

Gold Standard Ctg V/S Prf For Treating Miller's Class I Gingival Recession

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Abstract

Background: Gingival recession is the most common aesthetic problem addressed amongst all gingival conditions. Proper management and treatment of recession defect is essential. The aim of this study was to compare the clinical efficacy of coronally advanced flap (CAF) along with connective tissue graft (CTG) and coronally advanced flap with platelet rich fibrin membrane (PRF) for treating Miller's class I gingival recession.

Materials and Methods: 20 sites with Miller's Class I gingival recessions, were selected out of which 10 sites received CAF+CAF (Group 1) and 10 sites received CTG+PRF (Group 2). Each patient had undergone an initial periodontal treatment, including oral hygiene instructions, plaque control, scaling and root planning. Clinical parameters: recession height, recession width, clinical attachment level, pocket probing depth and healing index, were recorded immediately before surgery (baseline) and post operatively after 1 month and 3 months interval period.

Results: For group 1 significant improvement was seen in CAL, REC-HT, REC-WD, PPD from baseline to 3 months. For group 2, significant improvement was seen only in REC-HT from baseline to 3 months.

Conclusion: Along with CTG and CAF, PRF may also provide advantage for recession coverage in Miller class I recession cases. Long-term trials with more sample size are needed to validate these findings.

Keywords: Connective Tissue Graft, Gingival Recession, Platelet-Rich Fibrin

Introduction

Periodontal disease is a pathological inflammatory condition of the gingiva and periodontal tissues supporting the teeth. Pathogenic microorganisms in biofilm, genetic and environmental factors, are considered to be the etiological factors of the disease¹. Along with loss of connective tissue attachment; there is apical migration of epithelial attachment of gingiva and resorption of the alveolar bone². Gingival recession is the displacement of the gingival margin apical to the cemento enamel junction³, with exposure of root surface⁴. Gingival anatomic factors; chronic trauma, periodontitis, and tooth alignment are the causative factors of this defects⁵. It may lead to root hypersensitivity, erosion, root caries, and unaesthetic area⁶. Miller 1985⁷ proposed four classes of marginal gingival recession based on the involvement of periodontal tissues. Coronally advanced flap (CAF) is one of the most common option for treatment of Miller's class I and class II gingival recessions. The Consensus Report of the Sixth European Workshop on Periodontology affirmed that CAF is a safe and predictable approach for root coverage in Miller's Class I and II gingival recession. Various studies have shown

that using CAF with combination provided better results rather than CAF alone. Placement of various grafts including Connective tissue graft (CTG) and membranes underneath CAF is experimented. The rationale behind placing the graft beneath CAF is that it prevents the collapse of membrane and enhances clot stability⁸. Choukroun's 2006⁹ platelet rich fibrin is the first development of second-generation platelet aggregates. It is a fibrin matrix in which cytokines, growth factors, cells are trapped and released over a time, and acts as aresorbable membrane. It has simplified preparations which require neither anticoagulant nor bovine thrombin. PRF is in the form of gel, it offers several advantages including wound healing, cell growth and maturation, and improving the handling properties of grafts. Under the light of the advantages and disadvantages of CTG and PRF, this study was done to compare the effectiveness and the predictability of PRF with coronally advanced flap (CAF) along with (CAF) with connective tissue graft for treating Millers class 1 gingival recession.

Materials and Methods

The study was carried out on the patients attending the outpatient clinic of department of Periodontology and Oral Implantology, Daswani dental college and hospital, Kota, Rajasthan having Miller's class 1 gingival recession. A total of 20 sites with Miller's class 1 gingival recession were selected and were divided in 2 groups, amongst them 10 sites were assigned as Group 1 and other 10 sites as Group 2. Group 1 patients were treated with coronally advanced flap along with connective tissue graft whereas Group 2 patients were treated with coronally advanced flap using platelet rich fibrin. Patients between 18-50 years of age group, Medically healthy subject, free of deleterious oral habit, Gingival recession not extending beyond mucogingival junction were included in the study. Whereas, patients with periodontal diseases, Immunocompromised subjects, Allergies or hypersensitivity to drugs were excluded from the study. The clinical variables assessed in for both the groups were plaque index, pocket probing depth, relative clinical attachment level, width of keratinised gingiva, recession height and Landry's healing index. All the clinical parameters were measured immediately before surgery (baseline) and at 1 and 3 months follow-up visits using williams periodontal probe. Reproducible alignments of the probe were provided by custom made self cure acrylic stents.

Surgical Procedure

After oral scrubbing with betadine (povidone iodine 5%), local anaesthesia (lignocaine HCL 2% with 1:80,000 adrenaline) was administered. After injection of the anaesthetic drug, the root surface was denuded to remove any possible calculus, caries, or root concavity. The preparation of recipient site was common for both the groups. For CAF intra sulcular incision was made with a #15 scalpel blade on the vestibular aspect of the target teeth followed by two horizontal incisions (one mesial and one distal) starting at CEJ level and extending to the centre of the papilla. Two vertical releasing incisions were made from the end of horizontal incisions and extending to the mucogingival junction. The flap was then elevated in the Corono-apical direction with a split-full-split design. All muscle insertions present in the thickness of the flap were removed by placing the blade parallel to the external mucosal surface so as to permit coronal advancement of the flap. Coronal mobilization of the flap was done till the point the marginal portion of the flap was able to passively reach a level coronal to the CEJ of the targeted tooth.

Preparation of Connective Tissue Graft

Connective tissue was harvested from the palate by trap-door technique. In the palate, the distance between the horizontal incision and gingival margin had to be more than 2 mm. The epithelium was elevated by using no.15 scalpel and then a 1.5-2.0-mm thick connective tissue graft was obtained. The epithelium was laid back and sutured with 3-0 silk suture.

Preparation of PRF Membrane

For PRF preparation 10 ml of blood was withdrawn from patient and was drawn quickly into test tubes without an anticoagulant and centrifuged immediately. Blood was centrifuged using a table topcentrifuge for at least 15 min at 3000 rpm. A 3 layered structure was obtained after centrifugation, topmost layer consisting of platelet poor plasma, PRF clot in the middle, and red blood cells (RBCs) at the bottom. The PRF clot was withdrawn with the help of sterile tweezers, while removing the clot the RBC layer attached to it was carefully discarded using a sterilized scissor, in such a way that part of the RBC layer remained attached to the PRF clot. The clot was then carefully placed and pressed between 2 moist gauze pieces to obtain a membrane of suitable thickness and quality.

Post Operative Care

- Patient was given post-surgical instructions
- Not to eat anything hot from 24 hours post surgically
- Not to brush the surgical area for 3 weeks following surgery to avoid the trauma around the surgical site
- To rinse mouth thoroughly after eating or drinking
- In case there is any problem report to the clinic as soon as possible



Fig 1a: CAF Flap Reflection



Fig 1b: Procurement of CTG



Fig 1c: Placement of CTG on the recipient area



Fig 1d: Follow Up after 3 months



Fig 2a: Preoperative Recession



Fig 2b: Flap Reflection



Fig 2c: PRF Preparation

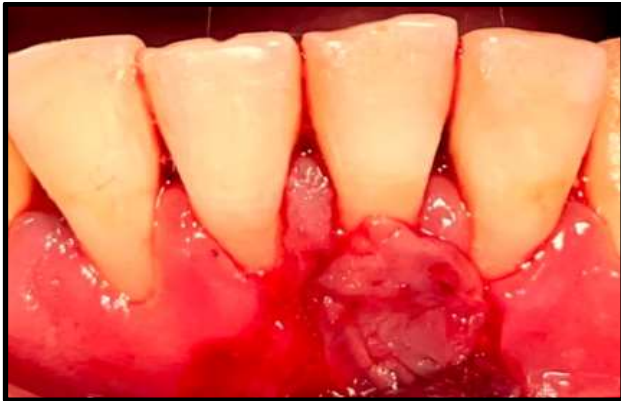


Fig 2d: Placement of PRF on recipient area



Fig 2e: Follow Up after 3 months

Results

The study included 20 sites and was divided into 2 groups.

Table 1: Mean values of clinical parameters at various time interval in Group 1 (CTG)

Time interval	Plaque	CAL	Rec- HT	Rec-WT	PPD
Baseline-1month	0.73+0.23	3.40+0.51	1.80+0.34	3.0+0.81	1.60+0.62
Baseline-3month	0.10+0.27	3.25+0.82	2.40+0.21	2.50+0.63	1.45+0.72
1-3 month	0.03+0.06	1.13+0.51	0.60+0.45	1.65+0.23	0.15+0.24

Table 2: Mean values of clinical parameters at various time interval in Group 2 (PRF)

Time interval	Plaque	CAL	Rec- HT	Rec-WT	PPD
Baseline-1month	0.09+0.22	3.20+1.00	1.80+0.42	2.87+0.80	1.43+0.71
Baseline-3month	0.10+0.36	3.40+0.69	1.95+0.55	2.75+0.12	1.45+0.61

1-3 month	0.01+0.24	0.20+0.58	0.15+0.41	2.12+0.23	0.00+0.40
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Table 3: Intergroup comparison of Group 1 and Group 2 from Baseline to 3 months

	Plaque	CAL	Rec-HT	Rec-WT	PPD
CTG	0.10+0.27	3.25+0.81	2.40+0.21	2.50+0.63	1.45+0.72
PRF	0.10+0.36	3.40+0.69	1.95+0.55	2.75+0.12	1.43+0.61
P VALUE	1.00	0.249	0.001	0.97	0.949

Discussion

The goal of periodontal plastic surgical procedure used in the treatment of marginal tissue recession is the complete regeneration of all the supporting structure of periodontium, resulting in complete coverage of denuded root surfaces in an aesthetic and natural manner. Although CAF is a predictable Root coverage method and Connective tissue graft might increase the probability of Complete root coverage, inconsistent Complete root coverage outcomes and limited regeneration of the missing attachment apparatus with healing through long junctional epithelium or adaptation of connective tissue to the root surface have been reported with the use of CAF+CTG. In the present study the mean plaque index at baseline for both the groups was 0.75+ 0.25 and 0.92+0.24 respectively. At 1 month the mean PI was found to be 0.66+0.16 and 0.83+0.27 for group 1 and group 2 respectively. At 3 months the mean PI was found to be 0.63+0.14 and 0.82+0.23 for group 1 and group 2 respectively. Intergroup and intragroup comparison showed insignificant difference in PI at baseline, 1 month ad 3 months. The results are in accordance with the study done by Mufti et al 2017¹⁰, and Uraz et al 2015.¹¹ In contrast Padma et al 2018¹² found significant reduction in PI from baseline to 3 months. The mean recession height, at baseline for group 1 and group 2 was 2.65 + 0.24 mm and 2.55+0.43 mm respectively. At 1 month the mean REC-HT was found to be 0.85+0.47 and 0.75+0.54 mm for group 1 and group 2 respectively .At 3 months the mean REC-HT was found to be 0.25+0.26 mm and 0.60+0.45 mm for group 1 and group 2 respectively. Group 2 showed statistically significant reduction in recession depth from baseline to 1 month and from baseline to 3 months. These results are in accordance with the studies which combine the use of PRF with CAF done by Shalaby et al 2019¹³ where mean recession depth was reduced from 3.00mm to 1.00 mm from baseline to 6 months, Padma et al 2018¹² observed the reduction from 3.44+ 1.09 mm to 0.00+0.00mm from baseline to 6 months. In contrast to our results a systemic review and meta analysis of Moraschini et al 2016¹⁴ documented that rapid degradation of PRF membrane may interfere with early stabilization of the flap during healing which results in insignificant increase in Rec- HT when applied in root coverage procedure. Group 1 showed statistically significant reduction in recession depth from baseline to 1 month and baseline to 3 month .These was in accordance with the study done by Mufti et al 2017¹⁰. On intergroup comparison the mean recession height showed no significant difference between both the groups. The mean probing depth for group 1 and group 2 was 1.90+0.56 mm and 1.83+0.59 mm respectively. At 1 month the mean PPD was found to be 0.30+ 0.34 mm and 0.40 + 0.39 mm for group 1 and group 2 respectively. There was insignificant difference in mean PPD between group 1 and group 2 from baseline to 1 months, baseline to 3 months and 1 month to 3 month. Group 2 showed significant decrease in PPD from baseline to 1 months and from baseline to 3 month .This was in accordance with the study conducted by Aroca et al 2009¹⁵ which showed significant reduction in PD from 1.41+0.65 mm to 1.17+0.41mm from baseline to 6 months and Gupta et al 2015¹⁶ which showed significant reduction in PD from 1.73+0.46 mm to 1.00+0.00 mm from baseline to 6 months with the combined use of PRF and CAF in the treatment of Millers class 1 gingival recession. Group 1 showed significant reduction in PPD from baseline to 1 month and from baseline to 3 months, this was in accordance with the study conducted by Cairo et al 2012¹⁷ which showed significant reduction in PPD from baseline to 6 months with the combined use of CAF and CTG for treating millers class 1 gingival recession. The mean width of keratinized gingiva scores at baseline for group 1 and group 2 was 4.65+ 0.62 mm 4.70 +0.67 mm respectively. At 1 month the mean WKG was found to be 4.75+0.32 and 5.5+0.97 mm respectively. At 3 months the mean WKG was 5.00+0.23 and 5.90+0.69 mm respectively. The mean WKG increased significantly in group 2 from baseline to 1 month and baseline to 3 month and from 1 month to 3 month. The improvement in WKG in group 2 was in accordance with the study done by

Gupta et al 2015¹⁶ where WKG was increased from 5.07+0.46 mm to 6.67 +0.49 mm from baseline to 6 months. Jankovic et al 2012¹⁸ also showed significant increase in width of keratinised tissue from 1.32+0.66 mm to 2.20+0.554 mm over a period of 6 months with the combined use of PRF and CAF. In contrast, Aroca et al 2009¹⁵ in his study with CAF and PRF did not observe any gain of keratinised gingiva. In fact, a slight decrease was seen from 2.78 +1.08mm to 2.54+0.85mm. He stated that 6 months time adopted in his study was not appropriate to observe a proper creping attachment when a PRF membrane is placed under the flap, because the length of time for this observation may vary along various mucogingival techniques. Cheung & Griffin 2004¹⁹ showed significant increase in keratinised tissue width where CTG + CAF was used for treating millers class 1 gingival recession. Jankovic et al. 2012¹⁸ reported that use of CTG+PRF is more effective than CTG in increasing the width of keratinized gingiva. PRF growth factors might have a positive effect on the proliferation of gingival and periodontal fibroblasts. Anitua 2012²⁰ stated that, PRF accelerates the reconstruction of gingival connective tissue by stimulating several important processes involved in wound healing. In this study, the mean increase in KTW did not exhibit any significant differences between both the groups; though both techniques showed a positive effect on increasing the thickness of gingiva and the width of keratinized gingiva. The results of this study indicated that both CTG and PRF membrane are effective and predictable treatment modalities for the management of recessions. Positive effects of PRF in this study may be attributed to its various growth factors (PDGF, VEGF and TGF), cytokine, structural glycoprotein and the dense polymerizing fibrin matrix constituent, that enhances wound stability, promotes angiogenesis and increases matrix synthesis. Although the structure of the fibrin matrix is considered a critical element of regenerative potential rather than the gradual release of growth factors residing in PRF, the PRF preparation protocol, concentrations of platelets, growth factors and cytokines inside PRF might have affected the results. Growth factors secreted by PRF might have improved the attachment of cells in the overlying flap to membrane and of the membrane to the underlying root surface resulting in prevention of the flap shrinkage. Aroca et al 2009¹⁵ evaluated the combination of CAF and PRF-M for the treatment of gingival recessions and failed to find any additional benefits of PRFM combined with CAF in terms of the clinical parameters used in this study. This was attributed to the dehydration of the membrane and the inadequate volume of the membrane. Mufti et al¹⁰ have found significant difference in terms of CAL, REC-HT, REC-WD, HKT and TKT from baseline to 6 months in test group (CAF+PRF), whereas in the control group (CAF+CTG), only significant improvement seen was in REC-HT and TKT from baseline to 6 months. Certain limitations to this study were small sample size; short follow up period, absence of histological analysis, A split-mouth design could be preferred to provide a more objective comparison of the surgical interventions and to know patient's individual objective reactions and healing.

Conclusion

It can be concluded that treating gingival recession lesions with coronally advanced flaps along with connective tissue graft versus coronally advanced flap along with PRF yields similarly favourable results. Addition of PRF, may add to benefits considering healing, major clinical periodontal and soft tissue parameters. However, these findings are still not sufficient to advocate the true clinical effects. The effect needs to be further investigated using long-term clinical and histological studies including large populations and patient-based outcome evaluations.

References

1. Philstrom BL, Michalowicz BS, Johnson NW. Periodontal diseases. *The Lancet*. 2005; 366(9499):1809-20.
2. Page RC: Gingivitis. *J Periodontol* 1986;13:345-35.
3. Jain S, Kaur H, Aggarwal R. Classification systems of gingival recession: An update. *Indian J Dent Sci* 2017;9(1):52.
4. Polimeni G, Xiropaidis AV, Wikesjo UM. Biology and principles of periodontal wound healing regeneration. *Periodontol* 2000 2006;41:30-47.
5. Prasad DK, Shetty NS, Solomon EG. The influence of occlusal trauma on gingival recession and gingival clefts. *J Indian Prosthodont Soc* 2013;13(1):7-12.
6. Wennstrom JL. Mucogingival therapy. *Ann Periodontol* 1996;1(1):671-701.
7. Allen EP, Miller PD. Coronal positioning of existing gingiva: short term results in the treatment of shallow marginal tissue recession. *J Periodontol* 1989;60(6):316-9.
8. Paolantonio M. Combined periodontal regenerative technique in human intrabony defects by collagen membrane. A controlled study. *J Periodontol* 2002;73(2):158-66.
9. Dohan DM, Choukroun J, Dohan S et al. Platelet rich fibrin (PRF): a second generation platelet concentrate. Part I: Technological concepts and evolution. *J Oral Med Oral Surg Oral Radiol* 2006;101(3):e37-44
10. S Mufti, S Dadawala, P Patel, M Shah, D Dave. *Contemp Clin Dent*. Comparative Evaluation of Platelet-Rich Fibrin with Connective Tissue Grafts in the Treatment of Miller's Class I Gingival Recessions 2017;8(4):531-537.
11. 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. *J Dent Sci* 2015;10:36-45.

12. Padma R, Shilpa A, Kumar PA, Nagasri M, Kumar C, Sreedhar A. A split mouth randomized controlled study to evaluate the adjunctive effect of platelet-rich fibrin to coronally advanced flap in Miller's class-I and II recession defects. *J Indian Soc Periodontol*. 2013;17:631–6.
13. Shalaby, S Morsy. Comparative evaluation of coronally advanced flap using platelet rich fibrin membrane and fresh amniotic membrane in gingival recession. *E.D.J* 2019;65(2):1279-1290.
14. V Moraschini , E Santos, P Barboza .Use of Platelet-Rich Fibrin Membrane in the Treatment of Gingival Recession: A Systematic Review and Meta-Analysis. *J Periodontol*. 2016 Mar;87(3):281-90.
15. Aroca S, Keglevich T, Barbieri B, Gera I, Etienne D .Clinical evaluation of a modified coronally advanced flap alone or in combination with a platelet-rich fibrin membrane for the treatment of adjacent multiple gingival recessions: a 6-month study. *J Periodontol*. 2009;80:244–25
16. Gupta S, Banthia R, Singh P, Banthia P, Raje S, Aggarwal N . Clinical evaluation and comparison of the efficacy of coronally advanced flap alone and in combination with platelet-rich fibrin membrane in the treatment of Miller class I and II gingival recessions. *Contemp Clin Dent* 2015;6:153–160.
17. Cairo F, Cortellini P, Tonetti M et al. *J Clin Periodontol*. 2012;39(8):760-8.
18. Jankovic S, Aleksic Z, Klokkevold P, Lekovic Vet al. Use of platelet-rich fibrin membrane following treatment of gingival recession: A randomized clinical trial. *Int J Periodontics Restorative Dent*. 2012;32:41–50.
19. Cheung WS, Griffin TJ. A comparative study of root coverage with connective tissue and platelet concentrate grafts: 8-month results. *J Periodontol* 2004;75:1678-1687.
20. Anitua E, Troya M, Orive G. Plasma rich in growth factors promote gingival tissue regeneration by stimulating fibroblast proliferation and migration and by blocking transforming growth factor-induced myodifferentiation. *J Periodontology*. 2012;83:1028–10.