



Prevalence of midline diastema and its correlation with high Frenal attachment

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ABSTRACT

The aim of this study is to assess the prevalence of midline diastema in the South Indian population and to find its correlation with high frenal attachment. The study includes patients visiting the department of orthodontics. The data was collected from the digital archives of the institution. Intraoral photos were assessed. A total 305 patients who reported to the department of orthodontics from June 2019 to March 2020 were screened. The causes of diastema namely presence of high frenal attachment, generalised spacing and periodontal disease, were evaluated. The results were statistically analysed using chi-square tests and graphs were tabulated. A total of 305 patients were screened, among which midline diastema was present in 22.3% (68) of the cases. High frenal attachment was found in 52%, generalised spacing in 36% and periodontal disease in 12% of the cases. The mean age of the patient was 23 ± 5.25 years. The incidence of midline diastema was found to be 22%. High frenal attachment was found to be the most common etiology.



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patients (Gkantidis *et al.*, 2008). It is also known as open teeth or gapped teeth (Gkantidis *et al.*, 2008; Omotosa and Kadir, 2010). It is the spacing in the anterior midline region measuring more than 0.5mm between the proximal surfaces of central incisors (Keene, 1963).

Nainar *et al.* define true midline diastema to be one without periodontal or periapical factors and with the presence of all anterior teeth in the arch (Keene, 1963; Abdulateef *et al.*, 2014) whereas, Attia defines it as spaces of varying magnitude between the crowns of fully erupted incisors (Carruitero *et al.*, 2020).

Maxillary midline diastema is aesthetic problem appearing in children and affecting adults and adolescents irrespective of gender and ethnicity (Abdulateef *et al.*, 2014; Carruitero *et al.*, 2020).

Midline diastema is caused by many etiological factors like the disproportion between teeth sizes and

INTRODUCTION

The presence of diastema between the maxillary central incisors in adults is often considered as an aesthetic or malocclusion problem (Ferguson and Rix, 1983). Midline diastema is a dento-alveolar disorder that causes special concerns to

dental arch length, abnormal labial frenum attachment between central incisors (O'Mahony *et al.*, 2011; Edwards, 1977). Also, congenitally missing or extracted incisors or canine impaction, peg lateral incisors can also be minor causes.

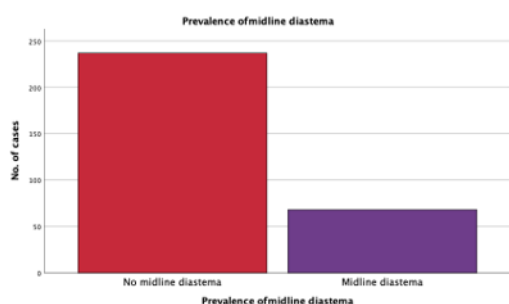
This study aims in finding the prevalence of midline diastema and its etiology among patients reporting to our institution.

MATERIALS AND METHODS

The study was conducted in the department of orthodontics of our institution. A total of 305 patients attending the department of orthodontics from June 2019 to March 2020 were screened. 68 patients were diagnosed with midline diastema and were assessed for etiology. Intraoral photographs of the patients were collected from the digital archives of the Dental Information Archive System of the institution and assessed for etiology. The distribution among male and female patients was assessed and evaluated. The most common cause of midline diastema namely high frenal attachment, generalised spacing and periodontal disease were assessed. The data obtained were subjected to statistical analysis using SPSS software version 25. Descriptive analysis and chi-square tests were performed and graphs were tabulated.

RESULTS AND DISCUSSION

The mean age of the patient was 23±5.25 years.



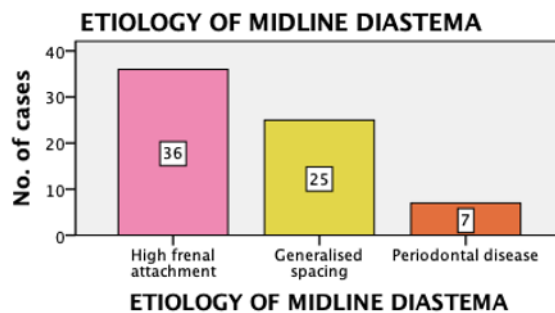
Graph 1: Shows the frequency distribution of the midline diastema among the study population

Prevalence of midline diastema

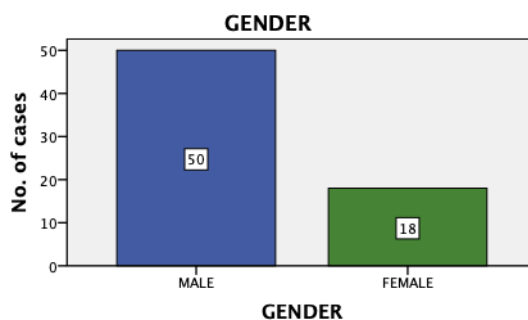
Out of 305 patients, 68 patients had midline diastema, which is about 22.3% which included both males and females. Table 1 and Graph 1 shows the prevalence of midline diastema.

Etiology of midline diastema

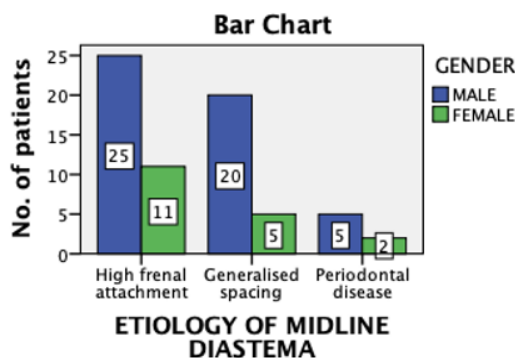
Among the patients diagnosed with midline diastema, the etiology was found to be high frenal attachment in 52%, generalised spacing in 36% and



Graph 2: Shows the frequency distribution of etiology of midline diastema among the study population



Graph 3: Shows the Gender distribution of the study population



Graph 4: Shows correlation between the etiology of midline diastema and gender among the study population

periodontal disease in 12% of the cases. Table 2 and Graph 2 shows the different etiologies of midline diastema prevalent among the population.

Gender predilection

It was found that male distribution was predominant with 73% of cases whereas females were only about 27%.

Table 3 and Graph 3 shows the gender distribution of the study population.

Table 1: Shows the frequency and percentage of midline diastema among the study population

	Prevalence of midline diastema	
	Frequency	Percent
midline diastema	68	22.3
no midline diastema	237	77.7
Total	305	100.0

Table 2: Shows the frequency and percentage of etiology of midline diastema among the study population

	Etiology of Midline Diastema	
	Frequency	Percent
High frenal attachment	36	3.6l
Generalised spacing	25	2.5
Periodontal disease	7	.7
Total	68	6.8

Table 3: Shows the frequency and percentage of the gender distribution of the study population

	Gender	Frequency		Percent	
		Frequency	Percent	Frequency	Percent
Valid	Male	50	5.0		
	Female	18	1.8		
	Total	68	6.8		

Table 4: Shows the chi-square test conducted to assess the correlation between the etiology of midline diastema gender among the study population

	Etiology of Midline Diastema	Gender		Total	Sig.
		Male	Female		
	High frenal attachment	25	11	36	0.52
	Generalised spacing	20	5	25	
	Periodontal disease	5	2	7	
Total		50	18	68	

Association between etiology and gender

Among the given population, high frenal attachment was found among 25 males and 11 females, generalised spacing among 20 males and 5 females, periodontal disease among 5 males and 2 females. Table 4 and Graph 4 shows the association between etiology of midline diastema and gender among the study population.

In Graph 1, X axis corresponds to the prevalence of midline diastema and Y axis corresponds to the number of patients. The colour red denotes patients without midline diastema and the colour purple denotes patients with midline diastema. Midline diastema was found in 68 patients. In table 2, The etiology of midline diastema was found to be

High frenal attachment in 36 patients, Generalised spacing in 25 patients and Periodontal disease in 7 patients. The prevalence of midline diastema was found to be 22.3% in Table 1.

In Graph 2, X axis corresponds to the etiology of midline diastema and Y axis corresponds to the number of patients. The colour pink denotes high frenal attachment, colour yellow denotes generalised spacing and colour orange denotes periodontal disease. High frenal attachment was found among 36 patients, generalised spacing among 25 patients and periodontal disease among 7 patients. In Table 2, The etiology of midline diastema was found to be High frenal attachment in 36 patients, Generalised spacing in 25 patients and Periodontal disease in 7

patients.

In Graph 3, X axis corresponds to the gender and Y axis corresponds to the number of patients. The colour blue denotes males and colour green denotes females. There was a higher male distribution (50 cases) than females (18 patients). It shows a male distribution in 50 patients and female distribution in 18 patients in Table 3.

In Graph 4, X axis corresponds to the etiology of midline diastema and Y axis corresponds to the gender of the patients. The colour blue denotes male population and green denotes female population. All the etiologies were more prevalent in males than females. However, this is statistically not significant (Pearson chi-square test; P-value = 0.520 - not significant). In Table 4, P-value obtained >0.05. It shows an insignificant association between the two parameters. (p-value = 0.520)

In the present study it was found that, among the given population, prevalence of midline diastema was found to be 22% and the major etiological factor was high frenal attachment with a percentage of 52%. This was similar to a study that showed prevalence of midline diastema to be 23%, but the major causative factor was generalised spacing [39%] (Abdulateef *et al.*, 2014; Carruitero *et al.*, 2020). A study reported that black children exhibit a higher prevalence [19%] of midline diastema than white children (Edwards, 1977; AlSadhan and Al-Jobair, 2017). In another study, the prevalence of midline diastema was recorded to be 7.3% and shows a higher frequency among females (Edwards, 1977; Elfadel and Abuaffan, 2016; AlSadhan and Al-Jobair, 2017). A similar study shows the prevalence of midline diastema to be 6.8% (Shenoy and Attokaran, 2016). A study done in Kenya shows that 35% of the population showed midline diastema. Another study, states that the primary factors contributing to maxillary diastema appear to be degree of spacing or crowding in most cases and that the frenal attachment making a minor contribution (Popovich and Thompson, 1979). Considerable research has been conducted in the field of orthodontics (Felicita, 2017a; Rubika *et al.*, 2015; Jain, 2014) with relevance to the current population under study (Sivamurthy and Sundari, 2016; Samantha *et al.*, 2017; Krishnan, 2015).

An attempt was made in this study to identify the prevalence of midline diastema (Kumar *et al.*, 2011; Felicita, 2017b) and its etiological factors among the population (Vikram *et al.*, 2017; Kamisetty, 2015; Viswanath *et al.*, 2015). Further studies with a larger population is advised (Felicita, 2018; Felicita *et al.*, 2012; Dinesh, 2013).

CONCLUSION

This study shows the prevalence of midline diastema to be 22.3%. The most common cause of midline diastema was found to be high frenal attachment, being present in 52% of the patients.

Conflict of Interest

The authors declare that there is no conflict of interest for this study.

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