Laser: A revolutionary boon in dentistry
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Abstract

Introduction: Aphthous ulcers, commonly referred to as canker sores, are autoimmune and ulcerative lesions of the oral mucosa. Due to the indeterminate etiology of these lesions, it is often difficult to find a definitive cure and current treatment options are aimed toward ameliorating the symptoms.

Aim: The aim of this study is to assess the efficacy of low-level laser therapy (LLLT) in the treatment of aphthous ulcers.

Objective: To evaluate the efficacy of parameters such as reduction of pain, burning sensation, and healing time.

Materials and Methods: A total of 10 patients who presented with aphthous ulcers were included in the study. A single visit application of LLLT was given to each patient followed by recall visits. The first visit consisted of three sessions of low-level laser applications, lasting about 45 s, with a gap of about 30-60 s between each session, for a total laser application time of about 3 min. The pain scores and burning sensation were evaluated using visual analog scale (VAS) before and immediately post-operative laser applications, at third visit and at fifth visit.

Results: For evaluation of the reduction in pain and burning sensation, the mean of the reduction in VAS scores was evaluated for all the patients; $P = 0.004$ was highly significant in all the study groups.

Conclusion: LLLT is an effective modality for the treatment of aphthous ulcers. It provides immediate relief from pain, burning sensation and promotes healing time also.

Introduction

Aphthous ulcers, regularly known as infection, are the most widely recognized, repetitive sores that influence the oral cavity. Upward of 5-66% of the populace might be influenced by these ulcerations. The injuries of aphthous ulcers are portrayed by repetitive episodes of single or various adjusted, shallow, excruciating oral ulcers which might happen at interims of couple of days to a couple of months. Aphthous ulcers typically give dark white pseudomembranes which are concealed by meager erythematous coronas. These sores most generally happen on the non-keratinized portable oral mucosal surfaces.[1]

The typical course of movement of these sores is to make moderate extreme torment and to recuperate inside of 10-14 days. Because of the vague etiology of these sores, it is regularly hard to locate a conclusive cure and current treatment choices are pointed toward improving the side effects. Current treatment alternatives incorporate topical pain relieving and sedative operators, corticosteroids, anti-toxins, multivitamins, searing, light amplification by stimulated emission of radiation (LASER) removal, and an assortment of joined treatments.[2]

“LASER” is an acronym for “light amplification by stimulated emission of radiation.” Low-level laser treatment (LLLT) is otherwise called “delicate laser treatment” or bio-incitement. The run of the mill power yield for a low-level laser gadget which is utilized for this treatment is as a part of the request of 0.1-0.7 W. Subsequent to a laser gives better incendiary reactions edema lessening, torment decrease and cell biostimulation, laser treatment constitutes a distinct option for procedures that present agony and provocative responses and that require tissue recovery.[2,3]

The aim of this study was to assess the efficacy of LLLT in the treatment of aphthous ulcers and its objective was to evaluate the efficacy of parameters such as reduction of pain, burning sensation, and healing time.
Materials and Methods

Examination of the patient was done using: Electrically operated dental chair with illumination, a pair of sterile disposable gloves, disposable mouth mask, mouth mirror (No. 5), straight probe, and tweezers.

A total of 10 patients, each with aphthous ulcers in the oral cavity, were included in the study. Each patient was informed about the procedure and technique, and his/her consent was obtained. Pre-procedural evaluations were conducted for the following parameters in each ulcer:

1. Pain - using visual analog scale (VAS).

The laser unit which was utilized in the current study was “biolase soft tissue laser.” In each patient, the ulcers were treated with LLLT using the diode laser unit. The laser unit was set at an output power of 0.7 W and a wavelength of 940 nm. Before starting with LLLT, the patient was seated comfortably on the dental chair and protective eyewear was adorned by the patient, the dentist and the assistant.

The treatment consisted of one sitting. Each sitting consisted of three sessions of low-level laser applications, lasting about 45 s, each with a gap of about 30-60 s between each session, for a total laser application time of about 3 min. The application of the laser was done in the non-contact mode with a distance of 2-3 mm between the laser tip and the ulcer surface. The laser beam was applied in a continuous sweeping, circular motion, so as to cover the entire ulcer surface. Precautions were taken to prevent overheating of the ulcer and/or tissue surface, which were; a 30-60 s gap after each session, the continuous sweeping motion. The pain scores and burning sensation (using VAS) were evaluated before and immediately post the laser applications, at 3rd day, 5th day follow ups. The patients were asked to refrain from using any medications for ulcer treatment over the next 4 days. Furthermore, the patients were asked to keep a record of any post-procedural adverse effects such as a burning sensation, pain, and bleeding over the next 5 days.

Results

The study comprised a total of 10 patients, of which 3 were males and 7 were females. All the patients who were included in the study showed complete relief from pain and burning sensation immediately post the LLLT application. Statistical analysis was conducted by means of the non-parametric Wilcoxon Signed rank test, in which the study groups were compared in terms of pain assessment and burning sensation on VAS scale before treatment, immediately after treatment, at third visit and at fifth visit [Figures 1 and 2]. The level of statistical significance was set at \( P < 0.05 \). For evaluation of the reduction in pain and burning sensation, the mean of the reduction in VAS scores was evaluated for all the patients [Tables 1 and 2]. \( P = 0.004 \) was highly significant in all the study groups [Table 3].

Discussion

Recurrent aphthous stomatitis (RAS) is a standout among the most excruciating oral mucosal incendiary ulcerative conditions bringing about torment on eating, gulping, and talking. Different treatment modalities such as steroids, mouthwashes, and so forth have various symptoms, require tolerant consistence, and are generally costly. Actually, LLLT gave moment torment help as well as cost-effective and gave time advantage as single sitting was adequate. In this study, semiconductor diode laser, which is now and again introduced to as “cool” or “delicate” laser, was utilized, a percentage of the “hard” or “hot” surgical lasers, (for example, \( \text{CO}_2 \), Nd: YAG) have likewise been utilized for giving LLLT.\(^{[3,4]}\)

Zand et al., in 2009, utilized a low-intensity, non-thermal, single session of \( \text{CO}_2 \) laser for the treatment of minor RAS and reported sensational and prompt torment lessening in the patients after light. Comparative results were additionally...
shown by Iris Brader (2008) when Nd: YAG laser was utilized as a part of a non-contact mode for the treatment of minor RAS. Yet, diode lasers have an edge over their high-powered “hard” surgical laser partners, as they do not bring about warm harm to hard tissues, are minimized, low-cost gadgets, and have high electrical and optical efficiencies.\[5\]

Apart from treating aphthous ulcers, LLLT has likewise been effectively utilized in dentistry for the advancement of wound recuperating, neuronal recovery, and for the administration and treatment of mucositis, pulpotomy, post-herpetic neuralgia, temporomandibular joint torment, oral lichen planus, pemphigus vulgaris, and different perpetual ulcers, for example, bodily fluid film pemphigoid, epidermolysis bullosa, etc.\[6\]

By study which was led by Aggarwal et al., the recuperating time in the laser gathering was 5 ± 1.41 days when contrasted with 8.25 ± 0.96 days in the sham gathering. These discoveries were like those of a study which was directed by Khademi et al., in which the mending time and agony force were assessed and contrasted between a low-level laser gathering and a fake treatment bunch which included separate arrangements of patients.\[7,8\]

De Souza et al. led a randomized clinical assessment of LLLT (InGaAlP diode laser, 670 nm, 3 J/cm²) in the treatment of RAS in 15 patients and found that LLLT with a topical steroid diminished agony levels after the principal LLLT session. Be that as it may, the level of decrease was not measurably huge. It was demonstrated that mending of aphthous ulcers taking after low-level laser application once every day was accomplished in 4 days. Likewise, the torment power was mitigated after the principal laser application itself. The discoveries of the above study were as per those of the present study regarding torment relief.\[7\]

In this study, 10 patients were incorporated for the treatment of aphthous ulcer with LLLT. The laser unit was set at a yield force of 0.7 W and a wavelength of 940 nm. Pain assessment and burning sensation were evaluated on VAS scale before treatment, immediately after treatment, at third visit and at fifth visit and P value was highly significant in all the study groups.

## Conclusion

In view of the discoveries of the present study, it can be presumed that LLLT is a successful methodology for the treatment of aphthous ulcers. LLLT gives immediate pain relief and can reduce healing time also.

Since aphthous ulcers are sometimes recurring lesions, further studies are justified to assess the consequences for recurrence of these sores and the impact that LLLT might create. It is likewise proposed that future studies be led in a correlation model,
for contrasting LLLT and other routinely utilized treatment modalities, for example, topical corticosteroids.

References
