Abstract: Dentigerous cysts develop from unerupted and impacted permanent teeth. Very rarely, supernumerary teeth are associated with dentigerous cysts and constitute about 5–6% of all dentigerous cysts. Although these cysts are not common in the first decade of life, regular thorough inspection of radiographs is of importance, as indicated by this case report. This case shows how an impacted supernumerary canine developed a dentigerous cyst, engulfing the whole of the maxillary antrum.

Clinical Relevance: This case report highlights the importance of having a comprehensive interpretation of the radiographic films. Aberrant teeth should be followed both clinically and radiographically at acceptable intervals, to allow early identification of pathological changes.

Dentigerous cysts are epithelial-lined cavities that develop from the reduced enamel epithelium related to the crown of an unerupted tooth. They represent 33% of all odontogenic cysts. About 95% of dentigerous cysts involve the permanent dentition and 5% are associated with supernumerary teeth. The initial diagnosis is usually reached by radiographic examination of the patient, however, in the transitional dentition the presence of many unerupted and partially erupted teeth adds to the difficulty in diagnosing both pathology and presence of extra teeth.

CASE REPORT
An 8-year-old boy was referred by his General Dental Practitioner to the Orthodontic Department with regards to a delayed eruption of the maxillary left central and lateral incisors, and the presence of a supernumerary in the same quadrant.

The patient presented with a Class I incisor relationship on a Class I skeletal base with an average Frankfurt Mandibular plane angle. He was in the early mixed dentition phase with unerupted maxillary left central and lateral incisors. The upper and lower arches were well aligned and the overjet and overbite within normal limits (Figure 1a–i). Radiographs were taken and vertical parallax revealed a supernumerary palatal to the crown of the upper left central incisor and another supernumerary close to the root apex of the upper left lateral incisor (Figure 2). There were no obvious signs of any cystic changes on the original radiographs.

It was decided to construct an upper removable appliance with a magnet close to the gingiva overlying the unerupted upper left central incisor area. It was felt that bringing down the central incisor would lead to subsequent eruption of the lateral incisor and using magnets is a technique shown to be both patient and operator friendly, and also effective with unerupted teeth. Under general anaesthesia, the supernumerary palatal to the upper left central incisor was extracted, and a magnet bonded to the tip of the upper left central incisor. The magnetic forces were used to bring the upper left central incisor into the arch and the anterior teeth were subsequently aligned with a sectional fixed appliance over a period of 3–6 months (Figure 3). A bonded retainer was placed on the palatal surface of the maxillary central incisors to counter the tendency for some relapse following initial alignment.

The supernumerary close to the canine was left in place as its removal was felt to be potentially hazardous at this stage. At review three years later, it was noticed that the patient’s upper left lateral incisor and first and second premolar were in cross bite, and the upper canines were still unerupted (Figure 4a–c). The patient’s orthodontic care was transferred to his General Dental Practitioner and an upper removable appliance was recommended to correct the cross bites. After 6 months’ treatment, the
Figure 1. Patient on initial presentation – unerupted $\overline{11}, \overline{12}$.

Figure 2. Supernumerary overlying $\overline{11}$ crown, second supernumerary mesial to $\overline{13}$ crown.
patient noticed a swelling of the left cheek and the palate, which was slowly increasing in size over a period of months. The patient was therefore referred back to the Orthodontic Department for reassessment (Figure 5).

Examination revealed a well-defined, slightly fluctuant swelling over the left hard palate which was seen radiographically to extend from the canine to the first molar. The swelling was also evident on his left cheek and there was expansion of the tissues in the buccal sulcus. There was no clinical evidence of nasal obstruction.

A decision was made to take a CT scan showing a complete opacification of the left maxillary antrum, which was markedly expanded (Figure 6). There was marked thinning of the bony wall of the left antrum anteriorly. A supernumerary tooth was clearly seen lying against the medial wall of the antrum just above the alveolus (Figure 7). The patient had the cyst enucleated under general anaesthesia and his postoperative recovery was uneventful (Figure 8). Histopathology confirmed the diagnosis of a dentigerous cyst.
Following cyst removal the patient was provided with upper and lower fixed appliances, which allowed treatment of the malocclusion within a normal time frame (Figure 9).

**DISCUSSION**

A study conducted by Sousa *et al.* on paediatric oral pathologies between the ages of 9 and 14 years revealed that mucocele (13.5%) was the most frequent of the oral pathologies seen, followed by dentigerous cyst (6.5%) and fibro-osseous lesion (5.4%).

Dentigerous cysts have only occasionally been reported to occur around supernumerary teeth. Since approximately 80% of supernumerary teeth remain unerupted, the majority of them can only be diagnosed by an imaging study. Early diagnosis and treatment of supernumerary teeth, where appropriate, is important to prevent later complications and full diagnosis should involve a thorough assessment of the initial radiographs.

Study of this patient’s radiographs showed the presence of the supernumerary canine tooth, both on the initial radiograph and also on subsequent OPG films. Current radiation guidelines preclude taking ‘unnecessary radiographs’ and serial OPGs following development of a malocclusion would rarely be taken with less than a 12-month interval, even in the transitional dentition.

The best time for the removal of supernumerary teeth remains controversial. These teeth can either be removed at the time of initial diagnosis, or subsequently removed when the root development of the incisors is nearly complete and the adjacent permanent teeth have erupted.

In this case, a decision was made on initial assessment to remove only the supernumerary close to the central incisor whilst carrying out surgery to attach the magnet, but to leave the second supernumerary tooth in place. This second supernumerary was related initially to the apex of the lateral incisor and later to the crown of the unerupted canine, and it was felt that its early removal might have affected the long-term prognosis of either the lateral incisor or the canine.

The principal methods of treating dentigerous cysts are surgical enucleation or marsupialization. Enucleation has the advantage of completely excising the cystic membrane and closing the residual osseous cavity with a mucoperiosteal flap, allowing for primary healing. Marsupialization is sometimes preferred when the permanent teeth are involved with the dentigerous cyst and the plan is to retain the involved teeth. In our case report the decision was made to enucleate the cyst and remove the associated supernumerary tooth, as it was felt this could be done without risk of damage to the adjacent structures.

**CONCLUSION**

In this case, appropriate radiographs had been taken and a conscious decision was made to leave one of the supernumeraries in place whilst the other was removed, thereby dealing with the immediate problem of the unerupted central incisor.

Whilst there is a small risk in any exposure to radiation, young patients with supernumerary teeth will probably require monitoring of their developing malocclusion with periodic OPT radiographs. The benefits of these radiographs are that treatment can be started at the most appropriate time to maximize the benefits of tooth eruption and minimize the potential disadvantages of prolonged treatment.

With hindsight, a closer eye should have been kept on the supernumerary tooth close to the unerupted canine. Had careful inspection been made of the later radiographs, it is possible that the subtle radiographic changes may have been noticed prior to the patient presenting clinically, with swelling related to the dentigerous cyst. Earlier intervention, as soon as evidence of cyst development was seen, would have prevented an episode of pain and swelling for this patient. However, the subsequent

**Figure 7.** Supernumerary tooth difficult to see clearly on OPT but ‘cyst’ borders can be seen.

**Figure 8.** Enucleated dentigerous cyst and root of associated tooth.
outcome for the patient was more than satisfactory.

REFERENCES

ABSTRACT
FREE TOOTHPASTE

The participants of controlled clinical trials are often either winners or losers. However, as this intervention was opposed to ‘doing nothing’, accepting the status quo, the losers have not actually lost, but the winners have very definitely proved the thesis. Birth cohorts in high caries risk populations were selected, and one half was randomly selected to receive free toothpaste four times per year, with a free toothbrush annually. After four years it was found that the trial group had a significantly lower dmft than the control group.

The authors compare the actual costs of the programme to the estimated costs of providing dental treatment (fillings and extractions) had the programme not been instituted. The stated costs were £424 per child, which includes the salary costs of the programme administrator. However, if the programme were to be widened it would seem possible to reduce this cost per child dramatically. The estimated savings in dental treatment were £44 per child for restorations, or £678 for extractions. Again, general practitioners might question how these figures were arrived at. Those in community dental health management, however, will immediately perceive the benefits of the programme and will, I am sure, wish to consider similar programmes in high caries risk areas.

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