

Comparative Evaluation of Connective Tissue Graft and Platelet Rich Fibrin for The Management of Gingival Recession: A Split Mouth Study in 40 Cases with Long Follow Up of 3 Years

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Abstract

Introduction: Periodontal problems have taken top priority for treatment in patients suffering from periodontal diseases including gingival recession. This study aimed to compare Connective Tissue Graft (CTG) along with Coronally Advanced Flap (CAF) versus Platelet Rich Fibrin (PRF) along with Coronally Advanced Flap (CAF) in 40 sites of miller's class I and II recession sites over a period of 3 years.

Materials and methods: 40 bilateral Miller's class I and class II gingival recession cases were selected for the study and divided into two groups. Group A was treated with PRF and CAF whereas Group B was treated with CTG and CAF.

Following clinical parameters i.e., change in recession depth, change in probing depth, change in clinical attachment level, change in width of keratinized gingiva were assessed at baseline 3, 6 and 36-months post-surgery.

Results: 1. Group A showed root coverage of 71.00% whereas in Group B it was 83.33%. Group B subjects showed clinically higher and statistically significant amount of root coverage as compared to Group A.

2. Group B was associated with better clinical outcomes in terms of keratinized tissue gain.

Conclusion: Current study concludes that CTG along with CAF is a better option for root coverage procedure as compared to PRF along with CAF.

Key Words: Connective tissue graft, Platelet rich fibrin, Gingival recession

Introduction

Gingival recession is defined as the displacement of the soft tissue margin apical to the Cementoenamel Junction (CEJ) [1]. Gingival recession has become a cause of concern for patients due to its association with aesthetics and hypersensitivity. Faulty tooth brushing still remains the main etiological cause for recession along with other predisposing conditions like mal-positioned teeth.

The increased awareness of patients towards aesthetics and the requirement to solve recession associated problems like root caries and hypersensitivity have led the evolution of various periodontal plastic surgical techniques that allows root coverage [2-5]. Norberg in 1926 introduced coronally displaced flap [6]. Harvey in the 1965 introduced the coronally advance flap procedure for root coverage [7]. Later on, Restrepo OJ, Allen EP and P D Miller used a similar technique for covering the denuded surface of root [8,9].

Different periodontal plastic surgical procedures have been tried since years for root coverage [2-4]. Langer and Calagna described the "sub epithelial connective tissue graft" technique for the augmentation of edentulous ridge [10]. The CTG maintains high aesthetics but disadvantage is the need for an additional donor site and its technical difficulty.

CTG along with CAF is considered as the gold standard for the treatment of gingival recession. However, PRF is a novel treatment option for the treatment of gingival recession without having a second surgical site. Platelet rich fibrin

provides optimal aesthetic results, excellent soft tissue contour and texture, no need for second surgical site, less invasive, easy to prepare and there is no biochemical handling of blood, therefore the preparation is strictly autologous.

Materials and Methods

The purpose of the study was to evaluate the clinical result obtained while treating gingival recession using CAF with PRF and CAF with CTG in Miller's Class I and II cases. A total of 20 subjects and 40 sites aged between 20 to 50 years who reported to department of periodontics, were selected for this study. The subjects selected for the study were divided into two groups. Group A consisted of 20 sites in 20 patients and were treated by CAF along with PRF. In Group B equal numbers of subjects were treated using CTG along with CAF. Phase-I therapy and maintenance phase was followed by surgical phase. Patients, who could not maintain adequate plaque control, were excluded from this study. Photographs were taken with canon EOS 1300D DSLR camera. For Group B subjects' acrylic palatal stents were constructed pre-surgically. Periodontal pack was used to cover the surgical site post-operatively.

Clinical Parameters

The following clinical parameters were recorded to the nearest millimeter with the help of a William's/UNC15 graduated periodontal probe at baseline, 90, 180 days and 3 years after surgery.

1. Gingival Recession Depth (RD)
2. Clinical Attachment Level (CAL)
3. Probing Depth (PD)
4. Keratinized Gingiva (KG)

Results

Statistical Analysis

The data collected for both the groups was tabulated and was subjected to statistical analysis using student's paired t test. SPSS software was used for analysis. P-value (inter-group) analysis done by independent sample t test. P-value (intra-group) analysis done by Repeated Measures Analysis of Variance (RMANOVA). P-value<0.05 is considered to be statistically significant. P-value<0.01, NS-Statistically non-significant (Table 1).

Percentage of Gingival Recession Coverage

At 180 days, Group A showed root coverage of 72.67% where in Group B it was 85.00% which was statistically insignificant ('p' value is 0.054). The same parameter at 3 years interval is 71.00% and 83.33% respectively which was statistically significant ('p' value is 0.001). Hence, clinically Group B cases showed better percentage of root coverage.

Probing Pocket Depth (PD)

Distribution of mean probing pocket depth at 180 day and 3 years in both the groups did not differ significantly compared to mean probing pocket depth at baseline (P-value>0.05 for both).

Clinical Attachment Level (CAL)

At baseline the mean clinical attachment level for Group A subjects was 4.20 (\pm 1.03) while Group B subjects presented with a mean CAL of 4.80 (\pm 0.63). In Group A mean clinical attachment level at 180 days and 3 years post operatively

were 1.65 (\pm 0.62) and 1.90 (\pm 0.77) respectively. At baseline to 180 days and 3 years interval in Group B presented a mean value of 1.30 (\pm 0.59) and 1.40 (\pm 0.61). Distribution of mean % change (reduction) in clinical attachment level at 180 days and 3 years (from baseline) among the cases studied is significantly higher in Group B compared to Group A (P-value<0.05 for both). Distribution of mean clinical attachment level in both groups at 180 day and 3 years is significantly lower compared to mean clinical attachment level at baseline (P-value<0.001 for both). Distribution of mean clinical attachment level at 180 days did not differ significantly compared to mean clinical attachment level at 3 years (P-value>0.05) (Table 2).

Width of Keratinized Gingiva (KG)

At baseline, Group A subjects presented with width of keratinized gingiva with a mean value of 2.40 (\pm 0.69) while Group B patients were having pre-operative mean of 2.10 (\pm 0.57). In Group A at 180 days and 3 years post operatively the mean width of keratinized gingiva was 3.20 (\pm 0.78) and 3.30 (\pm 0.63) respectively. Similarly in Group B 180 days and 3 years interval presented a mean value of 3.85 (\pm 0.75) and 3.80 (\pm 0.67) respectively. Distribution of mean % change (reduction) in keratinized gingiva at 180 days and 3 years (from baseline) among the cases studied is significantly higher in Group B compared to Group A. When the percentage gain in width of keratinized gingiva was assessed for both the groups it was observed that at 180 days Group A showed coverage of 38.83% whereas in Group B it was 92.50% which was statistically significant (p < 0.003). The same parameter for percentage gain at 3 years intervals are 43.33% and 90.00% respectively and both were statistically significant ('p' value is 0.013). It is observed that the percentage gain in width of

Table 1: Inter-group and intra-group comparison of mean recession depth.

Recession depth (mm)	Group A (n=10)		Group B (n=10)		P - value
	Mean	SD	Mean	SD	
Baseline	2.9	0.87	3.3	0.48	0.222 ^{NS}
180 days	0.8	0.48	0.5	0.47	0.177 ^{NS}
3 years	0.85	0.47	0.55	0.49	0.184 ^{NS}
% Change at 90 days	72.67%	--	85.00%	--	0.054 ^{NS}
% Change at 180 days	71.00%	--	83.33%	--	0.001 ^{***}
P-value (Intra-group)					
Baseline v 180 days	0.001 ^{***}		0.001 ^{***}		
Baseline v 3 years	0.001 ^{***}		0.001 ^{***}		
180 days v 3 years	0.343 ^{NS}		0.343 ^{NS}		

Values are mean and SD. P-value (Inter-Group) by independent sample t test. P-value (Intra-Group) by repeated measures analysis of variance (RMANOVA). P-value<0.05 is considered to be statistically significant. ***P-value<0.001, NS-Statistically non-significant.

Table 2: Inter-group and intra-group comparison of mean clinical attachment level.

Clinical attachment level (mm)	Group A (n=10)		Group B (n=10)		P-value
	Mean	SD	Mean	SD	
Baseline	4.2	1.03	4.8	0.63	0.135 ^{NS}
180 days	1.65	0.62	1.3	0.59	0.213 ^{NS}
3 years	1.9	0.77	1.4	0.61	0.127 ^{NS}
% Change at 180 days	59.50%	--	72.67%	--	0.029*
% Change at 3 years	53.75%	--	70.42%	--	0.018*
P-value (Intra-group)					
Baseline v 180 days	0.001 ^{***}		0.001 ^{***}		
Baseline v 3 years	0.001 ^{***}		0.001 ^{***}		
180 days v 3 years	0.096 ^{NS}		0.168 ^{NS}		

Table 3: Group and intra-group comparison of mean keratinized gingiva.

Keratinized Gingiva (mm)	Group A (n=10)		Group B (n=10)		P-value
	Mean	SD	Mean	SD	
Baseline	2.4	0.69	2.1	0.57	0.306 ^{NS}
180 days	3.2	0.78	3.85	0.75	0.075 ^{NS}
3 years	3.3	0.63	3.8	0.67	0.105 ^{NS}
% Change at 180 days	38.83%	--	92.50%	--	0.003**
% Change at 3 years	43.33%	--	90.00%	--	0.013*
P-value (Intra-group)					
Baseline v 180 days	0.001***		0.001***		
Baseline v 3 years	0.001***		0.001***		
180 days v 3 years	0.168 ^{NS}		0.678 ^{NS}		

keratinized gingiva was more in Group B subjects (Table 3).

Discussion

Gingival recession has become a cause of concern for patients due to its association with esthetics and hypersensitivity. Faulty tooth brushing still remains the main etiological cause for recession along with other predisposing conditions like mal-positioned teeth. In Millers Class I and II cases the ultimate aim remains complete root coverage. Patient's awareness has helped immensely in maintaining oral hygiene post-operatively. Literature has showed both CTG as well as PRF showing good results as far as root coverage is concerned. CTG has been gold standard since years but with the use of PRF it has come up as a promising novel modality for root coverage. Various advantages of PRF have motivated researchers to find out long term results in root coverage procedure. Current study presents long term results of 3 years which shows stability of results over the period of time [2,3].

Although many comparisons have been made using different surgical approaches, of both the CAF and the CTG techniques for root coverage, the literature lacks studies that directly compare PRF with CAF and CTG with CAF that too for longer durations. This study showed that CAF+CTG was associated with better clinical outcomes in terms of keratinized tissue gain. On the contrary, CAF+PRF appears to be an easier procedure than CAF+CTG and does not require a donor area for CTG harvest, which generally implies lesser post-operative discomfort following therapy. Benefits of CAF+PRF versus CAF+CTG should be carefully evaluated. CAF+PRF is a simple procedure and is an alternative to CTG in order to reduce patient discomfort.

Conclusion

Both techniques produced predictable and satisfactory results. It was observed that coronally advanced flap along with sub-epithelial connective tissue graft showed more gain in width of keratinized gingiva and more percentage of gingival recession coverage.

References

1. American academy of Periodontology. Glossary of periodontal terms. Chicago. American academy of Periodontology. 1992.
2. Langer L, Langer B. The subepithelial connective tissue grafting for root coverage. *Dent Clin North Am.* 1993; 3:243-264.
3. Tözüm TF, Keçeli HG, Güncü GN, Hatipoğlu H, Şengün D. Treatment of gingival recession: comparison of two techniques of subepithelial connective tissue graft. *J Periodontol.* 2005 ;76(11):1842-1848.
4. Al-Hamdan K, Eber R, Sarment D, Kowalski C, Wang HL. Guided tissue regeneration-based root coverage: Meta-analysis. *J Periodontol.* 2003; 74(10):1520-1533.
5. AAP's Glossary of periodontal terms. *J Periodontol.* 2012; 51:74-76.
6. Norberg O. Är en utläkning utan vävnadsförlust otänkbar vid kirkurgisk behandling av sk alveolarpyorrea. *Svensk Tandläkar Tidskrift.* 1926; 19:171-172.
7. Cited in Caffesse RG, Guinard EA. The treatment of localized gingival recession Part II. *J Periodontol.* 1978; 49:357-361.
8. Harvey PM. Management of advanced periodontitis, I. Preliminary report of a method of surgical reconstruction. *NZ Dent J.* 1965; 61:180-187.
9. Restrepo OJ. Coronally repositioned flap: report of four cases. *J Periodontol.* 1973 ;44(9):564-567.
10. Allen EP, Miller Jr PD. Coronal positioning of existing gingiva: short term results in the treatment of shallow marginal tissue recession. *J Periodontol.* 1989 ;60(6):316-319.
11. Langer B. The subepithelial connective tissue graft. A new approach to the enhancement of anterior cosmetics. *Int J Periodontics Restorative Dent.* 1982; 2:22-33.