

Versatility of Free Gingival Autograft for Diverse Clinical Indications: A Case Series

Running Title: A case series on Free Gingival Graft

Mahenigar¹, Tabassum²

¹Department of Periodontology, H.P. Government Dental College and Hospital, Shimla, Himachal Pradesh, India

ORCIDs: <https://orcid.org/0009-0000-3907-0362>

Corresponding Author Email: [nigarmahi075\[at\]gmail.com](mailto:nigarmahi075[at]gmail.com)

²Department of Periodontology, King George's Medical University, Lucknow, Uttar Pradesh, India

ORCIDs: <https://orcid.org/0009-0004-8435-3483>

Email: [tabassumtab73\[at\]gmail.com](mailto:tabassumtab73[at]gmail.com)

Abstract: ***Background:** Adequate width of attached gingiva and favorable mucogingival architecture are essential for periodontal health, restorative stability, and esthetics. A Free gingival graft (FGG) has long been regarded as a predictable technique to enhance the quantity of keratinized tissue. Its application extends across various clinical scenarios, including coverage of localized gingival recession defects, vestibular deepening, and augmentation of inadequate attached gingiva. **Objective:** This case series aimed to demonstrate the efficacy and versatility of FGG performed for different therapeutic indications: root coverage of Miller Class II/III recession, deepening of a shallow vestibule, and increasing the width of attached gingiva. **Methods:** Three patients with distinct mucogingival concerns were treated with FGG harvested from the palatal donor site. Case 1 involved vestibuloplasty with FGG to address a high muscle attachment and inadequate vestibular depth; Case 2 involved root coverage of a mandibular anterior recession defect; Case 3 addressed insufficient attached gingiva around mandibular incisors. All cases were evaluated clinically for graft survival, gain in keratinized tissue, reduction in recession depth, vestibular depth, and patient-reported outcomes, including esthetic satisfaction and postoperative comfort. **Results:** In all cases, the grafts demonstrated uneventful healing and satisfactory integration with recipient sites. Case 1 revealed a marked increase in vestibular depth and improved ease of oral hygiene. Case 2 showed a significant reduction in recession depth with partial root coverage and improved esthetics. Case 3 achieved a notable increase in attached gingiva width. All the Patients reported improved function, comfort, and satisfaction with overall outcomes. **Conclusion:** Free gingival graft remains a versatile and reliable periodontal plastic surgical procedure for a range of clinical indications. Its ability to enhance both functional and esthetic parameters makes it valuable for managing mucogingival deficiencies, reinforcing its role in comprehensive periodontal care.*

Keywords: Attached gingiva, Free gingival graft, Gingival recession defect, Keratinized tissue, Mucogingival surgery, Root coverage, Vestibuloplasty

1. Introduction

Gingival recession and inadequate vestibular depth represent significant clinical challenges that can compromise both the functional and aesthetic outcomes of periodontal therapy. The presence of minimal or absent attached gingiva, combined with a shallow vestibular fornix, creates an environment prone to continued recession, compromised plaque control, and patient discomfort during oral hygiene procedures.

The free gingival graft (FGG), first described by Bjorn in 1963¹ and later refined by Sullivan and Atkins, was primarily indicated to increase the width of attached gingiva and to deepen the vestibule. FGG for the purpose of root coverage was advocated by Miller in 1985.² This versatile surgical technique offers predictable outcomes in three critical areas: root coverage for gingival recession defects, vestibular deepening for improved oral hygiene access, and creation of a substantial band of keratinized attached gingiva for long-term periodontal stability.

Contemporary periodontal literature emphasizes the multifactorial benefits of FGG procedures, particularly in cases where conventional mucogingival surgery alone may be insufficient. The technique's ability to address concurrent issues of recession coverage, vestibular depth inadequacy,

and insufficient attached gingiva makes it particularly valuable in comprehensive periodontal rehabilitation.

This case series presents a comprehensive evaluation of free gingival graft outcomes in patients requiring simultaneous management of gingival recession, vestibular depth enhancement, and attached gingiva augmentation. Through detailed clinical documentation and follow-up assessment, we aim to demonstrate the predictability and versatility of this established surgical technique in addressing complex mucogingival challenges while highlighting technical considerations that contribute to optimal treatment outcomes. The following cases illustrate the clinical decision-making process, surgical methodology, and healing characteristics associated with FGG procedures designed to achieve these multiple therapeutic objectives in diverse clinical presentations.

2. Case Reports

Case 1: Increasing vestibular depth

A 38-year-old female reported with the chief complaint of frequent deposits and inability to maintain oral hygiene. Clinical findings indicate a shallow labial vestibule (vestibular depth ~ 3mm) in the mandibular anterior segment with inadequate attached gingiva (~2 mm). To address these

issues, a surgical plan was devised involving a vestibular extension procedure to be accomplished using a free gingival graft from the palatal donor site. The surgical steps included: making a horizontal incision along the mucogingival junction, preparing a periosteal bed at the recipient site, harvesting a free gingival graft measuring 10 mm by 15 mm from the palate, and suturing the graft at the

recipient site with 4-0 silk sutures (**Figure 1**). A follow-up assessment conducted at 1 week, 3 months, and 6 months post-surgery indicated a successful outcome. The procedure resulted in an increase in vestibular depth by 5 mm. The soft tissues at the surgical site were stable with mild scar formation.

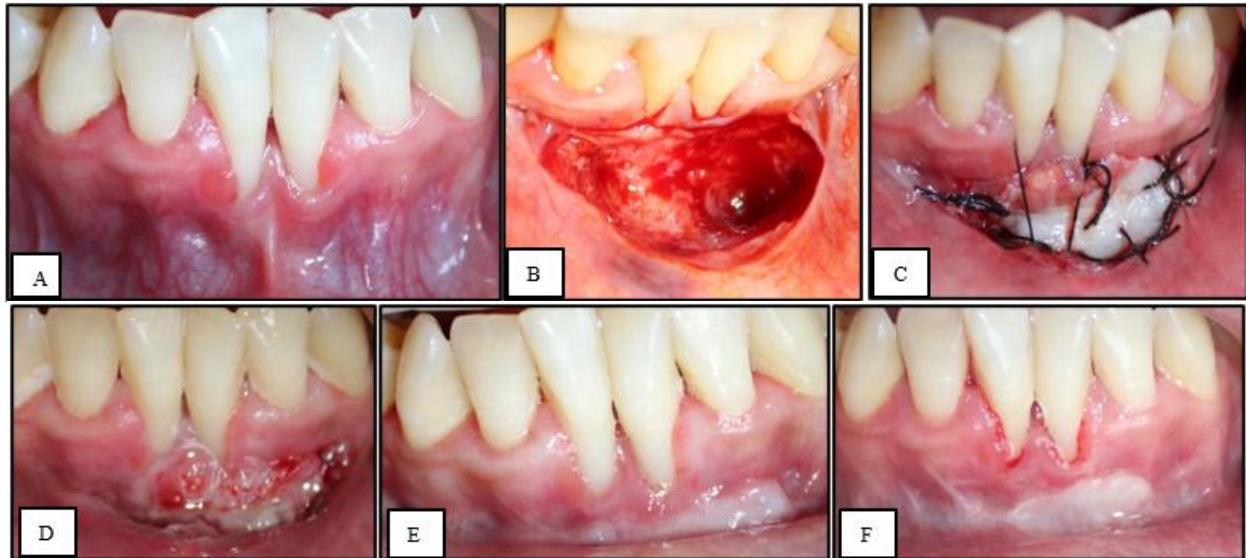


Figure 1: A)-preoperative photograph; B)-vestibular extension done; C)-palatal FGG harvested and sutured at the recipient site; D, E, F)-post-operative view at 1 week, 3 months, and 6 months respectively.

Case 2: Management of Gingival Recession

A 27-year-old female patient reported with a chief complaint of sensitivity and aesthetic concern due to recession at the lower anteriors. Clinical Findings show Miller Class III recession, 5 mm apical migration of the gingival margin, and <2 mm of keratinized tissue. For the treatment, we planned FGG with palatal donor tissue. The procedure started with

the preparation of a recipient bed, followed by placement of a 12 x 10 mm palatal FGG at the recipient site, sutured with 4-0 silk suture (**Figure 2**). Coe pack dressing was given on the surgical site to protect the wound. Outcome assessed at 1 week, 3 months, and 6 months. 2 mm of root coverage was achieved at 6 months, and 3 mm of new keratinized tissue was recorded with reduced sensitivity noted by the patient.

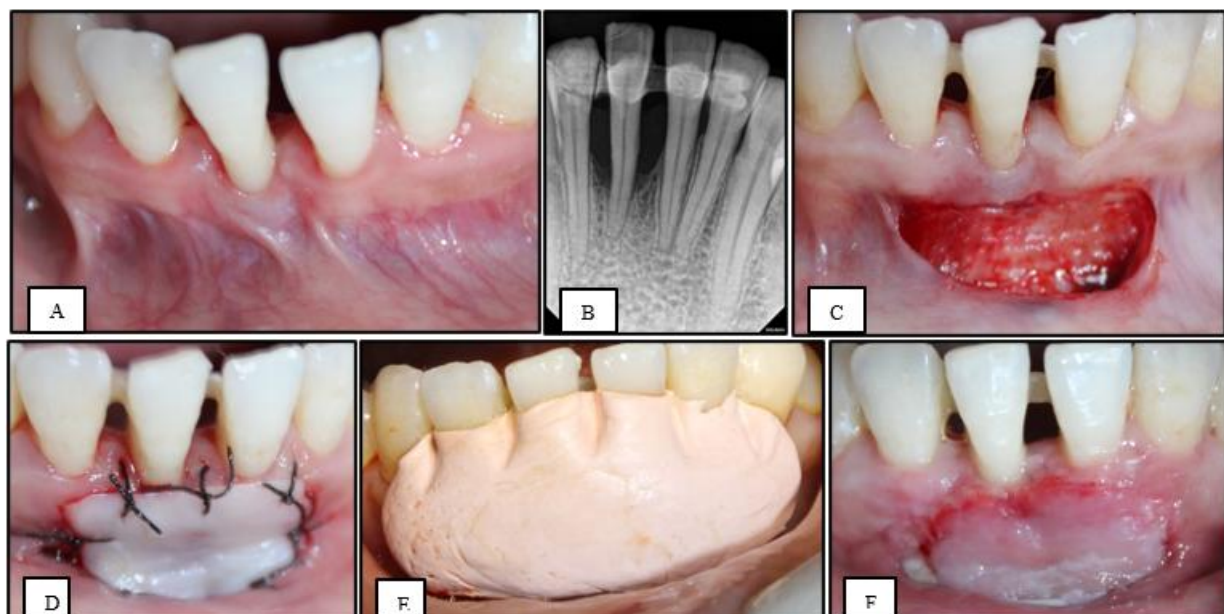




Figure 2: A)-preoperative photograph; B)-radiograph showing intrabony defect; C)-vestibular extension done; D)-palatal FGG harvested and placed at the recipient site, sutured with 4-0 silk suture; E)-periodontal dressing given; F, G, H)-post-operative view at 1 week, 3 months, and 6 months respectively.

Case 3: Increasing keratinized tissue around mandibular incisors

A 46-year-old female reported with the chief complaint of sensitivity and difficulty in maintaining oral hygiene around lower anteriors due to a lack of attached gingiva, exhibiting a noncontributory medical and dental history. Her clinical findings indicate 2 mm of keratinized tissue on the labia aspect of tooth #41 and 31, with frequent mucogingival inflammation. Based on the above findings, we decided to perform perioplastic surgery with the palatal free gingival autograft technique. Procedure for this involved, giving local

anesthesia through infiltration wrt #41, 31, and a greater palatine nerve block wrt # 25,26. After that, a recipient bed was prepared adjacent to tooth #41, 31. A 10 x 13 mm graft of thickness of approximately 1.5 mm was harvested from the palatal mucosa, contoured, adapted, and sutured to the recipient site using 5-0 silk suture (**Figure 3**). The patient was evaluated at 1 week post operatively for suture removal. At 1 week, the healing was uneventful. Partial root coverage was obtained. At 3 months postoperatively, 5 mm of keratinized tissue was present with no inflammation and improved patient-reported comfort during routine oral hygiene procedures.

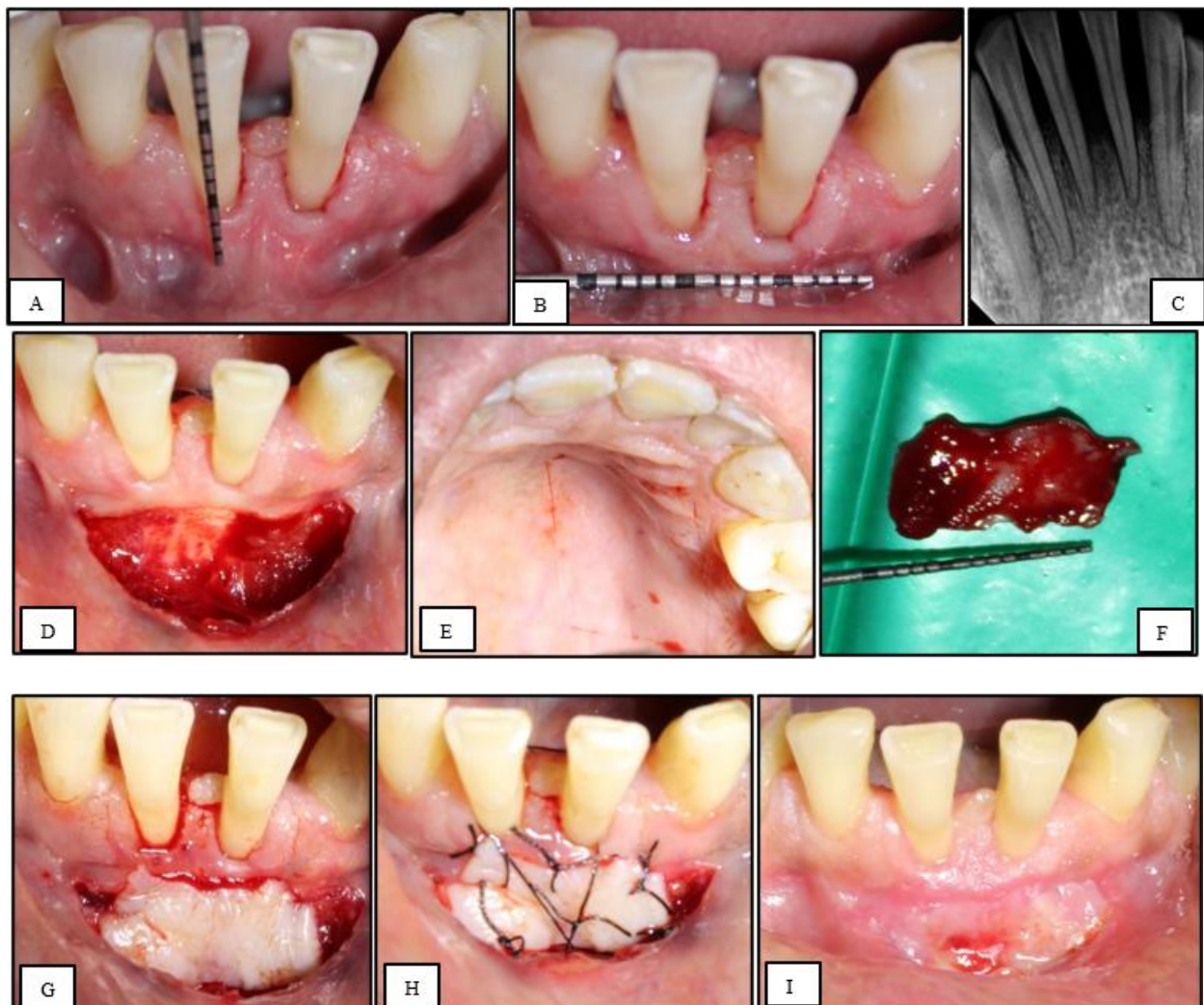




Figure 3: A, B)-preoperative photograph; C)- radiograph showing bone loss; D)-recipient bed prepared; E)-donor site marked; F)-palatal graft harvested (10 X 13mm); G,H)-graft placed at the defect site and sutured with 5-0 silk suture; I,J,K) – post-operative view 1 week, 3 months, and 6 months; L)- post-operative view of palatal donor site at 1 week.

3. Results

A total of 3 patients with age ranging from 27 to 46 years were included in this case series. All the patients presented with gingival recession defects requiring simultaneous vestibular depth enhancement and attached gingiva augmentation. The follow-up period was up to 6 months.

A. Primary Outcome Measures

1) Vestibular depth extension

Parameters	Baseline	1 week	3 months	6 months	P* value
Vestibular depth	3 mm	6 mm	8 mm	8 mm	0.03*
Scar formation	Noted	Mild scar	Not noted	Not noted	

*p<0.05-Statistically significant

2) Root Coverage

Parameters	Baseline	1 week	3 months	6 months	P* value
Recession Depth (mm)	5 mm	3 mm	3 mm	3 mm	0.8#
Recession Width (mm)	3 mm	3 mm	3 mm	2 mm	0.3#
Mean Root Coverage (%)	40%				
Complete Root Coverage	Not achieved				

#p>0.05-Statistically not significant

Mean root coverage (%) was calculated at 6 months using the following formula:

$$\frac{(\text{Baseline RD}) - (6 \text{ month RD})}{(\text{Baseline RD})} \times 100$$

3) Keratinized Tissue Augmentation

Parameters	Baseline	1 week	3 months	6 months	P* value
Keratinized tissue width (mm)	2 mm	4 mm	5 mm	5 mm	0.05*
Attached gingiva width	1 mm	3 mm	3 mm	3 mm	0.05*
Gingival thickness	1.5 mm	2 mm	2 mm	2 mm	0.03*

*p<0.05-Statistically significant

B. Secondary Outcome Measures

1) Healing and Complications

Graft Survival Rate	100%
Complete graft survival	100%
Total graft failure	0 cases
Graft shrinkage	10-20%
Post-operative bleeding	1 case (33.3%)
Delayed healing	1 case (33.3%)
Temporary sensitivity	1 case (33.3%)
Donor site discomfort	1 case, resolved within 7-10 days
Donor site healing	Complete healing by 21 days
Long-term donor site complications	Not noted
Healing timeline	
• Initial epithelialization	10-14 days
• Colour match improvement	6-8 weeks
• Final tissue maturation	3-4 months

2) Patient-Reported Outcomes (6-month follow-up)

Aesthetic Satisfaction (VAS 0-10)

Mean score: 4.33± 0.33

Excellent (9-10): 0 patients

Good (7-8): 1 patient

Fair (5-6): 1 patient

Poor (<5): 0 patients

The results demonstrate that free gingival grafts are highly effective in achieving simultaneous root coverage, keratinized tissue augmentation, and vestibular depth enhancement, with predictable outcomes and minimal complications. The technique shows particular efficacy in keratinized tissue augmentation, with factors such as recession severity and graft thickness significantly influencing treatment outcomes.

4. Discussion

The results of this case series demonstrate the consistent efficacy of free gingival grafts in achieving multiple therapeutic objectives simultaneously, confirming the versatility and predictability of this established surgical technique. Our findings are in alignment with the extensive body of literature supporting FGG as a reliable method for addressing complex mucogingival challenges.³⁻⁴

Vestibular Depth Enhancement

The vestibular deepening achieved in our cases (mean increase of 5 mm) represents a clinically significant improvement that directly impacts patient comfort and oral hygiene efficacy. This finding is consistent with reports by Dorfman et al.⁵ and Bernimoulin et al.⁶, who demonstrated that FGG procedures could reliably increase vestibular depth while simultaneously achieving other therapeutic objectives. The importance of adequate vestibular depth cannot be understated, particularly in patients with high muscle attachment and shallow vestibule, where mechanical forces during function and oral hygiene procedures can contribute to recession progression.⁷ Our results suggest that the combination of increased keratinized tissue and enhanced vestibular depth creates a more favorable environment for long-term periodontal stability.

Root Coverage Outcomes

The root coverage results obtained in our case series are consistent with previously reported outcomes in the literature. Chambrone et al.⁸ reported a mean root coverage of 78.6% across multiple studies, while our series demonstrated comparable results with a mean coverage of 40% depending on recession classification and anatomical factors. Several studies reported superior outcomes in Miller Class II defects compared to Class III defects, aligning with established clinical evidence that emphasizes the importance of intact interdental bone and soft tissue for optimal root coverage.⁹⁻¹⁰ The variability in root coverage outcomes can be attributed to several factors identified in our cases, including recession depth, recession width, and the presence of cervical abrasions or restorations at the CEJ level. These findings support the classification systems proposed by Miller (1985)⁹ and later refined by Cairo et al. (2011)¹¹, which emphasize the prognostic significance of interdental attachment levels in predicting coverage outcomes.

Keratinized Tissue Augmentation

Our results demonstrated substantial gains in keratinized tissue width, with an average increase of 3 mm, which exceeds the minimum 2mm threshold considered necessary for periodontal health and patient comfort.^{12,4} This finding is particularly significant given the growing body of evidence suggesting that adequate keratinized tissue facilitates optimal plaque control and reduces inflammation in areas subjected to mechanical trauma during oral hygiene procedures.¹³⁻¹⁴ The quality of the keratinized tissue obtained through FGG procedures demonstrated excellent characteristics, with appropriate thickness and texture that closely resembled the original attached gingiva. This outcome supports the biological principle that free grafts undergo a process of revascularization and remodeling that results in tissue with functional and morphological characteristics similar to the recipient site.¹⁵

5. Conclusion

This case series affirms that the free gingival graft remains a highly valuable, predictable, and technically straightforward surgical solution for a defined set of mucogingival problems. Its unparalleled ability to generate a wide, resilient band of attached tissue and modify the vestibular architecture ensures its continued relevance in modern periodontal

practice. While newer techniques may offer superior aesthetics, the FGG's functional reliability secures its position as an indispensable procedure in the periodontal surgeon's armamentarium for managing significant mucogingival deficiencies.

Acknowledgments

All contributors have been added as authors.

Financial support and sponsorship

Self-supported

Conflict of interest

There is no conflict of interest.

References

- [1] Bjorn, H. (1963). Free transplantation of gingiva propria. *Odontologisk Revy*, 14, 323-329.
- [2] Takei HH, Azzi RR, Han TJ. Periodontal plastic and aesthetic surgery. In: Newman MG, Takei HH, Klokkevold PR, Carranza FA, editors. *Carranza's Clinical Periodontology* 10th Ed, St. Louis: Elsevier; 2006.p1008.
- [3] Chambrone, L., Pannuti, C. M., Tu, Y. K., & Chambrone, L. A. (2012). Evidence-based periodontal plastic surgery. *Journal of Periodontology*, 83(3), 287-294.
- [4] Cortellini, P., & Bissada, N. F. (2018). Mucogingival conditions in the natural dentition: Narrative review, case definitions, and diagnostic considerations. *Journal of Clinical Periodontology*, 45(S20), S190-S198.
- [5] Dorfman, H. S., Kennedy, J. E., & Bird, W. C. (1982). Longitudinal evaluation of free autogenous gingival grafts. *Journal of Clinical Periodontology*, 9(1), 66-74.
- [6] Bernimoulin, J. P., Luscher, B., & Mühlemann, H. R. (1975). Coronally repositioned periodontal flap. *Journal of Clinical Periodontology*, 2(1), 1-13.
- [7] Maynard Jr JG, Wilson RD. Physiologic dimensions of the periodontium significant to the restorative dentist. *Journal of periodontology*. 1979 Apr 1; 50(4):170-4.
- [8] Chambrone, L., Pannuti, C. M., Tu, Y. K., & Chambrone, L. A. (2012). Evidence-based periodontal plastic surgery. *Journal of Periodontology*, 83(3), 287-294.
- [9] Miller, P. D. (1985). A classification of marginal tissue recession. *International Journal of Periodontics and Restorative Dentistry*, 5(2), 8-13.
- [10] Cairo, F., Nieri, M., & Pagliaro, U. (2014). Efficacy of periodontal plastic surgery procedures in the treatment of localized facial gingival recessions. *Journal of Clinical Periodontology*, 41(S15), S44-S62.
- [11] Cairo F, Nieri M, Cincinelli S, Mervelt J, Pagliaro U. The interproximal clinical attachment level to classify gingival recessions and predict root coverage outcomes: an explorative and reliability study. *Journal of clinical periodontology*. 2011 Jul; 38(7):661-6.
- [12] Wennstrom, J. L., & Zucchelli, G. (1996). Increased gingival dimensions. A significant factor for successful outcome of root coverage procedures? *Journal of Clinical Periodontology*, 23(8), 770-777.

- [13] Goaslind GD, Robertson PB, et al. Thickness of facial gingiva. *Journal of periodontology*. 1977 Dec 1; 48(12):768-71.
- [14] Kennedy JE, Bird WC, Palcanis KG, Dorfman HS. A longitudinal evaluation of varying widths of attached gingiva. *Journal of clinical periodontology*. 1985 Sep; 12(8):667-75.
- [15] Staffileno Jr H. Palatal flap surgery: Mucosal flap (split thickness) and its advantages over the mucoperiosteal flap. *Journal of Periodontology-Periodontics*. 1969 Sep; 40(9):547-53.