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MIDLINE DIASTEMA WITH LOWER ANTERIOR CROWDING

Dr Jeban Jyoti Sahu, Intern, Kalinga Institute of Dental Sciences, KIIT (Deemed to be University) 751024, Bhubaneswar, Odisha

Dr Nivedita Sahoo, Professor, Department of orthodontics and dentofacial orthopaedics, Kalinga Institute of Dental Sciences, KIIT (Deemed to be University) 751024, Bhubaneswar, Odisha

Dr Kedarnath Choudhury, Intern, Kalinga Institute of Dental Sciences, KIIT (Deemed to be University) 751024, Bhubaneswar, Odisha

Dr Katha Mandal, Intern, Kalinga Institute of Dental Sciences, KIIT (Deemed to be University) 751024, Bhubaneswar, Odisha

Dr Nayan Jyoti Sahu, 3rd-year PGT, Department of Pediatric and Preventive Dentistry, Institute of Dental Sciences, 751003, Bhubaneswar, Odisha

Corresponding author: Dr Nivedita Sahoo, Professor, Department of orthodontics and dentofacial orthopaedics, Kalinga Institute of Dental Sciences, KIIT (Deemed to be University) 751024, Bhubaneswar, Odisha

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Abstract: Midline diastema and dental crowding are common dental conditions that can affect a person's appearance and oral health. This study found that midline diastema is prevalent in adult patients in eastern India, with abnormal labial frenum attachment being the most common cause. The study also found that there is a correlation between midline diastema and lower anterior crowding.

Keywords: Midline diastema, Dental crowding, Aesthetics

Introduction: The most common malocclusion in mixed and permanent dentition are midline diastema and overcrowding of teeth, which can significantly affect the dentofacial esthetics.

Diastema, meaning "interval" in Greek, refers to a space or gap between adjacent teeth. It is most frequently observed in the center of the upper jaw between the two front teeth, hence the term median, or midline diastema.

Dental midline diastema, as defined by Angle in 1907, is a common type of malocclusion characterized by a gap in between the upper central incisors than lower central incisors. He asserted that the inter-dental diastema "always produces an unattractive appearance and interferes with speech

depending on its width". He was also aware of the midline diastema's functional and aesthetic effects.[3]

Many patients and their parents are bothered by the aesthetics of maxillary midline diastemas, which is common in youngsters and is a normal developmental feature of mixed dentition. It usually disappears on its own as dental growth advances.[1,2,4,5] However, in some cases the gap between the teeth may persist even through their adolescence. This is due to various aetiological factors such as abnormal labial fraenum, habits, missing maxillary lateral incisors, genetic, ectopic maxillary canines, periodontal status, tooth size or shape discrepancy, developmental, mesio-distal angulation of incisors.[1,2,6]

When teeth are too big for the jaw, they can overlap or misalign, leading to a condition called dental crowding. This occurs when the size of the teeth does not match the size of the jawbone.[7,8,9,10] The lower incisors are most likely to be overcrowded.[11,12,13] Dental crowding can result from various factors, such as how the jawbone develops due to genetics and environmental influences.[14] The present checks the prevalence of midline diastema and its etiology among adult patients. The study also determine the proportion of lower anterior crowding among midline diastema patients. This study was conducted in an eastern part of India, and only adults were chosen as participants, allowing for comparisons between different locations within the country and outside.

Hence, the objective of the study is to check the prevalence of midline diastema and the proportion of lower anterior crowding among them.

Materials and Methods: A retrospective study on patients attending Kalinga Institute of Dental Sciences, Bhubaneswar, Odisha, India, was conducted from January 2023 to June 2023.

Procedure: Every patient was seated in a dentist chair and their whole medical history was taken down. The oral cavity was thoroughly examined during the clinical examination using sterile disposable gloves, a mouth mirror, and a probe under natural or artificial light.

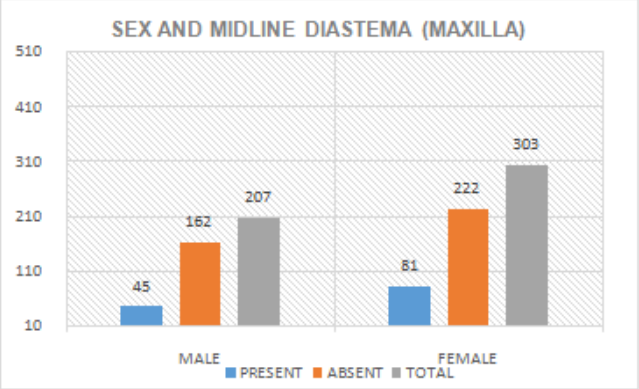
Presence of gap in the front teeth region was recorded. In case of midline diastema, the gap between the central incisors was measured directly within the mouth using a divider and ruler. This straightforward chairside method has been employed in previous similar studies.[15,16] Etiology of the midline diastema was also recorded. After that, anterior crowding in the lower arch was recorded among those patients with midline diastema. With this, a co-relation of midline diastema with lower anterior crowding was established.

To ensure accuracy, the primary observer’s examination and recording were duplicated by another observer.

Results: The collected data was summarized and analyzed using frequency tables and cross-tabulation.

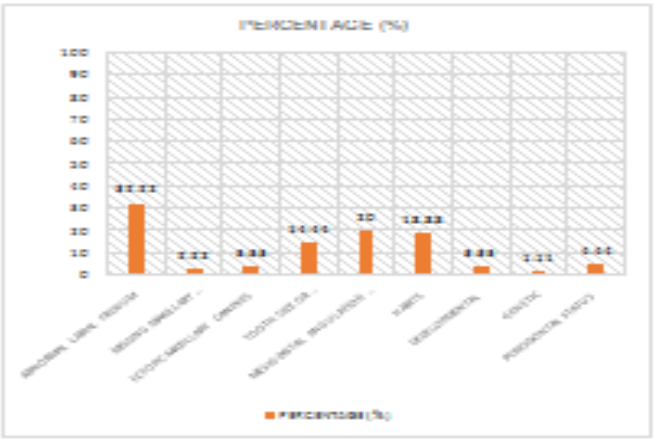
This research comprised 510 patients (207 men and 303 women) between the ages of 18-40 years. 126 (24.71%) patients presented with midline diastema and among those 24 (19.05%) patients had anterior crowding in the lower arch (Table 3). Prevalence of midline diastema was higher in females 26.73% than in males 21.74%. The occurrence of midline diastema in the maxillary arch for both genders are represented in Table: 1. Midline diastemas are more common with abnormal frenal attachment accounting for 32.22% and least common with hereditary factors accounting for 1.11% as shown in Table: 2.

SEX AND MIDLINE DIASTEMA (MAXILLA)			
SEX	PRESENT (%)	ABSENT (%)	TOTAL (%)
MALE	45 (21.74%)	162 (78.26%)	207 (100%)
FEMALE	81 (26.73%)	222 (73.27%)	303 (100%)
TOTAL	126 (24.71%)	384 (75.29%)	510 (100%)



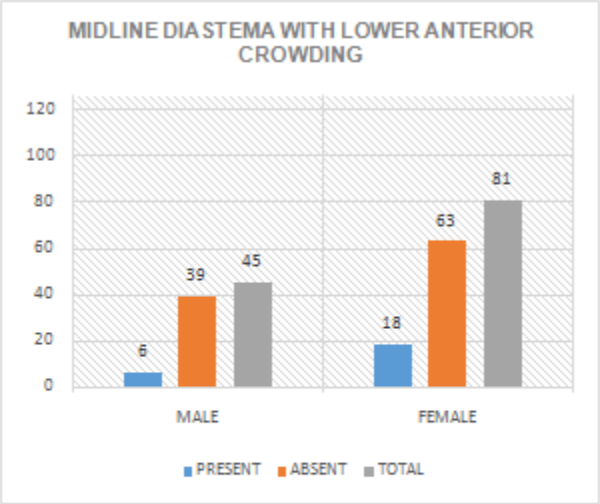
[Fig/Table: 1]. Prevalence of cases with and without midline diastema in both the genders in Maxilla

AETIOLOGY AND MIDLINE DIASTEMA (MAXILLA)		
AETIOLOGY	PRESENT (%)	PERCENTAGE (%)
ABNORMAL LABIAL FRENUM	87	32.22
MISSING MAXILLARY LATERAL INCISORS	6	2.22
ECTOPIC MAXILLARY CANINES	9	3.33
TOOTH SIZE OR SHAPE DISCREPANCY	39	14.44
MESIO-DISTAL ANGULATION OF INCISORS	54	20
HABITS	51	18.88
DEVELOPMENTAL	9	3.33
GENETIC	3	1.11
PERIODONTAL STATUS	12	4.44
TOTAL	270	100%



[Fig/Table: 2]. Distribution of aetiological factors of midline diastema in maxillary arch

MIDLINE DIASTEMA WITH LOWER ANTERIOR CROWDING			
SEX	PRESENT (%)	ABSENT (%)	TOTAL (%)
MALE	6 (13.33%)	39 (86.67%)	45 (35.71%)
FEMALE	18 (22.22%)	63 (77.78%)	81 (64.28%)
TOTAL	24 (19.05%)	102 (80.95%)	126 (100%)



[Fig/Table: 3]. Prevalence of cases with and without midline diastema with lower anterior crowding in both the genders

Discussion: In the current study, 24.71% of patients had midline diastema in the maxilla, and the most common etiological factor was abnormal frenal attachment (32.22%). However, there are several studies showing midline diastema and its etiology and also their treatment. This study shows the co-relation between the midline diastema in maxillary arch with that of anterior crowding in mandibular arch which is mostly seen in eastern states of India. Out of 24.71% presenting with midline diastema in upper arch, 19.05% have anterior crowding in lower arch.

For future research, expanding this study should include radiological examinations to complement the current clinical examination approach. Additionally, dental casts and patient photographs may aid in refining diagnostic accuracy.

Conclusion: This study concludes that, in Odisha, India, midline diastema in maxillary arch with that of lower anterior crowding is more common and midline diastema is often caused by abnormal frenal attachment.

Further research is needed to determine the exact cause of midline diastemas and rule out any underlying medical conditions. Patients and dentists should be aware of the possibility of underlying pathology, even in seemingly unimportant midline diastemas.

References

1. Azzaldeen A, Muhamad AH. Diastema Closure with Direct Composite: Architectural Gingival Contouring. J Adv Med Dent ScieRes 2015;3(1):134-139

2. Abu-Hussein M,Watted N,Abdulgani A;An Interdisciplinary Approach for Improved Esthetic Results in the Anterior Maxilla Diastema Journal of Dental and Medical Sciences 2015,14(12), 96-101
3. Angle EH. In: Angle . Treatment of malocclusion of the teeth, 7th edition. Philadelphia: S.S. White Dental Manufacturing Co., 1907:167.
4. Abu-Hussein M , Abdulgani A , Watted N Zahalka M ; Congenitally Missing Lateral Incisor with Orthodontics, Bone Grafting and Single-Tooth Implant: A Case Report. Journal of Dental and Medical Sciences 2015 , 14(4),124-130
5. Abdulgani A ,Watted N ,Abu-Hussein M DIRECT BONDING IN DIASTEMA CLOSURE HIGH DRAMA, IMMEDIATE RESOLUTION: A CASE REPORT.IJDHS2014.1(4);430-435
6. Al-Huwaizi AF, Al-Alousi WS, Al-Mulla AA. The dental midline at 13 year of age. J Coll Dentistry 2003; 15: 1-7.
7. Jadhav, V.; Tiwari, M.; Seegavadi, V.; Kamble, R.; Daigavane, P. A Formula for Estimating the Mesiodistal Width of Permanent Mandibular Central Incisors. *J. Datta Meghe Inst. Med. Sci. Univ.* **2021**, *16*, 29–32. [**Google Scholar**] [**CrossRef**]
8. Rizzo, C.; Di Bartolo, I.; Santantonio, M.; Coscia, M.F.; Monno, R.; De Vito, D.; Ruggeri, F.M.; Rizzo, G. Epidemiological and Virological Investigation of a Norovirus Outbreak in a Resort in Puglia, Italy. *BMC Infect. Dis.* **2007**, *7*, 135. [**Google Scholar**] [**CrossRef**]
9. De Vito, D.; Monno, R.; Nuccio, F.; Legretto, M.; Oliva, M.; Coscia, M.F.; Dionisi, A.M.; Calia, C.; Capolongo, C.; Pazzani, C. Diffusion and Persistence of Multidrug Resistant *Salmonella* Typhimurium Strains Phage Type DT120 in Southern Italy. *BioMed Res. Int.* **2015**, *2015*, 1–8. [**Google Scholar**] [**CrossRef**] [**PubMed**]
10. Coscia, M.F.; Monno, R.; Ballini, A.; Mirgaldi, R.; Dipalma, G.; Pettini, F.; Cristallo, V.; Inchingolo, F.; Foti, C.; De Vito, D. Human Papilloma Virus (HPV) Genotypes Prevalence in a Region of South Italy (Apulia). *Ann. Dell'istituto Super. Di Sanita* **2015**, *51*, 248–251. [**Google Scholar**] [**CrossRef**]
11. Paul, S.; Garg, S.; Saraf, B.G.; Sheoran, N.; Chawla, M.; Saji, S.E. Arch Measurements, Bigonial Width, Dental Caries, and Their Effect on Occurrence of Mandibular Incisors Crowding in Early Mixed Dentition Period. *Int. J. Clin. Pediatr. Dent.* **2021**, *14*, S57–S62. [**Google Scholar**] [**CrossRef**]
12. Tartaglia, G.M.; Mapelli, A.; Maspero, C.; Santaniello, T.; Serafin, M.; Farronato, M.; Caprioglio, A. Direct 3D Printing of Clear Orthodontic Aligners: Current State and Future Possibilities. *Materials* **2021**, *14*, 1799. [**Google Scholar**] [**CrossRef**]

13. Maspero, C.; Fama, A.; Cavagnetto, D.; Abate, A.; Farronato, M. Treatment of Dental Dilacerations. *J. Biol. Regul. Homeost. Agents* **2019**, *33*, 1623–1627. [**Google Scholar**]
14. Normando, D.; Almeida, M.A.O.; Quintão, C.C.A. Dental Crowding. *Angle Orthod.* **2013**, *83*, 10–15. [**Google Scholar**] [**CrossRef**]
15. Jonathan PT, Thakur H, Galhotra A, Galhotra V, Gupta N.Maxillary labial frenum morphology and midline diastema among3 to 12-year-old schoolgoing children in Sri Ganganagar city: A cross-sectional study. J Indian Soc Pedod Prev Dent. 2018;36(3):234-39
16. Nuvvula S, Ega S, Mallineni SK, Almulhim B, Alassaf A, Alghamdi SA, et al. Etiological factors of the midline diastema in children: a systematic review. Int J Gen Med. 2021;14:2397-405.