

CASE REPORT

Treatment of a Patient with Severely Shortened Maxillary Central Incisor Roots

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External apical root resorption is a common clinical complication of orthodontic treatment, most often involving the maxillary incisors. This article describes treatment of a patient with severely shortened maxillary central incisor roots.

Diagnosis

A 10-year-old girl presented with the chief complaint of an unesthetic appearance. Initial evaluation showed a Class I malocclusion, a midline diastema, a cusp-to-cusp relationship of the

anterior teeth, and missing maxillary lateral incisors (Fig. 1). Radiographic examination revealed shortened incisor roots in both arches.

Because root shortening can limit tooth movement and the stability of treatment results, the patient was referred to an oral pathologist and an endodontist for evaluation, which did not indicate any specific pathology. Before the initiation of orthodontic treatment, however, the patient and her parents were informed of the risk of further root shortening and possible loss of tooth stability.

Treatment Progress and Results

Fixed appliances were placed for closure of the maxillary lateral incisor spaces. Periodic radiographic evaluation indicated no change in the root morphology of the maxillary central incisors and no additional root resorption.

Treatment of the mandibular arch was delayed by 33 months to evaluate the root formation of the second premolars. The decision was then made to extract the mandibular second premolars rather than the first premolars.



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Fig. 1 10-year-old female patient with midline diastema, missing maxillary lateral incisors, and shortened central incisor roots in both arches before treatment.

The mandibular extraction spaces were closed using a T-loop archwire (Fig. 2). Class II elastics were not used because of the possibility of causing further root resorption.

After 45 months of total treatment time, the esthetic and functional objectives had been achieved (Fig. 3). After eight years of retention, at age 23, the maxillary canines were recontoured to simulate lateral incisors (Fig. 4). Radiographs showed that the roots were no shorter than before treatment. The patient has since become an orthodontist.

Discussion

Patients with shortened roots present special treatment-planning considerations. As the root shortens, the center of resistance moves coronally.¹ With this change in the distance from the point of force application to the center of resistance, moment-to-force ratios must be adjusted to account for differences in root

length and alveolar bone support.²

Clinically, it would be useful to identify patients at risk of severe apical root resorption before the initiation of orthodontic treatment, or at least early in treatment.³ The esthetic and functional improvement often justifies the risks of orthodontic treatment in a patient with shortened roots, but these risks must be clearly conveyed to the patient and family before treatment begins. Although it has been reported that patients with roots already shortened by resorption have an increased risk of further root loss during treatment, our patient showed no further shortening after prolonged and significant tooth movement.

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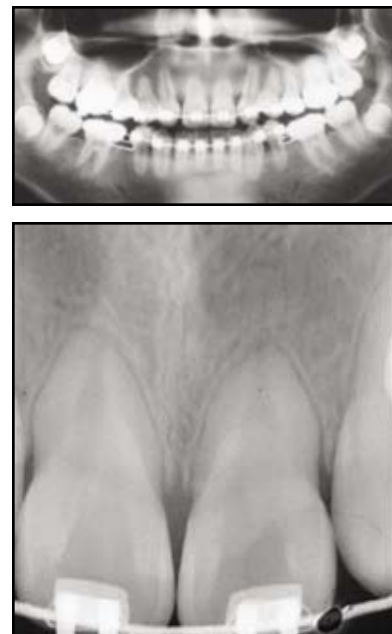


Fig. 2 Patient radiographs during treatment.

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Fig. 3 Patient after 45 months of treatment.



Fig. 4 Patient at age 23, after eight years of retention, with maxillary canines reshaped into lateral incisors. Radiographs show no further shortening of maxillary incisor roots.

