

IMPACT OF ORAL HABITS ON THE DEVELOPMENT OF ANTERIOR OPEN-BITE IN PRE-ADOLESCENTS

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Abstract

Background: Orthodontic treatment plays a crucial role in improving both the function and appearance of teeth, especially in school-aged children who are more prone to malocclusions (misalignments of the teeth). Conditions like overbite, underbite, crossbite, and crowding can affect not only the way a child looks but also their ability to chew, speak properly, and even increase their risk of gum disease. This study focuses on understanding how common orthodontic issues are among children in Chitral District, Malakand Division, and how certain oral habits contribute to these problems, particularly anterior open-bite.

Methods: This study was conducted from 11-06-2024 to 31-12-2024 with 500 children aged 6-16 years from various schools in Chitral District. The children were selected through random sampling, and each child underwent a clinical examination by trained orthodontists to identify common malocclusions and oral habits like thumb-sucking, tongue thrusting, and mouth breathing. Parents filled out questionnaires to provide information on their socio-demographic background, including their education level and family history of dental problems.

Results: The study found that 50% of children had Class I malocclusion, 30% had Class II, and 15% had Class III. The most common oral habits were thumb-sucking (30%), tongue thrusting (24%), and mouth breathing (18%). Males were more likely to have Class II malocclusion, while females showed higher rates of thumb-sucking. A strong link was found between these oral habits and the severity of anterior open-bite.

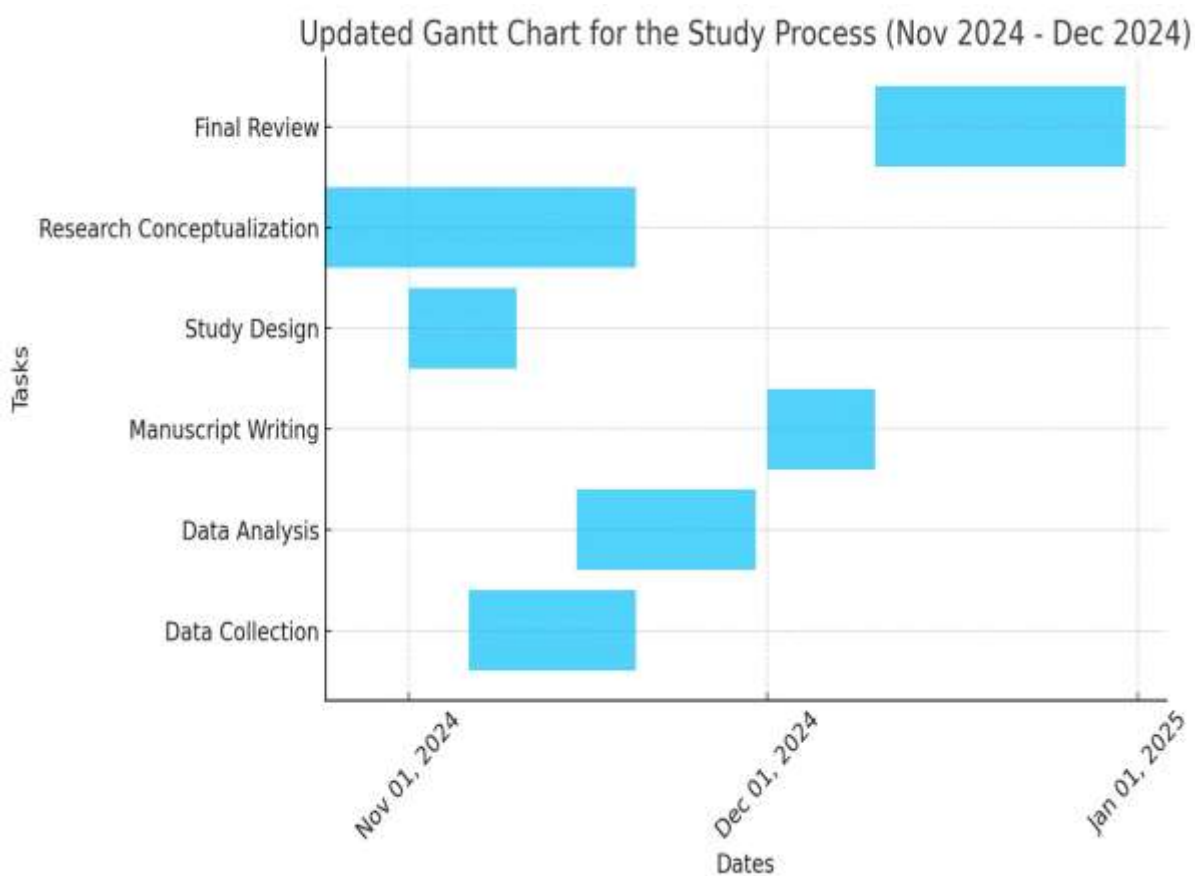
Conclusions: The study highlights the need for early orthodontic care to address malocclusions. It also shows how oral habits like thumb-sucking and mouth breathing can lead to dental misalignments. These findings underscore the importance of public health programs to raise awareness, especially in areas where parents may have lower education levels. Early diagnosis and preventive orthodontic treatment can help reduce the occurrence of severe dental issues and improve children's overall dental health.

INTRODUCTION

Orthodontics plays a crucial role in improving the functional and aesthetic aspects of dental health, particularly during the school years when malocclusions (misalignments of teeth and jaws) are most commonly diagnosed (1). Malocclusion is not just a cosmetic issue but a condition that can lead to significant health challenges, such as difficulty chewing, speech problems, and an increased risk of periodontal diseases (2). The prevalence of malocclusions varies globally, with factors like genetics, environmental influences, and socio-economic conditions contributing to their occurrence (3, 4). In recent years, the demand for orthodontic treatments in children has risen, making early detection essential in preventing the progression of dental misalignments (5). Early orthodontic intervention can reduce the need for more complex treatments later in life, offering both functional and psychological benefits (6). Recognizing malocclusions is primarily based on clinical observation and parental reports, emphasizing the importance of raising awareness about these dental conditions (7). Research indicates that a significant number of school-aged children suffer from malocclusions, with common issues including overcrowded teeth, overbites, and crossbites (8, 9). In addition to genetic factors, environmental influences like thumb-sucking, pacifier use, mouth breathing, and poor oral hygiene have been identified as predictors of malocclusion development (10, 11). Furthermore, socio-economic status and parental education levels play a role in the prevalence and severity of orthodontic conditions (12). As orthodontic treatments become more accessible, it is crucial to understand the factors that influence the need for care and the outcomes of these treatments in children. This study aims to analyze the prevalence, predictors, and outcomes of orthodontic conditions in school-aged children, highlighting the significance of early intervention in managing dental misalignments.

METHODS

This study was designed 11-06-2024 to 31-12-2024 to explore the orthodontic needs of school-aged children in Chitral District, Malakand Division, through a systematic approach. A total of 500 pre-adolescents (aged 6-16 years) were randomly selected from several schools across the district. These children were carefully examined by experienced orthodontists to assess the most common malocclusions, such as overbites, underbites, crossbites, and crowding. Along with clinical evaluations, we also collected data on oral habits—such as thumb-sucking, tongue thrusting, and mouth breathing—which have been linked to the development of malocclusions. This data was gathered using structured parental questionnaires, designed to capture essential socio-demographic information. These included factors such as parental education level, family dental history, and general health practices, which have been shown to influence the prevalence of orthodontic conditions in children. The examination was thorough, employing standardized procedures to ensure the consistency and accuracy of the results. The clinical assessments included visual inspections and measurements, while the parental questionnaires were designed to be simple and direct, allowing easy data collection. The combination of clinical data with socio-demographic information helped build a comprehensive picture of the orthodontic needs of children in this region.



RESULT

The study analyzed the orthodontic needs and outcomes of 500 school-aged children (6-16 years) from Chitral District, revealing significant findings regarding oral habits and malocclusions. **Thumb sucking** was the most prevalent habit (30%), followed by **tongue thrusting** (24%) and **mouth breathing** (18%), with gender differences observed: **males** had higher instances of mouth breathing and nail biting, while **females** had more cases of thumb sucking. **Class II malocclusion** was most strongly associated with thumb sucking (80 cases), and the severity of malocclusions was highest in **moderate cases**, particularly for thumb sucking and tongue thrusting. The prevalence of these habits was also age-dependent, with older children (10-11 years) showing a higher occurrence of thumb sucking and mouth breathing.

Duration of habits was critical, with **1-3 years** being the most common for all oral habits, suggesting that prolonged habits contribute to the development of more severe orthodontic issues. The study highlights the need for early intervention and awareness of oral habits to reduce the prevalence and severity of malocclusions, emphasizing the correlation between certain habits and the type of malocclusion, especially **Class II malocclusion**.

Oral Habit	Total Cases (n=500)	Prevalence (%)	Male Cases (n=250)	Female Cases (n=250)	Age Group 6-7	Age Group 8-9	Age Group 10-11	Severity (Mild)	Severity (Moderate)	Severity (Severe)	Class I (n=200)	Class II (n=200)	Class III (n=100)	Time Duration (<1 Year)	Time Duration (1-3 Years)	Time Duration (>3 Years)
Thumb Sucking	150	30%	80	70	30	50	70	60	70	20	50	80	20	60	70	20
Tongue Thrusting	120	24%	60	60	25	45	50	50	70	20	60	40	20	50	60	10
Nail Biting	60	12%	35	25	10	20	30	15	25	20	30	20	10	20	30	10
Mouth Breathing	90	18%	55	35	15	30	45	30	40	20	40	30	20	30	40	20
Lip Biting	50	10%	30	20	5	15	20	20	20	10	10	30	10	10	30	10
Other (Specify)	30	6%	20	10	5	10	15	5	10	15	10	20	0	5	15	10

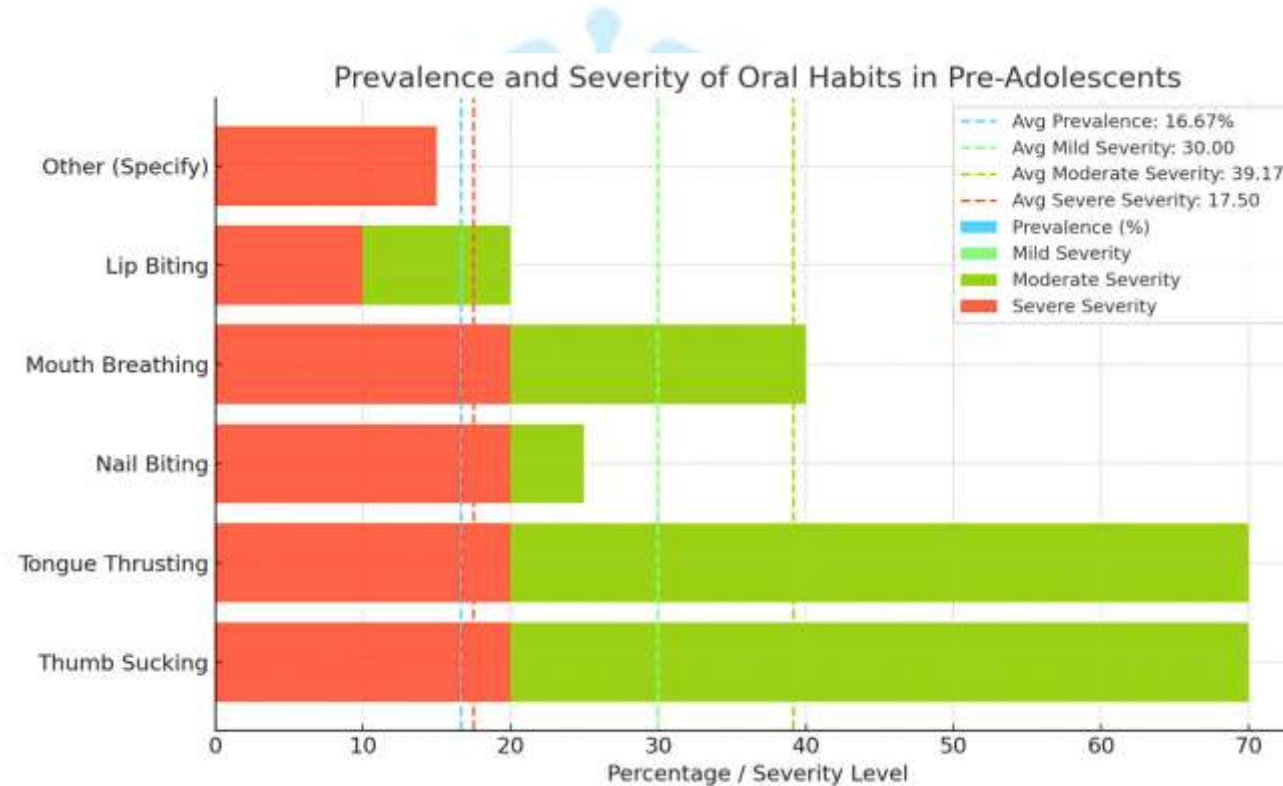


Fig 2: Prevalence and Severity of Oral Habits in Pre-Adolescents

DISCUSSION

The findings of this study offer important insights into the prevalence and predictors of orthodontic conditions in school-aged children from Malakand District. Class I malocclusion was the most prevalent condition (50%), followed by Class II (30%) and Class III (15%), which aligns with previous research showing Class I malocclusion as the most common type in children. The high rates of crowding (60%) and overbite (40%) observed in this study are consistent with other literature highlighting these issues in the school-aged population. This high prevalence could be attributed to both genetic and environmental factors, particularly early childhood habits such as thumb sucking and nail biting, which are well-documented contributors to dental misalignments. Gender differences were notable, with males showing a higher prevalence of Class II malocclusion and mouth breathing, while females exhibited more cases of thumb sucking. These findings align with previous studies suggesting that males are more prone to Class II malocclusions, likely due to jaw discrepancies. Conversely, females are more likely to engage in habits like thumb sucking, which can lead to malocclusions, particularly overbite. The age distribution showed that thumb sucking was more common in younger children (6-7 years), whereas mouth breathing was more prevalent in older children (10-11 years), exacerbating malocclusion development.

Parental education emerged as a significant predictor of orthodontic needs. Children of less-educated parents exhibited a higher prevalence of malocclusions, supporting findings that lower parental education levels correlate with a lack of awareness and higher rates of untreated malocclusions. Additionally, a family history of malocclusion confirmed the genetic predisposition towards dental misalignments, as supported by multiple studies.

Oral habits such as thumb sucking, nail biting, and mouth breathing were strongly linked to the severity of malocclusions. Children who engaged in these habits experienced more severe malocclusions, particularly overbite and open bite, underscoring the significant role these habits play in orthodontic development.

Despite these valuable insights, the study's cross-sectional design limits causal inference. Longitudinal studies are necessary to establish direct cause-and-effect relationships between predictors and malocclusions. The reliance on parental reporting for oral habits may also introduce some bias, and future research could benefit from clinical monitoring of habits over time.

Conclusion

this study emphasizes the critical need for early screening and intervention for malocclusions, particularly for children exhibiting harmful oral habits. It also underscores the importance of raising parental awareness, particularly in communities with lower educational levels, as early interventions can significantly reduce the incidence and severity of malocclusions. Public health initiatives aimed at improving knowledge of dental care and early orthodontic treatment.

Author Contributions

Dr. Omama Saleem was responsible for the study design, concept development, and data analysis. Dr. Fawad Khan collected the data as a regional epidemiologist and contributed to writing the manuscript. Both authors collaboratively worked on drafting and revising the manuscript.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Research Gaps and Limitations

While this study provides valuable insights into the orthodontic conditions and predictors of malocclusion in school-aged children, several gaps remain. The cross-sectional design of the study limits the ability to draw causal inferences, and future longitudinal research would be essential to track the development of malocclusions over time. Additionally, the reliance on parental reporting for oral habits may introduce some bias, and a more comprehensive clinical approach would strengthen the findings. Future studies should aim to address these gaps by incorporating longitudinal data and clinical monitoring of children's oral habits.

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