

FREQUENCY AND ETIOLOGY OF MIDLINE DIASTEMA IN ORTHODONTIC PATIENTS REPORTING TO ARMED FORCES INSTITUTE OF DENTISTRY RAWALPINDI

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ABSTRACT

Objective: To determine the frequency and etiology of maxillary midline diastema (MMD) in local settings.

Study Design: Descriptive study.

Place and duration of study: The study was carried out on orthodontic patients reporting to Armed Forces Institute of Dentistry Rawalpindi (AFID) from 2001 to 2007 at the Department of Orthodontics, Armed Forces Institute of Dentistry Rawalpindi.

Patients and Methods: A total of 1800 cases of malocclusions, were collected from orthodontic dept of AFID Rawalpindi, during research period. Sample purification resulted in a research sample of 1747 patients. The data of all patients was analysed as regards to age, gender, occlusal traits, and relevant diastema findings.

Results: The frequency of MMD turned out to be 12.59%. No single etiological factor was found responsible for MMD, however increased overjet was the most frequently (56.56%) occurring factor related to MMD, followed by high frenum attachment (33.03%) and finally deep bite, 31.6%.

Conclusion: Maxillary midline diastema is a common entity associated with multifactorial etiology.

Focusing on symptomatic treatment rather than addressing the cause oriented approach will lead to relapse of the already existing problem. Permanent retention should be considered in most cases.

Key words: Maxillary midline diastema, deep bite, increased overjet.

INTRODUCTION

Maxillary midline diastema is a frequently seen esthetic problem evident in mixed dentition stage. The midline diastema is an anterior midline spacing greater than 0.5mm between the proximal surfaces of adjacent central incisors [1].

MMD occurs in approximately 98% of six year olds, 49% of eleven year olds, and 7% of 12-18 year olds [2]. Lavelle studied the prevalence of MMD in 18-25 year old UK residents belonging to different races, he found the 3.4% Caucasians, 5.5% Negroids and 1.7% Mongoloids were affected by this condition [3]. A prevalence of 14.8% was found in North American population and 1.6% in South India. [4].

Campbell et al, studied that MMD could be transient or created by developmental, pathological or iatrogenic factors [5].

MMD is a part of normal development in children which spontaneously closes as canines come into occlusion resulting in a more

favorable position of incisor roots. In adults tooth size discrepancies and deep bite are the most common factors in the development of diastema. Incisor medio-distal angulation, generalized spacing, labio-lingual high frenum and pathological conditions are less frequent but important contributing factors. Peg laterals and increased over-jet are some of the other causes of excessive spacing in the maxillary arch [6].

An accurate diagnosis is necessary before the initiation of treatment. No treatment should be initiated if the diastema is physiological and usually if the canines have not erupted. Different treatment modalities for midline diastema include removal of etiology and simple removable appliances incorporating finger springs or split labial bow.[7] Other innovative therapies varying from restorative procedures such as composite build-up to surgery (frenectomies) and orthodontics are available. Before the practitioner can determine the optimal treatment, he or she must consider the contributing factors. These include normal growth and development, tooth-size

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discrepancies, excessive incisor vertical overlap of different causes, mesiodistal and labiolingual incisor angulation, generalized spacing and pathological conditions. A carefully developed differential diagnosis allows the practitioner to choose the most effective orthodontic and/or restorative treatment. The differential diagnosis leads to a treatment approach that most effectively addresses the patient's problem. By treating the cause of the diastema, rather than just the space, the dentist enhances both the patient's dental function and appearance. [8] Spilka and Mathews stated that in spite of the success and excellent results, orthodontists have had a problem in correcting dental abnormalities, one particular area, which lends itself to relapse, is the diastema between the incisors [9].

There is lack of local studies published on the frequency and etiology of midline diastema. This study will help in understanding the extent of this problem in our society.

PATIENTS AND METHODS

This descriptive study was conducted at Armed Forces Institute of Dentistry Rawalpindi from 2001 to 2007. A total of 1800 consecutive patients were observed for the presence of midline diastema. All orthodontic patients in their permanent or late mixed dentition (with erupted canines) were included in the study. Patients in their early mixed dentition and with cranio-facial syndromes were excluded from the study. Patients with impacted or extracted teeth were not included as were patients with inadequate records.

Dental casts of the patients were observed for the presence of diastema. Diastema was measured between the proximal surfaces of maxillary central incisors with the help of Vernier caliper, orthopantograms and intraoral photographs were observed to detect deep-bite, increased over-jet, frenal attachment, missing maxillary lateral incisor and peg lateral

Gender and age distribution was also observed

Statistical Analysis

Data was analyzed using SPSS ver 10. Descriptive statistics were used to represent the data.

RESULTS

Out of a total of 1800 patients 53 were excluded because they did not fulfill the inclusion criteria.

Data was analyzed from 1747 patients that fit all the inclusion criteria. Frequency of MMD was found to be 220 (12.59%). The mean value of MMD was calculated and it was 2.62 ± 1.28 mm. Mean age of the patients with MMD was 19.4 ± 8.51 years. This condition was found to be more frequent 73.3% in females and 27% in males.

Multiple etiological factors were observed for MMD in the sample. Among the observed factors the most frequent was excessive overjet which was found in 56.56% of the patients affected with MMD. 31.6% of the patients had deep bite, 33.03% of them had high frenum attachment while frequency for missing maxillary lateral incisor and peg shaped lateral incisor was 5.4% and 1.35% respectively (Figure).

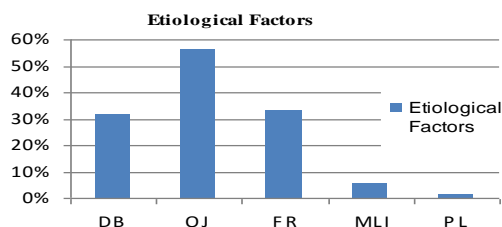


Figure: Distribution of etiological factors. DB; Deep bite. OJ; Over jet. FR; Frenum attachment. MLI; Missing Upper Lateral Incisor. PL; Peg laterals.

DISCUSSION

The percentage of MMD 12.59% is considerably higher in our sample as compared to prevalence in United Kingdom 3.4% of Caucasians [3] and 1.6% of South Indians [4]. This difference could be attributed to the difference in inclusion criteria, sampling technique or genetic predisposition perhaps because of a higher ratio of consanguineous marriages in our country [10]. The results of a medical genetic study of the spread of congenital morphogenetic types (CMGT) among 3-7 year old children living in Magnitogorsk whose territory is highly polluted with chemical compounds have shown

signs of diastema in 137.79 cases per 1000 children[5].

The MMD was found to be more frequent in females. It might be because of the greater level of esthetic concern in that gender predisposing them to visit the orthodontist more frequently.

In most cases no single etiological factor was attributable, hence only frequencies have been noted. In the earlier studies deep bite was found significantly associated with MMD [6] but in our study the most frequent etiological factor was found to be excessive over-jet 56.56%, but the other co-existing malocclusions with over-jet might be the cause of this deviation.

A marginal frequency of high frenal attachment is in line with the earlier concept that it might be the cause of diastema but this fact is not free of controversies that high frenum attachment isn't the cause but the effect of MMD [11, 12].

We also found the absence of maxillary lateral incisors in few (5.4%) of the MMD cases which might be due to the reduced prevalence of this problem altogether 2% [13]. A MMD can be due to various reasons such as hypo-dontia, tooth size discrepancy and impeded eruption. The dilemma for clinicians is whether to close, open or redistribute space. Closing space by orthodontics eliminates the need for prosthetic rehabilitation but it might compromise aesthetics and function. The prognosis for closing space and substituting congenitally missing maxillary laterals with canines depends on factors such as over-jet, lip support, crown colour, shape and root position. If these are unfavourable, opening space for prosthetic replacement is then preferred [14]. The midline alveolar bone clefts also contribute to the occurrence of MMD [15, 16]

Pathological tooth migration related to periodontal disease is a common complaint of periodontal patients.[12] we did not exclude these patients from our sample so it will be a confounding variable in our study.

The study could not focus on the precise etiology of MMD. Individual frequency of an observed etiological factor could be one of the reasons for this. Furthermore spacing in anterior region, Bolton's discrepancy, impacted canines, extractions, variable size of pre-maxilla and periodontal problems must be taken into consideration. Future studies should focus on correlation of MMD with a single etiological factor with a more purified sampling technique.

CONCLUSION

Maxillary midline diastema is a common problem with a frequency of 12.59% in our sample. Among the observed etiological factors the most frequent was excessive over-jet which was found in 56.56% of the cases Consideration of etiological factors, gingival condition and individual treatment planning are essential in the proper management of MMD.

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