

Treatment of a Large Maxillary Cyst with **Marsupialisation, Decompression**, Surgical Endodontic Therapy and Enucleation

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Running title: Large maxillary cyst treatment.

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Abstract

Treatment of a large maxillary cyst with decompression during 3 months, followed by surgical endodontic therapy of the affected teeth and cystectomy is reported. Although small cystic lesions frequently heal simply with non-surgical endodontic therapy, larger lesions may need additional treatment. If surgical enucleation of a large cystic lesion is elected, other teeth or structures may be damaged unnecessarily. Therefore, a case can be made for first attempting the more conservative treatment of decompression in order to diminish the size of the lesion, followed by apicoectomy and cystectomy.

KEY WORDS: Decompression; enucleation; radicular cyst; apical periodontitis.

Introduction

Traumatic injuries of teeth are a frequent occurrence and usually involve the anterior teeth of young patients. Pulp necrosis is a frequent sequel to trauma. If microbial infection occurs, it will result in the development of a periapical lesion, which then evolves into one of the following types of chronic inflammatory lesions: granuloma, periapical cyst, or scar tissue. Periapical or radicular cysts are inflammatory jaw cysts of teeth with infected and necrotic pulps. The cysts are a direct sequel to chronic apical periodontitis. Although the reported prevalence of cysts among apical periodontitis lesions varies from 6% to 55%, investigations based on meticulous serial sectioning and strict histopathologic criteria show that the actual prevalence of the cysts is well below 20%¹.

Most radicular cysts develop slowly and do not become very large. Patients do not experience pain unless acute inflammatory exacerbation is present and the lesions are often detected only during routine radiographic examination. If the cyst does become large, symptoms including swelling, mild sensitivity, tooth mobility and displacement may be observed. The affected tooth does not respond to thermal or electrical pulp test².

Current endodontic philosophy in the treatment of teeth with large periapical lesions includes the initial use of nonsurgical root canal treatment. When this treatment does not succeed in resolving the periradicular pathosis, additional options must be considered, such as nonsurgical retreatment or periapical surgery. However, there are many traditional reasons to choose surgical

treatment as first choice. The presence of a large (diameter > 20 mm or cross-sectional area > 200 mm²) apical radiolucency is cited as a reason for recommending surgical removal of the lesion³. When a longstanding, infected, necrotic pulp has resulted in a large apical radiolucency, it may be said to be refractory to conventional treatment because of the high probability of the lesion's being a cyst⁴. Another situation in which surgical treatment can be recommended is when the canal is supposedly "calcified" or obstructed and nonnegotiable. This is often assumed to be the case when the canal cannot be visualized radiographically, particularly if root-end surgery had previously been performed. Failure of a case that was treated with a metal obturating material is yet another scenario in which surgery is frequently indicated.

The normal surgical treatments for radicular cysts include total enucleation in the case of small lesions, marsupialisation for decompression of larger cysts, or a combination of the two techniques. Should surgical intervention become necessary, the decision point is whether to raise a flap and completely enucleate the lesion or to try "decompression" first^{5,6}. Trying **marsupialisation with decompression** first, the lesion will predictably be much smaller and present less difficulty with removal and less risk of damage to associated teeth and vital structures⁷.

The following case report describes the management of a particularly large maxillary cyst involving teeth #21, 22, 23, 24, and 25, and contacting with the nasal cavity and the maxillary sinus, by **marsupialisation with decompression**, surgical endodontic therapy and cystectomy.

Case report

A healthy 15-year-old Spanish man was referred to the Dental Clinic of the Faculty of Dentistry of Sevilla (Spain) for treatment of a large periapical lesion around his left maxillary central incisor, that was discoloured and had been previously root-filled because irreversible pulpitis following a traumatic injury. Orthopantomography (Fig. 1) demonstrated large periapical radiolucency, approximately 4 cm in the horizontal plane and 3 cm in the vertical plane, apparently associated with 21, 22, 23, 24 and, perhaps, 25 teeth. Clinical examination revealed labial swelling over the aforementioned teeth, and the area was tender to palpation and percussion. Teeth 22, 23, and 24 did not respond to thermal and electrical pulp tests. A provisional diagnosis of radicular cyst was made.

To better study the radiolucent lesion, taking into account its proximity to the nasal cavity and the maxillary sinus, a computerized tomography (CT) was asked (Figs. 2a and 2b). CT revealed a lesion approximately 4 cm wide in the antero-posterior plane affecting the whole right premaxilla and contacting with the floor of the nose and the maxillary sinus. Thus, the great size of the lesion could be appraised not only in the mesio-distal aspect, but also in the bucco-lingual one. The swelling, the buccal cortical break and the bone expansion were obvious. These features indicated a benign lesion.

Cystectomy as first election treatment at this time would imply root canal

treatment and apicoectomy of all affected teeth, possible damage of the floor of the nose or the maxillary sinus, as well as the use of general anaesthesia. Discussion was undertaken with several endodontic and surgical specialists, and **marsupialisation with decompression** was considered as a possible treatment alternative. In consultation with the patient and his parents, it was believed that decompression for a period of at least 12 weeks (depending of the reduction of the size lesion) following by root canal treatment of teeth #22, 23, and 24, apicoectomy of teeth #21, 22, and 23, and enucleation of the residual lesion would be the treatment of choice in order to diminish the risk of injure to noble structures during the surgery.

After infiltration anaesthesia, a Neumann trapezoidal flap was made in between the root eminences of teeth #11 and 23. Upon entry into the cyst cavity, there was a copious drainage of the typical straw-coloured fluid associated with cystic lesions of inflammatory origin, without purulent secretion (Fig. 3). Lavage with sterile saline was accomplished and a biopsy of the cystic capsule was taken whose histological study confirmed the diagnosis of inflammatory cyst. Then, an orifice was made through the mucosa and an approximately 2-cm length of #10Fr radiopaque latex tubing was inserted to the depth of the cyst cavity. One 4-0-gut suture was placed above and below the drain. Another suture was placed through the drain itself as well as through mucosa to stabilize it during initial healing (Fig. 4). The patient was instructed to irrigate through the lumen of the latex tubing three times a day with chlorhexidine 0.12%, consistent with a protocol previously described by Brondum and Jensen⁸.

The patient was recalled after 3 months when radiographic examination revealed significant healing (Fig. 5). Radiographs showed that trabecular bone was forming and the radiolucent area was diminished, as well as the distances between the cyst and the nasal cavity and the maxillary sinus. However, healing was not complete. Surgical endodontic therapy along with enucleation of the cyst was indicated.

Endodontic treatments of teeth 22 – 24 were performed. Briefly, following an adequate local anaesthesia and isolation with rubber dam, an endodontic access cavity was established. The root length was estimated using an apex locator (AFA Apex Finder, Analytic Technology, Orange County, CA, USA) and then confirmed with a periapical radiograph. After apical patency, the canal (two canals in tooth #24) was cleaned and shaped, dried and obturated by cold lateral condensation of gutta-percha (Dentsply Maillefer, Ballaigues, Switzerland) and sealer (AH Plus, Dentsply DeTrey, Konstanz, Germany), and the access openings of the teeth were filled with acid etched composite resins.

After six days, cystectomy was performed under local anaesthesia. The buccal flaps were raised and the cyst enucleated. A full histological study of the cystic capsule was carried out to exclude the existence of another tumour type and the previous diagnosis of inflammatory cyst was confirmed. The drain was removed, the mucosal orifice was sutured, and apicoectomy of teeth #21, 22, and 23 was carried out (Figs. 6a, 6b and 7)".

Healing was uneventful, and one week after the operation, the surgical sites showed good healing (Fig. 8). The patient was recalled 1, 3, and 6 months. Clinical examinations showed no sensitivity to percussion or palpation, and the soft tissues were healthy at these examinations. After 8 months, there were complete clinical healing and radiographic resolution of the maxillary radiolucency (Figs. 9 and 10).

Discussion

The maxillofacial region constitutes place of a great variety of cysts and neoplasias whose identification can be very difficult. The most important of these lesions are maxillary cysts¹. Cysts are pathological cavities with a defined wall of connective tissue and an epithelial carpet. Cysts are filled with a liquid, semi liquid or gaseous content and growth centrifugally and spreading out slowly and infiltrative⁹. Radicular cysts are thought to arise from epithelial cell rests of Malassez in the periodontal ligament and are believed to proliferate as a result of periapical inflammation consecutive to the infection of the root canal system, having particularly high incidence in the maxillary anterior region, presumably as a result of trauma¹⁰.

There has been a prolonged debate about the management of large cystic lesions¹¹. The treatment options for large periapical lesions may range from conventional nonsurgical root canal treatment with long-term calcium hydroxide therapy to various surgical interventions. Although some endodontists maintain that true cysts (those containing cavities completely enclosed by epithelial

lining) can only be successfully treated by surgical means¹², current endodontic philosophy in the treatment of teeth with large periapical lesions includes the initial use of nonsurgical root canal treatment¹³. But root canal treatment does not always succeed in resolving the periradicular pathosis. Thus, the prevalence of root filled teeth with chronic apical periodontitis has been found to be high in epidemiological studies carried out in the Spanish population^{14,15}. So, after root canal treatment patients must be given an appointment at 6 months for a clinical and radiological evaluation of the resolution of the periapical process after endodontic treatment, but what happens if the lesion was not of endodontic origin and the patient does not return, or even if the patient returns, 6 months have passed? Or in the case that it was a periapical cyst, what happens if it has not been resolved satisfactorily and the patient only returns when the symptoms reappear and/or the situation worsens? It will evidently be necessary to provide surgical treatment to a lesion that is much more compromising to adjacent structures than in its initial stages¹¹.

The surgical literature clearly recommends enucleation of the cyst because marsupialisation has the risk of leaving cystic cells behind that may become malignant^{16,17}. However, we felt this was the best treatment option for this patient.

On the other hand, surgeons, in defence of the surgical alternative, are not closed to the possible success of perfect endodontic treatment, but they insist on the diagnostic value of periapical surgery thereby touching on a sore point among endodontists. That is, a perfect canal treatment, or perfect re-treatment

may satisfactorily resolve a periapical cyst. But what if it is not a periapical cyst?

At this point of the discussion we have gone back to the initial doubts, **where it is considered** whether a dentist should recommend enucleation and biopsy of periapical pathologies of apparent endodontic origin, or whether he should attempt to provide conservative treatment and only suggest surgery in the event of doubt regarding their endodontic origin. No clear answer is readily available from the literature, nor are there conclusive results in any of the different studies along these lines. The cause of this divergence of criteria and results is probably due, on the one hand, to the presence of periapical lesions, which in spite of having an epithelial covering and expansive growth still retain a route of communication with the root apex and so could be referred to as pseudocysts, and on the other hand, true periapical cysts, where there is no communication with the root canal. The result is that a certain percentage of pseudocysts involute with adequate canal treatment.

In the case of very extensive lesions, as the case reported here, the undesirable consequences of surgical curettage have led to the use of tube decompression procedure following by apicoectomy and enucleation of the cyst. **Marsupialisation and decompression** techniques intended to reduce the size of the lesion¹⁸. However, they depend on patient cooperation, they take a long time, and they do not maintain the basic principles of endodontic therapy, especially with regard to the bacterial contamination through the oral environment. Although it is not known what percentage of radicular cyst cases can be expected to heal only with **marsupialisation** and decompression, it is a

viable treatment modality that bears consideration when treating large, presumptively cystic lesions⁷. Furthermore, decompression technique has been proposed as an alternative to apical surgery for large areas of rarefaction involving anatomic structures⁷. However, we think decompression must be taken in mind only as a first phase of the treatment of large cystic lesions in order to reduce their size and to facilitate the posterior surgical procedures.

In this case, after 3 months of marsupialisation and decompression, with good cooperation of the patient, the radiolucent area decreased steadily and cystectomy was performed more easily. Finally, the resolution of the lesion was complete after 8 months.

Figure legends

Figure 1. Panoramic radiograph.

Figures 2a and 2b. Maxillary CT. Arrows: cystic lesion.

Figure 3. Access cavity to cyst.

Figure 4. Radiopaque latex drain.

Figure 5. Panoramic radiograph after decompression.

Figures 6a and 6b. Enucleation of the cyst and apicoectomy of teeth #21, 22, and 23.

Figure 7. Periapical radiographs after apicoectomy.

Figure 8. One week after the operation.

Figure 9. Panoramic radiograph after 8 months.

Figure 10. Clinical image after 8 months.

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