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To Clinically And Radiographically Compare Regenerative Effectiveness of Open Flap Debridement Alone and in Combination with PRF in the Treatment of Periodontal two and Three Wall Infrabony Defects

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Abstract

Background: Periodontitis is characterized by microbially-associated, host-mediated inflammation that results in loss of periodontal attachment. **Objectives:** To clinically evaluate the clinical attachment level, PPD, gingival marginal position , wound healing , VAS scale , plaque index , sulcus bleeding index and radiographically evaluate the bone fill of the selected site treated with open flap debridement alone and with PRF. **Methods:** A total of 30 sites, split mouth study within age group ≥18-55 ≤ years with chronic periodontitis patients were selected. Surgical sites were identified and divided into 2 groups: Group I control site (n=15)–the site was treated with open flap debridement. Group II test site(n=15) – the site was treated with open flap debridement along with PRF. **Results:** There was statistical significant probing depth reduction and better bone fill in test site as compared to control site. This can be attributed to beneficial effects of P.R.F. **Conclusions:** P.R.F shows added benefits in soft tissue healing and bone regeneration.

Keywords:- P.R.F, Periodontitis.

INTRODUCTION

Periodontitis is a chronic multifactorial inflammatory disease associated with dysbiotic plaque biofilms and characterized by progressive destruction of the tooth supporting apparatus.[1]

According to study done by Cortellini and Tonetti on long term survival following regenerative treatment on infrabony defects indicate that, in patients participating in a supportive periodontal care program, 96% of teeth with severe infrabony defects and treated with a periodontal regenerative procedure could be retained for a period up to 10 years, so it increases the prognosis of the tooth.[2]

Various grafts used for periodontal regeneration includes autografts, allografts,

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xenografts and alloplasts. Autografts are referred to as the "gold standard" owing osteogenesis, osteo- conduction and osteo-induction as well. However, the main disadvantage is more extensive armamentarium and need of additional surgical site. Allografts are osteoconductive with the exception of DFDBA. However, it requires the tissue bank for procurement and may show some chances of antigenicity and risk for disease transmission. Alloplastic materials neither contain osteoconductive nor osteoinductive property. Morever, it doesn't contain or release growth factors nor stimulating peripheral cells into osteoblasts.

However, in alternative to all of this, PRF can be used as a substitute to bone graft material due to its ability to act locally by stimulating large number of cell types by influencing recruitment and proliferation of mainly fibroblasts, endothelial cells and osteoblasts by enhancing the hard and soft tissue repair. Morever it is derived from patient's own blood, so no chances of antigenicity, way more economical and it also improves the antibacterial host defense as it contains leukocytes (L-PRF).

Objectives

To clinically evaluate the clinical attachment level, PPD, gingival marginal position, wound healing, VAS scale, plaque index, sulcus bleeding index and radiographically evaluate the bone fill of the selected site treated with open flap debridement alone and with PRF.

MATERIAL AND METHODS

A total of 30 sites, split mouth study within age group ≥18-55 ≤ years with chronic periodontitis patients were selected from the Outpatient Department of Periodontology, AMC Dental College and Hospital, Ahmedabad after fulfilling the inclusion & exclusion criteria and no gender bias were included.

Patients within the age group between≥18-55≤years, willing to provide informed consent, Availability for follow-up appointments, Probing depth ≥5mm at one or more sites after phase I therapy sites exhibiting clinically and radiographically presence of infrabony defects ≥ 3 mm and ≤ 7mm (distance from alveolar crest to base of the defect) were included. Patients with inadequate plaque control, Pregnant or lactating mothers, Subjects with known systemic disease or on any medication known to interfere with outcomes of periodontal therapy, Smokers, tobacco chewers and alcoholic patient were also excluded.

Methodology

Prior to the study, the purpose was explained to all participants. A written informed consent was obtained from all participants for taking part in the study. Surgical sites were identified and divided into 2 groups: Group I control site (n=15)–the site was treated with open flap debridement. Group II test site(n=15)–the site was treated with open flap debridement along with PRF.

All patients received nonsurgical therapy consisting of scaling and root planning with detailed oral hygiene instructions, followed by re-evaluation 4 to 6 weeks later. Acrylic occlusal stents were fabricated so that the measurements made post surgically were at the same position and angulation as those made pre-surgically. X-rays were taken with paralleling technique using PID device and with grid to measure bone density changes with 1mm scale.

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Surgical Procedure

Crevicular incision given and full thickness mucoperiosteal flap was reflected. After through debridement and curettage on both the sides, PRF clot was placed on one side. PRF preparation was done following choukroun's criteria (2800 rpm for 12 minutes) and PRF box was used for gentle compression of PRF clot. Flaps were replaced and sutured to achieve primary closure using interrupted loop sutures.

Post Surgical Care

The patient was asked to follow appropriate post-surgical instructions, antibiotic therapy along with an anti-inflammatory agent for 5 days was prescribed postoperatively and perform adequate plaque control by rinsing with 10 ml of 0.2% chlorhexidine gluconate mouthwash twice daily 1 day after surgery for 2 weeks postoperatively. Postoperative assessments of the clinical and radiographic parameters were done at 6, 9 months.

RESULTS

The clinical parameters assessed were Clinical Attachment Level (CAL), Probing Depth(PD), Gingival Marginal Position (GMP), Plaque Index (PI), Sulcus Bleeding Index (SBI), Early Wound Healing Index (WHI), VAS scale and radiographic parameters include Infrabony Defect Depth (IDD).

There was statistically significant PD reduction in both sites. Mean PD reduction in control site from (7.23±0.94mm) to (3.55± 0.64mm) and test site from (6.89±0.77mm) to (2.75±0.56mm) at 9 months. However, on comparison by Independent t test, there was no statistical significant difference at 6 months but on 9 months, there was significant PD reduction on test site as compared to control site (p value < 0.05, S).

There was statistically significant CAL gain in both sites. Mean CAL gain in control site from baseline(8.46±0.76mm) to (4.94±0.59mm) while on test site (8.24±0.84mm) to (4.51±0.51 mm) at 9 months. However on comparison, there was no statistical significant difference at 6 months and 9 months.

There was significant increase in mean GMP at 6 and 9 months in both sites compared to baseline indicating gingival recession. Mean increase in GMP at baseline (6.72±1.08 mm) to (7.67±1.14 mm) at control site while at test site from baseline (6.44±0.86 mm) to (7.37±0.92 mm) at 9 months. On intergroup comparison by independent t test, there was no significant change found at all time intervals.

There was significant mean reduction in PI at 6 and 9 months in both the sites. Mean reduction in PI from baseline (2.96±0.46) to (1.24±0.30) at control site, while at test site from baseline (2.84±0.44) to (1.17±0.34) at 9 months. However, on intergroup comparison by independent t test, there was no significant change found at all time intervals.

There was significant mean reduction in SBI at 6 and 9 months in both the sites. Mean reduction in SBI from baseline (2.98±0.47) to (1.08±0.28) at control site while at test site from baseline (2.78±0.26) to (1.02±0.07) at 9 months. However, on intergroup comparisons by independent t test, there was no significant change found at all time intervals.

Better healing evaluated by early wound healing index can be seen on test side as

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compared to control site and the results are statistically significant (p value < 0.05, S).

Reduced post-operative pain and discomfort on test side as compared to control site. (p value < 0.05, S).

There was significant mean reduction in IDD at 6 and 9 months in both the sites. Mean reduction in IDD from baseline (3.86±0.68mm) to (2.72±0.46mm) at control site while at test site from baseline (3.93±0.57mm) to (2.08±0.56mm) at 9 months. However, on intergroup comparisons by independent t test, there was no significant change found at 6 months, but at 9 months there was significantly greater IDD reduction in test site as compared to control site. (p value < 0.05,S).

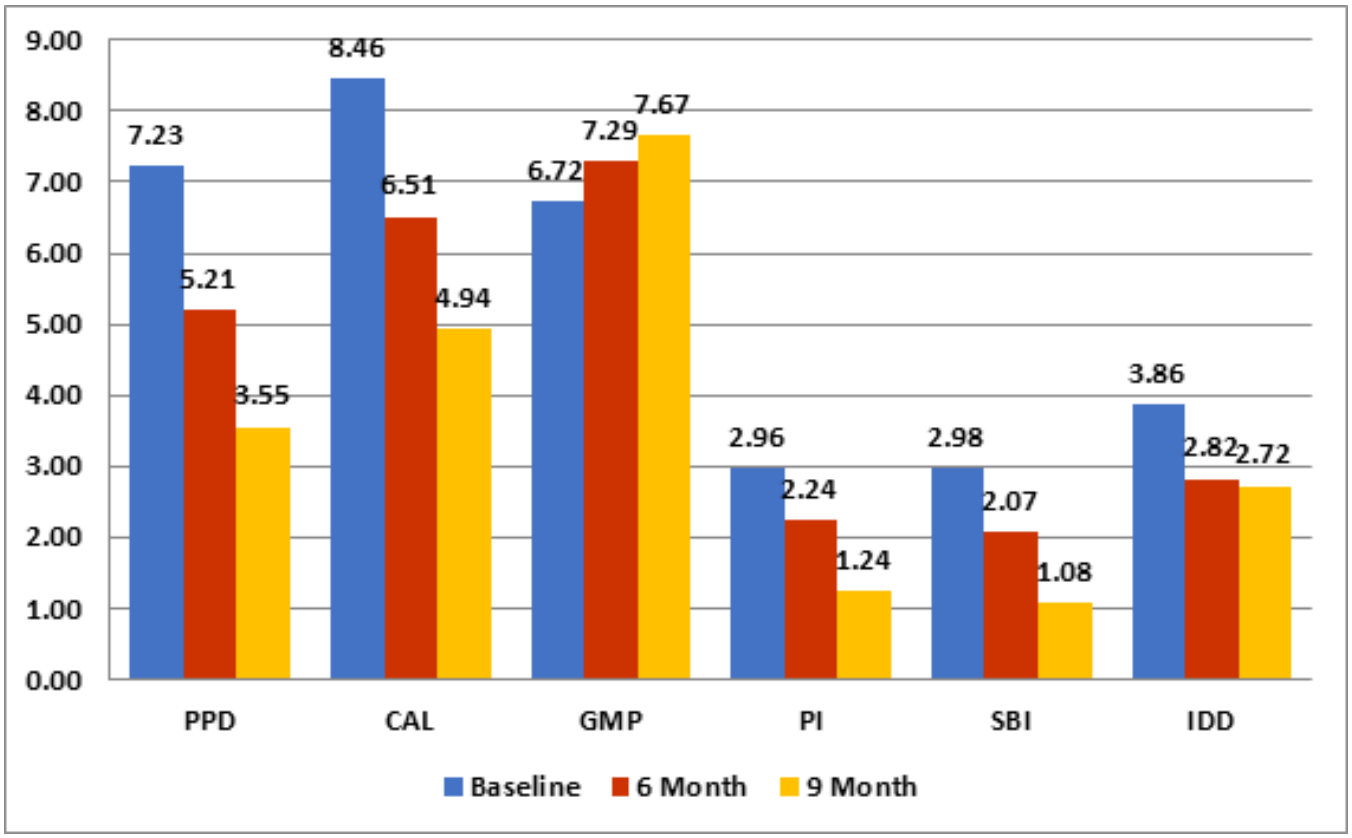

Figure 1: Comparison of all clinical parameters in Control site (PD, CAL, GMP, PI, SBI, IDD) at different time intervals.

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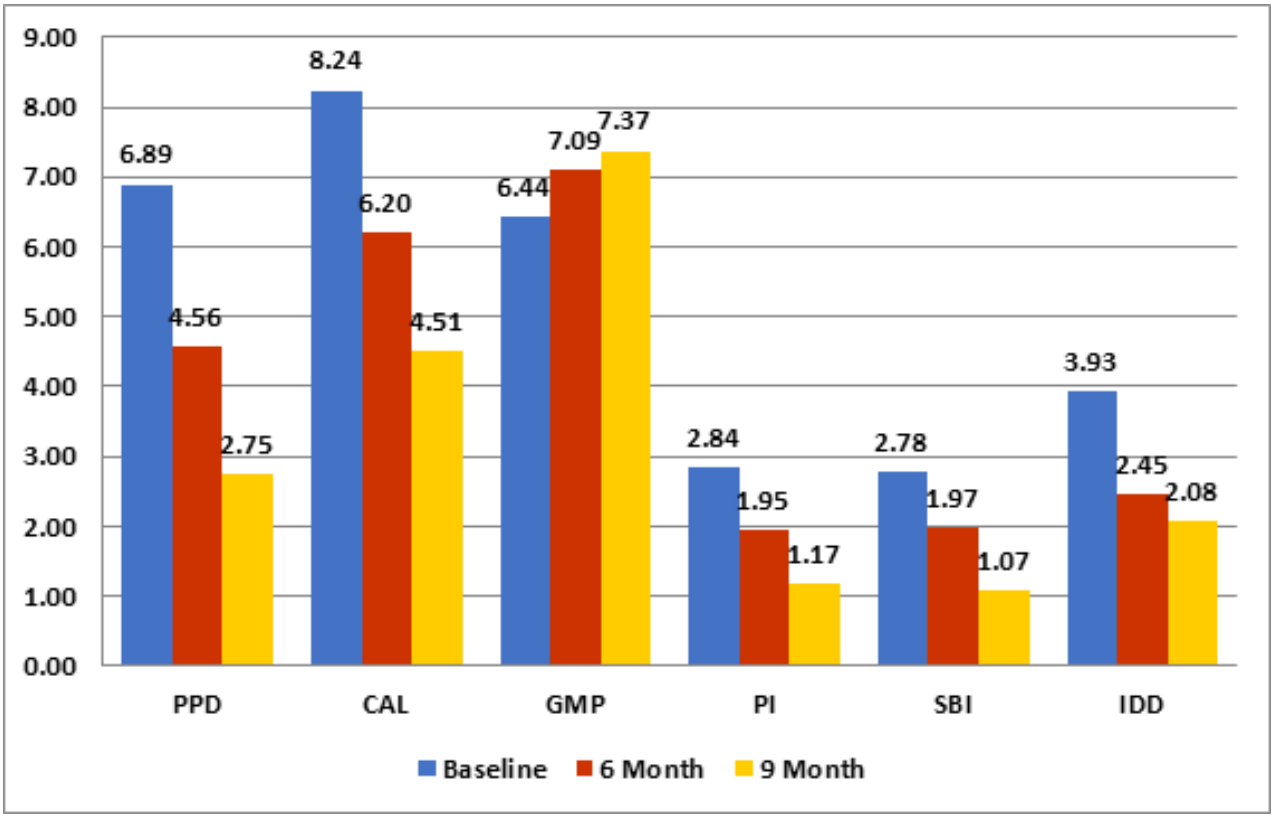

Figure 2: Comparison of all clinical parameters in test site (PD, CAL, GMP, PI, SBI, IDD) at different time intervals.

DISCUSSION

A total of 30 sites, split mouth study within age group ≥18-55 ≤ years (5 female, 4 male) with chronic periodontitis and no gender bias were included. Patients with probing depth ≥ 5 mm and presence of infrabony defect depth ≥ 3 mm and ≤ 7 mm were selected, as defect depth less than 3 mm can be well managed by either non-surgical therapy or resective osseous surgery and more than 7mm are usually associated with non-vital teeth as there are high chances of pulpal-periodontal infection. The exclusion criteria were: Smokers, tobacco chewing, pregnant females and systemic conditions like diabetes or any other condition that may complicate the periodontal therapy.

There was statistically significant probing depth (PD) reduction in treated test and control site at 6 and 9 months compared to baseline Healing of the infrabony defects in control site can be attributed to repair resulting in the development of a long junctional epithelium continuing almost to the bottom of the intraosseous defects. While on the other side, PRF has shown to act locally by quickly stimulating a large number of cell types by influencing their recruitment, proliferation and differentiation mainly of fibroblasts, osteoblasts etc. and thereby having potential for both hard and soft tissue repair as it contains pool of growth factors Study done by Thorat et al in 2011, Rosamma Josepha et al in 2012 and Ang Li in 2019, results showed PD reduction more in

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Page no- 151-157 | Section- Research Article (Periodontology)

the experimental group than the control group.[3,4,5] However, study done by Ajwani et al in 2015, showed no significant difference between both the groups.[6]

There was statistically significant change in gingival marginal position (GMP) in 6 and 9 months compared to baseline in both the site. Study done by Ajwani et al in 2015, Rosamma Josepha et al in 2012, Baghele et al in 2019, studied showed no significant difference between both the groups.[4,6,7] Sharma et al in 2017, results showed that PRF was superior to single OFD with respect to GML (GMP) change at the 9-months.[8]

There was statistically significant difference in plaque index (PI) at 6 and 9 months compared to baseline in both sites (p value < 0.05 S). Study done by Sharma et al in 2011, Ajwani et al in 2015, Chatterjee et al in 2016, Martende et al in 2016 showed equivalent oral hygiene was maintained by patients of both groups irrespective of sites.[6,8,9,10]

There was significant decrease in mean values of SBI at 6 and 9 months compared to baseline in both the sites. Study done by Sharma et al in 2011, Chatterjee et al in 2016, Martende et al in 2016 showed significant difference in SBI index values at 9 months compared to baseline.[8,9,10]

There was statistically significant difference in wound healing between two sites evaluated one week post operatively by early wound healing index with better healing in test site as compared to control site (p value=0.003, p value<0.05, S). The three - dimensional fibrin network inserted into the treated area determines effective neovascularization of the area, accelerated wound healing and rapid scar tissue remodeling There was significant reduction in infrabony defect depth (IDD) after 6 and 9 months compared to baseline in both the sites. Study done by Patel et al in 2017, Bajaj et al in 2017, Sharma et al in 2011, Baghele et al in 2019, showed greater bone fill in experimental group as compared to control site.[7,8,11,12]

Morever, it is difficult to determine actual 100% bone fill because conventional radiography represents 2-D representation of 3-D actual image. The main shortcoming of PRF is its preparation and storage as it will shrink resulting in dehydration altering the structural integrity of PRF. Morever, it cannot be stored resulting in risk of bacterial contamination.

Thus, larger sample size with advanced 3 D radiographic techniques are needed to establish the exact role of PRF in regeneration of infrabony defects.

CONCLUSIONS

PRF shows better soft tissue healing and helps in bone regeneration With limited sample size and observation time for study ,only 30 sites with 6,9 months follow up it can be concluded that P.R.F shows better probing depth reduction, faster soft tissue healing , reduced post operative pain and better bone fill.

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