Successful nonsurgical management of a large radicular cyst: A case report with review of literature
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Abstract
Radicular cyst is the most common of all jaw cysts comprising about 52-68% of the cysts affecting the human jaw. It is known to originate as a result of bacterial infection and necrosis of the dental pulp, which causes the proliferation of epithelial cells in a pre-existing granuloma. Although a common entity, there still exist a dilemma regarding the management of this pathology. Some author reported that surgical intervention is necessary, whereas others recommends non-surgical management. This article is about successful management of a large radicular cyst following non-surgical endodontic treatment.

Keywords: Calcium hydroxide, non-surgical treatment, periapical cyst

Introduction
Microbial invasion of pulp tissue through caries, trauma or developmental tooth anomaly causes pulpal infection leading to necrosis. Necrotic root canal system is a privileged hub for numerous microbial stains, their by-products and tissue breakdown products. Such substances when leaches out into surrounding periradicular tissues stimulate the host defense system, resulting in various periradicular pathoses. These lesions although a defensive attempt to curtail further infection progression are non self-healing.¹ Periapical cyst is one such pathoses that originates from the stimulation of epithelial cells of malassez in a preexisting granuloma.

Periapical cyst presents itself as slowly growing entity usually asymptomatic unless secondarily infected. Although it represents 40-50% of all apical lesions,² a debate still exist over its management. Some authors have reported that the immune system can promote repair of such lesion if its etiology, the intraradicular infection is eliminated through nonsurgical endodontic treatment,³-⁵ while others have emphasized that surgical intervention is mandatory.⁶ Compiling the various investigations and studies done so far it is now generally accepted that reduction or elimination of microbial load from the root canal system can lead to a successful treatment outcome. Various authors have reported successful healing of large periradicular lesions through nonsurgical endodontic treatment only.⁷⁻⁹ This article presents one such case of a large radicular cyst healing after nonsurgical endodontic treatment.

Case Report
A 16-year-old male reported with the chief complaint of a large palatal swelling, which has been progressively increasing in size. He denied spontaneous pain, but developed painful symptomology upon percussion of the tooth 22 and palpation of the lesion.

Medical history was noncontributory. His dental history revealed trauma to the anterior teeth 3 years back. Following that he remained asymptomatic but noticed a swelling 10 months previously, which has been progressively increasing in size. He was given several courses of antibiotics by the general practitioner before being referred to this hospital. Extraoral examination revealed no sign or symptom. Intraoral examination revealed a large volumetric increase in the left side of anterior hard palate [Figure 1]. The swelling was localized, tender on palpation and fluctuant. The patient was referred with a diagnostic
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An orthopantomogram [Figure 2] and an occlusal radiograph [Figure 3], which revealed a large periapical radiolucency extending from tooth 21 to tooth 24.

An intraoral periapical (IOPA) radiograph was done which showed a large unilocular radiolucent lesion extending from the apices of tooth 21, 22 and 23 and displacement of root of the left canine distally [Figure 4].

Cold and Electric Pulp Test confirmed the tooth 22 to be nonvital whereas teeth 21 and 23 responded within normal limits. A provisional diagnosis of the dental cyst was made. When the root canal of the involved tooth was opened, suppurrative fluid oozed out. More fluid was expressed through the root canal by compressing the palatal swelling. A sample of this fluid was collected for cytological examination. Once no more fluid could be drawn out through the root canal, canals was prepared to the working length with K-files (Dentsply), and the access opening was sealed with a temporary filling (Cavit).

The exfoliating cytology of the lesion’s fluid was compatible with periapical cyst. The patient returned for a second visit and was informed about the diagnosis, tooth condition, and treatment options. Patient opted for non-surgical treatment.

The provisional restoration was removed and the canal was irrigated with 2.5% sodium hypochlorite. A size 30 K-file (Maillefer Instruments SA) was introduced beyond the radiographic apex. At this moment, an abundant serum, purulent, and hemorrhagic exudates flowed through the root canal. Once the exudates have stopped, the canal was dried with paper points. Preformed radioopaque calcium hydroxide paste (Metapex) was introduced intentionally into the periapical region and the whole canal was filled with this paste. A periapical radiograph was done [Figure 5].

The patient reported asymptomatic after 1-month. At this stage the root canal was obturated with gutta-percha cones (Dentsply Ind. Com. Ltda, Petrópolis, RJ, Brazil) and Zinc oxide-Eugenol (Dentsply Ind. Com. Ltd) using the lateral condensation technique. A definitive restoration was then placed a week later.

The patient was scheduled for clinical and radiographic controls every 6 months during the first 2 years. However, he did not turn up for the follow-up visits and reported after 2 years with no advert signs and symptoms. An IOPA was done which revealed evidences of a healing lesion [Figure 6].
Discussion

The foremost step in the treatment of large periapical radioluency is to establish a differential diagnosis. In the presented case, a provisional diagnosis of a cyst was made owing to its relation to a nonvital tooth 22, its radiographic size is greater than 2 cm and a well-defined sclerotic border. Although the radiographic appearance gave an impression of a radicular cyst, a definitive diagnosis was made only after the cytology since several studies have shown the difficulty to distinguish radiographically these pathological entities. Currently, the only reliable definitive diagnostic method for periapical cyst is histologic serial examination of the lesion in toto thus making it a post-hoc diagnosis. Hence, in the reported case, exfoliating cytology owing to a simplified technique was chosen to examine the lesion’s fluid.

Regarding the management of a radicular cyst there still exist a dilemma between surgical and non-surgical intervention. Periapical cyst exists as two distinct identities the True cyst and the Pocket cyst. Routine histopathologic diagnostic reports detecting partial or remnant of epithelium has given a false impression that the majority of the periapical lesions are self-sustaining True cyst needs enucleation. However, true cyst have a low prevalence rate of 10%. The majority of the cysts are Pocket cysts which are also epithelium-lined cavity open to the root canal space of the affected tooth and constitutes an extension of the infected root canal space into the periapex. Thus, removal of the etiological agent from root canal system via nonsurgical therapy creates a favorable environment for repair of the lesion and has been it has been accepted as the first line of treatment.

Some studies have reported that periapical cysts are refractory to non-surgical endodontic therapy. In this context, nonmicrobial etiological factors, such as true cystic lesions extraradicular infection, presence of foreign bodies and endogenous cholesterol crystals, should be taken into consideration and surgically treated. Nevertheless periapical surgery being an invasive procedure involves the risk of damaging bone support and underlying anatomic structures, may cause anatomic defects or scar and causes more post-operative pain or discomfort.

As already discussed the most critical factor for healing in large periapical lesions is reduction of microbial load. In the presented case meticulous debridement was done by efficient biomechanical preparation, use of sodium hypochlorite as an intracanal irrigant and calcium hydroxide as an intracanal medicament. Root canal instrumentation was done slightly beyond the apical foramen. This was done to eliminate microorganisms from the apical area, to facilitate cyst resolution through the relief of the intracystic pressure and as suggested by Bhaskar (1972) to produce a transitory acute inflammation and destruction of the protective epithelial layer of the cyst, converting it into a granulated tissue, which has better resolution.

Calcium hydroxide paste was used due to its excellent antibacterial property. It was overextended into cystic lesions to ensure better cyst resolution. Calcium hydroxide exhibits anti-inflammatory property, anticlastic property by inhibiting phospholipase, activates alkaline phosphatase, and causes destruction of the cystic epithelium, allowing conjunctive tissue invagination to the lesion.

Permanent restoration within a week of root canal treatment also contributed to periradicular healing, as several studies have shown that an adequate coronal restoration-placed as soon as possible enhances outcome of endodontic therapy.

The case was regarded successful as the 2-year follow-up radiograph revealed changes such as the increase in density of the lesion and trabecular regeneration which confirmed healing in addition to the absence of clinical signs and symptoms. A 2-year follow-up period has been considered a reasonable interval for regarding a case successful. The radiograph revealed decrease in size of the lesion without complete resolution. It could not be predicted if a complete resolution of the cystic lesion would take place or it may persist as long as the extruded calcium hydroxide has not been completely resorbed or the residual radiolucent area is a scar tissue.
In such a case, the residual radiolucency was accepted as the peridontal ligament was continuous and of normal thickness. This patient was a young healthy subject and these factors would have also contributed to successful radiographical and clinical healing as previous studies have showed that the patient's general health may have an influence on the healing process in periradicular lesions.  

Conclusion

Large periapical lesions may not require surgery immediately after endodontic treatment. Most radicular cysts of endodontic origin can heal without surgery. Attempt for nonsurgical management of radicular cysts is justified.

References