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Leukocyte - Platelet Rich Fibrin (L-PRF) in Combination with Tunneling Technique in Management of Gingival Recession: Randomized Clinical Study

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Abstract

Introduction: This study is to compare the clinical efficacy; Leukocyte Platelet Rich Fibrin (L-PRF) and Connective Tissue Graft (CTG) both with tunneling technique in management of Miller class I and II multiple gingival recession using; a) Clinical criteria of root coverage as primary outcome., b) Patient satisfaction as secondary outcome.

Subjects and methods: A total of 30 patients complaining from multiple gingival recession esthetic zone were divided into the following groups: Group I (Tunneling technique + L-PRF): consisted of 15 patients who had Miller Class I or II multiple gingival recession and were treated by leukocyte and platelet rich fibrin with modified tunneling technique and was considered the (The study group). Group II (Tunneling technique + DECTG): consisted of 15 patients who had Miller Class I or II multiple gingival recession and were treated by de-epithelized connective tissue graft with modified tunneling technique and was considered the (The control group).

Results: Both groups when combined with tunneling technique were successful in management of multiple Miller`s class I and II recession. The L-PRF group showed more reduction in recession depth and width and in periodontal probing depth and greater gain in CAL than DECTG group, but there was no statistically significant difference between means % reduction in the two groups through baseline - 6 months.

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Introduction

Periodontal diseases are complex, multifactorial, polymicrobial infections affecting 10–15% of adult populations worldwide. It is characterized by the destruction of tooth-supporting tissues and eventually loss of teeth(*Petersen and Ogawa, 2012*).

Gingival recession is defined as the apical migration of the junctional epithelium with exposure of root surface. It is a common condition that can be localized or generalized, involving single or multiple teeth and its extent and prevalence increase with age(*Kasaj , 2016*).

Patients with gingival recession may complaint of esthetic problems due to root exposure. Although gingival recession can occur without any symptoms, it can give rise to pain from exposed dentine and tooth sensitivity, patient's concern about loss of the tooth, poor esthetics, or root decay. It also poses a problem while performing oral hygiene procedures(*Zucchelli et al., 2006*).

The optimum goal for gingival recession treatment is to obtain complete coverage of the exposed root surface with an agreeable color and tissue blend related to the adjacent soft tissues(*Oates et al., 2003*). Gingival recessions have been classified by Miller according to their severity/extent and the prognosis of root coverage(*Pini-Prato et al., 2010*).

Minimally invasive techniques have been developed to minimize these previous drawbacks. Raetzke first described the envelope technique to place the CTG without the vertical incisions required in a coronally positioned graft(*Raetzke , 1985*). Zabalegui was the first to combine these techniques in the treatment of multiple adjacent gingival recession defects through the use of a mucosal partial-thickness “Tunnel” spanning multiple teeth, to introduce the CTG(*Zabalegui, 1999*).

Subjects and methods:

Subjects selection:

A total of 30 patients complaining from multiple gingival recession esthetic zone were recruited from the outpatient clinic of Oral Medicine and Periodontology department, Faculty

Dentistry,Ain Shams University with multiple gingival recession involving more than 2 adjacent teeth in the aesthetic zone (Anterior teeth or premolars) and Classified as Miller Class I or II with recession depth ≥ 2 mm when measured from the cementoenamel junction (CEJ) to gingival margin.

Patients grouping:

The study was designed as randomized controlled parallel arm comparative single center open trial. The subjects were randomly assigned using coin toss for one of the two treatment protocols in the following groups:

Group I (Tunneling technique + L-PRF): consisted of 15 patients who had Miller Class I or II multiple gingival recession and were treated by leukocyte and platelet rich fibrin with modified tunneling technique and was considered the **(The study group)**.

Group II (Tunneling technique +DECTG): consisted of 15 patients who had Miller Class I or II multiple gingival recession and were treated by de-epithelized connective tissue graft with modified tunneling technique and was considered the **(The control group)**.





Assessment

A-Clinical assessment

Clinical parameters were documented on the day of the surgical appointment immediately prior to surgery (**baseline**) and (**after 6 months post-operatively**)

Plaque Index (PI)(*Silness and Løe, 1964*).

score 0: no plaque.

score 1: a film of plaque adhering to the free gingival margin and adjacent area of the tooth. The plaque may be seen in situ only after application of disclosing solution or by using the probe on the tooth surface.

score 2 : moderate accumulation of soft deposits within the gingival pocket, or the tooth and gingival margin which can be seen with the naked eye.

score 3: Abundance of soft matter within the gingival pocket and\ or on the tooth gingival margin

-Gingival Index (GI)(*Løe and Silness, 1963*).

0 point: no inflammation, no bleeding and normal appearance, **1 point:** mild inflammation, no bleeding and slight change in color and mild edema with slight change in texture.

2 points: moderate inflammation, bleeding on probing\ pressure and redness, hypertrophy, edema and glazing.

3 points: sever inflammation, spontaneous bleeding and marked redness, edema, hypertrophy and ulceration.

-Probing Depth (PD)

Measured from the gingival margin to the bottom of the gingival sulcus(*Latha et al., 2009*).

-Clinical Attachment level (CAL)(*Agarwal et al., 2016*).

Measured from the CEJ to the bottom of the gingival sulcus

-Recession Depth (RD)(*Eren and Atilla, 2013*)

Measured from the CEJ to the most apical extension of the gingival margin.

-Recession Width (RW)(*Jepsen et al., 2013b*)

Measured as the distance between two points that were placed on the CEJ, at the mesial-most and distal-most end of the selected tooth.

-Keratinized Tissue width (KTW)(*Agarwal et al., 2016*).

Measured as the distance between the gingival margin and the mucogingival junction (MGJ). MGJ was detected by using the rolling technique.

-Gingival thickness: The gingiva is anesthetized by topical application of an anesthetic gel. The thickness was recorded using an endodontic spreader with a rubber stopper inserted at a point at the center of the gingival margin and mucogingival junction in a perpendicular direction (*Egreja et al., 2012*).

Preoperative standardized photographs for the defects and clinical measurements were taken at baseline.

B-Satisfaction questionnaire, modified from McGill Pain Questionnaire(*Melzack, 1975*), was used to score degree of pain experienced during and after treatment and the degree of patient satisfaction with the cosmetic results of the procedure. **Table (1)**

Table (1) Satisfaction questionnaire:

Question	Scoring
Was the treatment painful?	1, no pain; 2, mild pain; 3, severe pain
Did you experience pain on the day of the treatment?	1, no not at all; 2, mild; 3, severe
Did you experience pain during the first week after the treatment?	1, no pain; 2, mild pain; 3, severe pain
Did you notice a cosmetic change 1 week after the treatment?	1, no not at all; 2, moderate; 3, marked
Did you notice a cosmetic change 6 months after the treatment?	1, no not at all; 2, moderate; 3, marked
Did the treatment meet your expectations?	1, no ; 2, yes; 3, over and above
Would you repeat the treatment if necessary?	1, no ; 2, yes; 3, over and above

Result:

The L-PRF group showed more reduction in recession depth and width and in periodontal probing depth and greater gain in CAL than DECTG group, but there was no statistically significant difference between means % reduction in the two groups through baseline - 6 months.

Tunneling technique with DECTG technique showed more statistically significant increase in gingival thickness and keratinized tissue width when compared to L-PRF>

Table 2: Descriptive statistics and results for comparison between mean RD in the two groups and the % of changes by time within each group

Variables	RD (mm)								P-value
	Group I (L-PRF)				Group II(DECTG)				
	Mean	SD	Median	Range	Mean	SD	Median	Range	
Baseline	2.55	0.41	2.33	1.67	2.62	0.35	2.67	1.17	0.342
6m	0.73	0.36	0.67	1.33	0.82	0.28	1.00	1.00	0.599
P-value	0.001*				0.001*				
%Change	71.87	12.53	70.87	42.92	69.05	9.49	68.45	30.17	0.706

*; significant ($p < 0.05$)

Discussion:

The introduction of non-invasive techniques as envelope, tunnel technique (TUN) had reduces the struggles in other invasive operations and provide good vascularity due to

absence of the vertical releasing incision. Connective tissue graft is considered the gold standard technique, however the limited amount of donor tissues, technique sensitivity and post operative patient's discomfort all considered as disadvantages for this technique(*Dridi SM et al 2008*).

(L-PRF) is characterized by simplicity, cost-effectiveness, and user friendliness and malleability. Moreover, tunneling flap procedures (TUN) allows flap elevation without detachment of the papillary tissues and without vertical releasing incisions (*Tavelli et al., 2018; Zuhr et al., 2018*). This combination may be regarded as effective procedure demonstrating comparable results to the connective tissue graft (CTG) techniques which is considered the gold standard for root coverage. However it will overcome the complications associated with secondary surgical site as well as the need for a skillful operators in particular with the presence of multiple recessions(*Sculean et al., 2017*). Both groups showed significant improvements in all clinical parameters after the 6 months follow up except for PD. While the improvement in KTW and GT was not significant in L-PRF group. The results of the present study revealed no statistically significant differences between the two studied groups in all clinical parameters at baseline and after 6 months except for KTW and GT in which the difference was significant in favor of DECTG at 6 months.

Overall, patient satisfaction showed statistically significant less pain experience in L-PRF group compared to DECTG group during treatment, one day and 1st week after treatment. Moreover, patients in the L-PRF group, unlike DECTG patient group, did not mind repeating the procedure if necessary. On the other hand, there was no statistically significant differences between groups regarding the cosmetic outcomes.

Conclusion:

Both L-PRF membrane and de-epithelized connective tissue graft (DECTG) when combined with tunneling technique were successful in management of multiple Miller's class I and II recession.

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