

Prevalence And Etiology of Midline Diastema in Patients Presenting to Outpatient Department of Tehsil Headquarter Hospital Tangi Charsadda

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Abstract

Objectives: To determine the Prevalence of midline diastema and etiological factors in patient presenting to outpatient department of tehsil headquarter hospital tangi Charsadda

Methodology: Cross sectional study was conducted in tehsil head quarter hospital tangi Charsadda with duration of six months and sample size was 150 participants to investigate midline diastema.

Result: We computed the frequency distribution and determined the corresponding percentages. Out of a total of 150 patients, 8 (5.3%) were diagnosed with midline diastema and 142 (94.7%) exhibited no signs of disease. When considering gender differences, among 64 females, 3 (2.0%) had midline diastema. and. Among the 86 males, 5 (3.3%) were found to have midline diastema.

Conclusion: In the given population, a small proportion of individuals were affected by midline diastema, with a prevalence rate of 5.3%. Moreover, the occurrence of midline diastema was more common among males.

Key Words: Midline diastema, malocclusion

Introduction:

Aesthetics and functionality are the primary goals of contemporary dentistry, with increasing emphasis placed on achieving harmonious facial appearance and optimal oral health. A well-aligned, pleasing smile enhances self-esteem, while proper occlusion contributes to effective mastication and clear speech.¹ Among various esthetic concerns, midline diastema gap between the maxillary central incisors—remains a commonly encountered issue in both pediatric and adult dental practice.² Its prevalence varies considerably, ranging from 1.6% to 25.4%, depending on factors such as age, ethnicity, and diagnostic criteria. Interestingly, the occurrence of midline diastema tends to decrease with age, suggesting a developmental pattern.³ The maxillary midline is more frequently affected than the mandibular counterpart, with prevalence rates reported around 20–30% for the former and 5–10% for the latter.⁴

Angle originally described the midline diastema as a form of incomplete occlusion characterized by spacing between central incisors. He emphasized the importance of eliminating such interdental gaps to achieve optimal dental function and esthetics.⁵ Public perception typically regards anterior spacing—especially maxillary midline diastema—as unattractive or unaesthetic. While some cases are self-correcting during transitional dentition phases (as noted in

Broadbent's "ugly duckling stage"), persistent diastemas in the permanent dentition often warrant intervention.⁶

Diagnosing and treating midline diastema poses a clinical challenge due to the multitude of contributing factors. These include genetic predisposition, oral habits (e.g., thumb sucking, tongue thrusting), high labial frenum attachment, abnormal tooth morphology (e.g., peg laterals), supernumerary teeth (notably mesiodens), and discrepancies between tooth size and arch length.³ Additionally, factors such as anterior traumatic bite, pathological tooth migration due to periodontal disease, and benign tumors like odontomas may contribute to the persistence or recurrence of diastemas. Understanding the underlying etiology is paramount in formulating an appropriate treatment plan.⁷

Genetic influence is evident when diastema occurs in multiple family members or is associated with abnormal frenum attachment. In such cases, early intervention may be considered, especially when the tissue blanch test suggests high frenal insertion.—⁸ Oral habits such as tongue thrusting may gradually create or exacerbate spacing in the anterior segment, and habit-breaking appliances are often essential alongside orthodontic correction.⁹ Furthermore, discrepancies in tooth and jaw size, such as small teeth within a large arch or vice versa, are well-documented contributors. Missing or malformed lateral incisors may also result in central incisor drift, producing a midline space.¹⁰

Another crucial factor is the presence of a mesiodens, which may impede the eruption or alignment of adjacent teeth.¹¹ Radiographic evaluation plays a critical role in identifying such anomalies. In cases involving odontomas or cystic lesions, surgical intervention is necessary prior to orthodontic space closure. Additionally, conditions such as macroglossia

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and anterior open bite must be carefully evaluated, as they often complicate retention and long-term stability.¹²

The timing of intervention is also a vital consideration. While many practitioners recommend delaying treatment until the permanent canines have erupted, early orthodontic management may be indicated in cases of large or symptomatic diastemas. Treatment options range from simple removable appliances to fixed orthodontic systems, composite build-ups, crowns, and prosthetics.¹³ Regardless of the chosen modality, ensuring long-term stability after closure remains a significant concern. Relapse is commonly reported, especially in cases with large pretreatment diastemas or a strong familial history. As such, permanent retention, such as bonded lingual retainers, is often advised to maintain treatment results.¹⁴

The midline diastema represents more than a mere esthetic issue, it is a multifactorial condition that demands comprehensive evaluation and individualized management.¹⁵ This article aims to explore the etiological factors, diagnostic protocols, and current treatment approaches for maxillary midline diastema, emphasizing the importance of etiology-based intervention and retention strategies to ensure long-term success.

Objectives and Rational

(1) To determine the Prevalence of midline diastema in patient presenting to outpatient department of tehsil headquarter hospital tangi Charsadda.

(2) To determine the etiological factors of midline diastema in patient presenting to outpatient department of tehsil headquarter hospital tangi Charsadda.

There is lack of studies regarding Prevalence and etiology of midline diastema in Charsadda district, Khyber Pakhtunkhwa. This study will help to generate the evidence regarding midline diastema because it has an effect on aesthetic and speech which lowers the confidence of patients.

Methodology

This cross-sectional study was conducted over six months at Tehsil Headquarters Hospital Tangi, Charsadda, Khyber Pakhtunkhwa, Pakistan, to assess midline diastema. A consecutive sampling technique was employed, and the sample size of 150 was calculated using OpenEpi, based on a population size of 428,239, an anticipated frequency of 12%, a 95% confidence level, and a 5% margin of error. The study included adult male and female patients aged 15–40 years, while patients with a history of orthodontic or prosthetic treatment, mixed dentition, missing teeth, those under 15 years, and uncooperative individuals were excluded. Ethical approval was obtained from the institutional committee, having registration number having Reg No.180/GMS/2024. and informed consent was taken from all participants. Data were collected using questionnaires and analyzed using SPSS Version 22, with continuous variables presented as mean and standard deviation, and categorical variables as frequencies and percentages.

Results

The purpose of the study was to assess the prevalence of midline diastema in tehsil headquarter hospital tangi

Charsadda KPK Pakistan. There were 150 participants with the age group of 16-40 years, in a mean age of 28 % and a standard deviation of 6. The maximum age group 21-25 years, followed by 26-30 and so on. The detailed analysis of population demographics, District Charsadda shows the distribution of males 57.3%, greater than females that are 42.7% of the total sample. Furthermore, the noticeable figures were the educational level of this district where the rate of illiteracy is 59.3%, followed by the primary level education that is 9.3% , FSc 12%, undergraduate, 14%, postgraduate 5.3%.

The clinical examination showed that according to age groups the highest prevalence was shown by 16-20 and 21-25 age ranges, with 1.3% of participants in each group having the condition. Overall, only 8 (5.3%) of participants had midline diastema of the 150 participants have midline diastema as shown in figure 1. The causes included high frenum, missing lateral incisor, peg laterals and oral habits. The details of which are given in table 1

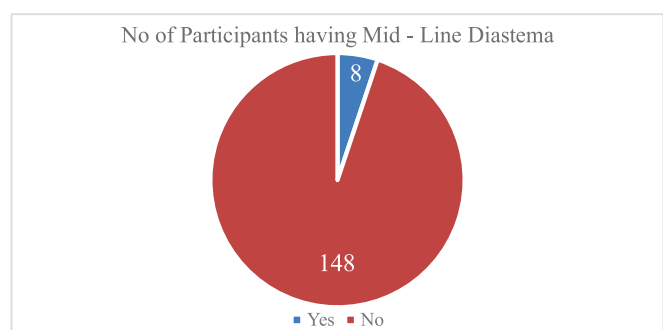


Figure 1: Number of Participants having Mid-line Diastema

Table 1: Percentage Of Mid-Line Diastema with Causes

S.No	Variables	Categories	Frequency	Percentage
1	High Frenum	Yes	3	2.0%
		No	147	98.0%
2	Lateral Incisor Missing	Yes	1	0.7%
		No	149	99.1%
3	Peg Lateral Incisor	Yes	00	0.0%
		No	150	100%
4	Oral Habits	Yes	2	1.3%
		No	148	98.7%

Discussion

Midline diastema is one of the common orthodontic issue and aesthetic problem. The observational study aimed to explores the prevalence of midline diastema for the general population of tehsil headquarter hospital tangi Charsadda KPK Pakistan visited by a self-perceived disease or on referral by a dentist. However, despite the raising awareness in developed countries, the need to evaluate midline status in home country areas is highlighted.

A non-probability consecutive sampling technique was used to recruit 150 participants. The study findings and comparisons collected from this study were clinically examined and questionnaire were filled, are presented in tables. The highest age group in our study was 21-25, followed by 26-30 and so on.

One of the recent study conducted by Azlan et, al investigated the prevalence of malocclusion among Malaysian adolescents aged 13 to 17 years which revealed that Midline diastema was

observed in 6% of the subjects,¹⁶ Whereas our study we observed that 5.3% midline diastema which is almost similar to our study results.

Another retrospective study performed by Harikrishnan R et al the male participants had more prevalence of midline diastema. In our only 5.3% midline diastema overall, gender wise male has 3.3 % midline diastema and female have 2.0% midline diastema. As their study show more midline diastema because in the mentioned study there was high percentage of high frenum i.e (39.83%) while in our study high frenum is only 2%, furthermore there is similarity in such a way that both studies have shown that male have greater midline diastema as compared to female.¹⁷

In one of the cross-sectional studies conducted by Sanjeevi et al in Chennai city India to assess midline diastema prevalence among school children aged 15-19 years. Their study finding reveals 9% midline diastema incidence rate. While the midline diastema was 5.3% in our study, further their study show no gender wise differences in midline diastema while our study show that male have higher midline diastema comparatively female this may be due to our sample size difference and study populations.¹⁸

In another cross-sectional descriptive study conducted by Elfadel et al. to assess the prevalence, causes, and perceptions of midline diastema among Sudanese university students aged 18-23 in Khartoum. Their findings indicated that the prevalence of midline diastema was 7.3%, while in our study there is 5.3% prevalence of midline diastema.¹⁹ Which is almost similar with each other, furthermore their study show that female have higher prevalence of midline diastema as compared to male while our study reveal that male have higher prevalence of midline diastema, this differences may be due to sample size and study population.

Conclusion

Midline diastema, one of the common orthodontics' conditions globally, has often been referred to as a "aesthetics issue," leading to insufficient awareness regarding its prevalence and its effects on oral health. Over the last two decades, a growing body of research has highlighted the significance of in-depth investigations within the field of orthodontic.

This study objective is to investigate the prevalence of midline diastema in tangi Charsadda, Khyber Pakhtunkhwa Pakistan. Midline diastema is a common orthodontic condition which is

characterized by abnormal space between the incisors teeth.

Within the limitations of this study, it was found that in the studied population of individuals aged 21-25 years and above, midline diastema was more prevalent. Furthermore, the research revealed that midline diastema was more common among males, additionally; the study observed that as individuals' age increased, the prevalence of midline diastema increased.

Recommendations

Conduct regular dental check-ups to identify midline diastema early and provide timely interventions. Educate patients about the impact of habits like thumb sucking and tongue thrusting on dental health, emphasizing preventive measures.

Launch awareness programs in local communities to educate people about midline diastema, its causes, and potential treatments. Address misconceptions surrounding midline diastema to reduce stigma, particularly in rural areas.

Equip hospitals and dental clinics with advanced diagnostic tools, such as radiographic equipment, to accurately assess underlying causes of midline diastema. Train healthcare providers in identifying various etiological factors, including genetic predispositions, pathological conditions, and behavioral habits.

Integrate dental health education into primary healthcare services to ensure early detection of anomalies like midline diastema. Include discussions on oral hygiene and growth monitoring in pediatric consultations.

Advocate for the inclusion of dental health education in school curriculums to teach children about the importance of oral health and its impact on overall well-being. Develop policies encouraging access to orthodontic and prosthodontic services in underprivileged areas.

Limitations

Limitation of the present study includes a small sample size and the use of only clinical parameters for disease categorization. Therefore, further research is needed to validate the results of this study. This can be achieved by incorporating various clinical, oral radiographic, genetic factors, oral bad habits, assays to diagnose and classify the status of midline diastema.

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Author Contributions

1. Muhammad Usama - Data collection and Manuscript review
2. Ibrar Ahmad - Manuscript writing
3. Talha Falak – Conceptualization and Methodology of study
4. Hussain Shah - Data Analysis