

Prevalence of Malocclusion and Occlusal Traits in Young Eastern Indian Population: A Multicentric Cross-sectional Study

RUPA GHOSH¹, SRIKRISHNA CHATTARAJ², SUTANU MODAK³, SHILADITYA SIL⁴, PINAKI ROY⁵, SNIGDHA MONDAL CHOWDURY⁶



ABSTRACT

Introduction: Malocclusion is emerging as a common oral health problem with an increasing demand for treatment. Studying the prevalence of malocclusion will help generate public awareness of its deleterious effects while bringing attention to the benefits of orthodontic treatment. Compiling such data will provide an understanding of the national scenario of the condition.

Aim: To determine the prevalence of malocclusion and occlusal traits with gender variation among adolescents and young adults in an Eastern Indian population.

Materials and Methods: This descriptive multicentric cross-sectional study was conducted in the Department of Orthodontics and Dentofacial Orthopaedics, Dr. R. Ahmed Dental College and Hospital, Kolkata, West Bengal, India, from February to May 2024. A total of 1062 samples, comprising 453 males and 609 females in the age group of 14-22 years, reporting to the Outpatient Department (OPD) of Government Dental Colleges of West Bengal, were randomly selected. The samples were clinically examined and classified according to Angle's classification into Class I, Class II (Div 1 and Div 2) and Class III cases. The Class I

cases were further subdivided into normal occlusion, crowding, proclination, spacing, deep bite, open bite and crossbite. To obtain gender-wise distribution of malocclusion, the subjects were categorised into male and female subjects. Data were tabulated and statistically analysed using the Chi-square (χ^2) test.

Results: The mean age of participants was 18.37 ± 2.19 years. Normal occlusion comprised 109 (10.26%) cases, while malocclusion was found in 953 (89.74%) of the total subjects. In the malocclusion group, Class I was found in 724 (68.17%) cases, Class II Div 1 in 162 (15.25%), Class II Div 2 in 33 (3.11%) and Class III in (3.2%) of the total sample. Crowding was significantly higher at 287 (39.64%) ($p < 0.001$) than other variants of Class I malocclusion. Gender dimorphism was evaluated using the Chi-square test. Significant gender differences were observed for Class I ($p < 0.001$), Class II Div 1 and Div 2 ($p < 0.001$).

Conclusion: Class I malocclusion showed the highest prevalence, with crowding being the most common variant. Females showed a higher prevalence of developing Class I malocclusion, whereas males presented with a higher prevalence of Class II Div 1 and Div 2 malocclusion.

Keywords: Crossbite, Crowding, Deep bite, Open bite, Proclination

INTRODUCTION

World Health Organisation (WHO) (1987) included malocclusion under the heading of Handicapping Dentofacial Anomaly, defined as an occlusal anomaly that causes disfigurement or impedes function and requires treatment, if the disfigurement or functional defect is likely to be an obstacle to the patient's physical and emotional well-being [1]. It is considered the third most common oral health problem after dental caries and periodontal diseases [1].

In the modern era, awareness of the benefits of an aesthetically pleasing face and a functionally healthy dentition has vastly increased. Adverse consequences of malocclusion include poor aesthetics, susceptibility to dental diseases, loss of tooth substance, low self-esteem, psychological disturbances, increased susceptibility to dental trauma and Temporomandibular Joint (TMJ) disorders [2], among other problems. Malocclusion not only affects the arrangement of teeth but can also cause restricted normal growth and development, affecting the morphology of jaws, face and cranium. Variations in the prevalence of malocclusion have been found among different races and ethnic groups [3,4]. Studying the incidence of malocclusion can provide quantitative information on the pattern of dentofacial characteristics within a population [5].

West Bengal is a state in the eastern part of India with a population of approximately 16.5 million in the age group of 14-22 years [6]. Extensive multicentric studies are required to obtain nationwide representative data. Studies on malocclusion will not only help in orthodontic treatment planning and the evaluation of dental health

services and manpower requirements but will also offer a valid research method for validating the operation of distinct environmental and genetic factors in the aetiology of malocclusion. Population-based data on dental conditions like malocclusion are a prerequisite for systemic planning and meeting the oral health needs of society.

The purpose of the study was to evaluate and quantify the malocclusion status through clinical examination and classify them according to Angle's classification. Angle's classification (1899) [7] is the most widely used and accepted method to classify major types of malocclusions. It provides a description of malocclusion that allows for easy communication between clinicians. Similar studies on the prevalence of malocclusion have been conducted in other regions like North India, South India and Maharashtra. However, no published record of the malocclusion status is available in West Bengal to date [3]. Thus, the objective was to determine and compare the prevalence of malocclusion and occlusal traits among young adults (males and females) in an Eastern Indian population.

MATERIALS AND METHODS

The descriptive multicentric cross-sectional study was conducted at the Department of Orthodontics and Dentofacial Orthopaedics, Dr. R. Ahmed Dental College and Hospital, Kolkata, West Bengal, India, from February 2024 to May 2024, spanning a period of 4 months. Approval was obtained from the institutional Ethics Committee of Dr. R. Ahmed Dental College and Hospital, Kolkata, West Bengal, before the study commenced (Ethical Committee Reg. no EC/NEW/INST/2023/3191, approval no RAD/EC/13/2023). Written

informed consent was obtained from parents/individuals willing to participate in the study.

Inclusion criteria: Young male and female patients between 14-22 years of age, with a full complement of fully erupted permanent teeth except third molars and having either Class I malocclusion, Class II malocclusion, or Class III malocclusion, were included.

Exclusion criteria: Teeth with caries, periodontal diseases, large restorations or crowns, fractured incisors with a history of orthodontic treatment, subjects with severe systemic diseases and syndromic conditions and teeth with abnormal buccolingual relationships were excluded.

Sample size: The study involved 1062 subjects, comprising 453 males and 609 females aged 14-22 years, who were available for clinical examination in the OPD of different Government Dental Colleges of West Bengal, namely Dr. R. Ahmed Dental College and Hospital in Kolkata, North Bengal Dental College in Siliguri and Burdwan Dental College and Hospital in Burdwan, within the study period.

Study Procedure

Intraoral examinations were performed in centric occlusion by instructing the patients to swallow and bring their teeth into maximum intercuspation. Subjects were classified according to Angle's classes [5], as listed below. Other malocclusion parameters such as overjet, overbite, anterior crossbite and upper and lower arch crowding and spacing were assessed. The examinations were conducted using a sterile mouth mirror and the horizontal and vertical overlapping of incisors were measured using a divider and metal ruler.

Subjects were then grouped as follows:

- Normal occlusion [Table/Fig-1]
- Class I malocclusion
- Class II Div 1 malocclusion [Table/Fig-2a,b]
- Class II Div 2 malocclusion [Table/Fig-3]
- Class III malocclusion [Table/Fig-4]
- The groups were further categorised by gender.



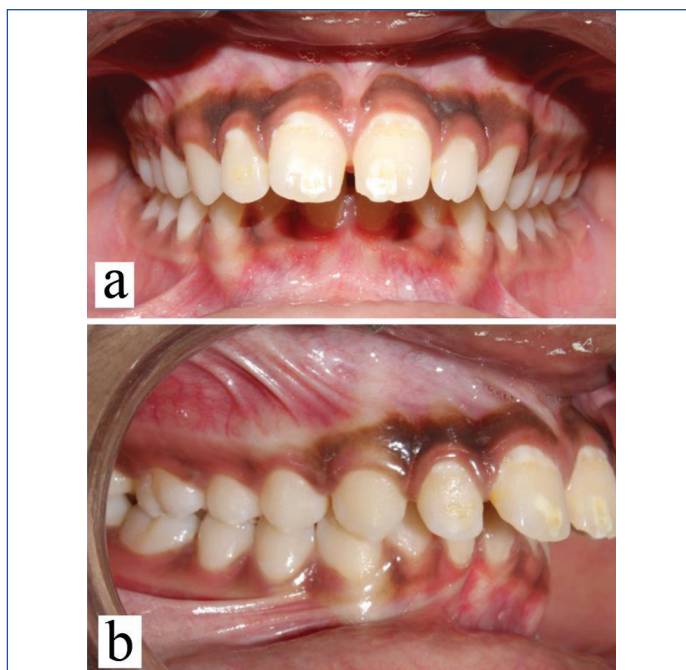
[Table/Fig-1]: Showing the normal occlusion of the patients considered in the present study.

Subjects with Class I malocclusion were subdivided into the following types:

- Crowding [Table/Fig-5]
- Proclination (Overjet >2 mm)
- Spacing [Table/Fig-6]
- Deep bite [Table/Fig-7]
- Open bite (Anterior) [Table/Fig-8]
- Anterior crossbite [Table/Fig-9]

STATISTICAL ANALYSIS

The collected data was tabulated in a spreadsheet using Microsoft Excel 2021 and then statistical analysis was carried out using



[Table/Fig-2]: Showing Angle's Class II Div 1 malocclusion patients: (a) frontal view; (b) right-side view.



[Table/Fig-3]: Showing Angle's Class II Div 2 malocclusion of the patients considered in the study.



[Table/Fig-4]: Showing the Angle's Class III malocclusion considered in the study.



[Table/Fig-5]: Showing Angle's Class I malocclusion with crowding of teeth in the anterior segment.



[Table/Fig-6]: Showing Angle's Class I malocclusion with spacing of teeth in the upper anterior segment.



[Table/Fig-7]: Showing Angle's Class I malocclusion with deep bite in the anterior segment.



[Table/Fig-8]: Showing Angle's Class I malocclusion with open bite in the anterior segment.



[Table/Fig-9]: Showing Angle's Class I malocclusion with crossbite in the anterior segment.

RESULTS

Total 1062 samples, comprising 453 males and 609 females, reporting to the OPD of Government Dental Colleges of West Bengal, were randomly selected. The age group considered was 14-22 years, with a mean age of 18.37 ± 2.19 years.

It was observed that in the current study population, 109 subjects had clinically normal occlusion (10.26%, 95% CI: 8.58-12.23). It was also noted that the proportion of subjects diagnosed with Class I malocclusion was significantly higher than other variants ($p < 0.001$). The results indicate that in the current study population, females had a higher propensity of developing Class I malocclusion, while Class II malocclusion (Division 1 and 2 respectively) was more prevalent in males [Table/Fig-10].

Types	Overall (N=1062)		Males (n=453)		Females (n=609)		p-value ^a
	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI	
Normal occlusion	109 (10.26%)	8.58-12.23	52 (11.48%)	8.86-14.74	57 (9.36%)	7.29-11.93	0.3
Class I	724 (68.17%) [#]	65.31-70.9	268 (59.16%)	54.58-63.59	456 (74.88%)	71.28-78.16	<0.001*
Class II Div 1	162 (15.25%)	13.22-17.54	97 (21.41%)	17.88-25.42	65 (10.67%)	8.46-13.38	<0.001*
Class II Div 2	33 (3.11%)	2.22-4.33	21 (4.64%)	3.05-6.98	12 (1.97%)	1.13-3.41	0.007*
Class III	34 (3.2%)	2.3-4.44	15 (3.31%)	2.02-5.39	19 (3.12%)	2.01-4.82	0.86

[Table/Fig-10]: Prevalence of various types of malocclusions stratified by gender.

N: Total sample size; n: Number of subjects in each gender; CI: Confidence intervals

#: Proportion is significantly different from others ($p < 0.001$)

^aanalysed by the Chi-square (χ^2) test between the gender

NS: Not statistically significant ($p > 0.05$), *: statistically significant ($p \leq 0.05$)

Out of the 724 subjects with Class I malocclusion, 287 subjects had crowding (39.64%, 95% CI: 36.14-43.25%), 287 subjects had proclination (23.2%, 95% CI: 20.28-26.42%), 149 subjects had spacing (20.58%, 95% CI: 17.79-23.68%), 55 subjects had crossbite (7.6%, 95% CI: 5.88-9.76%), 41 subjects had deep bite (5.66%, 95% CI: 4.2-7.59%), while the remaining 24 reported with an open bite (3.31%, 95% CI: 2.24-4.89%). It was noted that the proportion of subjects with crowding was significantly higher than other variants ($p < 0.001$) [Table/Fig-11].

Types	Frequency (%)	95% CI	p-value ^a
Crowding	287 (39.64%)	36.14-43.25	<0.001*
Proclination	168 (23.2%)	20.28-26.42	
Spacing	149 (20.58%)	17.79-23.68	
Deep bite	41 (5.66%)	4.2-7.59	
Open bite	24 (3.31%)	2.24-4.89	
Crossbite	55 (7.6%)	5.88-9.76	

[Table/Fig-11]: Distribution of subjects according to the various types of Class I malocclusion.

Total no. of subjects with Class I malocclusion=724

CI: Confidence intervals

^aanalysed by the Chi-square (χ^2) test

*: Statistically significant ($p \leq 0.05$)

When stratified by gender, crowding was found to be higher in males (41.04%, 95% CI: 35.32-47.02%) than in females (38.82%, 95% CI: 34.45-43.36%) ($p < 0.001$). Proclination was found to be higher in males (26.12%, 95% CI: 21.22-31.69%) than in females (21.49%, 95% CI: 17.97-25.49%). Spacing was found to be higher in females (21.93%, 95% CI: 18.38-25.95%) than in males (18.28%, 95% CI: 14.12-23.35%). Deep bite was slightly higher in females (5.7%, 95% CI: 3.92-8.22%) than in males (5.6%, 95% CI: 3.42-9.03%). Open bite was higher in males (3.36%, 95% CI: 71.28-78.16%) than in females (3.29%, 95% CI: 2-5.36%) and crossbite was slightly higher in females (8.77%, 95% CI: 6.51-11.72%) than in males (5.6%, 95% CI: 3.42-9.03%). All the proportions did not significantly differ from

IBM Statistical Package for the Social Sciences (SPSS) Statistics for Windows, Version 27.0 (Armonk, NY: IBM Corp). Descriptive statistics were used to report the categorical variables in terms of counts and percentages along with the 95% Confidence Intervals (CI) and they were tested using the Chi-square (χ^2) test. A p-value of ≤ 0.05 was considered the level of significance.

each other ($p>0.05$), implying a similar pattern of distribution of the Class I malocclusion traits across genders [Table/Fig-12].

Types	Males (n=453)		Females (n=609)		p-value*
	Frequency (%)	95% CI	Frequency (%)	95% CI	
Crowding	110 (41.04%)	35.32-47.02	177 (38.82%)	34.45-43.36	0.06
Proclination	70 (26.12%)	21.22-31.69	98 (21.49%)	17.97-25.49	0.15
Spacing	49 (18.28%)	14.12-23.35	100 (21.93%)	18.38-25.95	0.24
Deep bite	15 (5.6%)	3.42-9.03	26 (5.7%)	3.92-8.22	0.95
Open bite	9 (3.36%)	1.78-6.26	15 (3.29%)	2-5.36	0.95
Crossbite	15 (5.6%)	3.42-9.03	40 (8.77%)	6.51-11.72	0.12

[Table/Fig-12]: Distribution of subjects according to the various types of Class I malocclusion according to gender.

n: Number of subjects in each gender; Total no. of subjects with Class I malocclusion=724

CI: Confidence intervals

*analysed by the Chi-square (χ^2) test

NS: Not statistically significant ($p>0.05$)

DISCUSSION

In the study, normal occlusion was recorded in 10.26% of the total subjects, while malocclusion was observed in 89.74%. A face with misaligned teeth can lead to discrimination against individuals, impacting their well-being. Malocclusion, a developmental issue influenced by hereditary and environmental factors, can vary in type and frequency within different populations [8].

Similar studies conducted in various regions of India have been compiled and presented in [Table/Fig-13] [5,9-14]. The current research involved 1062 subjects (453 males and 609 females) from an Eastern Indian population in West Bengal, India. Malocclusion was assessed based on Angle's classification [7].

Author	Place/year of the study	Study type	Sample size	Prevalence of malocclusion
Kharbanda OP [5]	New Delhi and Haryana, 2011	Cross-sectional	4554	45.7%
Das UM and Reddy D [10]	Bengaluru, 2008	Cross-sectional	745	71%
Narayan RK et al., [9]	Kozhikode, Kerala, 2016	Cross-sectional	2366	83.3%
Kaur H et al., [12]	Karnataka, 2013	Cross-sectional	2400	87.79%
Babu AS et al., [13]	Davangere, 2005	Cross-sectional	1000	19.6%
Kumar DA et al., [11]	Bilaspur, 2012	Cross-sectional	883	66.8%
Reddy ER et al., [14]	Nalgonda AP, 2013	Cross-sectional	2135	52%
Present study	West Bengal, 2024	Cross-sectional	1062	89.74%

[Table/Fig-13]: Table showing malocclusion status of similar studies conducted in different regions of India [5,9-14].

The prevalence of malocclusion in the study was found to be 89.74%, while normal occlusion was only 10.26%. These results were consistent with studies conducted by Sidhu S et al., in Indian populations and Aikins EA and Onyeaso CO in the Nigerian population [15,16]. However, a study by Kharbanda OP in 1991 on a North Indian population reported a much lower prevalence of malocclusion compared to the current study on an Eastern Indian population [5].

Class I malocclusion was the most common type, representing 68.17% of the total sample and this finding was statistically significant ($p<0.001$). This aligns with the results of studies by Sidhu S et al., in Delhi and Narayanan RK et al., in Kerala [9,15]. However, the prevalence was higher than the findings of Das UM and Reddy D but lower than those of Kumar DA et al., in Maharashtra, Kaur H et

al., in Karnataka and Babu AS et al., in Davangere city [10-13]. An interesting observation in the present study was the gender difference noted. A significantly higher proportion of female subjects exhibited Class I malocclusion (74.88%) ($p<0.001$) compared to males. Similar gender differences were observed in a Nigerian population by Aikins EA and Onyeaso CO, in British school children by Goose DH et al., and in Eskimos by Wood BF [16-18].

Out of the 724 subjects with Class I malocclusion, crowding was present in 39.64% of them, which was significantly higher than other variants ($p<0.001$). Comparable results were reported in a Nigerian population [16]. Kumar DA et al., and Thilander B et al., individually stated that crowding was more prevalent in females than in males, contrary to the findings of the current study [11,19].

The findings regarding the prevalence of other features of Class I malocclusion were as follows: an increased overjet (more than 2 mm) was observed in 23.2% of the studied population, spacing in 20.58%, deep bite in 5.66%, open bite in 3.31% and crossbite in 7.6%.

Once again, males showed a higher predisposition than females regarding the prevalence of proclination, which was consistent with the studies by Harrison RL and Davis DW, Al-Emran S et al., while female subjects in the current study reported a higher prevalence of spacing, deep bite and crossbite [20,21].

The prevalence of Angle's Class II (Div 1 and Div 2) malocclusion was recorded as 15.25% and 3.11% of subjects in an eastern Indian population, respectively. These findings were slightly higher than the results obtained by Kharbanda OP (14.6%) in the North Indian population, Das UM and Reddy D and Reddy ER et al., (13.9%) in Nalgonda and 6.8% in Bangalorian subjects [5,10,14]. Proffit WR et al., [22] reported Class II Div 1 in approximately 15% of American children and youth. Ravanmehr H, Rasidi Birgani M recorded a prevalence of 15.6% in Iranian subjects in Tehran.

The gender distribution showed that the prevalence of Class II malocclusion was statistically more significant in males ($p<0.005$) than in females.

The prevalence of Class III malocclusion was 3.2% of the studied population, which was in accordance with studies by Kharbanda OP [5] in North Indian subjects. A study by Narayan RK et al., in Kerala showed slightly higher results than ours [9]. According to Proffit WR et al., Class III malocclusion is more prevalent (3% to 5%) in Japan, nearly 2% in China with an additional 2% to 3% pseudo Class III [22].

Limitation(s)

The sample size considered in the study was limited. More diagnostic criteria and parameters are required to substantiate the malocclusion traits.

CONCLUSION(S)

Normal occlusion in the study was recorded as 10.26%, while the prevalence of malocclusion was found to be 89.74% of the total subjects. Class I was found to be the most common type, with females showing a significantly higher prevalence, whereas Class II malocclusion was predominant in male subjects. The proportion of subjects with crowding was significantly higher than other variants in the Class I malocclusion group. However, all the proportions did not significantly differ from each other, implying a similar pattern of distribution of Class I malocclusion traits across gender. There is a large variation in the prevalence of malocclusion due to differences in food habits, nutritional status and genetic patterns. More multicentric studies should be conducted and compared.

REFERENCES

- [1] World Health Organization. Standardization of reporting of dental diseases and conditions: Report of an Expert Committee on Dental Health [meeting held in Geneva from 14 to 20 November 1961].
- [2] Jones ML, Oliver RG. Waither and Houston's Orthodontic Notes: 6th edn, John Wright, 2000, p. 99.

- [3] Sandhu SS, Bansal N, Sandhu N. Incidence of malocclusions in India-A review. *J oral Health comm Dent.* 2012;6(1):21-24.
- [4] Sidhu S, Kharbanda OP, Jalili VP. Status of malocclusion in Tribal children of Mandu (Central India). *The Journal of Indian Orthodontic Society.* 1993;24:41-46.
- [5] Kharbanda OP. *Orthodontics: Diagnosis and Management of Malocclusion and Dentofacial Deformities*, E-Book. Elsevier Health Sciences; 2019 Nov 14.
- [6] INDIA. Population in Different Age Group-Census 2011 [Internet]. Available from: https://www.education.gov.in/sites/upload_files/mhrd/files/statistics-new/Population2011.pdf.
- [7] Angle EH. Classification of malocclusion. *Dental Cosmos.* 1899;41:248-64.
- [8] Vig PS. *Orthodontics: Current principles and techniques*: Graber TM and Swain BF St. Louis, 1985, The CV Mosby Company.
- [9] Narayanan RK, Jeseem MT, Kumar TA. Prevalence of malocclusion among 10-12-year-old schoolchildren in Kozhikode District, Kerala: An epidemiological study. *International Journal of Clinical Pediatric Dentistry.* 2016;9(1):50.
- [10] Das UM, Reddy D. Prevalence of malocclusion among school children in Bangalore, India. *International Journal of Clinical Pediatric Dentistry.* 2008;1(1):10.
- [11] Kumar DA, Varghese RK, Chaturvedi SS, Agrawal A, Fating C, Makkad RS. Prevalence of malocclusion among children and adolescents residing in orphanages of Bilaspur, Chattishgarh, India. *Journal of Advanced Oral Research.* 2012;3(3):18-23.
- [12] Kaur H, Pavithra US, Abraham R. Prevalence of malocclusion among adolescents in South Indian population. *J Int Soc Prev Community Dent.* 2013;3(2):97-102.
- [13] Babu AS, Chandu GN, Shafiulla MD. Prevalence of malocclusion and orthodontic treatment needs among 13-15 year old school going children of Davangere city, Karnataka. *Journal of Indian association of Public health Dentistry.* 2005;5(6):32-35.
- [14] Reddy ER, Manjula M, Sreelakshmi N, Rani ST, Aduri R, Patil BD. Prevalence of malocclusion among 6 to 10 year old Nalgonda school children. *Journal of International Oral Health.* 2013;5(6):49.
- [15] Sidhu S. Incidence of varieties of malocclusion. *J Indian Orthod Soc.* 1968;13:43-55.
- [16] Aikins EA, Onyeaso CO. Prevalence of malocclusion and occlusal traits among adolescents and young adults in Rivers State, Nigeria. *Odonto-Stomatologie Tropicale.* 2014;37:05-12.
- [17] Goose DH, Thompson DG, Winter FC. Malocclusion in school children of the West Midlands. *Br Dent J.* 1957;102:174-78.
- [18] Wood BF. Malocclusion in the modern Alaskan Eskimo. *American Journal of Orthodontics.* 1971;60(4):344-54.
- [19] Thilander B, Pena L, Infante C, Parada SS, De Mayorga C. Prevalence of malocclusion and orthodontic treatment need in children and adolescents in Bogota, Colombia. An epidemiological study related to different stages of dental development. *The European Journal of Orthodontics.* 2001;23(2):153-68.
- [20] Harrison RL, Davis DW. Dental malocclusion in native children of British Columbia, Canada. *Community Dentistry and Oral Epidemiology.* 1996;24(3):217-21.
- [21] Al-Emran S, Wisth PJ, Bøe OE. Prevalence of malocclusion and need for orthodontic treatment in Saudi Arabia. *Community Dentistry and Oral Epidemiology.* 1990;18(5):253-55.
- [22] Proffit WR, Fields Jr HW, Moray LJ. Prevalence of malocclusion and orthodontic treatment need in the United States: Estimates from the NHANES III survey. *The International Journal of Adult Orthodontics and Orthognathic Surgery.* 1998;13(2):97-106.

PARTICULARS OF CONTRIBUTORS:

1. Professor and Head, Department of Orthodontics and Dentofacial Orthopaedics, Dr. R. Ahmed Dental College and Hospital, Kolkata, West Bengal, India.
2. Associate Professor, Department of Orthodontics and Dentofacial Orthopaedics, Dr. R. Ahmed Dental College and Hospital, Kolkata, West Bengal, India.
3. Assistant Professor, Department of Orthodontics and Dentofacial Orthopaedics, Dr. R. Ahmed Dental College and Hospital, Kolkata, West Bengal, India.
4. Assistant Professor, Department of Oral Medicine and Radiology, North Bengal Dental College and Hospital, Siliguri, West Bengal, India.
5. Associate Professor, Department of Orthodontics and Dentofacial Orthopaedics, Burdwan Dental College and Hospital, Burdwan, West Bengal, India.
6. Assistant Professor, Department of Orthodontics and Dentofacial Orthopaedics, Dr. R. Ahmed Dental College and Hospital, Kolkata, West Bengal, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Shiladitya Sil,
Assistant Professor, Department of Oral Medicine and Radiology, North Bengal
Dental College and Hospital, Sushruta Nagar, District Darjeeling-734012,
Siliguri, West Bengal, India.
E-mail: shiladitya.sil@gmail.com

PLAGIARISM CHECKING METHODS: [\[Lain H et al.\]](#)

- Plagiarism X-checker: Jun 06, 2024
- Manual Googling: Jul 27, 2024
- iThenticate Software: Aug 28, 2024 (13%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Jun 05, 2024**

Date of Peer Review: **Jul 24, 2024**

Date of Acceptance: **Aug 29, 2024**

Date of Publishing: **Nov 01, 2024**