



RADICULAR CYST ENUCLEATION, APICOECTOMY AND MANAGEMENT OF OSSEOUS CAVITY USING ALLOPLAST AND PLATELET RICH FIBRIN IN RELATION TO NON-VITAL TEETH- A CASE REPORT

Dental Science

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ABSTRACT

One of the most common dental cysts to affect the human jaw is radicular cyst. The tooth/teeth associated with radicular cysts are usually non-vital and rarely presents with clinical signs and symptoms until diagnosed during routine dental examination. The present case report highlights on radicular cyst enucleation, apicoectomy of the involved teeth and periodontal management of the resultant osseous defect using alloplast bone graft, platelet-rich fibrin (PRF) and guided tissue regeneration (GTR) membrane.

KEYWORDS

Alloplast, Apicoectomy, GTR, Periapical lesion, Radicular cyst

INTRODUCTION:

Radicular cysts are considered to be most common inflammatory odontogenic cyst of the oral cavity.¹ They are thought to be instigated from the epithelial cell rests of Malassez.² This type of cyst is usually coupled with non-vital teeth where the pulp is necrosed. Amongst all the odontogenic cysts, radicular cysts alone encompass about 52% to 68%.³ The management of these cysts is usually done either by conventional modality or by surgical removal along with the cystic lining.

Conventional treatment options, however, are restricted only to small lesions. Larger lesions usually require cyst enucleation, decompression or marsupialization depending upon the size and extent of invasion of the lesion. Enucleation of the radicular cyst leaves behind a huge osseous cavity that needs intervention to achieve periodontal regeneration. Moreover, the open apex corresponding to the non-vital teeth should also undergo apicoectomy and root-end filling.

The present case report emphasizes on the enucleation of a large radicular cyst, followed by apicoectomy of the involved teeth and osseous defect fill using alloplast bone graft, PRF and GTR.

CASE REPORT:

A 32 year old male patient reported with a chief complaint of discoloured upper front teeth and desired crown for the same. On routine dental examination, the teeth #11 and #12 (FDI tooth number system) were found to be non-vital with grade II mobility. Radiographic investigation revealed unilocular periapical radiolucency with well-defined border (Figure 1). The well-defined border was suspected to be the epithelial lining of a cyst.

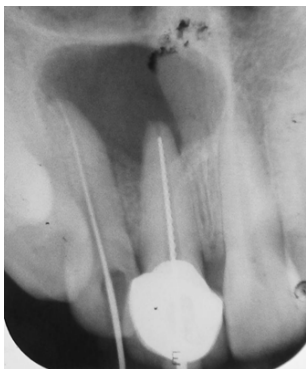


Figure 1: Radiograph Showing Periapical Radiolucency With Well-defined Border

On obtaining detailed medical history and dental history, the patient was found to be systemically healthy. However, 5 years back the patient experienced a road traffic accident (RTA) following which the teeth gradually changed colour. There was no associated pain,

swelling, bleeding or pus discharge.

After explaining in detail regarding the treatment protocol, written informed consent was obtained from the patient and root-canal therapy (RCT) was commenced following splinting of the teeth. Following the completion of RCT, periapical cyst enucleation was planned and the patient was scheduled for the procedure.

On the scheduled appointment, local anaesthesia was achieved using 2% lignocaine HCl with 1: 200000 adrenaline. Envelope flap was elevated and lateral window was created using micro-motor and bur along with copious saline irrigation. Once the access to the cyst was attained, careful separation of the cystic lining from the adjacent bone was done using tunnelling knives and excavators. The cyst along with the lining was then enucleated completely without any breach of the cystic contents (Figure 2). The bone was thoroughly curetted.



Figure 2: Completely Enucleated Cyst Along With The Epithelial Lining

Apicoectomy was then performed using high-speed airrotor and bur. The root-end was filled in retrograde fashion and plugged using mineral trioxide aggregate (MTA). The osseous cavity was then filled with alloplast bone graft that primarily contains hydroxyapatite (HA) and β -Tricalcium phosphate (β -TCP) and PRF. The lateral window was covered with resorbable GTR membrane. The access flap was then approximated and sutured using 4-0 silk suture material. The enucleated specimen was then sent for histopathological investigation.



Figure 3: Apicoectomy Of The Involved Teeth, #11 And #12 And Root End Filling With MTA



Figure 4: The Osseous Cavity Is Filled With Alloplast Bone Graft And PRF

Immediate post-operative radiograph revealed complete bone fill of the cavity as well as sealed root apex. The patient was recalled after one week for suture removal.



Figure 5: Immediate Post-operative Radiograph Reveals Root End Seal And Bone Fill

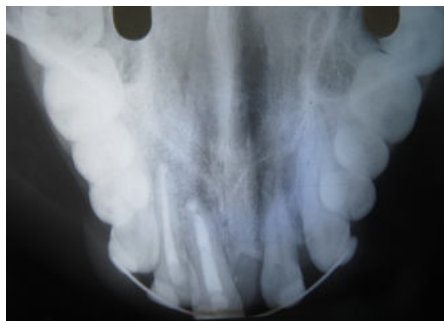


Figure 6: Occlusal radiograph at 6 months follow-up visit showing complete resolution of the lesion and bone formation.

During the recall visit, uneventful healing of the access site was noted. The patient reported no discomfort, pain or any adverse reactions. The histopathological investigation confirmed the diagnosis of radicular cyst. The examination showed that the cyst had stratified squamous non-keratinized epithelium arranged in arcading pattern. The contents of the cyst included dense infiltrate of inflammatory cells, chiefly of lymphocytes and plasma cells. The 6 months follow-up visit revealed the mobility reduced to grade I and the occlusal radiograph showed no recurrence of the lesion with complete bone formation in relation to #11 and #12.

DISCUSSION:

Cysts associated with non-vital teeth are mostly inflammatory in nature. Depending upon the connection of the epithelial lining of such cysts to the root canal, they are classified as bay cyst or apical cyst.² When the connection exists, it is called as bay cyst, whereas, when the epithelial lining is intact and does not communicate with the root canal;

it is termed as periapical cyst. The male to female ratio 1.6: 1 with higher prevalence in males. Anterior maxillary teeth exhibits higher rate of such cysts as they are more prone for trauma and the resultant tooth non-vitality.⁴ In the present case report, the main aetiology for the teeth non-vitality was trauma few years back and the teeth where not endodontically intervened for over a period of 5 years that lead to radicular cyst formation.

Other main reason for the patient not reporting to the dental office was, these cysts are usually asymptomatic without any symptom of pain and swelling. The only complaint the patients usually reports with is the discoloured tooth that is unaesthetic. When the cyst gets secondarily infected, it might be associated with pain, tooth mobility, swelling or pus discharge. In some instances, root resorption can be noted during radiographic investigation.⁵

The important diagnostic tool is the cystic fluid and its contents. The cystic content typically varies from a clear, yellow-coloured fluid to a solid mass. The protein content fluctuates between 5 to 11 g/100 ml.⁶ The level of protein content, most importantly of globulin, is the important diagnostic difference from other dental cysts such as dentigerous cyst or keratocyst.

Depending upon the size, extent and invasion of the cyst, the treatment option varies from endodontic therapy, decompression, enucleation or marsupialization. When severe external root resorption has occurred and the extent of cyst invaded into adjacent anatomical structures, the involved teeth are usually extracted.^{7,8} In the present case, though the cystic lesion involved two teeth, the size and extent of the lesion was large for conservative treatment and decompression; small for marsupialization. Therefore cyst enucleation and regeneration of the osseous cavity was decided as the treatment plan.

Following enucleation, regeneration of osseous cavity was attempted using alloplast- HA and β -TCP as it is economical, easily available in bulk quantities and is osteoconductive in nature. PRF was additionally used because of the abundant supply of growth factors such as platelet-derived growth factor. The osseous cavity was then covered using GTR membrane to prevent epithelial cell migration into the bone graft. These measures will further enhance the bone regeneration at the same time allows healing of the affected teeth.

The recurrence of completely enucleated radicular cysts is uncommon provided adequate care is taken to eliminate any remnant cystic tissue or fluid.⁹

CONCLUSION:

Early and prompt intervention is mandated for the treatment of radicular cysts to avoid extensive invasion of the lesion, loss of teeth and any other potential complications. The present case report focuses on the swift diagnosis and treatment plan, the successful management of the post-enucleation osseous defect and reduction of the post-operative morbidity of the treated site. The 6 month follow-up of the region showed that such lesions heal after adequate treatment and also bone formation will take place once the periapical environment favours regeneration.

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Conflict of interest: None declared

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