

## Bilateral posterior open bite due to failure of primary eruption-a treatment approach

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### Abstract

Posterior open bite is a challengeable anomaly and the treatment outcome depends very much on its etiology. In the present case, we describe the therapeutic management of a bilateral posterior open bite due to failure of eruption of molars and premolars. Moreover, the patient had partially reincluded deciduous molars, all four second premolars anodontia, a biretrusive profile and high angle facial pattern. Before starting the orthodontic treatment, the patient was removed all deciduous molars, following MBT brackets bonding aiming for tractioning down to the occlusal plane the upper right molars, closing all the spaces, flatten the curve of Spee and protrude both arches. After the active treatment (2 years and 10 months), essix retainers were given to wear 12/24. Assessment of the medical and dental history, trauma or other clinical conditions resulted in a therapeutic diagnosis that could be addressed with the proper orthodontic treatment achieving satisfactory results.

**Keywords:** Posterior Open Bite, Failure of Primary Eruption, Premolar Anodontia.

### Background

Posterior open bite is one of the most severe dental anomalies which alters greatly the primary function of teeth mastication. Subjects suffering of this pathology often complain of inability to chew and so other related complications arise. Even so, this condition is not well understood and poorly studied. Posterior open bite may be a consequence of failure teeth eruption, involving mechanical failure of eruption and primary failure of eruption [1]. Mechanical failure of eruption is usually triggered by ankylosis the cementum is bonded to the alveolar bone causing teeth eruption deficiency. In most cases it affects one tooth and responds to surgical luxation and orthodontic treatment [2]. Primary failure of eruption is partial eruption of non-ankylosed teeth because of a malfunctioning eruption mechanism [3] this condition affects several posterior teeth including all teeth distal to the most anterior affected tooth showing infraocclusion [3] Bilateral primary failure of eruption seems to be less than two times more frequent than unilateral [4].

In this case we describe the therapeutic management of a bilateral posterior open bite due to failure of eruption of molars and premolars. Patient's both parents consent was obtained for publication of the report and use of photographs.

### Diagnosis

The 14 years old girl referred to our clinic by her dentist for

evaluation of ankylosed deciduous molars, anodontia and bilateral posterior open bite. The medical history showed no major disease or dento-facial trauma and the patient was in a clinical good state of health. Her parents did not recall any family history of tooth eruption failure or anodontia.

Orthodontic examination of the patient revealed a moderate amount of facial asymmetry consisting of entire left hemiface (except for the lips) situated upper than the right one. The lips are quite opposite: the left Cheilion is lower than the right one but when smiling they fit the facial pattern-figures 1 and 2. The profile is slightly convex, quite balanced-figure 3.



Figure 1



**Figure 2**



**Figure 3**

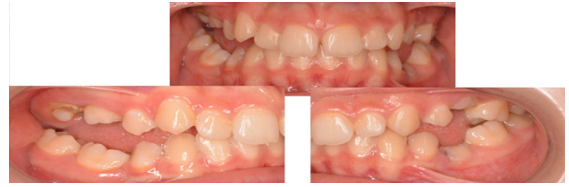
Intraorally as we can see in the figure 4-the upper right first permanent molar is partially erupted, both left second deciduous molars are partially reincluded and lower right bicuspid is missing. Percussion of the upper right first molar evoked a regular dull sound, indicating that ankylosis was unlikely [5].



**Figure 4**

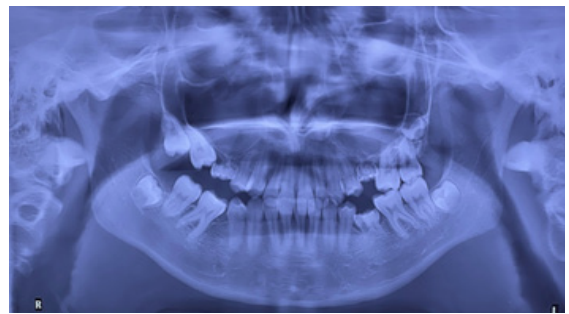
When checking occlusion-figure 5-we can look at asymmetrical posterior open bite: both sides bicuspids and right side molar open bite. Also, lower arch is slightly constricted, and the inferior

midline deviated to the right which is not concerning taking into consideration that the space for right lower second bicuspid is totally closed. The curve of Spee is deep on both sides.



**Figure 5**

A panoramic radiograph (figure 6) confirmed our suspicion of all four second bicuspid anodontia and showed us the inclination of both upper right molars as well as a very low maxillary sinus, practically descending onto the mesial face of the upper first molar which seems to be blocked by the deciduous molar.



**Figure 6**

Lateral cephalometric X-ray-figure 7 and 8-revealed a biretrusive profile:  $SNA=76^\circ$  and  $SNB=72^\circ$  but convex, as we expected from the facial examination-the ANB angle is  $4,5^\circ$ .  $SN-MP$  is  $42,2^\circ$ , quite an increased value, as well as the  $FMA-34,9^\circ$ , so our patient is hyperdivergent. Both upper and lower incisors have a retruded position, more retruded the lower incisors- $IMPA (-1/MP)=84,2^\circ$ . These findings indicated a high angle facial pattern with clockwise rotation of the mandible.



**Figure 7**

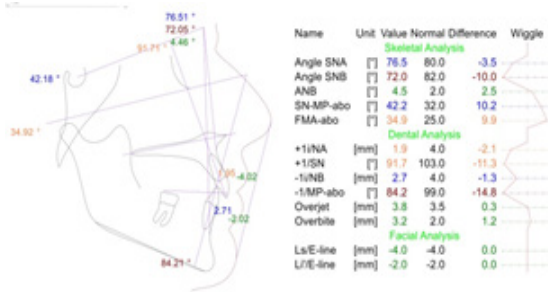


Figure 8

Based on all the data gathered from the clinical examination, panoramic X-ray and lateral cephalometric X-ray, we could diagnose class I malocclusion with bilateral posterior open bite and all four second bicuspid anodontia.

### Problem list and treatment objectives

In this particular case, the problem list is the following: 1) Failure of eruption for the right upper molars; 2) Partially reincluded second deciduous molars; 3) all four second premolars anodontia; 4) Lower midline shifted to the right; 5) a very low maxillary sinus, practically descending onto the mesial face of the upper first molar; 6) A high angle facial pattern; 7) Biretrusive profile.

In order to address all of the problems above, the treatment plan was elaborated: 1) Extraction for all the deciduous teeth was indicated in order to create space for alignment; 2) Low forces fixed orthodontic treatment was preferred, aiming to delicately traction down to the occlusal plane the upper right molars, close all the spaces and regulate the midline, flatten the curve of Spee and protrude both arches.

### Treatment

Before starting the orthodontic treatment, the patient had extracted all deciduous molars, so we had the space we needed for the permanent upper right molars to erupt. Subsequently a 0,022 inch slot MBT brackets were bonded to commence the orthodontic treatment. The right upper first molar was also bonded, leaving the second one for later on. Levelling the teeth took about 5 months, time also used for the mesialisation of the upper right first molar. After 10 months into treatment, the upper right second molar began eruption by itself. At 12 months into treatment we bonded it and three months later the second molar was also aligned on the maxillary arch. Afterwards we focused on closing all the spaces left (due to all four second premolar anodontia) as well as regulating the midline which was not difficult taking into consideration it was shifted to the right, where the inferior space was naturally closed figure 10. The intercuspation was not satisfactory at this stage of the treatment, so the patient was given lateral vertical elastics for the last 3 months before debonding the brackets.

### Treatment results

The active treatment period time was 35 months, 33 appointments. The intraoral photographs at the end of the treatment-figure 9-show us the neutral occlusion, which was achieved, the closing of the spaces while maintaining the class I. The intercuspation is now satisfactory, the overjet and overbite are within neutral values. One can also notice the correspondence of the midlines. The panoramic

X-ray-figure 11-was taken just before removing the braces and it showed us the root parallelism, which was also satisfactory, as well as the presence of the third molars needing to be long-term monitored. Essix retainers were given to wear 12 hours daily and the patient was instructed to return for a check-up after 6 months.



Figure 9

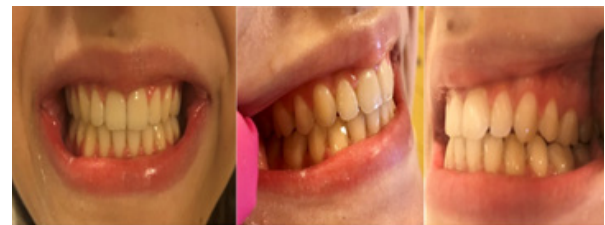


Figure 10



Figure 11

### Discussion

Failure of the upper molars to erupt is very rare the prevalence in the population in 0,01% for the first molar and 0,06% for the second molar [1,6]. Different treatment approaches and procedures have been proposed based on dental and medical patient's history, preceding trauma, functional difficulties and different clinical circumstances [7-12]. In this particular case there were no systemic diseases, nor prior trauma or other functional habit, but the eruption seemed blocked by the deciduous second molar. Percussion of the first molar produced a normal dull sound and a mobility within normal ranges, implying that ankylosis was improbable. Infraocclusion of the left premolar and right molars were detected indicating primary failure of eruption [1].

A genetic cohort study has showed that the first molar is affected in 93% of the cases, the second bicuspid and the second molar are also often implicated [11]. In this case report the patient and her family were hesitant in having a genetic analysis completed to achieve a definitive diagnosis [11-18]. However, the clinical findings still indicated primary failure of eruption for the first

molar, but the ankylosis was also clinically excluded, so the approach was conservative and consisted in orthodontic extrusion. As a result, they responded well to low orthodontic forces, so levelling the teeth into the normal occlusal plane was possible only with conventional orthodontic appliance and not with temporary anchorage devices as described in many posterior open bite protocols by different authors [19-22]. In this particular case we have chosen the simple path but always keeping in mind other options, as well as informing the patient from the start that mini-implants might be needed [23,24].

## Conclusion

When treating an open bite case it is highly important to discover the etiology in order to treat it in the most satisfactory way, with best results. The clinician should carefully consider all data from both medical and dental history in order to discover prior dental or cranio-facial trauma, vicious habits and other clinical conditions that may indicate an open bite etiology.

Still, for a better diagnosis of primary failure of eruption, a genetic analysis is required and it would be very useful for both the patient and the clinician in creating a treatment plan for successfully solving the “problem list”.

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