

## Delayed eruption of maxillary permanent first and second molars due to an ectopically positioned maxillary third molar

M. John Hicks, DDS, MS, PhD    Catherine M. Flaitz, DDS, MS  
Robert O. Greer, Jr. DDS, ScD

### Abstract

*This clinical report describes an ectopically positioned maxillary third molar which prevented eruption of the maxillary permanent first and second molars.*

**D**elayed eruption of permanent teeth in children and adolescents has been categorized into three separate groups: (1) local factors; (2) systemic conditions; and (3) generalized delayed eruption.<sup>1</sup> Local factors responsible for delayed eruption are those which create a physical barrier to the eruption of the permanent tooth. Some of these factors are: (1) presence of a supernumerary tooth, (2) an odontoma, (3) odontogenic and nonodontogenic lesions, (4) retained primary teeth, (5) malformed primary or permanent teeth, (6) trauma to primary predecessors, (7) deficient arch length, (8) space loss due to caries or premature extraction, and (9) bone formation over a permanent tooth following extraction of a primary tooth.<sup>2-6</sup>

Several systemic conditions affect eruption of the permanent teeth. Delayed eruption of the permanent teeth can be expected with conditions such as cleidocranial dysostosis, Down's syndrome, hypothyroidism, and hypopituitarism.<sup>7</sup> Generalized delayed eruption is observed in a small percentage of the population who apparently do not have local or systemic factors which cause the delay. Eruption in these individuals follows the appropriate sequence, but is consistently later than the mean eruption times for the general population.

The prevalence of delayed eruption due to local factors has been determined for children and adolescents. Delayed eruption of one or more permanent teeth occurred in 4.3% of one pediatric population

studied. When delayed eruption due to premature extraction of primary molars was excluded from the data, 3.5% of the children still were affected with delayed eruption due to local factors. The age group most affected was the 11-year-old age group (24.4%). No differences were noted between males and females.<sup>1</sup> Disregarding impacted third molars, maxillary canines have been found to be most affected by delayed eruption with a prevalence of up to 2.5%<sup>8-10</sup> Mandibular second premolars showed a prevalence of 0.38%,<sup>9</sup> followed by mandibular canines with a prevalence of 0.01%.<sup>9</sup>

### Clinical Report

A 10-year, 7-month-old Caucasoid male was examined in the pedodontic clinic at the University of Colorado School of Dentistry. The chief complaint of the parents and the child was an "improper bite." The health history and physical examination revealed a healthy child with no significant medical or social histories and no history of orofacial trauma. Clinical examination of the mixed dentition revealed a Class III malocclusion with an anterior crossbite, occlusal caries, and pericoronitis associated with delayed eruption of the maxillary right first permanent molar. Only the mesiobuccal and distobuccal cusp tips of the maxillary right first permanent molar were present in the oral cavity.

A panoramic radiograph was taken in order to determine the reason for delayed eruption of the maxillary right first permanent molar. It revealed the presence of a calcifying third molar positioned ectopically and overlaying the second permanent molar in the maxillary right quadrant (Fig 1). The second molar was inclined more distally than its antimere and

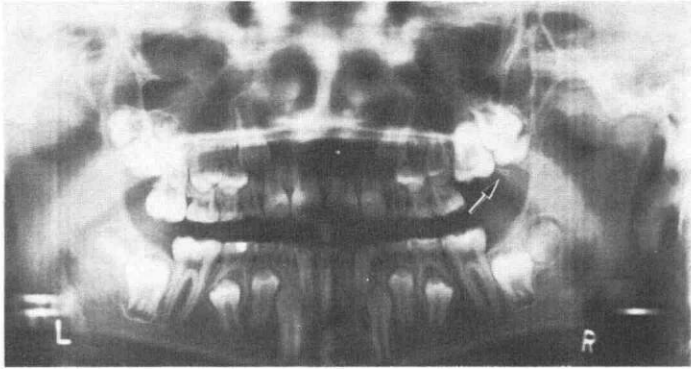


FIG 1. Panoramic radiograph reveals the local etiologic factor (arrow) responsible for delayed eruption of the maxillary right first molar. Note position of mandibular third molars relative to mandibular second molars.

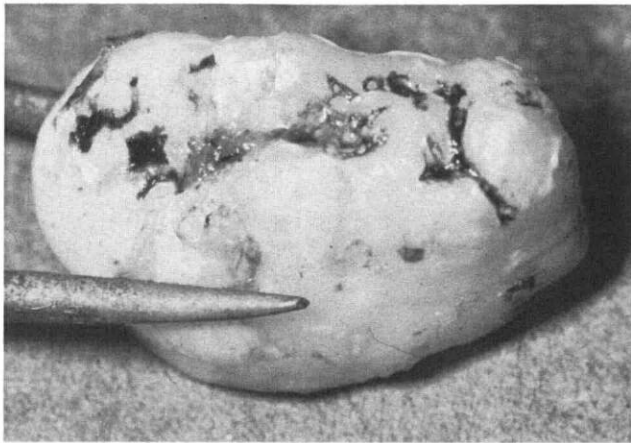


FIG 2. Appearance of calcified crown of maxillary right third molar following surgical removal.

was positioned superior to the developing third molar. The first permanent molar had less root formation than its antimere and was blocked physically from its eruption pathway by the presence of alveolar bone overlaying the ectopically positioned third molar and the permanent second molar. Radiographic examination of the mandibular arch revealed developing third molars bilaterally that were positioned superior to the developing second molars in the ascending rami. All other permanent teeth were present radiographically and appeared to be positioned such that a normal eruption sequence would occur (Fig 1).

The developing maxillary right third molar was removed surgically to enhance eruption of the first molar. The alveolar bone overlaying the third molar, along with its dental follicle (Fig 2) was removed. An apically positioned flap was used to expose partially the crown of the maxillary first molar. The dental follicle

and calcified crown of the third molar were submitted for histopathologic examination. Clinical exploration of the occlusal surface of the first molar proved the tooth to be caries free, indicating that the radiolucent area present on the radiograph represented an artifact.

Microscopic examination of the surgical specimen revealed several fragments of variably dense connective tissue stroma containing fibroblasts and a few vascular channels (Fig 3). Numerous aggregations of columnar and cuboidal odontogenic epithelial cells were associated with the dental follicle (Fig 4). Within the connective tissue, odontogenic epithelial rests and stellate cells representing the stratum intermedium were observed. In addition, several foci of partially mineralized osseous tissue were present. The histopathologic findings were indicative of and consistent with a hyperplastic dental follicle.

Follow-up examinations revealed eruption of the maxillary right first permanent molar and uneventful

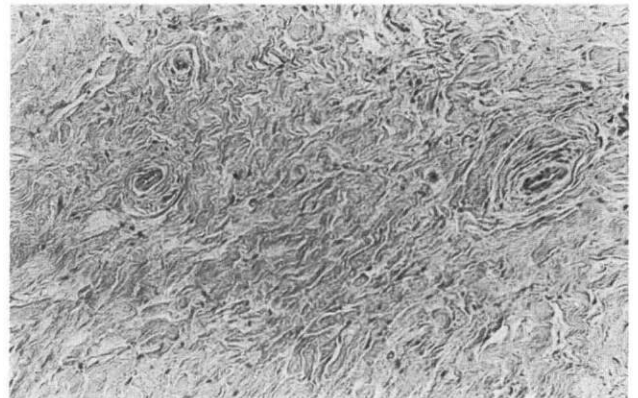


FIG 3. Dense connective tissue stroma containing fibroblasts and vascular channels. (H&E stain, 160x)



FIG 4. Columnar odontogenic epithelial cells (arrow) characteristic of a benign hyperplastic dental follicle. (H&E stain, 160x)

healing of the soft tissue; the first molar remained caries free. Three-month postoperative radiographs revealed that the first permanent molar had erupted into its proper place and that the second molar was progressing into a normal eruption pathway (Fig 5). Currently, the patient is undergoing orthodontic therapy.

## Discussion

When the pediatric patient with delayed eruption is encountered, the dentist must consider a number of etiologic factors. A thorough medical history may reveal possible systemic conditions related to delayed eruption. With systemic etiologic conditions, the primary and permanent dentition should follow a normal eruption sequence, but will be delayed in tooth development patterns and eruption. If systemic conditions are ruled out based upon histories, local etiologic factors which cause physical barriers to eruption pathways should be considered.

Both a clinical examination and radiographic survey should be completed. The clinical examination may reveal space loss due to premature extraction or interproximal caries, deficient arch length, malformed primary or permanent teeth, or the presence of a supernumerary or primary tooth retained past its expected exfoliation time. The radiographic survey should include a panoramic radiograph to determine if the etiologic factor is a localized problem. Further

radiographs may be indicated following examination of the panoramic film to locate and identify the etiologic factor more precisely. The radiographic survey may reveal the presence of supernumerary teeth, radiolucent or radiopaque lesions, trauma to the dentoalveolar process, bone formation over a permanent tooth due to premature extraction of a primary tooth, or soft tissue and osseous lesions that prevent eruption.

If a local etiologic factor — including a history of previous trauma — cannot be identified, the dentist must consider referring the patient to an appropriate medical professional for possible identification of a systemic etiologic condition. If both systemic and local etiologic factors are discounted, delayed eruption may be considered to be a generalized delayed eruption peculiar to that individual. In that case, eruption of the primary and/or permanent teeth should be affected by delayed eruption *in toto*. The eruption sequence should follow the normal pattern accepted for the general pediatric population; however, the development of the teeth will be delayed. The child's parents or siblings may have a history of delayed eruption.

If a local etiologic factor is identified, appropriate therapy should be instituted to allow eruption of the tooth into its appropriate position. Where partial or incomplete eruption has occurred, the situation must be corrected to avoid caries, malocclusion, pericoronal infections, periodontal and periapical lesions, and bone loss and root resorption involving adjacent teeth. If the tooth is impacted, dentigerous cysts and odontogenic lesions such as fibromas, myxomas, and ameloblastomas may develop.<sup>5,11,12</sup> The prevalence of radiolucencies and dentigerous cysts surrounding the crowns of impacted third molars has been reported.<sup>9</sup> An unerupted tooth also may cause malposition and root resorption of adjacent teeth and be a source for neuralgia or referred pain.<sup>11,12</sup> If surgical removal of the physical barrier is indicated, excised tissue should be submitted for histopathologic examination to ensure that it is benign and nonrecurring.

In the clinical case reported, pericoronitis was present in the maxillary right quadrant and associated with the exposed mesiobuccal and distobuccal cusp tips of the maxillary first permanent molar. The etiologic factor for delayed eruption was identified radiographically as an ectopically positioned third molar overlaying the developing second molar. The third molar and overlaying alveolar bone was removed surgically and submitted for histopathologic examination. Diagnosis of the surgical specimen revealed a hyperplastic, benign dental follicle. This patient has been followed and eruption of the first maxillary molar has occurred. Continued follow up

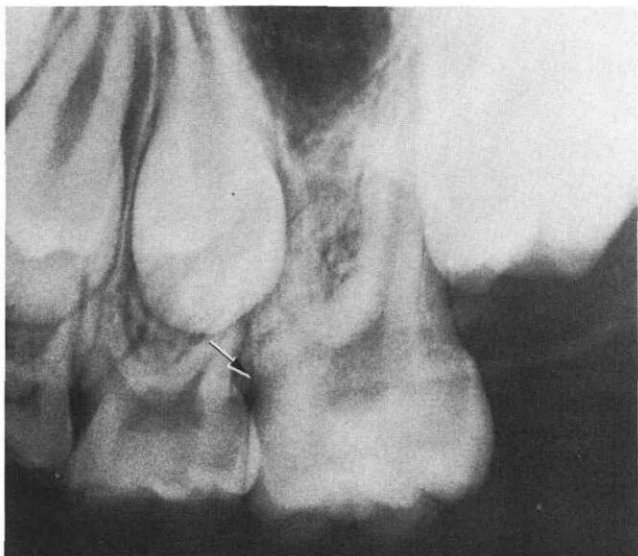


FIG 5. Maxillary first molar (arrow) has erupted into its proper position and the second molar is progressing into a normal eruption pathway. Follow-up radiograph taken three months after surgical removal of maxillary third molar and overlaying alveolar bone.

also will be necessary to ensure that the mandibular second molars erupt at the appropriate time due to the position of the mandibular third molars.

Dr. Hicks is an assistant professor, dental research unit and growth and development; Dr. Flaitz is an assistant clinical professor and is in the private practice of pediatric dentistry; and Dr. Greer is professor and chairman, biological and diagnostic sciences, School of Dentistry, University of Colorado Health Sciences Center, Denver, CO 80262. Reprint requests should be sent to Dr. Hicks.

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### **Quotable quote: helping hands for nation's troubled youth**

To many adults who look back on their youth with fond memories, it may come as a shock: Young people aged 15-24 are the only group in the United States with a death rate that is increasing.

From the suburbs of Dallas to the inner city of Detroit, from Oklahoma City to Boston, tragedies pile up from traffic accidents, homicide, suicide, unwanted pregnancy, and drug abuse.

Together, these factors account for almost 80% of the deaths in the 15-24 age group.

Now, authorities in several cities are taking aim at the problem with new programs to identify and assist "high risk" youth.

A target of several of these efforts is automobile accidents, the number one killer, claiming the lives of about 20,000 youths each year. Because most traffic deaths involve alcohol or drug use, health clinics and counseling centers are active in the effort to address the causes of death at an early age.

While such programs are geared to help teenagers grapple with a present-day crisis, authorities say the real benefits may be in the future as young people enter adulthood better prepared to cope with its frustrations.

Helping hands for nation's troubled youth. *U.S. News and World Report* 97:50. September 17, 1984.