



An Alternative Approach to Bilateral Maxillary Second Premolar Space Opening: Case Report

Abdoul Hafizou Rabé, Samir Mainassara Chekaraou, Ali Amadou, Abdoul Majid Habibou, Mahamadou Dandi Abarchi

Odontology Department, Niamey Military Hospital, Niamey, Niger

Email: abdoulrabeamani@gmail.com

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Abstract

This article presents a case study on a 9-year-old male with bilateral impacted upper second premolars due to lack of space in the maxillary arch. Early orthodontic treatment involved maxillary expansion and open-coil springs, leading to successful space creation and alignment of the premolars. After 18 months, the treatment concluded with stable and aesthetically pleasing results confirmed by four-year follow-up.

Subject Areas

Dentistry

Keywords

Anchorage, Case Report, Distalization, Impacted Teeth

1. Introduction

One of the causes of delayed or failed eruption of permanent teeth is the absence or lack of space in the maxillary arch. This is most often due to early extractions of primary molars following dental caries or trauma [1]-[3].

The incidence rate of premolar impaction is estimated at 0.5%, with less impaction in the maxilla than in the mandible. Simple complications related to premolar impactions, such as subsequent dentigerous cysts or odontogenic keratocysts, can occur. Other serious complications, such as squamous cell carcinoma or mucoepidermoid carcinoma, are feared [1] [4]-[6]. Early diagnosis and rapid treatment to open the dental space are essential to avoid this significant risk, especially in a young patient.

Our case aims to show the space opening of a rare case of two upper premolars through early orthodontic treatment.

2. Diagnosis and Treatment

A 9-year-old male presented with the symptom of missing or unerupted upper second premolars. This condition, along with his bilateral Class I canine and molar relationships with the lateral maxillary incisors in a palatal position (**Figure 1**), led to an unsightly smile and a lack of school integration, significantly impacting his daily life. Radiography (**Figure 2**) revealed a complex orthodontic case with bilateral impacted maxillary second premolars. The lack of space in the maxillary, particularly on the left side (7 mm) compared to the right (4 mm), adds a layer of challenge to this case.



Figure 1. Occlusal view of the maxillary arch.

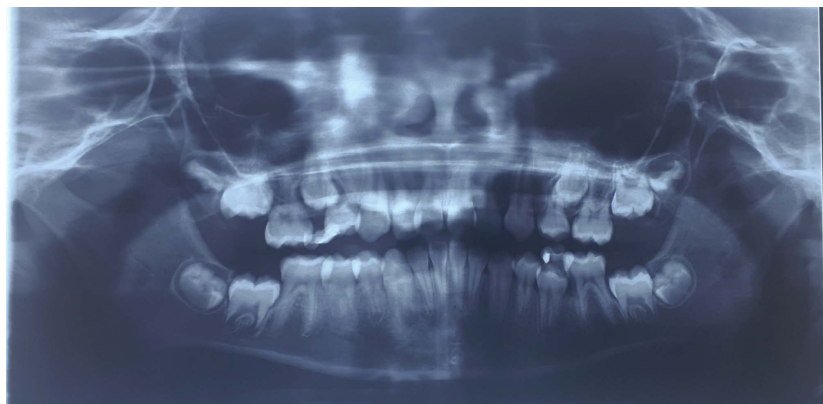


Figure 2. Radiography revealing bilateral impacted maxillary second premolars.

The treatment plan was meticulously designed and executed, starting with maxillary expansion through the transpalatal arch, followed by the extraction of the 55 and the bilateral opening of the spaces of both the right and left second premolars using open-coil spring.

Following the maxillary expansion and the extraction of the 55, a significant milestone was reached when a 0.016" × 0.022" stainless steel archwire was inserted after four months of initial leveling on 0.014", 0.016", and 0.016" × 0.022" nickel-titanium archwires. This marked the beginning of the bilateral opening space with the open-coil springs (**Figure 3**) between the first molar and first premolar to open and maintain adequate space for the second premolars.

The progress of impacted tooth movement was regularly and meticulously evaluated on a monthly basis. Nine months later, the crown had been sufficiently inserted in its places to replace the bracket, and a segmental 0.014" nickel-titanium wire was inserted for alignment (**Figure 4**).

After 18 months of treatment, a significant milestone was reached when the fixed appliances were successfully removed. This was followed by the bonding of an upper and lower 3-3 lingual retainer wire (**Figure 5**). Follow-up records taken four years after treatment confirmed the stability of the results, marking the successful completion of the treatment.



Figure 3. Open-coil springs between the first molar and first premolar.



Figure 4. Alignment of the upper second premolars.



Figure 5. Bonding of an upper and lower 3-3 lingual retainer wire.

3. Discussion

Open space is generally considered the best treatment approach for an impacted premolar. Surgical intervention is more problematic with a retained tooth [7].

Traumatic injuries and prematurity extraction are believed to be the most common causes of impacted posterior teeth [7]-[9]. There was no history of facial or jaw trauma in our patient, but a premature extraction of the 65.

The older the patient, the more likely an impacted tooth will not erupt by natural forces alone, even if the space is available for the tooth to fit in the dental arch [8]. We opted for a precocious open-space technique, which delivers not only spontaneous eruption of both maxillary second premolars but also functional and aesthetically pleasing results in our practice, much to the satisfaction of our patient.

Some studies [10] [11] have reported a relatively high prevalence of gingival defects in impacted teeth, which may require adjunctive post-orthodontic periodontal surgery. This additional surgery, performed after the orthodontic treatment, is aimed at correcting any gingival irregularities to achieve an esthetic gingival contour.

After orthodontic treatment, our patient's exposed premolar gingival contour was acceptable and functionally pleasing, eliminating the need for further mucogingival surgery, much to the relief of our patient and us.

4. Conclusion

As this case demonstrates, the open space technique, combined with an open coil spring and orthodontic treatment, can be a very effective solution for impacted bilateral maxillary premolars when the principles of biomechanics are rigorously applied. The harmonious smile and functional chewing found at the end of treatment allowed perfect social and academic integration for this young patient.

Conflicts of Interest

The authors declare no conflicts of interest.

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