervention, three days post-intervention, and one week post-intervention. Data will be analyzed using the Shapiro–Wilk test for normality, followed by repeated-measures ANOVA with Bonferroni post-hoc testing or Friedman and Mann–Whitney tests, as appropriate. Statistical significance will be set at $p < 0.05$.

Palavras-chave: keywords: photobiomodulation; laryngeal hyperfunction; semg.