# Mesiodens in primary, mixed and permanent dentitions: a clinical and radiographic study

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*The term mesiodens refers to a supernumerary tooth located between the maxillary central incisors. The aim of the study was to investigate the characteristics of mesiodens among children in Turkey. The study population involved 24 children who attended the Department of Pediatric Dentistry, Ege University for dental problems. The characteristics of mesiodens were obtained from clinical and radiographic examinations. Results showed that twenty-four patients had thirty-four mesiodens for an average of 1.42 mesiodens per person. Males were affected approximately 3 times more frequently in comparison with females. Forty-two percent of the patients had bilateral mesiodens. All of the mesiodens were conical in shape and 91 % were in the downward position. The age and sex distribution, location, direction, eruption of mesiodens and effects on permanent maxillary incisors were also presented in this study. It could be concluded that, delayed, ectopic or asymmetric eruption of the central incisors should alert the clinician to the possibility of a mesiodens.*
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## INTRODUCTION

Supernumerary teeth are considered to be one of the most significant dental anomalies affecting the primary and early mixed dentition. The prevalence of the supernumerary teeth ranges from 0.10% to 3.6% in the permanent dentition and 0.02% to 1.9% in the primary dentition. The term mesiodens refers to a supernumerary tooth located between the maxillary central incisors. It is clinically the most frequent of all the supernumerary teeth and the overall prevalence of mesiodens is between 0.15% and 1.9%.

There are several theories regarding the development of a supernumerary tooth- atavism, dichotomy of the tooth germ, or local hyperactivity of the dental lamina. However, the hyperactivity theory which states that supernumerary teeth are derived from independent local hyperactivity of the dental lamina has been more accepted. Genetics are also thought to contribute to the development of mesiodens, as such teeth have been diagnosed in twins, siblings and sequential generations of a single family. A sex-linked pattern has also been proposed, as males are affected twice as frequently as females.[1-6]

Morphologically the mesiodens may present a rudimentary morphology with a cone-shaped crown, smooth surface and smaller size than the adjacent normal teeth. Or, with a tuberculate shape and normal size, it may be found to mimic a natural tooth. The root, which is generally totally formed, is often arched and globular. More frequently the mesiodens occurs unilaterally, but it may also be bilateral, while three or more supernumerary teeth in the median region of the palate is more rarely found. The mesiodens is most frequently found between the central incisors, in particular on the palatine side, along the sagittal median plane. It may occasionally be found high and inverted into the palate or in a horizontal position.[4,6,7]

Since in most cases it is totally impacted (88.7%), its presence may create some clinical problems, especially in the stages of the primary and early mixed dentitions. The most common clinical complications of mesiodens include an abnormal central diastema, delayed eruption, abnormal tooth eruption, abnormal occlusion development, resorption of the roots of the adjacent incisors and cystic degeneration.[8-14]

The aim of the study was to investigate the characteristics of mesiodens among children in Turkey.

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## MATERIALS AND METHODS

The present study involved 24 patients, who attended the Department of Pediatric Dentistry, Ege University for their dental problems between January 2001 and February 2002. The patients were either referred to the hospital for removal of a mesiodens or were found during routine radiographic examination. The patients underwent clinical and radiographic examinations including panoramic, occlusal and periapical films. Radiographic observations included numbers of mesiodens; location distribution: right, midline, left; as well as direction distribution: normal, inverted, horizontal; erupted or unerupted; and shape. The age and sex distribution, number of mesiodens per patient and effect on permanent maxillary incisors were also presented.

## RESULTS

### Distribution of the patients with mesiodens by sex and number

Between January 2001 and February 2002, 34 mesiodens were diagnosed in 24 patients for an average of 1.42 mesiodens per affected person. The mean age of the patients was 8.96 years; range 7 to 13. There were 18 male and 6 female patients and the sex distribution was in favor of males in the ratio of 3:1. Approximately 58% of the patients had only one mesiodens, while 42% of the patients, there were two mesiodens. The results are shown in Table 1. The prevalence of mesiodens in the primary, mixed and permanent dentition stages were 4.2%, 87.5% and 8.3% respectively.

### Location

The results have shown that the mesiodens were found slightly more frequently in the left side than the right side, 53% and 47% respectively, and none of them were found exactly on the midline in the present study.

### Direction

The correlation of location and direction of mesiodens is shown in Table 2. The mesiodens occurred mostly in a normal direction (downward) (Figure 1a) rather than in an inverted (upward) (Figure 1b) or horizontal direction (Figure 1c) in the ratio of 91%, 6%, 3% respectively. Among ten patients with bilateral mesiodens, all of them were in the same and normal direction. The distribution of mesiodens by direction and number was shown in Table 3.

### Shape and eruption

All of the mesiodens were in conic-shape. Among 14 unilateral mesiodens, 3 of them were erupted (12.5%) while 2 bilateral mesiodens were erupted among 10 bilateral mesiodens (20%).

**Table 1.** Distribution of the patients with mesiodens by sex and number.

| | Number | | |
|---|---|---|---|
| | **One** | **Two** | **Total** |
| **Male** | 9 | 9 | 18 |
| **Female** | 5 | 1 | 6 |
| **Total** | **14** | **10** | **24** |

**Table 2.** Correlation between location and direction of mesiodens.

| | LOCATION | | | |
|---|---|---|---|---|
| **Direction** | **Right** | **Left** | **Middle** | **Total** |
| Normal | 15 | 16 | 0 | 31 |
| Inverted | 0 | 2 | 0 | 2 |
| Horizontal | 1 | 0 | 0 | 1 |
| **Total** | **16** | **18** | **0** | **34** |

**Table 3.** Distribution of mesiodens by direction and number.

| | **One mesiodens** | **Two mesiodens** | **Total** |
|---|---|---|---|
| **Normal** | 11 | 10 (Pair) | 31 |
| **Inverted** | 2 | 0 | 2 |
| **Horizontal** | 1 | 0 | 1 |
| **Total** | **14** | **20** | **34** |

### Family history

In twenty-four patients, six of them had a family history of mesiodens with respect to the anamnesis, which was supplied from the parents.

### Effects on permanent maxillary incisors

The effects on permanent upper incisors included delayed eruption, abnormal central diestema and abnormal tooth eruption. The mesiodens were non-specific and found accidentally in 16 patients (67%). The most common clinical complication was delayed eruption in 4 patients (17%). Abnormal central diastema was observed in 2 patients (8%) and abnormal tooth eruption (inclination of erupted permanent incisors) was also observed in another 2 (8%) patients, (Figure 2).

Mesiodens in the primary dentition also could cause early exfoliation of the primary maxillary incisors (Figure 3a, 3b).

## DISCUSSION

Anterior maxillary supernumeraries in young patients are of great of concern to both dentists and parents because of occlusal and esthetic problems they can create.[5]

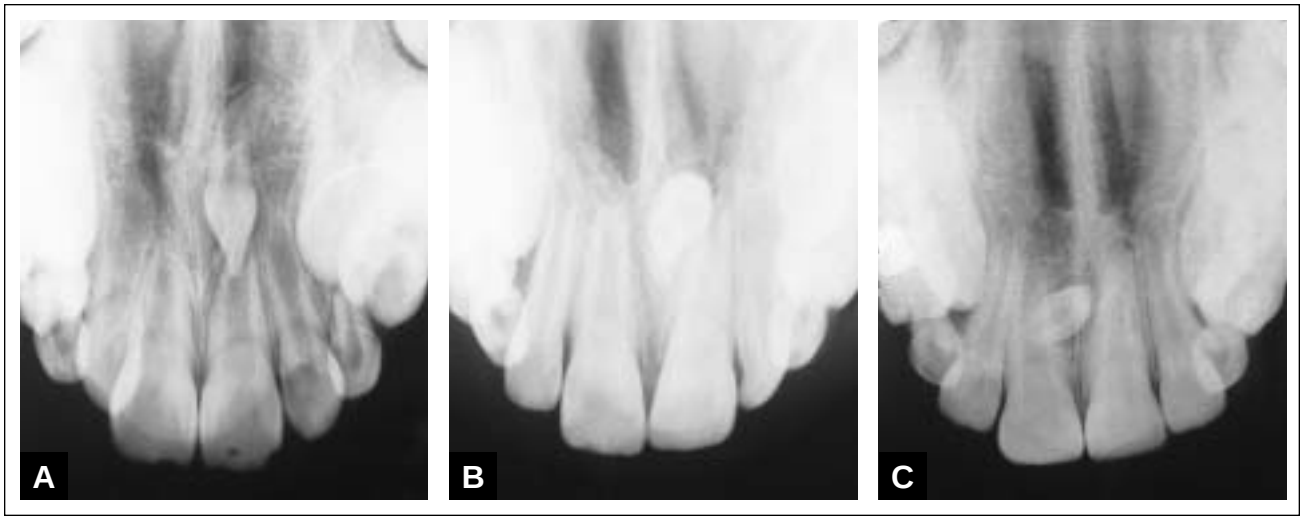


**Figure 1.** Anterior occlusal films showing mesiodens in different directions **A)** Normal **B)** Inverted **C)** Horizontal.

It is reported that if a significant delay, ectopic or asymmetric eruption of the maxillary permanent central incisors are observed clinically, the presence of mesiodens should be suspected. Radiographic examination is essential to confirm diagnosis, the position of the mesiodens and the relation with the adjacent teeth, and the distance of the unerupted permanent teeth from the occlusal plane.[5]

The present study included 24 children aged between 7 to 13 years. They were examined with clinical and radiographic techniques; maxillary anterior occlusal view was used for screening as well as panoramic and periapical radiographs because panoramic radiographs exhibit some distortion or burned areas especially in the anterior midline region. The maxillary anterior occlusal view is the most diagnostic radiographic method to identify and locate a mesiodens.

It is reported that mesiodens occurs more frequently in boys than in girls, with the ratio being approximately 2:1.[2,8] In the present study, the male-female ratio was 3:1 showing a male predominance. In this study, six patients had family histories of mesiodens in their mothers or their male siblings. Some authors suggested that there appears to be evidence to suggest a familial predisposition to producing extra teeth.[2] Sedano *et al.*[15] reported that mesiodens is an autosomal dominant trait with lack of penetrance in some generations. Although, no investigation proved the hereditary condition of mesiodens, it is quite possible, in view of the patients showing a familial disposition.[16] The findings of the present study revealed that a more detailed investigation into family history of patients with mesiodens are needed.

Removal of a supernumerary tooth preventing permanent tooth eruption usually results in the eruption of the tooth, provided adequate space is available in the arch to accommodate it.[17] Some authors reported that

**Figure 2.** Intraoral view of the mesiodens showing the inclination of erupted permanent incisor.

75% of incisors erupted spontaneously after removal of the mesiodens. Eruption occurred on average within 18 months, provided that the incisor was not too far displaced and that sufficient space was available.[5,7] However, it is controversial that supernumerary teeth should be extracted immediately or not after the diagnosis of their presence. Giancotti *et al.*[4] suggested that therapeutic choice must taken into account, whether to preserve or remove the supernumerary and also the timing of surgery. However, some authors advocate immediate removal of the unerupted maxillary anterior supernumerary following initial diagnosis of their presence.[15] Surgical removal of a supernumerary in the primary dentition is usually not recommended because of the risk of displacing the permanent tooth during the operation. Moreover, it is reported that most primary supernumeraries erupt normally because the presence of the interdental spaces allow for uneventful eruption of the extra tooth.[11] In the present study, among the 24 patients, one patient was in the primary dentition stage. The right

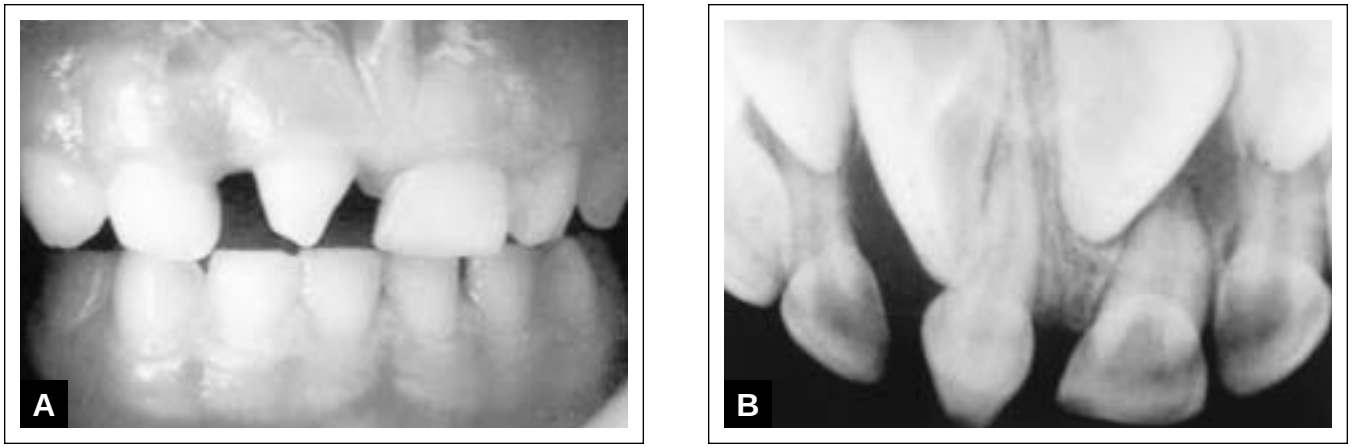


**Figure 3. A)** A peg-shaped mesiodens in primary dentition **B)** The periapical radiograph of the mesiodens.

maxillary primary central incisor (51) of the patient was exfoliated before visiting the clinic and a mesiodens was erupted in the space of 51 (Figures 3a, b). However, it is reported that extraction during early mix dentition stage allows normal eruptive forces to promote spontaneous eruption of the permanent central incisors after the extraction. Extraction of a mesiodens at a time appropriate for promoting self-eruption in the early mixed dentition may result in better alignment of the teeth and may minimize the need for orthodontic treatment. In the present study, the prevalence of mesiodens in the mixed dentition stage was more than the other stages (21 patients) and extractions were the treatment of choice as the patients were around 10 years of age and the apicies of the unerupted central incisors were almost mature. It is reported that the later the extraction of the mesiodens, the greater the chance that the permanent tooth either will not spontaneously erupt or will be malaligned when it does erupt (Figure 2). Lack of eruption could be attributed to diminished eruption rate, significant root development, displacement of the tooth from its normal position in the alveolar bone or insufficient arch space into which the tooth can erupt. Thus, it is mentioned that significant delay in treatment could create the need for more complex surgical and orthodontic management.[18-20]

It can be concluded that delayed, ectopic or asymmetric eruption of the central incisors should alert the clinician to the possibility of a mesiodens and early diagnosis and treatment of patients with mesiodens allow early intervention, more favorable prognosis and minimal complications to prevent orthodontic and aesthetic problems.

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