



COMPARATIVE EVALUATION OF TREATMENT OF SHALLOW VESTIBULE BY PERIOSTEAL FENESTRATION AND EDLAN MEJCHAR VESTIBULOPLASTY

Dental Science

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ABSTRACT

Objective: This study aims to compare the Edlan Mejchar technique and Periosteal Fenestration for augmenting keratinized mucosa and vestibular depth based on clinical evaluations.

Materials and Methods: The study included 30 patients who underwent a vestibuloplasty with either a Periosteal fenestration (n = 15) or the Edlan Mejchar (n = 15). Follow-up examinations were performed at 7th day, one and three months after surgery. Clinical parameters like vestibular depth, widths of keratinized gingiva were recorded. Pain levels and healing were assessed with a visual analog scale (VAS) and healing index (HI). Significance was set at $P < 0.05$.

Results: Comparison of the width of keratinized tissue and vestibular depth in (PF) and test (EM) groups showed that the mean width of keratinized tissue and vestibular depth increased in statistically significant way in each group after surgery. Better healing and significantly higher VAS scores were in Edlan Mejchar group ($P < 0.001$)

Conclusions: Edlan Mejchar technique seemed to be a promising alternative for the augmentation of keratinized mucosa and vestibular depth with minimal contraction of the vestibular depth gained and scar formation.

KEYWORDS

Edlan Mejchar, Periosteal Fenestration, visual analog scale, wound healing

INTRODUCTION

The shallow vestibule is found particularly on the labial aspect in the mandibular anterior region. It has been empirically believed to interfere with gingival health and make home care procedures less efficient. It not only impedes the proper placement of tooth brush but also hinders with the construction of a denture by impinging on the buccal flange.^[1] Goldman (1953) discussed the indications for increasing the vestibular depth in cases of periodontal disease in which satisfactory hygiene cannot be maintained and where the periodontal pockets are at least as deep as the attached gingiva is wide.^[2]

A way to deal with this condition is to deepen the vestibule by lowering the connection of the mucosa and muscle, or 'vestibuloplasty'. A variety of surgical techniques has been used for vestibuloplasty including sub mucosal vestibuloplasty, secondary epithelization vestibuloplasty, Edlan-Mejchar vestibuloplasty and soft tissue grafting vestibuloplasty.^[3,4]

In Periosteal fenestration approach removal of periosteum at the base of the operative field is done creating a fenestration to create a scar which prevents post-surgical narrowing of the attached zone.^[5] While Edlan and Mejchar (1963) technique appeared to be particularly applicable to patients where no pockets and little gingiva was present. This procedure appeared to increase the width of the attached gingiva in cases of lack of vestibular depth.^[6]

Hence, the present study was designed to envisage the effectiveness of Edlan Mejchar technique for vestibular deepening in comparison to Periosteal fenestration technique.

MATERIALS AND METHODS

A randomized controlled clinical study was conducted on thirty subjects (30) who had reduced vestibular depth in the mandibular anterior region and required vestibuloplasty as their overall periodontal treatment plan. The study sample was derived from the population of subjects who presented at the outpatient department of Periodontology, Himachal Dental College, and Sunder Nagar Himachal Pradesh from January 2015 to March 2016 and met predetermined selection criteria. At the first visit, interested subjects who met the inclusion criteria (18 years of age, good systemic health, Radiographic evidence of sufficient bone adjacent to the involved site and no tooth mobility) were given detailed explanations about the postoperative follow-up required for study participation and all other study procedures and were required to provide signed informed consent. Subjects were excluded if they smoked >5 cigarettes per day

or had any systemic disease, pregnant and unwillingness to provide informed consent.

The subjects were divided into two groups i.e. control and test group determined randomly through the coded sealed packets (Jeffcoat et al. 2003). In Group 1 (Control): Periosteal fenestration (PF) technique was performed. In Group 2 (Test): Edlan Mejchar (EM) technique was performed. Ethical committee clearance was obtained and endorsed duly by the head of the institution.

Pre-surgical measures

Prior to surgery a thorough medical and dental history, radiographic and routine blood examination of each subject were obtained. An impression of the jaws was taken to fabricate a customized acrylic incisal stent with a guide groove. This provided a fixed angulation for the measurements at each site over the entire duration of the study. Each subject received Phase-I therapy. Incisal adjustments were done if necessary to relieve traumatic occlusion. All subjects were given detailed instructions in plaque control measures.

To assess the effectiveness of Edlan Mejchar technique compared to Periosteal fenestration, traditional clinical measures of periodontal health and healing were recorded. Measurements included: 1) Plaque index^[7] 2) Gingival index^[8] 3) Oral Hygiene index^[9] 4) Visual Analog scores^[10] 5) Healing index^[11] 6) Vestibular depth^[12] 7) Width of Keratinized tissue. Radiographs of the sites were recorded pre-operatively. Vestibular depth was measured with the help of periodontal probe on the mid facial aspect of lower central and lateral incisors (gingival margin to the mucogingival junction

Surgical procedure

The surgical procedure was performed under local anesthesia The PF and EM technique was performed. For PF, a horizontal incision was made, (Fig 1, B) holding a #15 Bard-Parker surgical blade parallel to the alveolar process, dissecting close to the periosteum. At the level of this deepened vestibule, a periosteal separation incision, down to bone was made, perpendicular to the alveolar process from canine to canine. Thumb pressure in this area created an osseous exposure of 4 to 5 mm. Lateral relaxing incisions were made at this level to allow for blending with adjacent tissues. A non-eugenol periodontal dressing for protection (Fig 1, D) was placed following a surgical procedure.

EM technique was performed. Vertical Incision was given (Fig 2, B) on the mesial aspect of the mandibular canines and starting at the junction of the attached and free gingiva, an incision was made for a distance of

10 to 12 mm extending on to the lower lip. A similar incision was made corresponding to the other mandibular canine. These two incisions were joined by a horizontal incision across the midline. The loose labial mucosa was separated from the underlying muscle. This resulted in a loose flap of labial mucosa with its base on the gingiva. The loose flap of the labial mucosa was folded upward and a horizontal incision was made on the periosteum. This incision was made so that it extended between the two initial vertical incisions mesial to the canines. The incision of the periosteum was extended in a vertical direction at its ends. The periosteum was then separated from the bone, forming a second flap with its base on the apical portion of the mandible. The loose flap of the labial mucosa was folded back and placed on the bone from which the periosteum will be removed. It was fixed with interrupted non-resorbable sutures (Fig 2,D) to the inner surface of the periosteum, which was removed from the bone. The upper edge of the periosteum was also sutured using non-resorbable sutures to the mucous membrane of the lip to cover the area denuded by the reflection of the first (labial mucosal) flap.

Figure 1. Exemplary case presentation using Periosteal Fenestration. A) Presurgical situation. B) Incision given. C) Flap Reflection. D) Coe-Pak given. E) At 7th Day after Removing Coe -Pak. F) Post-Operative.



Figure 2. Exemplary case presentation using EM. A) Presurgical situation. B) Incision given. C) Flap Reflection. D) Suture given. E) Coe-Pak given. F) At 7th Day after Removing Coe -Pak. G) Post-Operative.



During postoperative care, antibiotics, Combiflam, twice daily, and vitamin B complex, 1 capsule daily, were prescribed for one week to all subjects. Subjects were instructed to rinse with 0.2% chlorhexidine gluconate mouth was (10ml) twice daily for 4 weeks and were asked to abstain from tooth brushing, flossing, and interdental cleaning techniques in the treated area for 4 weeks after surgery. Non-eugenol periodontal dressing and sutures were removed after 1 week.

The first follow-up visit occurred 1-week post-surgery. Any adverse events and VAS scores were documented. Oral hygiene instructions were reviewed and as per the subjects treatment needs were performed at the surgical site. Further follow-up evaluations occurred at 1, and 3 months post-surgery. Photos of the test and control sites, along with clinical measurements, were obtained.

RESULT

Thirty subjects completed the study, which included 15 PF subjects and 15 EM subjects. [Table 1] shows mean and S.D. of both groups at different time points for different parameters. The results at the end of 3 months showed that the mean Plaque index (PI), Gingival index (GI), Oral Hygiene Index (OHI-S) decreased significantly and remained low throughout the study period. At 7 days postoperatively, 12 of 15 PF subjects had experienced postoperative pain since the surgery. All 15 EM subjects indicated experiencing pain during the same time period. The mean Visual Analog Scale (VAS) pain score for PF subjects was 5.3 (range: 0 to 10), whereas the score for EM subjects was 8.2 (range: 3 to 6). The difference between PF and EM groups did reach statistical significance (P value < .001). Healing index (HI) was evaluated at one month and three months through the examination of the fibrinous slough. The healing index score was found to be 0.66 and 0.76 in PF group and EM group respectively. The mean gain in percentage of vestibular depth (VD) at the end of three months was 53.7% from the baseline with no relapse in PF group. For EM group, the mean gain in percentage of vestibular depth at the end of three months was 59.3% from the baseline. The mean gain in percentage of the width of keratinized tissue at the end of three months was 43.4% and 55.5% in PF and EM group respectively. In inter-group comparison, EM showed better results in terms of increasing the vestibular depth and keratinized tissue than PF and intergroup comparison was highly significant at 3 months. [Table 2, 3]

Results of this study suggest that Edlan Mejchar offers a predictable way in which gingival health can be achieved and maintained. Clinical advantages of this technique are related to significant increase in vestibular depth and keratinized tissue and advanced tissue healing by first intention, thereby minimizing the chances of bone resorption and further recession. As compared to the periosteal fenestration technique there was a minimal contraction of the vestibular depth gained and minimal scar formation.

Table 1 shows changes in the clinical parameters Over Entire Observation Period

PARAMETERS	Group 1				Group 2			
	BL	7TH DAY	1 MONTH	3 MONTH	BL	7TH DAY	1 MONTH	3 MONTH
PI	0.5±0.7	-	0.4±0.7	0.3±0.8	0.4±0.5	-	0.2±0.5	0.1±0.4
GI	0.6±0.4	-	0.3±0.5	0.3±0.4	0.4±0.6	-	0.2±0.5	0.1±0.4
OHI-S	0.6±0.7	-	0.4±0.7	0.4±0.5	0.4±0.7	-	0.3±0.7	0.2±0.4
VAS	-	5.33333	-	-	-	8.2	-	-
HI	-	-	1.1±0.2	1.7±0.2	-	-	3.3±0.2	4.7±0.2
VD	2.5±0.3	-	5.4±0.7	5.4±0.6	2.6±0.3	-	6.4±0.4	6.4±0.5
WKG	1.3±0.5	-	2.3±0.5	2.3±0.5	1.2±0.5	-	2.7±0.5	2.7±0.7

Table 2: Intergroup comparison of mean difference Vestibule Depth of Group 1 and Group 2 at different time intervals

Time interval	n	MD ±SD		p-value	Sig.
		Group I	Group II		
Baseline to 1 month	15	-2.86±.351	-3.86±.351	.717	NS
Baseline to 3 month	15	-3.00±.654	-3.93±.593	<.001	HS
1 month to 3 month	15	-0.13±.743	-0.06±.457	.001	HS

SD – Standard deviation; p<.001- highly significant (HS); p<.05-significant(S); p>.05- non significant(NS); MD- mean difference

Table 3: Intergroup comparison of mean difference of Width of keratinized gingiva scores of Group I and Group II at different time intervals

Time interval	N	MD±SD		p-value	Sig.
		Group I	Group II		
Baseline to 1 month	15	-1.00±.516	-1.46±.5164	.695	NS
Baseline to 3 month	15	-1.13±.516	-1.53±.7432	.031	S
1 month to 3 month	15	-0.13±.516	-0.06±.5936	.063	NS

SD – Standard deviation; $p \leq 0.001$ - highly significant (HS); $p \leq 0.05$ - significant(S); $p \geq 0.05$ - non significant(NS); MD- mean difference

DISCUSSION

In this study, an effort was made to assess the effectiveness of Edlan Mejchar(EM) technique compared to Periosteal fenestration(PF) in attaining gain in vestibular depth and width of attached gingiva.

To assess patient compliance in maintaining oral hygiene GI, PI and OHI-S were recorded in the present study. The results at the end of 3 months showed that the mean Gingival index (GI), Plaque index (PI), oral hygiene index (OHI-S) decreased significantly and remained low throughout the study period. A previous study of Wade AB (1969)^[12] who utilized Edlan Mejchar technique for deepening inferior labial vestibule found similar results and attributed the improvement in the scores to patient's compliance to perform effective plaque control postoperatively. These results were also analogous to study Yadav N et al (2014)^[13].

In the present study, Visual analog scale (VAS) was evaluated on the 7th day after surgery to evaluate discomfort after vestibuloplasty. The mean VAS pain score for the first 7days postoperatively was 8.2 for EM subjects compared to 3 for PF. The respective 7-day score differences between EM and PF approached, but did not reach, statistical significance, suggesting that a larger sample size might have resulted in significant differences. As far as we could determine, this was the first study to use VAS scores to evaluate postoperative pain following EM procedures. The higher VAS scores in EM group could be attributed to the extent of surgical manipulation along with the suturing that might have led to severe postoperative discomfort associated with swelling and pain (Corn H et al)^[14].

To the best of our knowledge, ours is the first study to use Healing index (HI) to evaluate the healing events clinically one month and three months. Results of HI indicated improvements of wound healing (1 and 3 months post-surgery) in the group treated with Edlan Mejchar technique compared to the group treated with periosteal fenestration technique which can be related to the healing occurring by the first intention in EM group in contrast to PF.

At baseline, participants of the PF and EM groups showed a comparable lack of keratinized mucosa before vestibuloplasty. This allowed good comparability between groups. The primary outcome of this study revealed a significant improvement of keratinized mucosa and vestibular depth after vestibuloplasty in both groups. In this examination of comparison of PF and EM, the test group EM generated significantly more KT than did the PF at 3months (55.5% versus 43.4%). On intergroup comparison, however, the differences were found to be non-significant ($p > 0.05$) at one month but significant at three months. Vestibular depth showed a significant gain for both the groups. For the PF group the mean gain was 53.7% and for EM group, it was 59.3% at end of 3 months. The greater gain in vestibular depth in EM group could be due to the non-exposure of bone and minimal scar formation and contraction of the vestibular depth gained. These outcomes are in agreement with literature reports for treatment of shallow vestibule by Edlan Mejchar technique.^[12,15,16]

CONCLUSION

Edlan Mejchar technique culminates to a reliable and probable increase in the width of the attached gingiva and may be successfully used in the treatment of a shallow vestibule. Future expanded studies utilizing the information gained from this trial evaluating the efficacy of Edlan Mejchar for increasing the vestibular depth and width of keratinized tissue are warranted to determine the stability of results, in a larger size sample.

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