CASE REPORT

Correction of a Malocclusion Caused by a Dentigerous Cyst

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The dentigerous cyst is one of the most common pathological entities found in dentistry, accounting for about 20% of all mandibular cystic lesions.[1] It is usually associated with the crowns of permanent teeth, involving the odontogenic epithelia[2] of enclosed, impacted, or semi-erupted teeth.[3,4] The third molars are most frequently involved, although there is a substantial incidence among second molars and mandibular premolars.[5] A slight predominance has been found in males[2,6] and in patients suffering from leucoderma[7] between the ages of 1 and 30.[3]

Dentigerous cysts can be responsible for structural changes in the bone,[8] root resorption,[2] and abnormal development of the dentition. They generally exhibit an asymptomatic development, but can often be observed on routine x-rays.

This article reports the orthodontic treatment of a case in which mandibular premolars were severely damaged by a dentigerous cyst, and multiloop archwires were used to level, align, and preserve the involved teeth.

Diagnosis and Treatment Plan

A 10-year-old female presented complaining about the increase in size of an asymptomatic lump in the left mandibular region. The lower left premolars were not visible, and the left second deciduous molar was still present (Fig. 1). The lower left permanent canine was tipped distally.

X-ray examination revealed a large radiolucid area extending from the lower left permanent canine to the lower left second deciduous molar. The lower left first premolar was horizontally impacted, with its crown pointing toward the adjacent second premolar, which was tipped mesially. Both teeth were enveloped by a cystic lesion below the lower left second deciduous molar, the roots of which had been almost completely resorbed.

Because of the patient's age, a treatment plan was devel-

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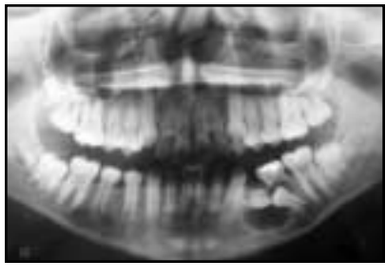

Fig. 1 10-year-old female patient with impacted lower left premolars, distally angulated lower left permanent canine, and retained lower left second deciduous molar. X-ray shows large radiolucid area between lower left permanent canine and lower left second deciduous molar, enveloping horizontally impacted premolars.

Fig. 2 Marsupialization, decompression, and complete curettage of cystic lesion, preserving enclosed premolars.

Fig. 3 Patient six months after surgery, with first premolar erupting in infraocclusion and second premolar tipped mesially and rotated 90°.

Fig. 4 Multiloop .014" archwire used for eruption, rotation, and leveling of premolars.

Fig. 5 Patient after six months of treatment, showing .014" archwire with box loops for eruption of second premolar.

Fig. 6 Patient after 12 months of treatment, showing .018" × .020" continuous archwires.

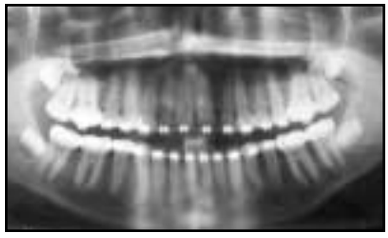

Fig. 7 Patient after 15 months of treatment, showing correct positioning of involved premolars.

oped to preserve the permanent teeth.

Treatment Progress

In one surgical procedure, under local anesthesia, the lower left second deciduous molar was extracted, and the lesion was marsupialized for decompression (Fig. 2). The entire cystic cavity was treated by curettage, but the premolars inside were preserved. The removed material was forwarded to a laboratory for a biopsy, which confirmed the diagnosis of a dentigerous cyst.

Six months later, the patient showed bone deposition in the decompressed cystic cavity, but the first premolar was erupting in infraocclusion with respect to the second premolar, which was tipped mesially and rotated 90° (Fig. 3).

An .022" edgewise appliance was designed for leveling and alignment. An .014" stainless steel multiloop archwire was fabricated with two "T"-loops, each with a helix at each end, on the mesial and distal sides of the lower left first premolar, and a boot loop, with a helix at the distal end, on the mesial of the first molar (Fig. 4). These loops added enough resilience to the archwire to enable vertical and rotational correction of the premolars.

The multiloop archwire was adjusted and reactivated over a four-month period, then replaced by an .014" stainless steel archwire with two box loops for forced eruption of the lower left second premolar (Fig. 5). Another four months later, leveling of both arches was begun with .018" × .020" stainless steel continuous archwires (Fig. 6) and concluded with .019" × .026" stainless steel rectangular archwires.

After 15 months of treatment, the teeth were all in proper occlusion (Fig. 7).

Discussion

The conventional surgery for a dentigerous cyst involves cystic enucleation and the complete removal of the involved teeth.[1,7-9] If the cyst is too large, it must first be marsupialized for decompression,[1,10] which can stimulate bone deposition and reduce the risk of damaging adjacent structures.[3] If there is any residual tissue in the cystic cavity after marsupialization, however, it may lead to a recurrence or even malignancy of the cyst.[11]

Marsupialization of the lesion as the sole surgical intervention is supported by several authors. Eruption of the involved teeth has been demonstrated four weeks after marsupialization,[12] but this is unpredictable, and might occur only when the teeth are not too severely impacted or tipped from their normal eruption axes.[13] Although orthodontic treatment can be performed even if the teeth do not erupt,[14] leveling of the arch would be impossible.

Despite the risks of the marsupialization technique,[11] this approach was attempted in the present case because of the patient's age and the size of the cyst.[8] Good bone regeneration would have been expected in a growing patient after surgery,[10] but a lack of mandibular premolars on one side would have been difficult to overcome orthodontically. In addition, the impacted teeth showed incomplete root formation and open apices, creating a favorable prognosis for relatively quick eruption.[3,13]

Multiloop archwires were used because the greater length of wire between brackets increases their resilience, thus reducing the applied force and improving the leveling capacity. Directional control is better with looped stainless steel wires than with superelastic nickel titanium wires, which are resilient, but cannot be bent into loops.[15-18] Disadvantages of multiloop archwires include the possibility of soft-tissue impingement and the increased chairtime needed for wire bending.[19-21] With experience in the technique, however, patient discomfort can be avoided and chairtime reduced. In addition, the overall treatment time with multiloop archwires is usually less because undesirable tooth movements do not occur.

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