

The Comparative Evaluation of Patient's Satisfaction and Comfort Level by Diode Laser and Scalpel in the Management of Mucogingival Anomalies

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ABSTRACT

Background: Surgical correction of mucogingival anomalies is required to enhance patient's compatibility to maintain oral hygiene or to improve facial aesthetics or both. Laser has become a desirable and dependable alternative for traditional surgical techniques because it is simple and painless with more predictable outcomes.

Aim: The aim of this study was to compare the effects of the conventional scalpel technique and the laser technique on the degree of discomfort, satisfaction, healing and postoperative pain experienced by patients after correction of mucogingival anomalies.

Materials and Methods: In the present study 70 patients were

enrolled and randomly distributed in two groups i.e. surgical correction of mucogingival anomalies by scalpel and by laser. Patient's comfort level, pain and satisfaction level was assessed by using Visual analogue scale (VAS) and healing was evaluated by healing index.

Results: The results indicated patients treated with the diode laser had less postoperative pain and discomfort with remarkable satisfactory results and healing compared to patients treated with the conventional technique.

Conclusion: Laser is a desirable therapeutic alternative to correct soft tissue anomalies. It allows good control of haemorrhage with comfortable healing phase and appreciable satisfactory outcomes.

Keywords: Healing, Pain, Soft tissue anomalies, Visual analogue scale

INTRODUCTION

Mucogingival is the portion of oral mucosa that covers the alveolar process and it includes the gingiva (keratinized tissue) and the adjacent alveolar mucosa. Mucogingival deformity can be explained as departure from the normal dimension and morphology of and/or interrelationship between gingiva and alveolar mucosa; the abnormality may be associated with a deformity of the underlying alveolar bone [1] and are classified in [Table/Fig-1] [2]. Correction of mucogingival deformities is essential to gain the adequate width of keratinized gingiva to maintain proper oral hygiene which is a prerequisite for prevention of root caries and root sensitivity along with aesthetic concerns.

A Periodontist extensively deals with various soft tissue surgical procedures, to correct mucogingival anomalies or to enhance facial aesthetics. Various surgical techniques are available to serve this purpose which include conventional scalpel surgery, electrosurgery, cryosurgery or use of laser. All of these techniques have inherent advantages and disadvantages of its own. Most commonly used

1.	Gingival or soft tissue recession
a)	Facial or lingual surfaces
b)	Interproximal (papillary)
2.	Lack of keratinized gingiva
3.	Decreased vestibular depth
4.	Aberrant frenum or muscle position
5.	Gingival excess
a)	Pseudopocket
b)	Inconsistent gingival margin
c)	Excessive gingival display
d)	Gingival enlargement
e)	Abnormal colour

[Table/Fig-1]: Classification of mucogingival deformities and conditions around Teeth [2]

technique is conventional scalpel surgery which has advantages like: ease of use, accuracy, faster wound healing, minimal damage to the surrounding tissue, less time consuming and inexpensive. On the other hand this technique has limitations like: intraoperative bleeding at surgical site, need for local anaesthesia and suturing, swelling, postoperative pain and swelling, scarring and multiple visits.

Recent advancements in intraoral surgical techniques include use of lasers with the advantages like [3]: greater precision; relatively bloodless surgical field and postsurgical course; sterilization of the surgical area; minimal swelling and scarring; minimal or no suturing required; less postoperative pain; minimal tissue shrinkage, therefore tissue margins remain at the same level after healing as they are immediately after surgery; little mechanical trauma; reduction of surgical time and high patient acceptance. Limitations of this technique are: expensive; technique-sensitive; need for eye protection to operator, assistant and patient; chances recurrence of disease (e.g. gingival pigmentation); thermal damage to underlying hard tissues [4].

AIM

Therefore the aim of the study was to compare the patient's satisfaction and comfort level by two different surgical techniques in the management of mucogingival anomalies.

MATERIALS AND METHODS

Study Design: The study sample was selected from patients who had been referred to the Department of Periodontics, Sri Aurobindo College of Dentistry, Indore (M.P), India.

Total no. of 70 patients, of age between 20-40 years, were randomly distributed in each group i.e. by scalpel and laser (35 patients in each group) Seven surgical procedures (frenectomy, vestibuloplasty, epulis excision, depigmentation, operculectomy,

crowns lengthening, mucocele removal, 5 patients were treated by each procedure). were performed both by scalpel and laser. A variety of procedures were performed to validate the use of laser in various soft tissue correction procedures. The study protocol was reviewed and approved by the institutional review board. Informed written consent was obtained from all patients.

Inclusion Criteria

1. Patients with chief complaint of mucogingival deformity.
2. No systemic conditions that would contraindicate routine surgical procedures.

Exclusion Criteria

1. Pregnant and lactating mothers.
2. Current smokers.
3. Patients who demonstrated poor oral hygiene maintenance after phase I therapy.
4. Teeth with Grade III mobility.
5. Patients with known allergy to local anaesthetic agent.

Procedure

After topical application of the local anaesthetic agent the diode laser with wavelength of 980nm was used for soft tissue incision with power of 1.8 watt in continuous mode. After surgical procedures analgesic were prescribed. In scalpel surgical group 2% local anaesthetic agent with adrenaline was infiltrated at the surgical site and after surgical procedures sutures were placed, wherever required. Data collection was done on subsequent recall visit.

Method of scoring

Patient's comfort level was assessed by VAS method (0- 10 i.e. from unsatisfied to satisfied) at 1 week postoperative period in terms of comfortable/ uncomfortable in routine activities, mood, speech, sleep and interaction with other routine activity. The VAS scores of pain during procedure and at 24-36 hours intervals were taken ranging from no pain (score-0) to severe pain (score-10). Three weeks postoperative patient's satisfaction level was also assessed by the VAS scores ranging from not satisfied (score-0) to fully satisfied (score-10) with the treatment outcomes. Healing was assessed using the healing index [5] (Landry et al., 1988) at 1

and 2 weeks postoperatively.

STATISTICAL ANALYSIS

Non-parametric tests were chosen for continuous variables because the data was randomly distributed. Comparisons between groups were applied using the Mann-Whitney U-test.

RESULTS

Results of the study are summarized, in [Table/Fig-2-5]. The VAS scores of patient's comfort level 1 week postoperatively [Table/Fig-2] was significantly higher in the laser group compared to the conventional technique. [Table/Fig-3a,b] is showing the VAS scores of pain intraoperatively and 24-36 hours postoperatively. Significantly higher values for pain were observed, during procedure in laser group but after 24-36 hours postoperatively, higher pain scores were evident in scalpel group. Patient's satisfaction data (3 weeks postoperatively) is illustrated in [Table/Fig-4] and observed that the patients treated with lasers were more satisfied as compare to patients treated with scalpel. Postoperative healing was assessed by healing index [Table/Fig-5a,b] and better healing was observed in scalpel incisions and patients were quite satisfied with the healing.

DISCUSSION

The primary goal of surgical therapy should be the achievement of postoperative satisfactory results of the treatment with no or minimal intraoperative and postoperative complications and acceptable healing phase with optimum patient's comfort. Scalpel technique is the gold standard surgical technique as it is time tested, easy to use, inexpensive and less time consuming. In the present study patients operated with laser had experienced less postoperative pain with fewer postoperative complications with more satisfactory results. However, in this study scalpel surgery had shown better healing in early postoperative days. This may be because of the primary closure by sutures in the scalpel surgery. Delayed healing by Laser, was the only disadvantage observed in this study which may be because of the charring and carbonization created by Laser energy. But 2 weeks postoperative healing results were better with respect to laser which may be because of bandage formed over the wound

Groups		Depigmentation	Frenectomy	Operculectomy	Vestibuloplasty	Epulis	Gingivectomy	Mucocele
Scalpel	Median	15.0000	16.0000	19.0000	18.0000	17.0000	16.0000	17.0000
	Range	4.00	2.00	6.00	3.00	3.00	3.00	2.00
Laser	Median	25.0000	26.0000	26.0000	20.0000	20.0000	19.0000	20.0000
	Range	4.00	3.00	4.00	1.00	3.00	2.00	2.00
Mann-whitney U		.000	.000	.000	.000	.000	1.000	.000
p-value		.009	.008	.008	.007	.009	.014	.008

[Table/Fig-2]: Patient comfort scale 7 days postoperative

Groups		Depigmentation	Frenectomy	Operculectomy	Vestibuloplasty	Epulis	Gingivectomy	Mucocele
Scalpel	Median	.0000	.0000	2.0000	1.0000	1.0000	1.0000	1.0000
	Range	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Laser	Median	2.0000	3.0000	4.0000	4.0000	3.0000	3.0000	3.0000
	Range	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Mann-whitney U		2.000	.000	1.000	.000	.000	1.000	.000
p-value		.020	.007	.013	.006	.007	.013	.006

[Table/Fig-3a]: Pain analogue scale during procedure

Groups		Depigmentation	Frenectomy	Operculectomy	Vestibuloplasty	Epulis	Gingivectomy	Mucocele
Scalpel	Median	3.0000	3.0000	3.0000	3.0000	5.0000	4.0000	5.0000
	Range	1.00	1.00	1.00	1.00	2.00	3.00	2.00
Laser	Median	1.0000	1.0000	3.0000	3.0000	2.0000	2.0000	3.0000
	Range	2.00	1.00	2.00	2.00	2.00	.00	2.00
Mann-whitney U		.000	.000	12.000	11.000	.500	2.500	1.000
p-value		.006	.007	.905	.729	.010	.017	.013

[Table/Fig-3b]: Pain analogue scale 24-36 hours

Groups		Depigmentation	Frenectomy	Operculectomy	Vestibuloplasty	Epulis	Gingivectomy	Mucocele
Scalpel	Median	5.0000	6.0000	6.0000	5.0000	5.0000	6.0000	5.0000
	Range	1.00	3.00	4.00	3.00	2.00	2.00	2.00
Laser	Median	9.0000	10.0000	8.0000	8.0000	9.0000	8.0000	9.0000
	Range	1.00	1.00	3.00	2.00	2.00	2.00	3.00
Mann-whitney u		.000	.000	4.000	.500	.000	1.000	.000
P value		.006	.008	.066	.011	.008	.013	.008

[Table/Fig-4]: Patient satisfaction scale- 3 week post-treatment

Groups		Depigmentation	Frenectomy	Operculectomy	Vestibuloplasty	Epulis	Gingivectomy	Mucocele
Scalpel	Median	3.0	3.0	2.0	2.0	3.0	3.0	3.0
	Range	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Laser	Median	2.0	2.0	2.0	2.0	2.0	3.0	2.0
	Range	.0	1.0	.0	.0	1.0	1.0	.0
Mann-whitney u		2.500	7.500	7.500	7.500	5.000	6.000	.000
P value		.014	.221	.134	.134	.072	.093	.005

[Table/Fig-5a]: Healing Index- 1st Week postoperatively

Groups		Depigmentation	Frenectomy	Operculectomy	Vestibuloplasty	Epulis	Gingivectomy	Mucocele
Scalpel	Median	4.0	4.0	4.0	3.0	4.0	4.0	4.0
	Range	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Laser	Median	3.0	4.0	3.0	4.0	3.0	3.0	4.0
	Range	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Mann-whitney u		4.0	4.5	2.0	7.5	10.0	3.0	4.5
P value		.10	.10	.032	.31	.69	.06	0.95

[Table/Fig-5b]: Healing Index- 2nd Week postoperatively

by protein coagulation. The bandage protects the wound and less scar formation was observed. Previous investigators also concluded that laser has property of sealing of small blood and lymphatic vessels resulting in better haemostasis and less postoperative oedema. Disinfection of target tissues, reduced bacteraemia and mechanical trauma are also observed at laser surgical sites which can be explained as the result of local heating and production of an eschar layer which results in decreased amount of scarring due to decreased postoperative tissue shrinkage [6].

In the present study, patients treated with laser had experienced significantly less postoperative pain and discomfort with higher satisfaction level, which may be the result of the formation of protein coagulum on the wound surface by laser which act as a biologic dressing and seals the sensory nerve endings [7]. More satisfactory results were obtained in the laser surgical group as the patient in laser group experienced less scar formation and less functional complications as compared to scalpel surgery. Some other studies also suggested that laser surgical wounds heal rapidly with less scar tissue formation than conventional scalpel surgery [8,9], but the contradictory results have also reported [10].

CONCLUSION

Laser has been emerged as reliable alternative surgical tool to treat soft tissue anomalies with the advantages like bloodless field and less postoperative pain with better healing. Site of blood, injection of local anaesthetics and sutures may be the reason of dental patient's anxiety which leads to reluctance for oral surgical

procedures. These problems can be overcome by the use of laser. But as the laser is the form of light energy it can be reflected from shiny dental instrument surfaces and can injure the patient or operator or assistant. So, protective measures should be followed while using laser like protective eyewear and wet towels or gauze packs. A multicentre longitudinal study with more number of patients is required to strengthen the outcomes obtained by this study.

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Date of Submission: **Apr 24, 2015**

Date of Peer Review: **Jul 03, 2015**

Date of Acceptance: **Aug 03, 2015**

Date of Publishing: **Oct 01, 2015**

FINANCIAL OR OTHER COMPETING INTERESTS: None.