Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.comdoi: 10.21276/jamdsr Index Copernicus value = 91.86

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Low level laser therapy as an adjunct in treatment of lichen planus: An original research

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ABSTRACT:
Aim: The purpose of this research was to evaluate the efficacy of low level laser therapy for the treatment of oral lichen planus(OLP) as an adjunct to corticosteroid therapy. **Methodology**: All 45 male and female patients were randomly categorized into three groups. In the first group the placebo laser was used on the lesion. In the second group, the Diode laser as LLLT was used in the exposure ranged 810 nm, 10 mW, 0.2-1.0 cm^2, 1.5 J/cm^2 and 120 seconds. In the third group, corticosteroid therapy is used systemically with prednisolone (50 mg/day), and afterwards with clobetasol ointment in an adhesive medium. **Results**: The LLLT group demonstrated a significant ($p > 0.05$) pain level reduction and quicker epithelization as compared to the corticosteroid therapy. **Conclusion**: The finding of the present study indicates that the utilization of LLLT is beneficial to the treatment of the OLP.
Keywords: Oral Lichen Planus, Low Level Laser Therapy, Corticosteroid.

Received: 10-12-2021 Revised: 23-12-2021 Accepted: 31-12-2021

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This article may be cited as: Tandon C, Kashyap A, Aamir M, Gupta N, Shoaib M, Aditya K, Uppal A. Low level laser therapy for treatment of lichen planus: An original research. J Adv Med Dent Scie Res 2022;10(1):69-72.

INTRODUCTION

Oral lichen planus (OLP) is a relatively common chronic mucocutaneous disorder that affects 0.5-2% of the general population.[1] It usually affects individuals between the ages of 30-65 years, with a slight female predisposition. Buccal mucosa is the most common site of OLP followed by tongue and gingiva, but any site of the mucosa can be affected. Clinically, OLP is classified as reticular, papule, bullous, plaque-type, atrophic and erosive.[2] The reticular form is the most common form; it is mostly asymptomatic and requires no treatment. In contrast, atrophic erosive forms usually present erythematous, ulcerative areas causing symptoms, ranging from mild burning sensation to severe pain, interfering with eating and speaking; it greatly affects patients quality of life that requires medical intervention. Additionally, OLP is considered a potentially malignant disorder with estimated transformation rate of 1.09%, with higher risk among those with atrophic-erosive lesions.[3] Although the exact etiopathogenesis of OLP is still unclear, current evidence supports an inflammatory cell mediated- immune response to an unknown trigger.[1] Factors reportedly associated with OLP include dental materials, systemic diseases as well as medications, stress, viruses and genetic susceptibility.[4-6] Given the obscure etiology, there is no specific therapy for OLP as yet and the treatment is usually symptomatic and without a definite cure. Therapies that have been used for treatment of OLP

include corticosteroids such as clobetasol; topical calcineurin inhibitors such as tacrolimus; topical and systemic retinoids such as tretinoin; and immunosuppressants such as azathioprine.[1,2,7] Non-pharmacological modalities include cryotherapy, photodynamic therapy and surgical excision. Topical and systemic corticosteroids are the most widely accepted treatment option for OLP.[2] However, due to the chronic nature of OLP, long term use of corticosteroids has numerous disadvantages that include mucosal thinning, secondary candidiasis, adrenal insufficiency, patient compliance with the treatment, and discomfort during application.[7] Moreover, some cases remain refractory to steroid therapy. The use of low-level laser therapy (LLLT) as an alternative modality for treatment of OLP has been of great interest in the recent years. LLLT, also known as photo-biomodulation, is a non-pharmacological, non-invasive clinical application, which has potential analgesic, anti-inflammatory, immunomodulatory and biostimulating effects, with minimum adverse effects.[8-12] The principle of LLLT application is based on its biostimulatory, anti-infective, and anti-ablation effects. LLLT includes wavelengths between 500 and 1100 nm and typically involves the intensification of electromagnetic fields excited by external source of energy such as light that emits coherent, well-collimated, and monochromatic laser beam. This mechanism implies redox regulation that explains the clinical effects in chronic inflammatory response (OLP) characterized by acidosis and tissue hypoxia that has the potential of tissue healing and tissue regeneration without systemic disturbances and undesirable effects on the healthy tissue. Numerous studies have evaluated the efficacy of laser in treatment of symptomatic OLP.[13] Several low level lasers used to treat oral lichen planus, including ultraviolet waves below (350 nm length), helium-neon, more recently, the diode laser. Each type of laser has different parameters, such as wavelengths, intensities, power, durations, number of sessions, and therapeutic approaches that have been documented for laser therapy.

AIM:

The purpose of this research was to evaluate the efficacy of low level laser therapy for the treatment of oral lichen planus as an adjunct to the established corticosteroid therapy.

METHODOLOGY:

The ethical committee approval was taken for the study. All 45 male and female patients of age group 30 to 50 years were randomly categorized into three groups. The selected patients have no known allergies or underlying systemic diseases. Patients have undergone the complete oral prophylaxis to remove all the supra and sub gingival plaque and calculus resulting in the healthy gingiva. Patients were evaluated for demographics, medical history, presence of pain and discomfort, duration of disease, type, size, sites of oral involvement, these data were assessed and recorded. Patients with any systemic disease and Pregnancy were excluded from the group.

The first group was placebo in which laser with no energy and in non contact mode was used on the lesion.

In the second group, Ezlase Diode laser as LLLT was used as exposure range is 810 nm, 10 mW, 0.2-1.0 cm^2, 1.5 J/cm^2 and 120 seconds. The lesion was marked with the haematoxylin pencil. In a continuous non-contact mode with 320 µm diameter fiber optic as delivery system that was directed on the affected areas of oral mucous membrane with defocused mode and overlapping exposure until blanching of the treated area was observed. The patients and the operating staff were advised to wear special googles for eye protection. The session is repeated 3 times with the interval of 1 min to give time for the relaxation of the mucosal tissue. The sessions are done thrice a week until the lesion is resolved.

In the third group, corticosteroid therapy is used systemically with prednisolone (50 mg/day), and afterwards with clobetasol ointment in an adhesive medium is asked by the patients to be applied on the lesion twice daily until the lesion resolved.

The treatment efficacy was assessed by comparing the time of epithelization and the level of pain on the 14^{th} and 30^{th} day postoperatively. Follow up of 6 months was done for the treatment groups. The level of pain was assessed on the 3^{rd}, 14^{th}, and 30^{th} days postoperative using the visual analog scale (VAS). As far as the nonnormal distribution within a set of comparisons was revealed, the Wilcoxon rank sum test was used to evaluate statistical difference using alpha = 0.05. The level of significance was set at 0.05.

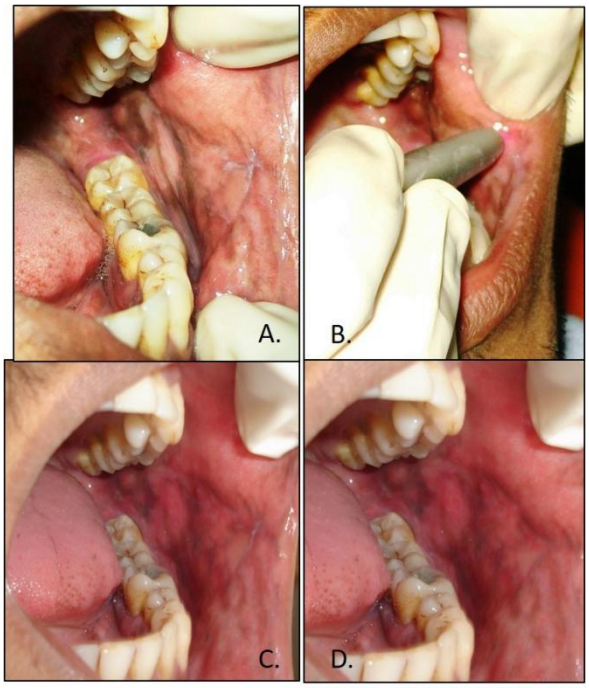
RESULTS

45 randomized patients underwent the surgical treatment. In all these patients the histopathological verification confirmed the OLP diagnosis. The mean lesion extension was 2.23 ± 0.91, 3.25 ± 1.4, 4.17 ± 1.79 and 2.37 ± 0.88 cm2 in group I,II, III, respectively. The analysis of pain level showed a significant pain reduction in case of LLLT from 3^{rd} day onward as compared to the corticosteroid group. From 14^{th} day onward the lesion became painless in both the LLLT group and corticosteroid group. The redness of the lesion started decreasing in corticosteroid group from day 14^{th} as compared to LLLT group. After day 30^{th} in both group II, III the lesion healed uneventfully. A good and fast healing process and minor discomfort for the patient were reported. The follow up of 6 months was done for all the patients who showed no recurrence of the lesion. (Figure1)

Table 1- Statistical significance level between each study group (left column) using the Wilcoxon test for cytokine levels (IL-1β, IL-6, and IFNγ) on 30th day postoperatively.

Treatment modality	Healing			Pain
	P values			
Group I	0.6	0.7415	0.023	0.211
Group II	<.0001	0.493	<.0001	0.0004
Group III	0.0199	0.636	0.542	0.0033

Figure 1: Diode Laser Group:- a)preop, b)intra op, c)30 days postop, d)6 months postop



DISCUSSION

A number of studies have compared the outcomes of LLLT with corticosteroid therapy in the management of OLP and showed conflicting results.[8] In a clinical trial by Elshenawy et al[10], OLP patients treated with local corticosteroid showed significant improvement in signs and symptoms as compared to those patients treated with LLLT. Similar results were reported by Othman et al. However, Jajarm et al[11], concluded that patients with OLP treated with LLLT showed comparable improvement in clinical outcomes over the use of corticosteroids at follow-up. Moreover, in a recent study by Dillenburg et al, LLLT showed statistically significant improvement than topical steroid therapy in the treatment for OLP[14,15]. OLP is a chronic mucocutaneous disease and, due to its nature, long-term treatment is necessary to ameliorate the symptoms, as a cure has yet to be discovered.[16-18] Although topical and systemic corticoids have been widely used as the first option for OLP treatment, however these are associated with adverse effects such as oral candidiasis and mucosa atrophy.[19] Moreover, alternative therapies are needed for patients with refractory disease and for those that do not respond to standard therapies. As mentioned in many clinical studies, which showed significant improvement with steroid therapy, laser was applied in ten sessions as compared to 12 sessions in which LLLT showed significant improvement as compared to steroid therapy. It can therefore be hypothesized that at least 12 laser applications should be sufficient; however, it is difficult to contemplate this protocol into clinical settings. As there are limited number of studies that have addressed the focus question, it is rather difficult to determine a threshold for how many times the LLLT should be applied to achieve favorable outcomes in the treatment of OLP.[12] In the study of Kollner et al., 75 to 150 mJ/cm² powers of 308 nm excimer laser were emitted to OLP lesions three times a week, up to 32 sessions. One patient showed remission after 12 sessions with no signs of relapse on a four months following period. Another patient had relative remission after 9 sessions, but with a relapse one month later. Four patients were relative and 2 patients were absolute non-responders. Pain was thoroughly halted during 10 sessions of the present study, and signs of lesion evolution were absent during 30 days postoperatively.[20]

CONCLUSION

The finding of the present study indicates that the utilization of LLLT is beneficial for the treatment of the erosive form of OLP. Within the limitations of the present study, it may be proposed that the levels of IL-1β, IL-6, and IFNγ in the WUS indicate the severity of OLP lesion and may be used in the future as assessment criteria for further treatment modalities.

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