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## Case Report

# Orthodontic management of an erupted mesiodens and a buccally displaced maxillary canine in an adult patient: A case report

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## ABSTRACT

In the majority of the cases with typical supernumerary tooth, mesiodens are the most widespread finding and may give rise to a variety of clinical symptoms, including displacement and obstruction, in the emergence and alignment of the adjoining teeth. The best time to remove the mesiodens is still up for debate, but it is typically suggested if there are any clinical complications or aesthetic issues present. While some authors advise awaited intervention following the full root development of the nearby teeth, others advise a rapid approach. In the present case report, one such patient's esthetics and quality of life have been successfully improved.

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## 1. Introduction

The supernumerary teeth are the teeth that are present in addition to the typical dentition. Mesiodens are the most prevalent form of supernumerary tooth.<sup>1</sup> It is the most frequent dental anomaly in permanent dentition, with 82% of instances occurring in the maxilla, notably in the premaxillary area.<sup>2,3</sup> According to reports, it affects more men than women in the general population and has a frequency between 0.15% and 1.9%.<sup>4</sup> Variance owing to changes in demographics, environment, and genetic background may have an influence on the stated occurrence.<sup>5</sup> Mesiodens exhibit a variety of morphological shapes. Three frequent kinds have been described, notably conical or peg-shaped, tuberculate, and supplementary (tooth-like), with the most prevalent conical variant.<sup>5–7</sup> The aetiology of mesiodens is not established. It can be observed

as a standalone feature or as part of a syndrome, such as cleft lip and palate, cleidocranial dysostosis, or Gardner's syndrome.<sup>8,9</sup> A hereditary foundation for supernumerary teeth was proposed Based on the increased likelihood of hyperdontia in connected families. It has also been proposed that environmental variables may have an impact on genetic vulnerability.<sup>10–12</sup> Supernumerary tooth eruption frequently leads to crowding and may pose an aesthetic concern in the upper front area.<sup>9</sup> Depending on its form and location, supernumerary teeth must be appropriately managed. The following conditions typically call for the immediate removal of mesiodens: 1) obstruction or delay of eruption, 2) displacement of the neighbouring tooth, 3) presence of a pathologic condition, or spontaneous emergence, and 4) difficulty with orthodontic equipment.<sup>13</sup>

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## 2. Case Report

A 21-year-old male patient reported to the postgraduate clinic of the orthodontic department with a chief complaint of a pointed tooth in his front teeth region of the upper jaw and was concerned about its unpleasant appearance, affecting his quality of life. On extra-oral examination, the patient had a Mesoprosopic facial form with an orthognathic profile. Lips were competent and the nasolabial angle was obtuse. Intra-oral examination revealed a supernumerary tooth, conical-shaped mesiodens, present in the midline between the upper central incisors. A buccally erupted canine was seen in the first quadrant of the dentition and a crossbite involving 12 was also observed. The full complement of permanent dentition except the maxillary third molars was present. A class I molar relation and an overbite and overjet of about 2 mm was recorded. The patient had overall good oral hygiene. Pre-treatment intra-oral and extra-oral photographs are depicted in Figure 1.

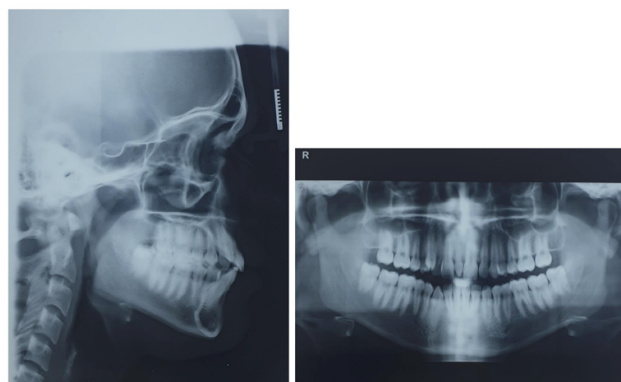


**Fig. 1:** Pre-treatment extraoral and intra oral photographs

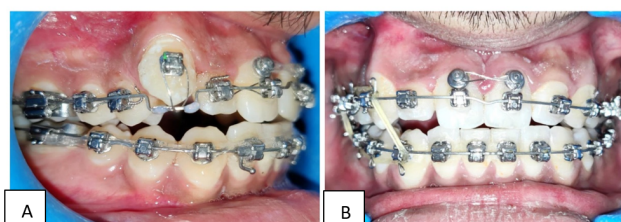
The functional examination of the temporomandibular joint was normal. A panoramic x-ray confirmed the presence of mesiodens between the upper two central incisor teeth and the congenital absence of maxillary third molars (Figure 2). The cephalometric analysis of the patient indicated a Class 1 Skeletal base with the normal sagittal positioning of both the maxilla and the mandible. Study model analysis indicated mild crowding in the lower arch due to tooth-jaw size discrepancy.

### 2.1. Treatment objectives

1. To improve esthetics by the removal of mesiodens and subsequent extraction space closure.
2. To achieve correct positioning of the buccally erupted canine (13) into the maxillary arch and accomplish Class 1 canine relation bilaterally.



**Fig. 2:** Pre-treatment OPG and lateral cephalogram



**Fig. 3:** Treatment mechanics applied

3. To correct crossbite of maxillary right lateral incisor tooth.
4. To correct midline and maintain Class 1 molar relation bilaterally.
5. To maintain skeletal and soft tissue orthognathic profile.

### 2.2. Treatment plan

A multidisciplinary approach was consented to for the management of the case. The patient was referred to the department of maxillofacial surgery for the intentional extraction of the mesiodens and the procedure for orthodontic treatment was initiated after 2 weeks of healing period. The treatment plan was designed to accomplish clinical objectives such as the removal of the mesiodens and the orthodontic closure of the midline diastema so as to allow proper alignment of the high maxillary right canine.

### 2.3. Treatment progress

Maxillary and mandibular arches were bonded with 0.022" Damon passive self-ligating brackets with standard torque prescription. Bands were placed on the first molars, and buccal tubes were bonded on the second molars. Initial levelling and alignment of the teeth (except maxillary canine) were achieved with 0.014 CuNiTi archwire and the early torque control was maintained with 0.014 × 0.025 CuNiTi and 0.018 × 0.025 CuNiTi. This was followed by

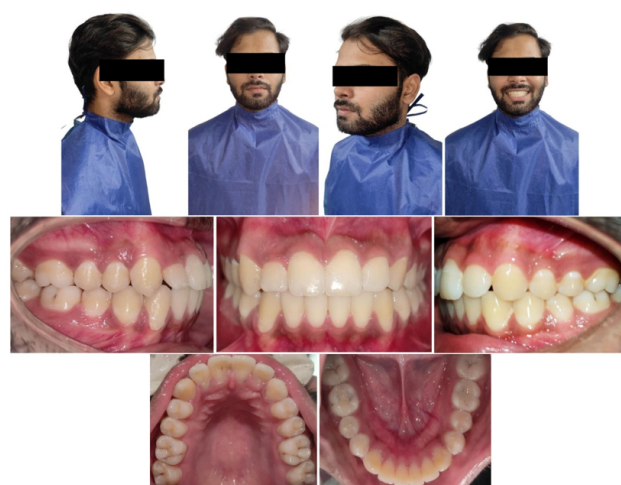
the placement of  $0.019 \times 0.025$  SS working archwire, and 20 grams of force was applied with the aid of an elastomeric chain that was extended between the labial buttons bonded at the cervical margins of the two maxillary central incisors, so as to avoid tipping movements and primarily produce bodily movement by directing the force vector close to their respective centre of resistance. An occlusal-directed V-bend was also incorporated in the maxillary archwire at the midline to produce sufficient counter-clockwise movements. Furthermore, NiTi open coil spring was placed between the maxillary right 1<sup>st</sup> premolar and lateral incisor to obtain adequate space for the downward motion of the buccally erupted canine while also augmenting the midline diastema closure. The buccally erupted canine was lightly ligated by the steel ligature wire with an occlusal step in the canine region of  $0.019 \times 0.025$  SS archwire to guide its proper movement and positioning into the maxillary arch (Figure 3 a). The labial buttons were ligated with steel ligature wire to maintain their correct position and later a 2.5 oz, 5/16" box elastic extending between the right upper and lower premolar and canines was also used for occlusal adaptation of the high canine (Figure 3 b). Once the arches were fully aligned and all the spaces were closed, finishing and occlusal detailing was undertaken by placing a  $0.019 \times 0.025$  TMA archwire, engaging all the maxillary teeth and producing minor first, second and third-order refinement. Lingual bonded retainers were given, and the patient was instructed to a 6-monthly follow-up schedule.

#### 2.4. Treatment outcome

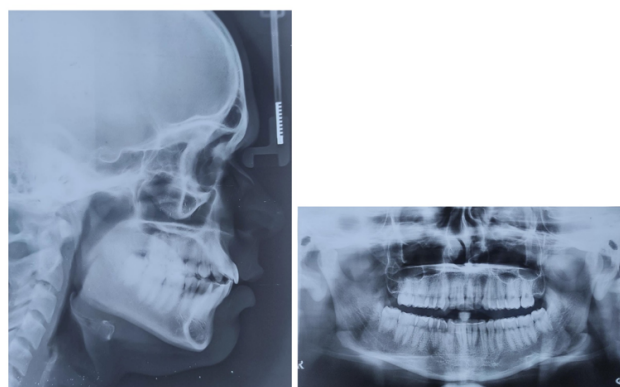
The orthognathic profile of the patient was successfully maintained throughout the treatment. All the teeth were well aligned, and the extraction space was efficiently utilized for the correct positioning of the maxillary anterior teeth. A correct midline was established with an adequate overjet and overbite. A class 1 molar and canine relationship was obtained. The primary esthetic concern of the patient was positively attained (Figure 4). The post-treatment radiographic x-ray (Figure 5) depicted an acceptable root paralleling. The pre and post-cephalometric values are summarized in Figure 6. The superimposition of the pre and post-treatment cephalogram is shown in Figure 7.

### 3. Discussion

Prehistoric human skeletal remains discovered since the Lower Pleistocene epoch contain the earliest reported instance of extra teeth.<sup>14</sup> Mesiodens' aetiology is still unknown, however few theories have been put up. The tooth bud can split into two identical or dissimilar portions, which can result in the formation of two teeth of the same size or of one typical and one dysmorphic tooth, as stated by Taylor's dichotomy theory. However, the most plausible etiological explanation for the formation of mesiodens is the



**Fig. 4:** Post-treatment extraoral and intra oral photographs



**Fig. 5:** Post-treatment OPG and lateral cephalogram

hyperactivity theory, which describes a constrained rise in the activity of dental lamina.<sup>9</sup> Delayed eruption, crowding, spacing, impaction of permanent incisors, abnormal root formation, alteration in the path of eruption of permanent incisors, a median diastema, cystic lesions, intraoral infection, rotation, root resorption of adjacent teeth, or even eruption of incisors in the nasal cavity can all occur as a result of the presence of mesiodens.<sup>15</sup> The abnormality is frequently detected during a regular clinical/radiographic assessment in asymptomatic instances of mesiodens.<sup>16</sup> The mesiodens can be solitary, bilateral, or numerous; in syndromic situations, several supernumerary teeth, known as 'mesiodentes,' can be seen.<sup>6</sup> It can take on a variety of clinical shapes, including conical or peg-shaped, tuberculate or barrel-shaped, and supplementary or tooth-like. A solitary peg-shaped mesiodens was found in this case, which verified Fernandez et al.'s results that 90% of mesiodens are conical or peg-shaped.<sup>5</sup> Many authors advocate for the extraction of mesiodens in the early mixed dentition to promote spontaneous eruption and alignment of the



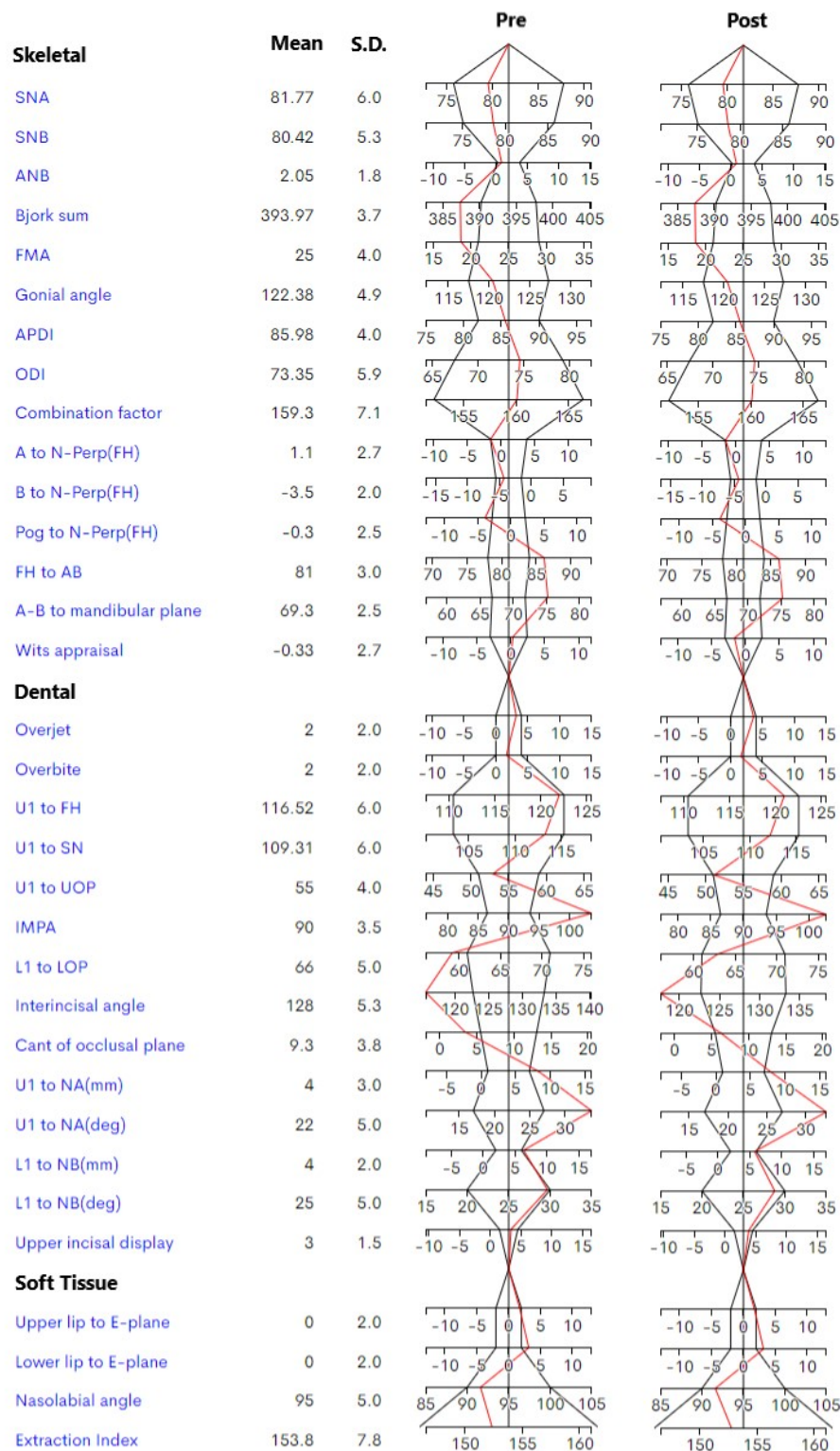


Fig. 6: Pre-treatment and post-treatment changes observed in cephalometric values



**Fig. 7:** Pre-treatment and post-treatment lateral cephalogram superimposition

adjacent teeth, potentially reducing the need for orthodontic treatment.<sup>17–19</sup> However, patients with mesiodens in a fully erupted permanent dentition such as the one discussed in the present case report necessarily need to undergo orthodontic treatment for proper utilization of the space obtained after extraction of the supernumerary tooth in order to achieve adequate tooth alignment and acceptable aesthetic results. Even after mesiodens extraction, careful monitoring of the dentition, fixed lingual retainer and radiographic evaluation after 6 months is strongly advised to avoid the formation of diastema.

#### 4. Conclusion

Evidence for the aetiology of mesiodens suggests that genetic vulnerability, in combination with environmental circumstances, may enhance the activity of the dental lamina, resulting in the creation of additional tooth/teeth. The type and location of the displaced tooth, the space available in the dental arch, and the stage of root development may all impact how long it takes for the misplaced tooth to be correctly positioned after surgical excision of the mesiodens. Although symptomless cases may be left untreated in conjunction with continuous monitoring, however, cases with esthetic peculiarities are addressed promptly.

#### 5. Source of Funding

None.

#### 6. Conflict of Interest

None.

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