

A New Approach in Managing Temporomandibular Disorders with Photo Biomodulation

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Abstract

Background: Temporomandibular disorders are very frequent among adults. One third of adult people report symptoms, which include jaw and myofacial pain, earaches, headaches or clicking. The causes of temporomandibular dysfunction are abnormal occlusion, parafunctional habits (bruxism, lip biting), stress and abnormalities of the intra-articular disc. Therapies for these disorders are considered to be invasive, pharmaceutical and non pharmaceutical. Most patients refer improvement after noninvasive treatments. Low-Level Laser Therapy (LLLT) is a kind of physical treatment which can be used for reducing the symptoms of temporomandibular joint disorders. The clinical effects of LLLT are anti-inflammatory, analgesic, bactericidal and biostimulating. These effects can be helpful in reducing pain. Nowadays, this method is used by many clinicians in the dental field. The purpose of this study is to present the effectiveness of LLLT in reducing pain in TMD and emphasise that it can be easily used by the patient.

Materials and Methods: All 8 systematically healthy patients who were selected for the study suffered from myogenic TMD-associated orofacial pain. Six of them were treated with real LLLT for 4 weeks and two of them with the same protocol received placebo laser devices. Each patient was instructed to express its pain level just before, 1 week, 2 weeks, 3 weeks and 1 month after the treatment.

Results: There was a significant reduction of pain in the group of patients who received real LLLT treatment from the second week of treatment. LLLT showed no improvement in the placebo group.

Conclusion: It might be concluded that LLLT is beneficial in patients with severe TMD's. It may be a treatment method for patients who are interested in noninvasive therapies.

Keywords: *Temporomandibular Disorders; Low-Level Laser Therapy; Noninvasive Dentistry; Temporomandibular Pain; Effectiveness of Low-Level Laser Therapy*

Abbreviations

LLLT: Low Level Laser Therapy; TMD: Temporomandibular Disorders; VAS: Visual Analog Scale

Introduction

Temporomandibular disorders (TMD) affect a large portion of the population, who refer symptoms in the masticatory muscles and the temporomandibular joint, headaches and earaches. The causes of temporomandibular dysfunction are multifactorial, bio-psychosocial,

(depression, stress, anxiety) biomechanical (occlusal overloading, parafunctions), neuromuscular and biological factors. The management of TMD may be pharmacologic or non pharmacologic, a lot of studies have reported physical therapy such as laser therapy, electrotherapy and manual therapy. The laser technology was first used in medicine in 1963. The first laser device designed for dentistry was marketed in 1989. The acronym LASER means Light Amplification by Stimulated Emission of Radiation. LLLT has been recently considered as an effective therapy for TMD because of its easy application, it does not need much time to cure and it has only few contraindications. (Figure 1 to 4). Previous studies have proved that LLLT is a noninvasive therapy which has been used for reducing the severe symptoms of craniomandibular disorders. Soft laser therapy is based on the absorption of light photons by mitochondria that cause the production of adenosine triphosphate (ATP) which is important for cellular activity. Generally LLLT has analgesic effect and has also antibacterial action. Thus, the purpose of this pilot study is to present the benefits of photobiomodulation with a safe, portable device which can be easily used and assess the efficacy of low-level laser therapy with B-Cure Laser in patients with temporomandibular disorders.



Figure 1: My-Cure Laser Device self applied at the dental clinic



Figure 2: Clinical picture during the use of the Dental-Pro My-cure laser. The laser device is in contact with the temporomandibular joint area.



Figure 3: Clinical picture during the use of the Dental-Pro My-cure laser. The laser device is in contact with the temporomandibular joint area.



Figure 4: Clinical picture during the use of the Dental-Pro My-cure laser. The laser device is in contact with the temporomandibular joint area.

Mechanism of action of LLLT

LLLT is based on the mechanism of biostimulation

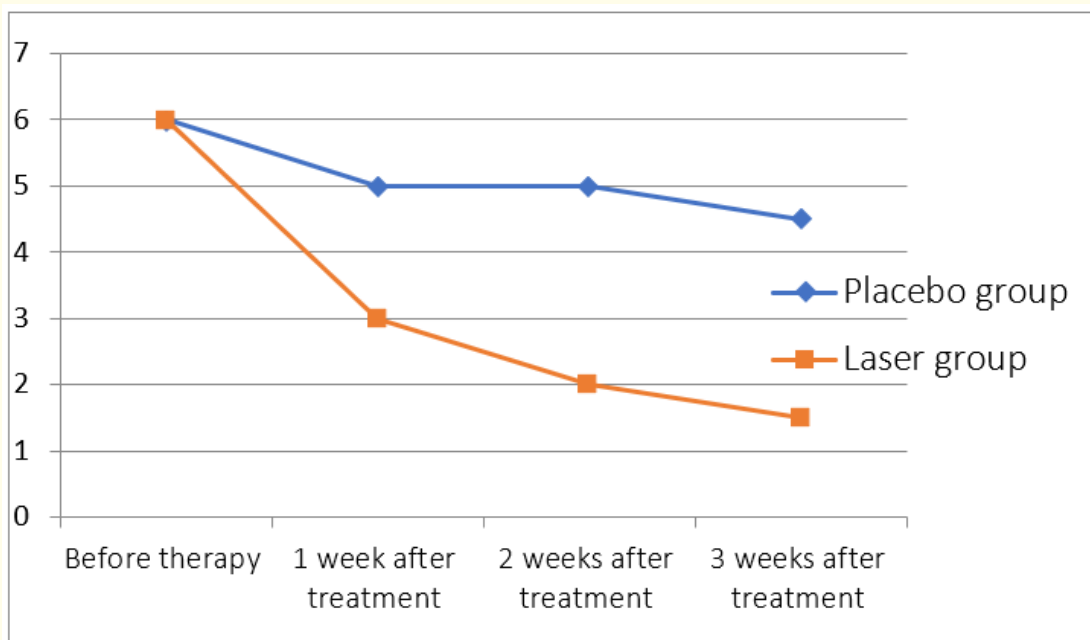
- Release of small doses of energy into tissues results in analgesic and anti-inflammatory effects
- Release of endorphin results in the reduction of pain signals from the nerves
- Absorption of light photons from the mitochondria of the cells increase the production of ATP that stimulates cell signaling
- Interferation in the microcirculation with the formation of new vessels which results in better healing
- Relaxation of the muscles
- Low-level laser therapy is based on photo-bio-modulation. This technique includes a low- intensity light which stimulates cell activity. The clinical effects of LLLT are anti-inflammatory, analgesic, biostimulating and anti-bacterial. The anti-inflammatory activity is achieved by the enhancing of the patient's natural immune system and the releasion of endorphins and inflammation enzymes which are speeding up the inflammatory processes.

B-Cure laser provides a very efficient and speedy treatment because the device is simple to use and does not require any specific knowledge or skills. This method is clinically proven from over 2000 studies. B-Cure laser is an advanced technology which provide effectiveness even in chronic TMDs [1-17].

Materials and Methods

8 patients with TMD and free pathological medical history were randomly selected. The patients were randomly divided in 2 groups. Group 1 (6 patients): in this group people receive real LLLT. (LLLT group), Group 2 (2 patients) : in this group patients received placebo laser devices (placebo group).The patients received daily therapy for 4 weeks with an 808 nm diode laser (Good Energies, B-Dental Pro Cure Laser, UK), with a portable dental laser device. The treatment period lasted 4 weeks. The laser device was in contact with the temporomandibular joint area. For the treatment, diode lasers are used with a wavelength of 808 nm, a dose of 11 J/cm² (B-Cure Laser) for 10 minutes twice a day. Each patient was instructed to express its pain level by a visual analog scale (VAS) before and after therapy with B-Cure Laser. The patients made a perpendicular line between the two extremes representing the pain that they felt.

Patient pain evaluation level (VAS)



Graph 1

Results and Discussion

The results showed that LLLT is effective in reducing pain. In group 1 one patient refer reduction of the symptoms from the first week and 3 patients refer reduction 2/6 in the VAS scale from the second week of treatment. Finally, after 3 weeks of treatment, three patients from laser group refer disappearance of pain symptoms from the third week of treatment. In group 2 the patients report no improvement.

Conclusion

In this pilot study a new method is investigated in the management of pain from the temporomandibular joint. B-cure laser Dental Pro device has been shown to be effective in the reduction of temoromandibular pain because of its anti-inflammatory effect in the irradiated

area. Dental-Pro B-CURE laser device (Good Energies, B-Dental Pro Cure Laser, UK) is considered to be a promising solution with several extra-oral applications in the dental field. The results of this study are very encouraging as they present a simple method for reduction of pain level. This pilot study may serve for a sample size calculations for a future full study. However, LLLT is considered a recent alternative therapy and further studies are required to clarify the encouraging results of this therapy in managing the TMD.

Conflict of Interest

None.

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