

CLINICAL EVALUATION OF DRUG THERAPY AND LOW LEVEL LASER THERAPY IN TEMPOMANDIBULAR JOINT PAIN –A CLINICAL STUDY

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ABSTRACT

Background: Non-surgical treatment is the first step in the treatment of temporomandibular disorders. Low-Level Laser Therapy (LLLT) was compared with drug therapy in these patients. **Methods:** 30 Patients were selected for the study and randomly divided into two groups of drug therapy (Acenac P 500mg capsules + Diazepam 2 mg) and LLLT (Zolar). Data were evaluated by Visual Analog Scale (VAS). Comparison of average changes in VAS after treatment in both groups was carried out by independent two-sample t-test. Finally, chi-square test was used to compare tenderness and clicking frequency after the treatment. P-value < 0.05 was considered to be statistically significant. **Results:** Both methods showed a decreasing trend in pain, clicking and tenderness. Decline in VAS immediately after treatment was significantly lower in LLLT therapy (P<0.01). **Conclusion:** Both laser and drug therapy methods were effective in the treatment of temporomandibular disorders. However, LLLT showed a significant decrease in the recovery process, so it is more sensible to consider it an appropriate therapy.

INTRODUCTION

The temporomandibular joint (TMJ) acts like a sliding hinge, connecting your jawbone to your skull. You have one joint on each side of your jaw. TMJ disorders can cause pain in your jaw joint and in the muscles that control jaw movement. The exact cause of a person's TMJ disorder is often difficult to determine. Pain may be due to a combination of factors, such as genetics, arthritis or jaw injury. Some people who have jaw pain also tend to clench or grind their teeth (bruxism), although many people habitually clench or grind their teeth and never develop TMJ disorders.^[1]

In most cases, the pain and discomfort associated with TMJ disorders is temporary and can be relieved with self-managed care or nonsurgical treatments. Its symptoms are muscular pain, pain in temporomandibular joint, sensitivity in touching the face, clicking and restrictive and asymmetrical jaw movement. Non-surgical or medical treatment is a major part of initial management of patients with temporomandibular dysfunction.^[2]

An occlusal appliance (splint) and massage of sore muscles can be used as some basic therapies for myogenous TMD. The other common therapeutic methods for reducing pain and temporomandibular dysfunction are drug therapy, laser therapy and physical therapy, and clinicians prefer non-aggressive therapeutic intervention for these cases.^[3]

Low level lasers do not liberate heat or destruct the fibers, and they are named so because their density is lower than 0.5w/cm². Some advantages of LLLT are stimulating biological system and improving cellular metabolism in the injured cells, having anti-irritant effect, improving blood circulation, increasing pain tolerance based on changes in the potential of embryonic layer, adjusting the immune system, increasing intracellular metabolism, speeding up scar recovery and indolence.^[4]

PATIENTS AND METHODS

This study was carried out on 30 patients. Written consent was obtained from all the patients.

Inclusion criteria

Patients in the age range of 20-45 years who had dental class I occlusion and at least two of the following symptoms: dysfunction of masticatory muscles, restrictive jaw movements, bruxism or clenching, clicking sound and sensitivity to palpation at TMJ.

Exclusion criteria

Included any kind of systemic illness, supportive therapies like drug and physical therapy, tooth loss, fixed or displaced prosthesis, previous trauma, malocclusion, orthodontic device, history of recent dental treatment or previous surgery in the maxillofacial area and age limits other than 20-45.

Patients were randomly divided into drug therapy and laser therapy. As for the drug therapy 15 patients, Acenac P 500mg capsules and Diazepam 2 mg were administered twice a day for 10 days. For laser therapy group, LLLT was performed (zolar Laser) using laser parameters at wavelength of 980 nm, output power of 50 mW, energy per point of 4 Joules, power density of 1.78 W/cm², laser beam of 0.028 cm² and energy density of 144 J/cm² twice a week for four weeks, and the laser was in touch with the epithelial surface on the TMJ location during the laser exposure (for 10 seconds per point).

Exposure was performed at three points in each session, so the energy per session was three times greater than the energy at each point. Pain measurement was carried out using VAS. The patients were asked to rate the pain from 0 to 10. Zero indicated "no pain" and 10 showed "the greatest possible pain". As for evaluation of clicking and crepitus noise, patient's TMJ was palpated during mandible movement and stethoscope use.

Statically analysis

Finally, the results of the two methods were compared and evaluated. SPSS (Version 18.0. Chicago: SPSS Inc.) used to analyze the data. Results were reported as "mean \pm standard deviation" for quantitative variables and as "number (percentage)" for qualitative variables. As for evaluation of frequency changes, McNamara's test was used. Two-way repeated measures ANOVA was used for the purpose of comparing VAS. Comparison of average changes in VAS after treatment in both groups was carried out by independent two-sample t-test. Finally, chi-square test was used for comparison of tenderness and clicking frequency after the treatment. P-value < 0.05 was considered to be statistically significant.

RESULTS

VAS decrease during the study period in each of the studied groups (laser and drug) was statistically significant (P < 0.05). Also, two-way repeated measures showed that pain reduction was significantly higher in the laser group than the drug group during the study period (P < 0.01).

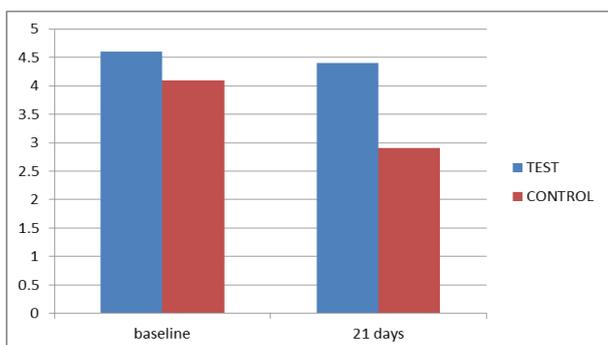
The results showed a significant decrease in clicking frequency in 10 days after the treatment. According to the results, the equality of test of variances was significant in VAS, and decreased VAS during the course of study in both groups was significant. Moreover, the interaction of therapy groups and time period was statistically significant. Also, equality of test of variances was significant, and the increasing trend in the study in both groups was significant. The interaction of group therapy and time period was not statistically significant.

It should be noted that there was no side effect until the end of the study.

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 10 DAYS	CONTROL	4.10	.316	.001*	-3.430	1.200
	TEST	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

Different therapy methods are used for the treatment of TMD such as physical therapy, drug therapy, laser therapy and surgery, and finding the best therapy is quite important because 20 to 30% of adults suffer from this disorder.^[5,6]

A study on the measurement of jaw movements and TMJ pain in patients treated by the gallium-aluminum-arsenide laser (GaAlAs) concluded that laser can be a supportive therapy in the treatment of TMD, causing a decrease in symptoms and an increase in mandible movements. Similarly, the results of the present study

showed that LLLT had the same effects. Another study on the effect of GaAIAs LLLT on TMD showed that LLLT could decrease VAS and increase AROM and thus be used as an effective treatment for TMD.^[7]

Evaluation of the tenderness frequency in our study indicated a decrease in the tenderness frequency four weeks after treatment compared with its amount before the treatment, although this reduction was not statistically significant. However, in the first week, second week and fourth week, the tenderness frequency was significantly lower in the laser therapy group than in drug therapy group.^[8-13]

Cetiner, *et al.* also dealt with the impact of GaAIAs LLLT on TMD. They used this treatment on 39 patients and concluded that LLLT was a suitable treatment for TMD, which should replace other therapeutic methods.^[14] Some other studies have shown no significant difference between LLLT and placebo and have suggested no preference for using this therapeutical method.

The results of the present study showed statistically significant advantages of laser therapy over drug therapy so that before the treatment both were similar as to age, sex, clicking, VAS and tenderness.^[4]

In a study by Sedat Çetiner, *et al.* the use of LLLT improved the maximum opening of mouth and chewing problem, and temporomandibular pain decreased in patients. Further, the LLLT results showed it was a suitable treatment for TMD. The results of this study were in agreement with those of the present study.^[9]

Another study compared the efficacy of LLLT with non-steroid anti-inflammatory drugs in treating the pain caused by TMD. The mean pain scale in the laser treatment group was significantly lower than those of the drug group and control group. The results of this study were consistent with the findings of the present study.^[10]

Another study was conducted on patients with pain caused by TMD in which LLLT was used to relieve pain in patients. LLLT was significantly effective in reducing the pain of patients compared with the control group, but there was no significant difference between patients with myofascial pain. The results showed that LLLT could be considered a useful technique to treat the pain associated with TMD, especially chronic pain. The results of this study were consistent with the findings of the present study.^[12]

In another study performed on 46 patients with bilateral subjective tinnitus with TMDs, LLLT with an neodymium-doped yttrium aluminum garnet (Nd:YAG) (1064 nm) laser and LLLT with a diode laser (810 nm) were applied to the patients. Results showed significant differences in the Nd:YAG laser and 810 nm diode laser

groups, which were in line with the findings of the present study.^[5,6]

LLLT has more advantages and fewer side effects and at the same time is more cost-effective, but in many cases drug therapy is more appropriate and cost-effective.

A limitation of this study was that the reports on the amount of pain were subjective and not reliable. Another limitation of this study was that it had no control group. Another limitation was that we could not expect pain relief after laser therapy at just one point on TMJ in patients that had constriction of lateral pterygoid muscle and restriction of mouth opening but no problem in TMJ. These patients could be included in the study according to the inclusion criteria, but they would not benefit from laser therapy on TMJ.^[15]

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