
PRF (Platelet rich fibrin): An effective bone regenerating agent in a patient with Large Benign Odontogenic cyst. A case report

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Abstract: Introduction

The surgical treatment for all Benign Odontogenic cyst aims to remove the pathology to obtain bone regeneration and healing. To enhance the regeneration of the tissue by using the patient's own blood is a peculiar concept in dentistry. The purpose of this case report is to point up the effectiveness of platelet rich fibrin (PRF) placement into a massive bone defect resulting from a large Benign Odontogenic cyst marsupialization. Literature suggests that 6 months to 1 year is the time taken for the complete healing of cystic lesion, however the placement of PRF in our case decreased the healing time to three months. The results of this case report reveals that PRF can be used successfully as monotherapy for obtaining complete wound healing and tissue regeneration.

Keywords: Benign Odontogenic cyst, Platelet rich fibrin, PRF, Platelet rich fibrin.

1. Introduction

PRF can be classified into pure platelet rich plasma (P-PRP), Leukocyte and platelet rich plasma (L-PRP), and Leukocyte and platelet rich fibrin (L-PRF).[1,2] The advantages of PRF, when compare to other regenerative materials are that, it is purely autologous, can be prepared easily, have low cost, have prolonged growth factor release.[3] Leukocytes and growth factors are the most important factors of platelets to help in the process of healing and repair.. Fibrin is act as a medium for cells to proliferate, organize and bring out their functions at the site of injury. For speedy recovery and healing of wound, PRF is a good alternative with minimum risk. PRF reduces post-operative pain and swelling and acts as a barrier membrane [4] This article documents an excellent outcome by using PRF, where almost complete bone regeneration was seen in a massive Benign Odontogenic cystic lesion in three months. This case is unique because a thorough literature research reveals that there was only few cases reported with complete bone regeneration using only PRF.

2. Case History

A 33 year old male patient came with a chief complaint of mild pain and discomfort on his lower right back tooth region since 1 month. The patient was fine initially, after one month he experienced pain and sensitivity which increased on taking cold beverages and relived on its withdrawal; after he noticed a pea sized swelling on palpation with his finger on the same side and then reported for the same to our dental college.

Extra orally, Right submandibular lymph node was palpable, single in number, round in shape, about 1cm in dimension, freely movable and not tender. On examination no swelling or surface changes was observed (fig 1 extra oral images). Intraoral examination revealed a minimally observable swelling in association with clinically missing right lower third molar, with minimal cortical bone expansion. The swelling extended from lower right second premolar region to third molar region with mild tenderness on palpation. The surrounding mucosa was normal and none of the teeth were mobile (fig 2 intraoral images).

Considering the missing third molar, minimal swelling and minimal unicortical bone expansion a provisional diagnosis of Odontogenic Keratocyst (OKC) was given. Clinical differential diagnosis of dentigerous cyst and Ameloblastoma were given. Electric pulp vitality test revealed non vital 47, whereas 46 and 45 showed delayed response.

Radiographic investigation with OPG followed by CBCT was done. The radiographic examination revealed impacted third molar with a massive radiolucent lesion about 53 mm × 14 mm × 30 mm in its greatest dimensions with predominantly buccolingual expansion. The radiolucent lesion was scalloped, multilocular, involving 43, 44, 45, 46, 47 and 48. The buccal and lingual cortical plates were breached and the inferior alveolar nerve canal was pushed inferiorly (fig.2. panoramic and CBCT image shows an osteolytic odontogenic lesion in the right mandible with impacted third molar).

Because of the minimal bone expansion and nature of spreading along the intramedullary space the radiographic diagnosis of OKC was given [5,6]. On the basis of above diagnosis further treatment was planned. RCT in 45 46 47 followed by marsupialization of cystic lesion and surgical removal of impacted 48 was carried out under local anaesthesia. (fig.4: Lesion exposed and the epithelium was curetted).

For preparing PRF, ten ml of whole venous blood was collected in a sterile vacutainer tubes without anticoagulant. The vacutainer tubes were then placed in a centrifugal machine at a speed of 3000 revolutions per minute for 10 minute. After centrifugation the collected blood settled into three layers, the middle layer fibrin clot was collected (fig.4: Three layers are obtained after centrifugation and the middle layer shows the PRF clot). PRF was placed in defect followed by suturing. Postoperative instructions was given. The obtained specimen was then grossed for histopathological diagnosis.

Histopathological result revealed densely collagenous connective tissue stroma with plump fibroblasts connective tissue shows numerous vasculated area, foci of calcification mixed inflammatory cell infiltrate consisting mainly of PMNLS and lymphocytes. Also noticed two - three layers of odontogenic epithelium resembling reduced enamel epithelium all these features suggested of infected odontogenic cyst.

The patient was Monitored clinically and radiographically every first, third and sixth months. Almost complete regeneration was seen in three months post the insertion of PRF (fig.5 (a) after one month of PRF placement, noticed evidence of bone regeneration. (b) almost complete bone regeneration after three month).

3. Discussion:

This case is peculiar and interesting because only tissue regenerating material used was PRF after marsupialization of large sized Benign Odontogenic cyst which gave an excellent result of complete bone regeneration. A thorough literature research reveals that there is only one case reported so far by Al-kholani AI et al, of complete bone regeneration using only PRF in large cystic lesion within three month and hence this case demands documentation.

Al-kholani AI et al using Platelet-Rich Fibrin (PRF) into the bony defect resulting from a Dentigerous cyst enucleation. The results showed the healing time is accelerated and decreasing to the half of the period. [7]

Case report of Dhote VS et al shows that unusually large radicular cyst management with PRF placement as a healing biomaterial in the bony defect, One year follow up showed uneventful and relatively faster healing facilitated by PRF placement.[8]

Çevik Tet al observed a significant increase in bone density after eight months of follow-up in a bone defect that occurs after the enucleation of the radicular cyst followed by T-PRF application.[9]

Another case report of Dugar M et al showed satisfactory healing after One-year follow-up in a large radicular cyst management with PRF augmentation in the bony defect. Healing was relatively fast and enhanced by placement of PRF without any post-operative complications. [10]

4. Conclusion:

This case is unique as it reports a massive Benign Odontogenic cyst cavity treated successfully with marsupialization and exclusively using PRF resulting in almost complete bone regeneration. It also highlights

the fast and complete healing of a wide alveolar defect with the application of PRF only. It also suggest that more research should be directed towards use of PRF exclusively in completely rehabilitating the patients.

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Figures



Fig.1 Extra oral images. a) Right lateral profile, b) Frontal profile, c) Left lateral profile.



Fig. 2 Intra oral image.

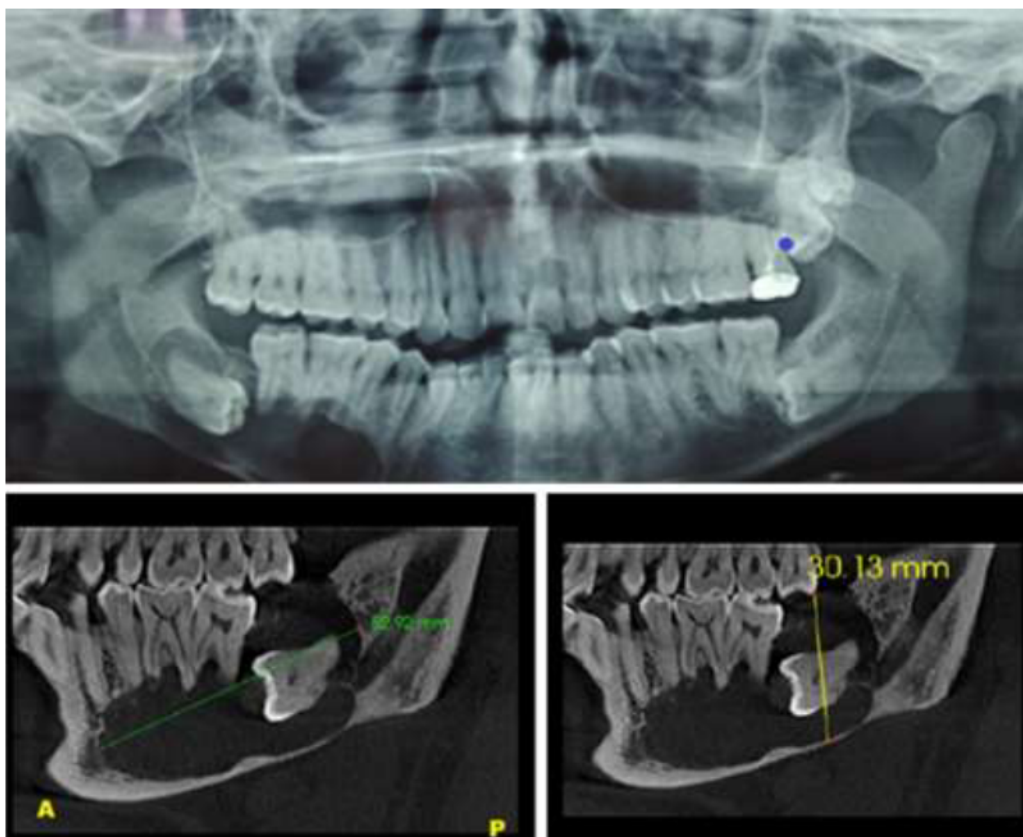


Fig 3.panoramic and CBCT image shows an osteolytic odontogenic lesion in the right mandible with impacted third molar .The growth of the lesion was predominantly along the length of the bone.



Fig.4 Lesion exposed and the epithelium was currettd. Three layers are obtained after centrifugation. The middle layer of PRF clot was removed with sterile tweezer.

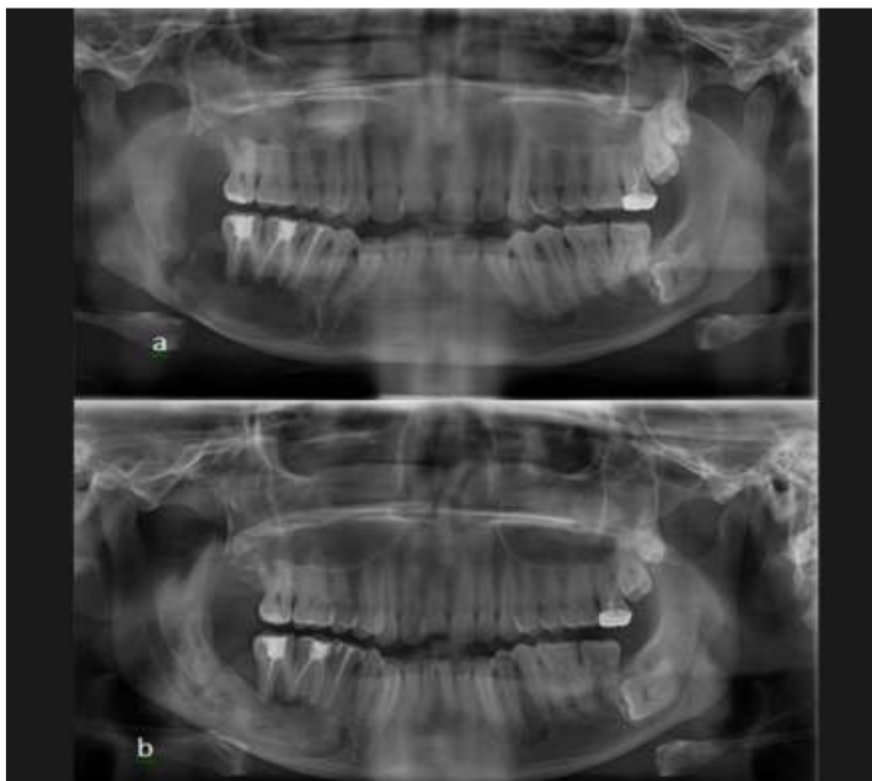


Fig.5 After one month of PRF placement, noticed evidence of bone regeneration (a). Almost complete bone regeneration after three month (b).

Supplementary figures



Fig .1Centrifuging Machine



Fig 2 Impacted tooth removed by splitting the tooth.



Fig 3. Specimen collected from lesion

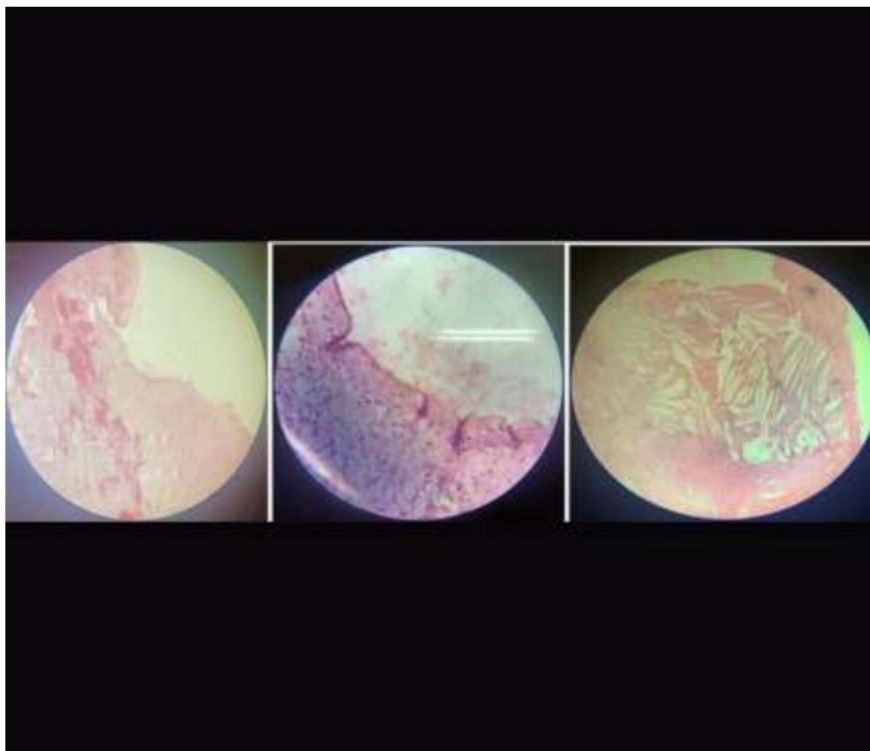


Fig. 4 The histological image shows 2-3 layers of odontogenic epithelium resembling reduced enamel epithelium(a,b) and densely collagenous connective tissue stroma with plump fibroblasts(c).Connective tissue shows numerous vasculated area, foci of calcification mixed inflammatory cell infiltrate consisting mainly of PMNLS and lymphocytes (b)