Original Research Paper

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Periodontology

COMPARATIVE EVALUATION OF AN ALLOPLASTIC GRAFT (RESORBABLE HYDROXYAPATITE GRAFT) AND AUTOLOGOUS PLATELET RICH FIBRIN IN THE TREATMENT OF INTRABONY DEFECTS – A CLINICO – RADIOGRAPHIC STUDY

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ABSTRACT **Background:** The primary goal of periodontal treatment is the maintenance of the natural dentition in health and comfortable function. Hydroxyapatite (HA) bone grafting material has been used to fill periodontal intrabony defects, which has resulted in clinically acceptable responses. Platelet rich fibrin (PRF) developed in France described by CHOUKRON et al is a second generation platelet concentrate widely used to accelerate soft and hard tissue healing. **Method:** The study sample includes 23 patients (which included 30 intrabony sites) with the age group of 20-55 years. The surgical sites were randomly divided into 3 groups, group A treated by OFD, group B treated by alloplast (resorbable HA) and group C treated by PRF. Clinical parameters (PI, PPD, CAL, GML) were recorded at baseline, 3 months, 6 months and 9 months post operatively. Radiographic parameters were recorded at baseline and 9 months post operatively. **Results:** Mean PPD reduction was 1.8(0.74) in group A; 2.8(0.74) in group B; 4.1(0.83) in group C. while mean CAL gain was 1.7(0.64) in group A; 2.8(0.65) in group B; 2.8(0.83) in group C. furthermore, significantly greater percentage of mean bone fill was found to be 66.39(17.28)% in group C compared to 50.0(7.45)% in group B and 13.7(19.73)% in group A. **Conclusion:** PRF can be used as a sole grafting material, useful alternative and economical to alloplastic graft in the treatment of intrabony defects.

KEYWORDS : Open Flap Debridement, Hydroxyapatite, Platelet Rich Fibrin, Intrabony Defect Depth, Percentage of Bone Fill.

INTRODUCTION

Periodontics is an infectious disease that cause destruction of the tooth – attachment apparatus.[1] Periodontal therapy is performed with the primary objective of gaining access to the disease sites, achieving reduction in pocket depth, arresting further disease progression and finally restoring the periodontal tissues lost due to disease process.[2]

Conventional flap debridement falls short of regenerating tissues destroyed by the disease, and current regenerative procedures offers a limited potential towards attaining complete periodontal restoration.[4] Various biomaterials[5-8] based on endogenous regenerative technology (ERT), have been used for periodontal tissue regeneration in addition to autogenous[9,10] and allogenic bone grafts,[11,12] but not a single graft material is considered as a gold standard in the treatment of intrabony defects.

Porous hydroxyapatite (HA) bone graft material has been used to fill periodontal intrabony defects, which has resulted in clinically acceptable responses.[13] Hydroxyapatite (HA) has good biocompatibility when in contact with bone as its chemical composition is similar to that of bone. They are biocompatible, non-toxic, resorbable, and non- inflammatory, cause no immunological, foreign body or irritating response, and have excellent osteo-conductive ability.[14,15,16]

Among platelet concentrates, platelet rich fibrin (PRF) belongs to a group of second generation blood autologous preparation that was originally described by Choukroun[17] et al in 2001 is defined as an autologous leukocyte and PRF biomaterial. First biochemical analysis of the PRF composition indicated that this biomaterial consists of an intimate assembly of cytokines, glycanic chains and structural glycoproteins enmeshed within a slowly polymerized fibrin network. The biologic activity of the fibrin molecule is enough in itself to account for the significant cicatrical capacity of the PRF and the slow polymerization mode confers to the PRF membrane, a particularly favourable physiologic architecture to support the healing process.[18]

The use of PRF and HA bone graft for periodontal regenerative therapy offer an interesting and a potentially clinical useful modality to the clinician in treating periodontal osseous defects. Thus the purpose of the present study was to investigate the efficacy of autologous PRF and alloplastic graft (resorbable HA) bone graft in comparison to open flap debridement (OFD) alone in the treatment of intrabony defects.

MATERIALS AND METHODS

A clinical and radiographic study was designed and conducted at Department of Periodontics, HKE Society's S. Nijalingappa Institute of Dental Sciences and Research, Gulbarga.

The study included 30 surgical intrabony sites. Both males and females between the age group of 20-55 years of age were included in the study.

The project was reviewed by the board of ethical committee at H.K.E Society's S. Nijalingappa Institue of Dental Sciences and Research, Gulbarga and the project was envisaged after the clearance was obtained. The patients were informed about the study design and verbal and written informed consents were obtained from all subjects prior to their enrollment in the study.

Total of 30 surgical intrabony sites included in the study were divided into 3 groups Group A (n=10 sites) – intrabony defects treated by open flap debridement. Group B (n=10 sites) – intrabony defects treated by alloplastic graft (resorbable hydroxyapatite). Group C (n=10 sites) – intrabony defects treated by autologous platelet rich fibrin (PRF).

Clinical Procedure: The defect sites was anaesthetized with 2% lignocaine. Full thickness Mucoperiosteal flap was reflected, and root surface debrided. Defect sites in each patient were randomly divided into 3 groups to be treated with OFD, resorbable Hydroxyapatite and Platelet Rich Fibrin respectively. Sutured and Periodontal dressing placed and post – operative instructions given. Patient was recalled after 7 days for suture removal. Post Surgical evaluation and follow up at 3 months, 6 months and 9 months was done. Clinical parameters were recorded using UNC- 15 probe and customized acrylic stents at 3, 6 and 9 months. Radiographic parameters were recorded using IOPA grids at baseline and at 9 months post operatively.

PRF Preparation: Preparation of PRF follows the protocol developed by Choukroun et al in Nice France. The steps involved are as follows:

a) Blood specimen is collected or drawn from the patient.
b) The blood specimen is placed in the centrifuge and the tubes were immediately centrifuged at 3,000 rpm for 10 minutes at room temperature.

The layers that are formed are:-

I. The lower fraction containing the RBC's.
II. The middle fraction containing the fibrin clot.
III. The upper fraction containing the straw colored platelet poor plasma (PPP).

Radiographic parameter: Conventional IOPA radiograph with IOPA grid were taken using paralleling cone technique of the surgical sites at baseline and 9 months post operatively and following measurements were made.

a) Distance from cemento-enamel junction to base of the defect (CEJ to BD).
b) Distance from cemento-enamel junction to the alveolar crest (CEJ to AC).
c) Intra Bony Defect (IBD) depth = CEJ to BD – CEJ to AC.

RESULTS

Clinical Assessment: Demographic data - In group A 2 males (28.71%) and 5 females (71.43%) were included in this group (table 1a & fig 1a). The mean age of patients was 28.71 years and the age range was 20-35 years (table 1b & fig 1b). 4 surgical sites were from upper and lower single rooted teeth and remaining 6 surgical sites were from upper and lower multi-rooted teeth. In group B 4 males (44.44%) and 5 females (55.56%) were included in this group (table 1a & fig 1a). The mean age of patients was 38 years and the age range was 20-54 years (table 1b & fig 1b). 1 surgical site was from lower anterior and remaining 9 surgical sites were from upper and lower multi-rooted teeth. In group C 4 males (57.14%) and 3 females (42.86%) were included in this group (table 1a & fig 1a). The mean age of patients was 31 years and the age range was 20-54 years (table 1b & fig 1b). 1 surgical site was from lower anterior and remaining 9 surgical sites were from upper and lower multi-rooted teeth.

Table 2 and fig 2 shows the mean and standard deviation of the plaque index for all the 3 groups at baseline, 3 months, 6 months and 9 months post operatively. A statistically significant reduction in the Plaque Index was observed in all the three groups from baseline to 9 months postoperatively. There was no statistically significant difference when compared between the groups.

Table 3 and fig 3 shows the mean and standard deviation of Pocket Probing Depth (PPD) for all 3 groups at baseline, 3 months, 6 months and 9 months post Operatively. Table 3 also shows the comparison between the groups by one way ANOVA test. There was statistically significant difference only in the 9th month between the groups (F value = 4.29).

Table 4 and fig 4 shows the mean and standard deviation of clinical attachment level (CAL) for all 3 groups at baseline, 3 months, 6 months and 9 months post operatively. Table 4 also shows the comparison between the groups by one way ANOVA test. There was statistically significant difference at baseline between the groups (F value = 4.32).

Table 5 and fig 5 shows the mean and standard deviation of gingival margin level at baseline, 3 months, 6 months and 9 months post operatively. Table 5 also shows the comparison between the groups by one way ANOVA test. There was no statistically significant difference at all periods between the groups. Table 5(a) shows the mean and standard deviation of changes in the clinical parameter with respect to baseline. Table 5(b) shows the comparison of changes in the clinical parameters (with respect to baseline) between groups. There was no statistically significant difference between group A and group C.

Radiographic Assessment: Table 6 and fig 6 shows the mean and standard deviation of CEJ to the base of the defect of all 3 groups at baseline, 3 months, 6 months and 9 months post operatively. There was statistically significant difference in group B [5.8(1.17) mm to 3.6(0.67) mm] with $p < 0.05$ respectively. There was statistically significant difference in group C [7.5(1.43) mm to 3.1(1.14) mm] with $p < 0.05$ respectively.

Table 7 and fig 7 shows the mean and standard deviation of CEJ to the alveolar crest of all 3 groups at baseline and 9 months post operatively. There was statistically significant difference in group B [3.4(0.66) mm to 2.4(0.66) mm] with $p < 0.05$ respectively. There was statistically significant difference in group C [3.6(0.92) mm to 1.6(0.92) mm] with $p < 0.05$ respectively. There was statistically significant difference between the groups at baseline (F value = 3.57) and 9 months (F value = 5.04) respectively.

Table 8 and fig 8 shows the mean and standard deviation of intra bony defect (IBD) depth of all 3 groups at baseline and 9 months post operatively. There was statistically significant difference in the means of group B [2.4(0.66) mm to 1.2(0.4) mm] with $p < 0.05$ respectively. There was statistically significant difference in the means of group C [3.9(1.14) mm to 1.5(0.81) mm] with $p < 0.05$ respectively. There was statistically significant difference between the periods in group B (T value = 4.65) and in group C (T value = 4.44). There was statistically significant difference between the groups at baseline (F value = 5.02) and 9 months (F value = 2.39) respectively.

Table 9 shows the mean and standard deviation of changes in the radiographic parameters with respect to baseline. The mean values of intra bony defect (IBD) depth of group A was 0.3(0.46) mm; group B was 1.2(0.4) mm; group C was 3.0(1.79) mm with $p < 0.05$ respectively. The percentage of bone fill in group A was 13.7(19.73)%; group B was 50.0(7.45)%; group C was 66.39(17.28)% with $p < 0.05$ respectively.

Table 10 shows the changes in the radiographic parameters with respect to baseline between the groups. Mean IBD depth reduction: There was statistically significant difference between group A and group B with T value of 4.44; between group B and group C with T value of 4.38; between group A and group C with T value of 2.94. Mean percentage of Bone defect fill: There was statistically significant difference between group A and group B with T value of 5.06; between group B and group C with T value of 6.03; between group A and group C with T value of 2.61.

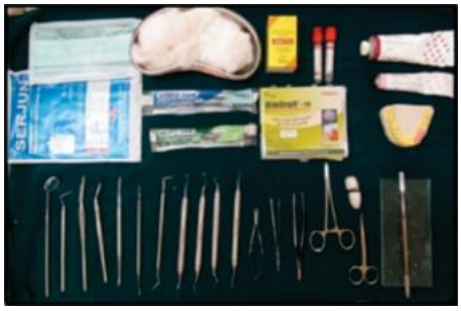


Fig 1: Armamentarium

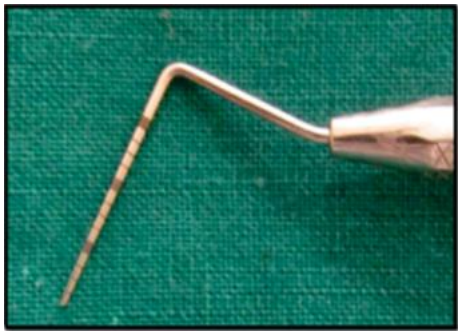


Fig 2: UNC 15 Probe

Fig 3: Group A (Open Flap Debridement)

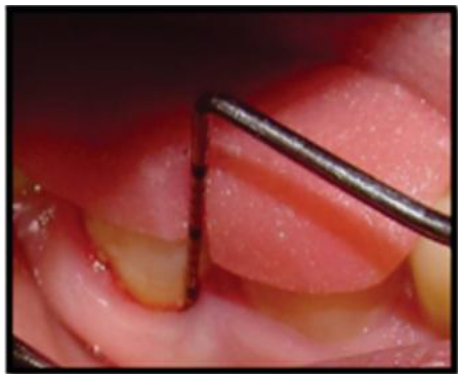


Fig 3 a: Detection of Periodontal Pocket

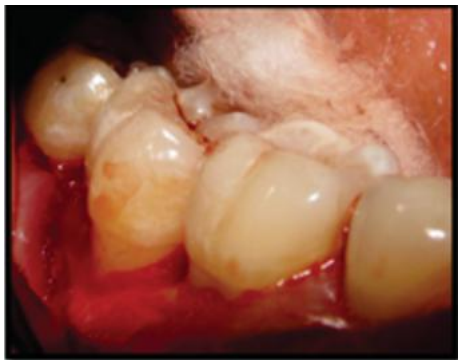


Fig 3 b: Flap Reflection and Debridement

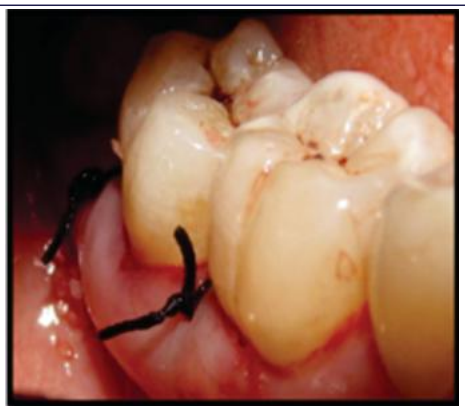


Fig 3 c: Sutures Given

Figure 4: Group B (Resorbable hydroxyapatite)

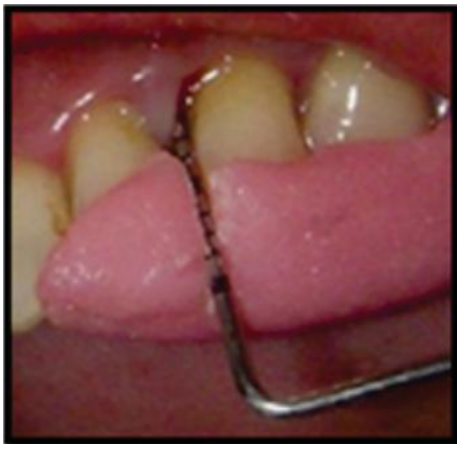


Fig 4a: Detection of Periodontal Pocket

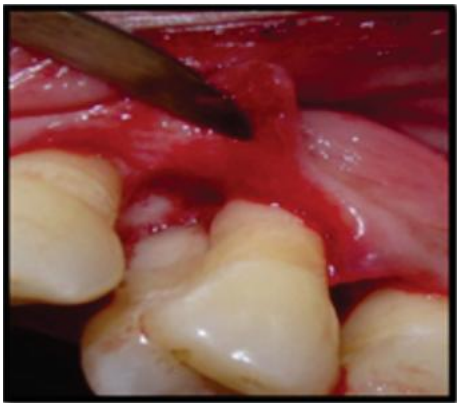


Fig 4b: Flap Reflection and Debridement

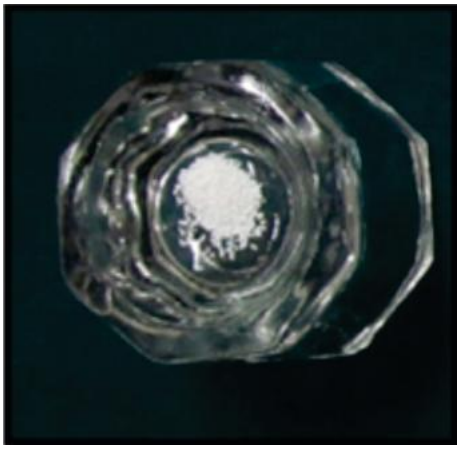


Fig 4c: Resorbable Hydroxyapatite Graft

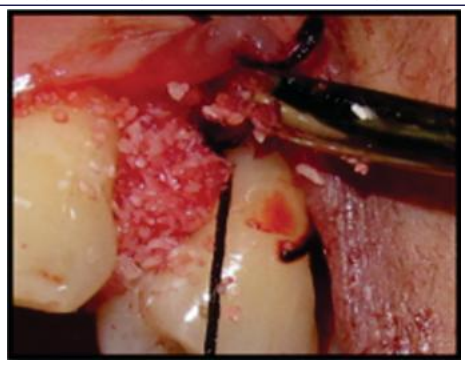


Fig 4d: Application of Bone graft

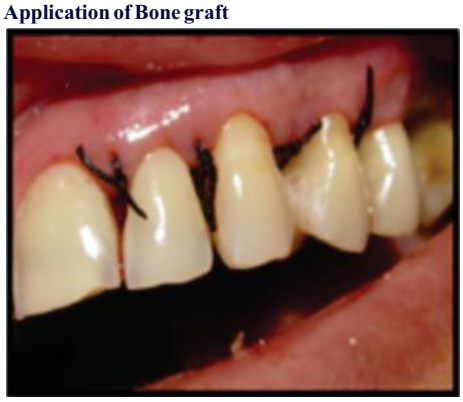


Fig 4d: Sutures Given

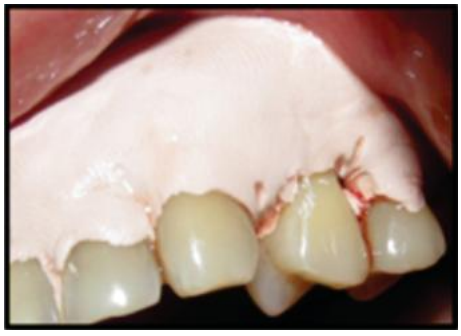


Fig 4e: Periodontal Pack given

Figure 5: Group C (Platelet Rich Fibrin)

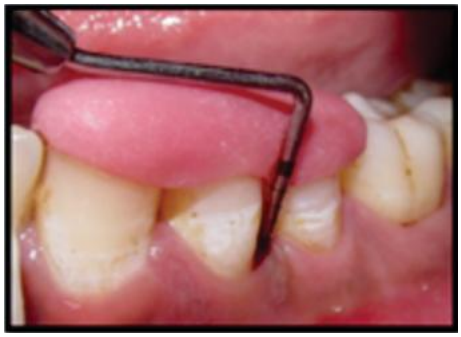


Fig 5a: Detection of Periodontal Pocket

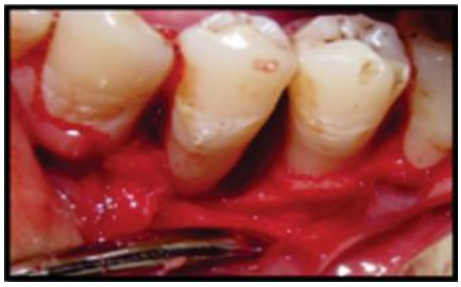


Fig 5b: Flap Reflection and Debridemen

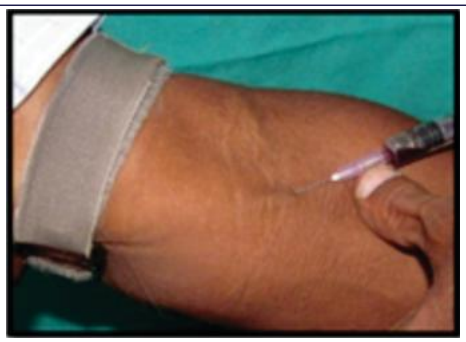


Fig 5c: Collection of Blood

Fig 5d: Centrifugation Machine

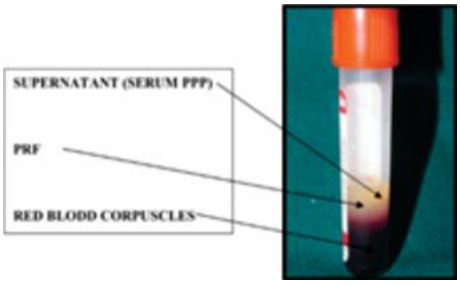


Fig 5e: The 3 Layers Formed

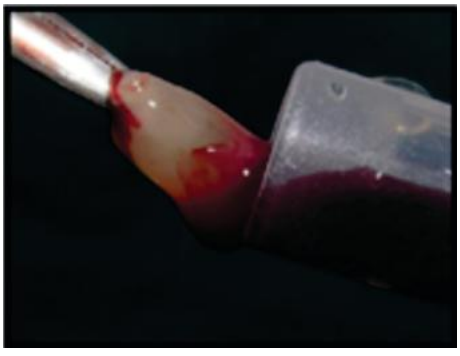


Fig 5f: PRF Obtained

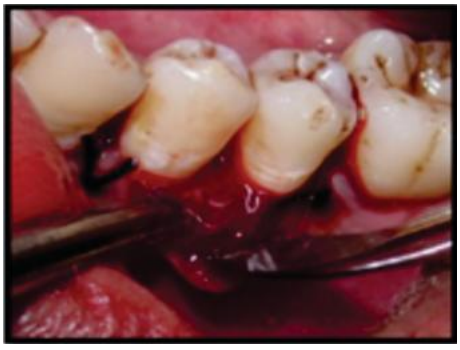


Fig 5g: Application of PRF

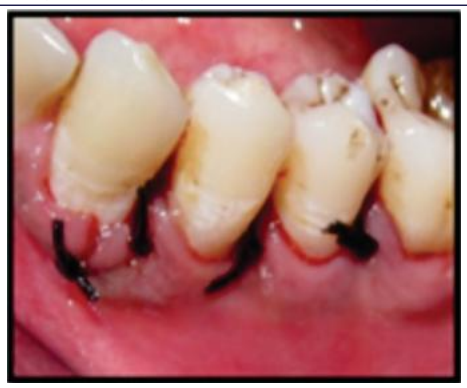


Fig 5h: Sutures Given

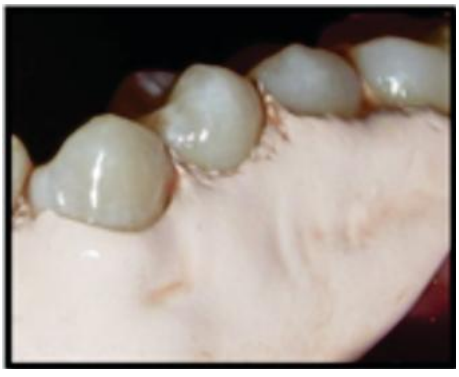


Fig 5i: Periodontal Pack Give

Figure 6: Radiograghic Assesment

Fig 6a: Group A Baseline

Fig 6b: Group A 9 Months Post Operatively

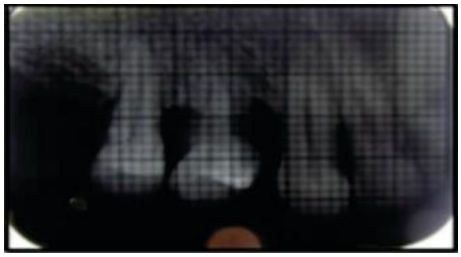


Fig 6c: Group B Baseline

Fig 6d: Group B 9 Months Post Operatively

Fig 6e: Group C Baseline

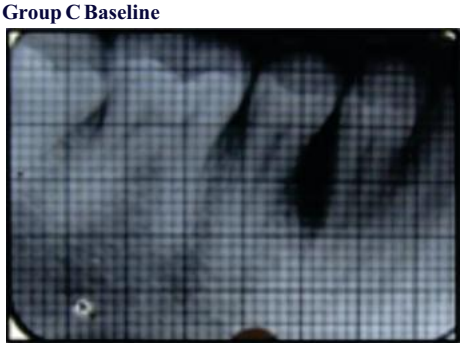


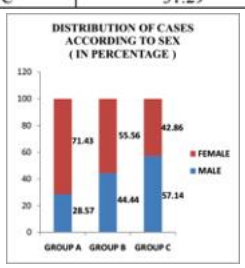
Fig 6f: Group C 9 Months Post Operatively

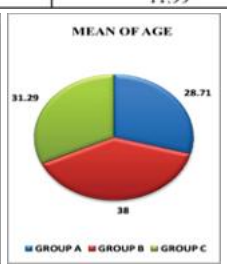
Table 1(a) Distribution of Cases According to Sex

GROUP	MALE		FEMALE	
	NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
A	02	28.57	05	71.43
B	04	44.44	05	55.56
C	04	57.14	03	42.86

Table 1(b) Mean and Standard Deviation (sd) of Ages

GROUP	AGE (IN YEARS)	
	MEAN	SD
A	28.71	4.16
B	38.00	11.83
C	31.29	11.99

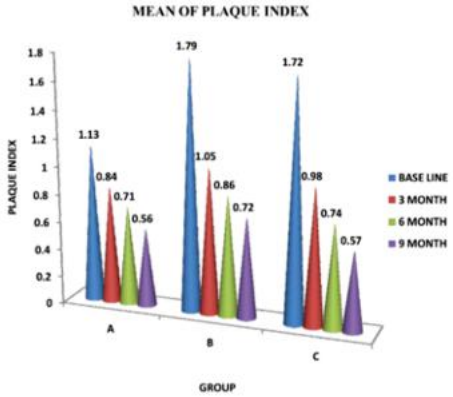




Graph 1(a) Graph 1(b)

Table 2 Mean and Standard Deviation (sd) of Plaque Index and Comparison Between the Groups

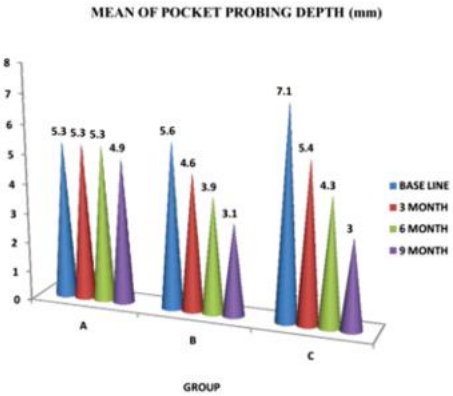
GROUP	BASE LINE		3 MONTH		6 MONTH		9 MONTH	
	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
A	1.13	0.33	0.84	0.28	0.71	0.21	0.56	0.26
B	1.79	1.05	1.05	0.48	0.86	0.39	0.72	0.41
C	1.72	1.23	0.98	0.49	0.74	0.29	0.57	0.25
F VALUE	0.93(NS)		0.46(NS)		0.46(NS)		0.57(NS)	



Graph 2

Table 3 Mean and Standard Deviation (sd) of Pocket Probing Depth (ppd) and Comparison Between the Groups

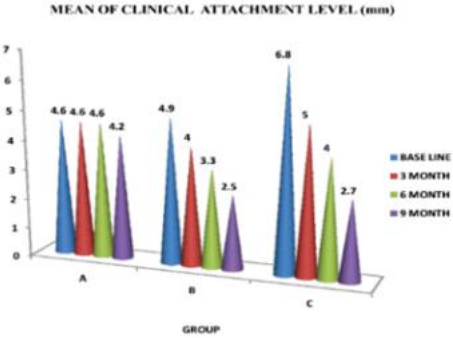
GROUP	BASE LINE		3 MONTH		6 MONTH		9 MONTH	
	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
A	5.3	2.1	5.3	2.1	5.3	2.1	4.9	1.81
B	5.6	1.36	4.6	1.36	3.9	1.45	3.1	1.45
C	7.1	1.81	5.4	1.56	4.3	1.42	3.0	1.34
F VALUE	2.63(NS)		0.59(NS)		1.64(NS)		4.29(S)	



Graph 3

Table 4 Mean and Standard Deviation (sd) of Clinical Attachment Level (cal) and Comparison Between the Groups

GROUP	BASE LINE		3 MONTH		6 MONTH		9 MONTH	
	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
A	4.6	2.06	4.6	2.06	4.6	2.06	4.2	2.04
B	4.9	1.37	4.0	1.26	3.3	1.35	2.5	1.28
C	6.8	1.66	5.0	1.41	4.0	1.34	2.7	1.35
	4.32(S)		0.87(NS)		1.46(NS)		3.06(NS)	



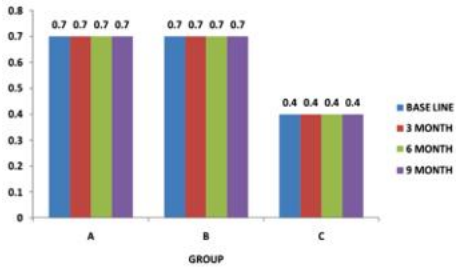
Graph 4

Table 5 Mean and Standard Deviation (sd) of Gingival Margin Level (gml) and Comparsion Between the Groups.

GROUP	BASE LINE		3 MONTH		6 MONTH		9 MONTH	
	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
I	0.7	0.46	0.7	0.46	0.7	0.46	0.7	0.46

II	0.7	0.46	0.7	0.46	0.7	0.46	0.7	0.46
III	0.4	0.8	0.4	0.8	0.4	0.8	0.4	0.8
F VALUE	0.76(NS)		0.76(NS)		0.76(NS)		0.76(NS)	

MEAN OF GINGIVAL MARGIN LEVEL (mm)



Graph 5

Table 5 (a) Mean and Standard Deviation (sd) of Changes in the Clinical Parameters (with respect to base line)

PARAMETER	GROUP	3 MONTH		6 MONTH		9 MONTH	
		MEAN	SD	MEAN	SD	MEAN	SD
MEAN PPD CHANGE (MM)	A	0	0	0.9	0.3	1.8	0.74
	B	0	0	1.6	0.67	2.8	0.74
	C	0.4	0.49	2.4	1.02	4.1	0.83
MEAN CAL (MM)	A	0	0	1	0	1.7	0.64
	B	0	0	1.7	0.46	2.8	0.65
	C	0.4	0.49	2.5	0.81	4.1	0.83
MEAN GML CHANGE (MM)	A	0	0	0	0	0	0
	B	0	0	0	0	0	0
	C	0	0	0	0	0	0

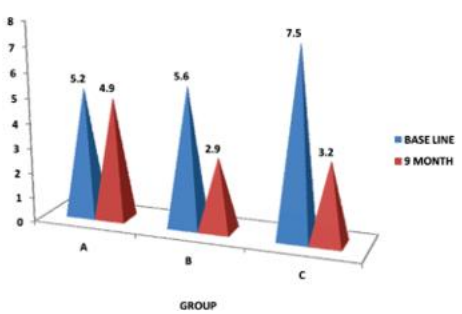
Table 5 (b) Comparison of Changes in the Clinical Parameters (with respect to base line) Between the Groups.

PARAMETER	GROUP	T VALUE		
		3 MONTH	6 MONTH	9 MONTH
MEAN PPD CHANGE (MM)	GROUP A AND GROUP B	9.00(S)	7.24(S)	5.30(S)
	GROUP B AND GROUP C	3.35(S)	3.60(S)	3.88(S)
	GROUP A AND GROUP C	0.13(NS)	0.09(NS)	0.06(NS)
MEAN CAL GAIN (MM)	GROUP A AND GROUP B	-	11.13(S)	6.68(S)
	GROUP B AND GROUP C	3.28(S)	3.76(S)	4.15(S)
	GROUP A AND GROUP C	-	0.08(NS)	0.06(NS)
MEAN GML CHANGE (MM)	GROUP A AND GROUP B	-	-	-
	GROUP B AND GROUP C	-	-	-
	GROUP A AND GROUP C	-	-	-

Table 6 Mean and Standard Deviation (sd) of CEJ to the Base of the Defect Comparsion Between Periods and Between the Groups

GROUP	BASE LINE		9 MONTH		T VALUE
	MEAN	SD	MEAN	SD	
A	5.2	1.99	4.9	2.02	0.31(NS)
B	5.8	1.17	3.6	0.67	4.92(S)
C	7.5	1.43	3.1	1.14	7.22(S)
F VALUE	5.19(S)		4.66(S)		

MEAN OF CEJ TO THE BASE OF THE DEFECT (mm)

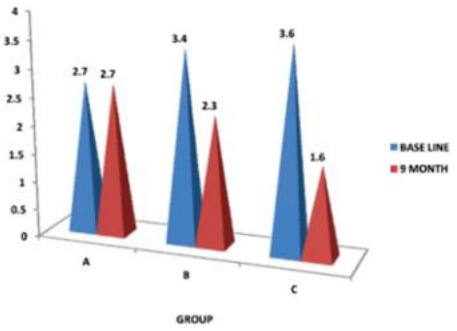


Graph 6

Table 7 Mean and Standard Deviation (sd) of CEJ to the Alveolar Crest, Comparsion Between Periods and Between the Groups.

GROUP	BASE LINE		9 MONTH		T VALUE
	MEAN	SD	MEAN	SD	
A	2.7	0.64	2.7	0.64	0(NS)
B	3.4	0.66	2.4	0.66	3.20(S)
C	3.6	0.92	1.6	0.92	4.63(S)
F VALUE	3.57(S)		5.04(S)		

MEAN OF CEJ TO THE ALVEOLAR CREST (mm)

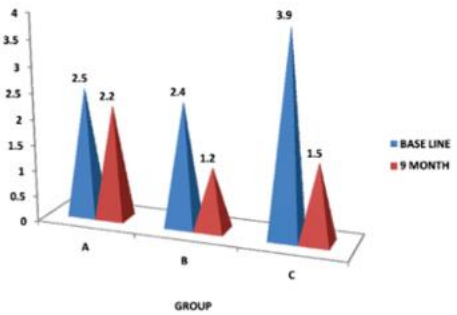


Graph 7

Table 8 Mean and Standard Deviation (sd) of Intra Bony Defect (ibd) Depth Comparsion Between Periods and Between the Groups

GROUP	BASE LINE		9 MONTH		T VALUE
	MEAN	SD	MEAN	SD	
A	2.5	1.43	2.2	1.47	0.44(NS)
B	2.4	0.66	1.2	0.4	4.65(S)
C	3.9	1.14	1.5	0.81	4.44(S)
F VALUE	5.02(S)		2.39(S)		

MEAN OF INTRA BONY DEFECT DEPTH (mm)

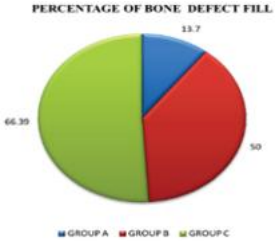


Graph 8

Table 9 Mean and Standard Deviation (sd) of Changes in the Radiographic Parameters (with respect to base line)

PARAMETER	GROUP	9 MONTH	
		MEAN	SD
MEAN IBD DEPTH REDUCTION	A	0.3	0.46
	B	1.2	0.4
	C	3.0	1.79
PERCENTAGE OF BONE DEFECT FILL	A	13.7	19.73
	B	50.0	7.45
	C	66.39	17.28

PERCENTAGE OF BONE DEFECT FILL



Graph 9

Table 10 Comparsion of Changes in the Radiographic Parameters (with respect to base line) Between the Groups

PARAMETER	GROUP	T VALUE
MEAN IBD DEPTH REDUCTION	GROUP A AND GROUP B	4.44(S)
	GROUP B AND GROUP C	4.38(S)
	GROUP A AND GROUP C	2.94(S)
PERCENTAGE OF BONE DEFECT FILL	GROUP A AND GROUP B	5.06(S)
	GROUP B AND GROUP C	6.03(S)
	GROUP A AND GROUP C	2.61(S)

Statistics

- The paired t – test was applied to assess the statistical significance between time point within each group clinical and radiographic parameters.
- ONE WAY ANOVA test was applied to assess the statistical significance between time points between the groups for clinical and radiographic parameters.

DISCUSSION

Regeneration has been defined as the reproduction or reconstitution of a lost or injured part to restore the architecture and function of the periodontium (American Academy of Periodontology 1992).[2]

New attachment has been defined as the union of connective tissue or epithelium with a root surface that has been deprived of its original attachment apparatus (Glossary of Periodontal Terms 2001).[20]

At present, one of the most widely used periodontal regenerative modalities is osseous graft therapy. The use of bone grafts for reconstructing osseous defects produced by periodontal disease dates back to Hegedus in 1923 and was reviewed by Nabers and O'Leary in 1965. Since that time, a number of techniques and materials have been used for regeneration. [21]

Platelet Rich Fibrin (PRF) described by Choukroun et al is a second generation platelet concentrate which contains platelets and growth factors in the form of fibrin membranes prepared from the patients own blood free of any anticoagulant or other artificial biochemical modifications. In vitro study[22] demonstrated that the viable platelets in PRF released six growth factors like PDGF, VEGF, TGF, IGF, EGF and bFGF in about the same concentration for the 7 – day duration. Prolong release of these growth factors, would be expected that PRF growth factors, would be expected that PRF treatment of an intrabony defect (IBD) may result in enchanced wound healing and periodontal regeneration compared with those sites treated with conventional flap debridement.

Clinical interpretation: Plaque index - Mean plaque index at 9 months was 0.56(0.26) in group A, 0.72(0.41) in group B and 0.57(0.25) in group C. A statistically significant reduction in the plaque index was observed in all the 3 groups from baseline to 9 months postoperatively.

Changes in Pocket Probing Depth (PPD) - Mean reduction in PPD was 0.8(0.28) mm in group A, 2.8(0.74) mm in group B and 4.1(0.83)mm in group C, which was similar to results obtained in a clinical study done by Kazuhiro et al[23] and A R Pradeep et al.[24]

Changes in Clinical Attachment Level (CAL) - Mean gain in CAL was 1.7(0.64)mm in group A, 2.8 (0.65) mm in group B and 4.1(0.83) mm in group C, which was similar to the findings of Kazuhiro et al[23] and Pradeep et al.[24]

Changes in Gingival Margin Level (GML) - Mean changes in GML was 0 for all the group.

An important clinical outcome of a periodontal reduction in PPD and CAL gain were found in all three groups when compared with baseline and 9 months.

Radiographic interpretation: Mean Intra Bony Defect (IBD) depth reduction - Mean IBD depth reduction was 0.3(0.46) mm in group A; 1.2 (0.4) mm in group B and 3.0(1.79) mm in group C. other studies by James et al[25], Corsair et al[26] and Pradeep et al[24] was similar to our results. Percentage of Bone Defect Fill - The percentage of bone defect fill was 13.7(19.73)% in group A, 50.0(7.45)% in group B and 66.39(17.28)% in group C. Our result was 66.39(17.28)% indicating more percentage of bone fill compared to other studies by Pradeep et al[24], James et al25, Corsair et al[26], Pradeep et al[27], Pradeep et al.[21]

It is prudent to introduce PRF as a graft material for the treatment of intrabony defects in a country like INDIA, where decisions still resolve around the economical viability of the treatment options. Simple way of preparation without the use of anticoagulants, inexpensive technique, less risk of disease transmission to the patient and more regenerative potential makes PRF as a demanding graft material to be used by developing countries like INDIA.

PRF is superior to other platelet concentrate like PRP due to its ease and inexpensive method of preparation and also it does not need any addition of exogenous compounds like bovine thrombin and calcium chloride. It is advantageous than autogenous graft also because an autograft requires a second surgical site and procedure.

In the current study the primary outcome was bone defect fill with the help of radiographic grid, as radiographic evaluation is a noninvasive examination for bony defects repair. Measuring the grid lines help in accurately measuring the defect as the distance between the 2 grid lines on the radiograph is 1mm, even if the images is foreshortened or elongated. Also, bone fill data derived from surgical re-entry are important to substantiate routine postoperative measurement data obtained radiographically.

In the present study grafting with (PRF) platelet rich fibrin showed more percentage of bone defect fill compared to grafting with an alloplastic (resorbable hydroxyapatite) and open flap debridement (OFD). This implies that platelet rich fibrin can be used as a sole grafting material in the treatment of intra bony defect. However, long-term, randomized, controlled clinical trials with large sample size are needed to prove its clinical and radiographic efficacy in periodontal regeneration.

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