



Comparative Evaluation Of Frenectomy Outcomes Performed By Lateral Pedicle Flap And V-Y Plasty Technique

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Background

Papillary and papilla penetrating frenum are considered as pathological and need frenectomy or frenotomy. As the conventional technique of frenectomy causes different disadvantages, some modified techniques like V-Y plasty, Miller's technique has been introduced.

Aim & Objectives of the study

To evaluate and compare frenectomy outcomes performed by Lateral Pedicle flap and V-Y plasty technique

Material and Method:

20 patients were divided in two groups and lateral pedicle flap and V-Y plasty technique were performed in group A and B respectively.

Results

Statistically significantly more bleeding was encountered in group A as compared to group B.

Pain gradually subsided significantly for both group A and B but Group B showed lower pain score constantly at all-time intervals and on 3rd day, the difference in pain index between this two groups was statistically significant.

Intragroup comparison showed consistent healing improvement from 7th day to 30th day for both the groups. Better healing score on an average were found in Group B consistently at all the time intervals as compared to Group A but the difference was not statistically significant.

Conclusion

Initially, V-Y plasty technique presented with lesser bleeding, pain and better healing response as compared to Miller's lateral pedicle flap technique, but Miller's technique gave some additional advantages. So, it can be concluded that V-Y plasty can be a good alternative to Miller's technique.

Keywords: Papillary Frenum, Papilla Penetrating Frenum, Lateral Pedicle Flap, V-Y Plasty Technique

Introduction

The frenum is defined as a triangular mucous membrane fold that attaches the lip or the cheek to the underlying or overlying alveolar mucosa or the gingiva and the underlying periosteum. There are multiple types of frenum present in a normal oral

cavity, e.g. the maxillary labial frenum, the mandibular labial frenum and the lingual frenum. The primary function of frenum is to provide stability to the upper and lower lips and the tongue.

Placek et al¹ in 1974 classified frenum depending upon the extension of attachment of fibres of Orbicularis Oris muscle.

1. Mucosal- when the fibres are attached up to mucogingival junction
2. Gingival- when the fibres are inserted within the attached gingiva
3. Papillary- when crossing the entire attached gingiva, fibres are extended into interdental papilla.

Clinically, papillary and papilla penetrating frenum are considered as pathological and results in loss of papilla, recession, diastema, difficulty in brushing, alignment of teeth and psychological disturbances to individual.² In such cases aberrant frenal attachment has to be removed or relocated.

Frenectomy is the complete removal of the frenum, including its attachment to the underlying bone, while frenotomy is associated only with the relocation of the frenal attachment.

The conventional technique of frenectomy introduced by Archer³ and Kruger⁴ results in wide rhomboid scarring which may lead to periodontal problems and an unaesthetic appearance, which leads to find out some modifications of this conventional technique. Both Lateral pedicle flap and V-Y plasty technique are such modifications.

LPF technique given by Miller, 1985, is a rotational graft technique, which provides some advantages like increase in the width of attached gingiva and colour match giving esthetically appreciable result.

V-Y plasty, being a simple modification of conventional technique, allows the lengthening of that area by relocating the frenum apically, thereby increasing the width of attach gingiva.

Hence the present study has been planned to evaluate and compare frenectomy outcomes performed by Lateral Pedicle flap and V-Y plasty technique.

Objectives:

1. To evaluate and compare the intra operative bleeding during lateral pedicle flap and V-Y Plasty technique (by preweighed gauge piece)⁶
2. To evaluate and compare pain experienced by each patient after lateral pedicle flap and V-Y plasty technique (Visual Analog Scale by Freyd in 1923)⁷

3. To evaluate and compare the wound healing following lateral pedicle flap and V –Y Plasty technique (Modified Early Wound Healing Index by Watchel et al in 2005)⁸

Materials and Methods

The present study was a randomized control clinical trial study and was conducted with 20 patients with high frenal attachment [age range 15-55 years] requiring frenectomy and were divided into 2 groups,- Group A – 10 patients treated with LPF, Group B – 10 patients treated with V-Y plasty technique

Syndromic patients, patient with mental retardation, patients presenting with gingival recession in teeth adjacent to frenum, Pregnant patients, significant medical and dental history and the patients who were not willing to undergo surgery were excluded from the study.

Surgical Procedure

For V-Y Plasty technique, the frenum [fig 1a] was held with the hemostat and an v shaped incision [fig 1b] was made on the undersurface of the frenal attachment. Then the frenum was apically relocated and sutured in Y shape [fig 1c]. Coe pak was placed [fig 1d] and patient was recalled on 7th day [fig 1e], 15th day [fig 1f] and 1 month post operative day [fig 1g].

For Lateral Pedicle flap, after undermining the frenum[fig 2a, 2b], a vertical parallel incision was given on the mesial side of lateral incisor. A horizontal incision joining the coronal end of these two vertical incisions, partial thickness pedicle flap was mobilized mesially and sutured [fig 2c] to obtain primary closure across the midline. Coe pak placed [fig 2d] and patient was recalled on 7th day [fig 2e], 15th day [fig 2f] and 1 month post operative day.

Severity of bleeding had been recorded by absorbing the blood in preweighed gauze pieces, and weighing those post-surgically and recording the difference. Pain was recorded on VAS scale 1st, 3rd, 7th, 15th day. On this scale left end was ‘no pain’ and right end was ‘worst pain imaginable’. Healing was recorded on 7th, 15th, 30th post-operative day by modified Early Healing Index by Watchel et al in 2005⁸.

Statistical Analysis

Chi-squared test was performed for trends and Fisher's exact test was performed for categorical data. Descriptive statistical data was represented by Mean, SD and SEM, P value less than 0.05 was considered as statistically significant. Statistical analysis was performed by using GraphPad Prism Software version 9.1.

Results

Bleeding occurred in both the surgical procedure as an unavoidable phenomenon but more bleeding was encountered in group A as compared to group B and the difference in bleeding amounts between these two groups was statistically significant. [P value = 0.0230][Table 1]

Post-operative pain was there for initial days, but no major complain was received from patients in this concern. Comparing intergroup pain index Group B showed lower pain scores constantly at all-time intervals as compared to group A but that was significant only on 3rd post-operative day. [Table 2] Intra-group comparison of pain index showed gradually decrease from day 1 to day 15 for both the groups and the reduction was statistically significant in all the intervals. [Table 3]

Efficacy of surgical procedure at a great extent depends on excellence in healing. Comparing intergroup healing index scores, better healing results on an average were found in Group B consistently at all-time intervals but the results were not statistically significant. [Table 4] Intragroup comparison revealed consistent healing improvement for both the groups from 7th day to 30th day. [Table 5]

Discussion

Resection of aberrant frenum was initially included under the term mucogingival surgery given by Friedman in 1957. Later it was included under the broad heading of periodontal plastic surgery.⁹ The classical scalpel technique left a longitudinal surgical scar which might lead to periodontal problems and an unaesthetic appearance. Hence, various modifications were proposed, like V-Y-plasty and Miller's technique. V-Y plasty was tried by Mc. Carthy in the year 1990 for surgery in fingertip.¹⁰ Miller's technique was first tried by P. D. Miller in the year 1985.¹¹

Miller's technique comes up with the following advantages like -

1. Post-operative continuous collagenous band of gingival tissue across the midline.
2. Bracing effect rather than scar tissue formation
3. Less rate of relapse
4. No disruption of trans-septal fibres, so there is no loss of interdental papilla.

In a study by Present MC et al, bleeding amount was evaluated in patients undergoing surgery with or without hypotensive anesthesia. In this study bleeding amount was evaluated by weighing the surgical gauze swabs and measuring the contents of the suction bottle.⁶ Another study by Kulkarni M. et al also evaluated intra-operative blood loss by weighing the cotton swab.¹² Here in this study bleeding has been measured by using the same technique. The intraoperative bleeding amount was significantly lower in V-Y plasty technique in our study. Bagchi et al¹³, explained V-Y plasty as a less invasive surgical procedure, which could attribute to the lesser amount of bleeding. In our study, large amount of bleeding was observed in case of surgery with Miller's technique which is consistent with studies by Sharma P et al¹⁴, Kumar S. et al¹⁵ Possible reasons for more bleeding in LPF as compared to V-Y plasty can be the following - Invasiveness, Complicated incision line, flap reflection, Partial thickness flaps, More surgical time, more trauma, more damage to local vasculature,

Among the different pain scales, VAS scale was used in this study because of simple procedure and greater acceptance. Several studies had evaluated the pain score correctly by this method like Singh P et al's study¹⁷ The pain index score gradually subsided in both the groups from day 1 to day 15 because of initiation of healing and subside of inflammation. Intergroup comparison of pain showed lesser pain for V-Y plasty group throughout the study period as compared to Miller's technique group, but the difference between these two were not statistically significant, except on day 3.

Less pain in V-Y Plasty technique could be attributed to less invasive surgery, less nerve damage, lesser microvascular damage, lesser trauma to tissue, less inflammation, no flap reflection, less stress and fear and early healing. Almost all the published articles

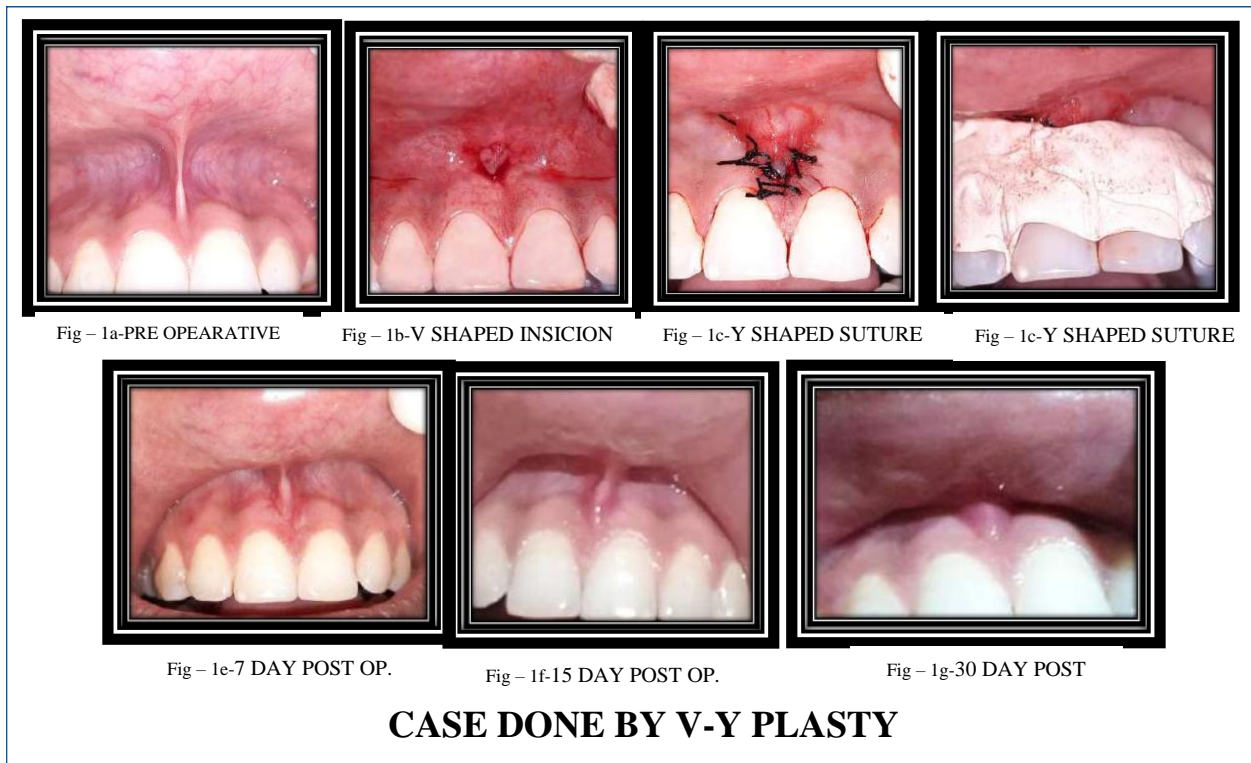
like Jananthanan S *et al.*¹⁸, Chaubey *et al.*¹⁹, Mani *et al.*²⁰, Anubh *et al.*²¹ approved the healing excellence and esthetic completeness for Miller's technique. Watchel *et al.*'s index is based on primary union or non-union with or without fibrin line. So, here in this study, Watchel *et al.*'s EHS was used in a modified form.⁸ In the present study, for intragroup comparison, healing in both the groups A and B showed significant improvement gradually in several post-operative days. This result was consistent with other studies like Kramper *et al.*²². Though significant difference in healing outcome could not be appreciated in any interval between these groups, but healing was on an average better for V-Y plasty group. The delayed healing of Miller's technique could be attributed to Invasiveness, Complicated

incision line, flap reflection, Partial thickness flaps, More surgical time, more trauma, more damage to local vasculature,

Though not standardized, but clinical examination showed some additional advantages in Miller's technique like no loss of interdental papilla, no scar formation, excellent color matching, and increase in attached gingival width as also stated by Chaubey *et al.*¹⁹ and Anubh *et al.*²¹

Limitation

Small sample size, short period of time, inability to use advanced bleeding assessment procedure, underestimation of occult blood, subjective pain and healing index are some of the limitations of this study.



CASE DONE BY LATERAL PEDICLE FLAP

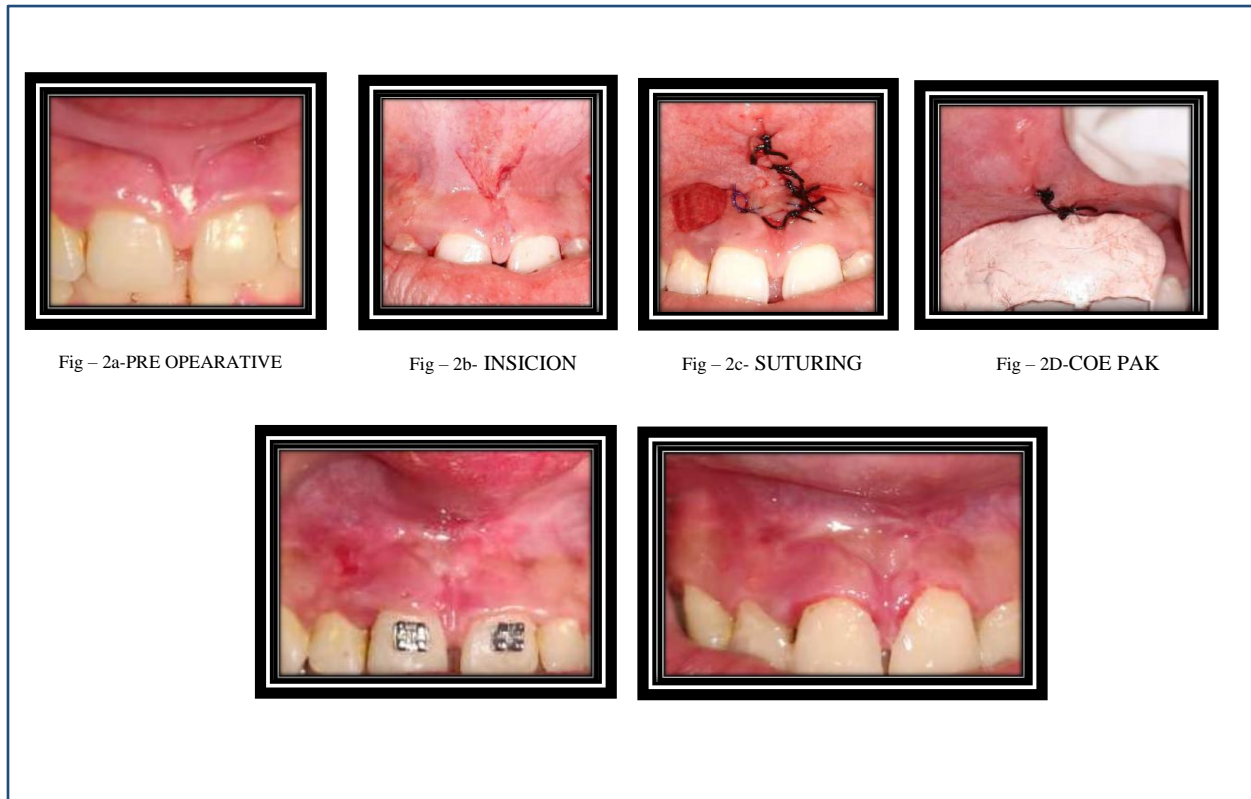


Table 1. Inter Group Comparison Of Intra-Operative Mean Bleeding [in mg] Between Group A & Group B

	Bleeding for group A [in mg]	Bleeding for group B [in mg]	P value for inter group comparison
mean	10680	3549	0.0230*
SD	7677.473543	1329.664995	

Table 2- Intergroup Comparison of Pain Index Scores of Group A & Group B

	1 st day		3 rd day		7 th day		15 th day	
	Group A	Group B	Group A	Group B	Group A	Group B	Group A	Group B
Mean	3.300	2.300	2.300	1.400	0.9000	0.500	0.000	0.000
Std. Deviation	0.8233	0.9487	0.9487	0.8433	0.7379	0.5270	0.000	0.000
Std. Error of Mean	0.2603	0.3000	0.3000	0.2667	0.2333	0.1667	0.000	0.000
P value	0.140		0.0367*		0.1625		----	

Table 3. Comparison for Intra Group Pain Index Scores For Group A And Group B

COMPARISON BETWEEN DAYS	P value for group A	P value for group B
DAY 1 vs DAY 3	0.0225*	0.0365*
DAY 1 vs DAY 7	0.0001**	0.0002**
DAY 1 vs DAY 15	<0.0001**	<0.0001**
DAY 3 vs DAY 7	0.0034*	0.0124*
DAY 3 vs DAY 15	<0.0001**	0.0005*
DAY 7 vs DAY 15	<0.0001**	0.0325*

Table 4- Intergroup Comparison For Healing Index Score Between Group A & B

	7 th day		15 th day		30 th day	
	Group A	Group B	Group A	Group B	Group A	Group B
Mean	2.400	2.200	1.700	1.300	1.000	1.000
Std. Deviation	0.5164	0.6325	.4830	0.4830	0.000	0.000
Std. Error of Mean	0.1633	0.1633	0.1528	0.1528	0.000	0.000
P Value	0.4218		0.1797		0.0000	

Table 5. Comparison For Intra Group Healing Index Scores For Group A And Group B

COMPARISON BETWEEN DAYS	P value for group A	P value for group B
DAY 7 vs DAY 15	0.0079*	0.0039*
DAY 7 vs DAY 30	<0.0001**	0.0003*
DAY 15 vs DAY 30	0.0031*	0.2105

Conclusion

In this study, both techniques came with their own advantages and limitations. No technique is superior to other. A long term study is still required to evaluate the esthetic stability and chance of recurrence for each technique.

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