

Mesiodens: A Hospital Based Study

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ABSTRACT

Background: A mesiodens, is the most frequent supernumerary tooth present in the maxillary central incisor region. This study is conducted to know the radiographic characteristics and management of mesiodens in children visiting hospital.

Methods: A cross-sectional retrospective data collection was done from hospital dental records of children who visited the institution from December 2015-December 2016. Radiographic characteristic of mesiodens including the number, shape, position, direction of crown and complication caused by mesiodens were recorded. Data were analyzed using IBM SPSS v.20.0.

Results: Out of 1871 dental records, it was found that 40 children had 53 mesiodens, with male female ratio of 3:1 and most of them were discovered at 8 years. Majority of mesiodens, 54.7% were erupted, conical, palatally placed with 77.3% vertically directed crown. Complications associated with it were crowding followed by diastema and delayed eruption. Among 40 children, one had three mesiodens, eleven had two mesiodens and rest had one each. Radiographically fully formed tooth was seen in 29 mesiodens. Immature apex was seen in 38 central incisors associated with mesiodens. Management undertaken was simple/surgical extraction and only few cases were kept for periodic observation.

Conclusions: Periodic radiographs act as an important tool for clinicians in detecting and managing mesiodens.

Keywords: Children; complications; extraction; Kathmandu; mesiodens; radiograph.

INTRODUCTION

A mesioden is most frequent supernumerary tooth present in maxillary central incisor region and can remain asymptomatic for years.¹ Mesiodens may occur as single or multiple, unilateral or bilateral and may be erupted or impacted. There are two subclasses in classification of mesiodens. The first group is eumorphic teeth resembling central incisor. Second group is dysmorphic teeth categorized into conical, tuberculate, supplemental and odontomas.¹⁻³ They are detected only if complications arise or noticed accidentally during routine radiographic examination. They might cause clinical complications like retention of the primary teeth, delayed/failure of eruption of permanent teeth, ectopic eruption, rotation of adjacent teeth, root resorption, abnormal diastema, formation of dentigerous and primordial cysts, hence requiring surgical or orthodontic intervention.^{1,4-8}

This study was conducted to determine radiographic features and management of mesiodens in the Department of Pediatric Dentistry at Kantipur Dental college and hospital.

METHODS

A cross-sectional retrospective study was done that comprised data from non-syndromic patients aged 3-15 years who visited Pediatric Dentistry department at Kantipur Dental College and Hospital or routine dental check-ups from December 2015- December 2016. The data was collected from 1st January 2017- 30th February 2017 after taking approval from institutional review committee. Either a periapical or panoramic radiograph, or both were examined in patients that had mesiodens or complications associated with mesiodens. All radiographs were manually studied by a single skilled dentist on a transparency projector under constant

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lighting conditions. In addition to gender and age distribution, the following characteristics were recorded about the mesiodens: (1) number; (2) morphology; (3) eruption status; (4) sagittal position; (5) direction of the crown; (6) complications caused by it; (7) maturation of the permanent incisors; (8) development status of mesiodens, and (9) management.

Data were analyzed using the IBM SPSS v.20.0 and results were tabulated. The differences between the groups were tested using the Chi-square test. The level of significance was set at 5% ($p < 0.05$) with confidence interval at 95%.

RESULTS

A total of 40 patients were diagnosed as having mesiodens from 1871 children dental records, of which 30(75%) were boys and 10(25%) were girls. The male female ratio was 3:1 and most of the mesiodens were discovered in the median age $8(8.19 \pm 3.045)$ years (Table 1). A total of 53 mesiodens were detected, 43(81.1%) of which were seen in permanent teeth and 10(18.9%) were in deciduous teeth. Twenty nine (54.7%) mesiodens were erupted and 24(45.3%) were impacted. Complications associated with mesiodens were crowding in 17(32.1%) cases, diastema in 14(26.4%) followed by delayed eruption in 10(18.9%) and 12(22.6%) patients were asymptomatic. Regarding sagittal position of the mesiodens, 35 (66%) of them were palatally placed, 15(28.3%) were within the arch and 3(5.7%) were buccally placed. According to radiographic position 41(77.3%) mesiodens were vertically positioned, 9(17%) were inverted and 3(5.7%) were horizontally placed. Most of the cases 28(70%) had 1 mesiodens, 11(27.5%) had 2 mesiodens and 1(2.5%) patient had 3 mesiodens. According to morphology, conical shape was the most common type 46(86.8%), 6(11.3%) were tuberculate and 1(1.9%) was supplemental. Out of these 53 mesiodens 7(13.2%) showed crown formation only, 17(32.1%) showed partial root formation and 29(54.7%) showed fully formed teeth. Radiographically central incisor associated with mesiodens showed immature apex in 38(71.7%) cases and mature apex in 15(28.3%) cases. The treatment modalities undertaken were, simple extraction in 29(54.7%) cases, surgical extraction in 19(35.8%) cases and 5(9.4%) cases were kept under observation depending upon placement of mesiodens and status of the permanent teeth (Table 2). Extractions were found to be statistically significant ($p < 0.05$) at age group 6-11 years (Table 3).

Table 1. The frequency of mesiodens according to age.

Age range (years)	Frequency	Percentage	Mean \pm S.D.	Mesiodens present
0 - 5	367	19.6 %	8.19 (± 3.045)	3 (7.5 %)
6 - 11	1183	63.2 %		28 (70 %)
≥ 12	321	17.2 %		9 (22.5 %)
Total	1871			40

Table 2. Characteristics of mesiodens.

Mesiodens characteristics	Frequency (n)	Percentage (%)
Total no	53	100
Gender		
Male	30	75
Female	10	25
Type of teeth		
Deciduous	10	18.9
Permanent	43	81.1
Number		
Single	28	70
Double	11	27.5
Triple	1	2.5
Eruption position		
Erupted	29	54.7
Impacted	24	45.3
Sagittal position		
Buccally	3	5.7
Palatal	35	66
Within arch	15	28.3
Complication		
Crowding	17	32.1
Diastema	14	26.4
Delayed eruption	10	18.9
Asymptomatic	12	22.6
Morphology / shape		
Conical	46	86.8
Tuberculate	6	11.3
Supplemental	1	1.9
Direction of crown		
Vertical	41	77.3
Inverted	9	17
Horizontal	3	5.7
Formation		
Only crown	7	13.2
Partial root	17	32.1
Entire tooth	29	54.7
Incisor apex		
Mature	15	28.3
Immature	38	71.7
Treatment		
Simple extraction	29	54.7

Surgical extraction	19	35.8
Observation	5	9.4

DISCUSSION

Mesiodens may occur individually or in multiples which are termed as mesiodentes.⁸ In the present cross-sectional retrospective study based on the hospital records, 40 patients showed the presence of 53 mesiodens. The male female ratio in present study was 3:1 which was similar to findings of other studies like, Kim et al.,⁹ Asami et al.⁷ and Huang et al.⁴ that reported 4:1, 2.8:1 and 2.5:1, respectively. In this study, 81.1% mesiodens were present in permanent dentition which was in agreement with the findings by Ferres-Padro et

al.¹⁰

Mesiodens were most frequently seen in 8 (8.19 ±3.045) years old children in this study (Table 1). Similarly, Kazanci¹¹ discovered largest number of mesiodens at 8-9 years and Asami et al.,⁷ at 7 years. This period coincides with eruption time of maxillary central incisor and complications such as delayed eruption, crowding often leading to dental visits followed by radiographic examinations. Therefore it's logical that most mesiodens were discovered in this period.¹¹

Most of the mesiodens in our study were erupted in 54.7% cases similar to study by Sulabha et al.¹² and impacted mesiodens were 45.3% which was lower than other studies in literature.^{8,11,13} This may be explained by

Table 3. Age and Treatment of mesiodens.

Age range (years)	Maturation		Dentition		Management/ Treatment		
	Immature	Mature	Permanent	Deciduous	Simple Extraction	Surgical Extraction	Observation
0 - 5	3 (5.7%)	0 (0%)	0 (0%)	3 (5.7%)	0 (0%)	0 (0%)	3 (3.7%)
6 - 11	32 (60.4%)	4 (7.5%)	29 (54.7%)	7 (13.2%)	22 (41.5%)	12 (22.6%)	2 (3.7%)
≥ 12	3 (5.6%)	11 (20.7%)	14 (26.4%)	0 (0%)	7 (13.2%)	7 (13.2%)	0 (0%)
Total	38 (71.7%)	15 (28.3%)	43 (81.1%)	10 (18.8%)	29 (54.7%)	19 (35.8%)	5 (9.4%)

presence of large numbers of conical mesiodens which are more likely to erupt.^{13,14}

von Arx et al.¹⁵ reported that majority of supernumerary teeth laid palatal to central incisors, similar to our result. The difficulty level increases in the labio-palatal impactions. Higher the impaction in the palate, less is the chance of damage to the apices of permanent teeth. Thus a careful surgical approach helps in removal of the supernumerary tooth without hampering the vitality of adjacent teeth.¹⁶

In present study, the number of mesiodens was one in 70%, two in 27.5% and three in 2.5%. Similarly many studies reported single mesiodens.^{4,7,9,13,14} In our study mesiodens shape was mainly conical (86.8%) followed by trabeculate and supplemental. Conical was found to be the most common type in accordance with other studies.^{2,9,14,17,18} Tuberculate mesiodens are common in permanent dentition that rarely erupt but may cause delay eruption of permanent incisors while supplemental mesiodens are more commonly seen in primary dentition resembling tooth of normal series and are rarely unerupted supporting the findings of our study.^{1,4,7,14}

In the present study, complications due to mesiodens were crowding (32.1%) of central incisors followed by diastema

and eruption, but 12(22.6%) cases were asymptomatic. Similar finding was seen in study by Roychoudhury et al.¹⁹ Various authors have reported mesiodens causing displacement/rotation of the adjacent teeth in 28-63% of the cases and delaying or preventing eruption of central incisors in 26-52% cases.^{1,2} These results also support the findings of the present study.

The direction of crown of mesiodens were mostly vertical followed by inverted and horizontal which was similar to that reported by Patil et al.¹⁷ and Kazanci et al.¹¹ The direction affects the management undertaken.

In the present study, 29 mesiodens showed fully formed teeth, 7 showed partial root formation and 7 showed crown formation only. This could be because, conical mesiodens is mostly diminutive peg-shaped and erupts as completely formed tooth because their root formation is ahead of or at an equivalent stage to that of the central incisor.^{1,14,17} The trabeculate mesiodens develops later and show delayed or incomplete root formation when compared with the adjacent teeth and often interferes with the eruption of incisors.¹⁷

Permanent central incisor radiographs associated with mesiodens showed immature apex in 38(71.7%) cases and mature apex in 15(28.3%) cases which is an important

criteria for treatment planning to the clinician. Some treatment approach calls for late extraction of mesiodens when the adjacent permanent incisors have completed their root formation.^{20,21}

Looking at the position of mesiodens and maturation of permanent incisors apex, there can be confusion about whether mesiodens should be extracted simply/ surgically or they should be retained and followed up radiologically.¹³ The management undertaken in this study were, simple extraction for 29(54.7%), surgical extraction for 19 (35.8%) and 5 (9.4%) were kept under observation. Extractions were found to be statistically significant at age group 6-11 years. Similarly, Russell and others recommended extraction of mesiodens in the early mixed dentition stage to allow normal eruptive forces for spontaneous eruption of the permanent central incisors after the extraction thereby minimizing the need for orthodontic treatment.^{1,2,18,19,22,23} Hogstrom et al.¹⁶ has suggested the removal of the mesiodens before the root development of the adjacent incisors is completed. However, surgical removal of a mesiodens in the primary dentition is usually not recommended because the surgical procedure could lead to the displacement or damage to the developing tooth buds. Another reason is that the primary supernumerary teeth generally erupt into the oral cavity due to the presence of the wide interdental spaces.²⁴ Another treatment modality calls for late extraction of mesiodens when adjacent permanent incisors have completed their root formation.²¹ If mesiodens is asymptomatic, periodic follow-up is necessary.^{14,25} Whatever the complications may be, early diagnosis and extraction of a mesiodens is a must to prevent malocclusion and dental abnormalities. This holds true in most of the cases in our study where majority of the mesiodens underwent extraction.

CONCLUSIONS

Early detection of mesiodens is imperative to prevent complications leading to malocclusion. Radiographic examination on regular basis is highly recommended for early detection of it. Pediatric dentists should be aware in making a correct decision to prevent complications and timely surgical intervention because a significant delay in treatment can create the need for more complex surgical and orthodontic management. This study was conducted in limited population in Nepal, the authors recommend future research involving larger population.

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