

Clinical Characteristics and Complications Associated With Mesiodentes

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Purpose: The purpose of the present study was to analyze the clinical characteristics and complications of patients with mesiodens.

Patients and Methods: Using the radiographic reviews of patients who visited Seoul National University Dental Hospital from January 2005 through January 2008, 919 patients were identified as having mesiodens (total 1,200 mesiodentes). The number, location, position, eruption status, shape, direction, and complications of the mesiodens and gender and age were collected and analyzed.

Results: The mean patient age was 11.05 years (median 7.58) with a male/female ratio of 2.74:1. The results showed that 71.38% of the patients had 1 mesiodens, 27.75% had 2, 0.65% had 3, and 0.22% had 4 mesiodentes. Complications occurred in 46.92% of the mesiodentes. Of the complications, midline diastema was observed in 35.34%, delayed eruption in 20.60%, displacement in 16.60%, rotation in 11.02%, root resorption of adjacent teeth in 7.58%, cystic changes or cyst formation in 5.29%, and nasal eruption in 3.58%.

Conclusions: Complications were found in approximately one half of the patients with a mesiodens. Early detection and timely surgical intervention should be emphasized to prevent unwanted complications.

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The number of teeth in humans has tended to decrease through evolution.¹ However, alterations in tooth development commonly result in an increase in the number of teeth. A frequently found supernumerary tooth present in the midline of the maxilla is called a mesiodens.²

Several theories have been postulated regarding the causes of supernumerary teeth, including atavism, dichotomy of the tooth bud, and hyperactivity of the

dental lamina.²⁻⁴ However, the exact cause is still unknown.

Multiple studies on the complications of a mesiodens or supernumerary tooth have been reported to date; however, most previous studies examined a relatively small study population. Few studies focused on the correlation between the complications and the various characteristics of mesiodentes. The aims of the present study were to examine

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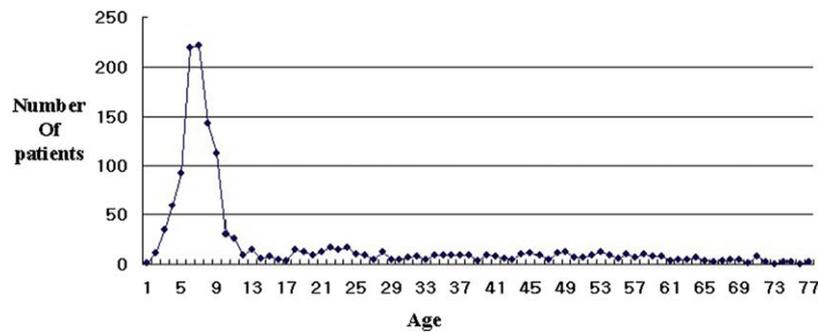


FIGURE 1. Distribution of patients according to age.

Hyun et al. *Characteristics and Complications of Mesiodens. J Oral Maxillofac Surg* 2009.

the characteristics of, and complications associated with, 1,200 mesiodentes identified in 919 patients and to compare the results with those of previous studies.

Patients and Methods

From the case reviews of patients who visited Seoul National University Dental Hospital from January 2005 through January 2008, 919 patients with mesiodentes (total 1,200 mesiodentes) on radiographs were identified. The number of mesiodentes per patient, location (palatal, labial, overlap), position (left, right, midline), eruption status (erupted, impacted), shape (conical, tuberculate, supplemental, other), crown direction (normal, inverted, horizontal), and complications (delayed eruption of adjacent tooth, diastema, displacement, rotation, cystic formation or cystic change, root resorption of adjacent primary or permanent tooth, nasal eruption) were investigated. The findings were also analyzed in relationship to the patients' gender and age. The correlation between gender and the number of mesiodentes was analyzed using a *t* test.

Results

GENDER AND AGE DISTRIBUTION

The age of the patients ranged from 2 to 77 years (Fig 1). The mean age was 11.05 years (median age

7.58). Of the 919 patients, 673 were male and 246 were female (male/female ratio 2.74:1; Table 1). The average number of mesiodentes was 1.33 in the males and 1.21 in the females; mesiodentes occurred more frequently in the males than in the females ($P < .01$).

NUMBER OF MESIODENTES

Of the 919 patients, 71.38% had 1 mesiodens, 27.75% had 2, 0.65% had 3, and 0.22% had 4 mesiodentes (Table 1).

LOCATION AND DIRECTION

Of the 1,200 mesiodentes, 1,098 (91.50%) were located palatally, 22 (1.83%) were located labially, and 80 (6.67%) were located in the overlap. Thus, most mesiodentes were located in the palatal area (Table 2). In addition, 42% were left of the midline, 42.33% were right of the midline, and 15.67% were in the midline (Table 2); 27.33% of the mesiodentes were in the normal direction, 56.58% were inverted, and 16.08% were horizontal. Therefore, most of the mesiodentes were in an inverted direction (Table 2).

MESIODENS SHAPE

The crown shape of the mesiodens was mainly conical (76.50%), and most mesiodentes (91.75%) remained impacted (Table 2). The conical mesiodentes erupted into the oral cavity in 9.26%, the tuberculate mesiodentes in 5.43%, the supplementary mesioden-

Table 1. DISTRIBUTION BY GENDER AND NUMBER OF MESIODENTES PER PATIENT

Gender	Mesiodentes per Patient (n)				Total
	1	2	3	4	
Male	462	203	6	2	673 (73.23)
Female	194	52	0	0	246 (26.77)
Total	656 (71.38)	255 (27.75)	6 (0.65)	2 (0.22)	919 (100)

Data in parentheses are percentages.

Hyun et al. *Characteristics and Complications of Mesiodens. J Oral Maxillofac Surg* 2009.

Table 2. CORRELATIONS BETWEEN CHARACTERISTICS OF MESIODENS AND COMPLICATIONS

Complication	Location			Position			Direction			Shape			Eruption State			
	Total	Palatal	Labial	Overlap	Left	Middle	Right	Normal	Inverted	Horizontal	Conical	TB	SP	Other	Erupted	Impacted
Any	563 (46.92)	522 (47.54)	13 (59.09)	28 (35)	227 (45.04)	75 (59.89)	261 (51.38)	159 (48.48)	315 (46.39)	89 (46.11)	417 (45.42)	121 (54.75)	11 (52.38)	14 (35.00)	56 (56.57)	507 (46.05)
Delayed eruption	144 (20.60)	135 (20.83)	3 (20)	6 (16.67)	61 (22.34)	9 (9.38)	74 (22.42)	38 (18.01)	81 (21.09)	25 (24.04)	100 (19.27)	35 (23.65)	3 (21.43)	6 (33.33)	12 (16.00)	132 (21.15)
Diastema	247 (35.34)	226 (34.88)	5 (33.33)	16 (44.44)	93 (34.07)	39 (40.63)	115 (34.85)	57 (27.01)	144 (37.50)	46 (44.23)	189 (36.42)	48 (32.43)	7 (50)	3 (16.67)	25 (33.33)	222 (35.58)
Rotation	77 (11.02)	71 (10.96)	3 (20)	3 (8.33)	34 (12.45)	8 (8.33)	35 (10.61)	26 (12.32)	41 (10.68)	10 (9.62)	62 (11.95)	11 (7.43)	1 (7.14)	3 (16.67)	7 (9.33)	70 (11.22)
Displacement	116 (16.60)	108 (16.67)	3 (20)	5 (13.89)	40 (14.65)	25 (26.04)	51 (15.45)	46 (21.80)	64 (16.67)	6 (5.77)	87 (16.70)	24 (16.22)	2 (14.29)	3 (16.67)	19 (25.33)	97 (15.54)
Cystic change	37 (5.29)	32 (4.94)	0 (0)	5 (13.89)	19 (6.96)	5 (5.21)	13 (3.94)	19 (9.00)	11 (2.86)	7 (6.73)	22 (4.24)	14 (9.46)	0 (0)	1 (5.56)	6 (8.00)	31 (4.97)
Root resorption	53 (7.58)	52 (8.02)	1 (6.67)	0 (0)	11 (4.03)	6 (6.25)	36 (10.91)	20 (9.48)	28 (7.29)	5 (4.81)	39 (7.51)	12 (8.11)	1 (7.14)	1 (5.56)	6 (8.00)	47 (7.55)
Nasal eruption	25 (3.58)	24 (3.70)	0 (0)	1 (2.78)	15 (5.49)	4 (4.17)	6 (1.82)	5 (1.94)	15 (3.91)	5 (4.81)	20 (3.85)	4 (2.70)	0 (0)	1 (5.56)	0 (0)	25 (4.01)
None	637 (53.08)	576 (52.46)	9 (40.91)	52 (65.00)	277 (54.96)	113 (60.11)	247 (48.62)	169 (51.52)	364 (53.61)	104 (53.89)	501 (54.58)	100 (45.25)	10 (47.62)	26 (65.00)	43 (43.43)	594 (53.95)
Total	1,200	1,098	22	80	504	188	508	328	679	193	918	221	21	40	99	1,101

Abbreviations: TB, tuberculate; SP, supplemental. Data in parentheses are percentages.

Hyun et al. *Characteristics and Complications of Mesiodens. J Oral Maxillofac Surg* 2009.

tes in 9.52%, and the other shaped mesiodentes in 2.50% (Table 3).

COMPLICATIONS

Although 563 of the 1,200 mesiodentes identified had 699 associated complications, the remaining 637 (53.08%) had none (Table 2). Of the 563 mesiodentes with complications, 104 mesiodentes had 2 complications, 13 had 3, and 2 had 4 complications. Midline diastema constituted 35.34% of the complications, delayed eruption 20.60%, displacement of the adjacent tooth 16.60%, rotation of the adjacent tooth 11.02%, root resorption of the adjacent tooth 7.58%, cyst formation or cystic change 5.29%, and nasal eruption 3.58% of the complications (Table 2).

Mesiodentes positioned within the arch (overlap) had a greater frequency of cyst formation and displacement of the adjacent teeth than mesiodentes positioned lingually or labially (Table 2). The mesiodentes located in the midline showed a greater frequency of complications than those in other locations. The tuberculate mesiodentes had a greater frequency of complications than other mesiodentes (Table 2). The mesiodentes with a normal direction were found to cause more displacement. The mesiodentes with a horizontal direction showed a greater frequency of displacement of the adjacent permanent incisors and cyst formation than the others (Table 2).

Discussion

Mesiodens is one of the developmental anomalies commonly seen in dental clinics and can cause esthetic or pathologic problems. Therefore, early detection is the most important measure for the prevention of complications. A thorough clinical examination and comprehensive radiographic imaging are necessary for an accurate diagnosis when considering the possibility of mesiodens.

Mesiodentes are known to occur more frequently in males than in females. The male/female ratio has been reported to range from 1.4 to 2.2.⁵⁻¹⁰ In the present study, the ratio was 2.74, similar to that of previous reports. The average number of mesiodentes was 1.33 for males and 1.21 for females.

Most previous studies have shown a predominantly palatal position for the mesiodentes.^{8,10} Our study results are consistent with this general observation. Using a tube-shift method, we found that 91.50% of 1,200 mesiodentes were in the palatal position. Previous studies reported that approximately 25% of mesiodentes were located in the midline and the remaining 75% were located in the unilateral location.² Consistent with these previous reports, we found that 15.67% of mesiodentes were located in the midline and 84.33% were mainly in a unilateral location.

Table 3. RELATIONSHIP BETWEEN ERUPTION STATUS AND MESIODENS SHAPE

Status	Conical	Tuberculate	Supplemental	Other Configuration	Total
Erupted	85 (9.26)	12 (5.43)	2 (9.52)	1 (2.50)	100 (8.33)
Impacted	833 (90.74)	209 (94.57)	19 (90.48)	39 (97.50)	1100 (91.67)
Total	918	221	21	40	1200 (100)

Data in parentheses are percentages.

Hyun et al. *Characteristics and Complications of Mesiodens. J Oral Maxillofac Surg* 2009.

The present study showed eruption of 8.25% of the mesiodentes. Most of the mesiodentes remained impacted; thus, they were difficult to observe clinically and were detected first by radiography. Therefore, a radiographic examination on a regular basis is required for early detection. If an unerupted mesiodens is present, the location and number of the mesiodentes should be further determined using a periapical and an occlusal radiographic examination.

Mesiodentes have been known not to cause any clinical signs in many cases; however, they can occasionally cause clinical complications involving the adjacent tooth and tissue. The complications include delayed eruption in children with mixed dentition or permanent dentition, midline diastema, displacement or rotation of adjacent permanent incisors, cyst formation or cystic changes, resorption or dilaceration of adjacent tooth roots, and nasal eruption (Fig 2).⁸⁻¹⁷

In a study of 204 mesiodentes found in children, 19.1% were reportedly not associated with any complications.¹⁸ In contrast, 65.5% of 256 mesiodentes found in an adult population did not have any effects on the adjacent tooth.¹⁹ The present study, which

included an adult population, found that 53.08% of the 1,200 mesiodentes were not associated with any complications and that 46.46% of the 919 patients had no complications.

In the present study, of the 699 complications, 247 (35.34%) were midline diastema, 144 (20.60%) were delayed eruption, 116 (16.60%) were displacement of the adjacent teeth, and 77 (11.02%) were rotation of the adjacent teeth. Thus, malocclusion was one of the most common complications caused by mesiodens. If a malocclusion in the maxillary anterior region is diagnosed, the presence of any mesiodens should be checked before treatment is planned. In the present study, 53 complications (7.58%) involved resorption of the adjacent tooth root, 37 (5.29%) were cyst formation or cystic changes, and 25 (3.58%) were nasal eruptions. Although mesiodens might not cause an orthodontic problem in mixed dentition, approximately 15% of the complications caused by mesiodens can result in these problems.

In the present study, complications were found in approximately one half of the patients having a mesiodens. To prevent complications and for timely sur-

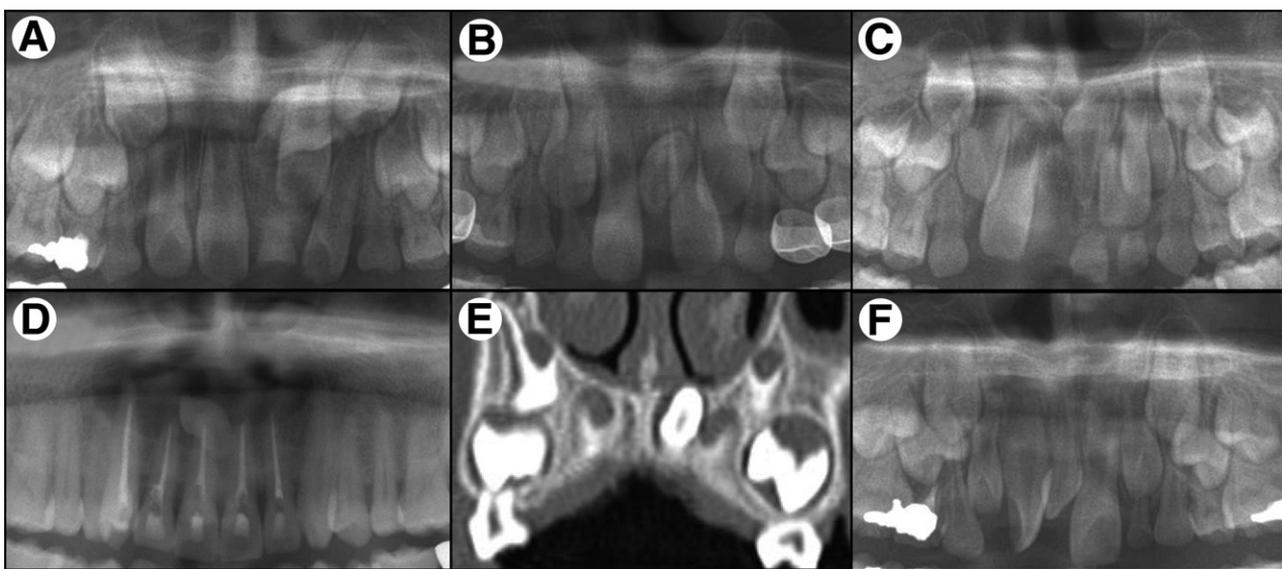


FIGURE 2. Complications due to mesiodens. A, Delayed eruption of left maxillary central incisor. B, Midline diastema. C, Dislocation of maxillary central incisors. D, Cyst formation. E, Nasal eruption. F, Rotation of right maxillary central incisor.

Hyun et al. *Characteristics and Complications of Mesiodens. J Oral Maxillofac Surg* 2009.

gical intervention, radiographic examination on a regular basis is highly recommended for the early detection of a mesiodens, in addition to any other developmental anomalies.

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