

Clinical and Histopathological Evaluation of Healing After Excision of Leukoplakia with Diode Laser

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ABSTRACT

Aim: Oral Leukoplakia is considered commonest precancerous white lesion affecting oral mucosa. There are several medicinal and surgical options available to treat the lesion. Scalpel removal of the lesion leads to scar formation and pain along with bleeding at the time of surgery. Removal with Laser is another option for managing leukoplakia. There are very few studies present with removal of leukoplakia using Diode Laser. This study was undertaken to clinically and histopathologically evaluate the efficacy of Diode Laser in leukoplakia.

Materials and Method: Six patients, 5 male (84%) and 1 female (16%) with leukoplakia were treated with Diode laser (980nm) at 3 - 4 watts. Patients on steroid therapy or immune-suppressants and suffering from any other chronic debilitating diseases were excluded from the study. Wilcoxon Signed Ranks Test was applied for assessing the p-Value for statistical analysis.

Result: After one month, the patients were examined for normal clinical healing of the site. For more confirmation, re-biopsy was done and result showed normal tissue healing except in one patient (16%). Only one patient (16%) developed pain, swelling, fibrosis and recurrence.

Conclusion: It was concluded that laser provides good coagulation, healing, reduces surgical time and prevents high-grade infection.

Keywords: Diode Laser, Wound healing, Leukoplakia, Histology.

INTRODUCTION

According to the definition of the World Health Organization, "oral leukoplakia is a white patch of the oral mucosa that cannot be scraped off and that cannot be characterized clinically or pathologically as any other disease"^{1,2}. Oral leukoplakia is considered as a common precancerous lesion of the oral mucosa. It is most commonly seen in patients having habit of tobacco, betel nuts and alcohol. It may also



arise due to infection with *Candida albicans*, or human papilloma virus and due to vitamin A, B12, folic acid deficiency³.

Definitive treatment of oral leukoplakia is very important because of its chances of recurrence and malignant transformation depending on the location, clinical features, degree of dysplasia and etiological factors². Diode Lasers are used for soft tissue procedures and wavelength is well absorbed by pigmented structures, providing good hemostasis and effective cutting of tissue. Cutting is clean, having good coagulation with minor charring. Depth of penetration ranges from 2 to 3 mm into

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tissues, at 980 nm wavelength, which means that the absorption of laser energy is more than the thermal effect.

Very few studies are found in literature for excision of Leukoplakia with diode laser. Need of this study is to evaluate efficacy of laser on leukoplakia and soft tissue healing.

MATERIALS AND METHOD

In this study, total six patients and seven sites were included (Table 1). Patients on steroid therapy or immune-suppressants and suffering from any other chronic debilitating diseases were not included in this study. After obtaining consent from the patient, treatment was done under local anaesthesia.

Procedure was performed under aseptic conditions. Proper protection was taken by wearing eyeglasses. The site was anaesthetized under field block or infiltration. The diode laser (980nm) was calibrated and measured to the desired power. After achieving proper anaesthesia the site of lesion was marked with laser. Complete lesion was irradiated with laser at 3-4 watts.

Proper medication was given to the patient postoperatively (Cap Amoxicillin 500 mg thrice a day and Tab Diclofenac sodium - SOS) for five days. Betadine mouthwash was prescribed for better oral hygiene. All the patients were advised to do mouth exercise to avoid formation of unnecessary fibrous tissue during healing from 2nd day to 15th day of surgery. Patient's tissue samples were sent to laboratory for histopathological examination. Patients were recalled after 1 month for evaluation of the site and punch biopsy was taken for histopathology.

All the data were collected on excel sheet, Mean and p values were calculated as per Wilcoxon Signed Ranks Test P Value.

RESULT

Total six patients, five males and one female, were included with total seven sites. Most affected site was buccal mucosa (43%) (Figure 1) followed by alveolar ridge (29%), buccal and labial vestibule (14%), (Table 1) presenting with leukoplakia which were treated by excision of lesion

using Diode laser (980 nm) at 3 or 4 watt. Patients were evaluated at regular intervals for pain, swelling, healing of site, histological evaluation of excision tissue and complications.

Post-operative pain was recorded based on Visual Analogue Scale for the patients. Out of all the patients, only one ($p < 0.317$) patient noted moderate pain after excision and others had minimal pain or no pain (Table 2).

Out of all the patients, only one ($p < 0.317$) patient developed small swelling over left buccal vestibule region (1.2 cm) (Table 3).

After removal of lesion, the tissues were histopathologically evaluated under a microscope (20X Magnification) and suggested as Leukoplakia (Table 4, Figure 2). All the patients were recalled for follow up after 1 month (Figure 3) and re-biopsy was done using punch biopsy method and sent for histopathological re-evaluation of the site. (Figure 4). Normal tissue healing was seen in all the patients except in one (16%) ($p < 0.025$) patient who had recurrent leukoplakia after excision and some fibrous tissue was noted in the histological evaluation after 1 month (Table 5). The patient had not quit the habit, had developed fibrosis of lower labial vestibule fibrosis and was treated later with labial vestibuloplasty.

DISCUSSION

Oral Leukoplakia has been redefined as "a predominantly white lesion of oral mucosa that cannot be characterized as any other definable lesions: some oral leukoplakia will transform into cancer" (Axell T, 1996)⁴.

Oral leukoplakia is considered as a common precancerous lesion of the oral mucosa. Most common influential factors causing leukoplakia are smoking and consumption of alcohol⁵. In North America and Europe tobacco smoking causes leukoplakia while in Asia tobacco chewing plays an important role in causing leukoplakia. In Gujarat, the incidence rate of leukoplakia is 11.7% and more because of Gutka chewing.

The malignant transformation of leukoplakia depends on Time (Longer presence of leukoplakia), Location (Lower buccal cavity, tongue), Type (Non-homogeneous leukoplakia), the

presence of *C. albicans* (particularly on the ridge of the tongue) and the presence of dysplastic alteration⁵. The risk of malignant transformation is 2 to 3 times higher in leukoplakia with moderate



Fig 1: Clinically evaluated lesion as leukoplakia.

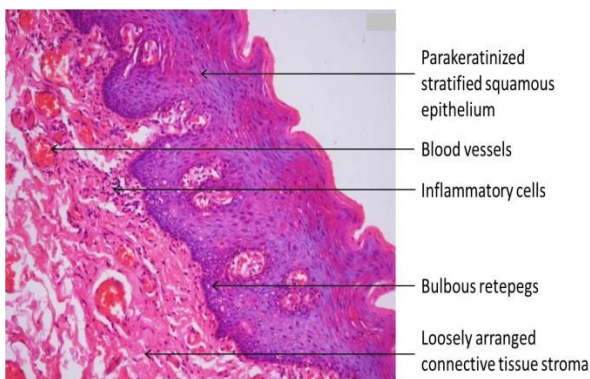


Fig 2: Histological evaluated lesion and conformed as leukoplakia.



Fig 3: Post-operative healing of lesion after 1 month.

to severe dysplastic alterations when compared to leukoplakia with mild dysplastic alterations⁶. It is 7 times more in non-homogeneous leukoplakia when compared to homogeneous leukoplakia and is markedly higher in older population.

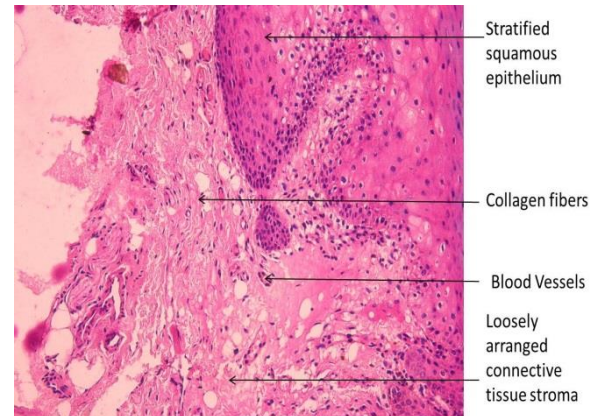


Fig 4: Normal healing of mucosa conformed histopathological.

Dietary sources like vitamin C, E, A and carotenoid significantly reduces the risk of oral premalignant lesion. High dose of vitamin C reduces the growing risk of premalignant lesion. High dose of vitamin A and E are associated with growing risk of premalignant lesion development⁶.

Various non-surgical and surgical treatments have been reported for leukoplakia. Operation can include conventional surgery⁷, electro cauterisation, CO₂ laser ablation, or cryosurgery^{8,9}. Randomised controlled trials for non-surgical treatment have not shown evidence that they effectively prevent malignant transformation and recurrence⁶.

Surgical removal of leukoplakia with the help of scalpel will damage more surrounding tissues and chances for post-operative scar, pain and swelling are more. The benefits of laser therapy include the haemostatic effect, short duration of therapeutic intervention and minimum traumatization of adjacent tissues¹⁰. Postoperative pain and swelling are minimal and rapid tissue healing with minimal scar on the ablated site was found with diode laser treatment as compared to cold knife. Therefore, there are so many advantages of laser treatment then scalpel in the treatment of leukoplakia.

Table 1: Age, sex, habit and site distribution of patients.

Sr No	Age (Years)	Sex M/F	Site	Habit
1	40	M	Right buccal mucosa	Chewing betel nut with tobacco (gutaka)
2	55	M	Labial vestibule	Tobacco (Miraj)
3	62	M	Right buccal mucosa	Smoking Bidi
4	62	M	Left alveolar ridge	Chewing betel nut with tobacco (gutaka)
5	50	M	Left alveolar ridge extending in buccal mucosa	Chewing betel nut with tobacco (gutaka)
6	45	F	Right buccal mucosa & Left buccal vestibule	Betel nut and snuff

Table 2: Post-operative pain score.

Pain score	No. of patients
0-2	4
3-4	1
5-6	1
7-8	0
9-10	0

Table 3: Post-operative swelling after excision.

Swelling score (cm)	No. of patients
0-2	1
3-4	0
5-6	0
7-8	0
9-10	0

Table 4: Histo-Pathological finding on the day of surgery.

Histological findings	No. of Patients
Normal keratinized tissue healing	0
Presence of Leukoplakia by biopsy	6
Fibrous tissue find in biopsy	0

Table 5: Histo-pathological finding after 1 month.

Histological findings	No. of Patients
Normal keratinized tissue healing	5
Presence of Leukoplakia by biopsy	1
Fibrous tissue find in biopsy	1*

1*- Same patient seen fibrous tissue as well as dysplastic changes in the histological investigation.

There are various surgical as well as nonsurgical treatment options for leukoplakia. Amongst all diode laser provides most acceptable benefits for the patient and the operator. It provides blood free operating site, which helps in increasing accessibility and sterility for operator at the time of treatment, improves healing and reduces chances of infections postoperatively. Laser helps in both reduction of postoperative pain and swelling, and provides quicker healing as compared to surgical removal with knife or use of corticosteroids.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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