Original Article

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Dentistry Section

Comparative Evaluation of Healing Outcomes, Surgical Time and Scar Tissue Formation in Paralleling versus Conventional Frenectomy Techniques: A Randomised Controlled Trial

NETRA SHAH[1], MONALI SHAH[2], JINAL PATIL[3], RUCHI RAVAL[4], JASUMA RAI[5]

ABSTRACT

Introduction: High Maxillary Labial Frenum (HMLF) attachment is associated with midline diastema, gingival recession, compromised oral hygiene, and aesthetic concerns. Frenectomy is the treatment of choice, and various techniques have been proposed to improve outcomes. The conventional method involves substantial tissue excision, resulting in scar formation and patient discomfort. Therefore, there is a need to explore and evaluate alternative surgical techniques that minimise tissue trauma while improving healing outcomes and reducing postoperative morbidity.

Aim: To evaluate and compare the healing response, surgical time and scar formation between the paralleling and Conventional frenectomy techniques.

Materials and Methods: The present randomised controlled clinical trial with a parallel-group study design was conducted in the Department of Periodontology at KM Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara over 10 months from June 2024 to March 2025 on 52 patients presenting with papillary or papilla-penetrating frenum attachments. The participants were randomly allocated into two equal groups: Group A, treated using the paralleling technique, and Group B, treated using the conventional technique. Total procedural time from incision to completion of suturing was recorded intraoperatively using a stopwatch. Clinical outcomes, including the Healing Index (HI) and Mucosal Scarring Index (MSI) were assessed at one week and one month, postoperatively. The data on clinical parameters collected at one week and one month were analysed using the statistical software IBM Statistical Package for the Social Sciences (SPSS) 16.0 (IBM Inc., Chicago). Wilcoxon signed-rank test were used for intragroup comparison intergroup comparison p-value of <0.05 is considered statistically significant.

Results: Group A demonstrated significantly superior healing outcomes, lower scarring, and shorter operative times compared to Group B ($p<0.001$). At one month, the paralleling technique achieved higher HI scores (4.76±0.44) and lower MSI values than the Conventional method (0.53±0.51). The mean surgical duration was shorter in Group A (17.88±2.11 minutes) compared to Group B (22.69±2.19 minutes).

Conclusion: The paralleling technique provides enhanced healing, minimal scar formation, and reduced surgical time, making it a more efficient and aesthetically favourable option for managing aberrant maxillary labial frenum attachments.

Keywords: Aesthetics, Maxillary labial frenum, Mucosal scarring, Wound healing

INTRODUCTION

The periodontium is a specialised tissue that surrounds and supports the teeth. It is made up of gingiva, periodontal ligament, cementum and alveolar bone. The periodontium exhibits several anatomical variations, among which the frenum is a notable example [1]. Such variations may predispose to disease development by serving as niches for microbial accumulation or by altering the distribution and direction of functional forces within the periodontal tissues [2]. The labial frenum is a fold of mucous membrane connecting the lip to the alveolar process and plays a key role in oral function and facial growth. Abnormal frenum attachment can contribute to periodontal issues, diastema, and aesthetic concerns, gingival recession, hinder oral hygiene, and complicate orthodontic or prosthetic treatments. It may also lead to plaque accumulation, periodontal pocket formation, and bone loss due to muscle pull, especially when attached close to the gingival margin, underscoring the importance of its assessment and management in periodontics [3]. Early diagnosis and intervention can prevent the progression of periodontal and orthodontic problems [4,5].

Anatomically, frenal attachments are classified as maxillary and mandibular labial, lingual, and buccal, each associated with distinct clinical implications [6,7]. Placek et al., (1974) categorised frenal attachments into mucosal, gingival, papillary, and papilla-penetrating types [8], whereas Sewerin IP described morphological variants including simple, double, and persistent tectolabial forms [9]. Frenectomy (complete removal) or frenotomy (repositioning) are standard treatments for problematic frena. Techniques include conventional scalpel surgery, laser surgery (diode, CO2), electrosurgery, and plastic surgery methods like Z-plasty or V-Y plasty. Laser techniques offer advantages over conventional such as less pain, faster healing, and better patient comfort, though they require specific expertise [10-12]. Combined periodontal and esthetic surgeries can address multiple tissue abnormalities efficiently.

The conventional Archer WH method in 1975, though widely employed, involves substantial tissue excision, resulting in increased postoperative discomfort and scar formation [13]. Conversely, the paralleling technique introduced by Abullais S et al., in 2016 utilises parallel incisions [14]. It reduces tissue trauma, enhances wound approximation, and promotes faster healing with minimal scarring.

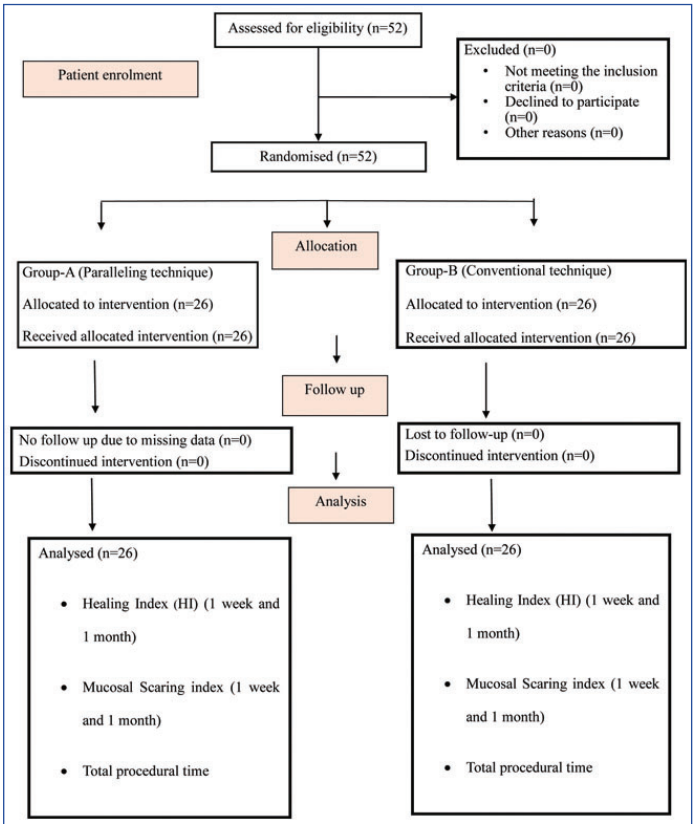
Therefore, the present study aimed to evaluate and compare postoperative healing, surgical duration, and mucosal scarring following conventional and paralleling frenectomy techniques.

MATERIALS AND METHODS

The current randomised controlled trial was conducted in the Department of Periodontology at K.M. Shah Dental College and

Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India, over 10 months from June 2024 to March 2025. The study protocol received approval from the Institutional Ethics Committee (IEC) of Sumandeep Vidyapeeth before initiation.

Sample size calculation: Sample size of 52 participants was calculated using G*Power software with an effect size of 0.65, α=0.05, power=80%, and allocation ratio of 1:1. Patients were selected based on inclusion and exclusion criteria and randomly allocated into two equal groups of 26 each. Participant enrolment, allocation, follow-up and analysis have been shown in Consolidated Standards of Reporting Trials (CONSORT) Flow [Table/Fig-1].



[Table/Fig-1]: CONSORT flow diagram.

Randomisation was done by coin and toss method. Group A included the paralleling technique, and Group B included the Conventional technique. The study was completed within 10 months of the date of IEC approval, including patient recruitment, surgical intervention, and follow-up. This was a double-blinded study in which both the participants and the outcome assessor were blinded to the Group Allocation. The operating surgeon was not blinded due to the nature of intervention.

Inclusion and Exclusion criteria: The inclusion criteria comprised male and female patients aged 16-50 years with high aberrant frenum attachment (papillary or papilla penetrating type) showing positive tension test based on classification given by Mirko P et al., in 1974. who exhibited brushing difficulty, midline diastema, gingival recession, or aesthetic concerns due to aberrant maxillary labial frenum attachment [8]. The criteria included unwilling participants, patients with uncontrolled systemic diseases, individuals with smoking or tobacco-related habits, and those with a history of antibiotic or steroid use within the previous six months.

Study Procedure

After obtaining informed consent, participants were randomly allocated into two groups and underwent Phase I therapy before surgical intervention. The surgical procedure was carried out under local anaesthesia using a standard surgical armamentarium consisting of a mouth mirror, Bard-Parker blades (no.11 and 15), artery and tissue forceps, needle holder, silk sutures, ultrasonic scaler, and lignocaine hydrochloride (1:80,000 with epinephrine). In Group A (Paralleling technique), two parallel incisions were made along the frenal ridge, followed by complete detachment of the frenum from top to bottom [14]. Sutures were taken and subsequent follow-up was taken at one week and one month.

In contrast, in Group B (Conventional technique), frenectomy was performed using the traditional incision approach [13]. Wound approximation was achieved with silk sutures, which were removed after one week. Patients were evaluated at follow-up visits scheduled at one week and one month.

The clinical parameters assessed were the HI, MSI, and the operative time required for the procedure. The Landry RG et al., HI was used in the present study to assess wound healing based on tissue colour, response to palpation (bleeding), presence of granulation tissue, and suppuration. The index ranges on a scale of 1-5 from a minimum score of very poor, indicating severe inflammation and compromised healing, to a maximum score of Excellent, indicating healthy pink tissue with no signs of inflammation or infection [15].

The MSI was used to assess scar outcomes based on scar width, height/contour, colour match, presence of suture marks, and overall appearance. The index ranges from the lowest score (0), indicating an ideal scar that is flush with surrounding mucosa, perfectly matched in colour, with no suture marks and good overall appearance, to the highest score [10], indicating a poor scar characterised by increased width, hypertrophy or invagination, obvious colour mismatch, clearly visible suture marks, and poor overall appearance [16]. Total procedural time, measured intraoperatively using a stopwatch from incision to completion of suturing.

Study Outcomes

HI, MSI and time taken for the procedure were evaluated for clinical parameters, where MSI was evaluated by using sub-parameters like width, height, colour, suture marks and overall appearance of the scar.

STATISTICAL ANALYSIS

The data on clinical parameters collected at one week and one month were analysed using the statistical software IBM SPSS 16.0 (IBM Inc., Chicago). Microsoft Word and Excel were used to generate graphs and tables. Qualitative data was represented as a number with a percentage, and quantitative data was represented as a mean with a standard deviation. Wilcoxon signed-rank test was used for intragroup comparison from one week to one month for HI and MSI for both Group A and B. Wilcoxon Mann-Whitney U test was used for intergroup comparison from one week to one month for HI and MSI. Additionally, the intergroup comparison of Time taken for the procedure in Group A and B was done using the same test. The p-value of <0.05 is considered statistically significant.

RESULTS

Results across all the parameters in both the groups were derived. Basic demographic features of the study population are shown in [Table/Fig-2]. Group A consists of 26 participants, of whom 16 (61.54%) are male, and 10 (38.46%) are female. The mean age of the participants is 27.13 years with a standard deviation of 7.29, indicating a moderate spread in age within the group [Table/Fig-2]. Group B consists of 26 participants, with 11 (42.31%) males and 15 (57.69%) females. The mean age of participants in this group is slightly higher than in Group A, at 29.00 years with a standard deviation of 7.76, suggesting a slightly greater variation in age among participants [Table/Fig-2]. There was no statistical difference between both groups for age and gender.

Intragroup analysis, comparison of all the study parameters at different time intervals measured in terms of Mean±SD is shown in [Table/Fig-3,4] for Group A (Paralleling technique) and in [Table/Fig-5,6] for Group B (Conventional technique). In the intragroup analysis,

Variables	Sub-group	Group A (n=26)	Group B (n=26)
Gender	Male	16 (61.54%)	11 (42.31%)
	Female	10 (38.46%)	15 (57.69%)
Age (years)	Mean±SD	27.13±7.29	29.00±7.76

[Table/Fig-2]: Demographic characteristics of the study participants in Group A and Group B (N=52).
(p<0.34, Non significant for gender) (Chi-square test) (p <0.54, Non significant for age) (Independent t-test)

Healing Index (HI)	n	Mean±SD	p-value
1 week	26	2.23±0.43	<0.001**
1 month	26	4.76±0.44	

[Table/Fig-3]: Healing Index (HI) in the paralleling technique Group at 1 week and 1 month (N=52).
(p<0.05 - Significant*, p<0.001 - Highly significant**) (Wilcoxon signed-rank test)

Variables	n	Mean±SD	p-value
Mucosal Scarring Index (MSI) (width)			
1 week	26	1.73±0.45	<0.001**
1 month	26	0.53±0.51	
Mucosal Scarring Index (MSI) (height)			
1 week	26	1.57±0.50	<0.001**
1 month	26	0.30±0.47	
Mucosal Scarring Index (colour)			
1 week	26	1.88±0.33	<0.001**
1 month	26	0.53±0.51	
Mucosal Scarring Index (suture marks)			
1 week	26	1.80±0.40	<0.001**
1 month	26	0.69±0.47	
Overall appearance			
1 week	26	1.92±0.27	<0.001**
1 month	26	0.53±0.51	

[Table/Fig-4]: Mucosal scarring Index (MSI) (width, height, colour, suture marks, overall appearance) in paralleling technique group at 1 week and 1 month (N=52).
(p<0.05 - Significant*, p<0.001- Highly significant**) (Wilcoxon signed-rank test)

Healing Index (HI)	n	Mean±SD	p-value
1 week	26	1.50±0.52	<0.001**
1 month	26	3.76±0.44	

[Table/Fig-5]: Healing Index (HI) outcomes in the Conventional technique group at 1 week and 1 month (N=52).
(p<0.05 - Significant*, p<0.001 - Highly significant**) (Wilcoxon signed-rank test)

Variables	n	Mean±SD	p-value
Mucosal Scarring Index (MSI) (width)			
1 week	26	1.88±0.33	<0.001**
1 month	26	1.19±0.40	
Mucosal Scarring Index (MSI) (height)			
1 week	26	1.57±0.50	<0.001**
1 month	26	0.30±0.47	
Mucosal Scarring Index (MSI) (colour)			
1 week	26	2.00±0.00	<0.001**
1 month	26	1.30±0.47	
Mucosal Scarring Index (MSI) (suture marks)			
1 week	26	1.19±0.40	<0.001**
1 month	26	1.00±0.50	
Overall appearance			
1 week	26	2.00±0.00	<0.001**
1 month	26	1.19±0.40	

[Table/Fig-6]: Mucosal Scarring Index (MSI) (width, height, colour, suture marks, overall appearance) in the Conventional technique group at 1 week and 1 month (N=52).
(p<0.05 - Significant*, p<0.001 - Highly significant**) (Wilcoxon signed-rank test)

both Group A (Paralleling technique) and Group B (Conventional technique) exhibited noteworthy improvements in the healing and scar formation from baseline to one month.

In Group A, a highly significant difference in HI between one week and one month is seen, p <0.001**. Mean±SD scores at 1 week and 1 month were 2.23±0.43 and 4.76±0.44, i.e., HI changes from poor to very good healing at the end of one month [Table/Fig-3].

The MSI showed high statistical significance between one week and one month (p<0.001). Mean±SD score for width, height, colour, suture marks and overall appearance at one week and one month were (1 week=1.73±0.45, 1.57±0.50, 1.88±0.33, 1.80±0.40 and 1.92±0.27, 1 month=0.53±0.51, 0.30±0.47, 0.53±0.51, 0.69±0.47 and 0.53±0.51), respectively [Table/Fig-4].

In Group B, highly significant difference in HI between one week and one month is seen, p <0.001. Mean±SD score one week and one month are 1.50±0.52& 3.76±0.44, i.e., HI changes from poor to very good healing at the end of one month [Table/Fig-5].

The MSI has shown high statistical significance between one week and one month (p <0.001). Mean±SD score for width, height, colour, suture marks and overall appearance at one week and one month were (1 week=1.88±0.33, 1.57±0.50, 2.00±0.00, 1.19±0.40 and 2.00±0.00, 1 month=1.19±0.40, 0.30±0.47, 1.30±0.47, 1.00±0.50 and 1.19±0.40), respectively [Table/Fig-6].

Intergroup analysis, comparison of all the study parameters at different time intervals between the groups is shown in [Table/Fig-7-9].

Timeline	Group A	Group B	p-value
1 week	2.23±0.43	1.50±0.52	<0.001**
1 month	4.76±0.44	3.76±0.44	<0.001**

[Table/Fig-7]: Intergroup comparison of Healing Index (HI) at 1 week and 1 month.
(p<0.05 - Significant*, p<0.001-Highly significant**) (Wilcoxon Mann-Whitney U test)

Parameters of Mucosal Scarring Index (MSI)	Paralleling technique (Mean±SD)	Conventional Technique (Mean±SD)	p-value
Width	1.73±0.45	1.88±0.33	0.04*
Height	1.57±0.50	1.57±0.50	1.00
Colour	1.88±0.33	2.00±0.00	0.02*
Suture marks	1.80±0.40	1.96±0.19	0.02*
Overall appearance	1.92±0.27	2.00±0.00	0.03*

[Table/Fig-8]: Intergroup comparison of Mucosal Scarring Index (MSI) (width, height, colour, suture marks, overall appearance) at 1 week.
(p<0.05 - Significant*, p<0.001 - Highly significant**) (Wilcoxon Mann-Whitney U test)

Parameters of Mucosal Scarring Index (MSI)	Paralleling technique (Mean±SD)	Conventional Technique (Mean±SD)	p-value
Width	0.53±0.51	1.19±0.40	<0.001**
Height	0.30±0.47	0.30±0.47	1.00
Colour	0.53±0.51	1.30±0.47	<0.001**
Suture marks	0.69±0.47	1.00±0.50	0.02*
Overall appearance	0.53±0.51	1.19±0.40	<0.001**

[Table/Fig-9]: Intergroup comparison of Mucosal Scarring Index (MSI) (Width, Height, Colour, Suture marks, Overall appearance) at 1 month.
(p<0.05 - Significant*, p<0.001 - Highly significant**) (Wilcoxon Mann-Whitney U test)

In the intergroup analysis, high statistical significance was noted in HI between the groups at one week and one month (p<0.001) [Table/Fig-7].

The intergroup comparison of the MSI at one week postoperatively was assessed using differences in scarring parameters between Group A and Group B. The results indicate that the Group A demonstrated lower mucosal scarring values across all parameters, suggesting better healing outcomes. The width of the scar was marginally lower in the Group A compared to the Group B (p=0.04*). The height of the scar also showed a statistically significant

difference (p=0.03*), favouring the Group A. The colour parameter was significantly better in the Group A (p=0.02*), indicating a more natural tissue appearance. Suture marks were less prominent in the Group A compared to the Group B (p=0.02*). Finally, the overall appearance of the surgical site was significantly better in the Group A (p=0.03*) which showed that this technique led to improved postoperative aesthetics and healing at one week [Table/Fig-8].

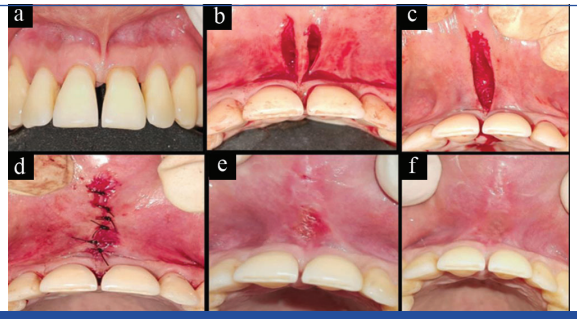
The intergroup comparison of the MSI at one month indicated that the Group A demonstrated lower mucosal scarring values across all parameters, suggesting better healing outcomes. Group A demonstrated a significantly smaller scar width than Group B, reflecting reduced postoperative tissue contraction. The height of the scar showed no difference between the groups at one month (p=1.00). The colour parameter was significantly better in the paralleling group (p<0.001**), suggesting a more natural tissue appearance post-healing. Suture marks were less prominent in the paralleling group compared to the Conventional group with a statistically significant difference (p=0.02*), reflecting a more refined healing process. Finally, the overall appearance of the surgical site was significantly better in the paralleling group (p<0.001**), that this technique leads to improved postoperative aesthetics and wound healing at one month [Table/Fig-9].

The mean±SD scores for the time taken for the procedure in Group A was 17.88±2.11 minutes, whereas for Group B, it was 22.69±2.19 minutes. p <0.001, indicating a highly significant difference between the two groups). This suggests that the procedure took significantly more time in Group B compared to Group A [Table/Fig-10].

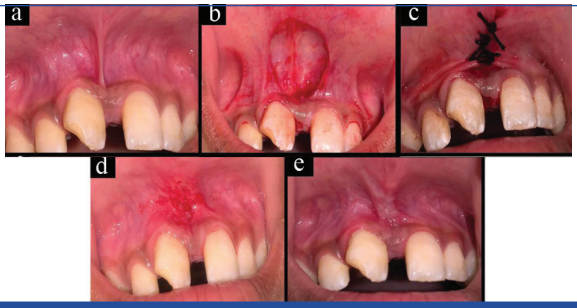
Groups	Time taken for the procedure (in mins) (Mean±SD)	p-value
Group A	17.88±2.11	<0.001**
Group B	22.69±2.19	

[Table/Fig-10]: Intergroup comparison of time taken for the procedure. (p<0.05 - Significant*, p<0.001 - Highly significant**) (Wilcoxon Mann-Whitney U test)

[Table/Fig-11a-f,12a-e] show the intraoperative and postoperative images for Group A and B, respectively.



[Table/Fig-11]: Paralleling technique. a) Pre-operative Baseline before performing the frenectomy procedure; Parallel Incisions were made adjacent to the maxillary labial frenum; c) Fibrous and muscular attachments of the frenum were carefully dissected and detached; d) Surgical wound margins were approximated and sutured; e) At one week postoperatively, the surgical site showed satisfactory healing after suture removal; f) At one month postoperatively, complete healing with elimination of abnormal frenal pull was observed.



[Table/Fig-12]: Conventional technique: a) Baseline clinical evaluation and records were obtained before surgery; b) Incisions: Detachment of muscle fibres adjacent to maxillary labial frenum; c) Surgical wound margins were approximated and sutured; d) At one week postoperatively, the surgical site showed satisfactory healing after suture removal; e) At one month postoperatively, complete healing with elimination of abnormal frenal pull was observed.

DISCUSSION

Frenum plays a major role in the health of the periodontium. Clinically, the morphology and insertion level of the frenum guide whether and how surgical treatment is required. Traditional management for diastema has involved closing the space orthodontically, followed by a frenectomy to prevent relapse. More recent studies, however, report that simple frenectomy alone may lead to spontaneous closure of diastema in over 70% of cases, likely due to soft-tissue remodelling during growth [17,18].

In comparing two frenectomy methods, paralleling vs. conventional, the present study found the paralleling technique superior across multiple metrics: wound healing (as measured by a HI at one month), less mucosal scarring (assessed via a validated MSI), and greater procedural efficiency (shorter surgery time). These advantages derive largely from the mechanical and clinical benefits offered by the paralleling technique over the conventional one.

The paralleling technique uses two parallel incisions alongside the frenum rather than the wide diamond/rhomboid excision used in the conventional technique [14]. This produces a narrower wound and less exposed raw surface area as reported by Dayakar M and Mishra S in a case report in 2023 [19].

The paralleling approach often heals by primary intention, because the wound edges can be approximated and sutured more easily, which reduces healing time, scarring and the risk of tissue contracture compared with secondary-intention healing in some conventional cuts. A clinical study by Gupta I et al., (2020) compared conventional scalpel, paralleling scalpel, and paralleling electrocautery frenectomy (n=10 each): intraoperative bleeding was highest with conventional scalpel (3.8±0.42), lower with paralleling scalpel (2.9±0.32), and lowest with electrocautery (~2.0) (p<0.001). Patient perception scores were consistently worse for conventional scalpel at surgery/3rd/7th/15th days (8.5/7.4/5.6/2.8) vs paralleling scalpel (6.2/5.2/5.1/2.1) and electrocautery (4.4/4.9/4.2/1.5), indicating better comfort with paralleling techniques. Healing differed at seven days (2.7±0.48; 3.2±0.42; 1.7±0.48; p<0.0001) but was comparable by 21 days (3.4±0.52; 3.9±0.57; 3.7±0.67; p=0.181), showing similar long-term outcomes [20]. The narrower incision and controlled tissue removal reduce tension on the interdental papilla, lowering the chance of papilla loss or black triangles crucial for achieving anterior aesthetic outcomes. This finding was reported in a case by Kande P et al., in 2022 [21]. The paralleling technique allows primary closure of the wound and preserves more mucosal tissue. The conventional method often leaves a larger wound area that heals more slowly and may cause more discomfort [14].

Clinical data and case series report lower patient-reported pain scores, less discomfort during the healing phase, and fewer functional complications (speech/feeding irritation) with the paralleling method versus conventional scalpel excision [3]. Abullais S et al., (2016) randomised 20 patients with high labial frenum to conventional scalpel vs new paralleling technique; pain/speech {Visual Analogue Scale (VAS)} and oral hygiene (plaque and gingival bleeding index) were assessed at baseline, one week, and one month. Gingival bleeding/plaque (Mean±SD) for conventional vs paralleling were 1.282±0.23 and 1.741±0.32 pre-op, 1.421±0.25 and 1.799±0.34 at 1 week, and improved to 0.686±0.12 and 0.854±0.11 at 1 month. VAS pain scores were lower with paralleling: day 1 (2.257±0.43 vs 1.814±0.267), reduced to 1.629±0.24 vs 0.001±0.16, and later 1.071±0.29 vs 1±0.13- showing less postoperative discomfort and improved oral hygiene with the paralleling technique [14]. Sanadi R et al., (2017) in research showed plaque/gingival bleeding (conventional vs paralleling) pre-op: 0.85/0.65 vs 0.76/0.66; at one week: 1.14/0.98 vs 1.04/1.00; at one month improved to 0.53/0.46 vs 0.42/0.31.VAS pain day 1: conventional 1.75 and 1.50 vs paralleling 0.86 and 0.57; reduced to 0.29 and 0.14 vs 0.13 and 0.00, and later 0.46 and 0.00 vs 0.00 and 0.00. Paralleling technique showed significantly lower pain and better oral hygiene outcomes

[22]. One comparative clinical trial (including electrocautery and scalpel variations) by Gupta I et al., in 2020 found that paralleling with the scalpel had acceptable bleeding, but bleeding was lowest when electrocautery was added [20]. Smaller wounds and less pain improve patient compliance with oral hygiene during the healing process; studies report improved plaque control and a faster return to normal oral care after paralleling frenectomy [14].

Agrawal A et al., (2024) evaluated postoperative pain (VAS) at 24 hours and seven days in patients with high labial frenum treated by conventional scalpel, electrocautery, soft-tissue diode laser, Z-plasty, and paralleling techniques. Comparative follow-up showed differences in comfort levels across modalities. Soft-tissue diode laser frenectomy demonstrated the least postoperative pain and was the most comfortable technique [23].

Although evidence supporting the paralleling technique for labial frenectomy is promising, it remains limited in scale and duration. Most available studies are case series, small randomised or non-randomised clinical trials, or descriptive reports rather than large, long-term randomised controlled trials, meaning that while short-term benefits such as reduced postoperative pain, faster wound healing, and improved oral hygiene are well documented, comprehensive data on long-term aesthetic stability and recurrence are still lacking [14]. Surgical skill plays a crucial role; precise tissue handling and complete excision of the fibrous band are necessary to prevent recurrence or residual tension, regardless of incision type [22]. Furthermore, the paralleling technique is not universally ideal; in complex or high-tension cases such as large papilla-penetrating frena, shallow vestibules, or when soft-tissue augmentation is needed, alternative approaches like Miller's laterally displaced flap, laser-assisted frenectomy, or connective tissue grafting may yield better functional and aesthetic outcomes [24]. In clinical practice, the paralleling technique is best indicated when the primary objectives are minimal wound size, primary closure, less postoperative discomfort, and faster return to oral hygiene. Clinicians should evaluate each patient's anatomy and frenum type before selecting the approach, anticipating superior short-term outcomes with the paralleling method but acknowledging that long-term comparative evidence remains limited.

Limitation(s)

Limitations of the study include a single-centre design and relatively short follow-up, which may not fully capture long-term stability, scar maturation, or relapse risk. Future research should integrate long-term follow-ups and patient-reported outcomes.

CONCLUSION(S)

The paralleling method demonstrated superior results over the conventional approach, showing better wound healing at one month, reduced mucosal scarring, and shorter operative time. These improvements are primarily attributable to the mechanical and clinical advantages inherent to the paralleling technique. Continued research with larger cohorts and long-term follow-up is essential to validate its advantages and establish standardised clinical guidelines for its broader adoption.

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PARTICULARS OF CONTRIBUTORS:

1. Postgraduate Student, Department of Periodontology, K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India.
2. Professor and Head, Department of Periodontology, K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India.
3. Postgraduate Student, Department of Periodontology, K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India.
4. Reader, Department of Periodontology, K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India.
5. Professor, Department of Periodontology, K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Ruchi Raval,
Reader, Department of Periodontology, K. M. Shah Dental College and Hospital,
Sumandeep Vidyapeeth Deemed to be University, Vadodara-391760, Gujarat, India.
E-mail: ruchi.raval18@gmail.com

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