Case Report

Labially Impacted Maxillary Canines Causing Severe Root Resorption of Maxillary Central Incisors

Diane J. Milberg[a]

Abstract: This is a case report of a patient with bilateral labial impaction of maxillary canines causing pressure resorption on the lateral aspects of the maxillary central incisors. The orthodontic treatment plan included extraction of the impacted canines, positioned between the central and the lateral incisors. Six years after the orthodontic treatment, the affected central incisors remained asymptomatic. (*Angle Orthod* 2006;76:173–176.)

Key Words: Labially impacted maxillary canines; Resorption; Pulpal involvement

INTRODUCTION

It is estimated that maxillary permanent canine impactions occur in less than 2% of the population.[1,2] Labially impacted maxillary canines occur less frequently than those positioned palatally. Research of labially impacted canines indicates a correlation to a maxillary arch length deficiency.[3,4]

The complication of incisor root resorption due to impacted maxillary canines has been underestimated in the past because of the difficulty in identifying the affected areas. Using stepwise radiographs, Ericson and Kurol[1] found that lateral incisor root resorption occurred in approximately 12% of the impacted maxillary canine population. Later, with computerized tomography of the maxilla, Ericson and Kurol[1] found resorption occurring in 38% of maxillary lateral incisors and 9% of central incisor roots in a population of 107 children with ectopically erupting canines. It is interesting to note that of the patients in their sample with normally erupting maxillary canines, 3% of the lateral incisors had root resorption.

Ericson and Kurol[5,6] also reported that maxillary incisor resorption occurred most commonly in the middle third of the roots, on the labial or lingual surfaces. They stated that 33% of the lateral incisors with root resorption appeared normal on conventional dental periapical radiographs. Medial inclination of the ectopically erupting canine, overlapping more than 50% of the lateral incisor crown, and impacted canines with well-developed roots presented the greatest risk to the lateral incisors. Most interestingly, even with pulpal involvement, lateral incisors with root resorption did not have clinical symptoms.

Early detection of potential canine impaction is the best deterrent to prevent incisor root resorption. Recommendations include annual palpation of the canine regions, dental radiographs before 10 years of age, and early extraction of deciduous canines.

CASE REPORT

Patient history, clinical examination, diagnosis

This 10-year-old African-American girl presented with a: Class II skeletal pattern due to mandibular retrusion (Figure 1A); end to end molar relationships, retroclined maxillary incisors; labially impacted maxillary canines; and mandibular canines in labial crossbite with the maxillary lateral incisors (Figure 1B).

The attached gingiva labial to the mandibular canines was thin because of the buccal position of the canines and the severe crowding in this arch. Numerous crossbites were present including a lingual crossbite of maxillary lateral incisors and constriction of maxillary right first and second molars and the mandibular left second bicuspid in lingual crossbite. The maxillary canines could not be palpated clinically. A panoramic radiograph (Figure 2) revealed that the maxillary canines were erupting into the middle third of the apices of the maxillary central incisors. It could not be determined whether apical resorption had occurred on the maxillary lateral incisors because of the overlapping of the teeth on the radiographs (Figure 3). Advanced imaging technology such as computerized

[a] Private Practice, San Diego, Calif.

Corresponding author: Diane J. Milberg, DDS, MSD, 306 Walnut Avenue Suite 32, San Diego, CA 92103 (e-mail: diane@dmilberg.com).

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FIGURE 1. (A) Pretreatment extraoral photographs. (B) Pretreatment intraoral photographs.

FIGURE 2. Pretreatment panorex radiograph.

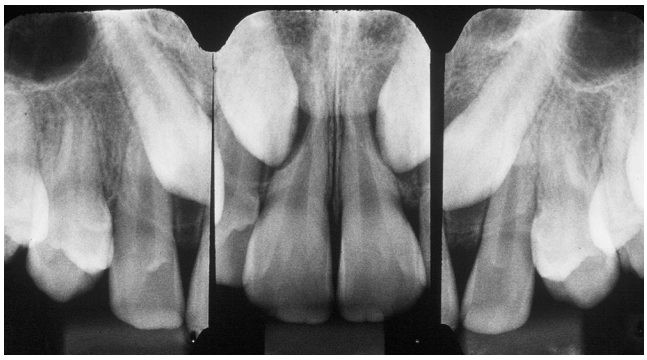

FIGURE 3. Pretreatment periapical X-rays of maxillary central incisors.

tomography would have revealed the areas of resorption.

The patient was advised to initiate orthodontic treatment immediately because of the precarious position of the maxillary canines. Her mother did not return to the office for six months, and as a result, there was increased distal resorption of the roots of the maxillary central incisors because of the mesial and horizontal eruption pattern of the canines. The maxillary central incisors were asymptomatic.

Treatment objectives

1. Deimpact the labially positioned maxillary canines to prevent further resorption to the maxillary central incisors.
2. Correct the numerous crossbite relationships in both maxillary and mandibular dental arches.
3. Reduce the deep anterior overbite.
4. Treat to a Class I molar relationship.
5. Achieve most ideal esthetics and occlusion possible in a reduced treatment time (because of maxillary central incisor apical root resorption).

Treatment plan

To reduce orthodontic treatment time and prevent further damage to the maxillary central incisor roots, the impacted maxillary canines and mandibular first premolars were extracted. Because of the proximity of maxillary canines and central incisor roots, alternative extraction sequences were not considered. The patient was referred to an endodontist to check the health of the asymptomatic maxillary central incisors and to monitor potential changes in the root length during orthodontic treatment.

Orthodontic treatment plan included full upper and lower edgewise appliances, headgear wear at home, and full-time bite plate wear. Maxillary first premolars would be substituted for the impacted maxillary canines. Maxillary first premolar and mandibular canine guidance would be the final occlusal treatment goal.

Treatment progress

Endodontic evaluation revealed normal pulpal responses of the maxillary central incisors, and root canal therapy was not indicated. The patient was advised that endodontic therapy could be needed in the future. The endodontist anticipated recall appointment every 3–4 months during active orthodontic treatment to monitor any changes in root architecture. After the first year, endodontic recalls were discontinued, and the patient was advised to return only if symptoms appeared.

Alignment of the dental arches was achieved with a $0.022 \times 0.025''$ edgewise appliance. The patient's compliance was minimal with the combination headgear, removable bite plate retainer, and elastics. Low-

FIGURE 4. Progress panorex radiograph.

er dental arch alignment was achieved before cementation of upper appliances.

The wire sequence was:

1. 0.0175″ wildcat twist, three strand;
2. 0.016″ round stainless steel;
3. 0.018″ round stainless steel;
4. 0.019 × 0.025″ rectangular stainless steel.

The maxillary incisors were moved slowly, and achievement of ideal root torque was not attempted because of the apical end root resorption. A progress panorex was taken about one year after initiation of orthodontic treatment (Figure 4).

Active treatment time was 22 months. During orthodontic treatment, the patient did not have any clinical symptoms of pulpal sensitivity of the maxillary central incisors. After removal of the appliances, upper and lower Hawley retainers were delivered.

RESULTS

The final frontal facial photographs show a pleasing smile (Figure 5). Substitution of the shorter maxillary first premolar for the impacted and extracted canines was not an esthetic problem because of the patient's long upper lip, which covered the gingival contours of her maxillary anterior teeth. Profile photographs show an improvement in maxillomandibular relationship because of favorable mandibular growth.

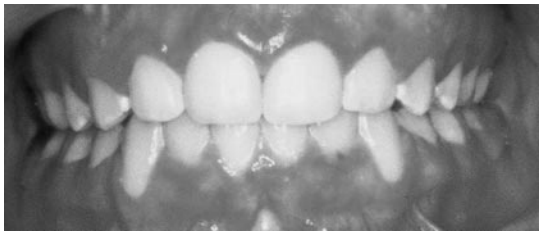

FIGURE 6. Final intraoral photographs.

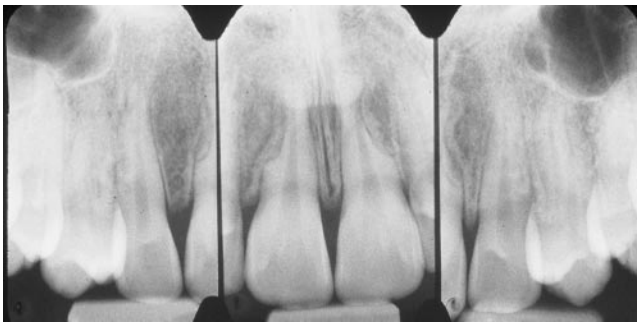

FIGURE 7. Final periapical radiograph of maxillary central incisors.

Dental alignment was achieved with correction of the crossbite relationships of the mandibular canines, premolars, and molars. Increased labial gingival attachment width was achieved with alignment of the mandibular canines. Lateral excursions were guided by the maxillary first premolars and mandibular canines (Figure 6). With conventional radiographs, no changes in the contour of the maxillary central incisor roots were apparent (Figure 7).

At the present time, six years after treatment, the occlusion remains stable. The maxillary central incisors, which suffered external root resorption due to the impacted maxillary canines, remain symptom free and have normal mobility (Figure 8). With removal of the maxillary canines and the source of pressure resorption, long-term prognosis for the maxillary central incisors is excellent.[1]

CONCLUSIONS

This case report shows an example of maxillary central incisor lateral root resorption associated with

FIGURE 5. Final extraoral photographs.

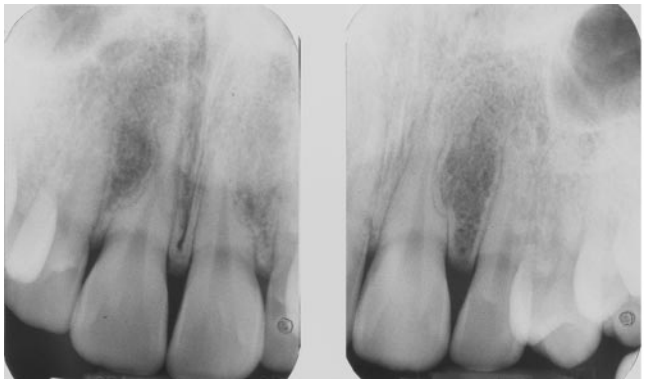

FIGURE 8. Six years posttreatment periapical radiographs of maxillary central incisors.

labial impaction of maxillary canines. Six years later, the compromised orthodontic treatment result has proven to be stable and satisfactory, and the maxillary central incisors remain asymptomatic, have normal mobility, and continue to function well.

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