Replantation of tooth involved in dentigerous cyst: a case report

ABSTRACT

Background Dentigerous cyst (DC) is a disembrionigenetic lesion. The cyst wall encloses the crown of an impacted tooth. Several therapeutic approaches have been mentioned in the literature for management of this lesion.

Case Report This article describes the management of an adolescent with a mandibular DC surgically treated with extraction of the tooth, enucleation of the cyst and replantation of the permanent tooth involved. Final outcome shows complete healing of the bone socket with eruption of a vital tooth. No orthodontic traction was required. No recurrence was detected at the radiographic follow-up at 12 months, thus confirming the success of this therapeutic approach. After a 7-year follow-up period the tooth responded positively to the vitality test. Clinical Implications: In selected cases surgical enucleation of the lesion without loss of involved tooth, might be considered as a viable treatment to obtain healing of the lesion, spontaneous eruption of the tooth and physiological restoration of bone.

Keywords Dentigerous cysts; Odontogenic cyst; Surgical enucleation; Tooth implantation.

Introduction

Dentigerous Cyst (DC) is an odontogenic lesion, which occurs mainly in younger adults, with little male predilection [Zhang et al., 2010].

This kind of cyst, generally solitary, is associated with the second premolar in the mandible, while in the maxilla is, more often, associated with the canine and the third molar [Kramer et al., 1992].

Multiple DCs are not a rare finding and can occur in association with syndromes such as Cleidocranial Dysplasia and Maroteaux-Lamy Syndrome [Ochsenius et al., 2007].

This lesion is generally asymptomatic and it is usually discovered after radiographic examination taken to investigate failure of tooth eruption.

Aetiology of dentigerous cysts remains unclear. One hypothesis suggests that they are caused by expansion of dental follicles resulting from accumulation of fluid between tooth crowns and epithelial components.

The cyst wall encloses the crown of an impacted tooth and histologically presents fibrous connective tissue with remnants of reduced enamel epithelium.

The squamous epithelium becomes thicker in presence of inflammatory changes [Benn and Altini, 1996].

DCs in rare cases can be the cause of more serious lesions such as Squamous Cell Carcinoma, Mucoepidermoid Tumor and Unicystic Ameloblastoma [Kramer et al., 1992; Benn and Altini, 1996; Houston, 2007; Ochsenius et al., 2007; Zhang et al., 2010]. The larger the lesion, the higher the probability of aggressive behaviour, also histological diagnosis is very important [Dunsche et al., 2003].

With regard to the treatment two main techniques can be employed with this kind of lesion: marsupialisation and enucleation [Motamedi and Talesh 2005].

Enucleation is a radical surgical approach which rarely results in recurrence; this treatment represents the best choice in large lesions, in which an early histological examination is very important[Riachi and Tabarani, 2010].

Case report

A 13-year-old Caucasian Italian female was referred to the Dentistry Department of the University Hospital “Le Scotte” (Siena, Italy) for specialist consultation.

Oral examination revealed absence of the second left mandibular premolar in presence of the corresponding deciduous tooth. The surrounding mucosa was normal in colour and shape. No symptoms were reported by the patient.

An X-ray examination revealed a well-circumscribed radiolucent lesion surrounding the crown of the impacted second premolar; the wall of the lesion extended toward the root of the impacted premolar and the mesial root of the second molar (Fig. 1).

The clinical features were consistent with a dentigerous cyst, and the patient was referred for surgical removal of the lesion.
The intervention was performed under local anaesthesia, with extraction of the second deciduous molar followed by enucleation of the cyst and, at the same time, extraction of the second premolar involved (Fig. 2) due to its high mobility.

Complete removal of the pathologic tissue from the tooth was obtained by cutting the cystic wall and exposing the dental crown. The tooth was carefully extracted avoiding any manipulation of the periodontal ligament and radicular cement, and it was immediately replanted. The residual cavity, previously occupied by the cyst, was filled with fibrin, in order to obtain good stability of the replanted tooth. The surgical opening was then sutured.

The surgical specimen was fixed in formalin and subsequently stained with Hematoxylin-Eosin. The patient was instructed to maintain good oral hygiene. No postoperative complications developed after surgery. One week later the surgical site showed good healing.

The diagnosis of dentigerous cyst was confirmed by the histological examination. After 8 months the affected second premolar erupted completely into proper position (Fig. 3). No orthodontics traction was needed. No recurrence of cyst was found in the radiographic examination at 12 months, confirming the success of this therapeutic approach (Fig. 4).

After 7 years the tooth responded positively to the vitality test.

Discussion

Enucleation and marsupialisation represent the main treatment modalities reported in the literature for the management of dentigerous cysts [Motamedi and Talesh 2005]. Before choosing the surgical approach it is very important to evaluate patient age, size and location of the cyst, and involvement of other anatomical structures [Yahara et al., 2009].

Marsupialisation consists in opening of a surgical window for drainage of the cystic content, preserving the permanent tooth associated at the dentigerous cyst. Healing is slower and a cavity persists, sometimes, for a long period, but this method is easier and more “conservative” than enucleation, especially with respect to the preservation of important anatomical structures [Kirtaniya et al., 2010; Hu et al., 2011]. More difficult appears the management of bigger cysts requiring cyst enucleation together with...
extraction of the impacted tooth.

In the present case, based on the size of the lesion, enucleation was the treatment of choice.

The aim of the surgical approach was to remove all the pathologic tissue and obtain a sample for histological examination. Taking into account the high mobility of the tooth, temporary extraction was performed to allow adequate removal of cystic tissue both from the tooth and bone cavity. Furthermore considering the position of the tooth, which was very close to the bone crest, the good eruption potential and the greater capacity of bone regeneration in young people, we decided to preserve the involved tooth by immediate replantation in the bone socket. Acceptable stability of the tooth was obtained by filling the residual cavity with resorbable material.

This procedure allowed for spontaneous eruption of the impacted tooth by maintaining its vitality. This technique may lead to potential problems such as: loss of blood supply and vitality of the adjacent teeth, ankylosis of the replanted tooth with failure of eruption and need of a new surgical procedure for extraction of the tooth.

It is well-known that preservation of periodontal ligament cells represents an important prerequisite for a successful junction between root and bone [Hecova et al., 2010]. Periodontal ligament cells respond directly to mechanical forces and adapt to the mechanical challenge by activation of mechanosensory signaling systems, cytoskeletal changes, and extracellular matrix organisation [Ten Cate, 1996; Rios et al., 2008]. In the present case, removal of pathologic tissue from tooth avoiding any manipulation of the periodontal ligament and radicular cement were very important in creating an eruption pathway, healing of the bony socket with formation of alveolar bone and rearrangement of periodontal fibres.

Conclusion

The case illustrates the success of a surgical approach of a large dentigerous cyst without loss of the involved tooth. Eruption of the permanent teeth and their maintenance in the dental arch have important clinical implications because this restores the occlusal function contributing to improve, at same time, the alveolar development in a growing patient. In selected cases this therapeutic approach might be considered as a viable treatment modality to obtain healing of the bone lesion, spontaneous eruption of the involved tooth and physiological bone growth.

References

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