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Comparative Evaluation of Amniotic Membrane with Platelet Rich Fibrin (PRF) in the Treatment of Islotaed Class I Or II Gingival Recessions with Coronally Advanced Flap: A Split Mouth Randomized Controlled Study

Sakshi Garg[1*] Shikha Virdi[2] Yangchen Palkyi[3] Rajat Garg[4] Kousain Sehar[5] Navneet Kour[6]

[1]Professor, Department of Periodontology and Implantology. B.R.S Dental College and Hospital, Panchkula, Haryana, India.
[2]Private Consultant, Department of Periodontology and Implantology, Panchkula, Haryana, India.
[3]Senior lecturer, Department of Periodontology and Implantology. B.R.S Dental College and Hospital, Panchkula, Haryana, India.
[4]Private Consultant, Department of Periodontology and Implantology, Panchkula, Haryana, India.
[5]Junior Resident, Department of Periodontology and Implantology. B.R.S Dental College and Hospital, Panchkula, Haryana, India.
[6]Junior Resident, Department of Periodontology and Implantology. B.R.S Dental College and Hospital, Panchkula, Haryana, India.

ABSTRACT

Background: A Single blind randomized clinical trial study was conducted to evaluate and compare the efficacy of coronally advanced flap with amniotic membrane and coronally advanced flap with platelet rich fibrin in treatment of bilateral Millers class I or II gingival recession.

Material and methods: A total of ten patients (8 males and 2 females) presenting with similar bilateral Millers class I or II gingival recession were selected and were randomly divided in two groups. In Group 1 coronally advanced flap was done with amniotic membrane (CAF+AM) and in Group 2 coronally advanced flap with platelet rich fibrin (CAF+PRF) was done. Clinical parameters like probing depth, clinical attachment level, recession depth, recession width, width of keratinized gingiva, gingival biotype and wound healing index were recorded at baseline 1, 3, 6 month post operatively.

Results: Statistically significant difference was found among few parameters when assessed preoperatively and postoperatively in both the groups.

Conclusion: Root coverage was achieved with both the groups but greater root coverage was seen in the group1 (CAF+AM).On the basis of this we conclude that Amniotic membrane can serve as a new perspective in root coverage procedure.

Keywords: Amniotic membrane, CAF, PRF.

INTRODUCTION

Gingival recession (GR) is the one of the most undesirable condition of the periodontal disease[1].The term designates the oral exposure of root surface due to the displacement of gingival margin apical to the CEJ. Etiology of gingival recession is multifactorial. The most common is plaque induced periodontitis, faulty tooth brushing and others include tooth malpositioning, alveolar bone dehiscence, thin marginal tissue covering, non vascularised root surface, aberrant muscle attachment, orthodontic, prosthodontic treatment and tobacco chewing. Gingival recession (GR) defects exhibit both esthetic and functional problems i.e. esthetic deficiencies, poor plaque

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*Correspondence Dr. Sakshi Garg.
Department of Periodontology and Implantology. B.R.S Dental College and Hospital, Panchkula, Haryana, India.
Email: Not Disclosed

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control, root surface hypersensitivity, root surface caries, cervical root abrasion[2]. These GR defects need a sound clinically oriented scientifically supported therapeutic approach to fulfill the esthetic and functional demands with minimum operative and postoperative sequel.

The concept of excluding the gingival epithelium with the mere use of barrier membranes has evolved to the incorporation of the correct signaling molecules like the growth factors and the presence of correct cell population like the stem cells, fibroblast, and cementoblast directly into the wound to promote regeneration.

Recently, an allograft of alternative origin derived from human amnion tissue has been advocated in the treatment of gingival recession. This composite membrane consisting of pluripotent cellular element embedded in a semi permeable membrane. It is an immuno tolerant structure having ability of trans differentiation in to other cellular elements of periodontium with excellent revascularization making it a suitable candidate for GTR[3] The placental allograft has properties like antiscaring, antimicrobial, anti-inflammatory, tissue reparative and reduction of pain, being tissue with immunoprivilege and thus different from other allograft, xenograft , and alloplast barrier membrane used in periodontal surgery[4].

MATERIAL AND METHODS

The present study was conducted in the Department of Periodontics and Oral Implantology of Santosh Dental College and Hospital Ghaziabad and approved by its Ethical Committee. 10 patients aged between 20 and 40 years with bilateral Miller's class I or II recession were recruited and informed consent was obtained from the patients. The selected patients were randomly allocated using a coin toss method into two groups.

1. ***Test Group- Group*** **1**(CAF+AM) with 10 sites of Millers gingival recession class I or II

2. **Control Group- Group 2** (CAF+PRF) with 10 sites of Millers gingival recession class I or II

Systemically healthy patients presenting with atleast two bilateral Miller's class I or I1 gingival recession on maxillary or mandibular teeth having platelet count within normal range and a CEJ without significant damage were included in the study. Patients who have undergone periodontal surgery in the past 12 months or any previous surgical attempts to correct the gingival recession, having mucosal disorders like high frenal attachments and ulcers, mal-aligned teeth, active infection or inflammation in area of recession, trauma from occlusion or deep bite, habit of bruxism or clenching, root caries, shallow vestibular depth, inability to maintain oral hygiene were excluded from the study. Smokers, patients with medical history that would complicate the outcome of the study or any other medical, physical or psychological reason that might affect the surgical procedure, bleeding or coagulation disorder, pregnant women were also included.

The selected patients were explained about the purpose, nature and surgical procedure of this study in detail. Prior to the commencement of surgery a detailed case history of the patients was carefully recorded. All the routine investigations were done prior to surgery.

All the patients underwent the phase 1 therapy (full mouth scaling and root planning) and were educated and motivated with an emphasis on proper oral hygiene maintaince. Root coverage procedure was done one month after the phase 1 therapy.

All surgical procedure were performed by single operator. Clinical parameters were recorded. Surgical areas were prepared with adequate anesthesia using 2%. Lignocaine HCL containing 1:80,000 adrenaline. Coronally positioned flap technique was done by making two horizontal incisions on distal and mesial inter dental papillae of tooth followed by crevicular incision and two vertical releasing incisions at the mesial and distant aspects of tooth. A full thickness flap followed by partial thickness was made in periosteum at the base of flap to facilitate tension free coronal displacement flap. The exposed root surface was scaled and root planned. Cervical step was reduced with the help of reduction hand piece and papilla was deepithelized to create a connective tissue bed.

On test site (CAF+AM) commercially available dehydrated amniotic membrane cut into the desired shape and length with scissors and placed on to the recession site.

For control site (CAF+PRF), PRF membrane was prepared by withdrawing 9 ml venous blood in a 10ml glass coated plastic tube without an anticoagulant and centrifuging it for 12 minutes at 2700 RPM. A fibrin clot obtained in the middle of the tube between the red corpuscles at the bottom and cellular plasma at the top was separated from PRP and RBC layer by cutting and was placed between the two gauze pieces to form a membrane. This PRF was placed underneath the flap on prepared surgical site.

In both the groups the previously reflected gingival flaps were coronally advanced to cover the PRF and amniotic membrane and were held in that position with 4-0 interrupted suture with very little tension. A tin foil & periodontal dressing were placed over the surgical site. Patients were advised to rinse with 0.2% chlorhexidine gluconate twice daily. Systemic analgesics and antibiotics were prescribed and patiens were instructed to follow the routine post operative instructions. The dressing and sutures were removed 10 days after surgery. Follow up was done at 1, 3, 6 months post operatively by the same examiner.

The statistical analysis:

Unpaired or Independent t-test was used for comparison of mean value between 2 groups when the data follows normal distribution. Wilcoxon sign rank pair test was used for comparison of 2 mean values obtained from a same group or a pair of values obtained from the same sample when the data does not follow the normal distribution. Friedman's test was used for comparison of more than 2 mean values obtained from a same group or obtained from the same sample when the data does not follow the normal distribution.

RESULTS

In this Spilt mouth randomized controlled single blind split mouth control clinical study, 10 subjects with 20 bilateral similar (Millers class I or II) recession defects were treated with either Amniotic membrane(AM) or Platelet rich fibrin(PRF) along with coronal advanced flap(CAF) technique. Clinical parameters like probing depth(PD),clinical attachment level (CAL),recession depth (RD), recession width(RW),width of keratinized gingiva(WKT),gingival biotype (GB) and wound healing index(WHI) were assessed at 1,3,6 months from baseline by single examiner using an acrylic stent and Williams periodontal probe.

DISCUSSION

The present spilt mouth randomized controlled, single blind clinical study was performed to evaluate the clinical efficacy of Amniotic membrane along with coronally advanced flap (CAF) technique for the treatment of Millers class I or II defects At baseline, none of the measured clinical parameter showed any statically significant difference between the test & control group. Bleeding on probing and presence or absence of plaque was recorded at all follow-ups to assess the oral hygiene maintaince and inflammation. All the patients maintained their oral hygiene as none of the site shown inflammation and bleeding on probing.

In the present study none statistically significant change in PD ($p>0.05$) was observed from baseline to 6 months in both the groups. This is in accordance with the study by **Agarwal et al**[5] & **Gautam**[1]. However, **Wallace et al**[6] reported decrease in PD by 0.8 mm from baseline to six months in a series of cases comparing amniotic membrane with acellular dermal matrix.

In terms of recession, significant gain in CAL was observed in both groups from baseline to 6months, indicating that both the techniques are effective in achieving root coverage. However on inter group comparison of mean CAL gain from baseline to 6 months, a significant difference was observed in both groups with a ($p<0.05$).With a greater CAL gain observed in test group as compared to control indicating better efficacy of amniotic membrane in improving this parameter. Amniotic membrane strongly resembles the oral mucosa basement membrane and contain different types of laminin specially laminin 5 which play an important role in the adhesion of gingival cells **Gurinsky 2009**[7],**Arya et al 2010**[8], **Meller et al 2011**[9],**Riau et al 2010**[10]. Laminins can promote regeneration, accelerate tissue adhesion, and preserve tissues all of which are key factors in improved healing of gingival lesions and might result in CAL improvement.

Our study shows more percentage of root coverage in AM group after 6 months (95.5%) in comparison

to root coverage in PRF group (77%) This is in contrast to **Agarwal et al**[5] study in which root coverage was more with PRF group. Studies by **Gurinsky**[7] **Agarwal et al**[5], **Gautam**[1] showed root coverage of (99.7%), (36%) and (92%) with AM. **Aroca et al**[11], **Jankovic et al**[12] and **Agarwal et al**[5] reported root coverage with PRF were (80.7%), (88.7%) and(56%). Our results shows more root coverage with AM group in comparison to PRF. However none of the method results in 100% root coverage.

At 3, 6 months follow up there was significant improvement in recession width (RW) from baseline to 6 months in both the groups. This was similar to results obtained in studies by **Atilla et al**[13], **Aroca et al**[11], **Uraz et al**[14] in PRF treated sites. Contrasting results were obtained in study by **Agarwal et al**[5] there was greater in mean reduction in horizontal component of gingival recession(HGR)(RW) in group I (CAF+PRF) followed by group II (CAF+AM) at the end of 3 months but similar results were obtained in next three months there was increase in HGR(horizontal component of gingival recession) value in group II (CAF+AM).However on comparison width reduction over 6 month was statistically greater in test group as compared to control group with a ($p<0.05$).

The mean width of keratinized gingiva (WKT) increased by (2.78±0.61) and (2.15±) in test and control groups ($p<0.05$) respectively at 6 months. The tendency of mucogingival junction to preserve its position after coronally displacement of flaps, the granulation tissue originating from the periodontal ligament might play role in increasing the keratinized gingiva. **Agarwal et** al[5] also reported significant increase in attached gingiva (AG) in both the PRF and AM groups, but increase in width was more in PRF group as compared to AM group. However, **Gautam A** [1] reported no significant difference in width of TKT in either of the two groups. In other studies by, **Jankovic et al**[12] and **Uraz et al**[14] the mean increase in keratinized tissue width of keratinized gingiva in PRF treated sites as compared to SCTG. **Wallace et al**[6] reported keratinized tissue width increase of 0.2mm at 4 months for AM treated site .

Various study on gingival biotype proved the fact that gingival tissue thickness is essential for complete root coverage and stability of the clinical outcome. In our study there was statistical significant increase in gingival thickness from base line to 6 months in both the groups with statistically non significant difference ($p>0.05$) among the two groups at 6 months, which indicates that both the material are equally efficacious in improving the gingival thickness during the given period. Similar results were noted in study by **Shetty et al**[15] in which root coverage with enhanced gingival biotype was seen in both the groups. This is in contrast to **Agarwal et al**[2] study in which increase in gingival tissue thickness in PRF treated site was more as compared to AM treated sites.

In our study wound healing index (WHI) was taken as one of the parameter. It was found to be statistically non significant for both the groups with ($p>0.05$) at 6 months, as healing was uneventful in both the groups. This outcome may be related to the properties of both the groups i.e. anti scarring and increase fibro genesis which provide both wound stability and good healing. Study by **Jankovic et al**[12]showed wound healing was better with PRF group as compared to connective tissue graft(CTG) group.

Agarwal et al[5] has taken patient satisfaction analysis based on visual analogue scale as one of the parameter analyzed at 3 and 6 month interval. They found that patient comfort score was more for AM treated group and patient esthetic score and hypersensitivity score was more for PRF treated site.

On the basis of these results it can be seen that AM is found to be better as compared to the PRF group in treatment of gingival recession. 100% root coverage was not achieved with either of the groups. The comparison between studies are compromised by the different methods used to measure the clinical parameters .The results in the study would have been more quantified if vernier caliper or the intra oral ultrasonic device which is the latest technique to measure the gingival thickness were used. Other limitations include small sample size, short term nature of study and lack of histological evaluation due to ethical concerns. These results are based on single centered small sample size study Henceforth long term multicentre randomized controlled clinical trials with larger sample size are further required to prove the efficacy of AM over PRF

CONCLUSION

In the light of above findings we can conclude that both the materials in combination with CAF technique are equally good as treatment modalities in Millers class I or II gingival recession. Both the materials resulted in decreased the recession depth, recession width, and increase in width of keratinized tissue. Both have shown good results in improving the gingival thickness and healing was fast and good with both the materials. However AM showed more root coverage and good width of keratinized tissue was attained as compared to PRF. Moreover AM being an allograft is non immunogenic, self adhering and simple to use material, whereas PRF is more technique sensitive and patient compliance dependent. AM is readily available and has longer shelf life as compared to PRF. So AM can be considered a better option over PRF in treatment of Millers class I or II recession, but further research is required to investigate the stability of the achieved root coverage and tissue thickness. Hence long term studies with larger sample size would be required to authenticate better efficacy of AM over PRF.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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