

Immediate Relief of TMJ Clicking Following Low Level Laser Therapy after Orthodontic Treatment

A Case Report

*Massoud Seifi, Elahe Vahid-Dastjerdi

Laser Application in Medical Sciences Research Center, Department of Orthodontics, Shahid Beheshti University of Medical Sciences

Abstract:

Introduction: To determine efficacy of low level laser therapy for clicking temporomandibular joint (TMJ) with a diode laser following orthodontic treatment.

Methods: Performance of LLLT with a diode laser for temporomandibular clicking and postoperative findings were evaluated in a case of an orthodontic patient following the termination of treatment. Patient had a history of severe clicking before initiation of treatment protocol. Low level diode laser (wave length 808 nm, power 0.7 watt, Time 60 seconds), applied for the purpose of relieving the signs.

Results: During the process of intervention and establishing the proper dental occlusion sign of temporomandibular joint dysfunction i.e. clicking reduced significantly ($p < 0.05$) but remained at the lowest level from the perspective of frequency and severity index. Patient had no sign and symptom at the end of treatment. Clicking was reemerged in the retention period, i.e. after six months. Clinical signs disappeared immediately after the application of laser once ($p < 0.05$) with no recurrence after four months follow up.

Conclusion: Low level laser therapy serves as an adjuvant to orthodontic treatment while establishing the proper occlusion of stomatognathic system has pivotal role in function and stability of outcome.

Keywords: Lasers; Laser Therapy, Low Level; Diode Laser; Temporomandibular Joint Dysfunction Syndrome; Case Reports

Please cite this article as follows:

Seifi M, Vahid-Dastjerdi E. Immediate relief of TMJ clicking following low level laser therapy after orthodontic treatment: A Case Report. *J Laser Med Sci.* 2011; 2(1):43-5

*Corresponding Author: Dr. Massoud Seifi; Professor of Orthodontics, Department of Orthodontics, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Tel: +98-21-22 40 30 75; Email: seifimassoud@gmail.com, mseifi@dent.sbmu.ac.ir

Introduction

From the etiologic perspective, Temporomandibular dysfunctions are very complicated and a pre-existing condition can be worsened during treatment and retentive phase of orthodontic-orthopedic corrections(1). Disorders of TMJ have correlation to several factors including dental occlusion, stress and psychosocial elements; thereby necessitating a multidisciplinary approach for management and assessment(2). Lateral pterygoid muscle plays an important role in parafunctional

excursive mandibular movement and in specific its superior head is active on ipsilateral and its inferior head on contralateral jaw movement(3), hence can influence the TMD problems(3-5). Patients who suffer from TMD and have dentofacial deformities may take advantage of orthognathic surgery in both correction of skeletal malrelations and improvement in sign and symptoms(6-7).

Laser with its various types, serves dentistry for the mucosal and hard tissue purposes. Soft tissue dental lasers are known for their precision in surgery, hemostasis in bleeding diatheses, and

reduced healing time. The neodymium YAG laser is used in oral and maxillofacial surgery and exhibits minimal tissue absorption and maximum penetration relative to CO2 laser(8). Clinical trials have shown that carpal tunnel syndrome (CTS) can be treated with diode lasers by placing the laser beam directly over the transverse carpal ligament(9). Low level laser therapy (LLL) has been promising for success in accelerating wound healing, pain relief and recovery after sport or accident injuries(10).

The main purpose of this study was determining the efficacy of low level laser therapy for a patient suffering from temporomandibular joint (TMJ) clicking even after establishing correct occlusal relationship after orthodontic treatment.

Case Report

The patient was a 14-year-old Persian female who was complaining about her dental irregularities and anteroposterior relationship of her jaws. During the intraoral examination, clinical sign of clicking was discovered and history of TMJ clicking confirmed by the patient (Right and Left condyles before treatment (B)) (Table 1). Clicking was quantified by allocating the numeric field to the proportionate severity i.e. zero allocated for no clicking and mild, moderate, and severe were referred to 1 to 3 respectively. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 16 by paired t-test between consecutive time periods.

The objective sign existed on both sides and recorded as clicking sound during treatment (DT) (Table 1). Treatment was based on comprehensive fixed appliance therapy with Roth prescription and 0.018 inch bracket slot. Patient had no sign and symptom at the time of debanding and debonding (A) (Table 1). The functional occlusion was established and the interocclusal relationships lacked any protrusive or lateral excursive interference (Fig. 1).

Regular recall was responded after six months



Figure 1. Establishment of functional occlusion with eliminating any protrusive or lateral excursive interference



Figure 2. Performing the protocol of TMJ laser therapy after six months from termination of active phase of treatment

during the retention period and a complete examination of the occlusion and stomatognathic system was performed and evidence of clicking in TMJ was recovered (Ret) (Table 1). In the aforementioned session a protocol of TMJ therapy rendered with low level laser therapy ($\lambda= 808$ nm, power = 0.7 watt, mode = continuous, Time = 60 seconds) in diode laser group (Lambda Scientifica ®, Altavilla, Italy). Astonishingly, the sign and symptom disappeared immediately after performing the protocol and did not recurrent in a four months follow-up (Laser group in Table 1) (Fig. 2).

Discussion

According to the stomatognathic studies, the prevalence of occlusal and RCP(CR)-ICP(CO)

Table 1. Distribution of clicking severity over the period of time (Before, During Treatment, After, Retention Phase, and Laser session) and Right/Left sides.

	Right (B)	Left (B)	Right (D T)	Left (DT)	Right (A)	Left (A)	Right (Ret)	Left (Ret)	Right (Laser)	Left (Laser)
Average	2.6	2.5	1.5	1.4	0	0	1.3	1.2	0	0
SD	0.52	0.53	0.52	0.51	0	0	0.48	0.42	0	0

discrepancies is as high as 18% in treated cases with fixed appliances(11). Non-working side contact occurs in 30% of subjects, and posterior contacts on protrusion in 20% of cases(12). These data clarify that a meticulous examination of occlusal relationship is mandatory before initiation of the debond process for a given patient. Clark has shown if a high degree of jaw function interference is present then the prognosis of improvement with brief self-directed physical therapy, an occlusal appliance, and over the counter Non-steroidal Anti-inflammatory Drugs (OTC NSAID) are lower(13). In the present study, as mentioned earlier the amount of occlusal discrepancy was diminished to its lowest degree by the establishment of an acceptable functional occlusion. Recurrence of clicking during the orthodontic retention period after active phase, demonstrate the importance of the follow-up session that cannot be granted. By application of low level laser (TMJ therapy protocol), clicking sound was ceased and TMJ relief obtained. The latter is consistent with other studies for TMJ therapies including the study performed by Fikackova et al for treating arthralgia of the TMJ. They showed the effectiveness of complex non-invasive treatment in patients with arthralgia of the TMJ and the analgesic and anti-inflammatory effects of LLLT which was confirmed by infrared thermography(14). Hence the therapeutic effect of diode laser on TMJ can be conferred through its photodynamic effects, alteration in blood flow, and mechanisms for reducing the inflammatory response of body in TMJ against environmental factors.

References

1. Henrikson T. Temporomandibular disorders and mandibular function in relation to Class II malocclusion and orthodontic treatment. A controlled, prospective and longitudinal study. *Swed Dent J Suppl.* 1999;134:1-144.
2. Rollman GB, Gillespie JM. The role of psychosocial factors in temporomandibular disorders. *Curr Rev Pain.* 2000;4(1):71-81.
3. Murray GM, Phanachet I, Uchida S, Whittle T. The human lateral pterygoid muscle: a review of some experimental aspects and possible clinical relevance. *Aust Dent J.* 2004 Mar;49(1):2-8.
4. Bhutada MK, Phanachet I, Whittle T, Peck CC, Murray GM. Activity of superior head of human lateral pterygoid increases with increases in contralateral and protrusive jaw displacement. *Eur J Oral Sci.* 2007 Aug;115(4): 257-64.
5. Murray GM, Phanachet I, Uchida S, Whittle T. The role of the human lateral pterygoid muscle in the control of horizontal jaw movements. *J Orofac Pain.* 2001 Fall;15(4):279-92; discussion 92-305.
6. Al-Riyami S, Cunningham SJ, Moles DR. Orthognathic treatment and temporomandibular disorders: a systematic review. Part 2. Signs and symptoms and meta-analyses. *Am J Orthod Dentofacial Orthop.* 2009 Nov;136(5):626 e1-16, discussion -7.
7. Al-Riyami S, Moles DR, Cunningham SJ. Orthognathic treatment and temporomandibular disorders: a systematic review. Part 1. A new quality-assessment technique and analysis of study characteristics and classifications. *Am J Orthod Dentofacial Orthop.* 2009 Nov;136(5):624 e1-15; discussion -5.
8. Bradley PF. A review of the use of the neodymium YAG laser in oral and maxillofacial surgery. *Br J Oral Maxillofac Surg.* 1997 Feb;35(1):26-35.
9. Chang WD, Wu JH, Jiang JA, Yeh CY, Tsai CT. Carpal tunnel syndrome treated with a diode laser: a controlled treatment of the transverse carpal ligament. *Photomed Laser Surg.* 2008 Dec;26(6):551-7.
10. Simunovic Z, Ivankovich AD, Depolo A. Wound healing of animal and human body sport and traffic accident injuries using low-level laser therapy treatment: a randomized clinical study of seventy-four patients with control group. *J Clin Laser Med Surg.* 2000 Apr;18(2):67-73.
11. Milosevic A, Samuels RH. Functional occlusion after fixed appliance orthodontic treatment: a UK three-centre study. *Eur J Orthod.* 1998 Oct;20(5):561-8.
12. Milosevic A, Samuels RH. The post-orthodontic prevalence of temporomandibular disorder and functional occlusion contacts in surgical and non-surgical cases. *J Oral Rehabil.* 2000 Feb;27(2):142-9.
13. Clark GT, Baba K, McCreary CP. Predicting the outcome of a physical medicine treatment for temporomandibular disorder patients. *J Orofac Pain.* 2009 Summer;23(3):221-9.
14. Fikackova H, Dostalova T, Vosicka R, Peterova V, Navratil L, Lesak J. Arthralgia of the temporomandibular joint and low-level laser therapy. *Photomed Laser Surg.* 2006 Aug;24(4):522-7.