**Abstract:**

The dentigerous cyst is the second most common odontogenic cyst and the most frequent cystic pathology in children under 12 years of age. It affects people especially at the second and third decade of life with a male predilection. It presents a preference for the mandibular region particularly for the second lower premolar. Surgical marsupialization or decompression are actually the most two conservative treatment option described for the management of dentigerous cyst with the preservation of involved teeth.

Two clinical cases of two young patients presenting a dentigerous cyst involving impacted teeth which were successfully treated by decompression will be reported in order to highlight the benefits and limits of cyst decompression as well as detailing its operating protocol and its instructions.

**Introduction:**

Odontogenic cysts are a fairly common group of lesions, secondary to disorders of development of the dental organ or due to inflammatory origin (1).

The morphological, clinical and evolutionary diversity of the various lesions led to an histological classification, today the most used. (2)

Dentigerous cysts represent 24 % of all epithelium lined jaw cysts (3) and are the second most common odontogenic cysts. They show a male predilection and a preference regarding mandibular region. It affects people more frequently at the second and third decades of life. (3, 4)

This pathologic entity is associated with an impacted tooth, more commonly with the third molar and canine due their frequency of impaction (5). Probably, the formation of dentigerous cyst is due to the accumulation of fluid resulting from pressure exerted by the potential of the eruption of the impacted tooth on the follicle. (4)

The most two treatment option described in the literature are surgical enucleation of the cyst and extraction of the involved tooth or decompression in order to preserve the impacted tooth and promote its spontaneous eruption. (6)

The aim of this article was to present two cases reports of two young patients presenting a dentigerous cyst involving impacted teeth which were treated by decompression, in order to highlights this alternative treatment option, detailed it’s steps, benefits and limits.

**Case 1:**

A 13-year-old patient was referred to the department of oral medicine and oral surgery of the university dental clinic of Monastir, Tunisia by the pedodontic department for a swelling at the right mandibular vestibule.

The Intra-oral examination showed a hard-bony swelling on the right body of the mandible (fig 1)

The 83 and 84 were decayed. The panoramic radiograph (OPG) showed a large and well-defined osteolytic lesion including a canine and first premolar still impacted (fig 2).

The 3D radiographic examination using CBCT (Cone Beam computed tomography) confirmed the limits of the lesion. They were well defined, pushing back without invading the surrounding anatomical structures over the entire edges of the lesion measuring about 2 cm in diameter (fig3).

Clinical and radiological finding were in favor of dentigerous cyst related to the impacted first premolar and the canine, less probable to be a radicular cyst related to deciduous teeth.

Having regard to the patient’s age and motivation, decayed temporary teeth were removed and cyst decompression was performed under local anesthesia to preserve the impacted teeth and let chance to their natural eruption. A biopsy for histopathological examination was done, and it confirmed the diagnosis of a dentigerous cyst.

To avoid mucosa cicatrisation, the device used was an obturator in acrylic resin incorporated in a partial removable denture (fig4). Some recommendations were given to the parents such as good irrigation of the cystic cavity twice daily with 10 mL of 0.2% chlorhexidine through a syringe.

He was seen once a week and was examined radiographically bimonthly. Six months after the surgery, the occlusal surface of the second premolar could be seen clinically, beginning of bone formation and modification of the 43-axis orientation. After one year, a panoramic radiograph revealed complete bone remodeling of the area with no recurrence of the cyst (fig 5), the eruption of the first premolar and the complete straightening of the axis of the canine which was horizontal (fi6).

**Case 2:**

A 7-year-old female patient was referred to the department of oral medicine and oral surgery of the university dental clinic of Monastir, Tunisia by her dentist while discovering accidentally osteolytic lesion surrounding the impacted maxillary left canine. A cone Beam computed tomography was requested to precisely determine the limits of the lesion which were well defined and preserving the integrity of surrounding tissues. (fig7)

A provisional diagnosis of dentigerous cyst was made. Thus, the therapeutic approach decided was cyst decompression in order to preserve the definitive canine. So, 63 was extracted under local anesthesia. A specimen of the cyst membrane was sent for histological examination, which conﬁrmed the diagnosis of dentigerous cyst. A shortened stent was inserted and sutured at the site to maintain the drainage and the opening of the cavity (fig8). The patient was instructed to irrigate the cavity three times per day with a saline solution or chlorhexidine.

Patient was recalled for regular clinical and radiological follow-up, after 3 days, 10 days, and one month. Three months later, bone remodeling of the cyst cavity was obtained (fig9). The speed of the eruption and the degree of root formation of the impacted canine was judged normal.

**Discussion:**

### The dentigerous cyst is one of the most frequent cysts of the maxilla. It is observed at all ages, with a higher frequency between the 2nd and 4th decade in men. It is most common in the 3rd molar, the maxillary canine and the second mandibular premolar (2, 7). The pathogenesis of the dentigerous cyst is related to pressure from an erupting tooth on the follicle that may obstruct circulation thus inducing to exudate accumulation between the reduced adamantin epithelium and the crown of the tooth. (8)

It is a slow-growing odontogenic cyst that is frequently asymptomatic (7). Radiologically, it appears as a well-limited radiolucent image surrounding a crown of a still impacted tooth. (9).The dentigerous cyst can lead to bone destruction, displacement of neighboring teeth and resorption of their roots. It also prevents the eruption of the permanent teeth associated with the cyst (10). The appropriate treatment is always surgical and can be conservative or radical (11).

Radical surgical treatment consist in enucleation of the cyst and the removal of involved tooth, which is a drastic option causing the loose of value tooth such as the canine (12).

The most two recommended conservative options are marsupialization and decompression which offer the possibility of preserving the impacted tooth (13).

Marsupialization is to be distinguished from cystic decompression. Marsupialization is probably the first treatment recommended of cysts and was suggested by Partsch in German literature in the late nineteenth century. It consists of creating a large window in the cyst cavity (14). This opening should be maintained by suturing the cystic membrane to the buccal mucosa. It is a well-accepted technique for primary treatment of large cystic lesions (15). Decompression, as described by Thomas, is based on Partsch's marsupialization technique, but he proposes drainage through a smaller window that is often held open with the aid of devices (tube, stent) (16). Actually, many devices have been described: stents, stents attached with minivis, iodoform gauze pack, decompression tubes or obturators (17). Regardless the technique used, a specimen of the cyst membrane is necessary in order to perform an anatomopathological examination. Indeed, the irrigation of the cyst cavity by a saline or antiseptic solution is mandatory to avoid infection. No specific technique has been demonstrated to be superior (18).

There are various factors to take into consideration when performing marsupialization such as patient age, size and cyst location and mainly patient cooperation (19). This therapeutic approach can be considered alone or associated to subsequent enucleation (20).

The aim of these two treatments is the same, to keep the cyst open in the oral cavity in order to reduce the intra-cystic pressure. Therefore, the expression of IL-1α and other inflammatory cytokines will decrease allowing the reossification of the defect (9).

Usually, it is indicated in the cases of benign cystic lesions, such as dentigerous cyst, Odontogenic keratocyst, cystic ameloblastoma and radicular cyst (21). Thus, it has been accepted as a ﬁrst option for the treatment of large cystic lesions no matter what diagnosis it is. It had been used alone, or combined with tooth extraction, tooth traction, enucleation, curettage, resection, carnoy saloution... The reintervention is often seen in the cases of odontogenic keratocyst and cystic ameloblastoma in order to eliminate the residual lesion because of their aggressive character and their high recurrence rate (15).

Marsupialization and decompression are useful in cases of cysts associated to mandibular premolars and maxillary canines (22), as it was reported in the two clinical cases, the decompression was very benefic and allowed the preservation and the eruption of involved teeth.

In comparison with other treatment modalities, they carry the lowest risk of recurrence and the least morbidity. In fact, they promote the eruption of teeth retained by the cyst (23). They also offer the possibility of preserving teeth having functional interest with or without performing orthodontic traction. In case of no bone remodeling or regression of clinical symptoms, enucleation with removal of the tooth can be considered. Although the predictive criteria for the eruption of the cyst associated tooth are not well known, the size of the cystic lesion is not a predictor factor. The most favorable factors are: age (less than 10 years), depth of inclusion and germ angulation (less than 25°) (19, 24).

Tooth eruption does not always occur spontaneously after decompression or marsupialization specially when there is no enough space to allow eruption or no favorable axis is available (19, 25).

Thus, orthodontic traction can be performed later. Combined orthodontic-surgical techniques may help promote cyst-related tooth eruption. The goals of this combination are: Traction of the tooth associated to cysts, open or maintain space, correct tooth position after marsupialization or decompression (26).

Cystic decompression is a conservative and minimally invasive technique that has many advantages. It can avoid injury to adjacent anatomical features as the inferior alveolar nerve, damage to the floor of the maxillary sinus and nasal cavity and mandible fracture. Also, it preserves the vitality of certain teeth and reduces their mobility. Besides, it can assure partial or total reossification of the site, avoiding the need for bone filling and facilitate implant placement. (27)

Despite its benefits over enucleation, decompression has some disadvantages. The persistence of pathological tissue in situ and the impossibility of performing an anatomopathological analysis of the entire lesion is the major inconvenient. It’s also a long treatment that requires regular check-ups with the dentist. Daily local care is required. It requires as well a great cooperation from the patient and his parents. In some cases, a second intervention is necessary if the tube is removed or the cyst has not regressed completely or if the histological examination does not confirm the suspected diagnosis (3, 23).

**Conclusion**

Dentigerous cyst is a very common odontogenic cyst. It is a begin pathologic lesion. Unless, its management should be decided carefully in order to be the most conservative regarding the involved teeth. Marsupialization and decompression are the most conservative treatment option for carrying out dentigerous cyst on condition of respecting its indications , steps and its limits.

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**Conflicts of interest**

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**Ethics approval**

Our institution does not require ethical approval for reporting individual cases or case series.

**Informed consent**

Written informed consent was obtained from the patient for his anonymized information to be published in this article

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**Figures title:**

Fig 1: Intra oral view : A hard-bony swelling on the right body of the mandible

Fig 2: Panoramic radiograph showing a large and well-defined osteolytic lesion including a canine and first premolar still impacted

Fig 3: CBCT showing a radiolucent lesion pushing back without invading the surrounding anatomical structures over the entire edges of the lesion measuring about 2 cm in diameter

Fig 4: An obturator in acrylic resin incorporated in a partial removable denture in place

Fig 5: A panoramic radiograph (after 18 months) revealing complete bone remodeling of the area with no recurrence of the cyst

Fig 6: Eruption of the first premolar and the complete straightening of the axis of the canine (after 18 months)

Fig7: CBCT showing a well-defined radiolucency preserving the integrity of surrounding tissues involving an impacted left maxillary canine.

Fig 8: A shortened stent was inserted and sutured at the site

Fig9: Bone remodeling of the cyst cavity was obtained (3 months later)

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