

## Orthodontic Management of Anterior Malocclusion Related to Mesiodens: Case Report

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### Abstract

Mesiodentes is the most commonly occurring supernumerary tooth, located in the maxillary central incisor region. Maxillary incisor eruption and alignment is commonly affected by the presence of mesiodentes. The recommended method of extracting mesiodentes is based on their occurrence in the dentition period. Extraction during the early, mixed-dentition period minimizes the complications of the eruption and alignment of maxillary incisors. Delayed extraction of a mesiodens might result in malaligned maxillary incisors, which require more complex orthodontic treatment. Case Description: This case report describes the management of anterior malocclusion related to mesiodens in two patients aged 11 and 12-year-old. Discussion: The type of mesiodentes in these cases were conical. Fixed-orthodontic appliances become a treatment option because the complexity of these case. In these case, malocclusions were corrected in eight to nine months. Conclusion: Fixed-orthodontic appliances can treat these malocclusion successfully in shorter time than removable-orthodontic appliances.

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### Introduction

A mesiodens is a supernumerary tooth located in the premaxilla between the two central incisors. It is the most common type of supernumerary tooth and may appear as single, multiple, unilateral, or bilateral. The prevalence of mesiodens ranges between 0.15% and 3.9%.<sup>1</sup>

Various hypotheses and speculations have been documented describing the etiology of mesiodentes. The atavism theory claims that mesiodentes represent a phylogenetic relic of extinct ancestors who had three central incisors. A second theory, known as dichotomy theory, suggests that split tooth germs result in the formation of a mesiodens. The third theory, hyperactivity of the dental lamina, is the most supported one. According to this theory, palatal offshoots of active dental lamina are induced to develop into an extra tooth bud, which result in mesiodens. Mesiodens have also been seen to

be present in siblings, twins, and generations of a single family, indicating the possible role of genetics. A sex-linked pattern has also been proposed as males are more affected than females.<sup>2,3,4</sup>

Mesiodentes can be classified by their occurrence in the permanent dentition (rudimentary mesiodentes) or the primary dentition (supplementary mesiodentes) and according to their morphology (conical, tuberculate, or molariform). Supplementary mesiodentes resemble natural teeth in both size and shape, whereas rudimentary mesiodentes exhibit abnormal shape and smaller size.<sup>2,5</sup>

Conical mesiodentes are usually singular, peg-shaped, and located palatally between the maxillary central incisors. They have a completely formed root and can erupt into the oral cavity, therefore, they tend to displace the erupting permanent central incisors. Tuberculate mesiodentes are barrel-shaped with several tubercles or cusps and have incomplete tooth formation. They rarely erupt but rather delay the eruption of maxillary permanent incisors. Molariform mesiodentes have a premolar-like crown and a completely formed root.<sup>2,6</sup>

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Mesiodentes frequently interfere with the eruption and alignment of the maxillary incisors. They can delay or prevent the eruption of central incisors, cause ectopic eruption, displace or rotate a central incisor. If un-erupted, mesiodentes can alter the eruption of permanent incisors and, as a result, cause malocclusion.<sup>4</sup>

## Case report

### Case1

An 11-year-old boy was brought by his father to the pediatric dental clinic of Universitas Indonesia, Jakarta, with a complaint of malaligned teeth in the upper front region of the mouth. The child was asymptomatic and medically fit. An oral examination of this child revealed the presence of a mesiodens at the palatal aspect of the maxillary permanent incisors. A diastema was seen between the maxillary central incisors and both lateral incisors was palatally placed in the maxillary arch. The patient had a permanent set of teeth (figure 1). The treatment plan for this patient was to extract the mesiodens followed by orthodontic treatment with a fixed orthodontic.



**Figure 1.** Occlusal view of dental arch (a) Before extraction of mesiodens, (b) during orthodontic treatment, and (c) after correction of anterior cross bite.

After extracting the mesiodens, the anterior cross bite was treated using a fixed-orthodontic appliance. A 0.022" Roth prescription slot bracket was bonded onto the teeth. The initial wire for aligning was 0.012" NiTi

arch wire. Open coil springs were inserted into the wire between the central maxillary incisors and canines to regain space. After sufficient space for the lateral incisors was created, unraveling was performed using a 0.014" NiTi arch wire. The patient's bite was raised on both sides by bonding glass ionomer cement on the occlusal surface of the mandibular first permanent molars. This bite raiser was removed when the anterior cross bite was corrected. Correcting the lateral incisors cross bite took eight months using this treatment option (figure 2).



**Figure 2.** Occlusion before, during, and after treatment with fixed appliance.

### Case 2

A 12-year-old girl had a fully erupted, conical mesiodens that caused crowding in the upper anterior region. According to her mother, none of the family had supernumerary teeth. This girl had Angle class I malocclusion, 5-mm over jet, and 3-mm overbite. Her left maxillary central incisor was rotated 90° distolabior because of the mesiodens (figure 3). Mesiodens extraction was performed under local anesthesia and later followed by a fixed-orthodontic treatment.

The aim of the orthodontic treatment was to correct the left maxillary central incisor position. A fixed orthodontic was implemented with a 0.012" NiTi arch wire and a no-ring, but the rotated tooth was not included. On the next visit, the o-ring was installed on the distal wing of the tooth bracket. On the third visit, the tooth had been slightly rotated so the o-ring could be

installed on the entire bracket. The arch wire was then replaced with 0.014" NiTi. In the seventh month, the tooth had rotated completely, but the inclination of left central incisor was still not good enough. The bracket position was changed because the previous position had been less precise. Nine months after orthodontic insertion, it appeared that the tooth position was aligned. The progress can be seen in figure 4.



Figure 3. Intra-oral condition on the first visit.



Figure 4. Progress of fixed orthodontic treatment to correct left maxillary central incisor position.

### Discussion

Managing mesiodentes is based on when they occur in the developmental stage of dentition. Extraction during the early, mixed-dentition stage allows normal eruptive forces to promote spontaneous eruption of the permanent central incisors. The later the extraction of the mesiodentes, the greater the chance that the permanent tooth will be mal aligned when it does erupt.<sup>2</sup> Space loss and midline shift of the

central incisors may have already occurred by this stage.

Therefore, once a mesiodens has been diagnosed, the clinician must decide on the treatment to minimize further complication. Delaying the extraction of mesiodens might result in the permanent incisor failing to spontaneously erupt due to diminished eruptive forces, arch-perimeter loss, and midline shifting; this might require comprehensive orthodontic treatment with surgery to expose the un erupted teeth.<sup>4</sup> Our report clarifies that delaying the extraction of a mesiodens induces malocclusion on the anterior region of the maxilla.

The type of mesiodentes in these cases were conical. Conical mesiodentes have a peg-shaped crown and complete root formation. They generally erupt palatally between the maxillary central incisors and tend to displace the erupting permanent central incisors.<sup>2,5</sup>

The malocclusion of the anterior region was successfully corrected with a fixed-orthodontic appliance. Both patients were treated with stainless steel brackets according to the straight-wire concept.

According to Ali, malocclusion in the anterior region can be successfully treated by fixed-orthodontic appliances in a shorter time than with removable appliances, as fixed appliances have greater action power and provide more continuous forces when compared to removable ones. The fixed appliance reduces the need for patient cooperation and allows for three-dimensional control of tooth movement.<sup>7</sup> In these case, malocclusions were corrected in eight to nine months.

### Conclusion

These paper presented two cases, which showed complexity of malocclusion caused by delayed extraction of mesiodens. Comprehensive orthodontic treatment was done by fixed-orthodontic appliances to treat malocclusion in anterior region. As a result, we can conclude that fixed-orthodontic appliances treat malocclusion successfully in a shorter time than removable appliances.

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