

# Surgical Management of a Large Periradicular Lesion in Mandibular Anterior Teeth associated with Trauma

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## ABSTRACT

**Background:** Pulp necrosis is a common detrimental consequence of dental traumatic injuries. Early management of such cases is mandatory in order to prevent subsequent pathological changes that could further complicate the treatment. Pulp necrosis, chronic and cystic apical periodontitis can be the fate if these teeth are left untreated. Despite these serious complications, root canal treatment followed by apical surgery is considered a valid treatment option when such cases become complicated with large periapical lesions.

This case report discusses the orthograde endodontic management, the surgical approach and the clinical outcomes of longstanding traumatic teeth with large cyst-like periradicular lesion.

**Keywords:** Pulp necrosis, Periapical cyst, Endodontic surgery, Dental trauma.

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## INTRODUCTION

Dental traumatic injuries, usually affecting anterior teeth, are one of the serious unanticipated events that can cause pain, disfigurement and psychological problems. Cyst-like apical periodontitis could be the fate of untreated traumatic teeth.<sup>1</sup> Many treatment options, including apical surgery, have been proposed for managing such cases. Radiographic differentiation of periapical cysts and granulomas is notoriously difficult. Natkin et al (1984) analyzed the data of various studies relating radiographic lesion size to histology. They stated that with a radiographic lesion size of 200 mm<sup>2</sup> or larger, the incidence of cysts was almost 100%. If the lesion is separate from the apex and with an intact epithelial lining (apical true cyst),<sup>2,3</sup> it may develop into a self-perpetuating entity that may not heal when treated nonsurgically.

The surgical approach using traditional means can provide wide range of success from 40 to 90%. Recent advances in endodontic surgical armamentarium have been mentioned to elevate the success rate to 96.8%.<sup>4</sup> However, Zuolo et al (2000)<sup>5</sup> stated that these favorable postsurgical outcomes are possibly affected by the site of surgery as reported to be 97% in anterior teeth compared to 85% in posterior teeth, which is characteristic for complex radicular anatomy.

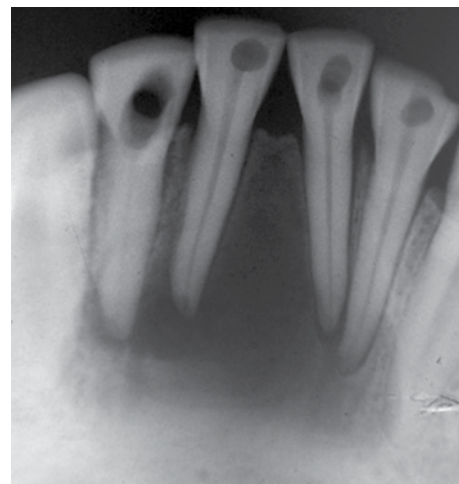
This case report demonstrates the favorable clinical outcome of a large periapical cystic lesion in mandibular incisors induced by trauma using combined nonsurgical and surgical endodontic treatment.

## CASE REPORT

A 25-year-old male reported with complain of pain and swelling in relation to mandibular anterior teeth. He had a history of trauma to his lower anterior teeth 10 years back. On clinical examination, teeth no 21, 22, 23 and 24 were discolored and access of teeth was found open which patient got opened a week earlier somewhere else because of pain. Soft tissue examination revealed labial swelling over these teeth, and the area was tender to palpation and percussion. Radiograph revealed a large periapical radiolucency, about 4 cm in the horizontal plane and 3 cm in the vertical plane, associated with teeth 21, 22, 23, 24 (Fig. 1). Teeth did not respond to thermal and electric pulp tests indicating nonvital teeth.

Because of nonvitality of affected teeth and presence of a large size of periapical lesion (>2 mm) a combined approach utilizing orthograde endodontic treatment of nonvital teeth followed by surgical enucleation of periapical lesion was planned.

After administering local anesthesia, the four mandibular incisors were simultaneously isolated with a rubber dam. Access cavity preparations were modified using Endo-Access diamond bur (Dentsply, Maillefer, Baillaigues, Switzerland). The root length was estimated with an apex locator (AFA



**Fig. 1:** Preoperative radiograph showing large periradicular lesion involving mandibular incisors

Apex Finder, Analytic Technology, Orange County, CA) and confirmed by periapical radiography. As apical patency was established a fluid discharge came from the canals. The canal of each tooth was then cleaned and shaped. During instrumentation, 2.5% sodium hypochlorite was used for the irrigation of the canals of the four mandibular incisors. After completion of the chemomechanical preparation, root canals were dried with sterile paper. When canals were completely dry, a calcium hydroxide paste closed dressing was given for a week. Seven days later when patient was asymptomatic, root canals were obturated with gutta-percha using lateral condensation method. A temporary filling (Cavit G; 3M ESPE, Seefeld, Germany) was placed, and a postoperative radiograph was exposed to assess the quality of obturation in all four canals.

### SURGICAL MANAGEMENT

Two days after the completion of the treatment, the patient presented without any clinical symptoms. A full-thickness mucoperiosteal flap was raised under local infiltration in the left and right anterior mandibular region (buccal and lingual). A large soft lesion was revealed involving the roots and the apices of all mandibular incisors.

The lesion was then circumferentially separated from the bony crypt and teeth and was then removed. A thin conical diamond bur was used to circumferentially remove the malformation as atraumatically as possible (Fig. 2). The periradicular lesion was fixed in 10% buffered formalin solution for histologic evaluation. Apical 1 mm root resection of the involved teeth was done. The remaining roots were then smoothed with diamond burs and retrograde filling with glass ionomer was done.

Because of large size of defect, bone graft was placed (Fig. 3) and secured by collagen membrane. After the placement of the membrane, the mucoperiosteal flap was sutured in place, and a periapical radiograph was taken to confirm the accuracy.

Healing was uneventful and 6 months postoperatively the patient was free of any signs and symptoms (Fig. 4). The clinical appearance of the anterior mandibular area was acceptable. The radiographic examination revealed that partial healing of the lesion had occurred. The patient was recalled 2 years postoperatively for clinical and radiographic examination.

### DISCUSSION

The response to trauma can be varied. Some pulp remains apparently normal with no adverse effects, whereas others become necrotic. Necrotic pulps provide a good nutritional supply for pathogenic bacteria, which can further lead to the development of a periapical lesion.<sup>6</sup> In the present case, the pulp tissue of the affected mandibular incisors was nonvital and there was a radiolucent lesion beyond the apex. Since the teeth were nonvital, root canal treatment was initiated.

Root canal treatment is based primarily on the removal of microbial infection from the complex root canal system.<sup>7</sup> Irrigants aid in reducing the microbial flora of infected canals and if a tissue-solvent solution is used, can help to dissolve the necrotic tissue. Therefore, 2.5% hypochlorite was used as an irrigating solution because of its tissue dissolving property.

A calcium hydroxide-based paste was used as an antibacterial dressing. Sjögren et al<sup>8</sup> found that the use of calcium hydroxide as a dressing for 1 week efficiently eliminates bacteria in the root canals. It has also been reported that treatment with calcium hydroxide resulted in a high frequency of periapical healing and some lesions, especially in young patients, were reduced or had completely disappeared only 1 or 3 months after treatment.<sup>9</sup>

The management of large cystic lesions has been the subject of prolonged debate. The treatment options for large periapical lesions range from conventional nonsurgical root canal treatment with long-term calcium hydroxide therapy<sup>10</sup> to various surgical interventions.<sup>11</sup> Some endodontists



Fig. 2: Surgical enucleation of periradicular lesion

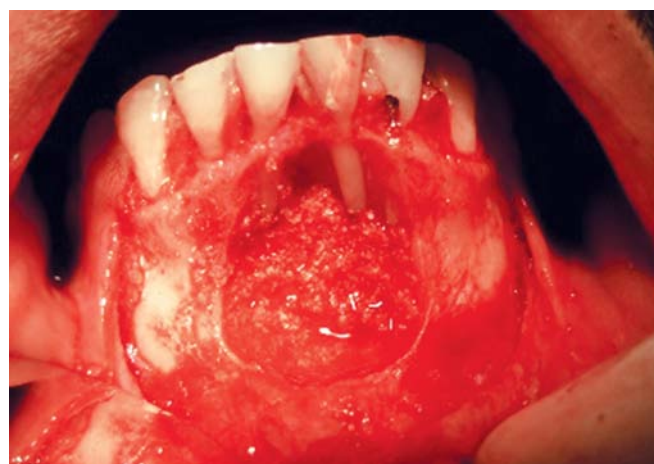
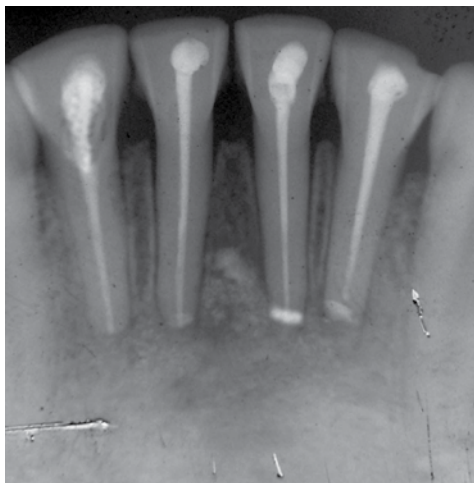


Fig. 3: Bone graft placed in bone defect



**Fig. 4:** Postoperative radiograph after 6 months showing healing

maintain that true cysts (those containing cavities completely enclosed by epithelial lining) can be successfully treated only by surgical means. For several reasons, surgical treatment may be the preferred approach to treating a large periapical cyst. For example, if the apical radiolucency is very large (diameter  $>20$  mm or cross-sectional area  $>200$  mm<sup>2</sup>), surgical removal may be the best option.<sup>12</sup> Longstanding infection and necrosis of the pulp causing a large apical radiolucency may be deemed refractory to conventional treatment because of the high probability that the lesion is a cyst.<sup>13</sup> In the present case because of the large size of the lesion, radiographic appearance suggesting lesion being cystic and long standing nature of the infection surgical intervention was done. Radiographs taken 6 months after treatment suggested periapical healing appeared to be occurring. Radiographic signs, such as density change within the lesion and trabecular reformation, confirmed healing, particularly when associated with the clinical finding that the teeth were asymptomatic and the soft tissues were healthy.

## CONCLUSION

In the present case, root canal therapy with intracanal medicament followed by enucleation and apicectomies proved successful in promoting healing of a large cyst-like periapical lesion. The result confirms previous reports

demonstrating that large periapical lesions can respond successfully to endodontic surgery.

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