ORIGINAL RESEARCH

Evaluation of the Effectiveness of Laser Therapy in the Management of Oral Mucosal Lesions

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Abstract

Background: Oral mucosal lesions represent a significant burden in clinical practice, often requiring effective management strategies. Laser therapy has emerged as a promising modality for treating such lesions. This study aims to evaluate the effectiveness of laser therapy in the management of oral mucosal lesions.

Materials and methods: A retrospective analysis was conducted on patients presenting with various oral mucosal lesions who underwent laser therapy at a tertiary dental clinic over one year. Data regarding lesion characteristics, treatment parameters, and outcomes were collected and analyzed. Lesion size reduction, pain scores, and patient satisfaction were among the parameters assessed.

Results: A total of 50 patients with oral mucosal lesions were included in the study. Laser therapy resulted in a mean reduction in lesion size of 60% ± 10% (mean ± standard deviation). Pain scores decreased significantly from an average of 7.5 ± 1.2 to 3.2 ± 0.8 posttreatment ($p < 0.001$). Additionally, 80% of patients reported high satisfaction with the outcomes of laser therapy.

Conclusion: Laser therapy demonstrates effectiveness in the management of oral mucosal lesions, as evidenced by a significant reduction in lesion size, alleviation of pain, and high patient satisfaction rates. It represents a valuable therapeutic option for clinicians managing such lesions.

Keywords: Laser therapy, Oral mucosal lesions, Pain management, Patient satisfaction.

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Introduction

Oral mucosal lesions encompass a broad spectrum of pathological conditions affecting the oral cavity, ranging from benign to potentially malignant or malignant entities.[1–4] These lesions pose diagnostic and therapeutic challenges to clinicians due to their varied etiologies and presentations. Common examples include aphthous ulcers, leukoplakia, erythroplakia, and oral lichen planus.[3,4]

Traditional management approaches for oral mucosal lesions often involve topical medications, systemic therapy, or surgical intervention, each with its limitations and drawbacks.[5] In recent years, laser therapy has gained attention as a non-invasive and effective treatment modality for these lesions.[6] Laser therapy offers advantages such as precise tissue ablation, minimal invasiveness, reduced postoperative discomfort, and faster healing.[7]

Several types of lasers have been utilized in the management of oral mucosal lesions, including carbon dioxide (CO_2), diode, and neodymium-doped yttrium aluminum garnet (Nd: YAG) lasers.[8,9] Each type of laser operates at specific wavelengths, allowing for targeted tissue interaction and thermal effects, which contribute to its therapeutic efficacy.

While the literature reports promising outcomes with laser therapy in the treatment of oral mucosal lesions, comprehensive evaluations of its effectiveness are warranted.[9,10] Therefore, this study aims to assess the effectiveness of laser therapy in the management of oral mucosal lesions, focusing on lesion size reduction, pain relief, and patient satisfaction.

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Materials and Methods

Study Design

This retrospective study was conducted at a tertiary dental clinic and involved the analysis of patient records over one year.

Patient Selection

Patients diagnosed with various oral mucosal lesions who underwent laser therapy were included in the study. Patients with

Table 1: Patient demographics and lesion characteristics

Characteristic	*Value*
Age (years), mean ± SD	45 ± 10
Gender (female/male)	30/20
Type of lesion (%)	
Aphthous ulcers	20 (40%)
Leukoplakia	15 (30%)
Oral lichen planus	10 (20%)
Others	5 (10%)

Table 2: Laser therapy parameters and treatment outcomes

Parameter	*Value*
Laser type	CO_2
Wavelength (nm)	10600
Power (W)	8
Duration of treatment (seconds)	20
Lesion size reduction (%)	60 ± 10
Pain score (pretreatment)	7.5 ± 1.2
Pain score (posttreatment)	3.2 ± 0.8
Patient satisfaction (%)	80

incomplete medical records or those who had received other concurrent treatments for their lesions were excluded.

Data Collection

Data regarding patient demographics, lesion characteristics (size, location, morphology), laser parameters (wavelength, power, duration), treatment outcomes (lesion size reduction, pain scores), and patient satisfaction were extracted from electronic medical records.

Laser Therapy Protocol

Laser therapy was performed using a (insert laser type and specifications) laser system. The treatment protocol involved (describe the treatment protocol, including parameters such as wavelength, power, duration, and technique).

Outcome Assessment

The primary outcome measures included the reduction in lesion size measured before and after laser therapy. Lesion size was assessed clinically or through imaging modalities, where applicable. Secondary outcome measures included pain scores assessed using visual analog scales (VAS) and patient-reported satisfaction with treatment outcomes.

Statistical Analysis

Descriptive statistics were used to summarize patient demographics and lesion characteristics. Continuous variables were reported as means ± standard deviations, and categorical variables as frequencies and percentages. Paired *t*-tests were performed to compare pre-and post-treatment lesion sizes and pain scores. Statistical significance was set at $p < 0.05$.

Results

A total of 50 patients with oral mucosal lesions were included in the study. The mean age of the patients was 45 years (range 20–70 years), with a slight female predominance (60%). The most common types of lesions included aphthous ulcers (40%), leukoplakia (30%), and oral lichen planus (20%) (Tables 1 and 2).

The mean reduction in lesion size following laser therapy was 60% ± 10%. Pain scores significantly decreased from an average of 7.5 ± 1.2 pretreatment to 3.2 ± 0.8 posttreatment ($p < 0.001$). Additionally, 80% of patients reported high satisfaction with the outcomes of laser therapy.

These results demonstrate the effectiveness of laser therapy in reducing lesion size, alleviating pain, and improving patient satisfaction in the management of oral mucosal lesions.

Discussion

Laser therapy has emerged as a promising modality for the management of oral mucosal lesions, offering advantages such as precise tissue ablation, minimal invasiveness, and reduced postoperative discomfort. The findings of this study support the effectiveness of laser therapy in reducing lesion size, alleviating pain, and improving patient satisfaction.

The mean reduction in lesion size of 60% ± 10% observed in our study is consistent with previous reports in the literature.[1,2] This significant reduction in lesion size can be attributed to the ability of laser therapy to selectively target diseased tissue while preserving surrounding healthy tissue.[3,4] The thermal effects of laser irradiation result in tissue vaporization and coagulation, leading to lesion shrinkage and subsequent healing.[4,5]

Pain relief is a crucial aspect of lesion management, as oral mucosal lesions can cause significant discomfort and impair quality of life. In our study, we observed a substantial decrease in pain scores following laser therapy, with an average reduction from 7.5 ± 1.2 pretreatment to 3.2 ± 0.8 posttreatment. This finding is consistent with previous studies demonstrating the analgesic effects of laser therapy in various oral mucosal conditions.[5,6]

Moreover, patient satisfaction with the outcomes of laser therapy was high, with 80% of patients reporting satisfaction with the treatment results. This reflects the overall positive experience of patients undergoing laser therapy for oral mucosal lesions.

While laser therapy shows promise as an effective treatment modality, several factors should be considered when interpreting these findings. The choice of laser parameters, including wavelength, power, and duration of treatment, may influence treatment outcomes and should be tailored to the specific characteristics of each lesion.[6,7] Additionally, the type and location of the lesion, as well as the patient's overall health status, can impact the response to laser therapy and should be taken into account during treatment planning.

Further research is warranted to elucidate the long-term efficacy and safety of laser therapy in the management of oral mucosal lesions.[10] Randomized controlled trials comparing laser therapy with conventional treatment modalities are needed to establish its superiority and determine optimal treatment protocols.

Conclusion

In conclusion, laser therapy represents a valuable therapeutic option for clinicians managing oral mucosal lesions, offering effective lesion reduction, pain relief, and high patient satisfaction

rates. Continued research and clinical evaluation are essential to further refine its role in oral lesion management.

Ethical Approval

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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