

Role Of Mesiodens In The Etiology Of Midline Diastema

Research Article

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Abstract

Midline diastema is a space between the maxillary or mandibular central incisors. It can be due to various etiology such as genetic, environmental, and so on. Mesiodens which is a supernumerary tooth located in the maxillary central incisor region, is said to be one of the causes of midline diastema. However its role in the etiology of midline diastema is not well known. The presence of diastema in the patients has esthetics and malocclusion concerns. Correct diagnosis of the etiology of diastema is essential for successful treatment. The aim of this study is to evaluate the prevalence of mesiodens in patients with midline diastema. Digital records of 1000 orthodontic patients over a six month period were retrieved and screened for presence of midline diastema. 285 patient records with midline diastema as a clinical finding were randomly selected and included in the study. Data on age, gender and presence or absence of mesiodens was methodically tabulated in Excel sheets and imported in SPSS and analyzed. Pearson's test of independence was done to check for association between the variables. From this study, it was observed that mesiodens was present only in 9% of the patients with midline diastema. Mesiodens was observed predominantly in males than in females in the age group of 10 to 18 years. In the Pearson's Chi Square test p value was 0.00 among different age groups ($P < 0.05$ statistically significant). Among the genders Pearson's Chi Square test p value was 0.014 ($P < 0.05$ statistically significant). Within the limits of the study, it can be concluded that the role of mesiodens in the etiology of midline diastema was not significant. There was statistically significant association between age, gender and presence of mesiodens. Males showed more prevalence of mesiodens than females. Mesiodens was observed more commonly in the younger age group.

Keywords: Midline Diastema; Mesiodens; Orthodontic Treatment; Prevalence.

Introduction

Aesthetics and function are the two most important goals of modern-day dentistry [1-3]. Maxillary midline diastema is one of the most frequently seen malocclusions. Andrews described the dental midline diastema as a rather common form of incomplete occlusion characterized by a space between the maxillary and less frequently the mandibular central incisors [4].

Midline diastema is generally considered a part of normal dental development during mixed dentition period, which will be self corrected after eruption of maxillary canine [5, 6]. However midline diastema unrelated to the eruption of teeth has been observed owing to various etiological factors such as supernumerary teeth,

congenital absence of permanent teeth, deleterious oral health high frenal attachment and others [7, 8]. Treating the midline diastema is a problem for the dental practitioner as many different aetiologies are reported to be associated with it [9].

Teeth which are in excess from the normal number are known as supernumerary teeth [10, 11]. The supernumerary teeth when located in the maxillary central incisor region are called as mesiodens [12]. Their prevalence has been estimated to be 0.15 to 2.2% of the population with a predilection for males [13]. The most common type of supernumerary tooth is mesiodens. It can be single or multiple in an arch. The presence of a mesiodens is usually found to be impacted, with a conical crown and a single root [14]. The diagnosis of the mesiodens is made by clinical and radiographic examinations.

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Evidence regarding etiology of mesiodens indicates that genetic susceptibility together with environmental factors might increase the activity of dental lamina leading to formation of the extra tooth [15, 16]. Extraction of mesiodens in the early mixed dentition helps spontaneous alignment of the adjacent teeth [17].

Clinician's knowledge of common anomalies and their location in the primary and mixed dentition will result in early diagnosis and may consequently prevent further complications [18]. Therefore, this study was conducted to evaluate the prevalence of mesiodens in patients reporting with midline diastema.

Materials and Method

Study Setting

This study was based on data collected from the digital database of Saveetha Dental College and Hospitals. From 86000 patient records over a six month period from September 2019 to February 2020, 1000 records of patients reporting with Orthodontic complaints was retrieved. Approval was obtained from the institutional Scientific Review Board and ethical committee. The ethical approval number for the present study is SDC/SIHEC/2020/DIASDATA/0619-0320. Two examiners were included in the study.

Sampling

Data was collected retrospectively over a six month period spanning from September 2019 to February 2020. A total of 1000 case sheets of patients were reviewed. Cross verification of data for error was done by presence of additional reviewer and by photographic evaluation. Simple random sampling was done to minimize sampling bias. 1000 case records were screened for clinical finding of mesiodens using appropriate filters. The final sample size was 285 patients with midline diastema.

Data collection

The data was entered in the system in a methodical manner. For the present study, Clinical examination, radiographic examination, orthodontic diagnosis and photographs of these patients were evaluated to find the presence of midline diastema and

mesiodens. The data was entered in excel manually and imported to SPSS for analysis. Incomplete or censored data was excluded from the study.

Analytics

IBM SPSS Software was used for data analysis. Descriptive statistics which included frequency of distribution and Pearson's Chi Square test was used for analysis. $p < 0.05$ was considered statistically significant.

Results and Discussion

Incidence of mesiodens in the study population was less. Age group of 10-18 years and 19-35 years showed more prevalence of mesiodens which accounted to 37.5% and 9.4% of the patients with midline diastema (figure 1). Mesiodens was present predominantly in males than females. It was observed that out of 178 males, mesiodens was present in 12.4% and absent in 87.6% and out of 107 females, mesiodens was present in 3.7% and absent in 96.3% (figure 2). Mesiodens was noted in only 9.3% of the patients with midline diastema while the rest of 90.8% was due to other etiologies (figure 3). Chi square test was done to test for association between age and mesiodens. Association was found to be statistically significant. Pearson's Chi Square p value was 0.00 hence proving that association of mesiodens among midline diastema patients in different age groups is statistically significant ($P < 0.05$). Chi square test was done to test for association between gender and mesiodens and the association was found to be statistically significant. Pearson's Chi Square p value was 0.014 hence proving that association of mesiodens among male and female midline diastema patients is statistically significant ($P < 0.05$).

In this study, it was observed that only 9% of the patients with midline diastema had presence of mesiodens. Also, mesiodens showed more prevalence in males in the younger age group. Campbell et al., stated that midline diastema could be transient or created by developmental, pathological or iatrogenic factors [19]. Treatment of diastema varies and it requires correct diagnosis of its etiology and early intervention relevant to the specific etiology. Correct diagnoses includes medical and dental history, radiological and clinical examination and possibly tooth size evaluation [20, 21].

Figure 1. Bar graph depicts the association between age and mesiodens. X axis denotes age group and Y axis denotes the number of midline diastema patients who have and do not have mesiodens. It shows that highest prevalence of mesiodens was observed in the age group of 10-18 years. Pearson's Chi Square value was 0.00 hence proving that association of mesiodens among midline diastema patients in different age groups is statistically significant ($P < 0.05$).

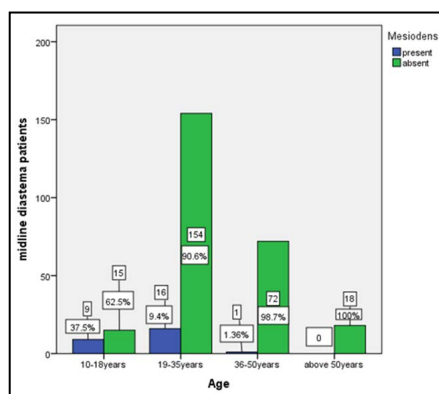


Figure 2. Bar graph depicts the association between gender and mesiodens. X axis denotes gender and Y axis denotes the number of midline diastema patients who have and do not have mesiodens. Males showed more prevalence of mesiodens compared to females. This was found to be statistically significant. Pearson's Chi Square value, $p=0.014$. ($P<0.05$). Hence Mesiodens associated midline diastema is more common among males.

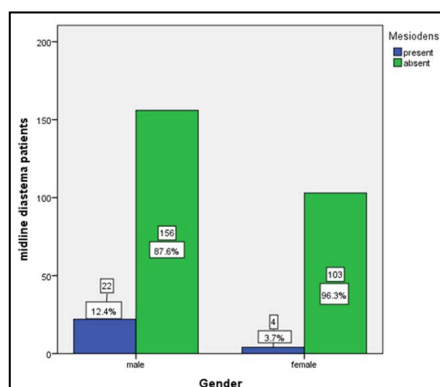
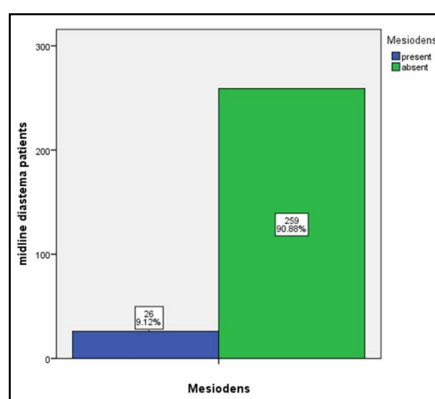


Figure 3. Bar graph represents the distribution of mesiodens among midline diastema patients. X axis denotes mesiodens and Y axis denotes the number of midline diastema patients. Blue colour denotes presence of mesiodens and green colour denotes absence of mesiodens. This shows that out of 285 patients, mesiodens was present in 9.1% and absent in 90.8% of the individuals with midline diastema.



Studies done by Asaumi et al [22], Ersin et al., [23] and kim et al., [24] reported that the prevalence of mesiodens varies from 0.15 to 7.8%, with a higher prevalence in males, with a proportion of 2:1, which was similar to the present study. Lara et al, observed that 28.57% of mesiodens was associated with midline diastema [25].

Studies by Hurlen et al., [26] and Salcido-García et al., [27] observed the prevalence of mesiodens among their study population of orthodontic patients with dental anomalies to be 1.4% and 1.6% respectively. Yamaoka et al stated that although the literature associates mesiodens as etiological factor to midline diastema, the presence of both situations in the same patient is very uncommon [28].

Similar to the results of the present study, various other studies also found the prevalence of mesiodens predominantly in males with the ratio being 1.5:1 [29, 30] Sexual differences in the prevalence of mesiodens disagreed with what has been found for tooth agenesis. Tooth agenesis is more frequent among females [31].

As in this study, mesiodens was commonly observed in younger individuals, Kazanci F et al also reported increased prevalence of mesiodens younger age group [32]. In case of asymmetry, mesiodens should be suspected [33]. In primary dentition, mesiodens often have normal shape and erupt normally and this is the reason why these teeth are often overlooked.

Management of mesiodens depends on the type and position of the tooth. Immediate removal of mesiodens is usually indicated [34]. Munns [35] stated that the earlier the mesiodens is removed, the better the prognosis.

The most preferred treatment for midline diastema due to mesiodens is the surgical removal of the mesiodens followed by the orthodontic space closure [36]. Interestingly, after the mesiodens removal, there will be 1 to 1.5 mm reduction in the diastema [37]. Spilka and Mathews stated that relapse is a major concern in the correction of midline diastema [38].

Exact diagnosis and removal of the aetiology is the key to obtaining a stable result in treatment of midline diastema. The present study however has certain limitations since it studies the prevalence in a limited demography of patients only reporting to a Dental hospital.

Conclusion

Within the limits of the study, it can be concluded that the role of mesiodens in the etiology of midline diastema was not significant. There was a statistically significant association between age, gender and presence of mesiodens. Males in the younger age group showed more prevalence of mesiodens than females.

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