



PREVALANCE OF MAXILLARY MIDLINE DIASTEMA ACCORDING TO GENDER IN A POPULATION OF HYDERABAD

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ABSTRACT **Objective:** To find the prevalence of Maxillary Midline Diastema in the population of Hyderabad. **Materials and Methods:** This study was conducted by OroGlee Solutions Private Limited, Hyderabad. A total of 2546 subjects aged 18 to 50 years were examined for the presence of Midline Diastema, out of which 1952 were males and 594 were females. Oral examination was done using Intraoral Camera. **Results:** The prevalence of midline diastema in the present study was 33%. Out of 1952 males 702 (36%) and out of 594 females 143 (24%) had Maxillary Midline Diastema. As per gender distribution, higher incidences of midline diastema were seen in males than in females. **Conclusion:** Midline Diastema is a commonly seen concern among individuals suggesting that, early detection of diastema can help in timely treatment when facial aesthetics have a vital role to play while engaging in social activities. A study of such kind helps in understanding the prevalence and awareness, thereby paving the way for further research.

KEYWORDS : Midline Diastema, Orthodontics, Prevalence, Gender

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. Midline diastema can be physiological, dentoalveolar, due to a missing tooth, due to peg shaped lateral, midline supernumerary teeth, proclination of the upper labial segment, prominent frenum and due to a self-inflicted pathology by tongue piercing². It is a major aesthetic concern for many teenagers and young adults.

Numerous studies have investigated the frequency/prevalence of diastema. Consequently, there was a wide range of findings from 1.6% to 25.4% in adults and an even greater range in groups of young people.¹ Prevalence of midline diastema is more frequent in Blacks than in Whites.³

For patients who consider diastema to be an aesthetic concern, active treatment is available. However, not all diastemas can be treated in the same terms of modality or timing. The extent and the etiology of the diastema must be properly evaluated for proper treatment. Adequate patient cooperation, and good oral hygiene all are important. In some cases, interceptive therapy can produce positive results early in the mixed dentition. Some other treatments for diastema involve mesial tipping movement of incisors, mesial bodily approximation of the incisors, decrease of an enlarged overjet, and closing the space as part of more comprehensive orthodontic treatment.⁴

The etiology, pathogenesis and diagnosis of maxillary midline diastema have been somewhat controversial over the years. The purpose of this paper is to find the prevalence of the midline diastema in order to give the practitioner an overview to direct effective diagnosis and treatment.

MATERIALS AND METHODS

A cross-sectional survey was conducted by OroGlee Solutions Private Limited, Hyderabad among the people of corporate offices in the city of Hyderabad. A total of 2546 adults were examined at their respective places of work.

A survey questionnaire was prepared to acquire personal details such as age, gender, habits, relevant dental and medical history. Patients with midline spacing were asked about awareness, esthetic concerns and speech difficulty secondary to midline spacing.

Oral examination was done using an intraoral camera connected to a laptop to record videos of all aspects of teeth. Informed oral consent of the participants was obtained before examination.

Inclusion Criteria:

1. Participants from the age group of 18 to 50 years were included in the study.

2. Patients having all upper anterior teeth were included.

Exclusion Criteria:

1. Participants below the age of 18 years and above the age of 50 years were excluded from the study
2. Participants with missing teeth in upper anterior were excluded from the study.

RESULTS:

In this study, 2546 adults aged 18 to 50 years were examined, 845 (33%) had Maxillary Midline Diastema. Out of 1952 males, 702(36%) and out of 594 females, 143(24%) had Maxillary Midline Diastema. (FIG:1)(Table 1)

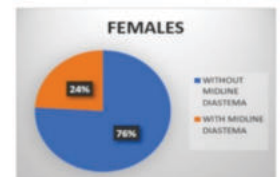
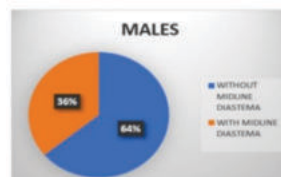
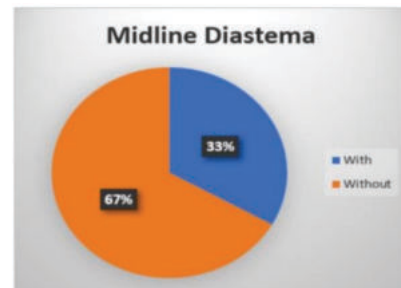


FIG:1 Pictorial representation of Gender-specific presence and absence of the Midline Diastema

Table 1: Subjects with Midline Diastema

Variables (Gender)	Total Subjects	Subject with Midline Diastema (n)	Subjects with Midline Diastema (%)
Males	1952	702	27
Female	594	143	6
Total	2546	845	33

DISCUSSION:

Diastema is an abnormal space between any two teeth. In adults after permanent teeth eruption all spaces should be closed according to Andrews's six keys of normal occlusion.⁵ the midline diastema is a space (or gap) greater than 0.5mm between the mesial surfaces of maxillary central incisors.⁶

The permanent maxillary central incisors are flared laterally for a brief period of time because the unerupted lateral incisors constrain the roots of the centrals, often called the "ugly duckling stage" of the developing dentition. This is a normal phenomenon and is self-correcting.¹ As the permanent maxillary lateral incisors and canines erupt, pressure is exerted medially, causing the space to close and the frenum to atrophy.⁴ For some individuals, however, the diastema does not close spontaneously.⁶

Etiology of Midline Diastema¹:(FIG2)

- Abnormal fusion at midline of premaxilla (32.9%),
- Enlarged or malposed upper labial frenum and high frenal attachment (24.4%)
- Midline diastema as part of normal growth (23.2%)
- Congenitally missing lateral incisors (11%)
- Supernumerary teeth at the midline (3.7%) – Mesiodens
- Microdontia (2.4%)
- Combination of imperfect fusion and congenitally missing lateral incisors (2.4%)
- Rotated teeth
- Parafunctional oral habits, such as thumb/finger sucking or tongue thrusting
- Orthodontic treatment, as in cases of rapid palatal expansion or false teeth movement
- Increased anterior overbite
- Distal or labial inclination of maxillary central incisors
- Generalised spacing
- Pathological tooth migration



Fig:2 Pictures representing Midline Diastema. Although no specific genes have been investigated for its genetic etiogenesis, many syndromes and congenital anomalies contained midline diastema as one of their components e.g., Ellis-van Creveld syndrome⁷, Pai Syndrome⁸, lateral incisor agenesis⁹, cleft palate¹⁰ and median cyst¹¹

Midline diastema is a problem concerning aesthetics and may not cause major difficulties in most of the population. Facial appearance, change in speech and self-esteem issues could be reasons for some to opt for closure of diastema.¹² People with significant midline diastema were very frequently considered less intelligent and less beautiful and were perceived to be of a lower social status in comparison to the individuals with excellent occlusion.

Because of the potential for multiple etiologies, the diagnosis of a diastema must be based on a thorough medical and dental history.

According to the present study, out of 2546 subjects in which 1952 were males and 594 were females, 845(33%) individuals had Midline Diastema. Out of 1952 males 702(36%), out of 594 females 143(24%) had Midline Diastema.

In a study conducted in Saudi by Luqman M et.al., 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 Maxillary Midline Diastema between the ages of 13 and 40 years. 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 favour of males (25%) than females (14%).¹³

In a study conducted by Gupta et.al in a population of Jammu, on the prevalence and etiology of midline diastema, he had taken a sample of 200 patients visiting the Department of Orthodontics in Indira Gandhi

Government Dental College and Hospital, Jammu, between the ages of 13 and 40 years. The patients were examined to find the prevalence and etiology of Maxillary Midline Diastema. The study sample consisted of 129 (64.5%) males and 71 (35.5%) females. Diastema was observed in 23% of the study sample with width ranging between 0.5 and 4 mm. Generalized spacing (39%) was the most common causative factor. Sexual dimorphism was more in favour in females (14%).¹⁴

In the study conducted by Hasan H S, et.al., 1021 orthodontic patients (537 males and 484 females) were randomly selected from Kurdistan-region population, attending to orthodontic department of Khanzad polyclinic teaching Centre, the prevalence of diastema in Kurdistan Region-Iraq area was found to be 23.2%. The diastema in the maxilla was 97%, in mandible 1.3% and in both was 1.7%. The highest prevalence of diastema (55.8%) was among patients aged ≥ 30 years, and it was also high (37.7%) among those aged < 15 years. The prevalence among females was (26.4%) significantly higher than that in males (20.3%). Main causes of diastema in females were thumb sucking and missing lateral incisors. The main causes of diastema in males were high labial frenum and super numerally teeth.¹⁵

In a cross-sectional study conducted by Nainar H S M, Gnanasudaram N et.al., on midline diastemas in a South Indian population in Madras, 9,774 patients aged 13-35 years were screened. True midline diastema was defined as one without periodontal/periapical involvement and with the presence of all anterior teeth in the arch. Sample purification resulted in a research sample of 166 patients with true midline diastemas. The incidence of true maxillary midline diastema ($160/9774 = 1.6\%$) was greater than that of true mandibular midline diastemas ($31/9774 = 0.3\%$).¹⁶

The practitioner can select the most efficient orthodontic and/or restorative treatment using a thoroughly designed differential diagnosis. The most receptive diastemas to restorative and prosthetic treatments are those based on tooth-size discrepancies. The best course of action frequently involves closing the midline diastema with orthodontics. Treatment options for diastema vary, and each one calls for an accurate etiology, diagnosis and early management tailored to that etiology.¹ Treatment options include Frenectomy for patients with high frenal attachments, direct restorations using composite resins, full contour porcelain crowns, orthodontic treatment (Removable or fixed appliances).

Relapse is a major factor to be considered in the treatment of midline diastema. Meticulous diagnosis and elimination of the etiology is the key to gaining a stable result. Long-term use of retainers or the use of permanent bonded lingual retainers have been encouraged, especially in cases with large diastema.^{17,18,19,20} Large pretreatment diastema and the existence of at least one family member with a related condition increases the risk of relapse.²¹

CONCLUSION:

Maxillary midline diastema is a common aesthetic complaint of patients. Speech difficulty and low self-esteem were mostly seen. Treating the midline diastema is a matter of concern for practitioners, as many different etiologies are reported to be associated with it. The appearance of midline diastema as part of the normal dental development makes it difficult for practitioners to decide whether to intervene or not at an early stage. Proper diagnosis and timing are the important part of management.

Management options are observation and follow up, orthodontic treatment, frenectomy and space closure and restorative treatment. Permanent retention is the most important part of treatment. There are variations across various studies related to diastema, therefore further research on different aspects of diastema, appearance and functionality of the oral cavity must be studied.

REFERENCES:

1. Abu-Hussein, M., & Watted, N. (2016). Maxillary midline diastema Aetiology and orthodontic treatment-clinical review. *IOSR J Dent Med Sci*, 15(6), 116–130.
2. Hussain, U., Ayub, A., & Farhan, M. (2013). Etiology and treatment of midline diastema: A review of literature. *Pakistan Orthodontic Journal*, 5(1), 27–33.
3. Sękowska, A., & Chalas, R. (2017). Diastema size and type of upper lip midline frenulum attachment. *Folia Morphologica*, 76(3), 501–505. <https://doi.org/10.5603/FM.a2016.0079>
4. Huang, W. J., & Creath, C. J. (1995). The midline diastema: a review of its etiology and treatment. *Pediatric Dentistry*, 17(3), 171–179.
5. Andrews, L. F. (1972). The six keys to normal occlusion. *American Journal of Orthodontics*, 62(3), 296–309. [https://doi.org/10.1016/s0002-9416\(72\)90268-0](https://doi.org/10.1016/s0002-9416(72)90268-0)
6. Proffit, W. R., Fields, H. W., & Sarver, D. M. (2007). *Contemporary orthodontics 4th ed.*

Philadelphia: Mosby.

7. Hattab, F. N., Yassin, O. M., & Sasa, I. S. (1998). Oral manifestations of Ellis-van Creveld syndrome: report of two siblings with unusual dental anomalies. *The Journal of Clinical Pediatric Dentistry*, 22(2), 159–165.
8. Yasuda, H., Mishima, M., & Yonemoto, T. (2013). A case of posterior reversible encephalopathy syndrome caused by acute renal failure with severe loin pain and patchy renal ischemia after anaerobic exercise. *Journal of the Japanese Society of Intensive Care Medicine*, 20(3), 405–409. <https://doi.org/10.3918/jscim.20.405>
9. Coster, D., Marks, P. J., Martens, L. A., & Huysseune, L. C. (2009). Dental agenesis: genetic and clinical perspectives. *Journal of Oral Pathology & Medicine*, 38(1), 1–7.
10. Tang, E. L., & So, L. L. (1992). Prevalence and severity of malocclusion in children with cleft lip and/or palate in Hong Kong. *The Cleft Palate-Craniofacial Journal: Official Publication of the American Cleft Palate-Craniofacial Association*, 29(3), 287–291. [https://doi.org/10.1597/1545-1569\(1992\)029<0287:PASOMI>2.3.CO;2](https://doi.org/10.1597/1545-1569(1992)029<0287:PASOMI>2.3.CO;2)
11. Neville, B. W., Damm, D. D., & Brock, T. (1997). Odontogenic keratocysts of the midline maxillary region. *Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons*, 55(4), 340–344. [https://doi.org/10.1016/s0278-2391\(97\)90121-x](https://doi.org/10.1016/s0278-2391(97)90121-x)
12. Venu, V., Muley, P., Gupta, H., & Shinde, M. P. (2022). Prevalence Of Midline Diastema In Population Of M/East Ward, Mumbai. *IJCSPUB-International Journal of Current Scienc (IJCSPUB)*, 12, 720–722.
13. Luqman, M., Sadatullah, S., Saleem, M. Y., Ajmal, M., Kariri, Y., & Jhair, M. (2011). The prevalence and etiology of maxillary midline diastema in a Saudi population in Aseer region of Saudi Arabia. *Int Journal of Clinical Dental Science*, 2(3), 81–85.
14. Gupta, R., Jandial, S., Mahajan, N., Kotwal, B., Kaur, S., & Gupta, N. (2017). The Prevalence and Etiology of Maxillary Midline Diastema in Jammu Population. *International Journal Of Preventive And Public Health Sciences*, 3(2), 41–43.
15. Hasan, H.-S., Al Azzawi, A.-M., & Kolemen, A. (2020). Pattern of distribution and etiologies of Midline diastema among Kurdistan-region Population. *Journal of Clinical and Experimental Dentistry*, 12(10), e938–e943. <https://doi.org/10.4317/jced.57122>
16. Nainar, S. M., & Gnanasundaram, N. (1989). Incidence and etiology of midline diastema in a population in south India (Madras). *The Angle Orthodontist*, 59(4), 277–282. [https://doi.org/10.1043/0003-3219\(1989\)059<0277:IAEOMD>2.0.CO;2](https://doi.org/10.1043/0003-3219(1989)059<0277:IAEOMD>2.0.CO;2)
17. Durbin, D. D. (2001). Relapse and the need for permanent fixed retention. *Journal of Clinical Orthodontics*, 35(12), 723–727.
18. Bearn, D. R. (1995). Bonded orthodontic retainers: a review. *American Journal of Orthodontics and Dentofacial Orthopedics: Official Publication of the American Association of Orthodontists, Its Constituent Societies, and the American Board of Orthodontics*, 108(2), 207–213. [https://doi.org/10.1016/s0889-5406\(95\)70085-4](https://doi.org/10.1016/s0889-5406(95)70085-4)
19. Mulligan, T. F. (2003). Diastema closure and long-term stability. *Journal of Clinical Orthodontics*, 37(10), 560–574.
20. Zachrisson BU. Important aspects of longterm stability. *J Clin Orthod*. 1997;31:562-83.
21. Shashua, D., & Artun, J. (1999). Relapse after orthodontic correction of maxillary median diastema: a follow-up evaluation of consecutive cases. *The Angle Orthodontist*, 69(3), 257–263. [https://doi.org/10.1043/0003-3219\(1999\)069<0257: RAOCOM>2.3.CO;2](https://doi.org/10.1043/0003-3219(1999)069<0257: RAOCOM>2.3.CO;2)