

Case Report

A Unique Case of Primary Failure of Tooth Eruption with Mandibular Deformity

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Abstract : Primary failure of tooth eruption, which is extremely rare, has serious consequences and several possible causative factors. Teeth in the posterior quadrants of the upper and lower jaw are preferentially affected and when it occurs it usually results in an open bite extending from anterior to posterior. We report the case of a 29-year-old female patient who presented with primary failure of tooth eruption and mandibular deformity. The patient, who had no family history of tooth eruption failure, presented with impactions of the mandibular left molars. We discuss the clinical and radiographic features of this patient and describe the limitations of treatment for patients with eruption failure.

Key words : primary failure of tooth eruption, mandibular deformity, ankylosis

Introduction

Both genetic and environmental factors are involved in tooth eruption, disturbances of which can occur at any stage of development¹⁾. Defective eruption has been linked to cysts, other teeth, bone features, unfavorable tongue posture, and a digital habit²⁾. Although any tooth of the human dentition can remain un-erupted or become impacted³⁾, there have been few reports⁴⁻⁶⁾ of the mandibular first, second and third molars impacting together, and the cases all involved adolescents. We describe the case of a 29-year-old female with primary failure of tooth eruption and rare clinical features.

Case Report

The patient was a 29-year-old female with mandibular deformity and chewing dysfunction (Fig. 1). She had no family history of tooth eruption failure and her medical history and physical examination were unremarkable. The laboratory test values, including bone metabolism parameters, were within the normal ranges. The patient was well-nourished and there were no abnormal extraoral findings. The first molar was impacted vertically, and the second pre-molar and second molars were rotated (Fig. 2). Panoramic radiography revealed impactions of the mandibular left molars, and indistinct delineation of the periodontal membrane was observed for several teeth (Fig. 3). The anterior-posterior maxillo-mandibular



Fig. 1. Facial photographs



Fig. 2. Intra-oral photographs



Fig. 3. Panoramic radiography. The indistinct delineation of the periodontal membrane was found in several teeth.

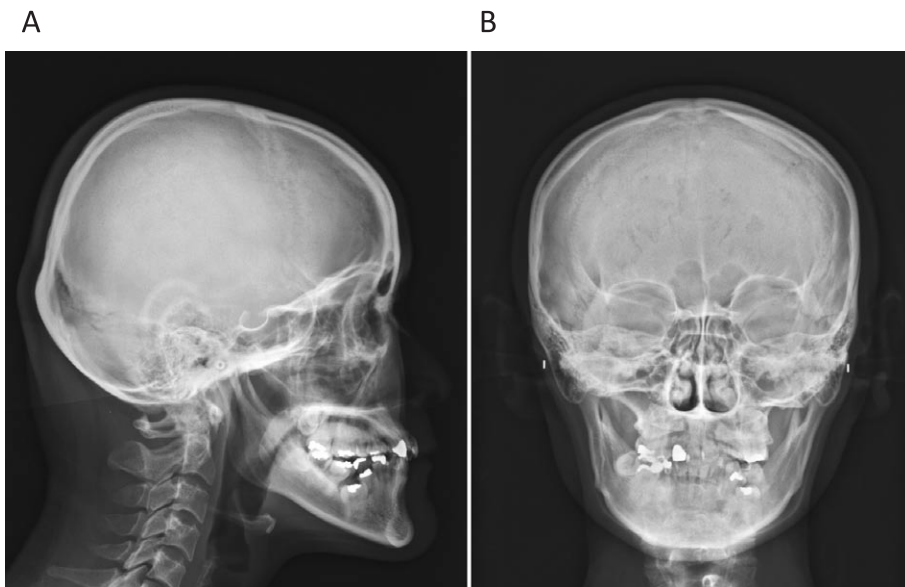


Fig. 4. Cephalograms

A : The lateral cephalogram showed skeletal Class III pattern. B : The postero-anterior cephalogram presented an asymmetric facial contour.

relationship was classified as skeletal Class III owing to overgrowth of the mandible (Fig. 4 and Table 1). Labial inclination of the upper incisors and lingual inclination of the lower incisors were evident (Table 1). The normal values listed in Table 1 are derived from the report of Iizuka and Ishikawa⁷⁾. The postero-anterior cephalogram revealed an asymmetrical facial contour (Fig. 4). The infra-occluded teeth showed no mobility and produced a dull sound on percussion. These findings led to a diagnosis of primary failure of tooth eruption, multiple ankylosed teeth, and reduced alveolar bone height.

Table 1 Cephalometric analysis

	Patient	Norm
Angular (°)		
SNA	82.1	82.3
SNB	81.9	78.9
ANB	0.3	3.4
Gonial angle	127.4	121.2
Ramus inclination	78.5	87.1
Occlusal plane angle	2.8	11.4
U-1 FH plane angle	123.7	111.1
FMA	25.9	28.8
IMPA	82.9	96.3
FMIA	71.2	54.6
Linear (mm)		
A'-Ptm'	48.0	48.3
Gn-Cd	126.8	119.3
Pog'-Go	87.2	77.2
Cd-Go	57.0	62.4

FMA : Frankfort-mandibular plane angle ; LI-MP : Lower incisor-mandibular plane angle.

Discussion

Stellzig-Eisenhauer *et al*⁸⁾ defined “primary failure of eruption” (PFE) as the complete or partial failure of a primary non-ankylosed tooth to erupt due to a disturbance of the eruption mechanism. Clinical diagnosis of ankylosis is based on subjective appraisals of mobility and percussion sounds. However, ankylosis is difficult to determine unambiguously when fusion occurs exclusively in a small area or on the buccal or lingual surface. However, extensive ankylosis can be detected in dental radiographs⁹⁾.

In PFE, the affected teeth fail to erupt to meet their counterparts in the opposite jaw on the appropriate occlusal plane. When ankylosis occurs in multiple teeth, the occlusion results in an open bite^{10,11)}. PFE is very rare¹²⁾. The frequency of first or second molar impaction is considered to range from 0.03% to 0.06%, while that of first molar impaction is less than 0.01%^{13,14)}. Multiple impactions occur less frequently than single impactions for deciduous molars¹⁵⁾. The incidence of ankylosis is higher for deciduous teeth than for permanent teeth, and is higher among Caucasians than among Asians^{9,16)}.

Even though the etiology of tooth impaction is not fully understood, it is generally accepted that both local factors and systemic conditions play central roles in the disruption of tooth eruption^{3,17)}. Changes in local metabolism, trauma, injury, and infection have been implicated¹⁸⁾. Several investigators believe that genetic predisposition has a significant influence on tooth impaction¹⁹⁾. Pelias and Kinnebrew¹¹⁾ reported on the familial occurrence of multiple ankylosed teeth. The proband (defined as the first individual in a family brought

to the notice of the researcher, and through whom the investigation of a pedigree is initiated owing to the presence of a specific trait, the inheritance of which is to be studied) of their report was a 32-year-old female who had a bilateral lateral open bite caused by multiple ankylosed teeth. Systematic evaluation revealed the simultaneous occurrence of mild bilateral clinodactyly of the fifth fingers. There was a family history of multiple ankylosed teeth and 12 affected persons were identified across four generations. Dental abnormalities and mild mandibular prognathism was found in some of the affected individuals. Based on the pedigree analysis, Pelias and Kinnebrew¹¹⁾ concluded that these abnormalities were transmitted in an autosomal dominant manner. In our patient, there was neither a history of specific disease related to bone metabolism nor definitive involvement of local factors, such as deficient dental arch length, presence of a developmental cyst or tumor, or history of trauma or of local pathosis.

Treatment strategies for PFE include luxation, reimplantation, prosthetic buildup, osteocortotomy, and extraction^{20,21)}. For our patient, orthodontic tooth movement was considered to be impossible based on the clinical examination. Surgical intervention, e.g., segmental alveolar bone osteotomy, was therefore indicated in this patient¹⁰⁾ for treatment of primary failure of tooth eruption and ankylosed teeth^{20,22)}. In recent times, bone distraction has become popular for the treatment of patients with cleft lip and/or palate, hemifacial microsomia, and syndromic craniosynostosis²³⁻²⁵⁾. This technique can also be applied to alveolar ridge augmentation, to facilitate the placement of dental implants^{26,27)}. Several groups have reported on the treatment of an ankylosed central incisor using a distraction osteogenesis technique²⁸⁻³⁰⁾.

Mandibular deformity, which was the major concern of our patient, requires sagittal split ramus osteotomy. As this region of the mandible appears to be susceptible to infection or pathologic fracture, care must be taken both during and after surgery to remove the impacted molars. Removal of at least the mandibular first molar teeth will be required.

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