Case Report

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INTERDISCIPLINARY MANAGEMENT OF LARGE CHRONIC PERIAPICAL CYST USING ENDODONTIC AND PERIODONTAL REGENERATIVE APPROACH: A CASE REPORT

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ABSTRACT:

Traumatic injuries are common in the anterior maxilla and mandible which may lead to non-vitality of dental pulp and may give rise to chronic periapical cyst or radicular cyst. It originates from epithelial cell rests of Malassez which expands from necrosed non-vital teeth. A 26 year old healthy patient with history of trauma to the anterior mandible 2 years back, came to the department with a chief complaint of pain and tenderness in the same region for the past few months. On radiographical examination, a round to oval shaped, well circumscribed radiolucent lesion could be seen involving the periapical region of mandibular anteriors. After complete assessment, periapical surgery was decided as the treatment option for the current situation. This case report describes the management of periapical cyst with an endodontic therapy followed by regenerative periapical surgery using Platelet rich fibrin, demineralized bone matrix and collagen membrane to achieve optimal, accelerated soft tissue and hard tissue healing. The healing was uneventful and half yearly follow up has been done ever since.

Keywords: Bone Matrix, Collagen, Dental Pulp, Radicular Cyst, Platelet-Rich Fibrin, Wound Healing

INTRODUCTION:

Cyst is defined as a pathologic cavity lined by epithelium with fluid or semisolid contents.[1] Periapical cyst, one of the most common odontogenic cyst, which is associated with necrosed dental pulp and leads to inflammation of periapical region.[2] It emerges from epithelial cell rest of Malassez.[1] On radiographs, it presents as a well defined unilocular or multilocular radiolucent lesion associated with periapical region of the involved tooth. According to Bhaskar et al, incidence of periapical cyst is higher in the third decade of life with high predilection for anterior maxilla with higher male to female ratio.[3] Here we describe a case of large chronic perapical cyst involving perapical region of multiple anterior teeth in the mandible which was managed by an interdisciplinary endodontic and periodontal regenerative approach for

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optimal and accelerated soft and hard tissue healing and reconstruction.

CASE REPORT

A healthy male patient, aged 26, reported to the Department Of Periodontics, Vydehi Institute of Dental Sciences and Research Center, Bangalore with a main complaint of pain and tenderness in the mandibular anterior region for the last quarter (Figure1). Patient gave history of road accident 2 years back, during which trauma occurred to the mandibular anterior region for which no treatment was done. Following the trauma; patient experienced a change in colour of the incisors which was associated with mild gnawing type of pain in the same region, which subsided by itself after fortnight. Patient has no history of tobacco use. On extraoral examination, no gross facial asymmetry was detected. On clinical intra oral examination the patient's oral hygiene was satisfactory with good periodontal tissue status. On hard tissue examination 42 41 31 32 33 were tender on percussion without any swelling or sinus tract associated with the same. Pulpal vitality test was performed using thermal test on these teeth which showed a negative response with 41 31 32 33. On radiographic examination there was a large unilocular well defined radiolucent lesion associated with mandibular incisors (Figure 2).

Based on clinical and radiographic examination, periapical cyst was given as the provisional diagnosis. Differential diagnosis includes dentigerous cyst, odontogenic keratocyst and pseudocyst etc. Pre-procedural routine hematological and biochemical examination was done to evaluate patients present health status. Endodontic therapy was performed with 41 31 32 33 in multiple visits. Calcium hydroxide dressing was provided in the teeth; repeated thrice for 10 days for a month for better healing of canals. Obturation was performed using lateral condensation technique using gutta percha and zinc oxide eugenol as sealant. Surgical eradication of the lesion was done by buccal approach. 1:100000 local anesthesia was given as right and left mental nerve block. Ochsenbein Leubke incision was given in the anterior mandible involving all associated teeth, (Figure 3a 3b) followed by elevation of full thickness mucoperiosteal flap with vertical releasing incision were placed at line angles of the tooth, at both extremities of the flap (Figure 4). Perforation was clearly visible on periapex of 41 (Figure5). Ostectomy was performed along the extent of lesion up to 33, (Figure 6) followed by complete enucleation of the cyst (Figure7a 7b). Cystic lining was dispatched for histopathologic examination (Figure7c). Apicoectomy was performed using buccal bevel at 41 31 32 (Figure 8a 8b) followed by retrograde filling and sealing of root canal with light cured ionoseal (Figure 9a 9b 9c 9d). Cystic cavity after enucleation and curettage was filled with platelet rich fibrin mixed with demineralized bovine bone matrix (Osseograft), (Figure10a 10b 10c 10d 10 e) followed by placement of collagen

membrane (Figure11a) and sutures were secured in position without tension, (Figure11b) followed by periodontal dressing placement (Figure11c), which was removed 10 days postoperative (Figure11 d). Healing was uneventful and follow up has done for the next 6 months (Figure12a 12b 12 c).

DISCUSSION:

Periapical cyst, which is the most common odontogenic cyst, also known as radicular cyst, periodontal cyst, root end cyst or dental cyst. It generally originates from periodontal ligament epithelial cell rests of malassez as a consequence of pulpal inflammation occuring due to necrosis of pulp, injury/ trauma, most common cause being dental caries involving pulp. [1] Incidence rate of radicular cyst is 0.5-3.3% in deciduous and permanent dentition.[5] Etiopathogenesis of radicular cyst occurs mainly in 3 stages which includes, initiation phase, formation phase and enlargement phase.[1,3] These lesions are generally asymptomatic and may not be noticed unless discovered by routine radiographic evaluation.[2] Some patients may have acute aggrevation of this chronic lesion[7] and may develop clinical symptoms that occurred in the present case.

In the present case periapical cyst is presented as well defined large unilocular radiolucent lesion located at the periapex of multiple teeth. Calcium hydroxide dressing was given during root canal therapy with intervals between the appointments for better reduction of bacterial levels compared to the reduction during biomechanical preparation of root canals alone. Bactericidal property of calcium hydroxide requires minimum of 2 weeks for its action to occur.[6]

As the lesion was larger, periodontal regenerative approach using platelet rich fibrin (PRF), demineralized bone (Osseograft) and Guided Tissue Regeneration (GTR) membrane was incorporated in the treatment plan for better healing and regeneration of lost tissues. PRF, a second generation platelet concentrate developed by choukran et al in 2001 is widely used to accelerate soft and hard tissue healing[10]. It acts as a favourable matrix for development of a coherent healing without inflammatory excess.[10] Demineralized bovine bone matrix possess good osteoconductive properties and is well integrated into bone tissue with good biocompatibility. Collagen membrane, serves the purpose of GTR concept by prevention of apical migration of epithelial cells and supports new connective tissue attachment and tissue regeneration.[11]

Histopathologic examination of enucleated cyst contents revealed 5-7 layers of cell thickness of non stratified cuboidal to flattened epithelium, connective tissue demonstrated the cholesterol crystals, chronic inflammatory cells, areas of hyalinization and red blood cells which substantiate the provisional diagnosis of periapical cyst (Figure13a 13b).

This case report revealed successful interdisciplinary management of large periapical cyst and reconstruction of lost tissue structures postoperatively.

CONCLUSION:

The present clinical case scenario was managed successfully by endodontic therapy followed by cyst enucleation, apicoectomy, retrograde root end filling and sealing of canals and regenerative periapical therapy as it is a large lesion. Different factors like extent and size of the lesion, location of the lesion, relation to vital structures etc are important in determining the prognosis of the lesion as well as treatment plan.[8] [9] Whether surgery is needed or the lesion can be managed by conservative approach can be decided based on these clinical features of the lesion.

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FIGURE:

Figure 1: Preoperative view

Figure2: Intraoral periapical radiograph (IOPA) showing unilocular well defined radiolucency suggestive of cyst with respect to periapical region of 41 31 32 33

Figure 3a 3b: Ochsenbein leubke incision given

Figure 4: Full thickness mucoperosteal flap reflected with vertical releasing incision

Figure 5: Bony perforation visible at the periapical region of 31 with the extension of lesion

Figure 6: Ostectomy performed to create a bony window along the bony perforation

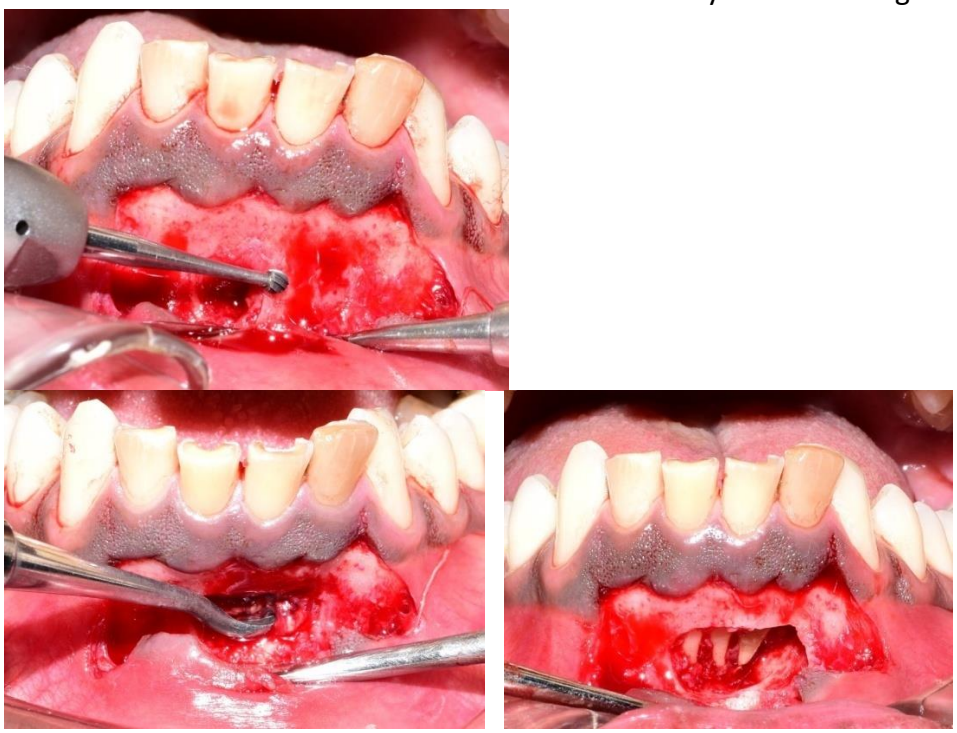

Figure 7a 7b: Cystic lining enucleation and curettage

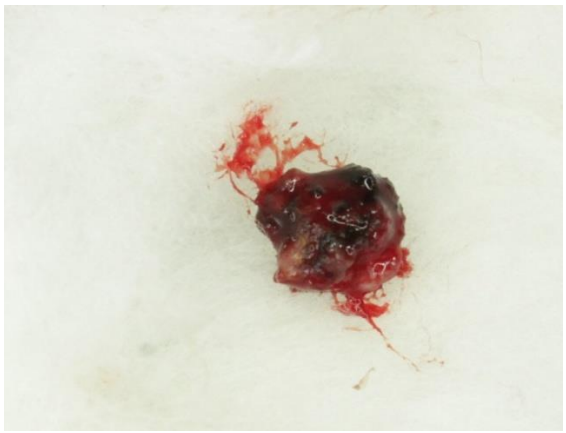

Figure 7c: Cystic lining specimen send for histopathological examination

Figure 8a 8b: Apicoectomy performed in relation to 31 41 42 with buccal bevel

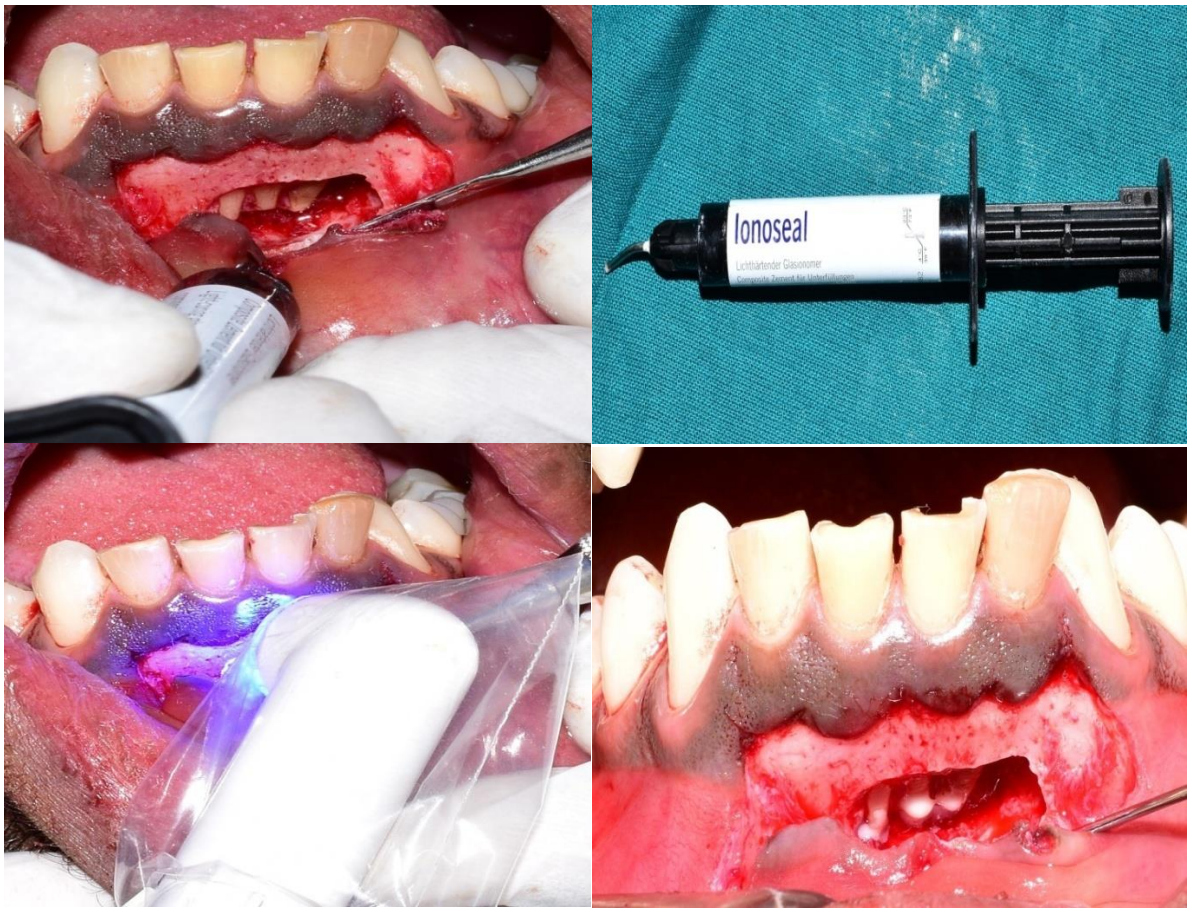

Figure 9a 9b 9c 9d: Retrograde filling and sealing of canals with Ionoseal light cured Glass Ionomer Cement

Figure 10a 10b: Platelet rich fibrin (PRF)and Osseograft (Demineralized bovine bone mineral)

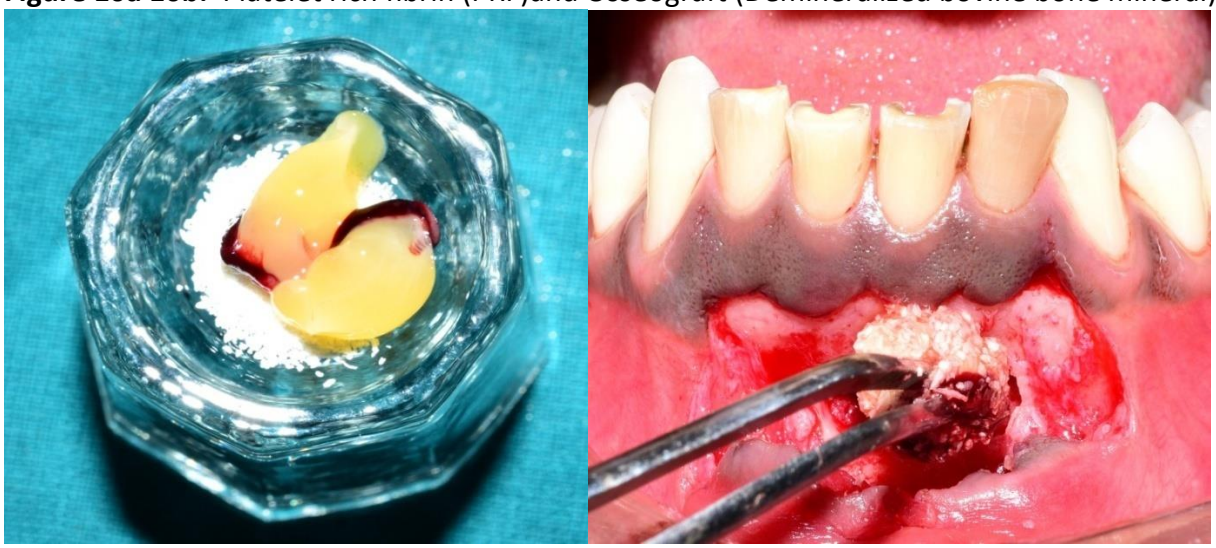

Figure10 c 10 d 10 e: PRF mixed with osseograft and condensed in the curetted anterior bone defect

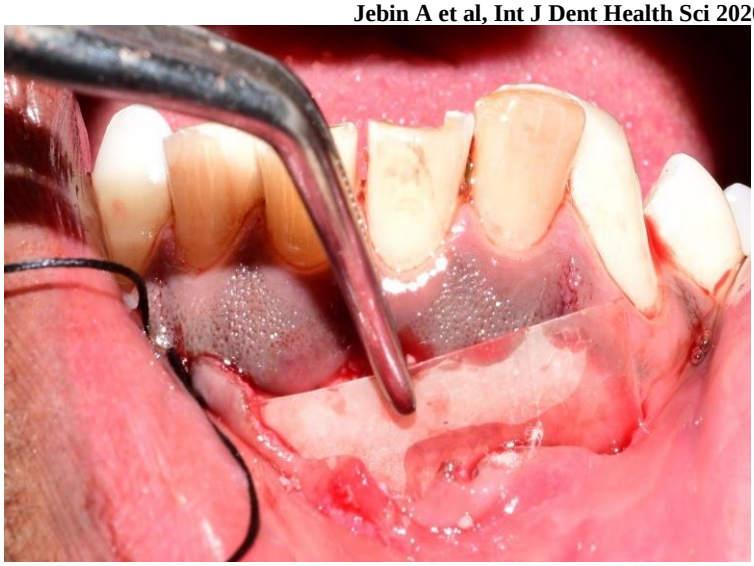

Figure 11a: Collagen membrane placed with defect which serves as GTR

Figure 11b 11c: Sutures secured in position and periodontal dressing placed

Figure 11d: Postoperative 10 days

Figure 12 a: Post operative 1 month clinical evaluation

Figure 12 b: Post operative 6 months clinical evaluation

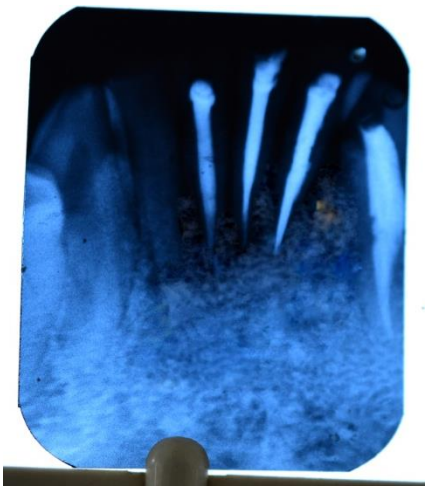

Figure 12c: Post operative 6 months IOPA

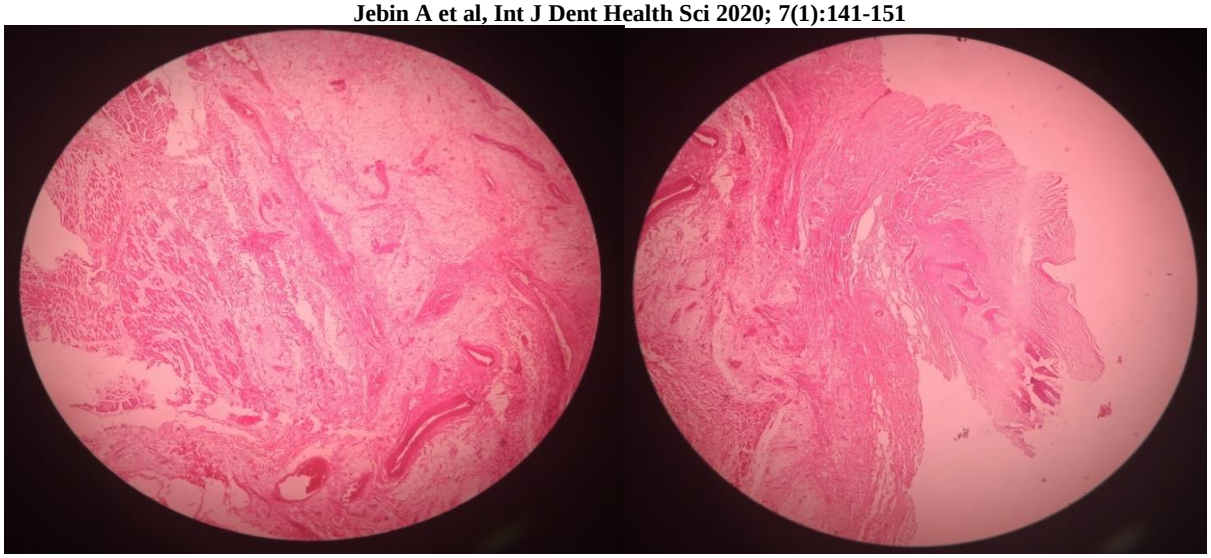

Figure 13a 13b: Histopathological analysis