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Non-Surgical Approach to Periapical Pathology: Case Reports of 2 Pediatric Patients.

Baksh-Inder Singh Lyall[1], and Swati Phore[2]*.

[1]Department of Pediatric and Preventive Dentistry, Himachal Dental College, Sundernagar, Himachal Pradesh, India.
[2]Department of Oral Medicine & Radiology, Jaipur Dental College, Jaipur, Rajasthan, India.

ABSTRACT

Present case reports describes non-surgical endodontic treatment of peri-apical pathologies. It can be considered as efficient and feasible alternative that can recover esthetics & function, instituting positive attitude towards dental treatment in growing children.

Keywords: Metapex, Cyst, Calcium, Hydroxide, Iodoform.

Corresponding author

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INTRODUCTION

Traumatic injuries to the teeth are relatively common, usually involving the anterior teeth of young patients. Such trauma is often followed by pulpal necrosis. If microbial infection occurs, a periapical lesion may develop, possibly evolving into a chronic inflammatory lesion [1].

Large periapical lesions, regardless of whether they are granulomas, abscesses or cysts, are primarily caused by root canal infection. Thus the treatment protocol should be elimination of etiological factors in the root canal system rather than their product [2].

The management of large cystic lesions has been the subject of prolonged debate. The choice of treatment may be determined by factors such as the extension of the lesion, relation with noble structures, origin and clinical characterstics of the lesion, and cooperation and systemic condition of the patient [3].

Some clinical studies have confirmed that simple nonsurgical treatment with proper infection control can promote healing of large lesions. When this treatment is not successful in resolving the periradicular pathosis, additional treatment options should be considered. Surgery may occasionally be required. Surgical treatment of persistent extensive periradicular lesions most often involves curettage and apical resection. However, simpler approaches such as marsupialization or tube decompression may be alternatives for large cystic lesions [4,5].

Case Report

Case I

A 14 year old boy reported to the Department of Pediatric and Preventive Dentistry in Himachal Dental College with fracture of upper left central and lateral incisor caused by trauma 2 years ago. Patient gave previous history of swelling which subsided on its own. His family, medical and past dental history were noncontributory.

On intraoral examination, 21 & 22 were fractured and there was no swelling or color change with the associated teeth or gingivae. Teeth were slightly tender on percussion but with no mobility. And both 21, 22 did not respond to electric pulp testing, whereas 23 responded normally.

Intraoral periapical radiograph was done, which revealed well defined radiolucency with sclerotic borders involving root apex of 21 & 22, measuring approximately 4 cm in diameter (Figure 1). Radiographic diagnosis of periapical cyst was given.

Treatment planning was followed by explanation of the procedure to the patient's parents and an informed consent was obtained. Access cavity was prepared. Necrotic pulp tissue was extirpated and working length determination was done. Canal was properly cleaned with K file using step back technique. During instrumentation, canal was continuously irrigated with normal saline and 2.5% sodium hypochlorite solution using 27 guage endodontic needle. After drying with sterile paper points, Metapex was introduced into the canal beyond the apex to fill the cystic cavity completely and afterwards the cavity was sealed with zinc oxide eugenol (ZOE) cement. A radiograph was done again to confirm the proper placement of metapex beyond the apex (Figure 2).

Patient was followed up at intervals of 2, 4 and 6 months and radiographs were taken (Figure 3,4 & 5 respectively) which revealed significant bone healing. Tooth had no symptoms clinically. At 6 months follow up, canals were irrigated properly, dried and obturated with gutta percha and ZOE cement using lateral condensation technique (Figure 5).

Case II

A 12 year old girl reported to the dental OPD in Himachal dental College with chief complaint of fractured upper central incisors due to trauma 1 year back. Patient gave no history of swelling and past dental, family and medical history were noncontributory.

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On intraoral examination 11, 21 were fractured & were tender on percussion. Electric pulp testing results showed no response.

Intraoral periapical radiograph was done which revealed ill-defined radiolucency involving root apex of 11 & 21 with loss of lamina dura and periodontal space widenening (Figure 6). Radiographic diagnosis of periapical abscess was given.

Same treatment was performed for the patient as in previous case after informed consent. A radiograph was done again to confirm the proper placement of metapex beyond the apex (Figure 7).

Patient was followed up at intervals of 2 & 4 months and radiographs were taken (Figure 8 & 9 respectively) which revealed significant bone healing. Tooth had no symptoms clinically. At 4th month follow up, canals were irrigated properly, dried and obturated with gutta percha and ZOE cement using lateral condensation technique (Figure 9).

Both the cases showed excellent results in bone healing after placement of Metapex.

Patients were instructed for further treatment by crown placement.

Figure 1: Well-defined radiolucency with sclerotic borders at the apex of 21,22 indicating of periapical cyst.

Figure 2: Filling the cystic cavity with Metapex and sealing the tooth with zinc oxide eugenol.

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Figure 3: Recall after 2 months- Subsequent reduction in size of cyst with bone healing.

Figure 4: Recall after 4 months- Reduction in size of cyst with more bone healing.

Figure 5: Recall after 6 months- Proper bone healing and obturating the canals with gutta percha.

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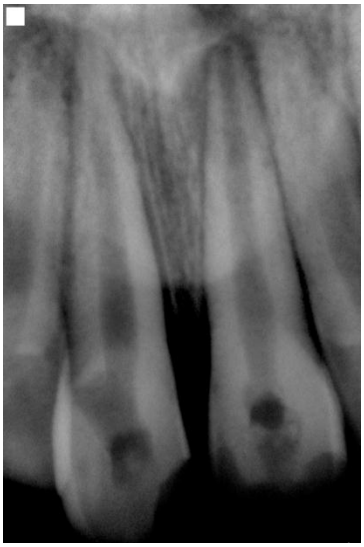

Figure 6: Fracture of incisal surface of 11,21. Ill defined radiolucency with loss of lamina dura and periodontal ligament space widening indicating of chronic periapical abscess at root apex of 11,21.

Figure 7: Introduction of Metapex beyond root apex of 11,21.

Figure 8: Recall after 2 months- Mild bone healing.

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Figure 9: Recall after 4 months- Proper bone healing and obturation of canals with gutta percha.

DISCUSSION

Radicular cysts are the most common (52%-68%) cystic lesions affecting the jaws [6].

Radicular cysts are direct sequel to chronic apical periodontitis but not every chronic lesion develops into a cyst. These cysts can occur in the periapical area of any teeth, at any age. But are seldom seen associated with the primary dentition. It is more frequent in maxillary than mandibular teeth [7].

Many cysts are symptomless and are dicovered when periapical radiographs are taken of non vital teeth [3].

During the past few years there has been gradual change in the attitude to surgical treatment of periapical lesions. Some authors support the fact that, with the endodontic infection elimination, the immune system is able to promote repair and lesion might recede by the mechanism of apoptosis similar to the resolution of inflammatory apical pocket cysts without any need surgical intervention to remove cyst epithelium.

Caliskan MK reported 73.8% success in nonsurgical management of large cyst-like periapical lesions using calcium hydroxide medicament [2].

The large cyst-like apical periodontitis lesions have been demonstrated to regress to smaller sizes and even complete healing after non-surgical endodontic therapy because of a decrease in periapical inflammation. Once periapical inflammation is decreased, there will be a reduction in inflammatory mediators, pro-inflammatory cytokines, with growth factors released by innate and adaptive immune cells and the epithelial cells of a cyst's lining epithelium will die of apoptosis [8].

Bhaskar SN, has suggested that in a case of periapical lesion evident in a radiograph the root canal instrumentation should be done 1 mm beyond the apical foramen. It results in transitory inflammation and ulceration of the epithelial lining leading to resolution of the cyst [9].

Bender in his commentary on Bhaskar's hypothesis reinforced that root canal instrument penetration of the apical area to the center of the radiolucency establishes drainage and thereby relieves pressure. Subsequently as the drainage stops, fibroblasts proliferate and deposit collagen, which causes compression of the capillary network, and thus the epithelial cells are starved and undergo degeneration, and are engulfed by the macrophages [10].

In support to this assumption, in the present cases, instrumentation was done beyond the apical foramen and cyst resolution was observed.
Ulku Ozan et al demonstrated the concept of "lesion sterilization and tissue repair LSTR therapy" that employs use of combination of antibacterial drugs (metronidazole, ciprofloxacin and minocycline) for intracanal disinfection [11].

Metapex^{R} (Meta Biomed Co. Ltd, Korea) is a material having Iodoform (40.4%), Calcium hydroxide (30.3%) and Silicon oil (22.4%) [12].

Calcium hydroxide being an important component of metapex and a material of choice in endodontic treatment because of its high alkalinity and bactericidal effects [13] including neutralizing bacterial endotoxins [14].

The use of root canal dressings between sessions in root canal treatment of teeth with chronic periapical lesions is important for reducing bacteria beyond levels obtained with mechanical preparation, particularly by penetration of areas that are unreachable by instruments or irrigation solutions, such as dentinal tubules and ramifications. Calcium hydroxide has also shown clinical efficiency in reducing exudate due to its hygroscopic properties. Takahashi et al, analyzing the ph and the concentration of calcium ions in the periapical area, concluded that at least 2 weeks are necessary for calcium hydroxide bactericidal activity [15].

Ghose et al. Has suggested beneficial osseoinductive actions of calcium hydroxide medicament when in close contact with the periapical tissue [16].

The diffusion of the calcium hydroxide through the apical foramen causes inflammatory action sufficient to break the cystic epithelial lining, followed by connective tissue invagination with ultimate healing [17].

Moreover Souza et al, suggested the four-fold action of Calcium hydroxide beyond the apex: anti-inflammatory activity; neutralization of acid products; activation of the alkaline phosphatase; antibacterial action [18].

Carlos et al demonstrated the high efficacy of iodoform on antimicrobial potential of calcium hydroxide. Iodine action gives a high reactivity by precipitating proteins and oxidizing essential enzymes [19].

Surgical management would have involved removal of diseased periapical tissue, and possibly apicectomy. In children a surgical procedure would normally be unpleasant and more traumatic than conventional endodontic treatment. Moreover apicectomy would certainly reduce the available length of an immature tooth [20].

This complication would be averted by adopting a conservative procedure that would allow the root canal and apices to heal and attain a mature configuration.

CONCLUSION

It was thus demonstrated in these case reports that the use of Metapex with peri-radicular lesion gave excellent healing results and prevents unnecessary post-surgical trauma & complications.

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