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President's message

Greeting dear members of the SPIK family…..

The understanding of the etio-pathogenesis of periodontal disease has undergone a dramatic shift with focus now on the inflammatory aspect rather than the periodontal microbiome. This has led to changes in how to evaluate, diagnose and treat periodontal problems. This changing landscape made us come with the theme of "Advances in Periodontal diagnosis and treatment" for our upcoming Midterm conference to be held at Mahe Institute of Dental Sciences and Hospital. The event is organised under the inspiring leadership of Anil Melath and a dynamic duo of Dr Subair and Dr Arjun MR. MAHE dental college has a rich history of hosting exemplary conferences filled with scientific deliberations. They have assembled a very energetic team to manage all aspects of the conference. Requesting all the life members and post graduate students to utilise this golden opportunity.

Our project of compiling a directory of our members is going on in full swing. The process of getting our journal indexed is being worked upon by our editor and her team. There are a few activities being planned on which ground work is being done.

Regards,

Dr Arun Sadasivan
President -SPIK
Mob: 98472 46961
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Secretary's Message

Dear Esteemed Members and Readers,

We are delighted to announce the release of the July issue of the JSPIK for the year 2025. This edition promises to be an exciting compilation of research, insights, and perspectives from our esteemed members and experts in the field.

As we share this milestone with you, amidst the festive glow of Dussehra and the upcoming lights of Diwali, we extend our warmest Season's Greetings to all — wishing you joy, prosperity, and happiness.

We request our esteemed members to continue your research activities and contribute your works to our journal to make this journal more attractive. We invite you to explore the latest developments, trends, and innovations in our field.

Thank you for your continued support.

Dr. Deepak Thomas
Secretary, SPIK

Editorial

Greetings from the editor…

It gives me immense pleasure to present the August edition of JSPIK. Each issue of this journal reflects the commitment, and collaborative spirit of clinicians, academicians, and researchers in their shared pursuit of excellence in periodontology.

This edition brings together a blend of original research, insightful reviews, and case reports . The contributions from our members and young researcher reflects the growing scientific enthusiasm within our community.

As we continue our journey, JSPIK remains dedicated to encouraging quality research, promoting evidence-based clinical practice, and providing a vibrant platform for academic exchange. I extend my heartfelt gratitude to all authors, reviewers, and contributors whose efforts make each issue a success.

Warm regards,

Dr Anjhana Narayanan
Editor, JSPIK

Comparative Evaluation of Short-Term adverse effects of 0.2% and 0.12% Chlorhexidine Digluconate Mouth Washes

Rebeca George[1], Jose Paul[2], Johnson Prakash D' lima[3], Swaroop Chandy[4], Reshma T S[5]

ABSTRACT

Background: Chlorhexidine, as a gold standard, appears to be the most effective antimicrobial agent for the reduction of both plaque and gingivitis. The reported side effects of chlorhexidine are alterations in taste, calculus formation, and staining of teeth and mucous membranes. Only a few studies have been conducted that compare the adverse effects of 0.2% and 0.12% CHX. Methods: 60 participants were divided into three groups: Group I (placebo), Group II (0.12% CHX), and Group III (0.2% CHX). They were all carefully instructed to rinse with mouthwash for 60 s, twice a day as per the manufacturer's instructions. Participants were recalled on the 21st day to examine the adverse reactions

Results: The results showed that 0.2% CHX had more extrinsic tooth stains and calculus formation than 0.12%. and the 0.12% concentration had fewer taste-related side effects than the 0.2% concentration.

Conclusion: The study suggests that 0.12% chlorhexidine mouthwash may be better for reducing dental plaque and calculus, with fewer taste-related side effects.

Keywords: Dental plaque, calculus, Chlorhexidine, teeth staining, taste alteration

Introduction

It is universally acknowledged that oral diseases are multifactorial in origin. The bacteria associated with biofilms cause the pathogenesis of oral diseases, including halitosis, caries, gingivitis, and periodontitis. The effectiveness of mechanical plaque control is purely based on skill, therefore, chemical plaque control agents, especially oral rinses, act as useful adjuvants for achieving maximum plaque control effect. Several antimicrobial agents are incorporated in mouth rinses to improve the outcome of mechanical plaque control procedures.[1]

While numerous products have been employed to manage plaque and gingivitis, chlorhexidine (CHX) stands out as one of the most extensively utilized and researched antiseptics[1]. The CHX is a bis-biguanide that carries a positive charge and can bind to various negatively charged sites, such as mucous membranes, the salivary pellicle on teeth, titanium implant surfaces, and various elements within the biofilm on tooth surfaces. Because of its strong binding to tissues, CHX experiences limited absorption from the gastrointestinal tract, resulting in the absence of systemic toxicity[2]. Long-term oral use of CHX has revealed no detectable blood levels and no identified teratogenic alterations[3]. The CHX molecule exhibits a wide range of bactericidal and bacteriostatic actions, providing a broad spectrum of effectiveness on both Gram-positive and Gram-negative bacteria, fungi, and some lipophilic viruses. Moreover, it demonstrates high substantivity, lasting for up to 12 hours within the oral cavity[4].

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CHX is widely regarded as the gold standard for diminishing Streptococcus mutans and controlling oral biofilm. In dentistry, CHX products are obtainable through prescriptions and encompass various formulations, such as mouthwashes, gels, chips, and varnishes. Mouthwash is the most effective of the CHX products due to its ability to inhibit significantly more plaque than gels and varnishes. he most acceptable and available mouthwash concentrations are 0.2% CHX and 0.12% CHX. Nevertheless, the drawbacks associated with CHX curtail its extended usage as an antiseptic agent, encompassing taste alterations, supragingival calculus formation, soft-tissue lesions in young patients, allergic reactions, and discoloration of both teeth and soft tissues.

The objective of this study was to evaluate the primary side effects associated with 0.12% CHX and 0.2% CHX by comparing them with the placebo group (mint-flavoured water) for 21 days. Through this study, stain formation, plaque and calculus development, and alterations in taste were evaluated.

Methods

This was a randomized control double-blinded study to compare the short-term adverse effects of 0.2% and 0.12% chlorhexidine digluconate mouthwashes. The study was conducted among outpatients attending the Department of Periodontics at Annoor Dental College and Hospital. The Indian Council of Medical Research approved the study with the reference ID: 2023-08764)

The study included 66 systemically healthy individuals who were not on any medication and had a minimum of 12 anterior teeth. Smokers and individuals with intrinsic or extrinsic stains, patients with history of hypersensitivity to chlorhexidine or any systemic condition that could negatively influence oral health were excluded from the study

At the beginning of the study, all participants were informed about the protocol, and written consent was obtained from each subject. To ensure stain-free teeth, a full-mouth oral prophylaxis was performed for all subjects before the study, setting their baseline dental plaque score to zero. Participants were divided into three groups and administered either a placebo10ml, CHX 0.2%10 ml, or CHX 0.12% 15 ml, respectively twice daily after half an hour of brushing. To standardize tooth brushes and brushing technique, similar tooth brushes were given to all the participants, and they were advised to brush with the modified Bass technique. This brushing technique was demonstrated to all participants. They were all carefully instructed to rinse for 60 s. twice a day as recommended by the manufacturers. Recall of the participants in the study was done on the 21st day to examine the clinical results. Alteration of taste sensation was evaluated using a questionnaire[3]. Oral Hygiene Index, the gingival index (John C Green &Jack R Vermillion-1964) , and stain index (Lobene-1968).were recorded to evaluate the oral hygiene status, inflammation, and stain formation respectively

Statistics

The present experiment aimed at comparing the primary effects associated with 0.12% CHX and 0.2% CHX by comparing them with a placebo group after 21 days.

The total number of participants was 66, with 22 participants in each group.

The Shapiro-Wilk test was used to determine normal distribution. The one-way Anova test was used to compare three groups, Post-hoc test was used for inter-group comparison. The Chi-square test was used to compare the variables of taste alteration. One-way ANOVA was used to compare differences among the three groups. The level of statistical significance was set at $P < 0.05$. This approach ensures adequate statistical power (95%) to detect clinically significant differences in plaque index measurements among the groups. All statistical analyses will be conducted using SPSS for Windows, Version 22.0.

Results

Table 1 shows the comparative results of three groups in OHI, staining, and gingival scores.

Oral Hygiene Index (OHI)

With a statistically significant p-value, both CHX 0.2% (mean OHI: 0.5580) and CHX 0.12% (mean OHI: 0.2420) significantly improved oral hygiene was observed compared to the placebo (mean OHI: 0.7233).

Stain Score

The CHX 0.2% group had the highest stain

Table 1 -Three-group Comparison of OHI, Stain Score, and Gingival Inflammation Score

		N	Mean	Std. Deviation	P VALUE Onewayanova
OHI	CHX 0.2%	22	.5580	.44026	.000
	CHX 0.12%	22	.2420	.25910	
	PLACEBO	22	.7233	.03078	
	Total	66	.2967	.35069	
STAIN SCORE	CHX 0.2%	22	3.0000	4.23022	.086
	CHX 0.12%	22	1.8000	2.82097	
	PLACEBO	22	.9000	.30779	
	Total	66	1.9000	3.01802	
GINGIVAL SCORE	CHX 0.2%	22	.1220	.14311	.135
	CHX 0.12%	22	.0570	.10524	
	PLACEBO	22	.2000	.00000	
	Total	66	.0930	.10442	

CHX 0.2% group showed the highest stain score, the difference in staining was not statistically significant (p=0.086). Gingival scores improved in CHX groups compared to placebo, but this difference was also not statistically significant (p=0.135).

Table II- Inter-group comparison was done using Post-Hoc Test

Dependent Variable	(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
OHI	CHX 0.2%	CHX 0.12%	.31600*	.09344	.004	.0912	.5408
		PLACEBO	.46800*	.09344	.000	.2432	.6928
	CHX 0.12%	CHX 0.2%	-.31600*	.09344	.004	-.5408	-.0912
		PLACEBO	.15200	.09344	.243	-.0728	.3768
	PLACEBO	CHX 0.2%	-.46800*	.09344	.000	-.6928	-.2432
		CHX 0.12%	-.15200	.09344	.243	-.3768	.0728
STAIN SCORE	CHX 0.2%	CHX 0.12%	-1.20000	.93001	.406	-3.4380	1.0380
		PLACEBO	.90000	.93001	.600	-1.3380	3.1380
	CHX 0.12%	CHX 0.2%	1.20000	.93001	.406	-1.0380	3.4380
		PLACEBO	2.10000	.93001	.070	-.1380	4.3380
	PLACEBO	CHX 0.2%	-.90000	.93001	.600	-3.1380	1.3380
		CHX 0.12%	-2.10000	.93001	.070	-4.3380	.1380
GINGIVAL SCORE	CHX 0.2%	CHX 0.12%	.06500	.03243	.120	-.0130	.1430
		PLACEBO	.02200	.03243	.777	-.0560	.1000
	CHX 0.12%	CHX 0.2%	-.06500	.03243	.120	-.1430	.0130
		PLACEBO	-.04300	.03243	.387	-.1210	.0350
	PLACEBO	CHX 0.2%	-.02200	.03243	.777	-.1000	.0560
		CHX 0.12%	.04300	.03243	.387	-.0350	.1210

Both CHX 0.2% and CHX 0.12% showed a statistically significant improvement in OHI with CHX 0.2% being more effective than CHX 0.12% (p = 0.004). Although CHX 0.2% tended to have higher staining compared to CHX 0.12% and placebo, the difference in stain scores was not statistically significant (p > 0.05). Similarly, no significant difference was observed in gingival scores among CHX 0.2%, CHX 0.12%, and placebo groups.

score (3.000), followed by CHX 0.12% (1.800) and the placebo (0.900), but the p-value of 0.086 indicates that the difference in staining between the groups is not statistically significant. This suggests a greater tendency for staining with higher concentrations of chlorhexidine.

Gingival score

The CHX 0.2% group had a mean gingival score of 0.1220, CHX 0.12% had 0.0570, and the placebo had 0.2000, indicating better gingival health in CHX-treated groups, but the p-value of 0.135 shows that the difference was not statistically significant.

The results concerning the taste variations are tabulated in Table 3, which shows that all participants (100%) using CHX 0.2% experienced taste loss, whereas no participants using CHX 0.12% reported this side effect. Additionally, CHX 0.12% users had a higher incidence (58.8%) of numbness in the tongue immediately after rinsing compared to CHX 0.2% users (41.2%). Soreness in the tongue was more frequently reported among CHX 0.2% users (53.8%) than those using CHX 0.12% (46.1%). Furthermore, taste alteration was significantly higher in the CHX 0.2% group (51.51%), with a statistically significant p-value of 0.00, highlighting a notable difference among the groups.

Discussion

The present study evaluated clinically two chlorhexidine concentrations, .0.2 %and 0.12 % with a placebo for their efficacy and side effects. All 66 eligible participants, with lower levels of gingival inflammation and ease of compliance control, completed the study protocol. After 21 days post-scaling, an evaluation of oral hygiene, staining, gingival condition, and taste alteration was conducted.

The findings indicate that CHX 0.12% is more

Table III: Taste variation as reported by the participants was examined using Chi-square test.

Dependent Variable	(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
OHI	CHX 0.2%	CHX 0.12%	.31600*	.09344	.004	.0912	.5408
		PLACEBO	.46800*	.09344	.000	.2432	.6928
	CHX 0.12%	CHX 0.2%	-.31600*	.09344	.004	-.5408	-.0912
		PLACEBO	.15200	.09344	.243	-.0728	.3768
	PLACEBO	CHX 0.2%	-.46800*	.09344	.000	-.6928	-.2432
		CHX 0.12%	-.15200	.09344	.243	-.3768	.0728
STAIN SCORE	CHX 0.2%	CHX 0.12%	-1.20000	.93001	.406	-3.4380	1.0380
		PLACEBO	.90000	.93001	.600	-1.3380	3.1380
	CHX 0.12%	CHX 0.2%	1.20000	.93001	.406	-1.0380	3.4380
		PLACEBO	2.10000	.93001	.070	-.1380	4.3380
	PLACEBO	CHX 0.2%	-.90000	.93001	.600	-3.1380	1.3380
		CHX 0.12%	-2.10000	.93001	.070	-4.3380	.1380
GINGIVAL SCORE	CHX 0.2%	CHX 0.12%	.06500	.03243	.120	-.0130	.1430
		PLACEBO	.02200	.03243	.777	-.0560	.1000
	CHX 0.12%	CHX 0.2%	-.06500	.03243	.120	-.1430	.0130
		PLACEBO	-.04300	.03243	.387	-.1210	.0350
	PLACEBO	CHX 0.2%	-.02200	.03243	.777	-.1000	.0560
		CHX 0.12%	.04300	.03243	.387	-.0350	.1210

Taste alteration wassignificantly higher in the CHX 0.2% group (51.51%), with a statistically significant p-value of 0.00, effective in preventing supragingival plaque than CHX 0.2% and placebo. Previous comparative studies reveal similar clinical efficiency between both concentrations of CHX. Ernst et al. found no statistically significant differences between 0.12% and 0.2% concentrations of chlorhexidine[4], while Jenkins et al. demonstrated less plaque accumulation with the higher concentration of CHX[5].

Even though both concentrations of chlorhexidine minimize gingival inflammation, in our study CHX 0.12% demonstrated slightly better inflammation control compared to CHX 0.2%. However, no statistically significant differences were observed between the two chlorhexidine concentrations. Franco et al., reported no remarkable differences between both concentrations with plaque and gingival bleeding scores[6]. Berchier et al., in a systematic review, compared the effects of 0.12% and 0.2% CHX rinses on plaque and gingivitis. They also concluded that there was no difference in the impact on gingivitis between the two concentrations of CHX[7].

Concerning the side effects of CHX, in this study, the results showed that after three weeks of using CHX, the area and intensity of dental staining increased significantly in the CHX 0.2% group. The results obtained in this study was similar to that of Jenkins et al.[5] On the other hand, Smith et al., through an in vitro study, observed that both concentrations of CHX have similar staining characteristics[8] during long-term use.

All participants who used CHX 0.2% in this study complained of loss of taste sensation. Overall taste alterations were statistically significant and higher in the 0.2% CHX group than in the 0.12%. These results were in accordance with the study conducted by Maliha et.al[3]

Conclusions

This study provided data on the comparison of two concentrations of CHX, 0.12% and 0.2% CHX mouth rinses concerning plaque accumulation, gingival inflammation, stain formation, and altered taste sensation. It is concluded that CHX 0.12 % demonstrated better reduction in plaque accumulation and gingival inflammation than CHX 0.2%

CHX 0.12% showed fewer instances of stain development and exhibited minimal overall taste variations when compared to a 2% solution.

There are only very few clinical trials that compare the efficacy and side effects of these two concentrations of CHX. The findings of this study suggest that prescribing a lower concentration of chlorhexidine in clinical practice may be advisable both in terms of clinical benefits and reduced side effects.

The limitations of the study were reduced sample size and shorter assessment interval. Studies undertaken at multiple centers, with large sample sizes and increased assessment duration, will throw more light on the parameters researched.

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Gingival unit graft for root Coverage – A Case series with 2-Year follow-up

Khyati Arora[1], Harikumar K[2], Smitha PS[3], Sanara PP[4], Sameera G Nath[5], Sakeer Hussain Arimbra[6]

ABSTRACT

Background: Periodontal phenotype plays a critical role in determining the risk and progression of mucogingival conditions such as gingival recession. Traditional grafting techniques like the Free Gingival Graft (FGG) have demonstrated efficacy in augmenting attached gingiva but show limitations in root coverage due to poor vascularization and aesthetic mismatch.

Case Presentation: This case series presents the application of the Gingival Unit Graft (GUG), a modified FGG technique incorporating marginal gingiva to enhance vascular supply and colour integration. Two female patients with Miller Class 1 and Class 2 recession in the mandibular anterior region underwent GUG therapy. Clinical parameters, including recession depth, width of keratinized tissue, and patient-reported outcomes, were evaluated at baseline, 6 months, 1 year, and 2 years postoperatively.

Results: The GUG technique resulted in complete root coverage, significant gain in keratinized tissue, and excellent colour harmony with adjacent gingiva. The graft demonstrated good marginal stability and sustained clinical outcomes over the 2-year follow-up period, with no signs of relapse or complications, and more gain in recession coverage in one case due to a phenomenon known as creeping attachment.

Conclusion: In localized gingival recession, GUG offers a predictable and aesthetically superior alternative to conventional FGG in achieving root coverage and increasing the width of attached gingiva for managing gingival recession in single tooth recession.

Keywords: Gingival recession, root coverage, Gingival unit graft, creeping attachment

Introduction

Periodontal phenotype encompasses both gingival phenotype and bone morphotype, which together influence the structural and functional integrity of the periodontium. It is a dynamic characteristic of the tissue that evolves, shaped by factors such as tooth position, therapeutic interventions, and environmental influences.[1] Periodontal phenotype is crucial in determining the risk of disease progression, including conditions like gingival recession and bone resorption.[2] These problems may lead to complications such as root hypersensitivity, pain, root caries, aesthetic concerns, and difficulties in oral hygiene maintenance. These issues can be exacerbated by poor plaque control, thereby requiring effective therapeutic interventions.

To address these challenges, periodontal phenotype modification therapies such as gingival augmentation procedures have been proposed. The Free Gingival Graft (FGG), first introduced by Björn in 1963, aims to enhance the width of attached gingiva.[3] Its application for root coverage is limited by challenges such as poor colour match between grafted

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tissue and the adjacent gingiva. FGG, while effective for soft tissue augmentation, has shown less favourable outcomes in root coverage due to limited blood supply from the underlying avascular cementum.[4] To overcome these limitations, various modifications of the FGG technique have been explored. Notably, Allen et al. (2004) introduced a modification incorporating marginal gingiva into the graft, which improves the vascular supply, enhances the healing process, and offers better colour adaptation.[5] This technique is called "Gingival Unit Graft (GUG) or Gingival Unit Transfer (GUT). This case report describes the predictable outcomes of GUG with a 2-year follow-up.

Case 1

Case Presentation

An 18-year-old female patient reported to the department with concerns regarding aesthetic dissatisfaction and mild sensitivity in the lower anterior included twice-daily brushing with a medium-bristle toothbrush, though the technique was noted to be horizontal and aggressive.

Clinical examination revealed Miller's Class I gingival recession on the labial aspect of tooth 31, characterized by apical displacement of the gingival margin without loss of interdental bone or soft tissue. The recession depth measured 3 mm. The gingival tissue appeared thin and fragile, consistent with a delicate periodontal phenotype. No probing attachment loss was noted interproximally, and tooth vitality was confirmed.

Radiographic evaluation showed no evidence of alveolar bone loss or periapical pathology.

Given the favourable prognosis associated with Miller's Class I recession and the patient's thin gingival phenotype, a decision was made to perform a Gingival Unit Graft (GUG) to achieve root coverage and augment the keratinized tissue. The donor site

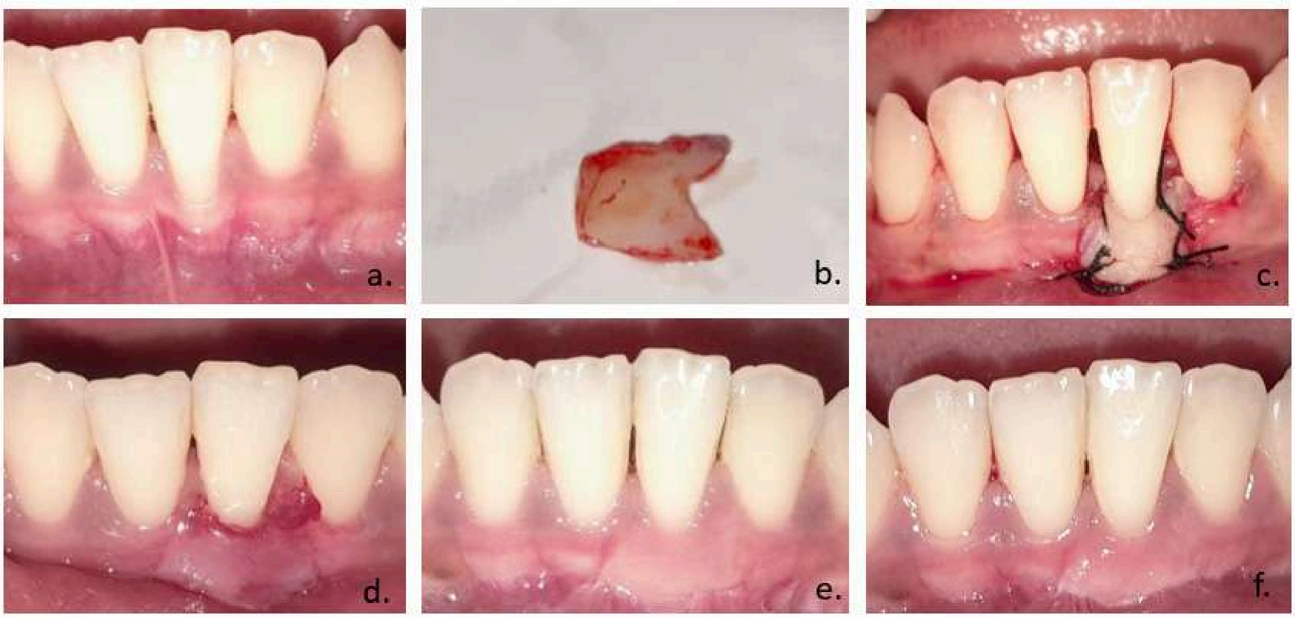

Figure 1. Sequential clinical steps in the management of Miller Class I gingival recession using Gingival Unit Graft (GUG) (a) Preoperative view showing Miller Class I gingival recession on tooth #31 with apical displacement of the gingival margin and intact interdental papillae. (b) Template preparation for harvesting the Gingival Unit Graft, ensuring inclusion of marginal and papillary components for optimal vascularity and aesthetic integration. GUG was procured from the palatal donor site under local anaesthesia using a standardized technique to preserve tissue integrity, and proper haemostasis was achieved with Gel form, and Hawley's Retainer was placed. (c) Graft sutured onto the recession defect following meticulous recipient site preparation, ensuring passive adaptation and stabilization. (d) One-week postoperative view after suture removal showing uneventful healing and initial tissue integration. (e) 1-month follow-up demonstrating complete root coverage, harmonious gingival contour, and stable keratinized tissue with excellent aesthetic outcome. (f) 2-year follow-up with no sign of relapse and even improved colour matching.

premolars, ensuring inclusion of marginal gingiva to enhance vascularization and colour integration.

Preoperative photographs and measurements were recorded, and the patient was educated regarding the procedure, postoperative care, and expected outcomes. Informed consent was obtained before surgical intervention.

Surgical presentation

Recipient site preparation of RT1 gingival recession of 31 was done by making a horizontal incision at the mucogingival junction (MGJ) as well as two vertical incisions extending to the adjacent teeth and about 3–4 mm beyond the MGJ. A sharp split-thickness flap was reflected, including the interdental papilla, using a 15C blade and microsurgical scissors. The root surface was planned thoroughly and irrigated with a saline solution. Graft was procured from the palate, including the marginal gingiva and interdental papillae, using a 15C blade so that the marginal gingiva, along with its contour, is part of the free graft, taking into account the vascularity from the marginal gingiva. Care was taken to obtain an even thickness of 1- 1.5mm. Graft was contoured, adapted, and sutured using 3-0 silk suture. Sutures were removed after 1 week. The patient was followed up for 2 years as shown in Fig 1.

Case 2

Case Presentation

A 36-year-old female patient presented with aesthetic concerns and mild dentinal hypersensitivity in the mandibular anterior region. Clinical examination revealed Miller Class II gingival recession involving tooth 41, characterized by marginal tissue recession extending beyond the mucogingival junction without loss of interdental bone or soft tissue. The width of attached gingiva at the affected site was found to be inadequate (<1 mm), compromising plaque control and long-term periodontal stability. Radiographic evaluation confirmed intact interdental bone levels and absence of periapical pathology. Based on the clinical and radiographic findings, a diagnosis of localized gingival recession with inadequate attached gingiva was established. So, a gingival unit graft was planned for root coverage and gingival augmentation.

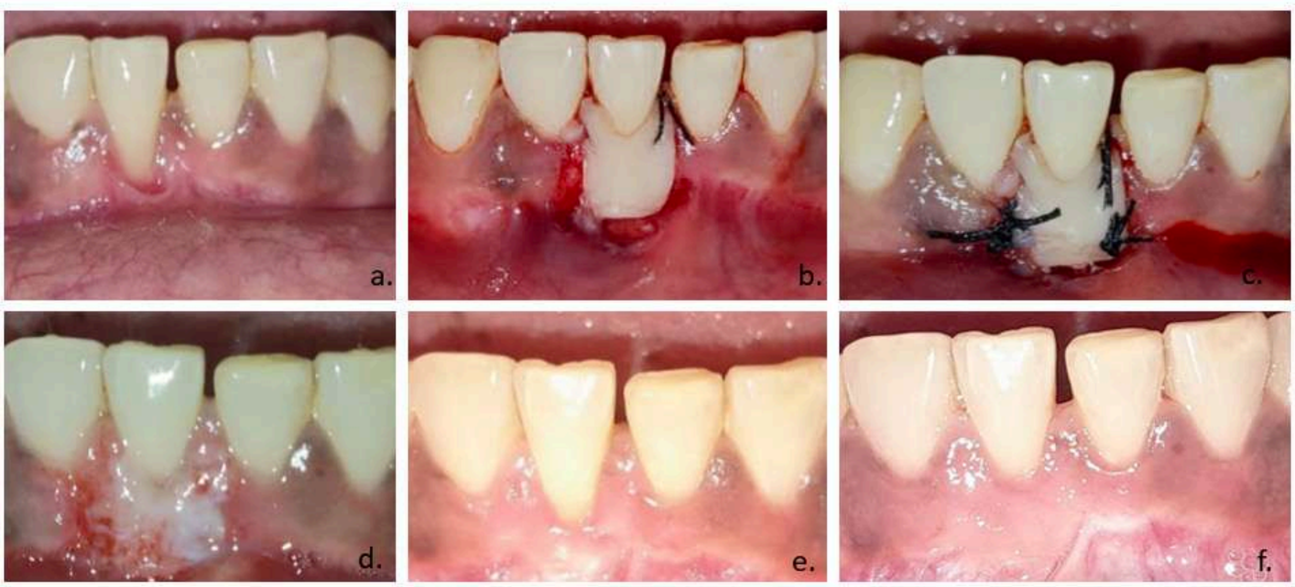

Figure 2. Sequential clinical steps of the Gingival Unit Graft (GUG) procedure for the management of Miller Class II recession with inadequate attached gingiva. (a) Presurgical view showing gingival recession at tooth #31 with minimal keratinized tissue and a thin biotype. (b-c) Intraoperative phase depicting precise harvesting and suturing of the gingival unit graft, including both epithelium and underlying connective tissue. (d) One-week postoperative review demonstrating initial healing, graft integration, and epithelial adaptation. (e) One-month follow-up showed increased width of attached gingiva, improved tissue contour, and partial root coverage. (f) Two-year follow-up revealed marginal stability, creeping attachment, satisfactory aesthetic outcome, and long-term periodontal health.

Discussion

Gingival Unit Graft (GUG) represents an evolution in autogenous grafting techniques, designed to address both functional and aesthetic concerns associated with gingival recession. Unlike conventional free gingival grafts (FGG), the GUG incorporates not only keratinized tissue but also the marginal and papillary architecture, thereby enhancing vascularization and integration at the recipient site. This anatomical continuity contributes to superior colour match, contour preservation, and long-term stability—key parameters in aesthetically sensitive zones.[5]

In the present case, the GUG was employed to treat Miller Class 1 and 2 gingival recession defects in the mandibular anterior region. The choice of GUG was guided by the need for optimal tissue blending and minimal donor site morbidity. Postoperative healing was uneventful, with early signs of graft integration and progressive root coverage observed within the first few weeks. At the 2-year follow-up, the site exhibited stable keratinized tissue, improved gingival thickness, and satisfactory aesthetic outcomes, aligning with the goals of phenotype modification therapy (PMT).

Recent literature supports the efficacy of GUG in enhancing both gingival thickness (GT) and keratinized tissue (KT), which are critical components of the periodontal phenotype. Barootchi et al. (2020) emphasized that techniques incorporating connective tissue elements—such as CTG and ADM—significantly improve GT, while KT gains are most pronounced with CTG and ADM.[6] The GUG, by design, offers a hybrid advantage, potentially maximizing both parameters without the need for extensive flap manipulation. Creeping attachment refers to the gradual coronal migration of the gingival margin following mucogingival surgical procedures, resulting in increased root coverage beyond the initial postoperative healing phase. First described by Goldman et al. in the 1960s, this phenomenon is most commonly observed after procedures involving free gingival grafts (FGG), gingival unit grafts (GUG), and subepithelial connective tissue grafts (SCTG), particularly in cases with Miller Class I or II recession defects.[7] It has been reported that creeping attachment does not occur at a constant rate and may be seen even after 1 year.[8] At the 2-year postoperative evaluation, Figure 2 demonstrates a clinically significant phenomenon of creeping attachment following gingival unit graft (GUG) therapy. The gingival margin exhibited a coronal migration beyond the initial root coverage achieved at 2 years, resulting in near-complete coverage of the previously exposed root surface. Moreover, the case aligns with the broader understanding that periodontal phenotype plays a decisive role in the success of restorative and periodontal therapies. As highlighted by Mohan Kumar P et al. (2024), maintaining the integrity of the periodontal apparatus is essential for long-term restorative success.[9] The GUG technique, by reinforcing the soft tissue barrier and enhancing the phenotype, contributes to this objective.

While microsurgical approaches are often preferred in advanced clinical settings, this case demonstrates that macrosurgical execution of GUG can yield comparable results when performed with precision and case-specific planning. The use of locally available materials and techniques further underscores the adaptability of GUG in diverse clinical environments, including those with limited access to advanced biomaterials.

Conclusion

The gingival unit graft (GUG) showed favourable outcomes in restoring both function and aesthetics, particularly in recession defects within aesthetically sensitive zones. Its inclusion of marginal and papillary components promoted vascular integration, tissue stability, and colour harmony. Healing was uneventful, with satisfactory root coverage and minimal donor site morbidity. Notably, a creeping attachment was observed at the 2-year follow-up (Figure 2), enhancing root coverage beyond initial healing. This underscores the graft's regenerative potential and the importance of precise technique, patient compliance, and tailored treatment planning. Further studies may help refine its indications and broaden clinical use.

Conflict of interest

There was no conflict of interest among the authors.

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JSPIK

Rethinking Root Planning: The Power of Guided Biofilm Therapy

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ABSTRACT

Periodontal diseases are primarily initiated and sustained by the presence of dental biofilm. Traditional scaling and root planning (SRP), although effective, can sometimes result in unnecessary removal of healthy tissue and patient discomfort. Guided Biofilm Therapy (GBT) represents a contemporary, minimally invasive approach that combines patient-tailored risk assessment with state-of-the-art technologies such as disclosing agents, air polishing with low-abrasive powders (e.g., erythritol), and ultrasonic instrumentation. This technique allows for the precise removal of biofilm and calculus while preserving hard and soft tissues. GBT not only improves clinical outcomes but also enhances patient experience, compliance, and long-term maintenance of periodontal health. This article reviews the principles, protocol, and clinical advantages of GBT as a novel adjunct or alternative to conventional SRP in periodontal therapy.

Keywords: Biofilm, Air Abrasives, Disclosing Agents, Dental Plaque, Periodontitis

Introduction

The human oral cavity hosts a diverse, dense, and complex community of microorganisms. Its warm temperature, nutrient-rich conditions, constant salivary flow, and near-neutral pH create an optimal environment for the proliferation of oral microbes.[1] Dental plaque is a microbial biofilm described as a 'matrix-enclosed population of bacteria that adhere to each other and/or to surfaces or interfaces.[2] Dental plaque biofilm, in conjunction with environmental, lifestyle, and genetic risk factors, serves as the primary causative agent in the initiation and advancement of periodontitis.[3] Periodontitis is characterized by the irreversible loss of periodontal attachment caused by chronic inflammation triggered by biofilm on the tooth surface (Kinane et al., 2017). It is generally believed that gingivitis precedes the onset of periodontitis.[4] Also it is initiated by bacterial infection, leading to a chronic inflammatory response that causes the destruction of connective tissue and alveolar bone supporting the teeth. Treatment involves initial phase of active periodontal therapy (APT), followed by supportive periodontal therapy (SPT) aimed at minimizing the risk of reinfection and disease progression[5]. In groups lacking routine oral hygiene and access to professional dental care, supragingival calculus can develop extensively across the entire dentition. In such populations, the presence of supragingival calculus is often linked to the progression of gingival recession.[6]

Traditional Methods of Plaque Removal

Enhancing oral hygiene through regular brushing or the use of chlorhexidine mouthwash is the most cost-effective and accessible method to prevent calculus formation. Traditional non-surgical therapy remains the foundation of periodontal treatment. Its success

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relies on minimizing the bacterial burden within periodontal pockets and eliminating hard deposits, such as calculus, that can exacerbate the infection.[7] Various hand instruments are employed in non-surgical periodontal therapy, with scalers and curettes being the most frequently used.

Ultrasonic instruments have become a widely preferred method for the removal of plaque and calculus. These power-driven tools operate at high frequencies, generating micro-vibrations that assist in dislodging subgingival plaque and calculus. Comparative studies of magnetostrictive, piezoelectric, ultrasonic, and hand instruments have been conducted, with one study suggesting that the piezoelectric system is more effective in calculus removal, although it tends to leave the tooth surface rougher than the other methods.[13] It remains uncertain whether power-driven or manual scalers result in greater root surface roughness, and the impact of such roughness on long-term wound healing is still unclear.

A notable drawback of power-driven scalers is the generation of contaminated aerosols, necessitating enhanced infection control protocols when using ultrasonic or sonic instruments in clinical settings. Although preliminary studies suggest that adding antimicrobial agents to the irrigant during ultrasonic instrumentation may offer limited clinical benefit, more long-term

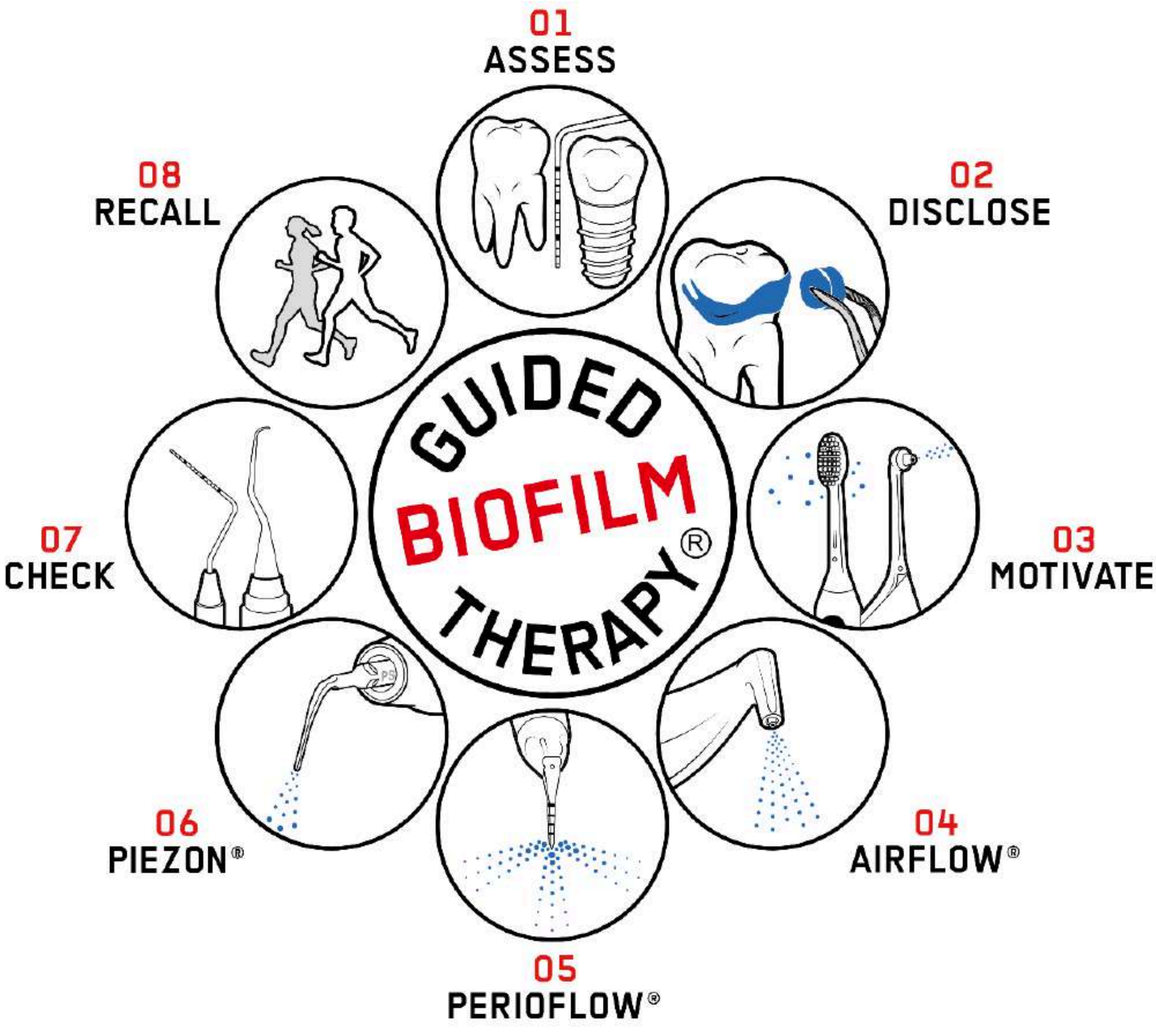

Figure 1

randomized controlled trials are needed to evaluate the sustained effectiveness of ultrasonic and sonic debridement techniques.[14]

Novel methods in Oral Prophylaxis

dürr Dental developed a set new standard in the field of painless, minimally invasive periodontitis treatment with the Vector System. The ultrasonic energy is diverted to the place where it is needed in a linear direction and instruments move parallel to the surface of the root. This enables vibration-free operation and can be incorporated into a clinically efficient and minimally invasive treatment plan.[15] The Vector™ ultrasonic scaling system is characterized by a resonating ring, which converts the generated horizontal oscillation (frequency: 25 kHz) into pure vertical movements with an amplitude of about 30 µm along the longitudinal axis of the instrument tip. Thus, the instrument tip moves only parallel to the root surface.[11]

Coolant is delivered to the working tip through intermittent pulsations, maintaining a controlled flow rate of 6 ml/min. Unlike aerosol-based systems, the suspension is not dispersed into the air; instead, it is retained hydrodynamically at the instrument tip, ensuring precise and localized application without airborne dispersion.[12] The system is typically used in conjugation with irrigation solutions containing hydroxyapatite or silicon carbide. Even though this system removes calculus efficiently the efficiency of removal is dependent on the abrasive fluid used.[13] Advantage of this system is the reduction in pain perception for the patient. This benefit may be attributed to the vertical vibrations of the ultrasonic tip and the abrasive fluid forms a smear layer on the scaled tooth surface which is responsible for reducing the postoperative sensitivity.[14] However, the system is least effective when a straight metal tip is used with a non-abrasive polishing fluid. When combined with an abrasive solution, the system results in a similar amount of tooth substance loss as seen with hand instrumentation.[15]

Guided Biofilm Therapy

Clinicians traditionally mechanically debride biofilm and calculus simultaneously using repetitive, overlapping strokes followed by polishing pastes. GBT is a system that replaces the antiquated methods of professional biofilm management The term “Guided Biofilm Therapy” was developed by EMS, a com-

Figure 2

pany devoted to research and development of novel technologies. Essentially, GBT involves an eight-step process in elimination of plaque and calculus (Fig 1). The process begins with the application of a disclosing agent to visualize biofilm, followed by the use of an air-abrasive powder to remove plaque and surface stains. Subgingival plaque and calculus are then cleared using a specialized nozzle, and, if necessary, scaling is completed with a precision tip.[16] The technological cornerstone of GBT is the Airflow® One handpiece, that significantly enhances the effectiveness of biofilm removal. This handpiece emits a controlled stream of warm water and fine powder, which gently yet effectively dislodges and removes food particles, plaque, and stains from the teeth's surfaces and hard-to-reach areas. The AIRFLOW® technology is particularly beneficial for patients with sensitive teeth, dental implants, or orthodontic braces, providing a comfortable cleaning experience without the discomfort typically associated with traditional cleaning. The final steps of GBT involve the use of the PERIOFLOW® and 'No Pain' PIEZON® technologies for meticulous cleaning. The PERIOFLOW® technology targets biofilm in pockets deeper than 4mm, while the PIEZON® method is used for the gentle removal of any remaining calculus without causing pain.[17]

Air polishing devices typically utilize two types of nozzles: supragingival and subgingival. The supragingival nozzle, also referred to as the standard nozzle, is primarily designed for the removal of plaque and stains above the gumline. In contrast, subgingival nozzles are intended for the treatment of periodontal pockets and peri-implantitis.[18] The supragingival nozzle is available in 120° and 90° angles for optimal access to posterior and anterior teeth, respectively. Studies have shown that even slight variations in the size, diameter, length, or curvature of the nozzle or tubing can markedly influence the effectiveness of the device.[19] Maintaining the appropriate nozzle-to-tooth distance and ensuring the correct angulation of the slurry stream are critical for safe and effective air polishing. Incorrect handpiece positioning or angulation can lead to undesirable effects on the soft tissues.[20]

Advantage of GBT over Traditional Prophylaxis Techniques

The GBT (Guided Biofilm Therapy) method may offer advantages over traditional prophylaxis techniques in the following ways:[21]

By applying a plaque disclosing agent, clinicians can evaluate a patient's adherence to recommended oral hygiene practices. It also helps patients visually identify areas they have missed during brushing.

Air-polishing systems are safer and more effective than conventional rubber cups for subgingival plaque removal, as they can eliminate disclosed plaque without causing trauma to delicate tissues.

Pre-scaling air polishing clears plaque, providing better visibility of calculus deposits. This allows the practitioner to concentrate ultrasonic scaling efforts specifically on areas with hardened deposits rather than uniformly across the dentition. As a result, this minimizes clinical attachment loss and soft tissue trauma in sites with shallow pockets, translating to reduced discomfort and sensitivity for the patient.

A second round of plaque disclosure acts as a form of quality control for both the clinician and patient, enhancing treatment outcomes and helping to shorten the overall duration of the procedure.

Ergonomic Benefits of GBT

The Ergonomic benefits of EMS technologies over traditional instruments lie in the handpiece weight, the amount of force needed during operation, and the level of vibration generated. The weight of the instrument directly influences the muscle effort necessary to carry out the procedure.[22] A comparison of equipment weight showed that the EMS Airflow handpiece and cord were 26% lighter than the contra-angled handpiece and cord typically used in practice.

By using AIRFLOW, clinicians can perform biofilm removal in a less invasive and more ergonomically favourable way.[23] Biofilm removal from deep subgingival areas—up to 9 mm—is achieved using the PERIOFLOW handpiece, which operates without vibration and requires only a light pinch grip, This slender, elongated tip can reach up to 10 mm below the gumline without overstretching the periodontal tissues. With proper technique, the PS tip instrument effectively removes calculus using minimal pressure, and the PIEZON handpiece can be maneuverer with a gentle grip. The reduced force needed during ultrasonic scaling greatly lessens strain on the forearm muscles. Integrating AIRFLOW, PERIOFLOW, and PIEZON for biofilm removal significantly decreases reliance on manual instrumentation. [23]

GBT AND PERI IMPLANTITIS

Maintaining oral health around titanium implants is essential. The formation of a biofilm on the titanium surface will influence the continuing success of the implant. Even though plastic ultra sonic tips are used studies have shown that it can leave plastic deposits behind on implant surface.[24] Recently Erythritol has recently been used in GBT to deliver supra- and subgingival airflow therapy in a way that is more comfortable for the patient and does not harm the cementum or implant surface.[25] Bywaters et al concluded that patients with periimplantitis have shown a reduction in inflammation, along with decreased levels of Tannerella forsythia (T. forsythia) and Treponema denticola (T. denticola), when erythritol is used as the air-polishing powder for peri implantitis treatment. A notable decrease in Matrix Metalloproteinase-8 (MMP-8) levels has also been observed.[26]

Guided biofilm therapy allows for a more thorough removal of implant supracrestal biofilm without roughening the exposed titanium, which could become a biofilm accumulation site in the future it also easily accesses hard-to-reach areas between the underlying soft tissue and the tissue side of the prosthesis.[27] The European 7th Congress in Vienna, conference on mechanical biofilm management concluded that the Guided Biofilm Therapy has proved to provide a better clinical outcome for peri-implant mucositis or peri-implantitis.[28]

Conclusion

Guided Biofilm Therapy (GBT) offers a paradigm shift in the management of periodontal diseases by integrating evidence-based protocols with advanced technology to achieve efficient, comfortable, and minimally invasive treatment. Unlike conventional scaling and root planning, GBT emphasizes biofilm detection and targeted removal, ensuring maximum preservation of healthy tissue and enhanced patient compliance. Its systematic, stepwise approach allows for consistent clinical outcomes and improved long-term periodontal stability. As research continues to support its efficacy, GBT stands out as a valuable innovation in modern periodontics, redefining the standards of preventive and therapeutic care.

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JSPIK

Assessment of Prevalence of Anterior Loop of the Mental Nerve & its Variations with Age & Gender Using CBCT – Observational Retrospective Study

Deepthy B Nair[1], Jose Paul[2], Johnson Prakash D'Lima[3], Reshma T S[4]

ABSTRACT

Background: The anterior loop (AL) of the mental nerve is a key anatomical variation of the mandibular neurovascular bundle. Accurate identification of the AL is crucial for implant placement in the inter-foraminal region to prevent iatrogenic nerve injury. Cone Beam Computed Tomography (CBCT) offers superior visualization of this structure compared to traditional radiographic techniques.

Aim: To assess the prevalence of the anterior loop of the mental nerve using CBCT, and to evaluate its variation with age and gender in South Indian population.

Materials and Methods: This retrospective study evaluated 140 CBCT scans obtained from the outpatient records of a Annoor dental college,Muvattupuzha, Kerala, India. Scans were assessed for the presence of the anterior loop and the distance from the most anterior tooth to the loop using NNT imaging software. Data were statistically analyzed for differences based on gender and age using t-tests, ANOVA, and Pearson correlation.

Results: Out of 140 scans, 83 (59.3%) demonstrated the presence of the anterior loop. Of the total 140 patients, 71 were male and 69 were female.In males, the anterior loop was detected in 45 scans (63.4%). In females, the loop was found in 38 scans (55.1%). Though the prevalence was slightly higher in males, the difference was not statistically significant

Conclusion: The anterior loop was present in more than half of the study population, with significant gender-based differences in its spatial relationship to dentition. Age did not significantly influence loop dimensions. These findings support the routine use of CBCT for safe implant placement in the mental foramen region to avoid neurovascular complications.

Keywords: Anterior loop, Mental nerve, Cone Beam Computed Tomography, Implant planning, Mandibular canal, Neurovascular bundle

Introduction

Cone Beam Computed Tomography (CBCT) has revolutionized dental diagnostic imaging by offering precise, three-dimensional views of the teeth, bones, and surrounding structures. This advanced imaging tool enables clinicians to evaluate the maxillofacial region in detail, supporting accurate diagnosis and safer, more effective treatment planning[1].

When planning surgical procedures, especially in implant dentistry, it is crucial to identify and understand key anatomical landmarks. One such critical structure is the mandibular canal, which houses the inferior alveolar nerve (IAN)—a vital nerve responsible for sensation in the lower jaw. The IAN enters the mandible through the mandibular foramen on the inner surface of the mandibular ramus. It then travels

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through the bone, eventually giving off branches, including the mental nerve, which exits the mandible through the mental foramen to supply the lower lip and chin[2].

Occasionally, a portion of the IAN extends forward beyond the mental foramen before looping back to exit—this configuration is known as the anterior loop (AL) of the mental nerve[3]. This anatomical variation becomes especially relevant when placing dental implants in the anterior mandible, as inadvertent injury to the nerve can lead to complications like numbness or pain.

The anterior loop follows a path that moves "forward, outward, upward, and then backward" before the nerve exits at the mental foramen. Bavitz and Misch described the anterior loop as a structure in which the neurovascular bundle moves ahead and below the foramen before curving back to exit. Understanding and identifying this loop is critical in avoiding nerve damage during surgeries[3,4].

In a study by Solar et al. (1994), the anterior loop was categorized into three types[5]:

Type I: A Y-shaped configuration where the loop is indistinct and the mental nerve branches off behind the mental foramen.

Type II: A T-shaped pattern, with no anterior loop. The mental branch exits perpendicularly from the main nerve trunk.

Type III: A clearly defined Y-shaped loop, easily distinguishable on imaging.

Thorough identification of the anterior loop is essential in surgical planning—particularly for placing dental implants in the interforaminal region of the mandible. Overlooking this structure can lead to iatrogenic injuries, affecting both the function and comfort of the patient. While standard safety recommendations often suggest maintaining a 5 mm buffer from the mental foramen and the most distal implant fixture, this guideline may not be universally applicable due to individual anatomical differences and ethnic variability[6].

Traditional two-dimensional imaging methods like panoramic radiographs are commonly used due to their accessibility and lower cost. However, these methods lack the precision needed to visualize the anterior loop reliably. CBCT, on the other hand, offers superior detail, making it the gold standard for detecting the presence and dimensions of the anterior loop. Still, due to concerns about cost and radiation exposure, many clinicians remain reliant on less precise imaging tools[7,8].

Although several studies have examined the anterior loop in different populations, there is limited data specifically focused on the Indian demographic. Given the importance of accounting for ethnic and individual variability in surgical planning, this study was undertaken to assess the prevalence of the anterior loop using CBCT among Indian patients. The study also aimed to analyse any differences based on age, gender to support safer and more personalized implant placement.

Material and Methods

A retrospective study was carried out in the Outpatient Department of Oral Medicine and Radiology, Annoor dental college, Muvattupuzha, Kerala where 140 images of participants who had undergone CBCT examination showing the mandibular premolar region were retrieved from the archival records and inspected for the presence of the mental nerve loop. The study was conducted after obtaining ethical approval from the Institutional Ethics Committee (IHEC/025-B/05). CBCT scans were examined in multiplanar sections, and the inferior alveolar nerve was identified using the nerve option in NNT software.

Proper diagnostic quality mandibular CBCT scans with complete patient files and records, patients of both genders in the age range of 20–70 years, patients with a negative history of trauma to mandible, previous orthognathic surgery or operated cyst and tumour, and patients without any systemic disease affecting growth and development were included in the study. However, CBCT scans with less diagnostic quality and artefacts, mixed dentition CBCT scans, scans showing any supernumerary or impacted tooth in the premolar area, and patients with developmental anomalies were considered in the exclusion criteria

The minimum sample size was calculated using the formula for prevalence studies, n=Z2×p×(1-p)/d2

where Z = 1.96 at 95% confidence level, p = expected prevalence of anterior loop (taken as 60% from previous studies), and d = 8% allowable error. The calculated sample size was 135, which was rounded to 140 to improve study power. Anterior loop was traced in the panoramic section in the CBCT scan and comparisons were made based on gender and mean age

Statistical Analysis

All data were compiled in Microsoft Excel and analyzed using SPSS version 24 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to calculate prevalence, expressed as frequency and percentage. The overall prevalence of the anterior loop was determined for the study population, and subgroup prevalence was presented for gender and age categories. A 95% confidence interval (CI) was calculated for prevalence estimates. The level of significance (α) was set at 0.05. The study had a statistical power of 80% at the chosen sample size

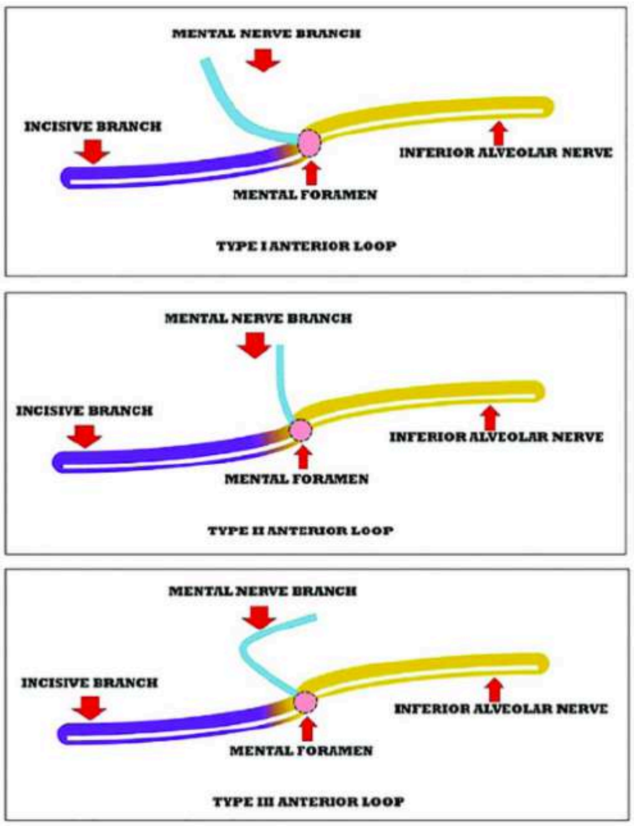

Fig 1: Classification of anterior loop of mental nerve (Solar et al, 1994)

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Table 1. Prevalence of Anterior Loop by Gender

Gender	n	Presence of AL (%)	p-value
Male	71	45 (63.4%)	
Female	69	38 (55.1%)	
Total	140	83 [59%]	0.316

Results

A total of 140 CBCT scans were evaluated to determine the presence of the anterior loop (AL) of the mental nerve, with additional subgroup analysis based on age, gender. The observed overall prevalence of the anterior loop was 59.3%, indicating that the AL is a common anatomical variation in the Indian population and should be carefully considered during surgical procedures such as implant placement in the interforaminal region. Of the total 140 patients, 71 were male and 69 were female. In males, the anterior loop was detected in 45 scans (63.4%). In females, the loop was found in 38 scans (55.1%). Though the prevalence was slightly higher in males, the difference was not statistically significant. A chi-square test was conducted to evaluate the relationship between gender and the presence of the anterior loop and the result indicates that the observed difference in prevalence rates (63.4% in males vs. 55.1% in females) is likely due

Table 2. Prevalence of Anterior Loop by Age Group

Age group	n	Presence of AL (%)	Presence of loop	p-value
19-30 years	40	24	60%	
31-40 years	38	22	57.9%	
41-50 years	36	21	58.3%	
51-60 years	26	16	61.5%	
Total	140	83	59.3%	0.991

to chance and not a true association between gender and this anatomical variation.

Discussion

The anterior loop (AL) of the mental nerve represents a critical anatomical variation in the interforaminal region of the mandible, particularly relevant during implant placement and other surgical procedures. The present retrospective CBCT-based study assessed the prevalence and morphometric characteristics of the anterior loop in South Indian population and analysed its relationship with age, gender, and side of occurrence. Out of 140 CBCT scans, the anterior loop was detected in 59.3% of cases, a finding consistent with prior CBCT-based investigations.

The observed prevalence in our study (59.3%) aligns with results reported by Neiva et al., who identified the anterior loop in 60% of hemimandibles during cadaveric dissection [Neiva RF et al., 2004][9]. Similarly, a CBCT study by Rosa et al. recorded AL prevalence ranging from 48% to 71% depending on the population and imaging setting [Rosa AL et al., 2007][10]. However, discrepancies exist in the literature, with some studies showing much lower prevalence rates when using two-dimensional imaging modalities. Jacobs et al., using panoramic radiographs, identified the anterior loop in only 11% of cases, highlighting the superior diagnostic capacity of CBCT [Jacobs R et al., 2002][7].

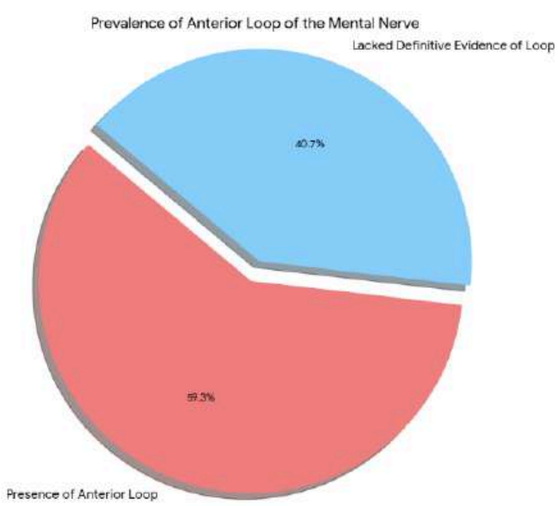

Fig 2: Prevalence of anterior loop

Contrary to expectations, age did not have a statistically significant impact on the distance of the anterior loop from the teeth ($p = 0.254$). This is in contrast to the findings of Ayesh et al., who noted a mild increase in AL dimensions with age, possibly due to bone remodeling and resorption patterns[Ayesh EB et al., 2013][12]. However, our results are consistent with findings by Naitoh et al., who also observed no meaningful correlation between age and anterior loop length in a Japanese population [Naitoh M et al., 2009][13]. These variations may arise from ethnic differences and study methodology.

A major strength of this study is the exclusive use of CBCT, which offers high-resolution multiplanar imaging and has proven to be the most accurate modality for assessing neurovascular structures. Furthermore, this study contributes valuable data specific to the Indian population, a group for which limited published data exists.

However, the study also has limitations. The sample was drawn from a single institution in South India, potentially limiting the generalizability of the

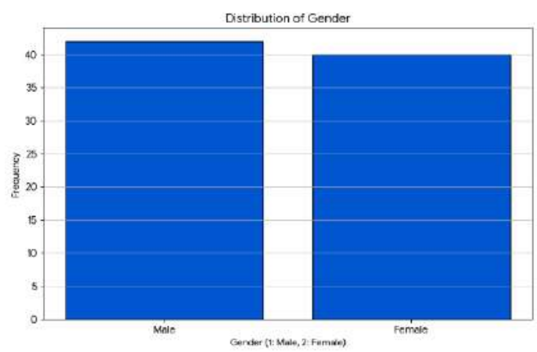

Fig 3: Distribution of gender

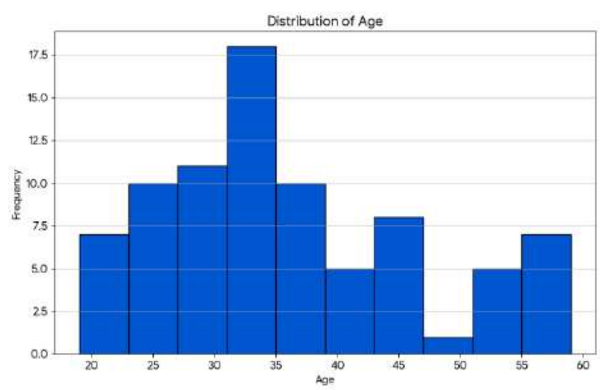

Fig 4: Prevalence of anterior loop based on age

findings. Additionally, the retrospective nature of the study restricted control over some patient-specific variables, such as bone quality and dental history.

Conclusion

The present study reinforces the importance of detecting and measuring the anterior loop of the mental nerve during implant treatment planning. With a prevalence of 59.3% and significant gender-related dimensional variations, the findings underscore the value of CBCT as a diagnostic tool for enhancing surgical safety and precision.

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Root Resection for Management of Furcation Involvement in Maxillary First Molars: A Report of Two Cases with Distal Root Resection

Seethu V A[1], Sanjeev Ravindran[2], Shyamala Devi M.P[3]

ABSTRACT

Advanced furcation involvement in maxillary molars presents a significant clinical challenge due to complex root anatomy and difficulty in achieving effective debridement. Root resection offers a conservative and functional approach to retain affected molars by removing only the diseased root. This case report presents two cases involving distal root resection of maxillary first molars following endodontic therapy. A 35-year-old male underwent resection of the distobuccal root of tooth #16, and a 40-year-old female underwent distal root resection of tooth #26. Root canal treatment (RCT) was completed in both cases prior to surgery. At 6-month and 1-year follow-up respectively, both patients showed satisfactory healing, stable probing depths, and maintained tooth function. These cases underscore the value of root resection in managing localized furcation defects.

Keywords: Root resection, Furcation involvement, Maxillary molar, Periodontal therapy, Furcation management

Introduction

Furcation involvement in multirooted teeth, particularly maxillary molars, is one of the most challenging clinical scenarios encountered in periodontics. It represents a critical stage of periodontal disease progression, frequently associated with advanced attachment loss and poor long-term tooth prognosis. The anatomical complexity of maxillary molars—such as divergent roots, concavities, and furcation entrance dimensions—hampers effective instrumentation, debridement, and plaque control, making nonsurgical periodontal therapy alone insufficient in many cases.[7]

Several treatment modalities have been proposed for the management of furcation defects, including guided tissue regeneration, bone grafting, tunneling procedures, and root resection. Among these, root resection (or root amputation) has long been recognized as a predictable treatment option for strategically important molars with advanced furcation involvement. The concept was first introduced in the early 20th century, with Weine (1985) later refining the clinical indications and techniques.[7] Carnevale et al. (1998) and Langer et al. (1981) have demonstrated that when performed with proper case selection, endodontic support, and prosthetic planning, root resection procedures can provide long-term tooth retention comparable to that of implant-supported prostheses.[1,9]

The success of root resection depends on several factors:

- Adequate periodontal support of the remaining roots.
- Comprehensive endodontic treatment of the involved tooth.
- A restorative design that distributes occlusal forces favorably.
- Patient's ability to maintain optimal plaque control.

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Maxillary molars often require distal root resection, as the palatal and mesiobuccal roots generally provide better periodontal support and allow for a more favorable restorative prognosis. Previous studies have shown survival rates ranging from 62–95% over 10–15 years when resected molars are properly maintained, highlighting the value of this procedure in preserving natural dentition.[8]

This report presents two clinical cases in which distal root resection, preceded by root canal treatment, was successfully performed in maxillary first molars with advanced furcation involvement. The cases emphasize the role of multidisciplinary management in achieving functional and esthetic success.

Case I: Distobuccal Root Resection of Maxillary Right First Molar (16)

A 35-year-old systemically healthy male patient presented with food lodgement and discomfort in the upper right posterior region.. Clinical examination revealed tooth 16 with a probing depth of 8 mm on the distobuccal aspect and Grade III furcation involvement. The tooth was vital, with no mobility, and radiographic evaluation showed significant bone loss round the distobuccal root (amount of bone present is only 10%). The mesiobuccal and palatal roots had adequate periodontal support. After initial periodontal therapy, endodontic treatment (Root Canal Treatment) was completed to ensure a clean and sealed root canal system before surgery. Distal root resection was planned to preserve the remaining healthy tooth structure and eliminate the furcation defect.

Case II: Distal Root Resection of Maxillary Left First Molar (26)

A 40-year-old systemically healthy female presented with discomfort and bleeding on brushing in the upper left molar region. Clinical findings showed Grade II furcation involvement and a probing depth of 7–8 mm on the distal aspect of tooth 26. Radiographs revealed vertical bone loss around the distal root(amount of bone present is 20 %), while the palatal and mesiobuccal roots were periodontally stable. Root canal therapy was carried out after initial periodontal treatment to ensure proper canal disinfection and sealing in preparation for the surgical phase. Distal root resection was scheduled to address the furcation involvement and retain the tooth.

Surgical Procedure

Surgical procedures for both cases were performed under local anesthesia using 2% lignocaine

FIGURE I A- Surgical exposure of a maxillary molar with evident Grade III furcation involvement. Significant attachment loss is also noted on the distal root surface. B- Resection of the distal root. C-Resected distal root D- Restoration with GIC (Glass Ionomer Cement) E- Flap readapted and sutured

with 1:80,000 adrenaline. After raising a full-thickness mucoperiosteal flap, debridement of the roots and removal of granulation tissue were carried out, which allowed clear exposure of the furcation area. (FIGURE 1). In Case I, the distobuccal root of tooth #16 was sectioned at the level of the furcation using a long-shank carbide bur and extracted with minimal trauma. In Case II, the distal root of tooth 26 was similarly resected and removed.

Following debridement and root planing, glass ionomer cement (GIC) restoration was placed on the exposed cut root surfaces of the remaining roots to prevent dentinal hypersensitivity and smoothen the surfaces for plaque control. After ensuring hemostasis, the surgical sites were irrigated, and flaps were repositioned and sutured with resorbable sutures. Occlusal adjustments were carried out to prevent trauma and redistribute masticatory forces.

Postoperative management included a 5-day course of antibiotics (Amoxicillin 500 mg, three times daily) along with analgesics, 0.12% chlorhexidine mouth rinse, and soft diet instructions. Sutures were removed after 10 days. Both patients were placed on a strict periodontal maintenance protocol. Neither patient received prosthetic restoration (crown) post-surgically, and both teeth remained asymptomatic and functionally stable during follow-up.

Discussion

Furcation involvement in maxillary molars is of-

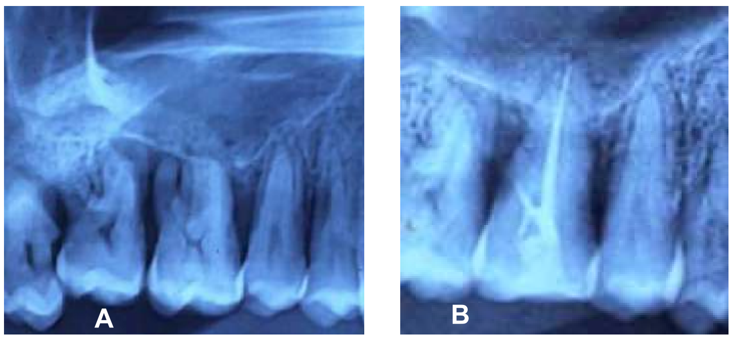

Figure 2- A- Case I Pre-operative radiograph B – Healing after 6 months

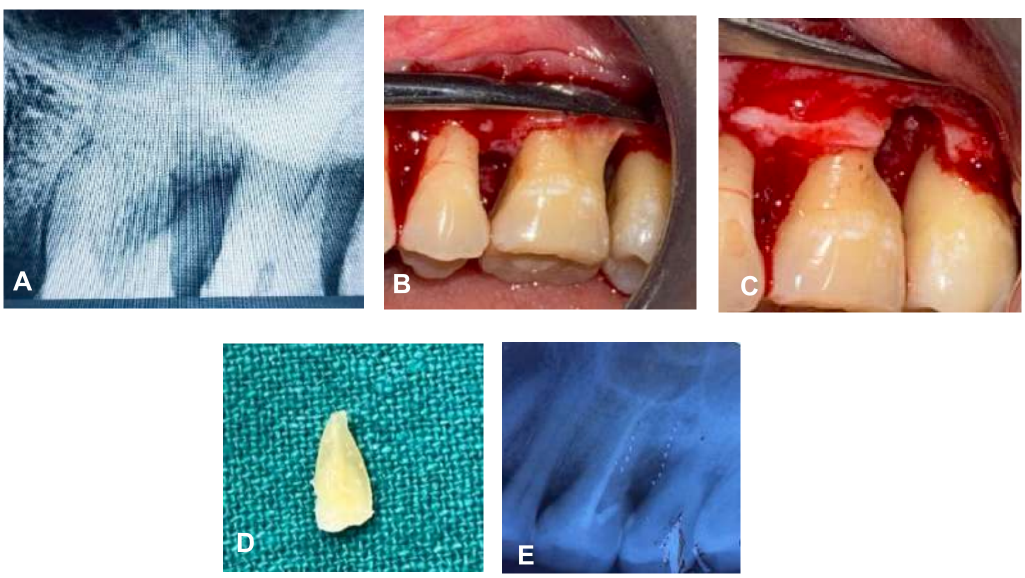

Figure 3- A- Case II Pre-operative radiograph B-After mucoperiosteal elevation C-Resection of distal root D- Resected distal root E-Healing after 1 year

ten a complex and significant challenge in periodontal therapy due to anatomical difficulties in accessing and debriding the furcation area. The success of root resection procedures lies in careful case selection, execution of proper surgical and endodontic protocols, and strict maintenance regimens.

Root resection, also known as root amputation, has been extensively documented as an effective treatment modality for managing advanced furcation defects. It allows for the preservation of part of the tooth when complete extraction is not yet warranted. According to Langer et al., root resection provides predictable results when the retained roots have sufficient periodontal support, and occlusal forces are well managed.[1]

In the present cases, both patients exhibited furcation involvement localized to the distal roots of maxillary first molars. Radiographic and clinical assessments supported resection as a viable treatment option over extraction. Endodontic therapy was performed prior to surgical intervention, aligning with the consensus in the literature that RCT should be completed before resection to prevent contamination of the surgical site and to allow for easier access and visibility during surgery.[2]

The distal roots were chosen for resection because of their unfavorable prognosis in terms of bone support and accessibility for hygiene. As reported by Basten et al., the distobuccal roots of maxillary first molars tend to have higher rates of furcation involvement and are often suitable candidates for resection.[3]

Use of glass ionomer cement (GIC) on the exposed cut root surfaces before flap closure is an important technique to reduce dentinal hypersensitivity and to enhance plaque resistance. GIC has a chemical bond with dentin, fluoride-releasing properties, and good biocompatibility. These features are particularly beneficial in periodontal surgical sites. A study by Pameijer and Jefferies emphasized the biological seal and sustained fluoride release of GIC in subgingival areas, making it a good material for exposed root surfaces.[4]

Importantly, no prosthetic crowns were placed post-resection. While some clinicians advocate for full-coverage restorations to protect the resected tooth, others, including Langer and Wagenberg, have shown long-term success in cases managed without crowns, provided occlusal forces are controlled and plaque accumulation is minimized.[1] Our patients maintained excellent plaque control and were placed under periodic recall and reinforcement of oral hygiene.

Both cases remained clinically stable, with no progression of periodontal disease or loss of tooth function during their respective follow-up periods (6 months and 1 year). This is consistent with the findings of Fugazzotto, who reported survival rates of 91.2% over 15 years for root-resected molars in compliant patients.[6]

Although implant therapy is an alternative, root resection still holds value in appropriately selected cases. It is often more cost-effective, less invasive, and biologically conservative. Moreover, the proprioceptive feedback from the retained tooth structure aids in mastication and occlusal harmony.

Overall, this report supports the existing evidence that root resection, particularly when combined with careful surgical technique, preoperative RCT, proper restorative sealing, and supportive periodontal therapy, offers a predictable and conservative treatment for molars with advanced furcation involvement.[6,9]

Conclusion

Root resection, supported by prior endodontic treatment, remains a valuable periodontal surgical approach for molars with advanced but localized furcation defects. In these two cases involving distal root resection of maxillary first molars, the combination of thorough RCT, surgical precision, use of GIC to prevent sensitivity, and regular maintenance resulted in excellent clinical and functional outcomes. Periodontists should consider root resection as a conservative treatment option where feasible, particularly when patient compliance and tooth anatomy are favorable.

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Clinical Outcomes of PRF-Assisted Vestibuloplasty in Gingival Recession: A Case Report

Shimreen K[1], Jeethu John Jerry[2], Nita Syam[3], Shabeer Ahamed[4], Nabeeh PK[5], Abhisha K[6]

ABSTRACT

Vestibuloplasty is a surgical procedure designed to increase the depth of the vestibule of the mouth by changing the soft tissue attachments. PRF is effectively used in periodontology to promote root coverage by enhancing soft tissue healing and regeneration in mucogingival procedures. This article presents the case management of a male patient presented with receding gums. The treatment involved vestibuloplasty combined with the application of a platelet-rich fibrin (PRF) membrane to achieve root coverage. During follow-up visits, clinical evaluation revealed a noticeable increase in the keratinized gingival width and an improvement in mucosal thickness, indicating successful soft tissue augmentation and favorable periodontal healing outcomes.

Introduction

Vestibuloplasty is a surgical procedure designed to increase the depth of the vestibule of the mouth by changing the soft tissue attachments.[1] Vestibuloplasty is commonly carried out to achieve sufficient depth in the labial or lingual vestibule, facilitating proper denture flange placement. Various surgical approaches have been introduced for this purpose, including the Kazanjian and lip-switch techniques. There are numerous procedures described, but the gold standard is represented by the free gingival graft (FGG) that, necessarily, requires a second surgical site with a consequent increase in morbidity and the risk of complications. Each of these techniques requires an ample amount of mucosal tissue to effectively deepen the vestibule. It has been established that at least 2 mm of keratinised tissue (KT) is essential for maintaining periodontal and peri-implant health.[2]

Platelet-Rich Fibrin (PRF) in periodontology is an advanced platelet-rich product developed in 2000, by Choukroun[3] et al. widely used to enhance soft and hard tissue healing in periodontal and implant procedures. PRF preparation requires no anticoagulants or thrombin, relying solely on centrifuged autologous blood. PRF forms a 3D fibrin matrix that acts as a biological scaffold, trapping cytokines and growth factors (VEGF, IGF, TGF-β1, PDGF), promoting angiogenesis, wound healing, and tissue regeneration. It also supports stem cell recruitment, has immunological benefits, and is associated with reduced postoperative infections.[2]

This article details a case report presenting with Miller's Class I gingival recession, managed through vestibuloplasty to minimize frenal tension, followed by the employment of PRF membranes over the affected site.

Case Report

A 38-year-old male patient,was referred to the Outpatient Department with a primary concern of gum recession affecting the front lower anterior region. The clinical assessment showed Class I Miller's recession associated with a prominent frenal pull in the mandibular anterior area (Figure 1). The extent of gingival recession was approximately 2 mm. The vestibular depth in the affected region was recorded as moderate

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to shallow,measuring about 4 mm from the gingival margine to the base of the vestibule. The width of keratinized gingiva in the mandibular anterior segment was estimated to be 3mm. The patient was informed about the available treatment options, which included vestibuloplasty to reduce frenal tension, followed by either plateletrich fibrin (PRF) membrane placement or a free gingival graft (FGG) for root coverage. After a thorough explanation of both procedures, the patient opted for the PRF-based treatment approach.

Surgical Procedure

A key consideration in the surgical technique is the placement of the horizontal incision, which should be made approximately 1 mm coronal to the mucogingival junction. This positioning facilitates the development of KT in the intervening region. A partial-thickness flap was carefully elevated following a horizontal incision placed approximately 1 mm coronal to the mucogingival junction (Figure 2). Apical positioning if the flap was achieved and it was sutured to the periosteum using sutures.

Preparation of PRF membrane

Prior to the surgical procedure, 10 ml of intravenous blood was drawn using two syringes and immediately transferred into sterile test tubes. The samples were centrifuged without the addition of any anticoagulant with rate of 3000 revolutions every minute for approximately 11– 12 minutes. In the absence of anticoagulants, platelet activation occurs upon contact with the glass walls of the test tube, initiating the coagulation cascade. This process results in the formation of three-tiered composition: an upper tier of acellular plasma, a centre tier containing the PRF clot, and a lower tier composed of red corpuscles. The centre PRF plug was carefully isolated from the surrounding layers and compressed between two sterile glass slabs to expel excess fluids, thereby forming a membrane suitable for surgical application.

Surgical Procedure

A key consideration in the surgical technique is the placement of the horizontal incision, which should be made approximately 1 mm coronal to the mucogingival junction. This positioning facilitates the development of KT in the intervening region. A partial-thickness flap was then carefully elevated independent of any vertical surgical incisions for release (Figure 2). Apical positioning if the flap was achieved and it was sutured to the periosteum using sutures.

Preparation of PRF membrane

Prior to the surgical procedure, 10 ml of intravenous blood was drawn using two syringes and immediately transferred into sterile test tubes. The samples were centrifuged without the addition of any anticoagulant with rate of 3000 revolutions every minute for approximately 11–12 minutes. In the absence of anticoagulants, platelet activation occurs upon contact with the glass walls of the test tube, initiating the coagulation cascade. This process results in the formation of three-tiered composition: an upper tier of acellular plasma, a centre tier containing the PRF clot, and a lower tier composed of red corpuscles. The centre PRF plug was carefully isolated from the surrounding layers and compressed between two sterile glass slabs to expel excess fluids, thereby forming a

Figure 1: Pre-operative

Figure 2: Horizontal incision given 1mm coronal to mucogingival junction

Figure 3: Vestibular depth deepening and preparation of recipient site before PRF membrane placement

membrane suitable for surgical application.

Prior to placement of the PRF membranes, the surgical site was carefully de-epithelialized to promote optimal integration of the PRF with the underlying tissue (Figure 3). The area was then cleansed using the exudate released during the compression of the PRF membranes. This exudate, rich in growth factors, exhibits a potent proliferative effect on stem cells, thereby enhancing the healing and regenerative potential of the surgical site.

Stabilization of PRF Membranes:

To ensure proper adaptation and stability, the PRF membranes were anchored using toothsupported sutures. This approach is recommended, as direct suturing of the membrane edges to the periosteum may lead to tearing due to the fragile nature of the PRF (Figure 4). Tooth anchored stabilization provides secure placement without compromising the integrity of the membrane. A protective pack was placed over the operative site using Ora-Aid to shield the area and promote healing (Figure 5).

Post-operative:

Following the procedure, the patient was prescribed amoxicillin 500 mg thrice daily for five days to prevent postoperative complications. Additionally, a 0.12% chlorhexidine mouthwash was recommended twice a day for 3-4weeks to maintain oral hygiene. The patient was advised not to brush the treated site during this period to prevent mechanical disruption of the healing site.

Follow-up and Healing Outcomes:

The patient was recalled for a follow-up appointment 15 days postoperatively, at which time the sutures were removed. Clinical examination revealed successful re-epithelialization of the surgical site. During the one-month follow-up, mucosal thickening was observed, along with improved root coverage. Additionally, there was an improvement in the width of the keratinized gingiva, indicating a favorable reaction to the PRF therapy. (Figure 6)) At the postoperative evaluation, gingival recession in the mandibular central incisors was nearly completely resolved, with only minimal residual recession of approximately 1 mm. The width of keratinized gingiva demonstrated a notable increase, measuring about 4 mm in the lower anterior region.

Discussion

This surgical technique combines traditional vestibuloplasty aimed at deepening the oral vestibule with the regenerative benefits of PRF. Traditionally, techniques such as secondary epithelialization and free gingival grafts (FGGs) have become frequently employed for achieving optimal outcomes. However, the latest innovations in regenerative medicine have enabled the use of PRF as an encouraging adjunct to these conventional methods.

In a follow-up case report by Peralvo[5] et al. (2022), the authors highlighted the potential of PRF as an effective grafting biomaterial in vestibuloplasty procedures. Their findings suggest that PRF serves not only as a scaffold for tissue regeneration but also as a biological stimulator that enhances wound heal-

Figure 4: Placement of PRF membranes over the recipient site.

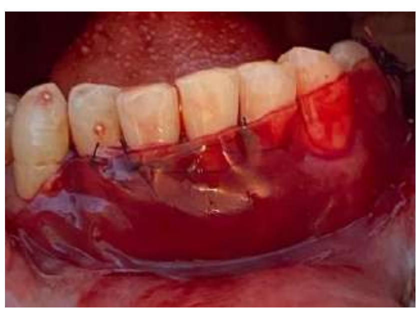

Figure 5: Protective pack Ora-aid placed.

Figure 6: Postoperative 1 month. Increased vestibular depth along with improvement in mucosal thickness and improved root coverage.

ing and tissue maturation. The report demonstrated that using PRF in vestibuloplasty yielded satisfactory clinical outcomes, particularly in terms of increased keratinized tissue (KT) width and root coverage.

Temmerman[6] et al. (2018) carried out research to evaluate the efficacy of leukocyte- and platelet-rich fibrin (L-PRF) membranes in promoting the growth of keratinized mucosa (KM) surrounding oral implants. The research compared L-PRF with traditional FGGs in terms of KM width gain and tissue shrinkage. Both techniques significantly improved the bucco-lingual width of KM, with FGGs showing a greater mean gain of 1.3 mm.

One of the major advantages reported was the significant reduction in postoperative discomfort compared to traditional methods. Unlike FGGs, which require a donor site and often result in increased morbidity and patient discomfort, PRF is autologous, minimally invasive, and eliminates the need for secondary surgical sites.

Conclusion

This case highlights the successful therapeutic strategy for Class I gingival recession employing a combination of vestibuloplasty and PRF membrane placement. The intervention resulted in improved root coverage, increased keratinized tissue width, and favorable healing outcomes, demonstrating the efficacy of PRF in periodontal regenerative procedures:

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Examples

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Book

Format: **Authors. Title of the Book. Edition. Place of publication: Publisher; Year.**

Example: Carranza FA, Newman MG, Takei HH, Klokkevold PR. Carranza's Clinical Periodontology. 13th ed. St. Louis: Elsevier; 2023.

Chapter in a Book

Format: Authors of chapter. Title of chapter. In: Editors, editors. Title of the Book. Edition. Place: Publisher; Year. p. page numbers.

Example: Socransky SS, Haffajee AD. Microbial complexes in subgingival plaque. In: Newman MG, Takei HH, Klokkevold PR, editors. Carranza's Clinical Periodontology. 13th ed. St. Louis: Elsevier; 2023. p. 205–220.

Website

Format: Authors (if any). Title of the webpage. Name of the website. Year [cited year month day]. Available from: URL

Example: World Health Organization. Oral health. WHO website. 2023 [cited 2025 Sep 10]. Available from: https://www.who.int/news-room/fact-sheets/detail/oral-health

Quick Tips

- Use standard journal abbreviations as listed in PubMed.
- Check every reference carefully for spelling, punctuation, and accuracy.
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INFORMATION TO AUTHORS

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JSPIK accepts articles from dentists, dental specialists (any speciality) and students. The articles submitted must have relevance to the speciality of Periodontics. Authors are encouraged to submit research papers, interdisciplinary case reports, interesting case discussions, letters to editor review articles or short communications.

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