

Surgical-Orthodontic Treatment of Developmental Odontogenic Cysts of the Jaws

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Summary

The results are shown of surgical-orthodontic treatment of developmental odontogenic cysts of the jaws with the purpose of demonstrating the importance of long-term teamwork of the orthodontist and oral surgeon in resolving each individual case, despite the fact that some cases may appear to be simple. Such cooperation enables the preservation of impacted teeth, even in cases when this appears almost impossible. The example presented of treatment of a large follicular cyst in an eight-year old girl is proof of the success of such cooperation. The authors also present contemporary knowledge on the treatment of odontogenic cysts, warn of the local invasive nature of odontogenic keratocysts and show the results of the application of resorptive granular tricalcium phosphate.

Key words: *developmental odontogenic cyst, follicular cyst, odontogenic keratocyst, keratinizing cystic odontogenic tumour, Partsch I, Partsch II, marsupialisation, tricalcium phosphate.*

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Introduction

Developmental odontogenic jaw cysts are frequently connected with impacted, developed or incompletely developed teeth, particularly in the case of follicular cysts, which usually occur in childhood or during adolescence, most frequently before the age of 20 years (1-3). In cases when odontogenic keratocysts occur later, usually between the ages of 20 and 40 years⁴, the impacted teeth or teeth germs are rarely directly connected with a cystic cavity.

In all such cases the physician is confronted with several questions which he needs to answer in order to successfully remove the pathological lesion, if

possible preserve the teeth and to establish satisfactory aesthetic and functional relations.

The nature of the pathological lesion is a fundamental question. In this respect the possibility of the development of carcinoma from the epithelial capsules of odontogenic inflammatory and developmental cysts should not be overlooked, which has been reported in the past (5-7), and also in contemporary professional literature in connection with the possible development of carcinoma from the capsule (8-10) of odontogenic keratocysts. In all such cases the question of the preservation of teeth is of secondary importance. In the same way, when confronted with an odontogenic keratocyst, once known

as a primordial cyst, and today keratinizing cystic odontogenic tumour (8, 9), because of its locally invasive nature and tendency to recurrence, the prevention of recurrence is more important than the preservation of the teeth (11).

In cases of so-called true follicular cysts the following should be taken into account: the method of removing the cystic capsule, ensuring the healing of the bone defect, preservation of the impacted teeth and later achievement of harmonic mutual and intermaxillary relations by an orthodontic procedure.

Thus, at the beginning of treatment the cooperation of specialists in pathology, oral surgery and orthodontics is essential, to ensure that all phases of the treatment are performed without mistakes and according to the agreed plan. The surgical procedure by which the cystic capsule is removed is not a problem in the case of smaller cysts and when the impacted teeth remain firmly embedded in the bone after the capsule has been removed (Figures 1-4).

In the case of large cysts during the phase of the surgical procedure when the bony cavity and impacted teeth are surgically exposed, the orthodontist assesses the possibility of the teeth being moved in the dental arch by one of the known orthodontic procedures. This can occasionally be achieved completely and occasionally only partially (Figures 5&6).

Occasionally the position of the teeth, size of the bony cavity and the relation of the capsule and teeth are such that it is impossible to completely remove the capsule and preserve the teeth, which results in the patient having a deficient number of teeth after the operation, and their relevant disturbed mutual relations (Figures 7&8).

Case presentation

An eight-year old girl was hospitalised because of a finding of a large follicular cyst which occupied the corpus of the mandible from the left lateral lower incisor up to the first molar. Intraoral swelling of the mandibular buccal corticalis was found from the region of the undeveloped canine up to the first permanent molar, with fluctuation in the region of the

canine. The first lower primary molar persisted in the dental arch, and the radiograph showed lobulated translucency which included the shadow of an impacted canine, mesioangular position of the shadow of the first premolar and the shadow of a partially erupted second premolar. The translucency projected over the shadow of the mesial root of the first molar (Figure 9).

After pre-operative preparation the operation was performed under general anaesthesia. Exploration of the area from the lateral incisor up to the area of the second molar was performed by moving the mucoperiosteal flap. The buccal corticalis and primary molar were removed, the cystic capsule scaled and the impacted teeth and nervus alveolaris on the floor of the bone cavity preserved. Intraoral post-operative suction was established and the wound healed primarily after eight days. Post-operatively the girl received antibiotic Klavocin 3x 625 mg in order to prevent the possibility of infection of the blood clot.

During the operation the orthodontist assessed that the position of the teeth was satisfactory for their moving in the dental arch up to the occlusal plane. Three years later, after eruption of the second premolar, the bone structure showed complete renewal of the bone at the site of the cyst, and orthodontic treatment with a fixed orthodontic apparatus was commenced (Figures 10&11). Two years after the beginning of the orthodontic therapy the result can be considered satisfactory, although still not final (Figures 12&13).

Discussion

Surgical treatment of large developing odontogenic cysts of the jaw is linked with numerous possible complications that depend on the type and localisation of the cyst, extent of the bone defect, position of the impacted teeth, type of surgical procedure, tendency of the patient to infection and anatomic relations of the cyst with the surrounding anatomic structures.

The most serious complication is recurrence of the cyst, which in the case of odontogenic keratocysts is reported to occur in 12-63% of cases (3, 11-14), and in cases of follicular cysts this compli-

cation rarely occurs. For this reason the clinical and radiographic appearance, relation to the teeth, type of growth, age of the patient, macroscopic appearance and cytological finding of the cystic fluid, obtained by puncture, together with clinical experience is decisive for determining the correct clinical diagnosis, and planning the surgical procedure accordingly, because in daily practice a biopsy is almost never performed prior to the operation in the case of odontogenic cysts. In order to prevent recurrence of odontogenic keratocysts a more radical surgical technique is needed with the removal of adjacent bones, application of Carnoy's fluid, criotherapy (15-17), and more recently marsupialisation has again been mentioned, with rinsing of the cystic cavity, as a procedure which statistically does not significantly reduce the possibility of recurrence, but does have an effect on cellular changes and growth characteristics, and thus the formation becomes less invasive (14, 18, 19).

Of other possible complications the following should be mentioned, deformation of the jaws, loss of the affected teeth, infection of the blood clot, infection of the bone transplants or alloplastic implants when used for filling the bone defects, and damage to surrounding structures, such as the mandibular nerve or maxillary sinus. All the above complications should be taken into consideration prior to the operation.

Our approach to surgical treatment of large odontogenic cysts have changed in relation to the principles applied in the past, which were determined by the size and localisation of the cyst. Thus, today Partsch II method, once applied only for small cysts (up to 3 cm in diameter) has become the universal method for treatment of all large cysts of the mandible and those in the frontal part of the maxilla with the application of permanent postoperative suction or decortication of one wall of the jaw (20, 21).

Partsch I method, or marsupialisation of large cysts of the mandible, has practically disappeared from everyday use and is only applied occasionally in cases when, because of the patient's deteriorated health, the operation cannot be performed under general anaesthesia, or in cases when the purpose is to reduce the cyst or odontogenic tumour by drainage and decompression (22-24). Based on

recent data from the literature it appears that its real value, in the case of large odontogenic keratocysts or cystic odontogenic tumours of the jaw, should in the future be verified

The application of autologous bone transplants also remains in reserve for exceptionally large bone cavities, in order to prevent mutilation of the patient and to ensure continuity of the jaw. The application of resorptive granular tricalcium phosphate is well known in the literature and is still today applied in certain indications, in order to accelerate the dynamics of the healing of bone defects (25, 26) which remain after large odontogenic cysts or pseudocysts have been removed (Figure 14). This therapy has proved very successful in the Clinical Department of Oral Surgery, University Hospital "Dubrava", in the treatment of odontogenic keratocysts, other odontogenic cysts and pseudocystic jaw lesions.

Conclusion

All the presented radiographic examples, showing preserved teeth after cystectomy, the example of the girl with orthodontic treatment after surgical procedure and other radiographic cases, demonstrate how, in the case of impacted teeth, various treatment possibilities exist, of which those best suited for the patient with regard to the establishment of optimal orthodontic and orthognathic relations, should be chosen. All the cases presented are the result of permanent daily, routine cooperation between the orthodontist and oral surgeon in the Clinical Department of Oral Surgery, University Hospital "Dubrava".