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Root resorption associated with an impacted mesiodens: a surgical and endodontic approach to treatment

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Abstract – This article describes a case of root resorption of a maxillary non-vital immature incisor associated with an impacted and angulated mesiodens. The impacted tooth was surgically removed and the compromised incisor was subsequently endodontically treated. Over a period of 27 months the tooth was medicated with repeated applications of calcium hydroxide. Radiographically after 18 months, an incomplete hard tissue barrier was observed with full apical closure at the conclusion of 27 months of treatment. Once the patient was comfortable after surgical removal of the mesiodens, the tooth was asymptomatic and remained so for the duration of the treatment and after definitive restorative work had been completed.

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Key words: calcium hydroxide; impacted teeth; root resorption; supernumerary tooth

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Hyperodontia (supernumerary teeth) is defined as a dental anomaly with one or more extra teeth. It may occur when the developing teeth are influenced by a complex interaction of genetic and environmental conditions (1). When these conditions interfere with the initial stage of a tooth germ formation an extra tooth bud can be formed, resulting in the development of a supernumerary tooth or odontoma (1, 2). This anomaly may also develop because of continuous activity of the dental lamina or as a result of complete division of an early developed bud (3, 4). Supernumerary teeth may be located on one side of the incisal papilla or in between the central incisors, which is termed mesiodens. Mesiodens may be single or multiple, unilateral or bilateral and anatomically malformed or can be normal in size and shape (1). Their prevalence is generally reported to be from 1% to 3% (3) with an increased incidence in cases with cleft lip and palate (3, 5). It appears to occur more frequently in males and in many instances is responsible for disturbances in the eruption of maxillary central incisors (6). Mesiodens may not erupt spontaneously and radiographically they appear as impacted teeth. When impacted, they may be without clinical manifestations, however, they can also cause various pathological complications. These include vestibular or lateral root angulation and/or dilaceration (4), delayed eruption and root resorption of adjacent teeth (2), eruption into the nose (2, 7) and formation of cysts (8). This article reports on severe root resorption of a maxillary central incisor with incomplete root formation associated with an unusually impacted mesiodens and emphasizes the importance of early diagnosis and correct clinical management.

Case report

A 9-year-old white female was referred to the dental office complaining of intermittent episodes of pain associated with her maxillary left central incisor. Her medical and dental history was non-contributory, except for a traumatic episode involving the anterior region of the maxilla sustained at the age of seven. Clinical examination and palpation revealed a prominent soft tissue elevation in the labial vestibule near the apical one-third of the permanent central incisors. The cortical plate was tender to

Fig. 1. Occlusal radiograph showing the presence of an impacted mesiodens with angulated root. Note that the tooth was positioned horizontally with the tip of the crown near to the root of the left central incisor.

palpation. Periodontal probing of the maxillary incisors did not reveal significant pocket depths. However, the maxillary left central incisor exhibited slight mobility and an elevated response to percussion. The tooth did not respond to electric or thermal pulp tests. An occlusal radiograph revealed the presence of an impacted supernumerary tooth with a severely angulated root situated in the premaxillary midline area (Fig. 1). The tooth was positioned horizontally with the tip of the crown near the root of the left central incisor and it appeared that it was partially anterior to the roots of the central incisors. Incomplete root formation and severe root resorption of the left upper incisor were noted. The following diagnosis was made: trauma to the left upper incisor, caused by displacement of the impacted supernumerary tooth at an early stage of root development, resulting in pulpal necrosis and subsequent root resorption. The following treatment plan was proposed to the patient: surgical removal of the impacted tooth followed by non-surgical endodontic therapy of the maxillary left central incisor. The endodontic treatment would consist of instrumentation of the root canal and long-term calcium hydroxide treatment. Repair of the periapical tissues as well as formation of a hard tissue barrier at the apex would be monitored. After an informed consent was obtained from the parents, an oral surgeon performed the surgical procedure under local anesthesia. Upon elevation of a facial semi lunar flap, bone was removed under constant cooling with sterile saline using a surgical bur in a high-speed hand piece. With an elevator the impacted tooth was luxated and removed without difficulty. Care was taken to avoid unnecessary bone removal or damage to the adjacent roots. After the surgical areas were profusely irrigated with saline, the bone margins were smoothed and the flap repositioned and sutured. The sutures were removed 14 days postsurgery. The patient did not exhibited adverse effects and the soft tissues healed uneventfully. The endodontic treatment of the maxillary left incisor was initiated 6 months after surgery as the patient did not respond to repeated attempts to set up a next appointment. At that time the tooth was still slightly mobile with an increased sensitivity to palpation and percussion. Radiographic examination confirmed once more that the incisor had incomplete root formation along with areas of root resorption (Fig. 2). The maxillary right central incisor showed complete root-end closure and responded within normal limits to thermal and electric pulp tests. After administering local anesthesia, the tooth was isolated with rubber dam. Upon access to the root canal, the working length was determined. The canal was debrided with large Hedström files and irrigated with 2.5% NaOCl solution followed by copious rinsing with sterile saline. The canal was then dried with the thick end of paper points and filled with a combination of calcium hydroxide powder and iodoform, mixed with saline into a thick paste. The access cavity was sealed with Cavit (Espe, Seefeld,

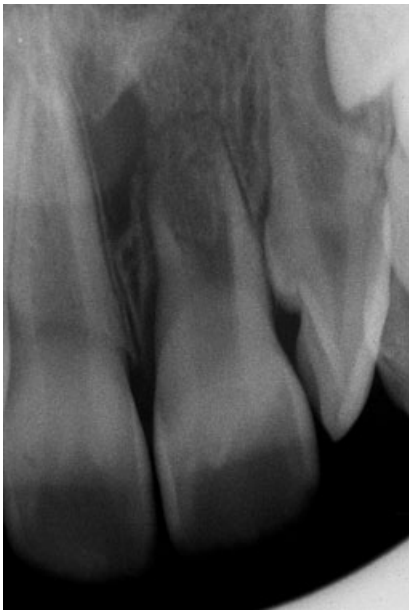

Fig. 2. Periapical radiograph of the maxillary left central incisor taken 6 months after extraction of the supernumerary mesiodens. The tooth had incomplete root formation along with areas of root resorption. Root canal morphology of the right central incisor is within normal limits with apexogenesis near completion.

Germany) and covered with a glass ionomer cement (GC Corporation, Tokyo, Japan). At a 14-day recall, the patient was clinically comfortable. It was decided to replace the calcium hydroxide/iodoform dressing every 3 months. At a recall appointment 18 months later the tooth was asymptomatic. Radiographic examination revealed that periapical repair had progressed but that hard tissue formation at the apex was still incomplete (Fig. 3). Treatment of a fresh calcium hydroxide dressings was continued and the patient was re-examined 27 months after initial treatment. At that time the tooth was still asymptomatic and all clinical tests appeared normal. Radiographs showed the presence of a dense hard tissue barrier at the apex and complete periapical healing (Fig. 4). The canal space was accessed and the calcium hydroxide dressing removed. Upon probing with a sterile no. 35 paper point the presence of a hard tissue barrier was confirmed. The canal was then re-instrumented and irrigated with copious amounts of calcium hydroxide irrigating solution, followed by rinsing with sterile saline. During instrumentation, care was taken to avoid disturbing the hard tissue barrier. Finally, the canal was dried and filled with a customized master gutta-percha cone complemented with laterally condensed gutta-percha and EndoRez (Ultradent Products Inc., South Jordan, UT, USA) as a sealer (Fig. 5). The access opening was temporized with the reinforced ZOE cement IRM (Dentsply/L.D. Caulk Div., Milford, DE, USA) and the patient was instructed to see her referring dentist for definitive restorative care. She returned after 30 days for a final follow-up examination and at that time it was determined that the tooth had remained asymptomatic and all clinical and radiographic findings were within normal limits.

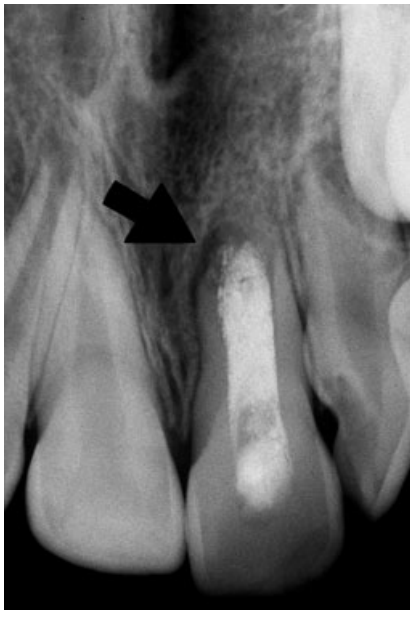

Fig. 3. Periapical radiograph taken 18 months after the initial endodontic treatment. Note the presence of an incomplete hard tissue barrier at the end of the root (arrow).

Fig. 4. Twenty 7-month recall radiograph indicating periapical healing and the presence of a complete hard tissue barrier. Note that the calcium hydroxide filling had been partially resorbed.

Fig. 5. Periapical radiograph of final root canal obturation.

Discussion

Supernumerary impacted teeth can be a cause of great concern as they can create various pathologi-

cal complications. Clinical examination, including labial and palatal palpation and radiographic assessment are essential to confirm the presence of impacted supernumerary teeth and their spatial relationship to adjacent teeth. There does not seem to be a clear consensus amongst various authors as to the optimum time for surgical removal (1, 9). Usually immediate removal after diagnosing the problem is recommended, as it is believed that early intervention contributes to a favorable prognosis with minimal complications (1). In this particular case, the presence of an impacted mesiodens had caused root resorption of the permanent left central incisor. No significant improvement in position of the mesiodens was anticipated and therefore it was decided that surgical removal of the impaction followed by long-term calcium hydroxide treatment of the permanent incisor was the treatment of choice. The use of calcium hydroxide as an intracanal dressing over extended periods of time is considered the treatment of choice for root resorption (10, 11). It has been demonstrated that calcium hydroxide used in combination with other medications offers effective antibacterial properties and stimulates periapical tissue repair (12, 13). The average time for a calcified barrier to form is approximately 9–18 months (10, 14). In the case reported here, however, the apical hard tissue barrier was still incomplete after 18 months. After 27 months of continuous treatment with calcium hydroxide, an apical hard tissue barrier had completely formed and the periapical tissues had returned to normal. Thus, the delay in the formation of a complete calcified barrier justified the extended calcium hydroxide treatment, while during this period of time the patient was comfortable and the tooth asymptomatic at all times.

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