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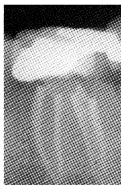

CASE REPORT

Non-surgical management of a large periapical lesion using a simple aspiration technique: a case report

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Abstract

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Aim To report the non-surgical management of a large periapical lesion.

Summary Surgical treatment of large periapical lesions is often subject to various complications. Hence, a non-surgical approach should be considered for the management of these lesions. The traditional aspiration technique involves creation of buccal and palatal wounds that can cause considerable discomfort for the patient. This case report describes a simple aspiration technique achieved through the root canal space, which might hasten osseous regeneration, whilst eliminating the need for periapical surgery.

Key learning points

- Non-surgical techniques can aid in healing of periapical lesions.
- Non-surgical approaches should be considered before resorting to surgery.

Keywords: aspiration, cyst, healing, non-surgical, periapical lesion.

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Introduction

Periapical radiolucent areas are generally diagnosed either during routine dental radiographic examination or following acute toothache (Barbakow *et al.* 1981). Most periradicular lesions (>90%) can be classified as dental granulomas, radicular cysts or abscesses (Bhaskar 1996). The reported incidence of apical cysts amongst periapical lesions varies considerably from 6% to 55% (Lin *et al.* 2007). The definitive diagnosis of a periapical cyst can be made only by a histological examination. However, a preliminary clinical diagnosis of periapical cyst can be made based on the following: (i) the periapical lesion is involved with one or more teeth with non-vital pulps, (ii) the lesion is >200 mm^2 in size, (iii) the lesion is seen radiographically as a circumscribed, well- defined radiolucent

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area bound by a thin radiopaque line and (iv) it produces a straw- coloured fluid upon aspiration or as drainage through an accessed root canal system (Eversole 1984).

All inflammatory periapical lesions should be initially treated with conservative non-surgical procedures (Lin *et al.* 2007). Various non-surgical methods have been used to treat periapical lesions (Shah 1988, Hoen *et al.* 1990, Loushine *et al.* 1991, Çalişkan 2004, Kürşat *et al.* 2007, Metzger *et al.* 2009). Toller (1972) proposed that the growth of the cyst may be attributable to the increased hydrostatic pressure of the confined fluid, which causes additional osteoclastic activity. The decompression technique (Loushine *et al.* 1991, Martin 2007) and aspiration- irrigation technique (Hoen *et al.* 1990) aid in decreasing the hydrostatic pressure resulting in shrinkage of the lesion. The decompression technique involves placement of tubing to maintain drainage (Martin 2007). However, several disadvantages such as inflammation of alveolar mucosa, persistence of a surgical defect at the site, development of acute or chronic infection of the lesion, submergence of the tube and patient cooperation limit the use of this technique (Çalişkan & Türkün 1997). The aspiration- irrigation technique involves aspirating the fluid using a wide gauge needle attached to a syringe. The needle penetrates the lesion through the buccal mucosa, creating a buccal wound, and exits through the palatal mucosa creating a palatal wound that later acts as a pathway for the escape of the irrigant. A disadvantage of this technique is the creation of the buccal and palatal wounds, which result in inflammation of the alveolar mucosa and cause discomfort (Hoen *et al.* 1990).

This case report describes the non-surgical management of a large periapical lesion by aspiration of fluid through the root canal space.

Case report

A 25-year-old man with a non-contributory medical history presented with a painless swelling in the maxillary left anterior sulcus. The patient gave a history of trauma to his anterior teeth when he was 17 years old. Intraoral examination revealed that teeth 21 and 22 were discoloured. Teeth 11, 21 and 22 failed to respond to thermal and electric pulp testing; the adjacent teeth responded within normal limits. Periodontal probing revealed a normal and intact gingiva.

A periapical radiograph revealed a large radiolucent lesion approximately 14 × 15 mm in diameter apparently involving the apices of teeth 21 and 22 (Fig. 1). Careful examination of the radiograph revealed that tooth 22 had an independent periapical radiolucency measuring approximately 1mm in diameter. Tooth 22 had an obliterated root canal space. Tooth 11 had radioopaque material extending in the root canal space that was short of the radiographic apex by 3 mm. The patient complained of occasional pain in tooth 11. Hence, it was decided to treat teeth 21 and 22 and simultaneously retreat tooth 11.

Following access cavity preparation, there was drainage of yellow straw-coloured fluid from tooth 21. The root canal space of tooth 21 was negotiated. The apical foramen was gauged using hand K- files, and the apical width was found to be equivalent to a size 40 K- file. The apical foramen was widened to a size 60 K- file. A 24-gauge needle was attached to a 5-mL syringe and was inserted through the root canal past the apical foramen into the bony cavity. Approximately, 4 mL of straw coloured fluid was aspirated whilst simultaneous digital pressure was applied on the swelling in the labial sulcus. The swelling decreased in size completely once the fluid evacuation was complete. The fluid was examined under the light microscope and was found to contain cholesterol crystals. A provisional diagnosis of a radicular cyst was made.

The canal was then irrigated with 2.5% sodium hypochlorite (NaOCl). Digital pressure was applied in the labial vestibule whilst the canal was dried with paper points and temporized. The canal orifice in tooth 22 was located with difficulty using long shank burs

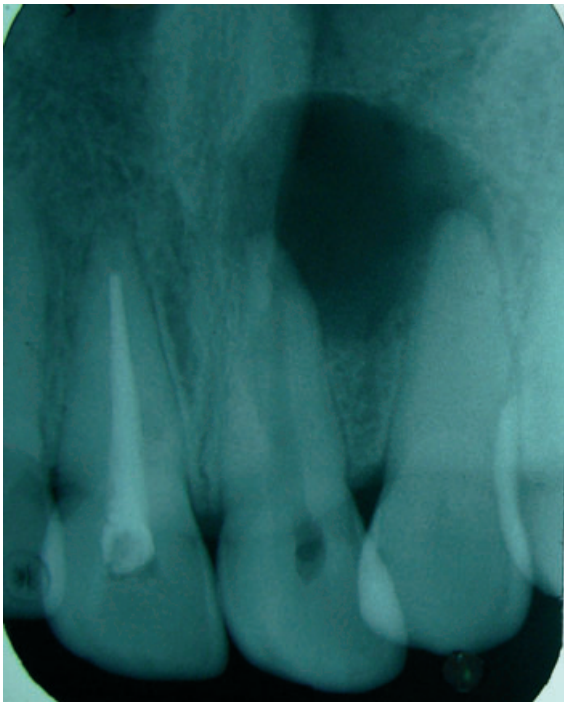

Figure 1 Preoperative radiograph demonstrating a large periapical lesion associated with tooth 21, measuring 14 × 15 mm in diameter.

(Munce Discovery Burs, CJM Engineering, Inc.), but only the middle one-third of the root canal space could be negotiated with a size 10 K- file. Retreatment of tooth 11 was started simultaneously.

At the next appointment after 1 week, the patient was asymptomatic with no evidence of swelling in the labial vestibule. The same procedure of aspiration through the root canal space of tooth 21 was repeated. Only about 1 mL of fluid was aspirated from the periapical lesion. Cleaning and shaping of the canal was completed, and the tooth was temporized. After 3 weeks, the patient was still asymptomatic. There was no fluid aspirated from the bony cavity. A periapical radiograph revealed a decrease in the size of the radiolucency to approximately 12 × 13 mm in diameter (Fig. 2). The canal was irrigated, dried and temporized. A month had elapsed from the start of treatment. The rate of repair was calculated to be 4 mm^2 $month^{-1}$. In tooth 22, a ProFile 0.04 Orifice Shaper had separated at the previous appointment, whilst trying to flare the middle one-third of the canal. After attempts at instrument retrieval failed, the tooth was temporized, and the patient was scheduled for the next appointment. Retreatment of tooth 11 was completed.

The patient however failed to report for the scheduled appointment and reported back only after 3 months. The patient was asymptomatic, and a periapical radiograph revealed a decrease in size of the lesion to approximately 5 × 3.5 mm (Fig. 3). The canal was irrigated, dried and temporized. The fractured instrument in tooth 22 was retrieved using ultrasonics. The apical one-third of the canal was negotiated (Fig. 4), cleaning and shaping was carried out, and the tooth was temporized. At the next appointment, canals in teeth 21 and 22 were filled, and the access cavities were restored with composite resin. The patient was recalled after 3-month interval. A radiograph after 1 year 6 months shows almost complete healing of the periapical lesion (Fig. 5).

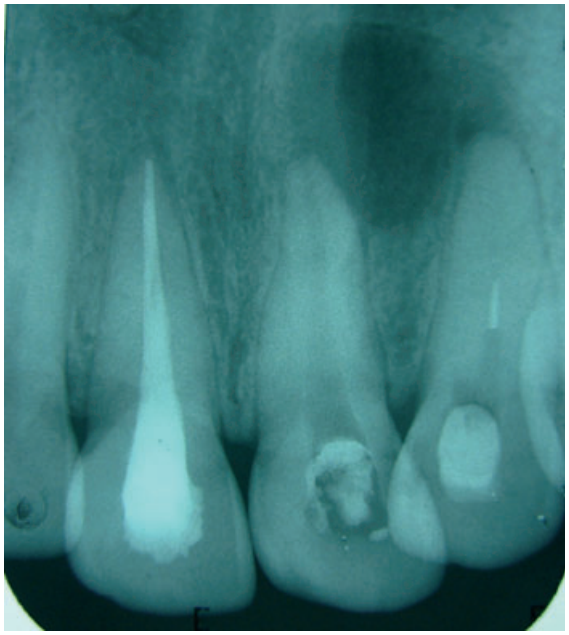

Figure 2 Radiograph after 1 month demonstrating a decrease in the size of the periapical radiolucency to 12 × 13 mm in diameter.

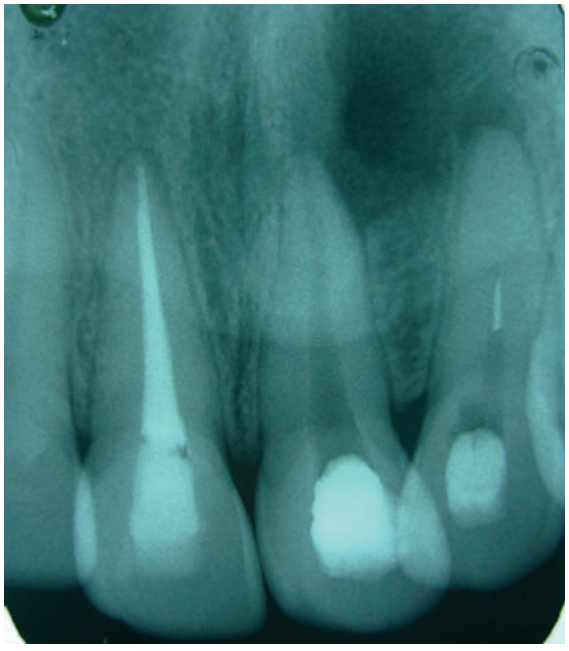

Figure 3 Radiograph after 3 months demonstrating a decrease in size of the periapical radiolucency to 5 × 3.5 mm in diameter.

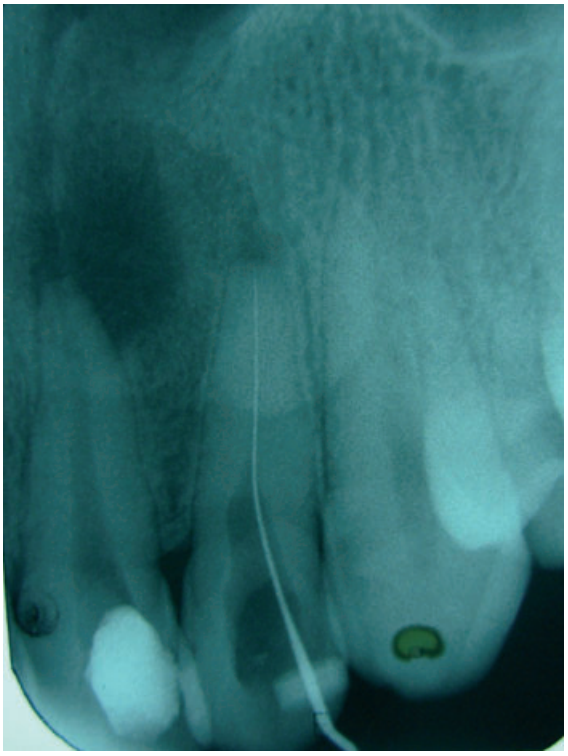

Figure 4 Negotiation of root canal space of tooth 22 with a No. 10 K-file.

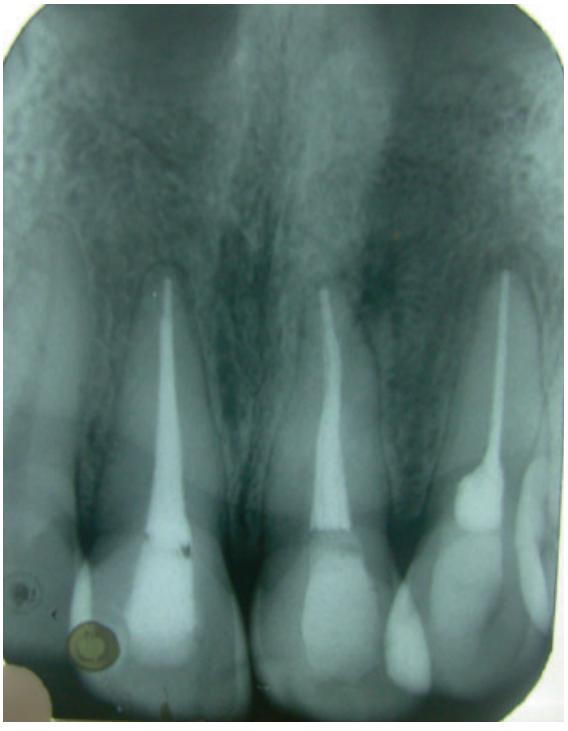

Figure 5 Radiograph after follow-up of 1 year 6 months, showing almost complete resolution of the periapical lesion.

Discussion

Aspiration through the root canal used in this case report eliminates the creation of buccal and palatal wounds as in the traditional aspiration-irrigation technique. This minimizes the discomfort that the patient might experience. It is a simple technique that aids in decreasing the hydrostatic pressure in the bony cavity without the need for sophisticated equipment.

Various authors have suggested that the minimal final working width at working length for central incisors can range between 0.3 and 0.9 mm (Jou *et al.* 2004). In the above case, the apical diameter was widened to 0.6 mm so that a 24-gauge needle (0.5 mm) could pass easily through the apical foramen.

The aspiration of fluid should be accompanied by the application of digital pressure so that the swelling decreases in size. It is important to apply digital pressure even whilst the canal is being dried and temporized to avoid entrapment of air in the bony cavity, which can result in an increased intrabony pressure once the tooth is temporized.

The periapical lesion in the above case report showed an estimated repair rate of 4 mm^2 after 1 month. The rate of repair was calculated by dividing the size differential between the initial and follow-up visits by the number of elapsed months. The calculated rate was in accordance to the average rate of repair of 3.2 mm^2 $month^{-1}$ as reported by Murphy *et al.* (1991). The fast repair rate in this case did not necessitate the placement of an intracanal medicament. If the repair rate is slow, then this technique can be complemented with calcium hydroxide therapy to hasten osseous regeneration (Çalişkan & Türkün 1997, Çalişkan 2004).

As in the traditional aspiration- irrigation technique, case selection is important. If upon aspiration, the clinician is unable to remove fluid from the bony cavity, this would indicate the presence of granulation tissue or some other type of soft tissue mass. The aspiration technique should not be attempted in such a case (Hoen *et al.* 1990). Severely curved canals might limit the use of this technique as the canal anatomy prevents the aspirating needle from reaching the apical foramen. This technique may also not be favourable in teeth with narrow roots, e.g. mandibular incisors, as the root canal will have to be widened excessively to allow the aspirating needle to pass into the bony cavity, thus weakening the tooth.

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