

Mesiodens: a radiographic study in children

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(Received 14 November 2007 and accepted 20 June 2008)

Abstract: We analyzed the frequency and radiological features of mesiodens in a group of children in Turkey. The study was based on a radiographic review of 23,000 pediatric patients (male: 12,667 female; 10,333) who visited the Department of Oral Diagnosis and Radiology during the period 2003-2005 (3 years). The presence of an unerupted supernumerary tooth, or tooth bud between the 2 central incisors or as unilateral or bilateral teeth in the midline of the maxilla was noted as mesiodens on radiographs. Eighty-five cases of mesiodens in 69 patients were found. Complete documentation, including radiographs, for these 69 patients were studied and analyzed. In addition to gender and age, the following information about the mesiodens was recorded: 1) number; 2) shape; 3) position; 4) complications caused by the mesiodens; 5) treatment. Of the 69 patients, the ratio of boys (47 cases) to girls (22 cases) was 2.1:1. Fifty-three (76.8%) of the children had 1 mesiodens, and 16 (23.1%) had 2 mesiodentes bilaterally to the midline. Of the 85 mesiodentes, 67 (78.8%) were fully impacted, 6 (7%) were partially erupted, and 12 (14.1%) were fully erupted. Most of the mesiodentes (55.2%) were found in the vertical position, followed by inverted position (37.6%), and horizontal position (7%). The main complications were delayed eruption of the permanent incisors (38.8%), maxillary midline diastema (17.6%), axial rotation or inclination of erupted permanent incisors (16.4%), and resorption of the adjacent teeth (4.7%) The prevalence of mesiodens has been estimated

to be 0.15% to 2.2% of the population. (J. Oral Sci. 50, 287-291, 2008)

Keywords: mesiodens; dental anomaly; supernumerary.

Introduction

The term mesiodens refers to a supernumerary tooth present in the midline of the maxilla between the two central incisors (1-3). Mesiodens can occur singly or multiply, and is responsible for disturbances in the eruption of maxillary incisor teeth (4).

Mesiodens is usually found to be impacted, with a conical crown and a single root, and often in an inverted position (5,6). It is diagnosed through clinical and radiographic examinations using maxillary anterior periapical and panoramic radiography (3). In addition, maxillary occlusal radiography is highly recommended for all children with dental disturbances in the premaxilla (3).

In many instances, mesiodens is associated with disturbances in tooth eruption, midline diastema or axial rotation or inclination of erupted permanent incisors, or complications such as resorption of adjacent teeth and development of dentigerous cysts (1,3,6,7).

The aim of this study was to analyze the frequency and radiological features of mesiodens among a group of children in Turkey.

Materials and Methods

The study was based on a radiographic review of 23,000 pediatric patients (male: 12,667 female; 10,333) who visited the Department of Oral Diagnosis and Radiology, during the period 2003-2005 (3 years). Radiographic examination of the premaxillary region was based on

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intra-oral periapical and occlusal radiographs independently by four dental radiologists with over 6 years experience. The presence of an unerupted supernumerary tooth, or tooth bud between the 2 central incisors, or of unilateral or bilateral teeth in the midline of the maxilla, was noted as mesiodens on radiographs. Standard equipment (65 kVp, 15 mA, 2.7 mm Al Filt., Trophy Irix, Trophy Radiologie, Paris, France) and films (Ekstaspeed, Kodak, Chalon-sur-Saone, France) were used, and automatic processing (Velopex, London, UK) followed standard routines. Examination and interpretation of the radiographs were also performed under standard conditions. Eighty-five cases of

mesiodens were found in 69 patients, for whom complete documentation, including radiographs, was available for analysis. In addition to gender and age, the following information about the mesiodens was recorded: 1) number; 2) shape; 3) position; 4) complications caused by the mesiodens; 5) treatment.

Results

Gender and age distribution

Between January 2003 and November 2005, 85 cases of mesiodens were diagnosed in 69 patients ranging in age from 4 to 14 years. The ratio of boys (47 cases) to girls (22 cases) was 2.1:1 and most mesiodens were discovered between 6 and 8 years of age (Table 1 and Fig. 1). The prevalence of mesiodens was 0.3%.

Table 1 Sex distribution among children with mesiodens

Sex	Number of individuals	%
Male	47	68.1
Female	22	31.8
Total	69	100

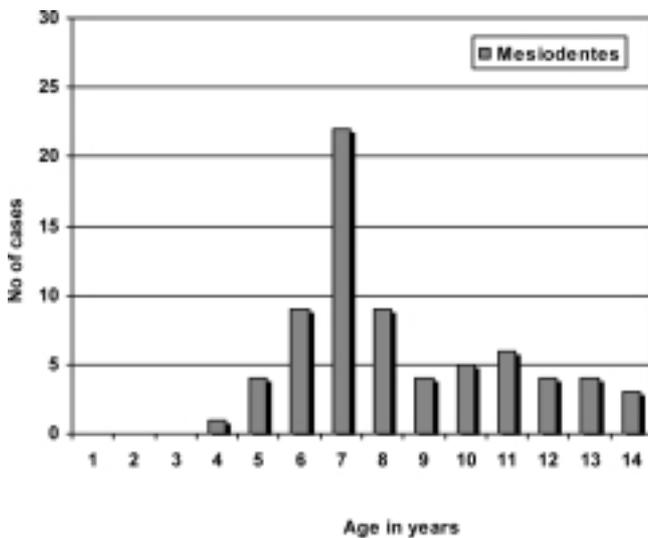


Fig. 1 Distribution of mesiodens according to age (n = 69).

Table 2 Shape of mesiodens

Shape	Number of cases	%
Conical	62	72.9
Canine-like	13	15.2
Incisor-like	5	5.8
Tuberculated	3	3.5
Round	2	2.3
Total	85	100

Number of mesiodens

Among the 69 children examined, 53 (76.8%) had 1 mesiodens, and 16 (23.1%) had 2 mesiodens bilateral to the midline.

Shape of mesiodens

Among the 85 mesiodentes, the conical shape was the most common (72.9%), followed by canine-like teeth in 13 cases (15.2%). Eighty (94.1%) of the mesiodentes were small in size (Table 2).

Table 3 Position of mesiodens

Position	Number of mesiodens	%
Vertical	47	55.2
Inverted	32	37.6
Horizontal	6	7
Total	85	100



Fig. 2 Anterior periapical radiographs showing mesiodens in different directions. A: Normal, B: Inverted, C: Horizontal.

Position of mesiodens

Of the 85 mesiodentes, 67 (78.8%) were fully impacted, 6 (7%) were orally partially erupted and 12 (14.1%) were fully erupted. Most of them were found in a vertical position (55.2%), followed by an inverted position (37.6%) and a horizontal position (7%) (Table 3 and Fig. 2).

Complications caused by mesiodens

The main complications were delayed eruption of the permanent incisors (38.8%), maxillary midline diastema (17.6%), axial rotation or inclination of erupted permanent incisors (16.4%) and resorption of the adjacent teeth (4.7%) (Table 4).

Treatment of mesiodens

Sixty-six (77.6%) of the mesiodentes were surgically removed within a period of 6 months after referral to the clinic. The remaining 19 (22.3%) were followed up with radiographs either until their removal, or to observe their course.

Discussion

Studies of the prevalence of mesiodens involving certain ethnic or racial populations, including Caucasians, Finnish, Norwegians and Hispanics, have been published to date (9,11-13). The prevalence of mesiodens has been estimated to be 0.45% in Caucasians, 0.4% in Finnish, 1.43% in Norwegians, and 2.2% in Hispanic populations (9,11-13). Additionally, Ersin (14) et al. have reported that the prevalence of mesiodens in the primary, mixed and permanent dentition in a group of Turkish children was 4.2%, 87.5% and 8.3%, respectively. In this study, we found the prevalence of mesiodens to be 0.3%.

Mesiodens occurs more frequently in boys than in girls, the ratio being approximately 2:1 (3-6). In this series, the male:female ratio was 2.1:1, in agreement with most previous studies (2-4,6-8,10,13,15) except for that of Ersin et al (14). In our study, the number of mesiodens was one in 53 cases (76.8%), two in 16 (23.1%). This is in line with reports by Kim (3) et al., Huang (8) et al. and Asaumi et

al. (10), who reported more than one supernumerary tooth in 25%, 28% and 27% of their cases, respectively.

The present series of 69 children were aged between 4 and 14 years at the time of referral to our clinic. This means that our study involved only primary or mixed dentition, in contrast to other studies where the subjects also included much older individuals (7,9). The average age at which mesiodens was discovered in our series was 7 years, coinciding with the age at which mesiodens shows maximum prevalence (22 cases; 25.8%). Of our 69 cases, 40 (47%) were discovered at age 6-9 years. This period coincides with the eruption time of the maxillary central incisors, and radiographic examination was performed as an aid to screening for congenitally missing teeth, supernumerary teeth, cysts and tumors, when delayed eruption or malposition of the maxillary central incisors was seen (6). It was therefore logical that most cases of mesiodens were discovered in this period.

The shape of mesiodens may vary from a simple conical form to a larger, more complicated crown shape with a number of tubercles (3-6,8-18). Conical mesiodens is more common, and is more likely to erupt between the central incisors as a diminutive but fully developed tooth (3-7). In contrast, tuberculate mesiodens tends to develop later and shows incompletely developed roots (2). In the present study, the shape observed was mainly conical (72.9%), which corresponds well with the literature (3-6,15,17,18).

Most mesiodentes remain impacted, but in approximately 25% of cases eruption occurs (2). In this series, 21.1% of the mesiodentes were partially or fully erupted, which is within range of percentages reported earlier (2,7,9).

With regard to the growth direction of the 85 mesiodentes, 47 (55.2%) were in a vertical direction, 32 (37.6%) in an inverted direction and 6 (7%) in a horizontal direction relative to the axis of the tooth. This is in line with reports by Tyrologou et al. (6), Asaumi et al. (10) and Roychoudhury et al. (15), who observed inverted impacted mesiodentes in 51.3%, 67% and 62.5% of their cases, respectively.

Table 4 Complications caused by mesiodens

Complications	Number of cases	%
Delayed eruption of permanent incisors	33	38.8
Midline diastema	15	17.6
Axial rotation or inclination of erupted permanent incisors	14	16.4
Resorption of adjacent teeth or mesiodens	4	4.7
None (Asymptomatic)	19	22.3
Total	85	100

The clinical complications of mesiodens include delayed eruption of permanent incisors, midline diastema, axial rotation or inclination of erupted permanent incisors, resorption of adjacent teeth or mesiodens, root anomaly, cyst formation, intraoral infection, and mesiodens pulpitis (1,3,6,7).

In the present study, the most common complication found was delayed eruption of permanent incisors (38.8%). This percentage was higher than in previous studies (7,9). However, cyst formation, root anomaly and intraoral infection were not found in any of the cases. In contrast, other studies have reported cyst formation, mesiodens root anomaly, intraoral infection and mesiodens pulpitis. The reason for this difference might be that the present series included children aged between 4 and 14 years. Asami et al. (10) reported 51 cases of mesiodens in patients over 20 years of age; 19 (37%) had dentigerous cyst formation, and only 3 cysts were discovered in patients aged under 19 years. Primosch (16) reported an enlarged follicular sac in 30% of cases, but histological evidence of cyst formation was available in only 4-9%. This indicates that when mesiodentes have been impacted for a long period, they have a high risk of forming dentigerous cysts (10).

The treatment of each case was planned, after consideration of all clinical and radiological findings. However, in the clinical management of mesiodens, very often there can be confusion about whether and when they should be surgically removed, or whether they should be retained and followed up radiologically. Irrespective of whether an immediate or delayed surgical approach is adopted, early diagnosis is critical (3-7,10,15,16). Immediate surgical removal is indicated after diagnosis of mesiodens because intra- or postoperative complications are less likely to occur in younger patients (3). Therefore, surgical removal was indicated in 66 (77.6%) of the cases in this study that had associated complications. The other 19 (22.3%) mesiodentes were followed up radiographically, and no complications due to the presence of mesiodens were found. Early detection of this anomaly does not, in our opinion, automatically require early removal of the supernumerary; but when pathological changes or interference with the normal teeth are diagnosed, removal should be performed.

The prevalence of mesiodens has been estimated to be 0.15% to 2.2% of the population. It occurs more frequently in boys than in girls, the ratio being approximately 2:1. In this series, the male:female ratio was 2.1:1 and the prevalence of mesiodens was 0.3. Sixteen (23.1%) of the 69 patients had 2 mesiodens bilateral to the midline.

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