



Research Article

The Effect of Auricular and Systemic Acupuncture on the Electromyographic Activity of the Trapezius Muscle with Trigger Points—A Pilot Study

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Abstract

The purpose of this study was to analyze and compare intra and intergroup the immediate effect of the auricular and LR8 systemic acupuncture on the electromyographic activity of the trapezius with the trigger points. This is an experimental clinical trial; 40 people were split in 4 distinct groups ($n = 10$): GI mustard seed application in the auricular acupoint; GII bilateral needle application in the LR8 acupoint; GIII combination of the techniques; GIV/Control Group mustard seed application in an acupoint not linked to the muscle tension. The EMG was used to assess the muscle contraction for 5 seconds during the resting time and during the isometric contraction time. The EMG signal was first collect without the acupuncture intervention; then both techniques were applied for 5 minutes; and the EMG was collected again right after these applications. The Shapiro-Wilk test was used, the t test was paired with the Wilcoxon test to the intragroup comparison; One-way analysis of variance test for intergroup comparison. There was no statistical difference in the intragroup comparison for the groups. The same happened to the intergroup comparison before and after application. Systemic and auricular acupuncture did not promote immediate changes in the EMG activity of the trapezius muscle in individuals with MTRPs.

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1. Introduction

Acupuncture is a Traditional Chinese Medicine technique which has the energy balance of the meridians as the principle [1]. It can be classified as systemic or auricular, and the form of application can be through the insertion of needles at different depths in strategic points of the skin and underlying tissues, as well as in auricular reflex points. These points are referred to as acupoints, and when stimulated, they trigger functional responses such as relief of muscle pain due to exacerbated muscle contraction [2, 3]. In addition to resulting in an energetic balance of the organism, afferent stimulation of acupoints promotes effects based on local or systemic reflex responses [4]. Currently, this technique is well known for its neurophysiological effects such as the inactivation of the neural circuit of myofascial trigger points (MTrPs), reduction of pain, and reduction of muscle contraction among others [2].

MTrPs can be defined as hypersensitivity points present in areas of skeletal muscle tension and are associated with hyperirritable nodules which, on palpation, may produce several local or distant symptoms, such as local cutaneous hyperthermia, dysesthesias, and hypesthesias, restriction of range of motion, referred pain in adjacent and/or distant areas, proprioceptive and coordination disorders, and motor dysfunction during physical examination [5, 6]. In other words, a complex of MTrPs in a certain tense musculature is composed of several contraction "knots" that are palpation sensitive [5–8]. The pathophysiological mechanism of MTrPs is related to changes in muscle activity, blood circulation, and local metabolism [8].

The trapezius muscle—descending fibers are one of the most affected areas by MTrPs due to the frequent presence of acute traumas, tension by chronic lesions, and tissue inflammation by repetitive movements in this muscle. Such tissue changes can lead to biopsychosocial

changes, reducing the quality of life and productivity of individuals [8, 9]. It is estimated that 21–93% of the population presents trigger points and that the trapezius muscle with its descending portion is an area of common involvement [10]. Clinically, this area is relatively more symptomatic as to the presence of pain implying muscle imbalances [11]. Different therapeutic approaches are used to treat MTrPs; among them, the use of acupuncture can be highlighted.

Some studies have demonstrated the effect of acupuncture on various biological systems, elucidating the mechanisms of action through neurophysiology [10, 12, 13]. The release of vasoactive substances, the increase in local blood supply, the increase in cellular oxygenation, the metabolic changes, the increase in immune system activation, changes in the lymphatic system, and the release of endogenous opioids that promote analgesia and muscle relaxation are also the results found by means of this therapy [10, 12–15]. The literature does not highlight which technique is the best to alter the electromyographic (EMG) activity of the trapezius muscle with MTrPs. Therefore, the first hypothesis is that the immediate stimulation in the auricular acupoint may act indirectly on the EMG activity of the trapezius muscle with MTrPs, and the systemic acupoint LR8 that presents the relaxation of tendons and muscles as one of the functions. The second hypothesis is the possible enhancement of the combined effects of both techniques and the individual effects of each technique. The last hypothesis was that the immediate effects of the procedures after 5 minutes of application would possibly lead to an alteration in the EMG signal.

Therefore, the purpose of the present study was to analyze and perform the intragroup and intergroup comparisons of the immediate effect of the auricular acupoint and systemic acupuncture LR8 on the EMG activity of the trapezius muscle with MTrPs.

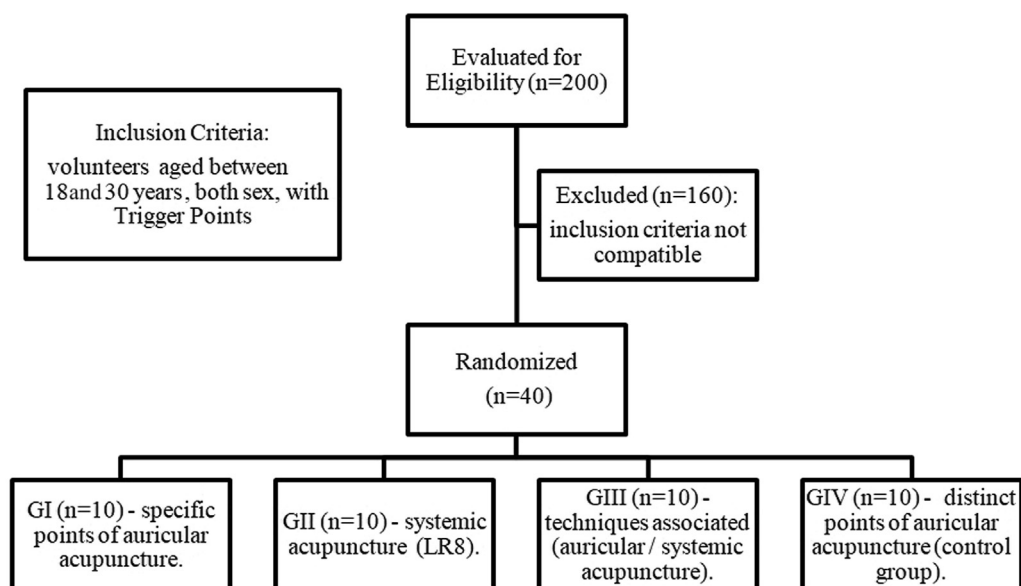


Figure 1 Flow diagram of the local and adjacent acupuncture. The diagram also includes the number of volunteers who were included and excluded from the trial.

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