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A Comparative Evaluation of Xenograft, Platelet Rich Fibrin And Guided Tissue Regeneration Membrane In The Treatment Of Mandibular Grade II Furcation Defects.

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ABSTRACT

INTRODUCTION: One of the most exacting facets in therapy of periodontitis is the regeneration of periodontium affected by tooth furcation involvement. The furcation region has a complex anatomy that requires the use of specialized instruments called furcation curettes to treat it. Grade-II mandibular furcation defects are furthermore amenable to treatment and various techniques and materials have been employed to treat them with moderate success.

AIM: The current study aimed to compare the surgical outcome of grade II furcation therapy with xenograft alone, xenograft along with GTR and xenograft along with PRF membrane.

MATERIALS AND METHODS: This was a corresponding arm prospective randomized and interventional trial conducted within 18 different patients (27 defects) possessing Grade- II mandibular tooth furcation defects. The patients were spitted into three groups. In Group A, 6 patients with 9 defects have been treated by the positioning of Xenograft while in the Group B, 6 patients with 9 defects were treated by the positioning of Xenograft as graft and Guided Tissue Regeneration membrane while in Group C, 6 patients with 9 defects were treated by the positioning of Xenograft as graft and PRF as membrane. Clinical specifications including "Plaque Index (PI)", "Probing Depth (PD)", "Relative Vertical Clinical Attachment Level (RVCAL)", "Relative Horizontal Clinical Attachment Level (RHCAL)", and quantity of Bone fill by using CBCT, were approximated at baseline and Six months post-operatively. Differentiation between the groups was analyzed by employing ANNOVA test, whereas the paired t-test was used to analyse the mean values within the groups.

RESULTS: On comparing those results between the groups it was observed that excepting from the Probing pocket depth (PD) and Depth of defect fill all other specifications were not arithmetically significant. The Probing depth inbetween the groups at baseline (5.73±0.79) in Group-A, 6.18 ± 0.75 in Group B) and (6.09±0.70) was not arithmetically significant, however after six months it was observed that in group A it was 1.73±0.79 , in the group B 1.36±0.50 and in the group C 2.09± 0.70 which was arithmetically significant ($p<0.05$). Similarly, the depth of the defect between the groups at baseline (3.67 ± 0.44 in the Group A, 3.95 ± 0.70 in the Group B and 3.46 ± 0.43 in the Group C) were not statistically remarkable, however 6 months postoperatively it was observed that in group A, the defect fill was1.51 ±0.34, in group B it was 1.26±0.26 and in group C it was 1.35± 0.27 which was arithmetically significant. ($p<0.05$).

CONCLUSION: Xenograft alone (Group A) Xenograft and Guided Tissue Regeneration membrane (Group B) Xenograft and Platelet Rich Fibrin membrane (Group C) were biocompatible with the tissues. There was a well-defined improvement in all the specifications assessed in all the three of the groups. However, patients in the Group B have showed better results than in Group C and in Group A.

KEY WORDS: "Grade-II mandibular furcation defects, PRF, GTR, Xenograft, CBCT".

KEY MESSAGES: The Furcation defects has successfully well treated with xenograft when used as graft and PRF as a membrane, however advanced materials like GTR and also the Xenograft have proved advantageous in treating them.

INTRODUCTION

Periodontal disease involves the degradation of periodontal tissues and connective attachment loss. It leads to furcation involvement, were multi-rooted teeth experience infiltration in bifurcation and trifurcation areas. This complication worsens periodontitis, limiting conventional treatments like scaling. Surgical interventions become necessary due to the challenges posed by furcation defects, rendering routine periodontal therapies insufficient.

The most strenuous aspect in the therapy of periodontitis is the periodontal revitalization within the furcation defect. The Surgical therapy for furcation regions provides access for debridement, recontouring the bone and odontoplasty along with regenerative procedures. Various methods have been tested and also employed over the previous decades for the treatment of Grade-II furcation defects.

Surgical strategies for addressing Grade-II furcation defects encompass various approaches such as autografts, demineralized freeze-dried bone allografts, bovine-derived xenografts, and combinations of bone grafts with barrier membranes. Presently, recombinant human platelet-derived growth factor-BB, bone morphogenetic proteins (BMPs), platelet-rich plasma, and plasma rich in growth factors are extensively employed for periodontal regeneration [2].

Xenografts are made from the naturally obtained deproteinized cancellous bone from the different species (such as bovine or porcine bone or coral). The added benefits of the xenograft are, it is comparable to the human bone in the porous architecture and also available in large quantities and can reinforce bone formation.

"Guided tissue regeneration (GTR)" is a non-graft revitalization technique that is based on the idea that revitalization of periodontal supporting structures is possible by replicating previously diseased root surface areas with specific progenitor cells and preventing gingival epithelium and connective tissue from communicating with the root surface during healing.[{3}]

Platelet-rich fibrin advanced by the Choukroun J et.al., composed of a fibrin meshwork in which the cytokines as well as the glycoproteins are established, that assists in healing of periodontal pathological defects. In addition, it has been perceived that the PRF acts as a matrix for the advancement of periosteal cells which facilitates the bony repair and also used as a membrane and these PRF membranes has the potential to abridge the soft tissue healing by safeguarding the region of surgery. According to some researchers, the membrane serves as a biomimetic link to the graft, a scaffold to help with the formation of new blood vessels, and a means of facilitating the advancement of osteoprogenitor cells to the graft's centre.

The barrier membrane can also assists graft containment that is considered as a vital factor for enhancing the regenerative response.[4]

Various treatment advancements have been introduced to sort out the grade II furcation defects with various combinations of membranes and grafts. The ongoing study aims to collate the revitalization prospective of Xenograft, Platelet- rich fibrin & GTR membrane in the Grade -II Mandibular furcation pathology.

Subjects and Methods used: Twenty-seven patients diagnosed with Grade II furcation involvement of the lower arch has taken part in this study which was carried out from November 2019 to August 2020 in an outpatient ward of a multi speciality hospital in Hyderabad City.

All the tests were performed using the SPSS Statistics version 22. The tests were carried out at the 95% confidence interval and $P<0.05$ was contemplated to be analatically significant.

Selection Criteria: Participants included patients whose probing depth was less than 5 mm and whose relative clinical attachment levels (RVCAL) and relative clinical attachment levels (RHCAL) were lower than 3 mm. Patients who were not compliant, smokers, or who had impaired immune systems, as well as those who took drugs known to impede the healing of periodontal wounds in women who were pregnant or nursing, were eliminated.

The samples were screened and randomly assigned into Group A, wherein the defects were treated by the placement of xenograft alone (Fig 1-8). Group B, wherein the defects were treated by the placement of Xenograft and Guided Tissue Regeneration {GTR} as a membrane (Fig 9-16). Group C, wherein the defects were treated by the placement of Xenograft and Platelet Rich Fibrin {PRF} as a membrane (Fig 17-24).

Clinical assessment for “Plaque index (PI)”, “Pocket depth (PD)”, RVCAL were made using William’s probe. The RHCAL was assessed using a Naber’s probe. “Cone beam computerised tomography (CBCT)” was used pre and postoperatively to assess the amount of defect fill in the furcation of the affected teeth.

An occlusal stent was fabricated using impressions of the participants' mandibular arches in the study. The Relative Vertical Cemento-Enamel Level (RVCAL) was determined by measuring the distance from the reference point (lower border of the stent) to the base of the pocket, subtracted from the distance from the lower margin of the stent to the cemento-enamel junction. The Relative Horizontal Cemento-Enamel Level (RHCAL) was measured using a Naber's probe from the lower margin of the stent into the furcation fornix.

In order to standardize radiographic technique, the same individual conducted pre- and post-surgery CBCT scans. Sagittal and coronal sections were generated at the same axial slice as the baseline after 6 months. CBCT measurements were taken before surgery and 6 months post-surgery

The primary outcome assessed was furcation defect fill, with secondary outcomes being probing depth (PD), RVCAL, and RHCAL. Prior to surgery, participants received

scaling, root planing, and instructions on mechanical and chemical plaque control.

Surgical procedures commenced 8 weeks after phase I therapy, following participant evaluation. Local anesthesia was administered at the surgery site. Crevicular and interdental incisions were made using a no. 15 Bard Parker blade. A periosteal elevator aided in reflecting the muco-periosteal flap, enabling necrotic tissue removal from the furcation defect using furcation curettes. Thorough irrigation of the sites was then performed. After isolation, **Group A** sites were treated by using **Xenograft alone; Group B** sites were treated by using placement of **Xenograft and Guided Tissue Regeneration {GTR} as a membrane. Group C** sites were treated by using the placement of **Xenograft and Platelet Rich Fibrin {PRF} as a membrane.**

Healiguide: Bio resorbable guided tissue regeneration membrane commercially available as Healiguide.

After flap elevation and complete debridement of the defect in **Group B**, **Xenograft was placed and then the Guided Tissue Regeneration {healiguide} membrane was placed over the graft,** using tissue holding tweezers and moved into position using a wet blunt instrument.

Protocol for platelet rich fibrin preparation:

In order to avoid using any anticoagulants, the patient's own blood was collected from the ante-cubital vein and transferred to sterilised glass test tubes. In a centrifuge, these test tubes were whirled at 2700 rpm for 15 minutes. Following centrifugation, the resultant clot was crushed between sterile gauze pieces and employed as a membrane.

After the flap reflection in **Group C**, **Xenograft was placed and then the PRF membrane was placed over the graft,** with a sterile tissue forceps, covering the defect. Then the membrane was stabilized and moved into position with a blunt instrument and flap was repositioned. Suturing was done with 3-0 black silk sutures and periodontal dressing was given.

Postoperative Care:

All the patients received appropriate antibiotics (Amoxycillin 500mg three times daily) and analgesics (Aceclofenac 100 mg+ Serratiopeptidase 15 mg + Paracetamol 325mg) 3 times daily for 5 days after post-operative instructions.

The post-operative care included chlorhexidine digluconate rinses (0.12%) twice daily for 2 weeks. Sutures and Periodontal dressing were removed 2 weeks postoperatively. The surgical wounds were gently cleansed using 0.12% of chlorhexidine digluconate and patients were given proper instructions for the gentle brushing with a soft toothbrush. Each patient was examined weekly, up to 1 month after surgery and was re-instructed for proper oral hygiene measures at 8 weeks postoperatively and again, at 6 months post-operatively.

Hard and soft tissue evaluation was performed 6 months after surgery. Soft tissue measurements were repeated and measured with previously used acrylic

stents. For hard tissue re-evaluation, CBCT of the defect site was taken and bone defect assessment was carried out.

RESULTS:

On intragroup comparison pertaining to the clinical (PI, PD, RVAL, RHAL) and radiological parameters (Height, Width and Depth of bone fill), it was observed that all the parameters showed "statistically significant results ($p < 0.001$)" (Table-1).

On intergroup comparison the results between the groups it was observed that excepting for the Probing "pocket depth (PD)" and Depth of defect fill all other parameters were not statistically significant.

The Probing depth between the groups at baseline was not statistically significant, however after 6 months it was observed that in group A it was 1.73 ± 0.79 in group B it was 1.36±0.50 and in group C it was 2.09 ± 0.70 which was statistically significant ($p <0.05$).

Similarly, the depth of the defect between the groups at baseline was not statistically significant, however 6 months postoperatively it was observed that in group A, the depth of defect fill was 1.51±0.34, in group B it was 1.26±0.26 and in group C it was 1.35± 0.27 which was "statistically significant. ($p<0.05$)". (Table-2)

DISCUSSION

Periodontal disease is of a bacterial origination and it is associated with an infectious response. In the posterior part of dentition, numerous factors impact the onset and progression of the periodontal disease and the loss of attachment of the roots is one of the most principal sequelae.[5]

Approach to furcation areas is farther convoluted by the posterior locale of the molars, the incongruity between root and furcation configuration, the shape and configuration of the debriding therapeutical instruments. The root debridement is consequentially an arduous as well as an inefficacious in the furcations.[6]

In this present study, Hu-Friedy SQBL 16(0.9mm) furcation curette was used, as it can gain easy access into the furcation area for debriding the furcation defect effectively.

Periodontal pathology pigmenting furcation's are occasionally seen in the first upper and lower part of the molars, these are the teeth being which, over a patient's lifespan, have endured the longest vulnerability to the microbial action of plaque. This association mean that the furcation manifestations increase with the age advancement. When a furcation becomes clinically visible, the risk of shedding the affected tooth increases. In the mandibular molars, the buccal furcation is the most commonly affected furcation, while in the upper quadrant molars the buccal furcation is normally the most frequently affected furcation pathology followed by the mesiobuccally and distobuccal furcation's and the upper first molars are more often affected than the lower first molars.[6]

Even though furcation measurement is one of the most common issues in the treatment of periodontal patients, despite the field of periodontics' constant and extensive

advancements, very few breakthroughs have been made in this area.

The Nabers, ZA2, ZA3, HO2, NS2, NP2C, and ACE probes are some examples of furcation probes that are specifically made for tooth furcation examinations. Automated probes, like the Florida probe with disc augmentation, and other variable distinct probes, like the Florida probe, have also been used in the past to measure furcation defects.

An authoritative approach of securing duplicable measurements of furcation pathology is still lacking behind, especifically in horizontal administration. Till date, the probing of the furcation regions using sounding instruments has been the most dependable techniques to assess the horizontal parts of furcation areas. But obtaining a steady and duplicable reference point has remained a problem.[7]

In the present study, an established reference point made in acrylic stent has been used, while measuring all the soft tissue parameters.

From the substantiation in literatary texts, it can be winded up that clinical outcome of bone sounding and clinical probing with help of furcation probes such as the Nabers probe can be a quite uncomplicated and dependable techniques for analysing the HAL and VAL dimensions of the furcation area involvement

Clinical specifications like probing pocket depth, relative vertical as well as horizontal clinical attachment levels were measured using Williams and Nabers probe using an acrylic stent for standardization for this study.

Because of the restricted physical approach to furcation depths the morphological discrepencies coupled with measurement inaccuracy, it is quite tough to precisely analyse the furcation regions clinically. Despite we frequently engage the two conventional (2D) radiographs for diagnosing the bony levels in periodontal pathology, the magnification as well as the distortion brought up due to the projection geometry of X-ray radiation makes accurate diagnosis a impossible one. These 2-D radiographs engender images with root surfaces of tooth superimposed on teeth of interest, thus arcaning bony alterations such as FI, buccal, and lingual alveolar bone defects.

A short time ago, the constraints of 2-D radiographs can be conquered by the application of "cone-beam computed tomography (CBCT)" imaging technique that provides 3D volumetric radiographic images with multiplanar reorganization in the axial, coronal, and sagittal planes without magnification. CBCT produces the high-resolution 3D data at cheap cost and reduced radiation exposure doses than conventional CT.[9]

Some authors deliberated artificial osseous defects which were created on mandibles of dry skulls. "CBCT screening", "periapical radiography (PA)", and unswerving quantifications using a periodontal probe were collated to an electronic caliper that was pre owned as a standard reference. It was drawn to a close that all the three modalities are useful for identifying interproximal periodontal

detects. Collated to the conventional radiographic interpretations, the 3D potentiality of CBCT offers exceptional advantage because all defects can be detected and quantified. {10}

In the present study, height, width and depth of the furcation defect were assessed using CBCT as it is more accurate than 2D imaging techniques.

Abruptly over a period of 10 years, the therapautical outcomes of revitalizing therapy in osseous defects have changed in part because of the new knowledge about the disease process and wound healing, and in part because of the achievebility of new materials.

Since the 1990s, rejuvenation has been the goal of therapy. Modern statistics demonstrates unequivocally that it is biologically viable to restore the once-devastated periodontal attachment tissues. Under comorbid conditions, the use of osteoconductive and osteoinductive graft materials can result in a 60–70% regeneration of the height or volume of the bone lesion, improving the clinical conditions concurrently.

A number of surgical treatments, including guided tissue regeneration (GTR), bone transplants, bone substitutes, and combinations of these can be used to treat periodontal disease. {11}.

Bovine porous bone mineral is a relatively new material used in periodontal regeneration. It is produced by removal of organic compounds from bovine bone, that results in a trabecular structure similar to human cancellous bone and can enhance bone formation.

Some authors in their study have deliberated the outcomes of bovine procured xenograft with and without a bioabsorbable collagen membrane, for the treatment procedure of mandibular class II furcation defects. A comparison between xenograft with and without membrane was made at baseline and 6 months.

In the present study, Xenograft was used in the mandibular Grade II furcation defects, which might have contributed to the improvement in clinical and radiographic parameters in Group A from baseline to 6 months. {Table-1}

The most preferable result of periodontal regeneration in furcation defects has been demonstrated by the combination of a graft material and “Guided Tissue Regeneration (GTR)”.

The use of membranes during a guided tissue regeneration operation holds up the possibility of improving the success rates of bone grafting. In GTR, a fencing material is inserted between the root surface and the gingival tissues to prevent the flap's gingival connective tissue and epithelium from migrating apically. This allows the granulation tissue grown from the periodontal ligament and osseous tissues to spread into the area next to the denuded root surface.

In the present study, Xenograft and Guided Tissue Regeneration membrane were used, which showed a statistically significant result in all the clinical parameters and bone defect fill at 6 months postoperatively. {Table-1}

Platelet rich fibrin (PRF), created by Choukron J et al., can be employed as a graft and a membrane. Cytokines and glycoproteins are established within the fibrin meshwork that makes up the PRF. Periodontal flaws are thought to repair more quickly due to the metabolic components of PRF.

Additionally, PRF is thought to serve as a matrix for the development of periosteal cells, which support bone mending. Due to its inherent ability to release growth factors gradually for one week to 28 days following implantation, PRF plays a crucial role in tissue remodelling. Because PRF does not include thrombin, a natural fibrin meshwork protects against the proteolysis of growth factors, increasing its stability. The inborn osteoconductive and/or osteoinductive feature of PRF is extremely advantageous for bone regeneration. {13}

In cases of furcation defects, PRF has been successfully employed as a graft. The potential for PRF membranes to enhance soft tissue recovery by protecting the site of operation has led to the support of their use as membranes as well. It is believed that the membrane functions as a biomimetic link to the graft and serves as a scaffold to help new blood vessels form and to facilitate the growth of osteoprogenitor cells in the graft's centre. **{13}**

By combining autologous PRF with collagen membrane and demineralized freeze-dried bone allograft in both groups, some authors in their study were able to increase the success rate of using the membrane to cure grade II furcation abnormalities in molars. At the initial, third, and sixth months, a comparison between the graft and membrane was made. In an intragroup comparison from baseline through three and six months, this study has argued that both groups produced results that were analytically significant. On intergroup comparison, there was no numerical difference between the PRF membrane and collagen membrane groups. **{14}**

In the present study, Xenograft and Platelet Rich Fibrin membrane were used, which showed a statistically significant result in all the clinical parameters and bone defect fill at 6 months postoperatively. {Table-1}

And when intergroup comparison was made between Xenograft and Guided Tissue Regeneration membrane (Group B) and Xenograft and Platelet Rich Fibrin membrane (Group C) statistically significant results were obtained only in relation to PD and depth of defect fill in Group B (table 2).

Limitations:

1. "The follow up period in this study was 6 months only".
2. "More research with an extensive study period and larger sample size is necessary to be carried out to assess the long term-stability of the results".

SUMMARY AND CONCLUSION

Periodontitis is a condition marked by the permanent loss of alveolar bone support and connective tissue connection. Traditional open flap debridement is insufficient to fully restore the periodontal tissues that have been damaged by the disease, and contemporary

revitalising techniques have limited potential.

One of the most often used methods for replacing the missing periodontal attachment system is treating furcation deficiencies with different kinds of bone transplants. For twenty years, periodontitis has been treated using demineralised freeze-dried bone allograft (DFDBA). It successfully regenerates cementum, periodontal ligament, and bone.

Autologous Platelet Rich Fibrin (PRF), which was employed as membrane in a recent procedure, is one of the most recent regeneration materials that has demonstrated success in treating mandibular grade II furcation defects.

One of the graft materials is Bovine Porous Bone Mineral (BPBM), specifically. It is created by removing organic molecules from bovine bone, which creates a trabecular structure resembling that of cancellous bone in humans. It has the ability to improve bone development. The graft material employed in this investigation is osteoconductive hydroxyapatite bone mineral obtained from inorganic sources.

The use of membranes during a guided tissue regeneration operation holds up the possibility of improving the success of bone transplantation. In GTR, a fencing material is inserted between the root surface and the gingival tissues to prevent the flap's gingival connective tissue and epithelium from migrating apically. This allows the granulation tissue grown from the periodontal ligament and osseous tissues to spread into the area next to the denuded root surface.

In this study, the surgical results of grade II furcation therapy using xenograft alone (Group A), xenograft plus GTR (Group B), and xenograft plus PRF membrane (Group C) were compared. When compared to Group C and Group A, the study's findings revealed an arithmetically significant improvement in Group B.

The following interpretations could be drawn from this study:

1. **Xenograft alone {Group A} Xenograft and Guided Tissue Regeneration membrane {Group B}, Xenograft and Platelet Rich Fibrin {Group C} were compatible with the tissues.**
2. **There was a well-defined improvement in all the clinical as well as radiological parameters assessed in all the three listed categories**
3. **Though all the three groups showed improvement in pre and post-surgical parameters assessed, a better improvement in probing depth and furcation defect depth fill was observed in Group B when collated to Group C and Group A.**

However long-term studies with a larger sample size are necessary to be carried out to assess the long-term stability of the results.

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Table 1: Inter group comparison using paired t-test

Group	Variables	Base line		Post		Difference		P Value
		Mean	SD	Mean	SD	Mean	SD	
XG	PI	1.48	0.40	0.42	0.38	1.06	0.39	<0.01 Sig
	PD	5.73	0.79	1.73	0.79	4.00	0.00	<0.01 Sig
	RVAL	4.00	0.77	0.82	0.75	3.18	0.60	<0.01 Sig
	RHAL	2.82	0.87	0.45	0.69	2.36	0.50	<0.01 Sig
	HEIGHT	2.45	0.63	0.80	0.32	1.65	0.67	<0.01 Sig
	WIDTH	2.17	0.43	0.82	0.25	1.35	0.29	<0.01 Sig
	DEPTH	3.67	0.44	1.51	0.34	2.16	0.32	<0.01 Sig
XGG	PI	1.75	0.64	0.50	0.36	1.25	0.53	<0.01 Sig
	PD	6.18	0.75	1.36	0.50	4.82	0.60	<0.01 Sig
	RVAL	4.91	0.83	0.45	0.69	4.45	0.52	<0.01 Sig
	RHAL	3.27	1.10	0.36	0.67	2.91	0.70	<0.01 Sig
	HEIGHT	2.69	0.68	0.88	0.37	1.81	0.49	<0.01 Sig
	WIDTH	2.29	0.58	0.70	0.31	1.59	0.41	<0.01 Sig
	DEPTH	3.95	0.70	1.26	0.26	2.80	0.74	<0.01 Sig
XRG	PI	1.48	0.60	0.33	0.12	1.15	0.55	<0.01 Sig
	PD	6.09	0.70	2.09	0.70	4.00	0.00	<0.01 Sig
	RVAL	4.09	0.83	0.55	0.69	3.55	0.52	<0.01 Sig
	RHAL	3.64	0.92	0.45	0.52	3.18	0.75	<0.01 Sig
	HEIGHT	2.46	0.52	0.74	0.31	1.73	0.38	<0.01 Sig
	WIDTH	2.38	0.46	0.85	0.29	1.53	0.32	<0.01 Sig
	DEPTH	3.46	0.43	1.35	0.27	2.11	0.56	<0.01 Sig

Table 2: Inter group comparison using ANNOVA Test

	XG		XGG		XRG		P Value	Sig
	Mean	SD	Mean	SD	Mean	SD		
PI	1.48	0.40	1.75	0.64	1.48	0.60	0.449	NS
PI_Post	0.42	0.38	0.50	0.36	0.33	0.12	0.437	NS
PD	5.73	0.79	6.18	0.75	6.09	0.70	0.332	NS
PD_Post	1.73	0.79	1.36	0.50	2.09	0.70	0.045	Sig
RVAL	4.00	0.77	4.91	0.83	4.09	0.83	0.025	Sig
RVAL_Post	0.82	0.75	0.45	0.69	0.55	0.69	0.466	NS
RHAL	2.82	0.87	3.27	1.10	3.64	0.92	0.159	NS
RHAL_Post	0.45	0.69	0.36	0.67	0.45	0.52	0.417	NS
HEIGHT	2.45	0.63	2.69	0.68	2.46	0.52	0.596	NS
HEIGHT_Post	0.80	0.32	0.88	0.37	0.74	0.31	0.596	NS
WIDTH	2.17	0.43	2.29	0.58	2.38	0.46	0.599	NS
WIDTH_Post	0.82	0.25	0.70	0.31	0.85	0.29	0.427	NS
DEPTH	3.67	0.44	3.95	0.70	3.46	0.43	0.128	NS
DEPTH_Post	1.51	0.34	1.26	0.26	1.35	0.27	0.022	Sig

*Here NS represent Not Significant

SIG represents significant

Figures: ***GROUP-A***

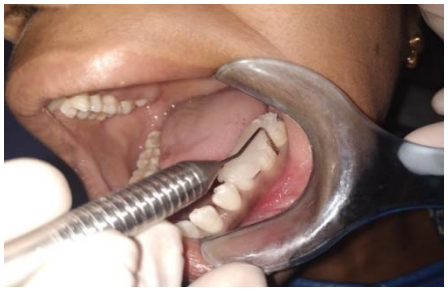

Fig 1- Vertical probing depth

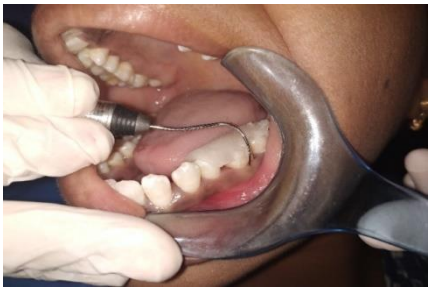

Fig 2- Horizontal probing depth

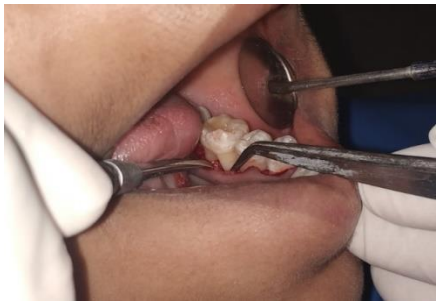

Fig 3- Furcation defect site

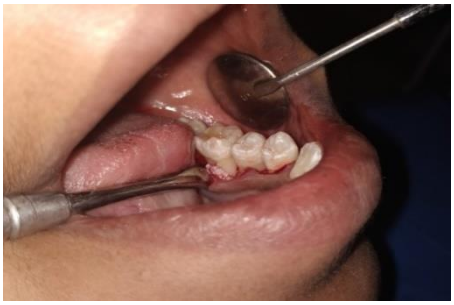

Fig 4- Xenograft placed

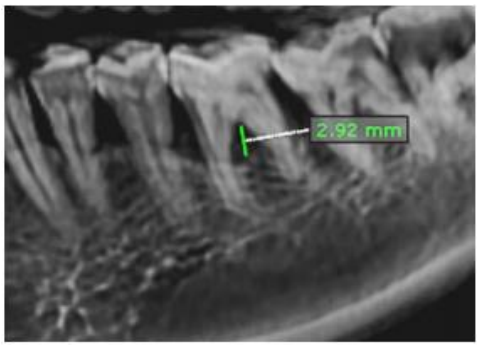

Fig 5- Vertical defect depth

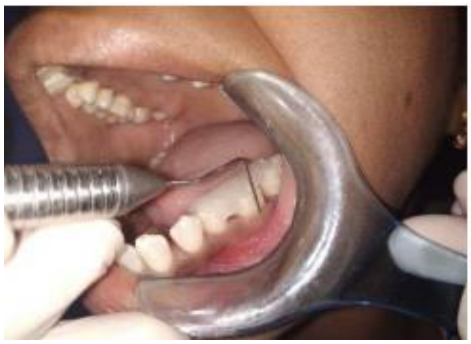

Fig 6- Vertical defect depth

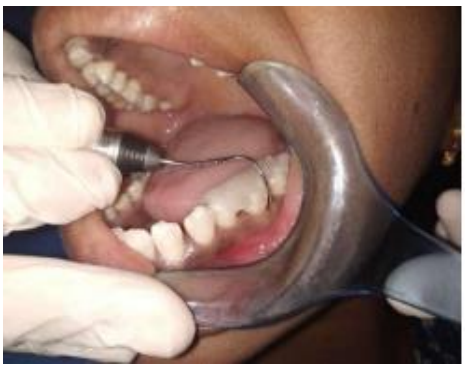

Fig 7- Horizontal defect depth

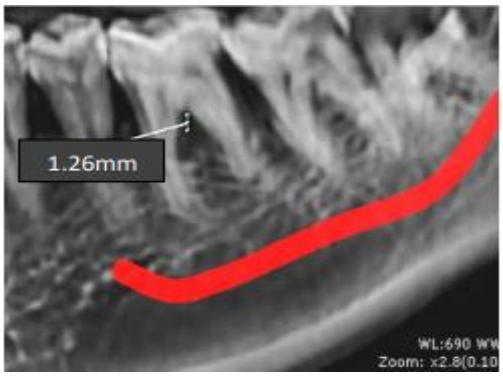

Fig 8- Post op vertical defect depth

GROUP - B

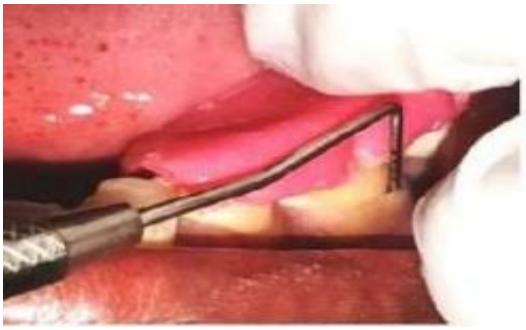

Fig 9- Vertical probing depth

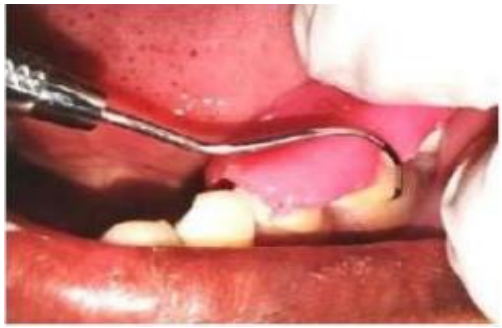

Fig 10- Horizontal probing depth

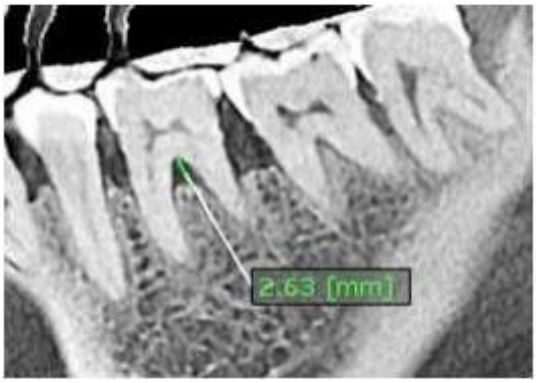

Fig 11- Pre op vertical defect depth

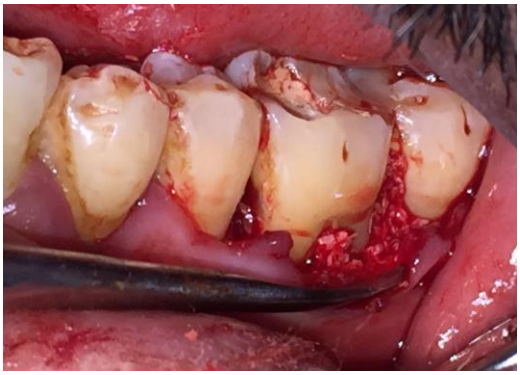

Fig 12- Xenograft placed

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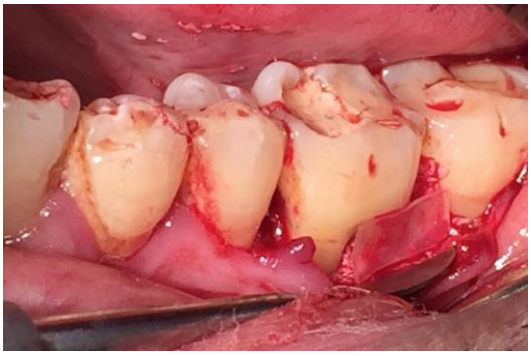

Fig 13- GTR membrane placed

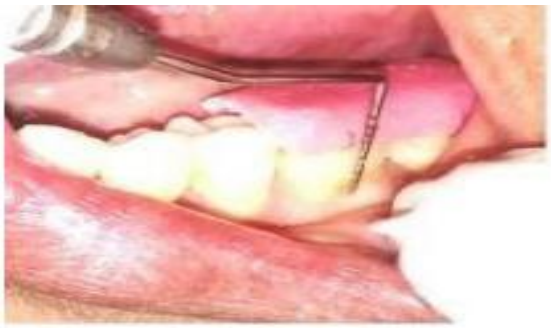

Fig 14- Post op vertical defect depth

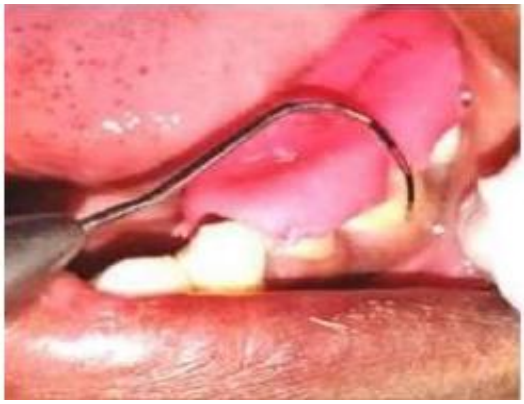

Fig 15- Post op horizontal defect depth

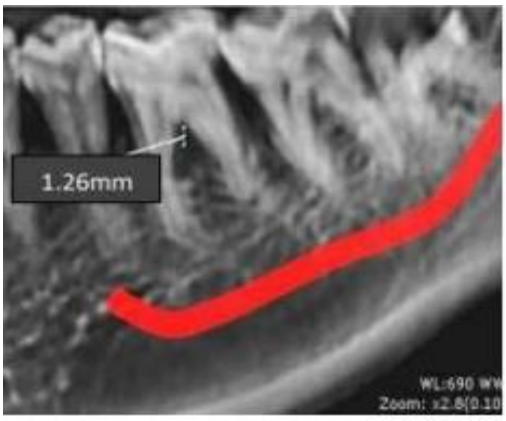

Fig 16- Post op vertical defect depth

GROUP - C

Fig 17- Vertical probing depth

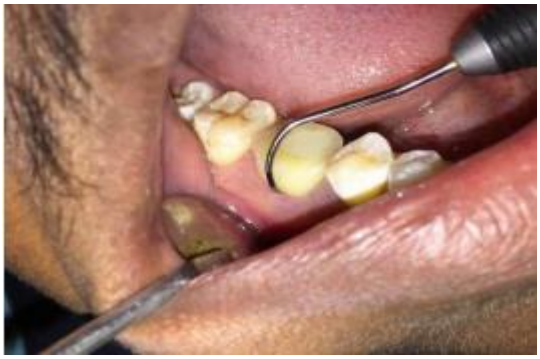

Fig 18- Horizontal probing depth

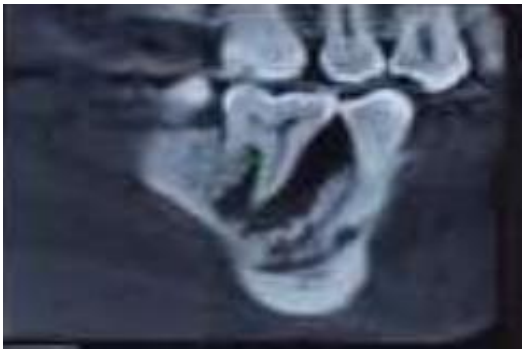

Fig 19- Vertical defect depth

Fig 20- Furcation area exposed

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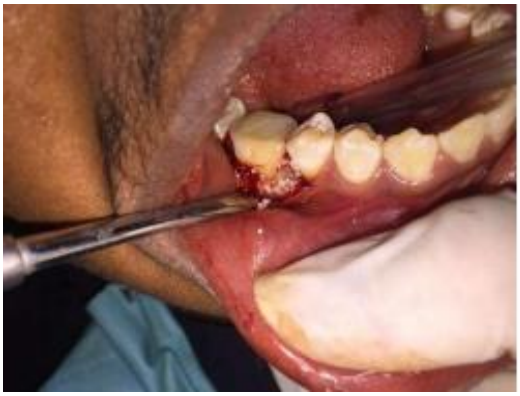

Fig 21- Placement of xenograft and PRF membrane

Fig 22- Post op vertical probing depth

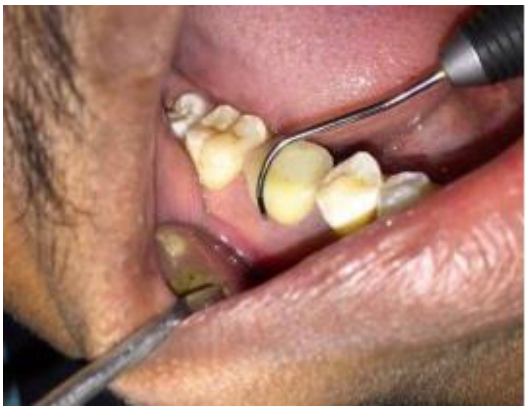

Fig 23- Post op horizontal probing depth

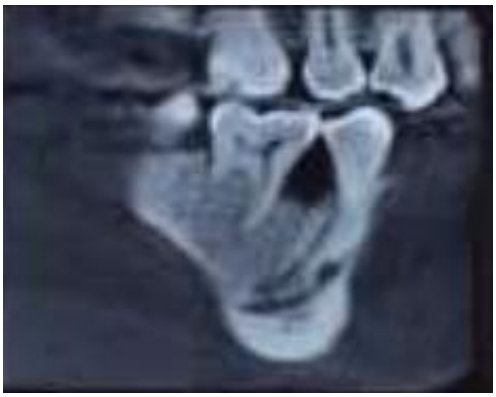

Fig 24- Post op vertical probing depth