RESEARCH PAPER

Clinical Evaluation of Sticky Bone Efficacy with Coronally Advanced Flap in the Treatment of Type 1 Gingival Recession (Randomized Clinical Trial)

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ABSTRACT

Background:

The major required outcomes for any Gingival Recession (GR) treatment are maximum root coverage and pleasing esthetics. Traditional soft-tissue-only treatments like the Coronally Advanced Flap (CAF) are challenging to maintain stability throughout time. Sticky bone is a composite of patient blood concentrates (e.g., injectable platelet-rich fibrin (i-PRF)) and bone particles. It offers a stable, moldable scaffold to restore these gingival tissue defects.

Aim:

To assess the sticky bone effect with CAF in the management of type 1 GR.

Patients and Methods:

Thirty isolated type 1 GR defects were randomly allocated into two groups. The test group underwent CAF and sticky bone treatment, whereas only CAF was done to the control group.

Results:

Both groups developed significant improvement at 6 months' follow-up in all clinical outcomes from the baseline. However, the addition of sticky bone to CAF resulted in superior outcomes in comparison to CAF alone.

Conclusion:

The adjunctive use of sticky bone with CAF led to superior clinical outcomes in comparison to CAF alone.

Keywords: Gingival recession, PRF, Sticky bone, Root coverage

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Introduction

GR is a prevalent clinical issue defined by the downward movement of the gingival edge in respect to the CEJ, leading to root exposing (1). This condition is linked to various causative factors, as periodontal disease, improper tooth brushing techniques, a thin gingival biotype, and specific anatomical characteristics (2, 3).

GR not only presents an esthetic concern, particularly in the anterior area, but might also result in dentin hypersensitivity, root caries, and difficulties in maintaining adequate dental hygiene. The exposure of the root surfaces due to GR can lead to discomfort and

increased vulnerability to decay. Furthermore, individuals with advanced GR may experience a decline in self-esteem and confidence due to the visibility of their dental issues, highlighting the importance of preventive and therapeutic measures in dental practice (4).

Cairo et al. classified recession defects (RT) into three classes based on clinical attachment loss at interproximal areas measured from CEJ. RT1: a recession defect with no interproximal CAL. RT2: a recession defect with interproximal CAL that is less than or equal to facial CAL. RT3: a recession defect that is more than interproximal CAL (5).

Various surgical techniques were introduced to control GR defects, aiming to achieve root coverage, increase keratinized tissue width, and improve esthetic outcomes. Among these, the CAF technique is widely recognized as a predictable and less invasive technique, especially in type 1 GR defect management (6, 7)

Current systematic reviews confirm that the CAF is a reliable way for securing complete root coverage (CRC). Furthermore, combining CAF with a connective tissue graft (CTG) is regarded as the benchmark for GR management. Nonetheless, utilizing an autogenous CTG remains problematic; harvesting the graft requires a secondary surgical donor site, which directly increases patient morbidity, prolongs procedure duration, and introduces risks of intraoperative bleeding or postoperative paresthesia(8).

To overcome those drawbacks in recent years, regenerative approaches were introduced to enhance the results of conventional periodontal plastic surgery. One such approach involves the use of "sticky bone," a graft substance made by mixing particulate bone graft with autologous fibrin, resulting in a cohesive and moldable matrix (9). Sticky bone is thought to promote angiogenesis, improve graft stability, and enhance tissue regeneration, potentially leading to superior clinical outcomes compared to conventional techniques alone(10).

Incorporation of i-PRF provides clinicians with a liquid platelet concentrate. It can be utilized by itself or easily mixed with different biomaterials. By utilizing slower centrifugation speeds for a shorter duration, i-PRF has more regenerative cells and elevated levels of growth factors like Platelet-Derived Growth Factor (PDGF), Transforming Growth Factor-Beta (TGF-β), and Vascular Endothelial Growth Factor (VEGF) as well as collagen1. Also, it was found increasing of fibroblast by 270% when cultured with i-PRF (11).

Despite the increasing interest in combining the CAF technique with biomaterials like sticky bone, there remains a lack of substantial evidence directly comparing the effectiveness of these methods when addressing GR. Thus, this study aims to assess and compare the clinical outcomes of GR treatment using only CAF versus CAF in conjunction with sticky bone.

Patients and methods:

Ethical regulations:

Prior to enrolment in the trial, all patients were given a thorough explanation of the entire treatment plan, including specific stages, risks, and predicted outcomes, and their full signed consent. The study followed the guidelines established by the International Conference on Harmonization Good Clinical Practice Guidelines, the Declaration of Helsinki, and the research ethics committee of the Faculty of Dentistry, Minia University, which approved the research proposal at its 102 committee meeting with decision number 870. The current study was designed as a controlled clinical trial, double-blind, parallel arm, randomized, that was registered at ClinicalTrials.gov (NCT06871475) and was outlined in the CONSORT statement. figure 1 (http://www.consort-statement.org/)

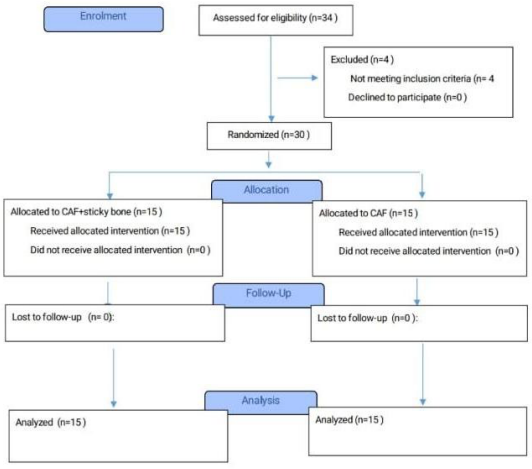


Figure 1: CONSORT 2025 Flow Diagram

Patient selection:

This study included 30 isolated defects with GR in anterior or premolar region. All patients with Cairo's RT1 defects were be selected from the Oral Medicine, Oral Diagnosis, and Periodontology Department outpatient clinics. Faculty of Dentistry, Minia University. participants were selected based on specific criteria: individuals aged between 25 and 45 years, who were systemically healthy and exhibited a full mouth bleeding score (FMBS) and full mouth plaque score (FMPS) less than 10%. Additionally, inclusion was based on either clinical indications or patient requests for recession treatment.

This study excluded pregnant females, smokers, special needs patients or patients with any mental difficulties, and any patient who was using any form of medicine that might affect the healing process, like radiation and chemotherapy, decayed and maligned teeth, and individuals who had previously undergone any surgery in the area of interest during the last year.

Sample size calculation**:**

A pilot study was done in order to estimate the expected effect size for the primary outcome (RD at 6 months). The control group (CAF alone) demonstrated a mean RD of 1.8 ± 0.6 mm (n=5), while the test group (CAF with sticky bone) showed a mean RD of 0.9 ± 0.4 mm (n=5). Based on these pilot study values, the effect size (Cohen's d) was calculated to be 1.73, indicating a large effect size.

A sample size was calculated using G*Power software version 3.1.9.7 for an independent t-test (two-tailed) with two groups. With an alpha level of 0.05 and a desired power of 0.80, the analysis indicated that a total sample of 30 patients (15 per group) would be sufficient to detect an effect size (Cohen's d) of 1.73. To account for an anticipated dropout rate of approximately 10% over the 6-month study period, the sample size was increased to 34 patients (17 per group). This sample size provides an 80% probability of detecting a significant difference in RD between the two groups at the 6-months follow up.

Randomization:

30 isolated defects will be assigned randomly by computer software (https://www.randomizer.org/) into two groups. Control group contains 15 defects and was treated with CAF. Test group contained 15 defects and was treated with CAF and sticky bone. Participants received their allocated treatment randomly through a concealed letter.

Clinical measurements**:**

A single calibrated masked periodontist recorded all clinical periodontal measurements at baseline, and then at 3 and 6 months. The assessment of clinical variables included: Plaque Index (PI), Gingival Index (GI), Probing Depth (PD), Recession Depth (RD), Recession Width (RW), Clinical Attachment Loss (CAL), Height of Keratinized Gingiva (HKG), and Thickness of Keratinized Gingiva (TKG). All measurements were taken with an UNC-15 probe and rounded to the nearest half millimeter.

(PI): Full Mouth Plaque Score (FMPS) was expressed as the percentage of all surfaces that exhibited the existence of plaque, using the O'Leary index (12).

(GI): Full Mouth Bleeding Score (FMBS) was expressed as the percentage of all surfaces that displayed bleeding upon probing, as established by Ainamo & Bay (13).

(PD): This was measured from the gingival edge to the base of the gingival sulcus.

(RD): This measurement was taken from the CEJ to the furthest point of the gingival edge toward the apex.

(RW): Measured at the widest point spanning from the mesial to the distal gingival edge.

(CAL): This was assessed from the CEJ to the bottom of the gingival sulcus.

(HKG): This distance was measured from the mucogingival junction (MGJ) to the gingival edge, determining the location of the MGJ using the rolling method.

(TKG): This was evaluated under local anesthesia by trans gingival probing until bone was touched.

At the 6-month post-treatment mark, both the Recession Esthetic Score (RES) for each patient and the root coverage percentage were calculated.

Presurgical phase:

All participants motivated to improve their oral hygiene then they received full mouth debridement one month prior to surgery. Proper brushing technique was shown as well. Four weeks later, baseline records were collected, and the participants underwent the assigned surgical treatment.

Surgical phase:

Control group CAF technique was used as described by Zucchelli and DeSantis (7)., **Figure(2)**

Test group CAF+ sticky bone (i-PRF + xenograft bone particulate[1]):

i-PRF was obtained by centrifuging 10 ml of the participant's venous blood at 700 rpm for 3–4 minutes in a plastic tube. This mixture was then added to xenograft bone particulate and allowed to polymerize for 5–10 minutes, obtaining a well-agglutinated sticky bone.(14) **Figure(3)**.

The prepared root surface was covered with sticky bone that had been molded to a thickness of about 1 mm. then, a 5-0 prolene suture was used to coronally advance the flap.

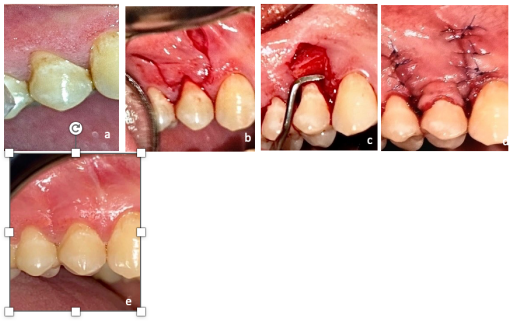


Figure (2), a) baseline b) flap design&elevation c) scaling d) flap closure e) 6 months follow up

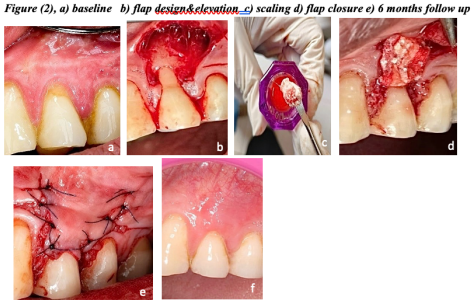


Figure (3), a) baseline b) flap elevation c) sticky bone d) sticky bone application e) flap closure f)6 months follow up

Post-surgical instructions:

postoperative pain and edema were controlled by prescribing a nonsteroidal anti-inflammatory drug (NSAID)[2]. Prior to the surgery, patients were given 600 mg of brufen. and post-surgical doses were repeated if required. Amoxicillin clavulanic acid, an antibiotic,[3] was prescribed for seven days after surgery.

They were told to rinse three times daily for one min ute for two weeks with chlorhexidine solution (0.12%)[4].

The sutures removal was done 14 days following surgery. Patients received strict instructions to avoid pulling their lip or, eating hard food (only soft diet) for 2 weeks before removal of sutures. following this time, the patients were told to do gentle tooth brushing with a soft toothbrush. Recall appointments for all patients for prophylaxis, motivational reinforcement, and training for atraumatic tooth brushing technique at 2 weeks after suture removal, 3 months, and subsequently at 6 months for final evaluation.

Statistical analysis:

Data analysis was done using the SPSS statistical package for Windows (version 25, IBM Corp., Armonk, NY, USA). The normality of data distribution for all continuous outcome variables was first assessed using the Shapiro-Wilk test. Based on the results of normality testing, appropriate parametric or non-parametric statistical tests were employed for each outcome variable. Since most data were not normally distributed, nonparametric tests were employed. All tests were two-tailed with a significance level of $\alpha = 0.05$, where $p < 0.05$ was considered statistically significant and $p < 0.001$ was considered highly significant. Results were presented as median (range). **Tables 1, 2 and 3** show the results of the studied groups.

Results:

30 healthy patients with Cairo RT1 buccal isolated GR were divided into 2 groups. Control group had 15 patients with 5 males and 10 females with mean age range is 37.67 ± 5.21 years while test group had 15 patients as well 7 males and 8 females with mean age range is 36.17 ± 6.34 years **Table 1.**

All subjects maintained excellent oral hygiene through the trial; both FMBS and FMPS were under 10% at baseline, 3 months, and 6 months. TKT showed a significant increase in the Test group from 0.83 ± 0.25 mm at baseline to 1.50 ± 0.30 mm at 6 months. While the control group was relatively stable from 1.00 ± 0.00 to 1.08 ± 0.12 mm at 6 months. The inter-group difference was highly significant at 6 months **Table 2**. Both treatment modalities resulted in significant clinical enhancements in PD from baseline to 6 months. PD was significantly reduced in the Test

[1] Maxxeus® dental xenograft bone particulate
[2] Brufen ®, Abbott, Egypt.
[3] Augmentin®, GlaxoSmithKline, Egypt.
[4] Hexitol (ADCO,Cairo,Egypt)

group 1.08 ± 0.19 mm at 6 months compared to the Control group 1.58 ± 0.47 mm at 6 months **Table 2.** As well as, HKG increased significantly in the Test group from 2.17 ± 0.39 mm at baseline to 3.08 ± 0.47 mm at 6 months compared to the Control group, 1.50 ± 0.43 mm at baseline to 2.08 ± 0.56 mm at 6 months with a highly significant intergroup difference ($p < 0.001$), **Table 3.**

RD and RW decreased in both groups. However, the Test group achieved significantly greater reductions. At 6 months, the mean RD and RW for the Test group were 0.75 ± 0.66 mm and 1.00 ± 1.04 mm, compared to 1.42 ± 0.47 mm and 2.25 ± 0.84 mm in the Control group respectively. as shown in **Table 3.**

In the Control group, the mean CAL was 5.00 ± 0.67 mm at baseline, decreased to 3.83 ± 0.65 mm at 3 months, and further to 3.00 ± 0.52 mm at 6 months. While in the test group was 4.42 ± 0.87 mm at baseline, decreased to 2.58 ± 0.70 mm at 3 months, and further to 1.83 ± 0.58 mm at 6 months, showing a highly significant difference over time **Table 3.**

The control group´s mean RC% was 54.43 ± 6.84%, with a median of 50% (range: 50–66.6%). While the Test group´s mean RC% was 72.02 ± 22.43%, with a median of 66.05% (range: 50–100%), **Table 3.** Those superior clinical outcomes were reflected on RES, where the Test group achieved a significantly higher mean 7.67 ± 0.98 compared to 6.83 ± 0.39 in the Control Group **Table 3**.

Table 1: Summarizes the Demographic Data Distribution of the Study Groups.

Demographic Data	Control	Test	P-value **
Gender*			
Male	33.3 %	46.7 %	0.324 NS
Female	66.7 %	50.3 %	
Site*			
Lower Right 5	33.3%	0%	
Lower Left 5	20%	20%	
Lower Right 4	13.3%	13.3%	0.123 NS
Upper Right 4	20%	33.3%	
Upper Left 4	13.3%	20%	
Lower Right Canine	0.0%	13.3%	
Age (Years)**	37.67±5.21	36.17±6.34	0.533 NS

- Inter-group comparison of Gender and Site between the two groups based on the Chi Square Test results. - ** Inter-group comparison of Age between the two groups based on the Independent T-test results. - NS= Non-significant P >0.05.*

Table 2. Oral Hygiene and periodontal parameters at different follow-up periods

Variable	Time	Control Group		Test Group		Intergroup P-value
		(Mean ± SD)	Median (Range)	(Mean ± SD)	Median (Range)	
PI	**Baseline**	10.08 ± 0.47	10 (9.5-11) A	10.00 ± 0.52	10 (9-10.5) A	0.796 NS
	3 Months	8.67 ± 0.49	9 (8-9) B	8.33 ± 0.49	8 (8-9) B	0.110 NS
	6 Months	8.50 ± 0.52	8.5 (8-9) B	7.67 ± 0.49	8 (7-8) B	0.002 S
Intragroup P-value		<0.001 HS		<0.001 HS		
GI	**Baseline**	9.75 ± 0.58	10 (9-10.5) A	9.42 ± 0.47	9.25 (9-10) A	0.134 NS
	3 Months	8.83 ± 0.72	9 (8-10) AB	7.67 ± 0.98	8 (6-9) B	0.005 S

	6 Months	8.00 ± 0.60	8 (7-9) [B]	6.50 ± 0.80	7 (5-7) [B]	<0.001 [HS]
Intragroup P-value		<0.001 [HS]		<0.001 [HS]		
TKG (mm)	**Baseline**	1.00 ± 0.00	1 (1-1) [A]	0.83 ± 0.25	1 (0.5-1) [B]	0.032 [S]
	3 Months	1.08 ± 0.12	1 (1-1.25) [A]	1.25 ± 0.26	1.25 (1-1.5) [A]	0.117 [NS]
	6 Months	1.08 ± 0.12	1 (1-1.25) [A]	1.50 ± 0.30	1.5 (1-2) [A]	0.001 [HS]
Intragroup P-value		0.082 [NS]		<0.001 [HS]		
PD (mm)	**Baseline**	1.92 ± 0.19	2 (1.5-2) [A]	1.83 ± 0.39	2 (1-2) [A]	0.859 [NS]
	3 Months	1.67 ± 0.39	1.75 (1-2) [A]	1.33 ± 0.39	1.25 (1-2) [B]	0.051 [NS]
	6 Months	1.58 ± 0.47	1.75 (1-2) [A]	1.08 ± 0.19	1 (1-1.5) [B]	0.006 [S]
Intragroup P-value		0.109 [NS]		<0.001 [HS]		

Table 3. Root Defect Dimensions, attachment Parameters and esthetic evaluation at different follow-up periods

Variable	**Time**	**Control Group**		**Test Group**		**Intergroup P-value**
		(Mean ± SD)	**Median (Range)**	**(Mean ± SD)**	**Median (Range)**	
RD (mm)	**Baseline**	3.08 ± 0.76	3 (2-4) [A]	2.58 ± 0.63	2.5 (2-3.5) [A]	0.118 [NS]
	3 Months	2.17 ± 0.72	2 (1-3) [AB]	1.25 ± 0.40	1 (1-2) [B]	0.002 [S]
	6 Months	1.42 ± 0.47	1.25 (1-2) [B]	0.75 ± 0.66	0.75 (0-1.5) [B]	0.024 [S]
Intragroup P-value		<0.001 [HS]		<0.001 [HS]		
RW (mm)	**Baseline**	3.50 ± 0.52	3.5 (3-4) [A]	3.00 ± 0.60	3 (2-4) [A]	0.048 [S]
	3 Months	2.83 ± 0.72	3 (2-4) [AB]	1.67 ± 0.78	1.5 (1-3) [B]	0.002 [S]
	6 Months	2.25 ± 0.84	2.5 (1-3) [B]	1.00 ± 1.04	1 (0-2) [B]	0.012 [S]
Intragroup P-value		0.002 [S]		<0.001 [HS]		
HKG (mm)	**Baseline**	1.50 ± 0.43	1.5 (1-2) [B]	2.17 ± 0.39	2 (2-3) [B]	0.001 [HS]
	3 Months	2.08 ± 0.56	2 (1.5-3) [A]	2.92 ± 0.36	3 (2.5-3.5) [A]	0.001 [HS]
	6 Months	2.08 ± 0.56	2 (1.5-3) [A]	3.08 ± 0.47	3 (2.5-4) [A]	<0.001 [HS]
Intragroup P-value		0.02 [S]		<0.001 [HS]		
CAL (mm)	**Baseline**	5.00 ±	5 (4-6) [A]	4.42 ±	4.5 (3-5.5) [A]	0.122 [NS]

		0.67		0.87		
	3 Months	3.83 ± 0.65	4 (3-4.5) [B]	2.58 ± 0.70	2.5 (2-4) [B]	<0.001 [HS]
	6 Months	3.00 ± 0.52	3 (2-3.5) [B]	1.83 ± 0.58	1.75 (1-2.5) [B]	<0.001 [HS]
Intragroup P-value		<0.001 [HS]		<0.001 [HS]		
RC %	**6 Months**	54.43 ± 6.84	50 (50 - 66.6)	72.02 ± 22.43	66.05 (50-100)	0.048 [S]
RES	**Baseline**	3.67 ± 0.49	4 (3-4) [A]	3.67 ± 0.49	4 (3-4) [A]	1.000 [NS]
	6 Months	6.83 ± 0.39	7 (6-7) [B]	7.67 ± 0.98	7 (7-9) [B]	0.015 [S]
Intragroup P-value		<0.001 [HS]		<0.001 [HS]		

Data at tables (2,3) are presented as mean ± SD and median (range). Intergroup comparison was done using the Mann-Whitney U test. Intragroup comparison across time was performed using the Friedman test followed by Wilcoxon signed-rank post hoc test with Bonferroni correction. Within the same group and parameter, values sharing different superscript letters are significantly different. NS: non-significant; S: significant; HS: highly significant.

Discussion:

In periodontal plastic surgery, the CAF treatment is a safe and dependable method that often results in root covering and consistent recession reduction (15).The most effective method for treating GRs is the gold standard CTG + CAF (16).

However, CTG has several disadvantages, including the need for a secondary harvesting surgery for donor tissue, which can lead to increased morbidity and potential complications at the donor site, such as pain and bleeding. These factors can negatively impact the patient experience and outcomes (17).

Other regeneration materials, such sticky bone, which is made by mixing i-PRF with xenograft bone particles acts as a scaffold that offers mechanical support, have been recorded as substitutes. It captures leukocytes, platelets, and bone graft material in a fibrin network. Autologous blood concentrates have been shown to e nhance healing and regeneration of the tissues. This approach is similar to connective tissue grafts using, which also aim to enhance regenerative outcomes in periodontal procedures (14).

Its distinct gel consistency guarantees exceptional adherence to the site of recession defects, ensuring it remains intact even under external forces. This important feature enhances graft stability and speeds up bone tissue regeneration and healing, providing a suitable condition for cell adhesion and growth. Additionally, the flexibility and bioactivity of sticky bone provide higher adaptability to align with the contours of the defect site. This enhanced integration with the surrounding tissue promotes superior healing outcomes, making sticky bone a promising approach in achieving lasting results in the management of GR (18).

According to Kapa, Bhargavi Preeti, et al.,(14) the integration of bone particles into i-PRF matrix acts as a stable scaffold that provides the necessary mechanical support and prevents soft tissue collapse during root coverage procedures.

The findings of this study demonstrated that both groups showed significant clinical improvement from baseline to the follow-up periods. Both groups underwent strict plaque control protocol , as reflected by the O'Leary plaque index values (≤10%) recorded at baseline (12). This threshold was intentionally selected to ensure optimal oral hygiene conditions prior to surgical intervention, thereby minimizing the potential confounding effect of plaque-induced inflammation on wound healing and treatment outcomes to achieve predictable outcomes following mucogingival procedures, as said by Cairo et al., and Zucchelli et al (15, 19).

The current study demonstrated a significant reduction in RD and RW over the intervals of the follow-up in

both groups. However, the test group exhibited significant decrease in mean and median values than the control group at both 3 and 6 months. These findings were in accordance with Panda, S., et al. & Uraz, A., et al.(20, 21) who evaluate the synergistic PRF effect on GRs. This clinical superiority can be explained by the physical space-maintainence capability of sticky bone beneath the CAF. On the contrary, Kuka, S., et al (22). demonstrate no significant difference between CAF or CAF+PRF in treatment of multiple GR.

Another finding was TKG showed a higher significant difference for the test group at 6 - months follow up than the control group. Kapa, Bhargavi Preeti, et al (14) found increase in gingival thickness with sticky bone. Many other studies are consistent with these findings, as Mancini, L. et al., Kuka, S. et al., Ozsagir et al and Idris, M. I., et al. (22-25), those previously mentioned systematic reviews and clinical trials support the positive effect of PRF on tissue thickness. This finding is also related to the regenerative effect of sticky bone, which contains bone graft particles with a liquid PRF matrix, acts as a rich reservoir of autologous growth factors, including TGFβ, PDGF, and VEGF (11).

Regarding the root coverage, the test group showed superior outcomes, which is in line with Ayyildiz, B. G et al. (26), who found a significant increase in root coverage with the use of i-PRF in thick and thin phenotypes. A systematic review was done by Bhagwat, P et al. (27) to evaluate the root coverage in the treatment of GR with collagen matrix and PRF, at which found to be successful in managing GR by enhancing RC and soft-tissue parameters. This illustrates that sticky bone improves clot stability and plays an important role in soft tissue regeneration, as said by Yang et al (28).

The integration of hard and soft tissue augmentation directly enhanced the esthetic outcomes. The test group shows a superior RES score. This is consistent with Kapa, Bhargavi Preeti, et al (14) showing that autologous platelet matrices mixed with bone grafts optimize the soft tissue contour, maximize volume, and bring a natural gingival color match, which satisfies the patient.

Conclusion:

The addition of sticky bone with CAF demonstrated a viable option for treating RT1 defects. The superior outcomes of the test group suggest using the sticky bone as an adjunctive biomaterial for treatment of GR.

Conflict of interest

The authors have no conflicts of interest to declare.

Authors' contributions:

The data of the review is collected by Dr. Shaimaa Mohamed Ibrahim. Data revised and corrected by Dr. Ahmed Abdallah and Dr. Aya Allah Kamal. All authors have read and approve the final manuscript.

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Informed consent

Informed consent was obtained from all individuals or their guardians included in this study.

References

1. Periodontology AAo. Glossary of periodontal terms: American Academy of Periodontology; 1992.

2. Kassab MM, Cohen REJTjotAda. The etiology and prevalence of gingival recession. 2003;134(2):220-5.

3. Tugnait A, Clerehugh V. Gingival recession—its significance and management. Journal of dentistry. 2001;29(6):381-94.

4. West N, Seong J, Davies M. Dentine hypersensitivity. Monogr Oral Sci. 2014;25:108-22. https://doi.org/10.1159/000360749

5. 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. Clin Periodontol. 2011;38(7):661-6. https://doi.org/10.1111/j.1600-051X.2011.01732.x

6. Cairo F, Nieri M, Pagliaro U. Efficacy of periodontal plastic surgery procedures in the treatment of localized facial gingival recessions. A systematic review. Clin Periodontol. 2014;41 Suppl 15:S44-62. https://doi.org/10.1111/jcpe.12182

7. Zucchelli G, De Sanctis M. Treatment of multiple recession-type defects in patients with esthetic demands. Journal of periodontology. 2000;71(9):1506-14. https://doi.org/10.1902/jop.2000.71.9.1506

8. Sculean A, Mihatovic I, Shirakata Y, Bosshardt DD, Schwarz F, Iglhaut G. Healing of localized gingival recessions treated with coronally advanced flap alone or combined with either a resorbable collagen matrix or subepithelial connective tissue graft. A preclinical study. Clinical oral investigations. 2015;19(4):903-9.
9. Sohn D-S, Huang B, Kim J, Park WE, Park CC. Utilization of autologous concentrated growth factors (CGF) enriched bone graft matrix (sticky bone) and CGF-enriched fibrin membrane in implant dentistry. Implant Adv Clin Dent. 2015;7(10):11-8.
10. Ghanaati S, Booms P, Orlowska A, Kubesch A, Lorenz J, Rutkowski J, et al. Advanced platelet-rich fibrin: a new concept for cell-based tissue engineering by means of inflammatory cells. J Oral Implantol. 2014;40(6):679-89. https://doi.org/10.1563/aaid-joi-D-14-00138
11. Miron RJ, Fujioka-Kobayashi M, Hernandez M, Kandalam U, Zhang Y, Ghanaati S, et al. Injectable platelet rich fibrin (i-PRF): opportunities in regenerative dentistry? Clin Oral Investig. 2017;21(8):2619-27. https://doi.org/10.1007/s00784-017-2063-9
12. O'Leary TJ, Drake RB, Naylor JE. The plaque control record. Journal of periodontology. 1972;43(1):38.
https://doi.org/10.1902/jop.1972.43.1.38
13. Ainamo J, Bay I. Problems and proposals for recording gingivitis and plaque. Int Dent J. 1975;25(4):229-35.
14. Kapa BP, N KS, G VG, Mehta DS. Coronally Advanced Flap Combined With Sticky Bone and i-PRF-Coated Collagen Membrane to Treat Single Maxillary Gingival Recessions: Case Series. Clin Adv Periodontics. 2022;12(3):147-51.
https://doi.org/10.1002/cap.10164
15. Cairo F, Pagliaro U, Nieri M. Treatment of gingival recession with coronally advanced flap procedures: a systematic review. Clin Periodontol. 2008;35(8 Suppl):136-62.
https://doi.org/10.1111/j.1600-051X.2008.01267.x
16. Chambrone L, Botelho J, Machado V, Mascarenhas P, Mendes JJ, Avila-Ortiz G. Does the subepithelial connective tissue graft in conjunction with a coronally advanced flap remain as the gold standard therapy for the treatment of single gingival recession defects? A systematic review and network meta-analysis. Journal of periodontology. 2022;93(9):1336-52.
https://doi.org/10.1002/JPER.22-0167
17. Amine K, El Amrani Y, Chemlali S, Kissa J. Alternatives to connective tissue graft in the treatment of localized gingival recessions: A systematic review. Stomatol Oral Maxillofac Surg. 2018;119(1):25-32.
https://doi.org/10.1016/j.jormas.2017.09.005
18. Yang Z, Zhai S, Liu Y, Wu Y, He T, Shi X, et al. Sticky Bone: Advances and Applications. International journal of nanomedicine. 2025;20:10151-75.
https://doi.org/10.2147/IJN.S524115
19. Zucchelli G, Mounssif I, Mazzotti C, Stefanini M, Marzadori M, Petracci E, et al. Coronally advanced flap with and without connective tissue graft for the treatment of multiple gingival recessions: a comparative short-and long-term controlled randomized clinical trial. Journal of clinical periodontology. 2014;41(4):396-403.
20. Panda S, Satpathy A, Chandra Das A, Kumar M, Mishra L, Gupta S, et al. Additive Effect of Platelet Rich Fibrin with Coronally Advanced Flap Procedure in Root Coverage of Miller's Class I and II Recession Defects-A PRISMA Compliant Systematic Review and Meta-Analysis. Materials (Basel). 2020;13(19).
https://doi.org/10.3390/ma13194314
21. 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. Journal of Dental Sciences. 2015;10(1):36-45.
https://doi.org/10.1016/j.jds.2012.10.010
22. Kuka S, Ipci SD, Cakar G, Yılmaz S. Clinical evaluation of coronally advanced flap with or without platelet-rich fibrin for the treatment of multiple gingival recessions. Clinical oral investigations. 2018;22(3):1551-8.
23. Mancini L, Tarallo F, Quinzi V, Fratini A, Mummolo S, Marchetti E. Platelet-Rich Fibrin in Single and Multiple Coronally Advanced Flap for Type 1 Recession: An Updated Systematic Review and Meta-Analysis. Medicina (Kaunas). 2021;57(2):144.
https://doi.org/10.3390/medicina57020144
24. Idris MI, Burhan AS, Hajeer MY, Sultan K, Nawaya FR. Efficacy of the injectable platelet-rich fibrin (i-PRF) in gingival phenotype modification: a systematic review and meta-analysis of randomized

controlled trials. BMC Oral Health. 2024;24(1):1331. https://doi.org/10.1186/s12903-024-05109-5
25. Ozsagir ZB, Saglam E, Sen Yilmaz B, Choukroun J, Tunali M. Injectable platelet-rich fibrin and microneedling for gingival augmentation in thin periodontal phenotype: A randomized controlled clinical trial. 2020;47(4):489-99. https://doi.org/10.1111/jcpe.13247
26. Ayyildiz BG, Terzioglu B, Eken S. Comparison of root coverage by injectable-platelet rich fibrin in thick and thin phenotypes: a parallel-armed, prospective, preliminary clinical study with up to 48 months of follow-up. Journal of applied oral science : revista FOB. 2026;34:e20250702. https://doi.org/10.1590/1678-7765-2025-0702
27. Bhagwat P, Kamat R, Rao P, Ashok K, Shitole P, Sachdev SS. Evaluation of Root Coverage in Gingival Recessions Treated With Collagen Matrix and Platelet-Rich Fibrin: A Systematic Review. Cureus. 2025;17(11):e97385. https://doi.org/10.7759/cureus.97385
28. Yang Z, Zhai S, Liu Y, Wu Y, He T, Shi X, et al. Sticky Bone: Advances and Applications. 2025:10151-75.

التقييم السريرى لفاعلية العظم اللزج مع السديلة المتقدمة تاجيا فى علاج النوع الاول من انحسار اللثة (دراسة سريرية عشوائية)

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الخلفية: تُعدّ تغطية الجذر بشكلٍ كامل وتحقيق نتائج جمالية مرضية من أهم الأهداف العلاجية في حالات انحسار اللثة. وعلى الرغم من أن العلاجات التقليدية للأنسجة الرخوة، مثل تقنية السديلة المتقدمة تاجيا،التي تستخدم على نطاق واسع، فإن الحفاظ على استقرار النتائج العلاجية على المدى الطويل قد يمثل تحديًا. ويُعد العظم اللزج مركبًا حيويًا يتكون من مركزات الدم الذاتية، مثل الفيبرين الغني بالصفائح الدموية القابل للحقن، وجزيئات العظم، حيث يوفر سقالة مستقرة وقابلة للتشكيل للمساعدة في ترميم عيوب الأنسجة اللثوية.
الهدف: تقييم تأثير إضافة العظم اللزج إلى تقنية الرفرف المتقدم إكليليًا في علاج حالات انحسار اللثة من النوع الأول.
المواد والطرق:تم توزيع 30 عيبًا منفردًا من حالات انحسار اللثة من النوع الأول عشوائيًا على مجموعتين. خضعت المجموعة الاختبارية للعلاج باستخدام تقنية السديلة المتقدمة تاجيا مع إضافة العظم اللزج بينما عولجت المجموعة الضابطة باستخدام تقنية السديلة المتقدمة تاجيًا وحدها.
النتائج:أظهرت كلتا المجموعتين تحسنًا ذا دلالة إحصائية