MIDLINE DIASTEMA PATIENTS LESS THAN 25 YEARS OF AGE OPTING FOR ORTHODONTIC CORRECTION

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ABSTRACT:

Midline diastema is a type of malocclusion characterised by spacing present between the maxillary and mandibular central incisors. The space caused by midline diastema is generally greater than 0.5 mm. It is one of the most commonly reported chief complaints of the patients when compared to other types of malocclusions, as they find it unaesthetic. It is generally observed as a transient malocclusion in mixed dentition between the ages of 9 to 10 years but presents a problem if it persists beyond that. The objective of this study was to analyse the number of patients, below the age of 25 years, opting for orthodontic correction of midline diastema over other disciplines. This retrospective study was done among patients visiting a private dental hospital for treatment of midline diastema. Patients’ case records were obtained from the dental hospital record management software. The data collected was tabulated in excel sheet and then transferred to SPSS by IBM for statistics. After accessing 86000 patients’ case records, 339 patients with midline diastema and willing for Orthodontic treatment were selected for the study. Among these patients 62.4% were males and 32.6% were females. Patients within the age group of 19-22 years were more willing for orthodontic correction.

Keywords: midline diastema; young adults; spacing; orthodontic correction

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INTRODUCTION:

A diastema is defined as a space greater than 0.5 mm between the proximal surfaces of adjacent teeth [1]. A midline diastema is a space present between the maxillary or mandibular central incisors. In layman terms, it is also called “open teeth” or “gapped teeth”. Among the types, the maxillary midline diastema is encountered most commonly [2,3]. This specific diastema has been attributed to genetic and environmental factors even though it's a physiological feature of growth known as the ugly duckling stage, during the age of 9 to 10 years, when the permanent canines erupt into occlusion. Studies have been done stating that the gonial angle can also predict the growth pattern [4]. The ugly duckling stage presents as a concern for parents; therefore determining the timing of closure of developmental diastema is essential for clinical practice [5]. On the other hand, for most children, the medial erupting path of the maxillary lateral incisors and maxillary canines, as stated by Broadbent et al., [6] results in normal closure of this space, however for some individuals the diastema does not close spontaneously.

Apart from the developmental midline diastema, it may also occur due to other factors like high frenal attachment which is due to a V shaped bony cleft developing between the two central incisors [7,8], also occurs as a normal growth characteristic, inheritable due to large dentoalveolar arch as seen in African and Mediterranean populations [9]. Pernicious habits such as lower lip biting and digit sucking can also present as a cause of maxillary midline diastema, this can be explained by the outward pressure from prolonged oral habits with inadequate lip seal [10]. Muscular imbalances in the oral regions such as macroglossia due to syndromes, flaccid lip muscles and tongue thrust can affect the equilibrium among various forces from the intra oral and extra oral soft tissues thus causing diastema. Other etiological components include physical impediment by supernumerary teeth (mesiodens), retained primary teeth, any cysts or fibromas, abnormal maxillary arch structure in conditions such as cerebral palsy, acromegaly, due to missing teeth or peg laterals [11].

When studying the incidence of midline diastema among different races, a higher prevalence was seen among the Black population as stated by Lavelle and associates compared with Caucasians, Mongoloids [12]. Varying incidences have reported ranging from 1.6% to 25.4% [13]. From a patient’s perspective, midline diastema presents as an aesthetic problem which is true for most populations. However, in certain African and Nigerian populations, a midline diastema is considered to be a beauty trait [14]. Social, cultural and psychological norms influence the perception of physical attractiveness as it plays a major role in social interaction and influences the impression of an individual’s social skill and in France it is even viewed as “lucky teeth” [15,16]. India being a large country consists of populations from multiple ethnicities, namely seven among which Dravidians are one of subethnic groups inhabiting South India and this study is based on the same [17]. Due to this difference of views among various populations, the objective of this study was to analyse the frequency of patients less than 25 years of age opting for orthodontic correction of midline diastema. Plethora of researches have been done in our university on mini-implants used for anchorage [18–21], efficiency of different orthodontic bonding adhesives [22,23], analysed different methods of recycling brackets [24], the ill-effects of obstructive sleep apnea on dentition [25], clinical reports [26,27] but there are not sufficient epidemiological studies with the data present, hence this study was conducted to do the same.

**MATERIALS AND METHODS:**

A retrospective study was carried out in a university setting among patients visiting a dental hospital, predominantly South Indian population. Patients who visited a private dental hospital and were less than 25 years, diagnosed with either a maxillary, mandibular or both midline diastema were chosen for the study and the prevalence of the ones willing for orthodontic correction of midline diastema were chosen for the study and their preoperative case records, intraoperative photographs were checked. Records of the patients were obtained from the patient management software of Saveetha Dental College and Hospitals. The advantage of this methodology was the ease of access and the limitations was that the sample was not large enough and study was confined to a metropolitan area only. Approval for the study and permission to access patients’ records was obtained from the
The case sheets of the patients below 25 years, with midline diastema opting for orthodontic correction were collected from the time period June 2019 to March 2020. Cross verifications were done by receiving the preoperative and intraoperative photographs.

Exclusion criteria:
- Patients with history of orthodontic treatment
- Patients with periodontal pathology
- Patients with congenital syndromes
- Patients with history of ankylosis in the anterior region or with the history of trauma or surgery

Inclusion criteria:
- Patients with maxillary or mandibular midline diastema
- Patients with permanent dentition specifically 16 to 25 years of age

Incomplete data was excluded from the study due to possibility of bias. The data was collected, tabulated, frequency distribution charts were made on the patients below 25 years opting for orthodontic correction for midline diastema. Descriptive statistics was performed using SPSS by IBM and Chi square tests were done.

RESULTS AND DISCUSSION:

In this study, among a total of 339 patients chosen, 62.4% were males and 37.6% were females suggesting a male predominance (Graph 1). 18% of patients willing for orthodontic correction of midline diastema belonged to the age group, 16 to 18 years, 50.7% of patients were among the age group 19 to 22 years and 31.3% of patients comprised the age group 23 to 25 years. The most common age group of patients with midline diastema opting for orthodontic correction were ranging from 19 to 22 years, who comprised 50% of the total sample. Chi-Square association test performed between age and gender of patients opting for orthodontic correction of midline diastema gave p value > 0.05, which was non significant but a trend was seen in the direction that there was a higher prevalence of males opting for orthodontic correction.

Previous studies have shown that there are variations in the incidence of midline diastema from one population to another, among people of different racial background, age group, gender as well as the importance attached to it by people of different cultures. Orthodontic treatment is based on the principle that if prolonged pressure is applied to a tooth, tooth movement will occur as the bone around the tooth remolds [28].

In the current study of the prevalence of patients willing for orthodontic correction, the results show a greater percentage of males, more than 60% below the age of 25 years, opting for orthodontic correction of midline diastemas (Graph 1). This may be due to the age factor as between the ages of 18 to 25, having a midline diastema can be stereotypically considered as a trait of decreased intelligence by our older generations and this indefinitely plays out in his minds of male patients more than female patients. The binding relationship between orthodontic treatment and facial esthetics has made the facial outline an important guideline for the treatment planning [29]. This concept was observed by a study done in Finland where people with midline diastema were rated as less attractive and belonging to a low socio-economic class thus illustrating the social disadvantage wrongly implied based solely on the dentition even when it is healthy [30]. Similar data was reported by Schour et al wherein he stated a higher prevalence of midline diastema found in males post age 14. The high percentage of male patients is thus related to the high incidence of diastema among males [31]. Similar reports were cited by Mehdi Abdul et al, Hashim et al, Jeng-Fen Liv et al, Tren at al and Richardson et al., [5,11,32,33]. However, Mevlut Celikoglu et al stated that in the population of Turkey, there was an equal distribution of males and females with midline diastema [34].
The study also shows that a higher percentage of patients willing for orthodontic correction of midline diastema belonged to the age group 19 to 22 years, 50.7% of the population. This may be attributed to the fact that the age group of 19 to 22 years is the period of university studies and it is during this period that males and females equally tend to give more importance to their appearance due to increased exposure to the social world.

The limitations of the study are its small sample size and that the population of only one metropolitan area could be studied. However, this study sheds more light into willingness for orthodontic treatment and the perception of midline diastema. Accurate diagnosis and precise appreciation of the etiological components and the patient’s reasons and expectations will aid us in better understanding of midline diastema, early prediction, overcoming major issues like anchorage loss and post treatment relapse [35] and eventually in optimal treatment outcomes.

Graph 1: Bar graph denoting frequency distribution of gender of the patients opting for orthodontic correction of midline diastema. X axis represents the gender of the patients and Y axis represents total number of patients in that category. There was a higher prevalence among males opting for orthodontic correction of midline diastema.
Table 1: Frequency distribution of age and gender of patients opting for orthodontic correction of midline diastema. It is evident that more patients are in the age group - 19 to 22 years.

<table>
<thead>
<tr>
<th>GENDER</th>
<th>Total</th>
<th>16 to 18 years</th>
<th>19 to 22 years</th>
<th>23 to 25 years</th>
<th>212</th>
</tr>
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<tbody>
<tr>
<td>Male</td>
<td>36</td>
<td>106</td>
<td>70</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>25</td>
<td>66</td>
<td>36</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>172</td>
<td>106</td>
<td>106</td>
<td>339</td>
</tr>
</tbody>
</table>

Chi-Square Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>.938</td>
<td>2</td>
<td>.626</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>.942</td>
<td>2</td>
<td>.625</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.907</td>
<td>1</td>
<td>.341</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>339</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Chi-square association test for age and gender of patients with midline diastema undergoing orthodontic correction

Graph 2: Bar graph representing association between age groups and gender of patients willing for orthodontic correction of midline diastema. X axis represents the age groups of the patients and Y axis represents total number of patients in that category. Pearson Chi-square: 0.938, p value: 0.626 (p>0.05), hence non significant however there seems to be a trend in the direction that patients within the age group 19 to 22 years were most commonly observed to be willing for orthodontic treatment of midline diastema.
CONCLUSION:
It can be concluded that within the limits of this study, males were more willing for orthodontic correction of midline diastema than females. There was a higher prevalence of patients of age range from 19 to 22 years willing for orthodontic treatment which may be explained by the fact that young adults may have the time that they can dedicate for orthodontic treatment and they can manage Doctor’s visits on their own and their increased exposure to the outside world may be another reason for them opting for Orthodontic treatment. Further studies are required to learn about the awareness and attitude among people about midline diastema, for effective treatment planning and execution.

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