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The effects of infrared laser and medical treatments on pain and serotonin degradation products in patients with myofascial pain syndrome. A controlled trial

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Abstract In this controlled study of 46 patients with myofascial pain syndrome, we investigated the effects of infrared (IR) laser application to trigger points and medical treatment on pain reduction and serotonin and its degradation products. Retaining double-blind trial principles, the patients were randomly assigned to two groups. The treatment group received IR laser treatment, whereas the control group received sham laser. However, both groups received medical treatment. In the treatment group, laser was applied once a day for 10 consecutive days at a dose of 1.44 J/cm². The effect of the laser treatment on pain was evaluated by visual analog scale. Urinary excretion of 5-hydroxy indole acetic acid (5-HIAA) and serotonin + 5-hydroxy tryptophan (5-HT+5-HTP) was studied by column chromatography. At the end of the treatment, there was a statistically significant difference between the VAS values of the treatment and control groups. The 24-h urinary excretion of the 5-HIAA and 5-HT+5-HTP was significantly higher in the laser treatment group than in the placebo group. In conclusion, IR laser is an effective modality in the treatment of MPS which increases an important mediator of pain inhibition, serotonin.

Keywords Laser therapy · Myofascial pain · Serotonin

Introduction

Though myofascial pain syndrome (MPS) is one of the most important diseases causing chronic and widespread pain, it is hardly ever diagnosed, and proper treatment is often missed [1]. The prevalence of MPS is predicted to be 12% in the population, and it is probably the most common cause of musculoskeletal pain [2].

Myofascial pain syndrome is a muscle pain characterized by referred pain radiating to a specific region by stimulation of the myofascial trigger points. Micro- and macrotraumas, excessive tension in the muscles, tiredness, psychological stress, and genetic factors are thought to be related to the disease. However, its etiology has not been clarified yet [3, 4]. On the other hand, some studies suggest that there are some features common to MPS and chronic fatigue syndrome such as sleep disorders and depression [2]. Taut bands and trigger points within these bands and the referred pain caused by palpation of these trigger points, together with regional pain symptom, are the leading factors for clinical diagnosis [1, 4].

Cold laser has been recently used for treatment of various disorders such as wound healing, edema, and pain. The mechanism of pain reduction is not completely understood. Some researchers have suggested that the cold laser changes the neuronal activity which, in turn, causes photochemical reactions [5]. Some studies report that cold laser application to trigger points in MPS decreases pain and tenderness and increases skin impedance [5, 6, 7, 8]. Walker et al. reported that cold laser application decreases pain and increases excretion of serotonin and its degradation products such as 5-hydroxy indole acetic acid (5-HIAA) in urine [9]. Jorgen et al. also examined the effectiveness of cold laser in patients with chronic orofacial pain and concluded that it is not very effective in these patients. However, in the same study there was also an increase in the urinary excretion of 5-HIAA in patients with reduced pain [10].

Excretion of 24-h urinary 5-HIAA is a measure of serotonin synthesis and degradation in the body. The

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