

*Research Article*

## Comparison between Buccal Fat Pad Versus Platelet Rich Fibrin Using Vestibular Incision Subperiosteal Tunnel Access Technique in the Treatment of Gingival Recession Class II

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### Abstract

**Background:** Gingival recession is a common condition that involves apical migration of the gingival margin leading to exposure of the root surfaces. The condition has a multifactorial etiology and is commonly associated with trauma caused by inappropriate brushing techniques and damage caused by periodontal disease. If not managed, the exposed root surface can become prone to the development of root caries, hype and sensitivity and can also compromise the patient aesthetically when the defect sites are present in the aesthetic zone.

**Aim of the study:** The aim of this study was to compare the effectiveness of Non-pedicated buccal fat pad versus Platelet-rich fibrin in the treatment of Miller class II gingival recession us the ing vestibular Incision Subperiosteal Tunnel Access Technique.

**Patients and methods:** This study was conducted on 40 patients with class II gingival recession in the anterior or premolar segment. The entire patient was selected from the outpatient clinic of the Oral Medicine, Oral Diagnosis, and Periodontology Department. Faculty of Dentistry, Minya University. Forty patients with gingival recession class II were divided randomly into two groups: **Group I:** (20 defects) using VISTA technique with Non- pedicled buccal fat pad (NPBFP), **Group II:** (20 defects) using VISTA technique with platelet-rich fibrin (PRF).

**Results:** In both groups, all clinical parameters were statistically significant from the pre-operative period till 6 months follow-up period. In comparison between the two groups after 6 month follow up period, there was no statistically significant difference between the two groups regarding all clinical parameters except the percentage of root coverage; there was a significant increase in the percentage of root coverage after 3 and 6 months follow up period in group II with p-value was less than 0.05. **Conclusion:** Both PRF membrane and NPBFP are effective in the management of Class II gingival recession defects using VISTA technique. PRF group has better results regarding the percentage of root coverage than NPBFP group after 3 and 6 months follow up.

**Keywords:** Gingival recession (GR), Vestibular Incision subperiosteal Tunnel Access (VISTA), Platelet Rich fibrin (PRF), non-pedicled buccal fat pad (NPBFP).

### Introduction

Gingival recession is a condition that involves the destruction of soft or hard tissues or both around the tooth and eventually leads to an apically positioned gingival margin. The exposed root surfaces are more prone to root caries, hypersensitivity, and also a source of esthetic concern which may compromise the patient's quality of life. To manage a gingival recession, researchers have devised an array of surgical techniques

and biomaterials. However, most of the devised techniques involve sulcular incision or vertical release incision which can lead to unfavorable healing outcomes.

VISTA (Vestibular Incision Subperiosteal Tunnel Approach) is a new technique that uses an approach from the vestibule to treat multiple gingival recessions. Due to the vestibular approach, the technique overcomes the disadvantages inherent in other root coverage procedures such as

sulcular incisions and vertical releasing incisions which can cause unfavorable healing<sup>[1,2]</sup>.

The platelet-rich fibrin (PRF) was first introduced by Choukroun et al. in 2001 and is regarded as a second-generation platelet concentrate. This autogenous biomaterial slowly releases a growth factor that lasts for at least 7-28 days. The growth factor promotes the healing of the tissue and to some extent has also been found to aid in regeneration<sup>[3]</sup>.

Buccal fat is a specially organized fat tissue also called syssarcosis, a fat that enhances intermuscular motion (muscles of mastication). It is not subjected to lipid metabolism, unlike subcutaneous fat where it has a different rhythm of lipolysis<sup>[4]</sup>.

The anatomical region is consistent, and surgery does not influence either its appearance or function. Excellent blood supply provided by the rich plexus of blood vessels, proximity between the donor and recipient site if it used pedicled, simplicity, and its ease to mobilize, stabilize/adapt, and suture along with its strong anti-infective and keratinizing properties makes it a suitable choice for oral reconstructions and root coverage procedure<sup>[5]</sup>.

**So, in this study, it is proposed to evaluate the effectiveness of NPBF versus PRF in the treatment of Miller class II gingival recession using the VISTA technique.**

#### **Patients and Methods**

This study was conducted on 40 patients with class II gingival recession in the anterior or premolar segment. The entire patient was selected from the outpatient clinic of the Oral Medicine, Oral Diagnosis, and Periodontology Department, Faculty of Dentistry, Minya University.

**1. Ethical regulations:** The complete treatment plan was explained to all patients including detailed steps, risks, and expected results, and their full signed consent was obtained before entry into the

study. The study has complied with the rules set by the International Conference on Harmonization Good Clinical Practice Guidelines, and the Declaration of Helsinki on the research ethics committee of the Faculty of Dentistry, Minya University (NO, 320:Date, 18/2/2019).

#### **2. Patient selection:**

Selected patients of both sexes are 20-55 years old, Patients were systemically healthy based on questionnaire dental modification of Cornell index, O'Leary index (1972) was less than 10% (the surgical therapy was not initiated until the patient reaches the 10% level or less of plaque accumulation), Buccal recession defects were classified as Miller Class II according to Miller's classification (1985), Clinical indication and/or patient request for recession coverage. On the other hand, Miller Class III or IV recession defects, Pregnant females, Smokers, Patients with special needs or with any mental problems, All patients were using any kind of medications that could interfere with the healing of periodontal tissues. Such as chemotherapy and radiotherapy, Teeth with carious lesions, Rotated and extruded teeth were excluded from the study.

#### **3. Randomization:**

Forty patients with gingival recession class II were divided into two groups, randomly selected for treatment with a coin toss:

**Group I:** (20 defects) (Non-pedicled buccal fat pad (NPBF)) and **group II** (20 defects) (PRF (platelet-rich fibrin)).

#### **4. Treatment plan:**

**4.1. Phase I therapy:-** was completed for each patient and detailed instruction on self-performed oral hygiene measures using a toothbrush and interdental brush or floss. Full mouth supra and subgingival scaling and root planning were performed on each patient in four sessions. Two weeks following the phase I therapy, a re-evaluation was performed for each patient to confirm the suitability for the surgical phase.

**4.2. Surgical phase:-** The operative site was anesthetized by using 2% lignocaine HCl with adrenaline (1:2,00,000) using

block or infiltration techniques according to premolar or anterior sites. The VISTA approach was begun with a vestibular access incision mesial to the defect, which provided access to the entire defect [figure 1; a].

A subperiosteal tunnel was created by passing the incision through the perios-

teum and inserting a periosteal elevator between the periosteum and bone through the vestibular access incision. To mobilize gingival margins and facilitate coronal repositioning, the tunnel was extended at least one or two teeth beyond the teeth requiring root coverage [figure 1;b].



**Figure 1: (a) vertical releasing incision mesial to the defect. (b) Sub-periosteal tunnel was created to mobilize the gingival margin and facilitate coronal repositioning**

The PRF membrane was prepared by taking 10ml of intravenous blood and centrifuged at 3000 RPM for 10 minutes. After centrifugation, the PRF clot was removed from the tube with the help of the tweezers and separated from the RBC base and transferred onto the gauze. The PRF obtained was formed of the membrane by squeezing out the fluid from the fibrin

clot. The PRF membrane was trimmed and adjusted to cover the root through the subperiosteal tunnel with fine-tipped curved serrated forceps. The membrane and mucogingival complex were to be then advanced coronally and stabilized in the new position with the help of suture and flowable composite [figure 2].



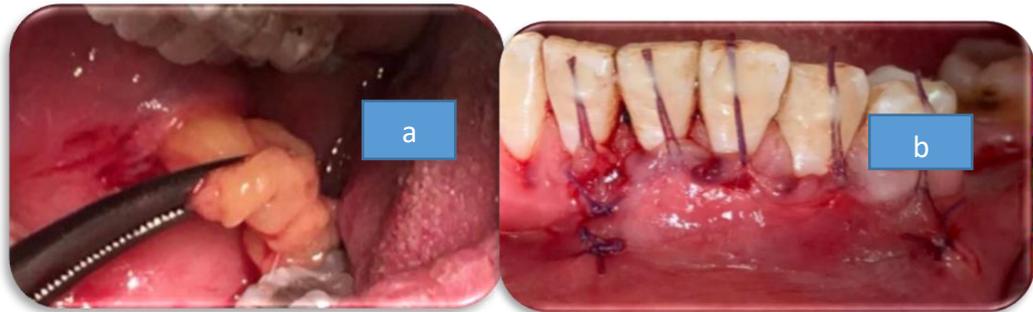
**Figure 2: Preparation of PRF and its Application in the defect site**

For the cases which were treated with NPBF before harvesting BFPG, a terminal infiltration anesthetic was injected into the region of the upper first and second molars at the intended BFPG

recipient site. A horizontal incision measuring 1.5 cm was made at the bottom of the vestibule with a no.15 blade, in the region of the maxillary right or left first and second molars, depending on which

side the surgery was performed. A curved hemostat was used to reposition temporarily the muscles at the relevant location, to expose the adipose tissue. Adipose tissue was then removed. The patient's cheek was then compressed, to promote the closure of the edges of the wound and the joining the tissue. The donor site was immediately sutured [Figure 3;a].

The NPBF was placed into the recipient site at the level of the CEJ and fixed by sutures over the graft with absorbable suture thread. The flap was coronally positioned to cover the entire NPBF using a suture and flowable composite. Suspensory and simple sutures were made in the releasing incisions [figure 3;b].



**Figure 3:(a) Removal of Buccal fat pad from  
(b) Flap was coronally advanced with suture and flowable composite**



**(a) Before and after 6 months follow up period in this case treated with VISTA+PRF  
(b) Before and after 6 months follow up period in this case treated with VISTA+BFP**

**4.3: Post surgical phase:**

Routine verbal and written postoperative instructions for periodontal surgery were given to all patients As with all surgical procedures, patients were informed to

contact the therapist if any problems were developed during the postoperative period. Mouth rinsing with a mouthwash containing 0.12% chlorhexidine digluconate (Antiseptol, Cairo

pharmaceuticals, and chemical industries Co., Egypt) for 1 min every 12 h for 14 days. The postoperative medications prescribed were (Amoxicillin+ clavulanic acid 625mg for 8 days) (Augmentin (Amoxicillin +clavulenic aci), Glaxo Smith Kline, Egypt) every 8 h or clindamycin 300 g every 8 h for 7 days for patients allergic to penicillin, and (Ibuprofen ( \*\*\*Brufen ,® Abbott, Egypt) 600 mg every 12 h for 5 days). The sutures were removed 14 days after surgery.

### 5. Assessment methods

Follow-up visits were performed on all patients regularly at baseline (before surgery), 3, and 6 months. The measures of the clinical parameters were assessed by the following parameters Using UNC.15 probe and recorded in mm.

The clinical parameters evaluated were; **Probing depth (PD)**, measured from the gingival margin (GM) to the bottom of the gingival sulcus; **Gingival Recession (GR)**, measured from the CEJ to the GM; **clinical attachment level (CAL)**, measured from the CEJ to the bottom of the gingival sulcus; **width of keratinized tissue (WKT)**, measured from the mucogingival junction (MGJ) to the GM; and **the thickness of keratinized tissue (TKT)**, measured with the periodontal probe placed perpendicularly along the tooth axis in the most central portion of the keratinized tissue, between the GM and the MGJ. Under local anesthesia, slight pressure was applied to the probe, towards the adjacent hard tissue. **the percentage of root coverage** was calculated by the following formula:

$$\frac{\text{Postoperative GR} - \text{Preoperative GR (baseline)}}{\text{Preoperative GR (baseline)}} \times 100\%$$

### Statistical Methods

Data entry and analysis were recorded on an investigative report, and transferred to an IBM card, using IBM pre with statistical program "Statistical Package for Social Sciences" "SPSS" (SPSS Inc., Chicago, IL and Systat, Richmond, CA) under windows Version 22 to perform the following statistical analysis: Graphics were done by Excel Microsoft office 2010. Data were graphically represented using the Harvard Graphic Windows HGW program

A student t-test was used to compare between means of the two groups. Paired t-test was used to compare two means before and after treatment within each group. A statistically significant level was considered when the p-value was less than 0.05.

### Results

**In group I (BFP) and In group II (PRF):** All clinical parameters were statistically significant. Mean±SD concerning PD, CAL, and RD was decreased from pre-operative to 6 months postoperative period while WKT and TKT were increased from pre-operative to 6 months postoperative period in both groups. In the comparison between the two groups after 6 months follow up period: there was no statistically significant difference between the two groups in all clinical parameters although it was significantly decreased in PD in group I in comparison to group II, while significantly decrease in CAL and RD in group II in comparison to group I. Regarding WKT, It was significantly increased in group II in comparison to the group I, while TKT; there was significantly increased in group I in comparison to group II (Table 1).

**Table 1: Comparison of parameters 6 months post-operative between BFP and PRF groups**

Parameters 6 months post-operative	Group I (BFP) n=20	Group II (PRF) n= 20	P-value
	Mean± SD	Mean± SD	
PD	1.70±0.57	1.85±0.37	0.3
CAL	2.45±2.11	1.25±1.97	0.07
RD	1.45±1.67	0.80±1.28	0.1
WKT	5.20±0.89	5.55±0.99	0.2
TKT	1.8±0.37	1.77±0.25	0.8

Regarding the percentage of root coverage: there was a statistically significant difference between the two groups during the follow-up period while there was a significant increase in the percentage of root coverage after 3 and 6 months follow-up period in group II in comparison to Group I (Table 2).

**Table 2: Comparison of percentage of root coverage 3 and 6 months post-operative between BFP and PRF groups**

Percentage of root coverage	Group I (BFP) n=20	Group II (PRF) n= 20	P-value
	Mean±SD	Mean±SD	
3 months post-operative	50.0±36.01	81.30±27.53	0.004*
6 months post-operative	51.25±36.53	82.00±30.22	0.006*

## Discussion

Gingival recession is a widespread clinical manifestation affecting single or multiple root surfaces<sup>[6]</sup>. Root hypersensitivity, aesthetic problems, and abrasion may accompany gingival recession and lead patients to seek treatment<sup>[7]</sup>.

Multiple Miller Class I and II recessions are present, an approach to treat all adjacent defects in one surgical visit is the first choice<sup>[8]</sup>. The periodontal reconstructive procedures were done to achieve complete and predictable coronal displacement of the gingival margin on all root surfaces.

One of the recently introduced techniques by Zadeh in 2011 was the vestibular incision subperiosteal tunneling access (VISTA)<sup>[9]</sup>. Among the various determinants behind successful root coverage, maintenance of adequate vascular supply is one of the most important determinants. Taking into consideration this procedure

not only promises adequate blood supply but also it being minimally invasive requires a small opening involving the undermining of the periosteum completely in the area of root coverage, which would further help in the coronal repositioning of the flap onto the exposed root surface. However, successful root coverage also depends on the underlying width of keratinized gingiva augmenting the width of keratinized gingiva in addition to covering the exposed roots.

This technique needs subepithelial connective tissue, an autograft to be placed in enhancing the periodontal biotype. VISTA, along with SCTG has provided very favorable results,<sup>[10]</sup> with the only disadvantage of this technique being the need for the second surgical site and often a large amount of SCTG would be required to cover multiple recessions.

One alternative to address this problem would be the use of biologic mediators

like platelet-rich fibrin (PRF), which is a platelet derivative.

PRF was also used in the study as Growth factors present in PRF play a vital role in hard and soft tissue repair. These growth factors include platelet-derived growth factor (PDGFs), epidermal growth factor (EGF), transforming growth factor-beta (TGF- $\beta$ ), vascular endothelial growth factor (VEGF), insulin-like growth factor-1 (IGF-1)<sup>[11]</sup>.

NPBFP was augmented with VISTA technique, Success of cases of NPBFP has been attributed to the ease in harvesting the buccal fat graft through a fast surgical technique with low donor site morbidity and a low rate of complications<sup>[12]</sup>.

The positive results are also attributed to the rich vascular supply that guarantees to maintain the vitality of the graft and the presence of stem cells that aid in tissue regeneration and differentiation of the grafted adipose tissue into the stratified squamous epithelium and dense connective tissue<sup>[13]</sup>. There is a report of long-term maintenance of the graft structure and volume since the buccal fat pad does not undergo lipolysis<sup>[14]</sup>.

Our results in the PRF group has approached the outcome achieved by Kale Rutuja et al.,<sup>[15]</sup>, who found that the percentage of root coverage obtained at the 6-month postoperative period was 83% with canine and 100% with lateral incisor which is class I gingival recession after treatment with VISTA technique and PRF.

Another case series describes the use of (VISTA) technique in combination with platelet-rich fibrin (PRF) membrane and VISTA with connective tissue graft (CTG) for treatment of GR defects. The results demonstrated 100% root coverage in all the cases at 6 months respectively in both treatment modalities<sup>[16]</sup> and this variation in the results may be related to the previously mentioned variation factors as well as the number of cases.

A case series of multiple gingival recession Coverage Treated with VISTA Approach with or without Platelet-Rich Fibrin showed that Patients having Class I recession defects showed almost complete root coverage with VISTA technique alone and reflected no added advantage of PRF-membrane. However, patients with Class III recession defects treated with VISTA + PRF-membrane showed more reduction in recession depth and gain in CAL as compared to sites treated with VISTA only<sup>[17]</sup>.

Our results in BFP approached the following study by Tatiana et al.,<sup>[18]</sup> who analyzed the efficiency of non-pedicled buccal fat pad graft (BFPG) for the treatment of Miller Class I or II gingival recessions (GRs) and compare these results with those of subepithelial connective tissue graft (SCTG), which is considered the gold standard. The clinical parameters were evaluated at baseline and 1, 3, and 6 months postoperatively.

None of the evaluated clinical parameters differed significantly between the groups. Six months after surgery, the mean percentages of root coverage were 67.5% and 87.5% in the BFPG and SCTG groups respectively. In both groups, complete root coverage was observed in 50% of cases 6 months after surgery. The results presented here indicate that the use of BFPG transplant has clinical similarities with SCTG and both may be considered as clinically successful methods for treating Miller Class I and II GRs.

El Haddad et al.,<sup>[19]</sup> reported that coronally advancement flap with pedicled buccal fat pad grafting in a maxillary first molar with the buccal root surface almost completely exposed, presenting grade III mobility and Class II furcation involvement. One month after treatment, there was an average gain of 8mm in root coverage and gained keratinized tissues with excellent matching of color and texture were observed.

Owing to the lack of studies involving the VISTA technique with NBF, it was not

possible to compare the results from the BFP group with those of other studies. However, GRs treated via BFP exhibited improvement in all clinical parameters as those treated via the PRF group. Therefore, the use of BFP can be considered a predictable treatment option for Miller class II GRs as PRF.

### Conclusion

Both PRF membrane and NPBF are effective in the management of Class II gingival recession defects using VISTA technique. PRF group has better results regarding the percentage of root coverage than the NPBF group after 3 and 6 months follow up.

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