Combined Apexification and Orthodontic Extrusion of a Hypoplastic Permanent Canine

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ABSTRACT

Localized infection in the primary teeth was reported as an etiological factor in the formation of a hypoplastic defect in the underlying permanent teeth. The purpose of this report is to present the case of a 10-year-old girl with an unusual local hypoplasia in the mandibular left permanent canine and emphasize the importance of multidisciplinary management, including combined apexification and orthodontic extrusion. The 12-month recall examination revealed no pathology associated with the rehabilitation, and the patient's esthetic and functional expectations were satisfied. (J Dent Child 2007;74:221-3)

KEYWORDS: LOCAL HYPOPLASIA, ORTHODONTIC EXTRUSION, PRIMARY TEETH INFECTION, APEXIFICATION, IMMATURE APEX

Enamel hypoplasia is a condition where the enamel does not form correctly or is damaged during its development. Developmental defects of the enamel are a frequent finding in the primary dentition as well as in the permanent dentition.[1] These defects are usually a combination of enamel hypomineralization and hypoplasia caused by an insult to the ameloblasts during amelogenesis. The exact mechanism and etiological factors of these defects are not fully understood.[2-5] It has been well documented that the developing permanent teeth may be damaged because of trauma or infection by their primary predecessors. Periapical odontogenic infections of the primary teeth can disrupt normal amelogenesis of the underlying permanent successors and involve a potential for localized enamel hypoplasia.[6-8] Clinical significance of enamel hypoplasia includes: poor esthetics, tooth sensitivity, malocclusion, and predisposition to dental caries.[9] The defects may vary from opacities to hypoplasia to complete malformation of the permanent teeth.[8]

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The purposes of this case report were to present an unusual case with local hypoplasia in the mandibular left permanent canine, and emphasize the importance of multidisciplinary management, including combined apexification and orthodontic extrusion.

CASE REPORT

A 10-year-old girl was referred to the pediatric dentistry clinic of Ege University, Izmir, Turkey, for her routine dental examination. The patient had reasonably good oral hygiene, with minimal debris and plaque accumulation. The gingival tissues were healthy. Intraorally, she was in the mixed dentition phase and her maxillary right and left primary second molars, mandibular left primary second molar, and mandibular right and left permanent first molars were noted to have carious lesions. Upon clinical and radiographic examination, an unusual type of a local hypoplasia with totally damaged crown was detected in her left lower mandibular permanent canine (Figures 1 to 3). There was a history of an abscess formation related to her mandibular left primary canine due to the profound caries, and it was extracted at age 6.

The patient was the family's first child with no consanguinity. Her mother had a normal gestation period. The patient and her mother did not indicate any history of a systemic disease or oral/dental trauma. Written, informed consent was obtained before the treatment.

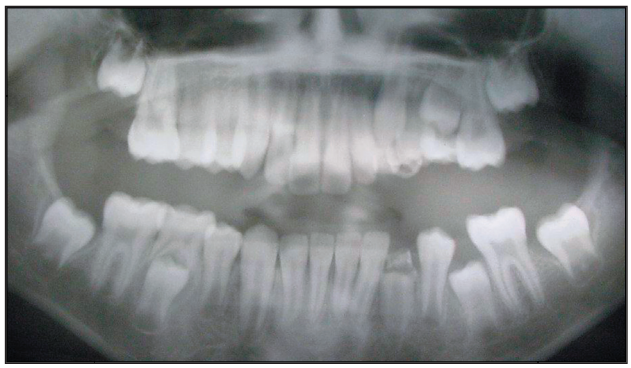

Figure 1. Panoramic radiograph: Radiographic evaluation of the hypoplastic mandibular left permanent canine with an immature apex.

Figure 2. Periapical radiograph: Radiographic evaluation of the hypoplastic mandibular left permanent canine with an immature apex.

Figure 3. Clinical view of the hypoplastic mandibular left permanent canine.

The initial treatment step was to remove the crown fragment. After surgical exposure of the tooth, apexification therapy was performed, because of the immature apex, with calcium hydroxide (Aktu Tic Ltd, Izmir, Turkey) on a 2-month recall schedule. Glass ionomer cement (GC Fuji IX GP, GC International, Tokyo, Japan) was used for temporary restoration at all sessions. At the 14-month recall visit, total apex development was achieved and root canal treatment was completed with gutta percha and orthodontic extrusion of the tooth was performed. A ligature wire in the shape of a hook was banded to the mandibular left permanent canine to bring it into the arch with the assistance of fixed orthodontic appliances (Figure 4). The tooth was placed in its proper position after 4 months of active orthodontic treatment.

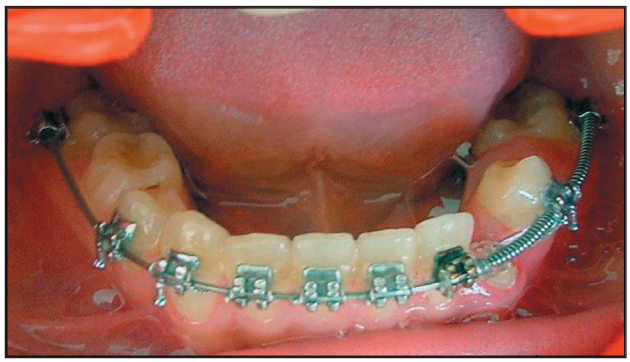

Figure 4. Orthodontic extrusion of the mandibular left permanent canine.

At the final session (the 18-month recall visit) a post (Anchorage post, Swenka Dental Instrument AB, Upplands Vaesby, Sweden) was cemented into the root canal and the tooth was restored with a direct resin restoration (3M Filtek Z250, 3M ESPE Dental Products, St. Paul, Minn; Figure 5 and 6). Abrasive discs (Hawe-Neos Dental, Bioggio, Switzerland) and silicone polishers (Kenda AG, Vaduz, Liechtenstein) were used to finish the restorations. The patient was controlled clinically and radiographically at 3-month, 6-month, and 12-month recall visits. The radiograph showed no pathology associated with the rehabilitation, and the patient's esthetic and functional expectations were satisfied (Figure 7).

Figure 5. Occlusion: Clinical appearance after direct resin restoration.

DISCUSSION

Localized trauma or infection in the primary teeth was reported as an etiological factor in the formation of the hypoplastic defect in the underlying permanent teeth in previous studies.[6-8] There are many reports about the effects of periradicular infection in a primary tooth on the permanent successor.[6-10] Early eruption, rotation, hypomineralization, and hypoplasia are the most frequently reported sequelaes.[11]

Figure 6. Mandibular jaw: Clinical appearance after direct resin restoration.

Figure 7. Radiographic appearance after treatment.

Factors which may determine the spread of infection from the affected primary tooth to the underlying permanent tooth germ as well as the nature and severity of changes which occur include the permanent tooth germ's development stage, infection duration, virulence of the organisms involved, and local and general resistance of the host.[10] Inflammatory infiltration of the follicular tissues at an early stage of development is more likely to result in serious sequelae for the permanent tooth germ, and the untreated longer infection in a primary tooth may damage the permanent successor.[6-8]

In the present report, an unusual local hypoplasia associated with mandibular left permanent canine was demonstrated. The patient had no history of trauma. According to her dental history, this hypoplasia was caused by an abscess of its primary predecessor confirming reports that the developing permanent teeth may be damaged by infection of their primary predecessors.[6-8]

Enamel defects can be managed with many alternative treatment modalities.[12] Bonding techniques with the newer composite resins may also be used to provide interim restorations for many hypoplastic teeth to produce well-contoured restorations.[13] The first criteria choosing the treatment option is the patient's age and most conservative management was chosen in the present case. This case report emphasizes the importance of multidisciplinary management of a hypoplastic permanent tooth, including combined apexification and orthodontic extrusion.

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