

Postoperative Recovery and Wound Healing of White Lesions using Diode Laser - A Clinical Study

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ABSTRACT

Introduction: Laser dentistry has always been subject of interest because of their high sensitivity, and the lack of risks of ionizing radiation. Many soft tissue procedures have been carried out with lasers because of less bleeding during surgery and less or no pain post-operatively as compared to scalpel surgery. The efficacy of 980 nm Diode laser in treating white lesions like oral lichen planus and leukoplakia by assessing different clinical parameters has been discussed.

Material and methods: The study included 25 patients aged 18-60 years with clinically diagnosed and histopathologically confirmed oral reticular lichen planus or homogenous leukoplakia. The lesions were irradiated by diode laser of 5 watts, as per the recommended protocol with proper isolation. Follow up of 2 visits was done (4 days and 4 weeks i.e 1 month in succession) for postoperative clinical evaluation of redness, swelling, thermal damage and functional disturbances and subjected to statistical analysis.

Results: Out of 25 patients, no pain and swelling was found in any of the patients after 1 month (4 weeks) postoperative period. Thermal damage completely healed after one month postoperatively. At 4 days postoperative period, 8 (32%) patients had mild functional disturbances, 3 (12%) had moderate functional disturbances and remaining 2 (8%) patients had severe functional disturbance due to pain and edema, which restored to normal within 4 weeks.

Conclusion: 980 nm Diode laser can be safely and effectively used as a treatment modality for OLP and leukoplakia, without any complication.

Keywords: White lesion, oral lichen planus, leukoplakia, diode laser

different time interval.

MATERIAL AND METHODS

The present clinical study was carried out in the Department of Oral Medicine and Radiology, Buddha Institute of Dental Sciences and Hospital, Patna, Bihar with permission from the ethical committee of Buddha Institute of Dental Sciences and Hospital. Study included 25 patients aged 18-60 years with clinically diagnosed and histopathologically confirmed oral reticular lichen planus (figure-1) or homogenous leukoplakia. Patients under any medication for oral leukoplakia or lichen planus were asked to stop before 15 days of laser surgery. Patients were instructed to undergo oral prophylaxis before the surgical procedure to be performed. The complete Procedure was explained to the patient and informed consent was obtained. Procedure:

Local infiltration was given around the lesion. Complete aseptic conditions were maintained and both patient and operator were given protective eyeglasses to wear as a protective measure. Patients on long term medications and those suffering from any other chronic debilitating diseases were not included in the study. The lesions were irradiated by diode laser of 5 watts, till area changed to white i.e., photocoagulation. The laser was used as per the recommended protocol. With proper isolation, tissue ablation was done using 300 micrometre tip in contact mode (power setting 5W, in pulsed mode). The laser hand piece tip was held very close to the tissue surface. This allows the laser energy to effect the incision and minimizes the tissue debris accumulated on the tip, which may lead to thermal damage to the adjacent tissue.³ Remnants of the ablated tissue were removed using sterile gauze dampened with saline solution. The procedure was carried out further till the desired depth of tissue was removed. Follow up of 2 visits was done (4 days and 4 weeks i.e 1 month in succession) for postoperative clinical evaluation of redness, swelling, thermal damage and functional disturbances as per grading of 0 to 10 according to the following⁵ (Fig 2,3)

- 1 to 2- no postoperative complications
- 3 to 5- mild postoperative complications
- 6 to 7- moderate postoperative complications
- 8 to 10- severe postoperative complications

INTRODUCTION

Many researches have been done in past for the clinical applications of lasers in dental fraternity, and many organizations have come up to support laser dentistry on national and international platform.¹ Two major advantages of laser-based procedures are their high sensitivity, and no risks of ionizing radiation to the operator or the patient and their attendants.² Many soft tissue as well as hard tissue procedures have been performed with Diode lasers.³ Diode laser (980 nm) provides an alternative technique for treatment of OLP and leukoplakia with significant clinical improvement and more importantly patient acceptance for this new method of treatment.⁴ The postoperative recovery and wound healing after treatment of oral white lesions like leukoplakia and oral lichen planus with Diode laser was undertaken in the present study.

The present study was designed to evaluate the safety and efficacy of 980nm diode laser for treatment of homogenous leukoplakia and oral reticular lichen planus. The objectives were to evaluate the healing of lesion and pain intensity at

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Signs and symptoms of lesions were recorded with subjective evaluation scale according to Gorsky and Raviv.⁶ Pain was recorded by using Visual Analogue Scale at 4 days and 4 weeks postoperative follow up period.

Subjective evaluation of treatment was done assessing the clinical complications after the follow up of the patients according to the following: (Tel Aviv-San Francisco Scale)

Stage 4: 90-100% remission of sign and symptoms

Stage 3: 70-80% benefits

Stage 2: 50% benefits

Stage 1: 30-50% improvement

Stage 0: little improvement or no change

Stage -1: deterioration

Statistical analysis

All the data's were entered in Microsoft excel sheets and statistical analysis was done using Fishers exact test. The test of significance with p- value less than 0.056 was taken to correlate the variables to determine the significance.

RESULTS

Out of 25 patients 7 male patients were diagnosed having leukoplakia and rest 11 female patients and 7 male patients were having oral lichen planus. Eighteen patients with age group of less than or equal to 30-50 years had white lesion and 7 patients in the age group of over 50 years, had the lesions. Six patients out of 25 reported of previously treated OLP. In 4 day postoperative period 4 out of 25 (16%) patients had no pain, 12 patients (48%) had mild pain (VAS 0.1-3), 5 patients (20%) had moderate pain (VAS 3.1-6) and remaining 4 patients (16%) had severe pain following irradiation. Pain disappeared at the end of the first and none of the patients had pain at 4 weeks postoperatively. In 4 days postoperative period, 14 out of 25 patients (56%) had no swelling, 5 (20%) patients had mild swelling, 3 (12%) had moderate swelling and remaining 3 (12%) had severe swelling. No swelling was found in any of the patients after 1 month (4 weeks) postoperative period. At 4 days postoperative period, no thermal damage was observed in 12 (48%) patients, 6 (24%) patients had mild thermal damage, 4 (16%) had moderate thermal damage and remaining 3 patients had severe thermal damage. Thermal damage completely healed after one month postoperatively. At 4 days postoperative period, no functional disturbances were recorded in 12 (48%) patients due to pain and edema, 8 (32%) patients had mild functional disturbances, 3 (12%) had moderate functional disturbances and remaining 2 (8%) patients had severe functional disturbance which restored to normal within 4 weeks (graph 1).

DISCUSSION

In the present study, laser therapy was performed on the lesions only after patients were clinically plaque and inflammation free as poor oral hygiene can aggravate the lesion further acting as mouth irritation.⁷ It is also reported in one of the article that any infection in the mouth can aggravate the lesion further.⁸ Sumairi B Ismail et al stated that maintenance of good oral hygiene can enhance healing and lessen the symptoms of oral Lichen planus.⁹ Dudhia S B et al stated that etiological factors for OLP apart from stress include mouth irritation and smoking.¹⁰ The age group in the study is consistent with the findings of many other authors who have stated the prevalence of oral lichen planus and oral leukoplakia in the middle-aged and elderly. Out of 25 patients,

11 female patients had lichen planus showing prevalence of oral lichen planus more in females than males.⁷ The finding is also consistent with many other authors like Fernando Augusto Cervantes Garcia de Sousa et al. In all patients, Visual Analogue Scale (VAS) was taken at 4 days postoperative and 4 weeks postoperative period to evaluate the pain. The postoperative pain or discomfort has always been found minimal following the use of different lasers.¹²⁻¹⁴ The exact mechanism of lesser pain with laser surgery is not known at present, however it is theorized that it may be due to protein coagulum that is formed on the wound surface, thereby acting as a biological dressing and sealing the ends of the sensory nerves.^{5,15} Mathew B et al reported that the mechanism for reduced postoperative swelling and discomfort is attributed to sealing of nerves and lymphatics by lasers.² The desired results with the least risk of unwanted thermal damage can be achieved by diode laser.^{16,17}

CONCLUSION

Nonsurgical therapeutic options used in treating oral lichen planus and leukoplakia as a treatment modality, includes long treatment with topical corticosteroids or systemic corticosteroids or both, topical or systemic retinoids, carotenoids and antioxidants but patient suffers psychologically from long treatment by corticosteroids or other treatment modality and fear from their side effects. Lasers offer an easy and less traumatic surgical method to treat lesions without causing any harm to the subjacent tissues. Diode lasers due to its compact size as compared to other lasers have always proved beneficial in carrying out any surgical procedures. Within the limits of our present study, it is possible to conclude that 980 nm diode laser can be safely and effectively used as a treatment modality for OLP and leukoplakia, without any complication. Further extensive studies may be carried out.

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