



# Unilateral Open-bite Caused by an Impacted Primary Molar with Ankylosis: A Case Report

○ Issei Saitoh<sup>1)</sup>, Satoshi Fukumoto<sup>2)</sup>, Yoko Iwase<sup>1)</sup>, Haruaki Hayasaki<sup>1)</sup>, Youichi Yamasaki<sup>3)</sup>

1) Division of Pediatric Dentistry, Graduate School of Medical and Dental Science, Niigata University

2) Department of Pediatric Dentistry, Tohoku University Graduate School of Dentistry

3) Department of Pediatric Dentistry, Kagoshima University Graduate School of Medical and Dental Sciences

## Introduction

Asymmetric craniomandibular morphology during growth causes kinematic disability. Subsequent growth can also increase the asymmetric morphology and kinematics, making late treatment difficult. Open-bite, defined as a lack of tooth contacts in maximal intercuspal position (MICP), is often observed clinically. In many cases, the open-bite malocclusion is in the anterior teeth because anterior open-bite is associated with abnormal oral habits, tongue-thrust, respiratory disturbances and posterior discrepancy. Takahashi et al. mentioned that an abnormal tongue position at rest, and during daily function, can cause certain types of malocclusion, including anterior open-bite<sup>1)</sup>. On the other hand, posterior open-bite can be caused by impaction or infraocclusion of upper molars, lower molars or both.

The incidence of submerged or impacted primary teeth is higher than that of permanent teeth<sup>2)</sup>. Submerged primary teeth potentially cause many problems during the growing period (e.g., delayed exfoliation, increased difficulty of extraction, progression of submergence, delayed eruption of successor teeth, damage to adjacent teeth, malocclusion, and craniofacial growth). Most submerged primary teeth have ankylosis of the root<sup>3)</sup>. In this case report, we present the consequences of ankylosis on the clinical treatment of a unilateral posterior open-bite.

## Case summary

A 7-year and 9-month-old girl had the chief complaint of unilateral (right) posterior open-bite. On initial examination, her right upper and lower teeth (primary canine, first and second primary molars and first permanent molar) lacked tooth contacts in MICP (Figure 1). Her upper right second premolar was shifted into a mesio-superior position (Figure 3-A). Her second primary molar was impacted, with ankylosis of the buccal roots observed radiographically, (Figure 2) by percussion sound and by the lack of normal mobility. The palatal root of her second primary teeth were close to the crown of her second premolar (frontal view), and they extruded partly into her maxillary sinus (sagittal view). Her mother did not remember whether her upper right second primary molar had been injured. Her family had no history of ankylotic teeth or lateral open-bite. The girl's upper right first molar was mesially shifted and tipped. She could not move her right condyle as far as her left condyle. She usually had her tongue thrust against the right posterior teeth, but her tongue size was normal (Figure 4-C-1). Her right upper and lower teeth were infraoccluded compared with her left teeth.

No space discrepancy was found in her lower dentition, but her right upper dentition had a discrepancy of about 3.0 mm. She had several abnormal skeletal patterns compared with the mean values of Japanese girls: an SNA of 76.2 degrees (Normal:  $80.2 \pm 3.2$  degrees), an ANB angle of 1.5 degrees (Normal:  $3.8 \pm 1.5$  degrees), a deep overbite and a Class II tendency.



Figure 1: Pretreatment intraoral photographs

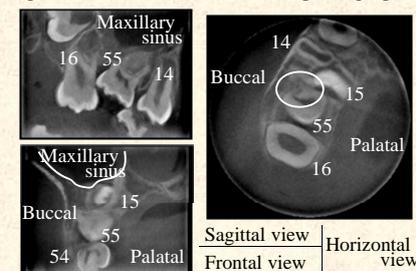


Figure 2: Pretreatment Computed Tomography

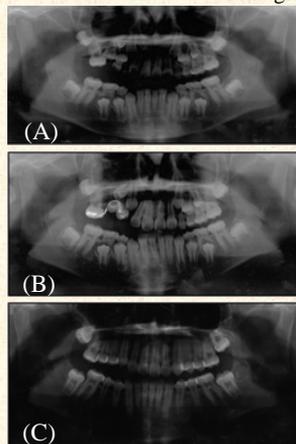


Figure 3: Panoramic radiographs: (A) pretreatment, (7y9m), (B) the upright of upper right first molar (7y11m), and (C) after initial treatment of right posterior teeth (8y5m).

## Treatment progress

Treatment was initiated with the following procedures. The first was to upright the upper right first molar and extract the first primary molar before extracting the impacted second primary molar (Figure 2-sagittal view and 4-A-1, 2). After two months, the upper right first molar was uprighted and moved distally about 3.0 mm, to ensure enough extraction space for the upper right second primary molar (Figure 3-B and 4-B-1, 2). The second primary molar was then extracted by dividing it into buccal and palatal parts (Figure 4-B-3). The buccal part, with the ankylosis, was extracted first, and the palatal part was extracted carefully to prevent fracture of the palatal root due to its close proximity to the crown of the second premolar (Figure 2 frontal view). The lingual arch was integrated with a tongue-thrust fence to eliminate pressure from the tongue and to elongate the upper and lower right molars through self-eruption (Figure 4-C-1, 2, 3). The second premolar erupted naturally within five months after the extraction of the impacted second primary molar as a result of twice fenestrating the gingiva and alveolar bone (Figure 5). The posterior unilateral vertical open-bite was corrected and a multiloop appliance was used for final alignment (Figure 6, 7). The total active treatment period was 38 months.



Figure 4: A-1: initial stage A-2: the uprighting apparatus on the first molar. The ankylotic first deciduous molar served for anchorage. B-1, 2: the uprighted first molar and the space for the extraction of second deciduous molar. B-3: extracted second deciduous molar. C-1: tongue thrust at the right posterior teeth. C-2, 3: Lingual arch with the fence for controlling tongue thrust.



Figure 5: Intraoral photographs (8 y 5 m)



Figure 6: Intraoral photographs (10 y 9 m)



Figure 7: Intraoral photographs after treatment

## Discussion

The aetiology of submerged primary molars is not known and the optimal treatment has still not been established. In this case, an asymmetric position at the upper right second premolar relative to the upper left was observed at the first examination (Figure 1). The treatment plan must consider the degree of submergence and the age of the patient. Extraction too early can cause space loss, requiring future orthodontic treatment. But many clinicians believe that unilateral open-bite in the posterior teeth should be treated early to prevent increasingly asymmetrical craniofacial growth. On the other hand, final alignment of the permanent teeth depends upon whether the permanent successor is present or absent. There is an optimal period to treat the submerged teeth even if the patient has some severe problems. We decided that enough self-erupting force of the second premolar remained because this patient was at the age of the change from the primary molar to the secondary premolar. This was an ideal time to perform actively accelerated eruption of the second premolar by extracting the second primary molar with fenestration. This result demonstrates the importance of treating primary molar with root ankylosis and improving oral habits in the optimal period of growing children.

## Reference

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