



Case Report

Lateral Window Trap-door Approach for Enucleation of a Colossal Periapical Cyst, Retrograde Biodentine Placement and Management of Osseous Cavity using Bone Graft and GTR — A Case Report

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ABSTRACT

Periapical cysts are one of the most common dental cysts that affect the human jaw. The tooth/teeth allied with periapical cysts are typically non-vital. They seldom present any clinical signs and symptoms until diagnosed during customary dental investigations. The present case report focuses on a tooth that presented with periapical cyst, its enucleation, apicoectomy and root end filling using biodentine and the management of the consequential osseous defect using bone graft and guided tissue regeneration (GTR) membrane.

Keywords: Alloplast; Apicoectomy; Biodentine; Enucleation; GTR; Periapical cyst

1 INTRODUCTION

Periapical cysts are regarded as the commonest inflammatory cyst of the oral cavity with odontogenic origin.⁽¹⁾ They are assumed to be prompted from the cell rests of Malassez.⁽²⁾ These cysts are usually linked with non-vital teeth. Periapical cysts, amongst all the cysts of odontogenic origin, have a prevalence rate of about 52% to 68%.⁽³⁾ They are usually managed by conservative treatment options or by surgical removal along with the cystic lining depending upon the size and extent of the lesion.

Conservative approaches, however, are considered only for smaller lesions. Larger lesions are managed by one of the following methods: cyst enucleation, decompression or marsupialization, reliant upon the size and the anatomical structures involved. Following the cyst enucleation a huge osseous cavity prevails that needs to be restored for favourable prognosis. Furthermore, apicoectomy and retrograde root-end filling should be performed to reinstate the open apex subsequent to the non-vital teeth.

Biodentine, a calcium-silicate based material, has gained popularity in recent years due to its better handling properties and faster setting time when compared to other root end-filling materials such as mineral trioxide aggregate (MTA).^(4,5) It has been advocated for clinical procedures, such as restoration of root perforations, retrograde root canal fillings, etc. The material was suggested as a contemporary material instead of MTA as its physical property is quite similar to that of dentine and also proffers low risk of tooth discoloration.⁽⁵⁾

Thus, the present case report highlights on the careful lateral window approach to achieve enucleation of a large periapical cyst, apicoectomy of the involved teeth, root end filling using biodentine and osseous defect fill using bone graft and guided tissue regeneration (GTR).

2 CASE REPORT

A 42-year-old female patient reported with a chief complaint of discoloured upper front tooth. She had intermittent pain with no associated aggravating or relieving factors. During

regular dental examination, #12 (FDI tooth number system) was non-vital with grade I mobility. Intra-oral periapical radiographic examination exposed an unilocular periapical radiolucency with well-defined borders (Figure 1). The well-defined border was suspected to be the epithelial lining of a cyst. As the tooth was non-vital, the provisional diagnosis for the case was made as periapical cyst.



Fig. 1: Radiograph showing periapical radiolucency with well-defined border

Comprehensive medical and dental history revealed that the patient was systemically healthy. The aetiology for the tooth non-vitality was found to be trauma before 5 years, resulting which the tooth progressively changed colour.

The patient was explained in detail regarding the treatment protocol and written informed consent was attained. Following the completion of root canal therapy (RCT), periapical cyst enucleation was intended and the patient was slated for the procedure.

During the scheduled visit, local anaesthesia was achieved using 2% lignocaine HCl with 1: 100000 adrenaline. Lateral window approach was initiated with elevation of envelope flap extending from distal aspect of #11 to distal aspect of #13. The osseous window was created using straight micro-motor hand-piece and stainless steel FG- 169L bone cutting bur along with plentiful saline irrigation (Figure 2).

Once the access to the cyst was attained, cautious separation of the cystic lining from the adjacent bone was accomplished using tunnelling knives and excavators. The periapical cyst along with the lining was then meticulously enucleated without the rupture of the cystic contents (Figure 3).

The osseous cavity was then scrupulously curetted. Apicoectomy was done using high-speed airrotor and diamond coated bur. Retrograde root-end filling was achieved using biodentine, a contemporary dentin replacement material. The osseous cavity was then filled with bone alloplast material that principally contains hydroxyapatite (HA) and β - Tricalcium phosphate (β -TCP) (Figure 4).



Fig. 2: Envelope flap elevation and lateral window preparation done to access the periapical cyst



Fig. 3: Completely enucleated cyst along with the epithelial lining



Fig. 4: The osseous defect cavity is filled with bonealloplast containing HA and β -TCP

The lateral window was then enclosed with resorbable GTR membrane (Figure 5). The envelope flap was re-approximated and sutured using 3-0 silk suture material (Figure 6). Immediate post-operative radiograph showed bone fill in the osseous cavity (Figure 7). The enucleated specimen was sent for histopathological examination. The patient was recalled after 10 days for suture removal.



Fig. 5: GTR membrane placed over the bone graft material and the defect cavity is completely sealed



Fig. 6: Envelope flap re-approximated and simple interrupted sutures placed



Fig. 7: Immediate post-op radiograph showing bone fill in relation to the periapical region of #12

Uneventful healing of the operated region was noted during the scheduled recall visit. There was no discomfort, pain or any other adverse reactions encountered by the patient. The histopathological examination showed that the specimen had stratified squamous non-keratinized epithelium arranged in arcading pattern with cystic fluid within the epithelium. The content of the cystic fluid was comprised of dense infiltrate of inflammatory cells, chiefly of lymphocytes and plasma cells. This confirmed the diagnosis of the lesion as periapical cyst associated with a non-vital tooth.

Periodic recall visits were scheduled for the patient and intra-oral periapical radiograph was taken during each visit. The 6 month follow-up visit showed complete healing of the lesion with trabecular pattern formation (Figure 8).



Fig. 8: 6 months follow-up radiograph showing complete bone formation in relation to #12

3 DISCUSSION

Inflammatory cysts of odontogenic origin are almost always associated with non-vital teeth. 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 a communication exists, it is called as bay cyst, whereas, if the epithelial lining remains intact and does not communicate with the root canal; it is termed as periapical cyst. Periapical cysts are more prevalent in the anterior maxillary teeth region as they are more prone for trauma.⁽⁶⁾ The cyst described here was associated with a non-vital tooth and did not show any communication with the root canal as observed during RCT.

The aetiology for non-vitality of the tooth was trauma that occurred 5 years earlier. Moreover, the patient did not report for dental examination immediately after trauma and the periapical lesion progressively developed into a periapical cyst over a period of 5 years.

Other foremost excuse for the patients to not report to the dental office is because these cysts are typically asymptomatic without any pain, swelling or pus discharge until secondarily infected. The lesion is discovered mostly during routine dental examinations and some cases might even exhibit root resorption during radiographic investigation.⁽⁷⁾

The important diagnostic tool to differentiate between various odontogenic cysts is the cystic fluid and its contents. The content of periapical cyst typically varies from a clear, yellow-coloured fluid to a solid mass. The protein concentration fluctuates between 5 and 11 g/100 ml.⁽⁸⁾ The level of protein, 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 conservative endodontic therapy, decompression, enucleation or marsupialization. Extraction is the treatment of choice if severe external root resorption has occurred and when the cyst has plagued into adjacent anatomical structures such as maxillary sinus.^(9,10) In the present case, the size and extent of the lesion was large for conservative management and small for marsupialization. Therefore enucleation of the lesion and regeneration of the osseous cavity using bone alloplast and GTR was chosen as the treatment.

Bone alloplast material containing HA and β -TCP was preferred as the material of choice for regeneration of defect cavity due to its cost efficiency and easy availability in bulk quantities. Moreover, the alloplasts are inert, osteoconductive filler materials that act as a scaffold to promote new bone formation.⁽¹¹⁾ Therefore, in the present case, defect cavity was first filled with HA (70%) and β -TCP (30%) alloplast material. The osseous window was then covered with resorbable GTR membrane made of fish collagen to prevent epithelial cell migration into the bone graft particles.

Bani in 2015 in a study suggested that biodentine has effortless handling properties and its placement is less time-consuming than MTA. The apical sealing ability of biodentine was similar to that of MTA at any apical plug thickness. The study concluded that biodentine, even at lesser apical plug thickness, considerably prevents apical microleakage. Moreover, the material has excellent dentin regenerative properties.⁽¹²⁾ Therefore, biodentine was the material of choice for root-end filling in the present case.

Once thoroughly enucleated, periapical cyst recurrence is uncommon provided sufficient intra-operative care is taken to remove the cystic lining and/or fluid completely.⁽¹³⁾

4 CONCLUSION

Periapical cysts associated with carious or non-vital teeth are common inflammatory cysts of the oral cavity, especially the

maxillary anterior teeth region. Swift intercession is required as the lesion can enlarge rapidly in size and invade the surrounding anatomical structures as well. The present case report focuses on the hasty diagnosis, prompt treatment plan, the efficacious management of the post-enucleation osseous cavity and reduction of the post-operative morbidity of the involved site. The 6 month follow-up of the treated site showed that periapical lesions associated with infected/non-vital root canal heal adequately after appropriate treatment. Biodentine, a contemporary root- end filling material also plays an important role in healing of the periapical structures. Additionally, complete bone formation will take place once the periapical environment favours regeneration.

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