

FREQUENCY OF DEVELOPMENTAL MAXILLARY MID-LINE DIASTEMA IN RAIWIND REGION, LAHORE

¹IFFAT BATOOL, ²ASSAD ABBAS, ³AISHA SAEED KHAN

ABSTRACT

The objective of this study was to determine the frequency of developmental maxillary mid-line diastema in different age groups of Raiwind school children. This cross-sectional study was performed in elementary school children whose ages were between 6 to 12 years. Total 700 children were screened and 511 were selected for this study (269 boys and 242 girls). Maxillary mid-line diastema widths were measured clinically with a Boley's gauge at 1.0mm above the incisal edge. Data was stratified for age and gender. Post-stratification chi-square test was applied with p value <0.05 as significant. At 6 years of age 80% girls and 60% boys had diastema, whereas, at age 12, 8.3% girls and 12.1% boys had midline diastema. Therefore it is necessary to consider gender difference when doing orthodontic treatment planning for midline diastema.

Key words: Maxillary mid-line diastema, frequency, treatment options

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INTRODUCTION

Maxillary midline diastema raises aesthetic concerns to both patients and parents in mixed and early permanent dentition owing to its location.¹⁻³ The occurrence of maxillary midline diastema can be regarded as a natural phenomenon during the transitional period from deciduous to permanent dentition.^{4,5} With the eruption of maxillary central incisors, (the "ugly duckling" stage of dental development) median diastema represents the available space for the erupting permanent dentition.⁴ It is defined as a space greater than 0.5 mm between the proximal surfaces of adjacent maxillary incisors and generally is closed by the time the maxillary canines erupt.⁴⁻⁹ In most of the children the medially erupting path of the maxillary lateral incisors and canines result in normal closure of this space.¹⁰ A diastema that remains after the eruption of the permanent incisors and canines may not close on its own and orthodontic treatment will be required to close it.

A physiological diastema exists, during the mixed dentition period, as a result of increase in the width of jaw growth for the erupting permanent incisors and canine. This space closes with the eruption of permanent

canines. In most cases a diastema of less than 2mm will close spontaneously unless the patient has generalised spacing of the dentition.^{11,12} Apart from physiological diastema, various other factors can be implicated in the etiology of mid-line diastema including genetic factors, abnormal labial frenum, missing maxillary lateral incisor, ectopic canines, tooth shape or size discrepancy, mesio-distal angulation of incisors, interarch relationship, habits, soft tissue or bony pathological lesion, supernumerary tooth or a combination of one or more factors.^{11,12}

The prevalence of median diastema varies in different population groups. The prevalence of median diastema was 7% among Californian children ranging in age of 12-18 years. In two studies on Caucasian children in the United Kingdom a prevalence of 6.8% and 3.5 to 4% was reported.¹¹⁻¹³ Racial and gender differences also exist for diastemas. The prevalence of the maxillary mid-line diastema was found to be greater in Africans than in Caucasians or Mongoloids.¹³ Black children 10 to 12 years old, exhibit a prevalence of 19% which is higher as compared to white children in which a prevalence of 8% is reported.¹⁴

There is limited data on midline diastema in Pakistani children. The frequency of diastema has been investigated in orthodontic patients.¹⁵ To assure good results in managing midline diastemas the diagnosis and treatment should be performed as early as possible. So, the investigation of the frequency of midline diastema in different age groups of children is important to understand the extent of this problem in our society so that corrective steps could be taken at an early stage to minimize its frequency.

¹ Dr Col Iffat Batool Syed, BDS, DCPS (HCSM), MCPS, FCPS, Principal, College of Dentistry, Sharif Medical and Dental College Address: 130-P Near Mini Market, Gulberg- II, Lahore. E-mail address: assad14@hotmail.com Cell: 0321-5263801

² Dr Assad Abbas, BDS, MCPS, FCPS, E-mail address: assad14@hotmail.com Cell: 03215514717

³ Dr Aisha Saeed Khan, BDS, E-mail address: aishakhan2103@gmail.com Cell: 0323-5183378

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METHODOLOGY

The study population comprised elementary school children in Raiwind area of Lahore City, Pakistan, whose ages were between 6 and 12 years. The children were examined during routine oral health screening at schools. Prior consent to examine the children was obtained from parents and school authorities. Simple random sampling technique was used. Total 700 children were screened and 511 were selected for this study. Sample size was calculated by taking 99% confidence level.

Presence of both permanent maxillary central incisors and absence of obvious dental or dentofacial abnormalities was regarded as inclusion criteria. Children who had a history of orthodontic treatment, trauma or crown restoration of anterior teeth were excluded from the study.

The clinical procedure included history-taking, oral examination and diastema width measurement. The study sample was divided into male and female groups and then further divided into 7 groups based on age from 6-12 years. Diastema widths were measured clinically with a Boley's gauge at 1.0mm above the incisal edge. SPSS version 20 (Inc., Chicago, IL, USA) was used to assess the frequency of diastema occurrence among boys and girls and the percentage of diastema among each age group was determined according to the formula: e.g: diastema% in boys at age 6= (no of boys with diastema at age 6/ total no of boys at age 6) x100.

RESULTS

The total sample size in this study was 511 children (269 boys and 242 girls). The frequency of diastema

was 52.9% among the 6 year old children, 45% among the 7 year olds while it was 28% among 11 year olds and 13.3% among 12 year-olds. There was a pattern of decreasing frequency of diastema with age.

At ages 7-9, the percentage of diastema in girls was higher than that in boys, while the percentage was higher among boys after the age of 10. At 12 years of age 15.1% of boys had diastema compared to 8.3% of girls.

DISCUSSION

This study shows that the frequency of maxillary mid-line diastema decreased with age and there was also a reduction in the mean size of diastema with age. A study on 1000 British children by Gardnier¹⁶ showed that 46% children had diastema at age 6, 33% at age 9, 18% at age 12 and 12% at age 13. In our study, the frequency of mid-line diastema in Raiwind school children among the 6 year olds (52.9%) is higher than that of Gardiner but it is lower than that of Gardnier among the 12 year olds (13.6%). This difference may be attributed to the differences in racial and ethnic background.

The frequency of diastema among boys and girls changed with age according to our study. There are an increased percentage of girls with diastema upto the age of 9 years. After that there is a gradual decline and at age 12, the percentage of boys with diastemas higher than that of girls. This is in accordance with the study done by Liu et al⁹ and Gardiner.¹⁶ The trend of increased prevalence of diastema in boys with increasing age could be because tooth development proceeds slower in boys as compared to girls consequently lateral incisors and

TABLE: 1 FREQUENCY AND PERCENTAGE OF MAXILLARY MID-LINE DIASTEMA ACCORDING TO GENDER AND AGE

Age	Gender	Number of children	Frequency of children with diastema	Diastema (%)
6	M	32	14	43.75%
	F	23	16	69.5%
7	M	69	24	34.7%
	F	53	31	58.4%
8	M	58	19	32.7%
	F	52	31	59.6%
9	M	23	10	43.4%
	F	39	20	52.6%
10	M	23	14	60.8%
	F	42	13	30.9%
11	M	30	13	43.3%
	F	19	2	10.2%
12	M	33	5	15.1%
	F	12	1	8.3%

canines erupt late.¹⁷⁻¹⁹ A diastema present in a 12 year old girl may require orthodontic intervention to close it, whereas for a 12 year old boy, waiting for it to close spontaneously may be the preferred option. Therefore gender difference should also be taken into consideration when doing orthodontic treatment planning.

According to a study done by Richardson et al²⁰ the prevalence of mid-line diastema at age 12 in Caucasians was 18.6% and in Africans was 24.6%. Horowitz¹⁴ studied the prevalence among white and black children and found that 19% of black and only 8% of white boys and girls exhibited mid-line diastema. Liu et al⁹ found that 14.6% of the children had diastema at the age of 12 years. In our study, 13.3% comparable population had mid-line diastema, which is lower than that of Africans and Taiwanese children. This result is in accordance to a study done by Levelle et al¹³, which also showed increased prevalence of diastema among Africans than Caucasians and Asians. This difference in the frequency of midline diastema among different population groups can be due to the increased number of factors contributing to midline diastema, to the definitions used to explain its presence and to gender and racial differences in the distribution of the midline diastema.²¹⁻²⁴

The frequency of diastema decreased with age and until the age of 12 years 13.3% of children had diastema and out of the total population studied, 4.9% of children had diastema greater than 2mm. Sanin et al²⁵ reported that for a diastema of 1.85 mm the possibility of space closure without treatment is only 50%; and for a 2.7 mm space it is only 1%. This finding indicates that for 4.9% of children who had diastema greater than 2, orthodontic intervention may be required to close the space as it may not close spontaneously.

The population in this study included students from elementary schools located in Raiwind area of Lahore. More studies with large sample size collected from different areas of Pakistan should be done so that the results can be generalized.

CONCLUSION

There is a trend of decrease in frequency of maxillary mid-line diastema with age.

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CONTRIBUTIONS BY AUTHORS
All Authors contributed substantially