

Comparative evaluation of vestibular incision subperiosteal tunnel access with platelet-rich fibrin and connective tissue graft in the management of multiple gingival recession defects: A randomized clinical study

Department of
Periodontology,
Yenepoya
Dental College,
Yenepoya (Deemed
to be) University,
Deralakatte, Mangalore,
Karnataka, India
The work belongs
to the Department
of Periodontology,
Yenepoya Dental
College, Yenepoya
(Deemed to be)
University, Deralakatte,
Mangalore, Karnataka,
India

Shashikanth Hegde, Jyosthna Ganapathi Madhurkar, Rajesh Kashyap, Maiya S Arun Kumar, Vinita Boloor

Abstract:

Background: The etiology of gingival recession is often multifactorial. Wide array of surgical techniques are available to manage gingival recession. The aim of the present study was to compare, minimally invasive approach (vestibular incision subperiosteal tunnel access [VISTA]), in combination with platelet-rich fibrin (PRF) and connective tissue graft (CTG) in the management of multiple recession defects in maxillary anterior region. **Materials and Methods:** A total of 32 sites from 10 systemically healthy controls were allocated randomly to VISTA with PRF (VISTA + PRF) and VISTA with CTG (VISTA + CTG). Plaque index, gingival index, Probing probing pocket depth (PPD), relative attachment level (RAL), recession depth (RD), recession width (RW), width of keratinized gingiva (WKG), and percentage of root coverage (%RC) were calculated at 6 months postoperatively. **Results:** Results showed significant improvement in mean PPD, RAL, RD, RW, and KTW. %RC in VISTA + PRF and VISTA + CTG was $83.25\% \pm 25.02\%$ and $86.43\% \pm 22.79\%$, respectively, at 6 months. There were no significant differences in the parameters between the VISTA + PRF and VISTA + CTG groups. **Conclusion:** VISTA is a minimally invasive surgical approach, which can be combined with CTG or PRF in the management of Miller's Class I and Class II recession defects, with predictable outcomes. There were significant improvements in the clinical parameters from baseline to 6 months in both the groups. To match with the CTG, which is the gold standard procedure, PRF can be used as an alternative for treating multiple recession defects.

Key words:

Connective tissue graft, minimally invasive, multiple gingival recessions, platelet-rich fibrin, vestibular incision subperiosteal tunnel access

INTRODUCTION

Smile plays a cardinal role to improve esthetics, a perfect smile often radiates health and self-confidence, which is achieved with optimal relationship between the teeth, surrounding oral tissues, and periodontal complex. Any disharmony between these components may lead to smile perceived as unesthetic.^[1]

Gingival recession is defined as an apical migration of gingival margin beyond the cemento-enamel junction.^[2] A broad array of surgical modalities have been introduced for managing gingival recession since 1960.^[3]

Numerous studies have described various combinations of tunnel approaches with connective tissue grafts (CTG) or allografts for treating multiple recession defects by avoiding

vertical releasing incisions and by maintaining papillary integrity. The limitations of this technique include the challenging nature of the intrasulcular tunneling, to obtain access

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Hegde S, Madhurkar JG, Kashyap R, Kumar MS, Boloor V. Comparative evaluation of vestibular incision subperiosteal tunnel access with platelet-rich fibrin and connective tissue graft in the management of multiple gingival recession defects: A randomized clinical study. J Indian Soc Periodontol 2021;25:228-36.

Access this article online

Website:
www.jisponline.com

DOI:
10.4103/jisp.jisp_291_20

Quick Response Code:



Address for correspondence:
Dr. Jyosthna Ganapathi
Madhurkar,
Department of
Periodontology,
Yenepoya Dental
College, Deralakatte,
Mangalore - 575 018,
Karnataka, India.
E-mail: jyosthna.
madhurkar93@gmail.com

Submitted: 22-Apr-2020

Revised: 19-Dec-2020

Accepted: 26-Jan-2021

Published: 03-May-2021

through a small sulcular access point and higher risk of trauma and perforation of the sulcular tissues, which may lead to unfavorable healing outcome.^[4] As a consequence of these limitations, the vestibular incision subperiosteal tunnel access (VISTA) approach was developed by Homayoun H. Zadeh.^[5]

The CTG is considered as a gold standard of the soft-tissue grafting procedures because of its high predictability and esthetic outcome. Even though outstanding esthetic outcome has been achieved, root coverage (RC) has been known to range from 69% to 97% in most of the studies, this technique demands a suitable donor site.^[4]

Platelet-rich fibrin (PRF), introduced by Choukroun *et al.* in 2001, is a second-generation platelet concentrate, which has proliferative effect on various types of cells such as dental pulp cells, human osteoblasts, human gingival and periodontal ligament fibroblasts, dermal prekeratinocytes, and preadipocytes. It is autologous in nature and is considered as a healing biomaterial, with its homogenous fibrin network it is used for enhancing healing of the soft tissue in periodontal plastic surgical procedures and implants, in the treatment of intrabony defects and bone regeneration.^[5]

The present study was carried out to evaluate and compare the efficacy of RC using a minimally invasive approach (VISTA), in combination with CTG and PRF for managing multiple recession defects in maxillary anterior region.

MATERIALS AND METHODS

A total of 32 sites from 10 systemically healthy controls (patients with minimum of 2 sites and maximum of 6 sites were included) aged 16–64 years were enrolled in this randomized controlled clinical trial. The research protocol was reviewed and accepted by the ethics committee of the institute (Ethical clearance number 2017/295). Purpose and study design was explained to the participants, and informed consent was obtained.

Participants who fulfilled all the inclusion criteria were enrolled; systemically healthy subjects, subjects with Miller's Class I or II gingival recession in the maxillary anterior region ≥ 1 mm of attached gingiva, pocket depth (PD) of <3 mm, recession depth (RD) ≥ 2 mm, loss of attachment ≥ 4 mm, gingival index (GI) score ≤ 1 . Participants with a history of RC procedures performed in the selected sites for last 2 years, participants with abnormal bleeding time, clotting time, and prothrombin time, participants with smoking, tobacco chewing and alcohol consumption, cervical abrasion, direct and indirect restorations involving the cervical areas of maxillary anteriors were excluded from the study.

The participants were randomly assigned by computer-generated random numbers into two treatment groups. VISTA with PRF was treatment of choice for sites in Group 1 and VISTA with CTG for Group 2.

Participants were subjected for scaling and root planing along with oral hygiene instructions 1 month prior to surgery.

Clinical measurements recorded at baseline and 6 months, were plaque index (PI) (Silness and Loe 1964), gingival index GI (Loe and Silness 1963), probing pocket depth (PPD), relative attachment level (RAL), recession depth (RD), recession width (RW), width of keratinized gingiva (WKG), and percentage of Root Coverage (%RC) was calculated at 6 months postoperatively [Flowchart 1].

The selected surgical sites were anesthetized using 2% lignocaine hydrochloride containing 1:80,000 adrenaline. Selected sites were subjected for VISTA technique, in Group 1 PRF was placed and in Group 2 CTG was placed.

Vestibular access incision was made at the midline frenum which provided access to the entire anterior maxilla [Figure 1]. Subperiosteal tunnel was made to expose the facial osseous plate and root dehiscence using VISTA 1 and 2 instruments, [Figure 2] extending it one tooth beyond the site that requires RC so as to mobilize and coronally reposition the gingival margin. In addition, the tunnel was widened interproximally under each papilla until the embrasure space, avoiding any surface incisions through the papilla using VISTA 3 and 4 instrument [Figure 3]. Once the gingival margin was coronally advanced, PRF membrane for Group 1 and CTG for Group 2 was placed.

Intravenous blood was collected from the antecubital vein using 10 ml test tube [Figure 4] and centrifuged at 3000 rpm for 10 min in a centrifuge machine (C-852, REMI, Mumbai, Maharashtra, India.). PRF clot thus formed was separated which was transformed into membrane using PRF box [Figures 5 and 6].

The donor area in the palate was anesthetized, and CTG was harvested using partial-thickness trap door technique [Figure 7].

The PRF membrane (Group 1) and CTG (Group 2) was gently placed in the tunnel [Figures 8 and 9] and the entire mucogingival apparatus was coronally advanced and stabilized in the new position using coronally anchored suturing technique, which entails placing a horizontal mattress suture at approximately 2–3 mm apical to the gingival margin of each tooth. The suture was then secured at the mid-coronal point facially of each tooth with the help of composite stopper to prevent apical movement of the gingival margin during initial stages of healing [Figures 10 and 11].

Patients were prescribed antibiotics-Cap Amoxicillin 500 mg thrice a day for 5 days, Analgesics-Tab Diclofenac sodium 50 mg twice daily for 3 days, 0.2% of CHX mouth rinse twice a day postoperatively after 2 days.^[4] Sutures were removed 15 days postoperatively. All the participants were provided with periodic periodontal maintenance therapy for every 3 months. All the clinical measurements were noted at baseline and 6 months postoperatively.

Statistical analysis

The data collected were analyzed by both descriptive and inferential methods. Descriptive methods such as mean and standard deviation were computed to summarize the data. Inferential method such as Mann-Whitney U-test and Wilcoxon signed-rank sum test were utilized to compare the parameters across differential time periods between the two groups and

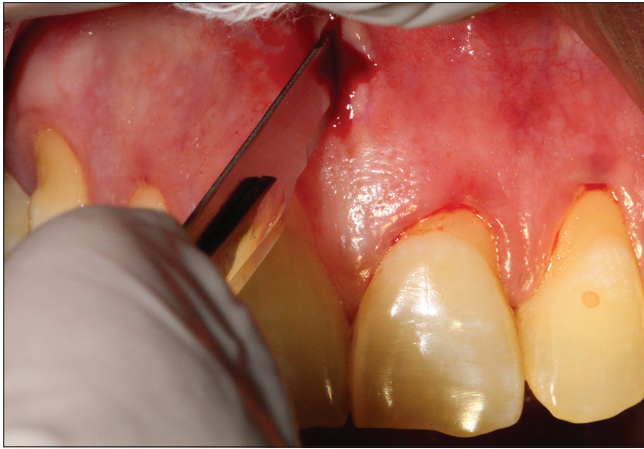


Figure 1: Vertical incision placed for vestibular access



Figure 2: Periosteal tunnel preparation

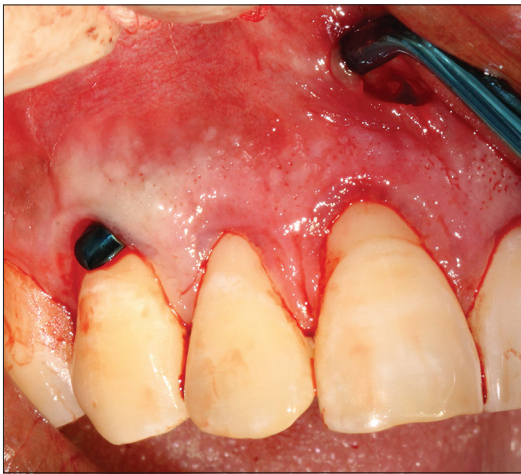


Figure 3: Intra sulcular tunnel

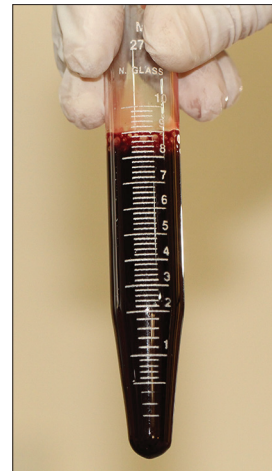


Figure 4: 10ML of blood drawn



Figure 5: Prepared platelet rich fibrin

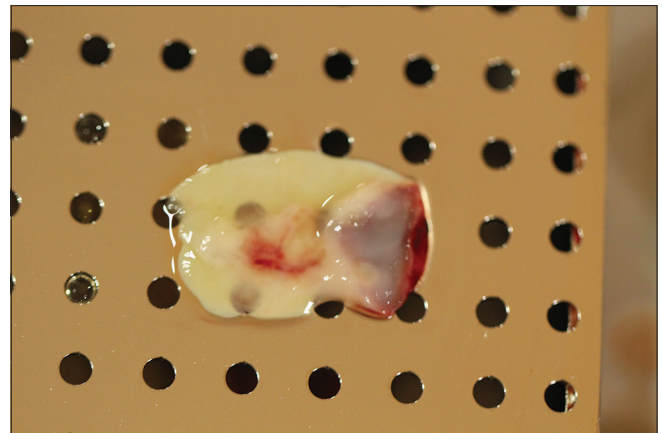


Figure 6: Platelet rich fibrin membrane

within the groups, respectively. $P < 0.05$ was considered statistically significant and $P < 0.01$ and < 0.001 were considered highly significant and very highly significant, respectively. Level of significance in the present study was 5%. Data were subjected to the statistical analysis with the Statistical Package for the Social Science (SPSS software version 22.0, SPSS Inc, IBM).

RESULTS

The results showed significant improvement in mean PPD, RAL, RD, RW, and WKG from baseline to 6 months in both groups. At 6 months, mean PPD in Group 1 was 1.31 ± 0.60 and Group 2 was 1.37 ± 0.5 , RAL was 5.25 ± 1.77 and 6.5 ± 1.155

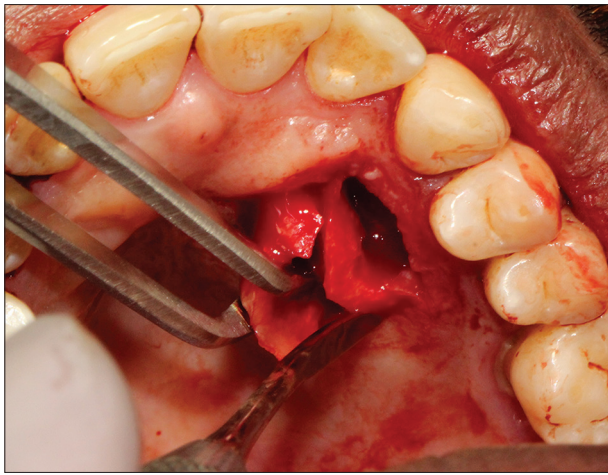


Figure 7: Harvesting connective tissue graft (trap door technique)

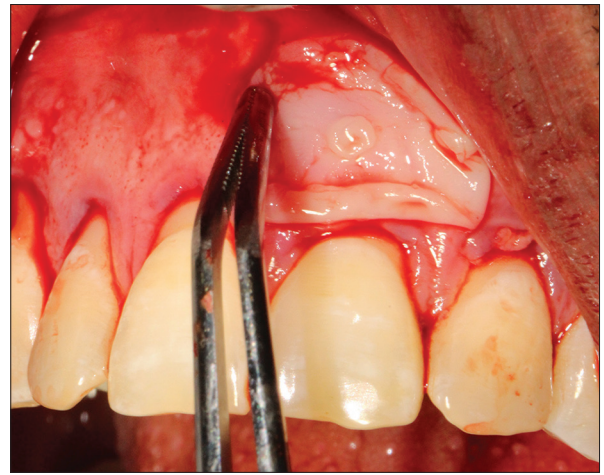


Figure 8: Insertion of platelet rich fibrin into the tunnel

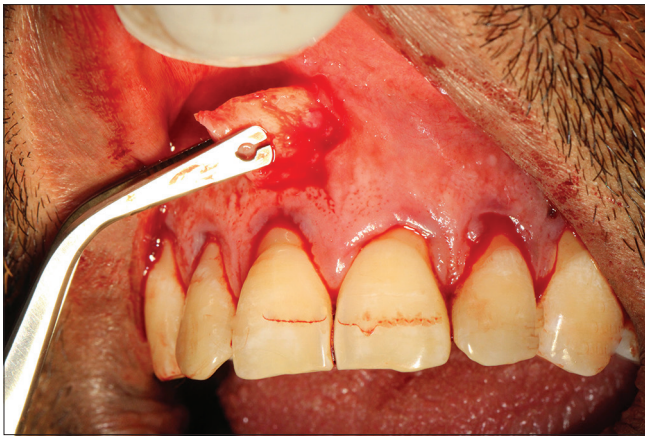


Figure 9: Placement of connective tissue graft into the tunnel



Figure 10: Coronally anchored sutures with composite stopper

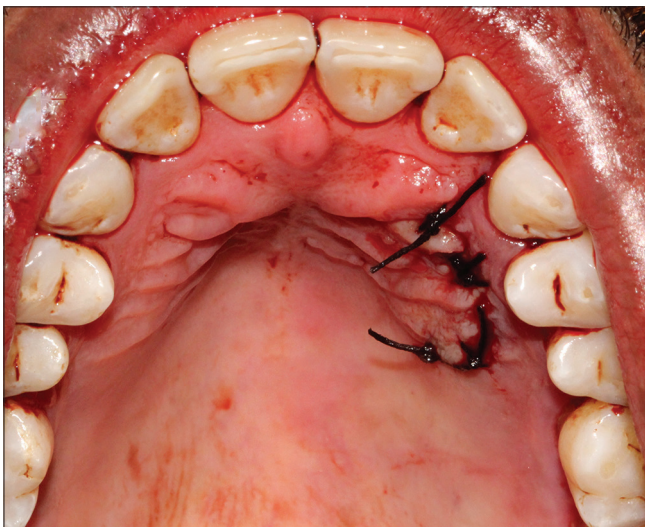


Figure 11: Suturing the donor site



Figure 12: Recession depth preoperative-PRF group

in Group 1 and 2, RW was 1.188 ± 1.642 and 1.063 ± 1.642 in Group 1 and Group 2, respectively.

Recession depth

The mean RD of Group 1 at baseline was 2.563 ± 0.964 and at 6 months was 0.813 ± 1.560 . Similarly, the mean RD of group 2 was found to be same as Group 1 at baseline and 0.500 ± 0.816 at 6 months. Statistically highly significant difference was achieved in Group 1 from baseline to 6 months, while



Figure 13: Recession depth 6 months postoperative–PRF group



Figure 14: Recession depth preoperative–CTG group



Figure 15: Recession depth 6 months postoperative–CTG group



Figure 16: WKG preoperative



Figure 17: Width of keratinized gingiva 6 month postoperative– PRF group

statistically very highly significance was achieved in Group 2. Intergroup comparison did not show statistical significant difference at baseline ($P = 1$) and at 6 months ($P = 0.721$) [Table 1, Graph 1, Figures 12-15].

Width of keratinized gingiva

Mean WKG was 3.500 ± 0.873 and 5.875 ± 1.784 was noted in Group 1 from baseline to 6 months. Similarly, the mean WKG was 2.438 ± 0.964 and 5.125 ± 0.885 was noted in group 1 from baseline to 6 months. However, within the groups, the difference was noted to be statistically very highly



Figure 18: Width of keratinized gingiva 6 month postoperative–CTG group

significant ($P \leq 0.001$). However, the difference between the groups at baseline ($P = 0.287$) and 6 months ($P = 0.641$) was not significant. The difference in Group 1 was 2.37, whereas the difference in Group 2 was 2.687, and this difference between the Groups 1 and 2 was not statistically significant ($P = 0.284$) [Table 2, Graph 2, Figures 16-18].

Table 1: Intergroup and intragroup comparison of recession depth at baseline and 6 months

	Mean±SD		Meandiff±SD	Z	P
	Baseline	Six months			
Group 1	2.563±0.964	0.813±1.56	1.75±1.437	2.844	0.004 (HS)
Group 2	2.563±0.964	0.500±0.816	2.06±0.68	3.598	<0.001 (VHS)
Group 1 versus Group 2 (P)	1 (NS)	0.721 (NS)		Z*=0.311, P=0.756 (NS)	

*Z=Mann-Whitney U-test, Z=Wilcoxon signed rank sum test. PRF – Platelet rich fibrin; CTG – Connective tissue graft; SD – Standard deviation; NS – Non-significant; HS – Highly significant; VHS – Very highly significant; P<0.05 was considered statistically significant and; P<0.01 was considered highly significant; P<0.001 was considered very highly significant; P – value or probability value

Table 2: Intergroup and intragroup comparison of width of keratinized gingiva at baseline and 6 months

	Mean±SD		Meandiff±SD	Z	P
	Baseline	Six months			
PRF group	3.500±0.873	5.875±1.784	2.37±0.885	3.32	<0.001 (VHS)
CTG group	2.438±0.964	5.125±0.885	2.687±0.946	3.407	<0.001 (VHS)
PRF group versus CTG group (P)	0.287 (NS)	0.641 (NS)		Z*=1.072, P=0.284 (NS)	

*Z=Mann-Whitney U-test, Z=Wilcoxon signed rank sum test. PRF – Platelet rich fibrin; CTG – Connective tissue graft; SD – Standard deviation; NS – Nonsignificant; HS – Highly significant; VHS – Very highly significant; P<0.05 was considered statistically significant and; P<0.01 was considered highly significant; P<0.001 was considered very highly significant; P – value or probability value

**Figure 19: Preoperative**

Percentage of root coverage

The percentage of RC achieved was 83.25 and 86.43 in Groups 1 and 2, respectively. Intergroup comparison did not show any statistically significant difference, even though CTG group showed higher percentage of RC [Table 3, Graphs 3 and 4, Figures 19 and 20].

DISCUSSION

The current study was carried out for assessing the RC using VISTA with PRF and CTG. The study was carried out for a 6-month period. Evaluation of clinical parameters was performed for comparing the efficacy of the two treatment modalities. To our knowledge, the current study is the first randomized controlled clinical trial comparing VISTA with PRF and CTG. Available literature on combination techniques are case reports and case series.

Significant improvements in the results were observed in clinical parameters (PPD, CAL, RD, RW, and WKG) at 6 months postoperatively, on comparison to the baseline measurements. The significant reduction in PD in PRF group at 6 months was in accordance with case reports by Gupta *et al.*,^[6] and clinical

**Figure 20: Six-months follow up**

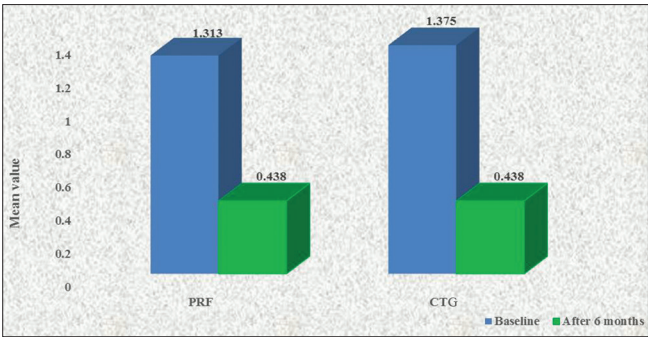
study by Chenchev *et al.*,^[7] Bherwani *et al.*,^[8] reported similar results when CTG was used in combination with Pouch and Tunnel technique.

Significant gain in mean RAL was noticed in PRF group at 6 months, Chenchev *et al.*,^[7] made a similar observation. In the present study, the CTG group also showed significant gain in mean RAL.

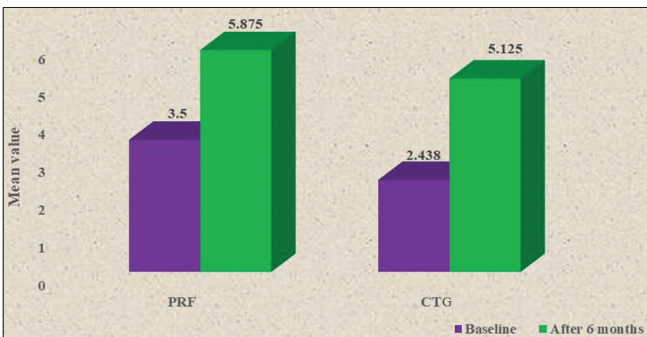
Remarkable reduction in RD was seen in both the groups, which is in accordance with case report by Reddy *et al.*,^[4] Gupta *et al.*,^[6] and Chenchev *et al.*,^[7] made similar observations using PRF with VISTA. Pini-Prato *et al.*,^[9] noticed significant reduction in RD when CTG was used with coronally advanced flap.

Significant reduction in RW in PRF group was in concurrence with study carried out by Chenchev *et al.*,^[7] Reduction in RW in CTG group was as observed by Uraz A *et al.*,^[10] Pini-Prato *et al.*,^[9] and Wegemund *et al.*,^[11] when CTG was used with coronally advanced flap.

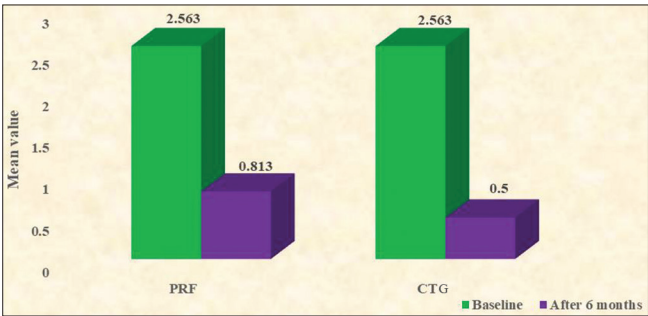
An optimal amount of WKG is essential to maintain the integrity of dentogingival junction. Mean increase in WKG in PRF group (5.75 mm) was similar to Gupta *et al.*,^[6] Chenchev *et al.*,^[7] and Onsu E *et al.*,^[12] Mean increase in WKG in CTG group was (5.125 mm) similar to Uraz A *et al.*,^[10] Mansouri *et al.*,^[13] and Fan *et al.*,^[14] Combination of VISTA with PRF and CTG resulted in increase of WKG and significant RC.



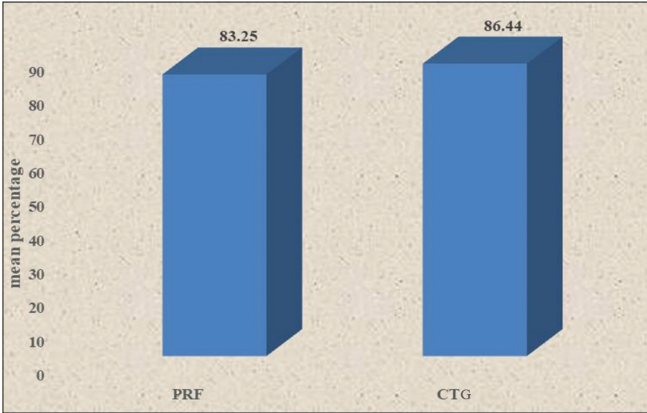
Graph 1: Intergroup and intragroup comparison of mean recession depth at baseline and 6 months. PRF – Platelet rich Fibrin, CTG – Connective tissue graft



Graph 2: Intergroup and intragroup comparison of mean width of keratinized gingiva at baseline and 6 months. PRF – Platelet rich Fibrin, CTG – Connective tissue graft



Graph 3: Comparison of percentage of root coverage between the groups. PRF – Platelet rich Fibrin, CTG – Connective tissue graft



Graph 4: Comparison of percentage of root coverage between the groups. PRF – Platelet rich Fibrin, CTG – Connective tissue graft

Table 3: Comparison of percentage of root coverage between the groups

Group	n	Mean	SD	Z
PRF group	16	83.250	25.027	0.401
CTG group	16	86.438	22.798	P=0.688 (NS)

PRF – Platelet rich fibrin; CTG – Connective tissue graft; NS – Nonsignificant; $P<0.05$ was considered statistically significant and; $P<0.01$ was considered highly significant; $P<0.001$ was considered very highly significant; n – Number of patients; SD – Standard deviation; Z – Wilcoxon signed rank sum test

In the present study, assessment of the gingival biotype was not an objective; however, an additional observation of increase in thickness of the gingival biotype in both the treatment groups was noted using visual method, which was in concurrence with the study carried out by Dayoub *et al.*,^[15] which concluded that CTG and PRF can be used as a successful treatment option for thin gingival biotype.

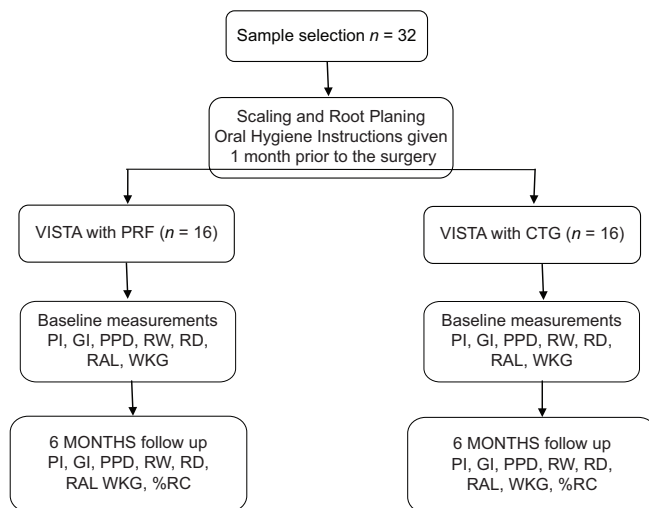
Success of RC depends on various factors such as anatomical features, periodontal status, flap design, tissue biotype, residual flap tension, and operator's skill. The mean RC in PRF group was 83.25% this is in agreement with Reddy *et al.*^[4] Chenchev *et al.*,^[7] Gupta *et al.*,^[6] Chatterjee *et al.*,^[16] Garg *et al.*^[17] and Rajeswari *et al.*,^[18] when VISTA was used with PRF. The mean percentage RC in CTG group was 86.43% similar to Uraz A *et al.*^[10] and Onsu E *et al.*,^[12] when PRF and CTG were used along with coronally advanced flap. Bherwani *et al.*^[8] and Wegemund *et al.*^[11] noted similar results when CTG was used with tunnel technique.

The original pouch and tunnel technique offered advantages such as optimal healing, adequate blood supply, and good

esthetics. However, there were few disadvantages such as insufficient graft coverage and limited ability to advance the flap coronally for RD >5 mm.^[5,13] These drawbacks can be overcome by VISTA technique, as the incisions are far from gingival margin and the detachments are subperiosteal that curtails the risk of marginal tissue loss. The coronalization of the flap is enhanced due to the subperiosteal tissue detachment which prevents stretching of the gingival margin while graft is being placed beneath the flap.^[13] VISTA introduced by Zadeh, used absorbable collagen membrane soaked in rhPDGF-BB/TCP composite.^[5]

The main feature of VISTA technique is the placement of remote incision which reduces the possibility of trauma to the soft tissue of teeth being treated.^[5,7] The success of VISTA depends on subperiosteal dissection, as the tension of gingival marginis was reduced while advancing it coronally and maintaining the interdental papillary integrity without reflection.^[5]

Grafting serves as a scaffold to support wound healing and provide better RC. Thus, this technique was further reinforced by PRF membrane and CTG which re-established the continuity and integrity of the keratinized gingiva and increases the gingival thickness.^[19] Connective tissue helps in better circulation, no immunologic reactions and cost-effectiveness. On comparison with previous studies, it is evident that whenever connective tissue is used, the amount of tissue gain and long-term stability are more predictable.^[13] PRF offers several advantages over other membranes or grafts as they release high



Flow Chart 1: VISTA – Vestibular incision subperiosteal tunnel access; PRF – Platelet Rich Fibrin; CTG – Connective Tissue Graft; PI – Plaque index; GI – Gingival index; PPD – Probing pocket depth; RAL – Relative attachment level; RW – Recession width; RD – Recession depth; WKG – Width of Keratinized gingiva; %RC – Percentage of root coverage; n – Number of patients

amount of growth factors which take part in soft tissue and hard tissue repair and regeneration, they play multiple vital roles in early wound healing, bone regeneration, hemostasis, development, maturation of a normal vasculature, cost effective, and eliminates any chances of immune reaction.^[7,20,21]

The vestibular incision brought about adequate blood supply and esthetics which are the prime considerations for the success of RC. In the maxillary esthetic zone, superior alveolar arteries, branches of the internal maxillary artery, run in a superior-inferior orientation. Therefore, a vertically oriented initial incision will less likely disrupt the blood supply than horizontally positioned incisions. The major advantage of present technique is reduction of micromotion, since there is the displacement of gingival margin during facial movement of the flap.^[5] There was no visible scarring of the soft tissue as the tunnel entrance was made within the maxillary frenum which is critical for esthetic outcome.^[5]

However, long-term studies are essential for evaluating the stability and success of VISTA technique to assess the predictability over the other techniques. For future studies, pin hole technique can be used which works on the principle of MIS.

CONCLUSION

VISTA is a technique that is considered to be minimally invasive, which may be considered for the successful treatment of multiple recession defects. In the current study, VISTA in combination with PRF and CTG has demonstrated significant increase in WKG and mean RC. Although VISTA has been used in other regions, its application is most advantageous in the esthetic zone. The Mean %RC in PRF group was 83.25% and CTG group was 86.43%, both techniques showing promising results. Although CTG being the gold standard of the soft-tissue grafting procedures, PRF being rich in growth factors, when used in combination with VISTA can be an alternative for treating multiple gingival recession defects.

Declaration of patient consent

All the study participants provided informed consent for images and other clinical information being reported in the journal.

Acknowledgment

We would like to thank all the participants of the study, teaching and nonteaching staffs of the department, all the postgraduate students for helping to complete the study.

Financial support and sponsorship

This study was financially supported by Indian council of medical research (ICMR) awarded a grant for conducting this study.

Ref no-3/2 June-2017/PG-Thesis-HRD (60) Dated-13.03.2018

Conflicts of interest

There are no conflicts of interest

REFERENCES

1. Sawai ML, Kohad RM. An evaluation of a periodontal plastic surgical procedure for the reconstruction of interdental papillae in maxillary anterior region: A clinical study. *J Indian Soc Periodontol* 2012;16:533-8.
2. Roman A, Louise F, Barek M, Brunel-Troabas S. Gingival recessions: epidemiologic, etiologic and therapeutic aspects. *Internet J Dent Sci* 2008;7:1-11.
3. Shkreta M, Atanasovska-Stojanovska A, Dollaku B, Belazelkoska Z. Exploring the gingival recession surgical treatment modalities: A literature review. *Open Access Maced J Med Sci* 2018;6:698-708.
4. Reddy S, Prasad MG, Bhowmik N, Singh S, Pandit HR, Vimal SK. Vestibular incision subperiosteal tunnel access (VISTA) with platelet rich fibrin (PRF) and connective tissue graft (CTG) in the management of multiple gingival recession – A case series. *Int J Appl Dent Sci* 2016;2:34-7.
5. Zadeh HH. Minimally invasive treatment of maxillary anterior gingival recession defects by vestibular incision subperiosteal tunnel access and platelet-derived growth factor BB. *Int J Periodontics Restor Dent* 2011;31:653-60.
6. Gupta G, Puri K, Bansal M, Khatri M, Kumar A. Platelet-rich fibrin (PRF) Reinforced vestibular incision subperiosteal tunnel access (VISTA) technique for recession coverage. *Clin Adv Periodontics* 2015;5:248-3.
7. Chenchev IV, Neichev D, Vicheva D, Atanasov D, Noncheva V. Vista technique and platelet rich fibrin membrane for treatment of multiple adjacent Gingival recession-6 months follow up. *IOSR J Dent Med Sci* 2016;15:73-8.
8. Bherwani C, Kulloli A, Kathariya R, Shetty S, Agrawal P, Gujar D, *et al.* Zucchelli's technique or tunnel technique with subepithelial connective tissue graft for treatment of multiple gingival recessions. *J Int Acad Periodontol* 2014;16:34-42.
9. Pini-Prato GP, Cairo F, Nieri M, Franceschi D, Rotundo R, Cortellini P. Coronally advanced flap versus connective tissue graft in the treatment of multiple gingival recessions: A split-mouth study with a 5-year follow-up. *J Clin Periodontol* 2010;37:644-50.
10. Uraz A, Sezgin Y, Yalim M, Taner IL, Cetiner D. Comparative evaluation of platelet-rich fibrin membrane and connective tissue graft in the treatment of multiple adjacent recession defects: A clinical study. *J Dent Sci* 2015;10:36-45.
11. Wegemund MC, Mlynarczyk BW, Tanasiewicz M, Gilowski Ł. Tunnel technique with collagen matrix compared with connective

- tissue graft for treatment of periodontal recession: A randomized clinical trial. *J Periodontol* 2016; 87:1436-43.
12. Oncu E. The use of platelet-rich fibrin versus subepithelial connective tissue graft in treatment of multiple gingival recessions: A randomized clinical trial. *Int J Periodontics Restorative Dent* 2017;37.
13. Mansouri SS, Moghaddas O, Torabi N, Ghafari K. Vestibular incisional subperiosteal tunnel access versus coronally advanced flap with connective tissue graft for root coverage of Miller's Class I and II gingival recession: A randomized clinical trial. *J Adv Periodontol Implant Dent* 2019;11:13-20.
14. Fan KA, Zhong JS, Ouyang XY, Xie Y, Chen ZY, Zhou SY, *et al.* Vestibular incision subperiosteal tunnel access with connective tissue graft for the treatment of Miller class I and II gingival recession. *Beijing Da Xue Xue Bao Yi Xue Ban* 2019;51:80-85
15. Dayoub S, Al-Qershi M. The role of platelet- rich fibrin in increasing the gingival thickness and modifying the thin gingival biotype: A comparative clinical split mouth study. *Dent Hypotheses* 2019;10:34-49.
16. Chatterjee A, Sharma E, Gundanavar G, Subbaiah SK. Treatment of multiple gingival recessions with vista technique: A case series. *J Indian Soc Periodontol* 2015;19:232-5.
17. Garg S, Arora SA, Chhina S, and Singh P. Multiple gingival recession coverage treated with vestibular incision subperiosteal tunnel access approach with or without platelet-rich fibrin - A case series. *Contemp Clin Dent* 2017;8:464-8.
18. Raja Rajeswari S, Kumar TA, Gowda TM, Mehta DS, Kumar A. Management of multiple gingival recessions with the VISTA technique: An 18-month clinical case series. *Int J Periodontics Restorative Dent* 2018;38:245-51.
19. Saket K, S.M Rekha, R.G Sushama. Management of multiple gingival recession defects in aesthetic zone with vista technique: A case report. *Br J Pharm Med Res* 2019;02:1660-6.
20. Koshy SB, Mahendra J, Rajaram V. Platelet rich fibrin reinforced vestibular incision subperiosteal tunnel access (VISTA) for multiple root coverage. A case report *J COPS* 2016;1:116-9.
21. Monica GS, Verma RK, Brar V, Latha H, Biir MSM. Vista technique with platelet rich fibrin - A case report. *Int J Contemp Med Res* 2018;5:110-2.