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IS ENDODONTIC TREATMENT PARAMOUNT IN COMBINED PERIO-ENDO LESIONS WITH LARGE BONY DEFECTS REQUIRING STICKY BONETM ? A PILOT STUDY WITH 5 YEARS FOLLOW UP.

Dentistry

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ABSTRACT

Aim: To see (1) whether endodontic treatment is always needed in perio-endo lesions and (2) to see the effect of Sticky BoneTM in large bony defects. **Material And Method:** in this pilot study of two cases, patients with large bony defects, having one-walled defects or combined defects were selected and sticky boneTM, prepared with xenograft (Ti-oss) and Advanced platelet rich fibrin (APRF) was placed after complete debridement. Patients were kept on a frequent follow up for a minimum period of 9 months, after which hard and soft tissue healing was analyzed. After that until 5 years patient was kept **Results:** Endodontic treatment is not always needed for the treatment of large perio-endo lesions and Placement of sticky boneTM in large bony defects showed no postoperative discomfort and rapid healing. **Conclusion:** Authors did not consider it paramount to get Root Canal Treatment as the teeth were asymptomatic. However, large sample size and long- term follow-ups are required to state with conviction that RCT is not needed in such cases.

KEYWORDS

Growth factors, APRF, periodontitis, bone grafting, bone loss

INTRODUCTION:

Both endodontic and periodontal diseases are the most commonly occurring diseases of the oral cavity, where is has been seen that the inflammatory products of the latter are found in the former or vice-versa which led to the description and coining of the term 'perio-endo' lesion by Simring and Goldberg in 1964[1,2]. There are three pathways through which the infection can be transferred - Apical foramen, Lateral and Accessory canals and Dentinal tubules[3]. A periodontal disease has no effect on the pulp till it does not involves the apex[4], thus the effect of it on the pulp is controversial[5]. Including large bony defects as the one discussed here.

These bony defects differ from patient to patient posing challenge towards tooth survival and eradication of the disease. Treatment options become limited with advanced periodontal conditions, however even with large one walled defects or combined bony defects the prognosis becomes reasonable when there is no soft tissue loss[6]. And for regeneration of such defects, appropriate biomaterials are required. A great deal of scientific advancements have taken place in the field of periodontology from the first bone graft used by Hegedus in 1923[7], to Sticky bone™[8]. Sticky Bone™ is a biomaterial which can be developed chairside to give maximum regenerative potential as the graft material is embedded in a Platelet Rich Fibrin (PRF) matrix[8]. This PRF matrix further evolved as injectable (i-PRF) and Advanced Platelet Rich fibrin (A-PRF) containing platelets which secrete growth factors and leukocytes helping in a high degree of vascularization[9]. Thus, this tightly packed bone graft material along with platelets provides many advantages over the use of bone graft material and/or fibrin clot separately. This article discusses the preparation, advantages and use of Sticky Bone™ in large bony defects.

METHOD AND MATERIAL:

A young male patient aged 38 years reported to the dental office with a complain of bad breath and bleeding from gums while brushing. He did not have any other medical condition. On oral examination there was generalised mild calculus and 7mm pocket probing depth in relation to (irt) 11 and 12 and 9mm on the buccal aspect of 11.(fig 1) In the rest of the teeth, the maxillary anterior teeth probing depth was between 3-4mm. Also, there was class I recession irt 11 and 21(fig 1). IOPAs were taken of the anterior teeth which showed a vertical defect irt 11,21 upto the middle third of the root portion (fig 2). Also there was a periapical radiolucency irt 11 and widening of periodontal ligament space was seen irt 11 and 21 (figure 2), indicating perio-endo lesion, falling in the category of periodontal-endodontic lesion given by Simon et al[10]. A treatment plan was made wherein, periodontal flap surgery was decided upon without endodontic intervention irt 11 and 21 as the pulp showed signs of vitality and TOP was negative. Patient was counselled regarding the treatment plan and on the patient's first visit, complete oral prophylaxis was done and he was instructed to do warm saline rinse, 4-5 times daily till the time of the surgery.

However, after 10 days of oral prophylaxis patient reported back with periodontal abscess and pus discharge from the pocket irt 11,21,22 (fig 3). Abscess was drained, complete curettage was done, irrigation was done, patient was kept on antibiotics and local drug delivery - Tetracycline fibers (company) were inserted. On his consecutive visit after 7 days, the patient was comfortable, there was no pus discharge and no pain on percussion in the anterior teeth, thus, he was appointed for periodontal flap surgery.

During the surgical procedure, Buccal and lingual mucoperiosteal flaps were raised from teeth 13 to 23 (Fig 4). The granulation tissue was removed and the root surface was thoroughly scaled and planed. As can be seen on the figure 4, there was a large periodontal defect, where the entire buccal bone irt 11 and the bone upto the middle one-third of 21 was resorbed, such defects are classified as one-walled, as only the palatal bone is present. Sticky bone™ (fig 5) was placed in the defects (fig 6). It was prepared by mixing APRF obtained from the patient's own blood by spinning at 1300 RPM for 5 minutes and xenograft (Ti-oss, korea).

APRF and collagen membrane after shaping into desired shape was placed (fig. 7) and the site was sutured using 3-0 silk sutures. The patient was advised to rinse with a 0.2% chlorhexidine solution twice daily for 10 days. Patient was prescribed Cap. Amoxicillin 500 mg TDS for 5 days and Tab. Diclofenac 50 mg, SOS. He was also instructed to maintain proper oral hygiene. On day 10 of the surgery, at the time of suture removal, the surgical site had satisfactory healing with no discomfort to the patient and wire-and-composite splinting was done irt 13-23. Patient was followed up till 9 months post-operatively, during this time on consecutive visits at 3 and 6 months, patient did not report any discomfort at the surgical site, there was no periapical radiolucency (fig. 8) and tooth was non-tender on percussion on follow-up appointments. Probing depth at 3 months was 4 mm irt 11 and 3 mm irt 21. A complete scaling was done for the patient and he was strictly advised to maintain oral hygiene. At 6 months, probing depth was 2 mm in 11 and 21. After which the splint was removed and he was kept on follow-up for a further 3 months. At 9 months there was no change in the probing depths and no pain on percussion. On vitality test, the tooth was found to be vital, indicating no endodontic intervention. Scaling was done for him once again and was asked to report to dental office in case of any pain in future. Until the period of 5 years after that patient was asked a regular check-up, however the visits reduced in number. In the entire duration of 5 years patient did not report any pain or discomfort. A proper oral hygiene was maintained by the patients.

Figure 1. Pre-op probing depths.

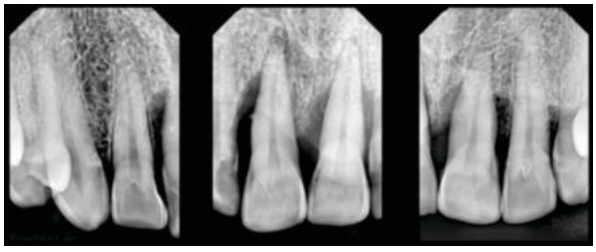

Figure 2. IOPA showing amount of bone present.

Figure 3. Pus drainage from the pockets

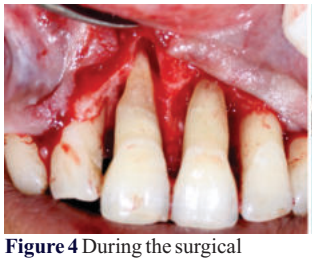

Figure 4 During the surgical procedure.

Figure 5. Sticky bone™

Figure 6. Sticky bone™ placed at the bony defects.

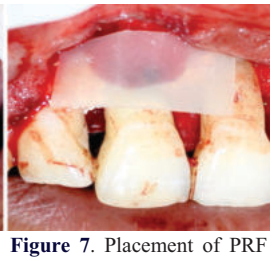

Figure 7. Placement of PRF membrane and collagen membrane.

Figure 8. Post-op at 3 and 6 months.

RESULT:

In the case described here, healing was satisfactory after 7 days when the patient reported for suture removal and his condition improved thereafter. On all of the follow-up visits of the patient, clinically, the tooth was non-tender on percussion, pocket depth decreased to 2mm, however recession did not improve, in fact it developed irt 21 as well. Radiographically, bone healing was satisfactory, good bone fill was seen in the x-rays (fig 9) at 9 months and no periapical radiolucency was present. Until 5 years of the period after that, patient did not show any sign of pain or discomfort.

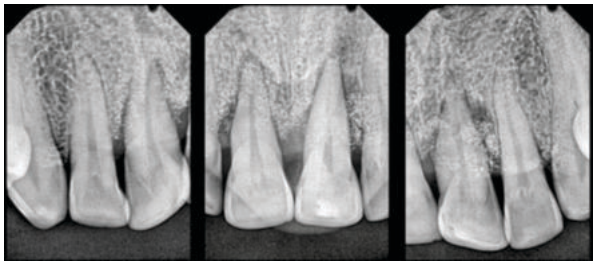

Figure 9. Post-op at 9 months.

DISCUSSION:

In the cases of primary endodontic or primary periodontal lesions the treatment becomes easy as either of the two have to be treated first, however when there is a combined lesion differential diagnosis and treatment can sometimes be difficult but correct diagnosis must be made so that the appropriate treatment can be provided[11]. In case of miscellaneous problems the causative agent such as – grooves, faulty RCTs, root perforations, iatrogenic communications, etc have to be treated first in cases of combined lesions[11], however in the case discussed here, any such problem did not exist. Thus from clinical and radiographic examination it was concluded that it was a perio-endo lesion, however as aforementioned patient did not have any endodontic-related sign or symptom and the tooth was vital, as a result RCT was not performed. Also, intraoral periapical radiograph (IOPA) is a 2-dimensional diagnostic tool, only upon CBCT true extent of the defect can be determined[12], as after opening the flap bony defect was short from the apex, but this does not stop the infection from reaching the apical foramina and cause pain, yet again, authors would like to stress upon the fact that no sign or symptom was present indicating the initiation of endodontic therapy irt 11 and 21. Patient had visited the dental office with a chief complaint of bad breath and bleeding gums but never had any episode of pain in his anterior teeth. As a result the defect was treated as any other large vertical defect.

The treatment of vertical defects is bone grafting. Sticky Bone™ is an advanced version of bone grafting which is prepared by mixing APRF and bone graft substitutes. Through a series of experiments, Gordon in 2003 first proposed that macrophages are involved in tissue repair by helping in fibroblast recruitment, removal of dead tissues, in-growth of new blood vessels and vascularization and tissue remodeling[13]. Lucas et al[14] in 2010 then stated that VEGF is produced by leukocytes as well. Lymphocytes release TGF- VEGF, macrophages and monocytes release PDGF[14]. Keeping this concept into consideration i-PRF and APRF blood derivatives were developed which are based on the Low Speed Centrifugation Concept (LSCC) where the speed and time of the centrifugation is kept to a minimum so that it is just enough to separate platelets from RBCs[15]. This provides presence of not only growth factors but leukocytes too in the matrix for an early and rapid vascularization, faster soft tissue growth, release of BMPs and more cytokines than classical PRF[16]. The presence of leukocytes is of high clinical relevance as they release angiogenic and lymphogenic factors involved in cell-to-cell communication for tissue regeneration[17,18]. They are also involved in communication between precursor cells and mesenchymal cells with regard to bone formation[10,20]. Aforementioned clinical research shows that platelets need leukocytes for sustainability of tissue regeneration as they aid in sophisticated cell-to-cell communication[21,22].

Discussed here, the Sticky Bone™ produced is different from the classical preparation as described by Sohn et al in 2015[8]. It is produced by centrifugation of 10-20 ml blood at the speed of 1300 RPM for 5-8 minutes (APRF) (and since the process of centrifugation is not long, two layers are seen, instead of 3, which Sohn et al has termed as autologous fibrin glue (AFG) and Choukroun et al[9] as liquid-PRF/injectable PRF/APRF depending upon the time and centrifugation speed. So all the content in the test tube above RBCs (layer rich in platelets and leukocytes) is pipetted out and mixed with the bone graft material. The coagulum is set aside for 5-10 minutes, after which a biomaterial wherein bone graft is embedded in the i-PRF matrix is obtained which is strong enough that when picked up with a tweezer and shaken, it doesn't migrate (fig. 5). The advantage of this biomaterial is that it can be rolled into different shapes, flattened to be used as a sheet, or cut into desired the size and condensed easily into the bony defect[6]. The basic difference between these two biomaterials is the preparation of liquid PRF/AFG,the former is prepared at 2400-

2700 rpm in 2-12 minutes, and the latter at 700-1300 rpm in 3-14 minutes. As aforementioned this change in speed and time is based on the LSCC where it has been clearly stated that higher the relative centrifugal forces (RCF) lesser the no of growth factors and leukocytes, required for regeneration.

CONCLUSION:

The Authors would like to state that this is one such case among three done so far (other 2 lost to follow up), where root canal treatment is being done only in teeth which show periapical lesion or a clear image of bone loss up-to the apical portion of the tooth. As x-rays are two dimensional[12], they should not cloud the clinician's judgment and signs and symptoms given by the patient should also be relied upon when in doubt. The Authors did not consider it paramount to get a RCT done irt 11 as that was not the patient's chief complaint, he never had pain in the anterior tooth 11, and the tooth was non tender on vertical percussion, suggesting no need for an endodontic intervention. Having said that, authors would still recommend to analyze the case and perform treatment as per the need, on case-to-case basis. A large sample size and long- term follow-up is required to state with conviction that RCT is not needed in such cases. Having said that, the authors understand that it is difficult to judge prognosis in mere 9 months, even though the patient was frequently being called for check-ups. However, keeping time related factors into consideration, the authors decided to publish this case and advised patient to report to the dental office if symptomatic. From the period of 9 months until 2 years, the visits were less frequent, but patient did not show pain or other symptoms of discomfort. From the period of 2 years to 5 years patient reported only once, and again he did not report any discomfort or pain on clinical examination.

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Conflict Of Interest: None

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