

The Prevalence and Etiology of Maxillary Midline Diastema in a Saudi population in Aseer region of Saudi Arabia.

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Abstract

Maxillary midline diastema is a self-diagnosing esthetic problem appearing in children and affecting adolescents and adults irrespective of gender or ethnicity. In the present study, 200 patients between the ages of 13 and 40 years were examined to determine the existence, degree and etiology of maxillary midline diastema. The study sample consisted of 158 (79%) males and 42 (21%) females. Diastema was observed in 23% of the study sample with width ranging between 0.5 – 4mm. Generalized spacing (39%) was the most common causative factor. Sexual dimorphism was more in favor of males (25%) than females (14%). Significant number of the patients (78%) had at least one other member of their family with diastema, mostly brother or sister. 43% of them considered diastema to be an esthetic problem, however, all wanted to undergo treatment to close the gap in the future.

KEYWORDS: Midline diastema, teeth spacing, Saudi Arabia

Introduction

Diastema, which means interval in Greek, is a gap or space between two or more consecutive teeth. It occurs more frequently in the median plane of the maxillary arch between the two central incisors and hence called the median, central or midline diastema¹.

Maxillary midline diastema (MMD) appears during the eruption of permanent incisors and the prevalence declines sharply as a result of closure of the gap after the eruption of the permanent canines². It is found more frequently in children less than 8 years, less frequently between 9 and 11 years and its frequency continues to decrease up to 15 years of age^{3,4,5}. However, it can stay even after the eruption of canine and is often perceived as disturbing⁶.

Sexual and racial predilection exists for MMDs. Richardson *et al.*⁷, reported high prevalence in females of 6 years age, however, at age 14 the prevalence was high for males. The West African populations were reported to have a higher prevalence than the British and Chinese⁸. MMD is accepted to be an ethnic norm for blacks and Mediterranean whites⁹.

Many intraoral abnormalities, environmental and hereditary factors have been associated with the etiology of MMD¹⁰. Irregularity in size, shape and position of incisors can cause disruption of dental arch continuity in the anterior segment leading to diastemas¹¹. The presence of a high attached labial frenum is more often capable of preventing maxillary central incisors approximation, resulting in an abnormally wide MMD¹². The presence of a supernumerary tooth in the pre-maxilla region can interrupt the normal eruption of incisors leading to MMD¹³.

The objective of this study was to determine:

- The prevalence of MMD among Saudi nationals in Aseer region
- The likely causes of this anomaly in this region
- Its impact on their appearance and the occurrence rate in their family members.

Materials and Methods

158 male and 42 female Saudi patients native of Aseer region attending the Dental Clinics of College of Dentistry, King Khalid University were screened randomly to determine the existence, degree and etiology of MLD. The age range was between 13 – 40 years to exclude diastema caused due ugly duckling stage or periodontal condition. All patients with artificial or missing upper anterior teeth, periodontally weak anterior teeth and those completed orthodontic treatment were also excluded. Patients with visible space between maxillary central incisors were clinically examined by measuring the width at the incisal third of the maxillary central incisors¹⁴. The existence of a 0.5mm or more space between the maxillary central incisors was considered as a diastema and the patient as positive patient¹⁵. The measurements were carried out using a graduated periodontal probe. The causative factors were identified via intraoral examination of labial frenum, inter dental spacing, peg shaped maxillary lateral incisors, missing teeth other than the maxillary anterior teeth, oral habits and excessive over bite. Findings of clinical examination of the patients that fulfilled the study criteria were recorded in a specially designed proforma. Panoramic radiographs were taken to correlate the clinical findings. The diastema positive patients were asked about the presence of diastema in their family members, were they concerned about its presence and will they be opting to treat it in future.

Results

Prevalence and degree of MLD

Amongst the 200 patients that fulfilled the selection criteria for the study 46 (23%) had MLD (Table 1). The width of the diastemas ranged between 0.5mm to 4 mm. Majority of the diastemas had width ranging between 1 – 1.4 mm (43.5%). Diastemas with width between 2 – 2.4 mm were recorded in more than one fourth of the positive samples. Table 2 contains the details of the number and width of the diastema in positive patients.

Age and sexual dimorphism

The positive patients were aged between 13-37 years, with mean age of 25 years. Majority of the positive patients (52%) were young adults aged between 20 – 24 years (Table 3). Only 13% of them were aged between 13-19 (Table 3). Out of the 158 males and 42 females that formed the study sample MLD was observed in 40 males and 6 females (Table 1). This clearly indicated a higher prevalence in males than in females.

Etiological factors

Several intraoral abnormalities were found to be associated with the presence of MLD in the positive

patients. These were inter dental spacing, labial frenum, peg shaped maxillary lateral incisors, history of oral habits and excessive over bite of the maxillary teeth. All of the positive patients had at least one from the above mentioned causative factors. Generalized spacing was the most common factor (39%) followed by high attached labial frenum (30%). Excessive anterior over bite was associated with MLD in 22 % positive cases while 9% recalled thumb sucking habit in childhood (Table 4). Two patients had peg shaped maxillary lateral incisors associated with MLD.

78% of the positive patients had at least one of their family members with MLD. 33% of them reported MLD in their fathers, 17% in their mothers and almost 87% in at least one of their siblings (Table 5). 43% of the diastema positive patients were concerned with the appearance and all of them wanted to undergo treatment to close the gap.

Discussion

There is a unanimous agreement in the literature on the racial differences in the prevalence of MMD. A general perception in this regard is that the Africans show a higher frequency than the Caucasians and Mongoloids⁸. According to this study MMD is moderately prevalent in Saudi nationals (23%), placing them between the aforementioned two ethnically diverse populations. Two published studies on Saudi nationals are done in Jeddah¹⁶ and Riyadh¹⁷. The result of Jeddah study is in sharp contrast (4.46%) with the result of the current study (23%). Jeddah is a cosmopolitan city representing an assortment of ethnically diverse Saudi nationals. On the contrary the present study was carried with utmost care to choose Saudi patients from Aseer region only, most likely representing a considerable cross section of the community. The result of Riyadh study is in accordance with the present study. The former and later studies do not change the stated perception that MMD is moderately prevalent in Saudi nationals. Similarly, carabelli trait a very common dental anomaly is also moderately prevalent in Saudi population¹⁸.

High incidence of MMD was observed in males (Table 1) with highest frequency among young adults between the ages of 20-25 years (Table 3). This is in accordance with other epidemiological investigations on MMD⁷. As also with other studies^{19,20,21}, there is high association of MMD with generalized spacing of maxillary teeth which is found to be the most common cause in this study. The generalized spacing can be possibly reduced by the mesial drift of permanent teeth following the eruption of third molars. Thereby the reduction in the frequency of MMD in ages 25 and above may be attributed to the eruption of third molars. The widest MMD of 4mm recorded in this study was in a male patient with generalized spacing. Presence of high labial frenum concurrently with MMD in almost one thirds of the positive patients (Table 4) vindicates the findings of Ferguson and Ross et al^{22,23}. About 22% of the study group had MMD as a result of thumb sucking, a very close value reported by Al-Zahrani¹⁷. A strong correlation was observed between the occurrence of MMD in the sample population and their family members (78% - Table 5). It was interesting

	Patients	Diastema positive patients
Male	158 (79%)	40 (25%)
Female	42 (21%)	6 (15%)
Total	200 (100%)	46 (23%)

Table 1: MMD positive patients

Width of MDD (in mms)	0.5-0.9	1-1.4	1.5-1.9	2-2.4	2.5-2.9	3-3.4	3.5-4
Number of Patients	2	20	2	6	1	2	1
Percentage	4.3%	43.5%	9%	26%	4.3%	9%	4.3%

Table 2: Width of MMD in positive patients

Age group	13-19 yrs	20-24 yrs	25-29 yrs	30-37 yrs
Number of Patients	6	24	8	8
Percentage	13%	52%	17.5%	17.5%

Table 3: Age groups of Maxillary midline diastema in positive patients

Causative factor	Number of patients	Percentage	Age of patients
Generalized spacing of teeth	18	39%	17-36 yrs
High attached frenum	14	30%	22-37 yrs
Anterior over bite	10	22%	13-27 yrs
Oral habits	4	9%	21-25 yrs
Peg shaped lateral	2	4%	21 yrs

Table 4: Causative factors for Maxillary midline diastema in positive patients (2 patients had more than one causative factor)

		Number	Percentage
MMD in family members of positive patients		36	78%
	Father	12	33%
	Mother	6	17%
	Siblings	30	83%

Table 5: MMD in family members of positive patients (12 patients had MMD in more than one family members)

to note that 43% of the positive patient found MMD to be esthetically disturbing while all of them wanted to get treatment to close the gap. The available treatment options for MMD are surgical correction of high frenal attachment, orthodontic closure, composite restoration, esthetic crowns etc.

Conclusion

MMD is an esthetic issue for which successful treatment is commonly available. Saudi population is moderately affected and it is more frequent in males than in females. This study invalidates the myth that having space in between the front teeth symbolizes beauty. It upholds the belief that modern societies consider uniform dentition without spacing to be esthetically pleasing. Given the moderate prevalence in Saudis it is prudent to ensure early diagnosis, prevention and interception of MMD. Keeping a record of parents and siblings already diagnosed can help in early intervention and successful treatment planning of the immediate family members. Corrective steps should be taken at early stages for young individuals coming from families with high rate of MMD to minimize its frequency.

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