

Accepted Manuscript

Published online: 26 Sept. 2026

Doi: 10.34172/japid.4286

Submitted: 27 Feb. 2026

Revised: 20 Aug. 2026

Accepted: 23 Aug. 2026

Original Article

Comparison of VISTA technique versus saddle flap technique with A-PRF for treatment of multiple gingival recessions

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Abstract

Background. Root coverage procedures are important components in treating gingival recessions. Multiple gingival recessions are the most difficult situation. For several reasons, this issue is important for patients and dentists. At the same time, new surgical techniques for treating multiple gingival recessions are available. Thus, this study examined and compared clinical outcomes of root coverage using VISTA and saddle flap methods with advanced platelet-rich fibrin (A-PRF) in treating various gingival recessions.

Methods. In this randomized, prospective, split-mouth clinical trial, 108 Miller class I/II recession defects in 20 patients were treated with either the VISTA with A-PRF technique or the saddle flap with A-PRF technique. Some clinical parameters such as recession depth (RD), recession width (RW), width of keratinized tissue (WKT), thickness of keratinized gingiva (TKG), the percentage of root coverage, and complete root coverage were evaluated before, 3 months after, and 6 months after surgery.

Results. Both groups showed favorable outcomes for the clinical parameters examined. In this respect, a statistically significant difference was observed in treatment efficiency between the A-PRF method using the VISTA method and the saddle procedure.

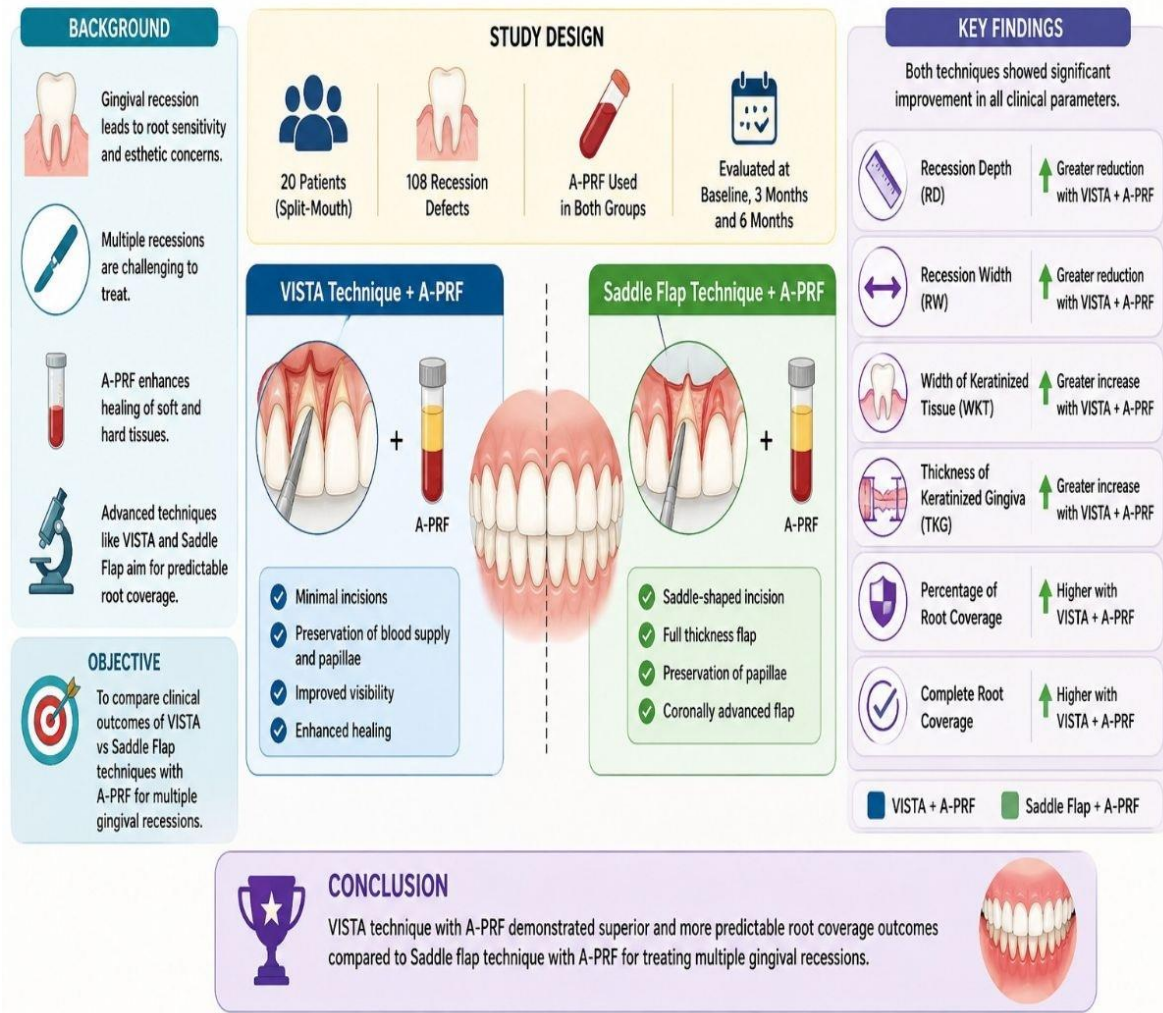
Conclusion. VISTA with A-PRF showed predictable results in terms of all the root coverage parameters compared to the saddle flap technique with A-PRF.

Trial registration: Clinical Trials Registry- India [CTRI/2021/07/034844].

Graphical Abstract

VISTA vs Saddle Flap with A-PRF for Multiple Gingival Recessions

A Randomized Split-Mouth Clinical Trial



Keywords: A-PRF, gingival recession, root coverage, saddle flap, VISTA.

Introduction

Gingival recession refers to the displacement of the gingival margin below the cutting edge of the tooth (root) where the root is protected (cemento-enamel junction [CEJ]). This event causes sensitivity due to tooth exposure and leads to unfavorable periodontal cosmetic results.¹ The primary instigating elements contributing to gingival recessions encompass the accumulation of calculus, malocclusion, aberrant frenulum attachment and muscular tension, diminished vestibular depth, improper brushing techniques, presence of intraoral piercings, and occurrences of trauma.²

In periodontal plastic surgery, the goal is to achieve satisfactory, stable root coverage with proper positioning of the tissue margin at the CEJ, while also increasing the width of the keratinized gingiva.³ Although several procedures have been suggested for treating single receding gums, treatment of multiple areas continues to be a problem. Various tunnel techniques capable of preserving papilla integrity have proved efficient in treating multiple receding areas too, but such processes are sensitive to their application and are injurious to

the sulcular epithelium, ending in bad healing process.^{4,5}

As the method offers better access to the mouth while limiting the required incisions, the new method known as VISTA was invented to address issues related to the application of such techniques. Using the coronally advanced flap (CAF) technique ensures predictable root coverage because the tissue moves coronally over the root surface.^{6,7}

A modification of the CAF design, the saddle flap technique offers unique benefits for achieving the best possible root coverage. The incision takes on the shape of a 'horse saddle,' allowing the clinician to raise a full-thickness flap and cut away some part of the attached gingiva. As a result, the papilla's integrity can be preserved. Periodontal regeneration still has several challenges, and biologics have become a crucial part of it. One of the first second-generation platelet concentrates is PRF, made of the patient's own blood, and was developed by Choukroun et al.⁸ in 2001.

A-PRF is an upgraded PRF that supports restoration of both soft and hard tissue. As such, there was justification for applying A-PRF here, as its benefits seem important at this point. The root coverage technique is complicated and necessitates a high degree of surgical skill and professional knowledge. Therefore, such methods should be carried out under a surgical microscope to increase effectiveness and promote optimal healing by minimizing incisions, reducing complications, and improving ergonomics for the dentist.⁹

Although many studies have been published on the VISTA technique since its introduction,¹⁰⁻¹² only one research paper was found, making it hard to assess how predictable the saddle flap method is for root coverage, even though this study focused only on single-root coverage. Thus, the current study analyzed the efficacy of the VISTA technique with an A-PRF membrane and the saddle flap technique with an A-PRF membrane for treating multiple gum recessions. Twenty patients with 108 gingival recession defects participated in the investigation.

Methods

This clinical study used a split-mouth randomized design to compare the A-PRF membrane with the Vista method versus the saddle flap with an A-PRF membrane. The study was performed at the Periodontics Outpatient Department of the Vishnu Dental College, Bhimavaram, from 1st January, 2021 to 31st March, 2021. IEC and Ethics Committee approval for the study was obtained in the form of "IECVDC/2021/PG01/PI/IVV/18" and "CTRI/2021/07/034844," respectively.

Sample Size Determination

Recession depth (RD) was specified as the primary outcome for the sample-size calculation, based on $\alpha=0.05$, 80% power, and Cohen's $d=0.99$ using G*Power 3.1.9.4. The calculated minimum sample size was 17 patients, and 20 patients were recruited.

Selection Criteria

Patients who met the inclusion and exclusion criteria were selected for the study (Figure 1). Only those patients who were 18–60 years old and had a healthy periodontium were recruited, and those who were systemically healthy, had no contraindications for periodontal surgery, as well as ≥ 2 adjacent Miller's class I and class II recessions. Pregnant and lactating female patients, as well as those patients who used any medications affecting the status of the gums, were ruled out.

This clinical study used a split-mouth randomized design, requiring every participant to undergo both treatment types: one type on one side and the other on the other side of the same mouth, with treatment allocation determined randomly using a laptop. Overall, 108

cases of class I/II Miller classification recession were treated, with 54 cases assigned to each treatment group.

Randomization was achieved through computer-based random allocation. To ensure secrecy, group assignments were placed in numbered, sealed envelopes prepared by a person not involved in the study. The envelope with the group assignment was opened just before surgery, so the surgeon did not know which group the patient was assigned to. In this split-mouth study, the treatment allocated to one side of the mouth (VISTA with A-PRF group) was similar to that on the other side of the mouth, where saddle flap with A-PRF was performed, according to the randomization scheme.

Blinding

In the current study, blinding was used to avoid bias during subjective data collection, such as clinical parameter measurements. For this study, it was not possible to blind the surgeons because surgery itself is the main intervention being performed on patients. Outcome assessors were blinded because they did not undergo any treatment and were unaware of the kind of surgical technique used for patients on either side of the study.

Clinical Parameters

Case history taking, including dental and medical history, used a structured questionnaire with the indicators described below.

It contained a full-mouth plaque index (FMPS) according to Silness and Loe's study dating back to 1964, gingival index (GI) which was created by Loe and Silness in 1963, probing pocket depth (PPD), clinical attachment level (CAL), recession depth (RD), recession width (RW), keratinized tissue width (WKT), gingival thickness (TKG), mean percentage of root coverage (%RC) and complete root coverage (CRC).

Clinical parameters were recorded at baseline, 3 months, and 6 months using the UNC 15 probe.

Surgical Procedure

The procedure was performed under local anesthesia using 2% lignocaine with adrenaline at 1:200,000 dilution. 20 mL of venous blood was taken from the patient and centrifuged on a table-top fixed-angle centrifuge at 1300 RPM for 14 minutes at 200 g. A-PRF was separated and transformed into membranes using a sterile PRF box.

VISTA Procedure

Parameters were measured before the surgical procedure. The approach, under anesthesia, started with an incision in the vestibular region. Next, an incision was made through the periosteum to establish a tunnel below it; this tunnel was created for some gingival recession cases. The A-PRF membrane was placed along with the application of suspensory sutures (Figure 2).

Saddle Flap Technique

Parameters were measured before surgery. Under local anesthesia, an intra-sulcular saddle flap technique was undertaken along with a horizontal saddle cut in neighboring teeth. Split-thickness elevation with oblique incision was performed 2 mm sub-marginally in adjacent teeth. Split-thickness elevation was performed after the MGJ (Figure 3e). A-PRF membrane was used, and stitches were taken (Figure 3).

Post-surgical measurements were taken at periodontal recalls at 3 and 6 months (Figures 2 and 3).

Patients' responses were assessed using a questionnaire on discomfort and dentin hypersensitivity during treatment, rated on a VAS scale of 1 to 10.

Statistical Analysis

The collected data were analyzed using descriptive and inferential statistics. Means and standard deviations were used to summarize the continuous clinical parameters. Since this randomized split-mouth study included multiple recession defects in the same patient, the patient was considered the experimental unit. Although 108 recession defects were included in the study, the individual defects were considered clinical sites nested in patients and were not assumed to be statistically independent.

To account for the correlation among multiple defects within the same patient and the repeated measurements obtained at baseline, 3 months, and 6 months, a linear mixed-effects model was used for the continuous clinical outcomes, including recession depth (RD). Patients were included as a random effect, while treatment group (VISTA with A-PRF versus Saddle flap with A-PRF), time (baseline, 3 months, and 6 months), and treatment $\times$ time interaction were included as fixed effects. Thus, the analysis accounted for the hierarchical structure of the data and did not treat the 108 recession defects as 108 independent participants. Statistical significance was set at $P < 0.05$. Statistical analysis was performed using SPSS 25.0 (IBM Corp.).

Results

The participants ranged in age from 21 to 58 years, with a median age of 39.5 years. The sample included 14 male and 6 female patients, accounting for 70% and 30% of the total sample size, respectively. The patients were included in the study after recording 108 recession defects in total. The study included patients with 54 recession defects treated with VISTA and 54 defects treated with the saddle flap technique. During the study period, there were no dropouts. The results showed that all percentages and indices of periodontal disease, such as GI, PI, and periodontal parameters PI and PPD, remained stable up to three and six months after surgery. No complications, bleeding, or pain were recorded throughout the study.

Both groups had similar parameter values, as shown by the baseline comparability statistics in Tables 1 and 2; Table 3 shows the intergroup comparisons of the parameters. PPD, CAL, PI, and GI also showed some significant differences, indicating a substantial mean reduction in both parameters in both groups; therefore, these were not a concern. However, RD and RW were significantly reduced, favoring the VISTA with A-PRF group.

Discussion

Despite dozens of published articles on VISTA surgery, little information exists on saddle flap surgery for treating multiple gingival recessions. Therefore, our task was to determine the results of the saddle procedure compared with VISTA.^{13–15}

In the VISTA and saddle groups for multiple gingival recessions, both groups showed a decrease in GR, GI, and PI indices from baseline to the 6th month of the experiment. The VISTA group showed a drastic decline in PPD from baseline to the end of the 6th month, consistent with results reported by Chenchav et al.¹⁰ and Subbareddy et al.¹¹ In the VISTA group, CAL increased from baseline to the 6th month, compared with other population studies.

The results clearly showed that the average RD and RW dropped significantly from baseline to 6 months in the VISTA group subjects. This outcome matches results reported by other scientists studying VISTA technique use in multiple gingival recession cases.

WKT and TKG improved after 6 months of treatment in the VISTA group, consistent with results reported in previous studies. According to the authors, it may have happened due to the use of A-PRF, which enhances the proliferation of fibroblasts and improves tissue perfusion.¹⁶⁻¹⁸

The average percentage of RC for the VISTA group in this research was 96%, which is also in line with the previous research by Chenchev et al.,¹⁰ who reported 87.10 ± 8.92 at the end of the sixth month and Subbareddy et al.,¹¹ who obtained 83 ± 8.76 at the end of the sixth month. Garget et al.¹⁸ also reported 100% root coverage in a case series after six months.

This study showed that 87% of defect sites achieved CRC, which differs from the research conducted by Subbareddy et al.¹¹ (30.3%). Garg et al.¹⁸ (62.5%), Rutuja et al.¹⁹ (91.5%), and Kamal et al.²⁰ (82%) reported results consistent with this study.

Miller has well documented that class I and class II recessions have a better prognosis. It is equally important that embrasures next to the lesion be restored by the interdental papilla. All treated sites in this study were free of occlusal trauma, which may have contributed to successful root coverage.²¹⁻²³

However, in the saddle group, statistically significant improvements were noted in PPD (from baseline to 6 months), CAL (from baseline to 6 months), and the mean RD and RW (from baseline to 6 months). In the saddle group, WKT and TKG were significantly better from baseline to 6 months. It is consistent with a study by Rajeswari et al.⁷ on GR patients where PPD significantly decreased from 1.50.53 mm in baseline to 1.20.42 mm in 6 month; CAL decreased from 3.950.83 mm in baseline to 1.350.53 mm in 6 month; RD reduced from 2.450.60 mm in baseline to 0.150.24 mm in 6 month, and RW reduced from 1.150.10 mm in baseline to 0.410.21 mm in 6 month.

The mean percentage of root coverage was 86.812% in the present study, similar to values reported by other authors (98%). Complete root coverage was achieved in 29/54 defects (53.7%) in the saddle flap + A-PRF group and 47/54 defects (87.0%) in the VISTA + A-PRF group, with a statistically significant inter-group difference ($\chi^2 = 12.83$, $P = 0.0003$). The parameters improved with a 2-mm submarginal angled incision rather than a vertical incision, resulting in decreased blood loss and improved healing.²⁴

Surprisingly, unexpected significance was also found in the VISTA group compared with the saddle group for RD, RW, WKT, and TKG. One possible reason for this phenomenon is the restricted size of the incision performed subperiosteally with wide soft tissue dissection in order to prevent any pull.

When comparing different groups, VISTA yielded much better root coverage results than the saddle flap technique. This may be because VISTA forms a tunnel under the skin through a different incision in the mouth, allowing conservation of the tissue margins without additional cuts through the recessions.^{24,25}

In contrast, while the saddle flap method aims to preserve papillae and maintain the interdental arterial plexus, the split-full-split technique and coronal repositioning still require more marginal tissue manipulation than the minimally invasive tunnel technique. This highlights the potential role of flap design, tissue biomechanics, and wound stability in explaining differences in root coverage, rather than vascularity alone.²⁴

The surgical intervention was performed using a surgical microscope, which enhanced traditional surgical methods through careful soft tissue handling, precise cuts, consistent flap division, and wound closure, resulting in a more pleasant postoperative experience for the patient.²⁵

Strengths of the Study

Since the entire procedure was performed under a surgical operating microscope, the main advantage was improved wound healing and patient comfort, achieved through precise cuts,

limited hand movements, and strong ergonomic benefits. The current study is the first one in which a split-mouth study with 20 patients, namely 108 Miller class I and II gingival recessions, was performed.

Limitations

This prediction was described only in one paper concerning isolated recessions. Further research on the efficacy and stability of the treatment seems necessary.

Conclusion

Compared with the saddle flap technique with the A-PRF group, VISTA with A-PRF yielded better results across all parameters considered, including greater reduction in recession depth and width, greater clinical attachment level gain, improved keratinized tissue, and increased gingival thickness.

Acknowledgments

The clinical work of this thesis study was carried out in the Department of Implantology, Vishnu Dental College, Bhimavaram, Andhra Pradesh, India.

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Writing—review and editing: Naga Sravanthi Vundavalli, Gautami Subhadra Penmetsa, Sruthima Naga Venkata Satya Gottumukkala, Mohan Kumar Pasupuleti, Anusha Boddeda, Dinesh Gera, Bhavya Manchala, and Manisha Beldhi

Competing Interests

The authors do not have any financial interests, either directly or indirectly, in the products or information listed in the paper.

Data Availability

All the data related to the current research is available in the manuscript. No additional information is available in other sources.

Ethical Approval

The study was approved, and ethical clearance was obtained from the Institutional Ethics Committee of Vishnu Dental College with Ref No: IECVDC/2021/PG01/PI/IVV/18.

Funding

This study was self-funded by the student [NSV] and received no specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Table 1. Comparison of different parameters within the saddle group

Parameter	Time intervals	Mean	SD	P-value
Plaque index score	Baseline	1.66	0.25	<0.001* ^a
	3 months	0.67	0.09	
	6 months	0.43	0.08	
Gingival index score	Baseline	1.57	0.10	<0.001* ^a
	3 months	0.62	0.11	
	6 months	0.39	0.06	
Probing pocket depth (mm)	Baseline	2.75	0.28	<0.001* ^a
	3 months	2.40	0.30	
	6 months	2.03	0.33	
Clinical attachment level (mm)	Baseline	5.54	0.80	<0.001* ^a
	3 months	3.30	0.62	
	6 months	2.60	0.56	
Recession depth (mm)	Baseline	2.07	0.75	<0.001* ^a
	3 months	0.49	0.57	
	6 months	0.30	0.44	

Recession width (mm)	Baseline	4.61	1.55	<0.001* ^a
	3 months	1.72	2.07	
	6 months	1.72	2.07	
Width of Keratinized Tissue (mm)	Baseline	2.77	0.92	<0.001* ^a
	3 months	3.21	0.63	
	6 months	3.21	0.63	
Thickness of keratinized gingiva (mm)	Baseline	0.87	0.03	<0.001* ^a
	3 months	1.35	0.120	
	6 months	1.45	0.10	
Pain VAS score	During surgery	0.25	0.44	0.209 ^b
	After surgery	0.33	0.47	
Dentinal hypersensitivity	Pre-surgery	8.51	1.31	<0.001* ^b
	Post-surgery	1.16	0.96	
Root coverage (Percentage)	-	86.81	23.03	-

*statistically significant, ^arepeated-measures ANOVA, ^bpaired t-test

Table 2. Comparison of different parameters within the VISTA group

Parameter	Timeintervals	Mean	SD	P-value
Plaque index score	Baseline	1.65	0.25	<0.001*\$
	3 months	0.64	0.07	
	6 months	0.43	0.07	
Gingival index score	Baseline	1.57	0.09	<0.001*\$
	3 months	0.59	0.10	
	6 months	0.41	0.06	
Probing pocket depth (mm)	Baseline	2.74	0.28	<0.001*\$
	3 months	2.42	0.30	
	6 months	2.06	0.33	
Clinical attachment level (mm)	Baseline	5.48	0.64	<0.001*\$
	3 months	3.28	0.61	
	6 months	2.96	0.53	
Recession depth (mm)	Baseline	2.11	0.65	<0.001*\$
	3 months	0.16	0.46	
	6 months	0.16	0.46	
Recession width (mm)	Baseline	4.96	1.46	<0.001*\$
	3 months	0.70	1.89	
	6 months	0.70	1.89	
Width of Keratinized Tissue(mm)	Baseline	2.18	0.82	<0.001*\$
	3 months	2.60	0.56	
	6 months	2.60	0.56	
Thickness of keratinized gingiva (mm)	Baseline	0.88	0.05	<0.001*\$
	3 months	1.57	0.09	
	6 months	1.68	0.06	

Pain VAS score	During surgery	0.21	0.41	1.000
	After surgery	0.21	0.41	
Dentinal hypersensitivity	Pre-surgery	8.60	1.35	<0.001* [#]
	Post-surgery	1.10	1.01	
Root coverage (Percentage)	-	96.00	16.00	-

*statistically significant, §repeated-measures ANOVA, [#]paired t-test

Table 3. Inter group comparisonsof different parameters

Parameter	Time interval	Saddle flap + A-PRF Mean ± SD	VISTA + A-PRF Mean ± SD	Inter-group P-value
Plaque index score	Baseline	1.67±0.25	1.66±0.25	0.881
	3 months	0.67±0.09	0.64±0.07	0.134
	6 months	0.43±0.08	0.43±0.07	0.725
Gingival index score	Baseline	1.57±0.10	1.57±0.09	0.955
	3 months	0.62±0.11	0.59±0.10	0.114
	6 months	0.39±0.06	0.41±0.06	0.078
Probing pocket depth (mm)	Baseline	2.75±0.28	2.74±0.28	0.832
	3 months	2.40±0.30	2.42±0.30	0.759
	6 months	2.03±0.33	2.06±0.33	0.604
Clinical attachment level (mm)	Baseline	5.54±0.80	5.48±0.64	0.726
	3 months	3.30±0.62	3.28±0.61	0.773
	6 months	2.60±0.56	2.96±0.53	0.001
Recession depth (mm)	Baseline	2.07±0.75	2.11±0.65	0.735
	3 months	0.49±0.57	0.16±0.46	0.002
	6 months	0.30±0.44	0.16±0.46	0.118
Recession width (mm)	Baseline	4.61±1.55	4.96±1.46	0.183
	3 months	1.72±2.07	0.70±1.89	0.011
	6 months	1.72±2.07	0.70±1.89	0.011
Width of keratinized tissue (mm)	Baseline	2.77±0.92	2.18±0.82	<0.001
	3 months	3.21±0.63	2.60±0.56	<0.001
	6 months	3.21±0.63	2.60±0.56	<0.001
Thickness of keratinized gingiva (mm)	Baseline	0.87±0.03	0.88±0.05	0.169
	3 months	1.35±0.12	1.57±0.09	<0.001
	6 months	1.45±0.10	1.68±0.06	<0.001
Pain VAS score	During surgery	0.25±0.44	0.21±0.41	0.656
	After surgery	0.33±0.47	0.21±0.41	0.201
Dentin hypersensitivity	Pre-surgery	8.51±1.31	8.60±1.35	0.720
	Post-surgery	1.16±0.96	1.10±1.01	0.772
Root coverage (%)	6 months	86.81±23.03	96.00±16.00	<0.001

Complete root coverage, n (%)	6 months	29/54 (53.7%)	47/54 (87.0%)	0.0003*
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*Welch's independent-samples t-test

CONSORT 2010 flow diagram

Enrollment

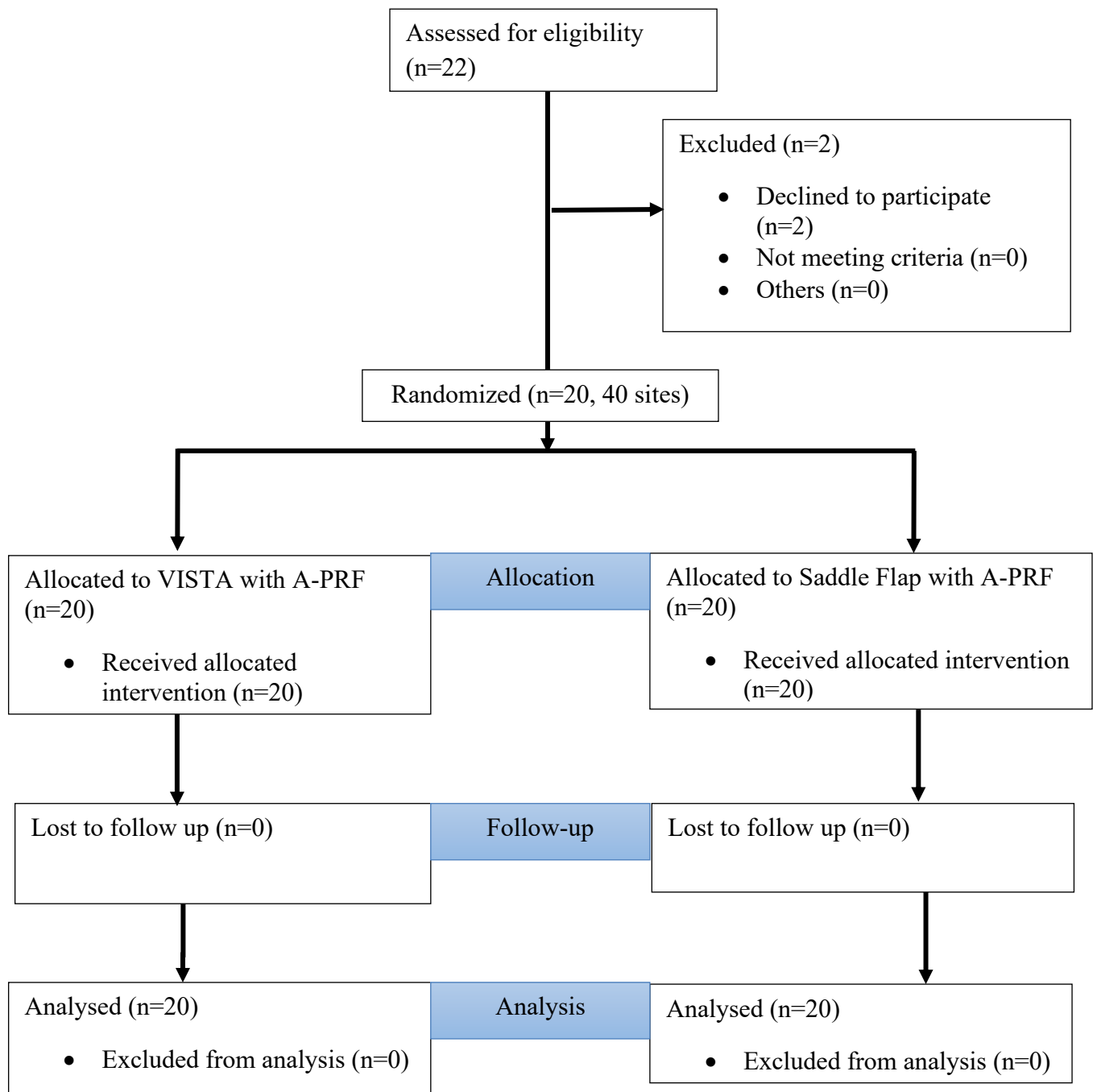


Figure 1. CONSORT flow chart.



Figure 2. VISTA technique. a) Preoperative view showing a recession depth of 2 mm, irt 35; b) Preoperative view showing a recession width of 5 mm, irt 35; c) Access incision given in the vestibule; d) Subperiosteal tunnel prepared, irt 35, 36; e) A-PRF membrane prepared using Choukron's protocol; f) A-PRF membrane placed in the tunnel; g) Stabilizing sutures placed using Monocryl 5-0, composite stops placed; h) Periodontal dressing placed; i) 3-month postoperative view showing a recession depth of 0.5 mm, irt 35; j) 3-month postoperative view showing a recession width of 2 mm, irt 35; k) 6-month postoperative view showing a recession depth of 0 mm, irt 35; l) 6-month postoperative view showing a recession width of 2 mm, irt 35.

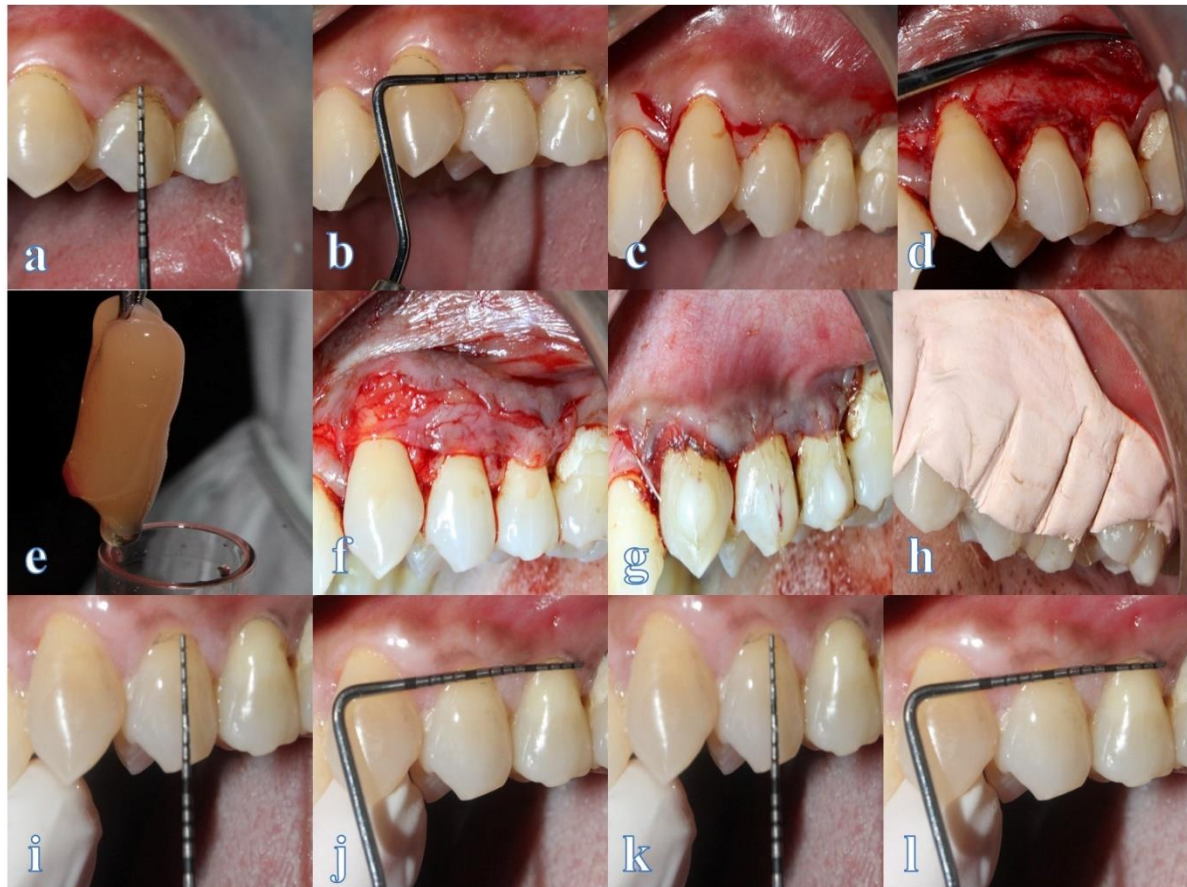


Figure 3. Saddle flap technique. a) Preoperative view showing a recession depth of 2 mm, irt 24; b) Preoperative view showing a recession width of 5 mm, irt 24; c) Intrasulcular and horizontal saddle incision given, irt 23, 24, and 25; d) Full split-thickness flap is elevated, irt 23, 24, and 25; e) A-PRF membrane prepared using Choukron's protocol; f) A-PRF membrane placed and stabilized, irt 23, 24, and 25; g) Stabilizing sutures placed using Monocryl 5-0, composite stops placed; h) Periodontal dressing placed; i) 3-month postoperative view showing a recession depth of 0 mm, irt 24; j) 3-month postoperative view showing a recession width of 0 mm, irt 24; k) 6-month postoperative view showing a recession depth of 0 mm, irt 24; l) 6-month postoperative view showing a recession width of 0 mm, irt 24.