

Prevalence of Malocclusion among School Children in Dhaka

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Abstract

Malocclusion is a common oral health problem among school-aged children and may adversely affect mastication, speech, facial aesthetics, and psychosocial well-being. Early identification of malocclusion is essential for timely preventive and interceptive orthodontic care. However, epidemiological data on the burden and pattern of malocclusion among school children in Dhaka remain limited. This study aimed to determine the prevalence and distribution of malocclusion among school children in Dhaka, Bangladesh. This prospective observational study was conducted at Mandy Dental Medical College, Dhaka, from July 2024 to June 2025. A total of 1,050 school children were selected using purposive sampling. Clinical oral examinations were performed using standard orthodontic diagnostic criteria to assess occlusal characteristics, including Angle's classification, overjet, overbite, crowding, spacing, crossbite, and open bite. Data were recorded using a structured checklist and analyzed using SPSS version 23.0. Descriptive statistics were used to determine prevalence and distribution patterns. The overall prevalence of malocclusion was 63.8% among 1,050 school children. Class I malocclusion was the most common type (41.6%), followed by Class II (15.2%) and Class III (7.0%). Dental crowding (27.4%) and increased overjet (18.9%) were the predominant occlusal traits. Anterior open bite showed a significant association with younger age groups. Malocclusion is highly prevalent among school children in Dhaka, with Class I malocclusion and dental crowding being the most common. Early orthodontic screening and preventive interventions are essential to reduce future treatment complexity and improve oral health outcomes.

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Introduction

Malocclusion is one of the most prevalent oral health problems worldwide and represents a significant public health concern, particularly among children and adolescents.¹ It refers to deviations from normal occlusal relationships of the teeth and jaws, which may manifest as crowding, spacing, abnormal overjet or overbite, crossbite, and open bite.² Although malocclusion is not a life-threatening condition, it can substantially affect oral function, facial aesthetics, speech, and overall quality of life, especially during the formative school years.³ The etiology of malocclusion is multifactorial, involving genetic, environmental, and behavioral factors.⁴ Hereditary influences play a crucial role in jaw size discrepancies and tooth alignment, while environmental factors such as oral habits (thumb sucking, mouth breathing, and tongue thrusting), premature loss of primary teeth, dental caries, and nutritional deficiencies further contribute to its development.⁵ Urbanization and changing lifestyles have also been implicated in altering craniofacial growth patterns, potentially

increasing the burden of malocclusion in developing countries.⁶ Epidemiological studies indicate wide variations in the prevalence of malocclusion across different populations, ranging from 40% to over 70%

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among school-aged children.⁷ These differences are influenced by ethnicity, age, diagnostic criteria, and sampling methods.⁸ Angle's classification remains the most commonly used system for categorizing malocclusion due to its simplicity and clinical relevance, allowing comparison across studies and populations.⁹ Understanding the distribution of malocclusion types within a specific population is essential for planning orthodontic services and allocating limited healthcare resources efficiently. In children, malocclusion can have consequences beyond oral health. Several studies have demonstrated its association with impaired masticatory efficiency, increased risk of dental trauma, and periodontal problems.¹⁰ Moreover, visible occlusal irregularities may negatively affect self-esteem, social interactions, and psychological well-being during school age, a critical period for emotional and social development.¹¹ Early identification through school-based screening programs allows timely preventive and interceptive orthodontic interventions, which may reduce treatment complexity and cost in later life.¹² In Bangladesh, oral health services are primarily curative, and preventive orthodontic care remains limited. While dental caries and periodontal diseases have been studied extensively, epidemiological data on malocclusion—particularly among school children in urban settings like Dhaka—are relatively scarce and fragmented. Rapid urban growth, dietary changes, and limited awareness regarding orthodontic problems may contribute to an increasing yet underrecognized burden of malocclusion in this population.¹³ Reliable, updated data are therefore necessary to guide policymakers, dental educators, and clinicians in designing effective preventive strategies and school-based oral health programs. Against this background, the present study was

designed to assess the prevalence and pattern of malocclusion among school children in Dhaka. By providing contemporary epidemiological evidence, this study aims to contribute to a better understanding of orthodontic treatment needs and to support the integration of early orthodontic screening into routine school oral health initiatives.

Methods

This prospective observational study was conducted at Mandy Dental Medical College, Dhaka, Bangladesh, from July 2024 to June 2025. The study population comprised school-going children from selected schools in Dhaka who were referred or brought for routine dental check-ups and screening. A total of 1,050 children were enrolled using a purposive sampling technique. The sample size was considered adequate to reflect the occlusal characteristics of urban school children within the study period.

Inclusion criteria: Children aged 6–15 years who were enrolled in primary or secondary schools in Dhaka were included in the study. Participants with fully erupted permanent first molars and sufficient erupted teeth for occlusal assessment were considered eligible. Only those children whose parents or legal guardians provided informed written consent were included.

Exclusion criteria: Children with a history of previous or ongoing orthodontic treatment were excluded. Those presenting with craniofacial anomalies, cleft lip and palate, syndromic conditions, or systemic diseases affecting craniofacial growth were also excluded. Uncooperative children and those with incomplete clinical records were not considered for analysis.

Study procedure: Clinical oral examinations were

carried out in a dental clinical setting under adequate illumination using sterilized mouth mirrors and probes. Occlusal relationships were assessed in centric occlusion using Angle's classification. Additional parameters such as overjet, overbite, crowding, spacing, crossbite, and open bite were recorded using a standardized checklist.

Data analysis: Collected data were coded and entered into SPSS version 23.0 for analysis. Descriptive statistics, including frequencies and percentages, were used to determine the prevalence and distribution of different types of malocclusions.

Result

A total of 1,050 school children were examined to determine the prevalence and pattern of malocclusion. The mean age of the participants was 10.9 ± 2.4 years, with the majority belonging to the 9–12-year age group (Fig. I). Males constituted a slightly higher proportion than females. Most children were from middle socioeconomic backgrounds, reflecting the urban school population of Dhaka. Overall, malocclusion was identified in 63.8% of the examined children, while 36.2% exhibited normal occlusion (Fig. II). The prevalence of malocclusion was marginally higher among males compared to females; however, this difference was not statistically significant ($p > 0.05$) (Table I). Age-wise analysis showed a higher frequency of malocclusion among children aged 9–12 years, followed by those aged 13–15 years, though the variation across age groups did not reach statistical significance. Assessment based on Angle's classification revealed that Class I malocclusion was the predominant type, accounting for 41.6% of the total sample. Class II malocclusion was observed in 15.2%, whereas Class III malocclusion was comparatively less common (7.0%). Normal molar relationship was present in 36.2% of children

(Table II). The distribution of Angle's classes differed slightly between sexes, but no statistically significant association was found. Analysis of specific occlusal traits demonstrated that dental crowding was the most frequent anomaly, affecting 27.4% of children. Increased overjet was present in 18.9%, deep bite in 14.5%, spacing in 12.1%, crossbite in 9.6%, and anterior open bite in 5.8% (Table III). Crowding and increased overjet were more common in males, whereas spacing was slightly higher among females; these differences were not statistically significant. When malocclusion prevalence was analyzed across age groups, crowding and increased overjet were most frequently observed in the 9–12-year age group. Anterior open bite was more common among younger children, while deep bite was relatively higher in older age groups. A statistically significant association was noted between age group and presence of anterior open bite ($p = 0.032$), indicating age-related variation in this occlusal trait (Table IV).

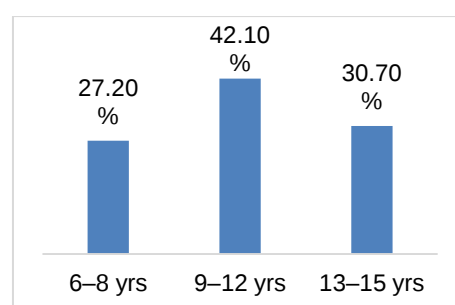


Figure I: Age distribution of participants (n = 1050)

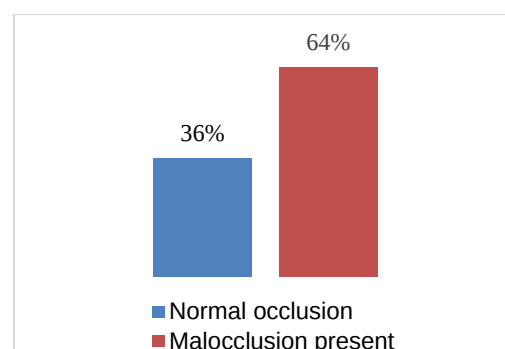


Figure II: Overall prevalence of malocclusion

Table I: Distribution of malocclusion according to sex

Sex	Occlusion status		p-value
	Malocclusion	Normal	
	n (%)		
Male	362 (65.6)	190 (34.4)	0.187
Female	308 (61.8)	190 (38.2)	
Total	670	380	

Chi-square test was used for statistical analysis.

Table II: Distribution of malocclusion according to Angle's classification

Occlusal classification	n (%)
Normal occlusion	380 (36.2)
Class I malocclusion	437 (41.6)
Class II malocclusion	160 (15.2)
Class III malocclusion	73 (7.0)
Total	1050 (100.0)

Table III: Distribution of specific occlusal traits among participants

Occlusal trait	Present	Absent
	n (%)	
Dental crowding	288 (27.4)	762 (72.6)
Increased overjet	198 (18.9)	852 (81.1)
Deep bite	152 (14.5)	898 (85.5)
Spacing	127 (12.1)	923 (87.9)
Crossbite	101 (9.6)	949 (90.4)
Anterior open bite	61 (5.8)	989 (94.2)

Table IV: Association between age group and selected occlusal traits

Occlusal trait	The highest prevalence age group	n (%)	p-value
Dental crowding	9–12 years	134 (30.3)	0.084
Increased overjet	9–12 years	96 (21.7)	0.119
Deep bite	13–15 years	62 (19.3)	0.071
Anterior open bite	6–8 years	28 (9.8)	0.032

Chi-square test was used for statistical analysis.

Discussion

The present study provides contemporary epidemiological evidence on the prevalence and pattern of malocclusion among school children in Dhaka, Bangladesh. The overall prevalence of malocclusion observed in this study was 63.8%, indicating that nearly two-thirds of the examined children exhibited some form of occlusal abnormality. This finding is consistent with reports from other urban populations, where prevalence rates among school children have ranged between 55% and 70%.^{14,15} The high prevalence underscores malocclusion as a significant oral health concern in school-aged children. Class I malocclusion was the most prevalent type in the present study, followed by Class II and Class III malocclusions. This distribution pattern aligns with findings from previous studies conducted in both developing and developed countries, where Class I malocclusion has been consistently reported as the dominant type.^{16,17} The predominance of Class I malocclusion may be attributed to dental arch length discrepancies, mild skeletal variations, and environmental factors rather than severe skeletal disharmonies.¹⁸ The relatively lower prevalence of Class III malocclusion observed in this study is also in agreement with studies conducted in South Asian populations.¹⁹ Dental crowding emerged as the most common occlusal trait, affecting 27.4% of children. Similar findings have been reported by other researchers, who identified crowding as the leading orthodontic problem among school children.²⁰ Crowding may be associated with premature loss of primary teeth due to dental caries, lack of space management, and discrepancies between tooth size and arch length, which are common in populations with limited access to preventive dental care.²¹ Increased overjet and deep

bite were also frequently observed, reflecting altered sagittal and vertical relationships during growth and development. The slightly higher prevalence of malocclusion among males compared to females was not statistically significant, which is consistent with several studies reporting minimal or no sex-related differences in malocclusion prevalence.²² This suggests that gender may not be a strong determinant of malocclusion and that genetic and environmental factors likely play a more dominant role. However, some studies have reported higher orthodontic treatment needs among females, possibly due to greater esthetic concerns rather than true differences in prevalence.²³ Age-wise analysis revealed that certain occlusal traits, particularly anterior open bite, were significantly associated with younger age groups. This finding may reflect the influence of transient oral habits such as thumb sucking and tongue thrusting, which are more common in early childhood and tend to decrease with age.²⁴ The reduction of open bite prevalence in older children may be attributed to spontaneous correction following cessation of these habits and completion of dentoalveolar development. In contrast, traits such as crowding and deep bite were more evident in older children, possibly due to the progressive nature of space discrepancies during the transition from mixed to permanent dentition. The findings of this study have important public health implications. The high burden of malocclusion among school children in Dhaka highlights the need for early orthodontic screening programs integrated into school oral health services. Early identification and interceptive treatment during the mixed dentition phase can reduce the severity of malocclusion and the need for complex orthodontic therapy later in life.²⁵ Moreover, increased awareness among parents, teachers, and healthcare providers is essential to promote timely

referral and preventive care. Despite its strengths, including a large sample size and prospective design, this study has certain limitations. The use of purposive sampling and an urban-based population may limit the generalizability of the findings to rural settings. Nevertheless, the study provides valuable baseline data and contributes to the limited body of orthodontic epidemiological research in Bangladesh.

Limitations

This study was limited by its purposive sampling technique and urban-based study setting, which may restrict generalizability to rural populations. Additionally, reliance on clinical examination without radiographic assessment may have underestimated certain skeletal components of malocclusion.

Conclusion

Malocclusion was highly prevalent among school children in Dhaka, with Class I malocclusion and dental crowding being the most common findings. The substantial burden of occlusal abnormalities highlights the need for early orthodontic screening and preventive interventions. Integrating school-based oral health programs may facilitate timely identification, reduce future treatment complexity, and improve overall oral health outcomes.

Recommendation

Routine school-based orthodontic screening programs should be implemented to enable early detection of malocclusion. Public awareness initiatives and training of primary dental care providers are recommended to promote timely referral, preventive measures, and interceptive orthodontic management.

References

1. Alhammadi, Maged Sultan, et al. "Global distribution of malocclusion traits: A systematic review." *Dental press journal of orthodontics* 23.06 (2018): 40-e1.
2. Proffit, William R., et al. *Contemporary Orthodontics-E-Book: Contemporary Orthodontics-E-Book*. Elsevier Health Sciences, 2018.
3. Ahmed, Sadia Nisar, et al. "Impact of Malocclusion on Oral Health Related Quality of Life in Young People." *Medical Forum Monthly*. Vol. 32. No. 11. 2021.
4. Peres, Karen Glazer, et al. "Deciduous-dentition malocclusion predicts orthodontic treatment needs later: findings from a population-based birth cohort study." *American Journal of Orthodontics and Dentofacial Orthopedics* 147.4 (2015): 492-498.
5. Lopes-Freire, Gabriela Mesquita, et al. "Exploring the association between feeding habits, non-nutritive sucking habits, and malocclusions in the deciduous dentition." *Progress in orthodontics* 16.1 (2015): 43.
6. Dimberg, Lillemor. *Malocclusions and quality of life: cross-sectional and longitudinal studies in children*. Diss. Malmö University, Faculty of Odontology, 2015.
7. Silva, Luciana Freitas Gomes E., et al. "Impact of malocclusion on the quality of life of Brazilian adolescents: a population-based study." *PLoS One* 11.9 (2016): e0162715.
8. Borzabadi-Farahani, Ali. "An insight into four orthodontic treatment need indices." *Progress in orthodontics* 12.2 (2011): 132-142.
9. Aikins, E. A., and C. O. Onyeaso. "Prevalence of malocclusion and occlusal traits among adolescents and young adults in Rivers State, Nigeria." *Odonto-Stomatologie Tropicale* 37.145 (2014): 1-12.
10. Manjula, K. T. "Manual Tooth Brush V/S Powered Tooth Brush. Assessment For Better Oral Hygiene." *International Journal* 4.5 (2021): 1248.
11. Sun, Ling, et al. "Relationship between the severity of malocclusion and oral health-related quality of life: A systematic review and meta-analysis." *Oral health & preventive dentistry* 15.6 (2017).
12. Kerosuo, Heidi, et al. "Outcome and long-term stability of an early orthodontic treatment strategy in public health care." *European journal of orthodontics* 35.2 (2013): 183-189.
13. Rahman, Md Mukhlachur, Farhana Nurul, and Farzana Anar. "Pattern of Dental Diseases in Adult Patients: A study in several private dental clinics, Dhaka, Bangladesh." *IOSR J. Dent. Med. Sci* 18 (2019): 1-4.
14. De Ridder, Lutgart, et al. "Prevalence of orthodontic malocclusions in healthy children and adolescents: a systematic review." *International journal of environmental research and public health* 19.12 (2022): 7446.
15. Alrashed, Muath, and Ali Algerban. "The relationship between malocclusion and oral health-related quality of life among adolescents: a systematic literature review and meta-analysis." *European Journal of Orthodontics* 43.2 (2021): 173-183.
16. Gupta, Manoj, et al. "Prevalence, risk factors and treatment needs of traumatic dental injuries to anterior teeth among 6–15-year-old schoolchildren." *Int J Curr Med Pharm Res* 4.2 (2018): 2958-2963.
17. Mtaya, Matilda, Pongsri Brudvik, and Anne N. Åstrøm. "Prevalence of malocclusion and its associated factors among pre-schoolchildren in Kinondoni and Temeke Districts, Tanzania." *Tanzania Journal of Health Research* 19.2 (2017).
18. Van Sant, Leah A. *Survey of Canadian orthodontists regarding Orthodontic Miniscrew usage*. MS thesis. The University of Western Ontario (Canada), 2020.
19. Singh, Varun Pratap, and Amita Sharma. "Epidemiology of malocclusion and assessment of orthodontic treatment need for Nepalese children." *International scholarly research notices* 2014.1 (2014): 768357.

20. Siddegowda, Roopa, and Rani M. Satish. "The prevalence of malocclusion and its gender distribution among Indian school children: An epidemiological survey." *SRM Journal of Research in Dental Sciences* 5.4 (2014): 224-229.
21. Sá-Pinto, A. C., et al. "Association between malocclusion and dental caries in adolescents: a systematic review and meta-analysis." *European Archives of Paediatric Dentistry* 19.2 (2018): 73-82.
22. Amponsah, Anthony Afriyie. "Prevalence of Malocclusion and Orthodontic Treatment Needs in African Adolescents: A Systematic Review." *International Journal of Dental Sciences & Research* (2023): 125-144.
23. Sun, Ling, et al. "Association between the severity of malocclusion, assessed by occlusal indices, and oral health-related quality of life: a systematic review and meta-analysis." *Oral health & preventive dentistry* 16.3 (2018).
24. Ling, Hiu Tung Bonnie, et al. "The association between nutritive, non-nutritive sucking habits and primary dental occlusion." *BMC oral health* 18.1 (2018): 145.
25. Myrlund, Rita, et al. "One-year treatment effects of the eruption guidance appliance in 7-to 8-year-old children: a randomized clinical trial." *European journal of orthodontics* 37.2 (2015): 128-134.