

**CLINICAL EVALUATION OF LOW-LEVEL LASER THERAPY IN  
TEMPOROMANDIBULAR JOINT PAIN: A CLINICAL STUDY**

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**ABSTRACT**

Temporomandibular dysfunction is characterized by the presence of painful joint/muscular symptoms muscle in the face. The main justification for the use of lasers in laser therapy dysfunction is its analgesic effect, which was observed in most studies in the literature. So the aim our study was to elevate the effectiveness of laser therapy in temporomandibular joint pain. **Methods:** 30 volunteers with temporomandibular joint pain were divided into two groups (Control- NSAIDS and Experimental-LASER) treatments were evaluated at baseline and 21 days after the first evaluation with registration of pain in Visual Analogue Scale. **Results:** In our study most of the female patients were reported with complain of temporomandibular joint pain. At 21 days there is significant difference in test and control group. **Conclusions:** The laser decreases the painful symptoms as compare to control group of the patient after application through its analgesic and/or a placebo effect.

**KEYWORDS:** Temporomandibular dysfunction, Control- NSAIDS and Experimental-LASER.

**INTRODUCTION**

Temporomandibular joint dysfunction (TMJD) or temporomandibular disorder (TMD) is characterized by facial muscle/joint pain, especially in the acute phase. TMD has numerous signs and symptoms: muscle and/or joint pain, joint noises, earache, mandible shifting and, in the most severe cases, dislocations.<sup>[1]</sup>

The main justification as to the use of low intensity laser (laser therapy) on TMD is its analgesic effect reported by most of the studies found in the literature. According to Medeiros, many studies show that laser increases the amount of collagen in the wound, causing angiogenesis and reducing lesion repair time, increasing the number of cells available for healing. According to Freitas et al., often times laser therapy can be used in lieu of anti-inflammatory medication, thus, preventing side effects. Nonetheless, Beckerman et al. reported effects arising from laser therapy – transitional pins and needles, mild erythema, a burning feeling, pain increase and exanthema.<sup>[2]</sup>

The low intensity laser is, in many cases, a new treatment mode for the treatment of maxillofacial region disorders such as joint pain, neuralgias and paresthesias. Despite the numerous treatment modes available for TMD, only low intensity laser has proven capable of relieving pain in minutes after administration, bringing about a significant improvement to the patient. Despite all these benefits brought about by laser treatment, it is

not the definitive treatment for TMD. It works as a coadjuvant in the treatment alleviating pain thanks to the laser's analgesic effect, which allows the patient to promptly resume her/ his functions, providing greater comfort.<sup>[6]</sup> Nonetheless, for a safe use of laser with patients, the professionals must be trained to use the equipment, thus reducing the possibility of iatrogenic effects. The goal of the present study was to assess the efficacy of laser treatment in the management of TMD by means of the Visual Analogue Pain Scale (VAPS).<sup>[3-9]</sup>

**MATERIALS AND METHODS**

The patients between the age group 18-40 year were selected for the study. 30 patient with bilateral TMJ pain were selected for the study, as confirmed by the an informed consent was obtained from each patient prior to participation in the study. They were able to read and to write and they had received no treatment for TMD in the last six months.

The study excluded all patients with degenerative joint diseases, psychiatric disorders, patients with severe pain who were treated of independently during the course of treatment way. The patients that received treatment for other conditions during the protocol were eliminated.

Pain score were elevated on baseline and 21 day on a Visual Analogue Scale (VAS). The treatment of the test group (active LLLT) was performed with GaAlAs laser (Model Laser Dent & KVT-206, Brand Lasertech),

which has an emission power of 0.125 W. The treatment dose was 6-9 J/cm<sup>2</sup>, with a trip time at each point of 80 s after the application score is recorded.

The treatment of the control group (NSAIDS) to the contralateral TMJ was managed in the same way but with the laser device not turned on. The result of the treatment assignment remained unknown to the evaluator and patient.

Each patient received instruction related to the maintenance of a soft diet, the limitation of mouth opening, recommended exercises, and the elimination of parafunctional habits, such as the use of chewing gum, nail biting, object biting, and bruxism. Each patient also received a sheet outlining the same instructions for the patient's reference during the treatment. The evolution of each person's TMJ pain was registered on baseline and 21 day on a Visual Analogue Scale (VAS) after the first evaluation.

Finally the outcomes were collected. For statistical analysis the SPSS V17.0 software program was used. The mean, median, standard deviations and proportions were calculated. The effectiveness of LLLT was evaluated through a comparison of the pain averages of patients in both groups with Mann Whitney U test, and the intra-group differences were calculated with

ANOVA test for repeated measures and significance less than 0.05.

## RESULTS

In comparing the results between test and control group, test group shows considerable decrease in pain on 21 day. However, the group of patients treated with control continued to show a decrease in pain until the end of the study, unlike the group of patients treated with active LLLT whose pain showed more irregular behaviour, and showed statistical significance when comparing the differences in pain before and after.

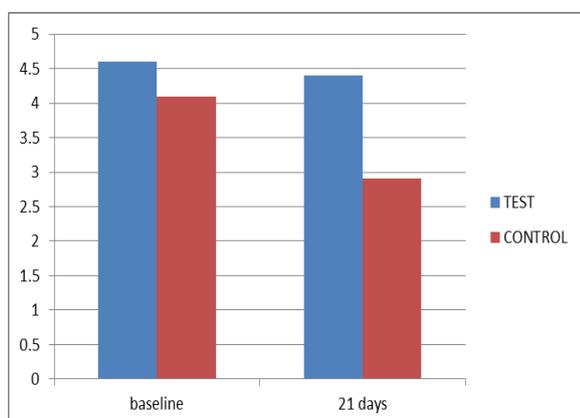
A significant reduction of pain relief following active LLLT (test) is noted in a comparison of differences between the treatment control group.

Finally, the **Unpaired t-test** was used to identify inter-group differences. In the right TMJ did not reveal differences between any treatment groups. Although the description of inactive LLLT seems to indicate a greater level of pain relief, the statistical results denote that the actual pain perception was the same before as after treatment in both groups. Conversely, in the left TMJ the active LLLT showed a decrease in pain among the first two evaluations and the last two and last two evaluations when a Post- Hoc Tukey test was applied, but the results of the inactive LLLT did not indicate great variations in pain.

**Table. 1: Comparison of Visual Analogue Pain Scale Test And Control Groups.**

VAS	Groups	Mean (mm)	Std. Deviation	t-test value	P-value	Mean Difference
Baseline	Test	4.60	.699	.435	-.781	.200
	Control	4.40	.699			
At 21 Days	Test	4.10	.316	<b>.001*</b>	-3.430	1.200
	Control	2.90	.738			

**Unpaired t-test**  
\*significant difference (p-value<0.05)



**Graph. 1. Show the Vas with Time in Different Groups Incorporated in the Study.**

## DISCUSSION

The participants in this research study were predominantly female, which is consistent with other epidemiological and clinical studies which have shown

that TMD affects more females, as well as other variables such as the greater frequency with which women come to seek treatment for any condition. Moreover, the average age of this study (30 years) is consistent with the average reported in the literature, which fluctuates between 18 and 45 years, because it is at this age when the disease presents higher peak frequency.<sup>[10-13]</sup>

This study was able to demonstrate the effectiveness of LLLT for pain relief of arthrogenic test group. The test group showed a marked decrease in pain perception between the baseline state and the evaluation of pain perception at the end of the study (21 days later) regardless of the type of treatment used which demonstrates a placebo effect in this type of treatment, as has been reported by several authors. LLLT showed a remarkable decrease in perceived pain from baseline state to the last application of therapy.<sup>[14-16]</sup>

An analysis of related studies found that precisely those studies reporting an actual beneficial effect of laser therapy, did not include in control group. In these studies, laser therapy was simply compared with other treatments such as painkillers or anti-inflammatory medication, which may explain the differences in pain relief for patients undergoing such treatment. However, the studies that documented only a placebo effect with LLLT were those that compared active and inactive LLLT.<sup>[17-21]</sup>

They implemented a different protocol than that used in this study, as well as different areas of application, dosages, application techniques, power densities. In general the most commonly used therapeutic laser in laser research has been the Ga-As-Al, semiconductor laser, which belongs to the group of continuous wave lasers that provide treatment through biostimulant, anti-inflammatory and analgesic effects. It is a small medical device with greater availability on the market, factors which facilitate and optimize its extensive utility in the dental clinic. It is also not limited to the treatment of one disease. These are the reasons why we decided to use this type of laser in the study. One of the main strengths of this study was that the researchers were able to control many of the variables.<sup>[23]</sup>

Furthermore, the benefit provided by the randomization of the process, allows results to be attributed solely to the process itself. Finally the researcher who evaluated the pain associated with TMD was unconnected to the treatment provided for each TMJ, which ensured that the results involuntarily obtained were not influenced by the researcher. However, weaknesses of this study were not to consider the type of (acute or chronic) received by patients and the size of the sample. Type of pain may have influenced the results because it is known that chronic conditions do not heal themselves, if not that, it tend to settle in the category of incurable diseases.<sup>[24-27]</sup>

## CONCLUSIONS

LLLT is an effective treatment for reducing pain associated with arthrogenic TMD, Specifically in the left side. The likely explanation is that most right-handed patients prefer chewing on the right side, and as a result, the TMJ is the more susceptible to pressure and therefore inclined to hurt more severely as it is the balance joint.

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