



International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
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ARTICLE TITLE IMPACT OF ADHD ON ORAL HEALTH IN CHILDREN – A LITERATURE REVIEW

DOI [https://doi.org/10.31435/ijitss.3\(47\).2025.3932](https://doi.org/10.31435/ijitss.3(47).2025.3932)

RECEIVED 21 July 2025

ACCEPTED 27 September 2025

PUBLISHED 30 September 2025

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IMPACT OF ADHD ON ORAL HEALTH IN CHILDREN – A LITERATURE REVIEW

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ABSTRACT

Introduction and Aim: Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common neurobehavioral disorders and has been suggested to be associated with poorer oral health in children. Difficulties with concentration and a tendency to become easily bored may contribute to inadequate oral hygiene practices and malocclusion. Additionally, hyperactivity and impulsivity often lead to frequent snacking on sweets, which further increases the risk of dental problems in this population. This study aimed to summarize the current knowledge on the relationship between ADHD and oral health, particularly focusing on the prevalence of dental caries, gingival bleeding, and malocclusion. Previous research indicates that children with ADHD are at an elevated risk of developing dental caries and may require more frequent dental visits compared to their peers without ADHD. However, further studies are needed to better understand these correlations and to establish evidence-based preventive and therapeutic strategies.

Results: ADHD may negatively affect the development of dental caries, gingival bleeding, and malocclusion in children. Children with this condition tend to have higher plaque (PI) and DMFT/dmft indices and are more likely to exhibit parafunctional habits. Diet and parental awareness also play a crucial role, as parents need to actively support and guide their children in maintaining proper oral hygiene.

Materials and methods: reviewing recent literature research up to 5 years ago based PubMed, Google scholar reaserch based on following key words: Attention deficit heperactivity disorder, oral health, gingival bleeding, bruxism.

KEYWORDS

ADHD, Dental Caries, Oral Health, Malocclusion, DMFT

CITATION

Michalina Pastuszka, Aleksandra Małgorzata Obarzanek, Kamil Nieroda, Michał Nowak, Zbigniew Klimek, Olaf Jadanowski, Natalia Nowek, Julia Joanna Bijata, Dominika Miśta, Julia Tetelewska. (2025). Impact of ADHD on Oral Health in Children – A Literature Review. *International Journal of Innovative Technologies in Social Science*, 3(47). doi: 10.31435/ijitss.3(47).2025.3932

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Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a developmental condition of the nervous system that impacts roughly 5% of children, with symptoms frequently continuing well into adult life. The disorder is mainly characterised by difficulties with sustaining attention, excessive activity levels, and acting without thinking-behaviours that are not typical for the person's developmental stage and that interfere with daily functioning in more than one context, such as at home and in school or at work.

Individuals with ADHD often show atypical patterns in cognitive processing, including reduced attention span, problems with decision-making, decreased alertness, poor impulse regulation, challenges in language use, issues with memory retention, and limited mental flexibility. Other domains, such as how one processes sensory information, physical coordination, interpersonal abilities, and control over emotions, may also be disrupted. These difficulties can significantly affect everyday life and are linked to a range of potential risks. [1] The combined effects of various ADHD-related symptoms can interfere with both physical growth and everyday functioning in affected children. One notable consequence is their reduced capability to properly maintain oral hygiene, which heightens the likelihood of developing dental health issues. Kids diagnosed with ADHD face multiple oral health-related concerns, including a greater susceptibility to tooth decay (dental caries), inadequate oral care routines, teeth grinding (bruxism), irregular eating behaviors, adverse reactions to medications, difficulties with behavior management, and broader implications for general health. Numerous studies have highlighted that youngsters with ADHD tend to experience a significantly higher prevalence of dental caries. In fact, research shows that they are approximately twice as likely to be categorized as high-risk for developing cavities compared to their neurotypical peers. [3]

Moreover, ADHD often coexists with other health conditions, including sleep-related problems, learning disabilities and mood disturbances, as well as other psychological and developmental disorders. ADHD is now widely accepted as a lifelong condition that deeply affects day-to-day life and overall life satisfaction.

The behavioural symptoms and functional difficulties associated with ADHD tend to persist across the lifespan, often increasing the likelihood of experiencing negative life outcomes. [1]

Identifying and treating attention-deficit/hyperactivity disorder (ADHD) during early developmental stages is considered a significant challenge for healthcare professionals. Studies indicate that in the case of children diagnosed with ADHD, there is often a lack of standardized and fully reliable clinical assessment tools aligned with symptom presentation, which can lead to considerable impairments in functioning. Certain indicators of ADHD—such as pronounced levels of hyperactivity—may fluctuate or even diminish as time progresses. Furthermore, collecting detailed and accurate insights from family members can sometimes be restricted or insufficient. [2] Within the field of dentistry, managing the behavior of children diagnosed with ADHD can present notable difficulties. These individuals often display heightened impulsivity, increased levels of physical restlessness, challenges in verbal expression, and struggle to remain attentive or comply with instructions during dental visits. Additionally, children with ADHD may face obstacles in carrying out routine daily activities, such as maintaining oral hygiene through regular toothbrushing and flossing, due to attention deficits and functional impairments.

Among the most frequently observed dental conditions in this group are excessive buildup of plaque and tartar (calculus), a higher prevalence of tooth decay, teeth grinding (bruxism), non-functional oral habits (parafunctional behaviors), and a greater occurrence of dental or oral injuries. [4] Families raising a child with ADHD tend to experience a higher frequency of conflicts between parents and the child, which can negatively impact the child's overall daily functioning compared to children without the disorder. As a result, caregivers are often required to provide additional assistance with routine tasks, including maintaining oral hygiene and adhering to a proper diet. This situation should serve as a warning to those involved in developing oral healthcare strategies, highlighting the importance of regularly monitoring dental check-ups in children with ADHD. Data collected through questionnaire-based research indicate noticeable discrepancies in the frequency of dental visits between neurotypical children and those diagnosed with ADHD. Findings reveal that families dealing with ADHD need increased guidance and should remain under consistent professional supervision. Moreover, the intervals between dental consultations should be shortened to minimize the risk of tooth decay, as this group tends to exhibit poorer habits related to oral hygiene. In many cases, dental visits are not scheduled proactively for the prevention and control of oral diseases but rather occur reactively triggered by accidental injuries or unexpected events, which further influences and often worsens oral care behaviors. [5]

Results

1. Dental caries

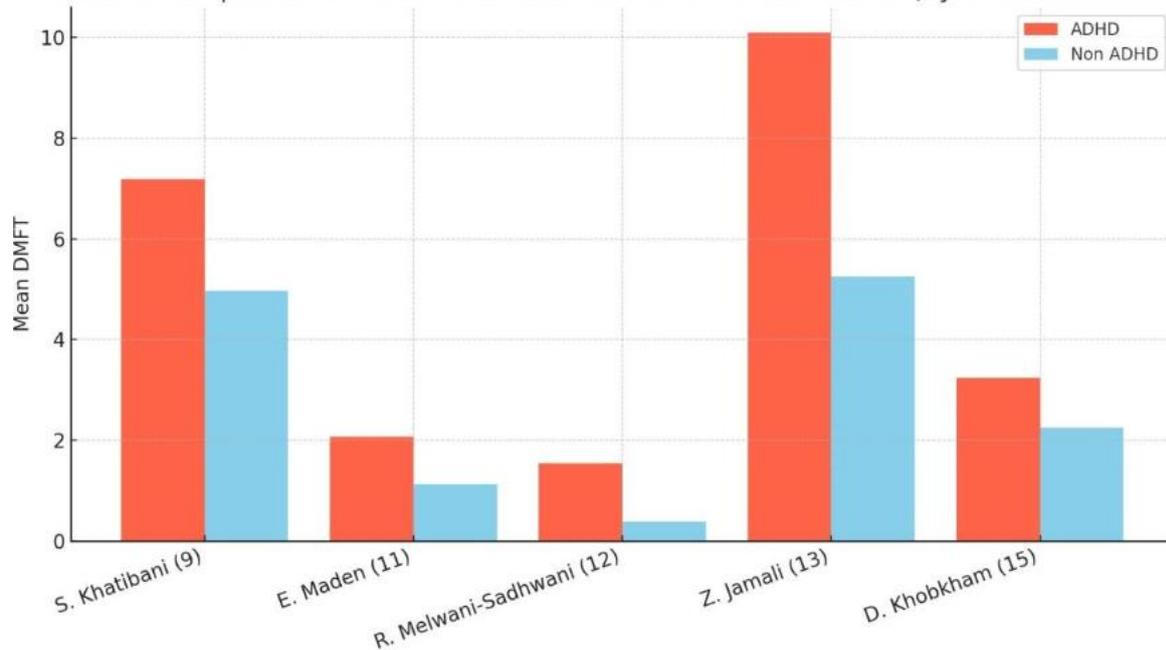
Dental health in children with ADHD appears to differ markedly from that of their healthy peers. Previous studies [6,16] have suggested a higher prevalence of caries in this population, potentially linked to behavioral factors, dietary habits, and challenges in maintaining oral hygiene. In the present study, we observed that children with ADHD exhibited a greater number of both primary and permanent teeth affected by carious lesions compared to the control group, highlighting a significant oral health disparity between the groups. Using the ICDAS system, significant differences were found in permanent teeth, with codes 1 and 3 showing more advanced carious lesions in children with ADHD compared to controls ($p = 0.071$; $p = 0.01$). [14]

A study conducted in Thailand, a middle-income country, where dental care and awareness are not so high developed, also confirms this thesis. After intraoral examination and the questionnaires about dental hygiene, conclusions were drawn about higher DMFT (3.24 vs 2.25), dental caries prevalence (88.6% vs 69.5%) in children with ADHD than in those without. [12] Another study showed that children with ADHD have significantly higher rates of oral health problems compared with their peers without ADHD. [9]

Taking into account milk teeth, there is also a significant difference in results between children with and without ADHD. [10] Using the ICDAS II index (0–6), children with ADHD were found to have significantly poorer primary dentition than controls, with caries prevalence of 84.6% versus 41.6%. Significant differences were observed for ICDAS codes 0, 1, 2, 5, and 6, indicating more advanced lesions in the ADHD group. [14].

Maden and Gamil unlike other researchers, found no significant differences in dmft, DMFT and GI. This may be related to the low income of the studied families, which results in poorer education and living conditions. [8]

Table 1. Comparison of DMFT in children with and without ADHD (by different authors)



2. Periodontal issues

Children with ADHD are at an increased risk of periodontal disorders, likely related to challenges in oral hygiene and behavioral patterns. Periodontal issues in children with ADHD tended to increase with age and with frequent tooth brushing, which supports earlier findings [17] of greater susceptibility to gingival bleeding in this group. After probing bleeding occurs 56.6% vs 38.68%. [9]

3. Malocclusion

Malocclusion refers to irregularities in tooth alignment or their relationship during occlusion that go beyond the normal range. According to the World Health Organization, it is considered the third most important oral health issue, as it can interfere with chewing, swallowing, and speech. Additionally, malocclusion can affect facial aesthetics and psychosocial self-esteem, negatively influencing daily life [11]. Children with ADHD may be more susceptible to malocclusion due to behavioral factors.

Children with ADHD demonstrated a significantly higher prevalence of dental rotation (25.6% vs 6.8%), greater malocclusion severity as indicated by higher mean DAI scores (28.99 ± 6.44 vs. 26.38 ± 5.39 ; $p = 0.042$), and more parafunctional oral habits ($p = 0.001$), including increased rates of bruxism (46.5% vs 17.5%) and a history of pacifier use ($p = 0.009$), compared to the control group. [18]

Parafunctional oral habits, such as nail biting (35.5% vs 2.8%), were significantly more common in the ADHD group, what can cause malocclusion. [6,8,18,]

The data indicated that children with ADHD were more often bottle-fed and received sweetened foods, whereas prolonged breastfeeding was more common in the control group. Such differences in infant feeding practices may not only be associated with the risk of developing ADHD but may also increase susceptibility to oral health problems, including dental caries and malocclusions.

4. Diet

Previous research has suggested a potential association between ADHD and unhealthy dietary patterns, particularly increased intake of sweets and snack foods. However, evidence remains inconsistent. While some studies report higher consumption of sugary products among individuals with ADHD, others, including the present study, do not support a significant relationship. Thus, the role of sugar intake in ADHD etiology or symptom expression remains inconclusive and warrants further investigation.[8]

Children with ADHD were about 4.7 times more likely to eat sugary foods and 9.7 times more likely to drink sugary beverages at least three times a day. Even daily intake (once or more) was higher, with odds of 4.5 for foods and 5 for drinks, all with statistically significant results.[15] Parents interviews revealed that children with ADHD more often consumed sweetened, carbohydrate-rich snacks between meals ($p < 0.001$), while parental supervision was reported to be limited ($p < 0.0005$). Compared with controls, the ADHD group

gave significantly more positive responses to questions about sweet snacks and drinks and reported more frequent consumption of carbonated and sweetened beverages ($p < 0.001$; $p < 0.0004$). [14] Moreover, Children without ADHD, despite consuming more yogurt and soy milk containing sugar, did not show higher levels of dental caries. This is likely because they maintained better oral hygiene and were more frequently exposed to fluoride from toothpaste, which protected their teeth. In contrast, children with ADHD had poorer brushing habits (shorter tooth brushing time and rarer brushing after having lunch) and less fluoride exposure, leading to a higher risk of cavities. [12] In Spain, the Mediterranean diet predominates, which can have a protective effect on certain oral health aspects (DMFT, DMFS, and DMFM). [9] Although previous studies have shown an increase in the consumption of cariogenic foods among children with ADHD, findings from Gran Canaria suggest that the type of diet does not have a negative impact on the dental variables examined. This is in line with the results of Mota-Veloso et al., who proposed that the influence of dietary habits on oral health may be less significant than previously assumed. [9]

Discussion

The aim of this paper was to review studies on oral hygiene in individuals with attention deficit hyperactivity disorder (ADHD). It also sought to determine whether ADHD increases the risk of tooth decay, periodontal problems and malocclusion and which characteristics of affected individuals might contribute to their susceptibilities. Current evidence, however, does not provide clear answers to these questions. This is likely due to small sample sizes and the use of varied research methods across studies. Therefore, further investigations involving larger, well-defined populations are needed to generate reliable, comparable, and statistically meaningful data.

Overall, most authors agree that ADHD predisposes children to a higher risk of dental caries. Children with ADHD often exhibit higher plaque accumulation and gingival inflammation, which can be attributed to less frequent or less effective toothbrushing. [13] Due to shorter toothbrushing, these children are more prone to developing cavities. In lower-income countries, these differences are less pronounced, likely reflecting broader limitations in the oral healthcare system. Several studies have also reported increased gingival bleeding in children with ADHD, which may contribute to a higher risk of periodontal diseases in the future. Researchers have highlighted differences in parafunctional habits as well. Children with ADHD more frequently bite their nails and clench their teeth, which may affect occlusion. These behaviors are thought to result from hyperactivity and increased muscle tension commonly associated with ADHD. Regarding dietary habits, the evidence is inconsistent. Some studies suggest that children with ADHD, due to their impulsive behavioral traits, are more likely to consume more high-carbohydrate foods, sweets, and sugary drinks. Parents also report difficulties in supervising their children's eating habits. Additionally, it is crucial to provide clear guidance to parents of children with ADHD, emphasizing the importance of monitoring oral hygiene routines and reducing the intake of cariogenic foods. Also dental appointments of this children are irregular and unstructured.[13]

However, other studies indicate that diet may not have as strong an influence on caries development in this population as previously believed, suggesting that some factors once considered critical may now be of lesser importance. One study assessed oral health in Egyptian children with ADHD before and after an oral health education program. Following professional scaling, both children and caregivers received guidance on diet and proper toothbrushing techniques. The Modified Bass Technique was demonstrated, and children were instructed to brush twice daily for two minutes. The results showed significant improvements in oral hygiene and dietary practices, demonstrating that a structured oral health education program can effectively enhance oral health in children with ADHD. [7]

Conclusion

The results of the reviewed studies demonstrate that children with ADHD are at a heightened risk of developing oral health problems, including dental caries, periodontal issues, malocclusion, and parafunctional habits such as bruxism. Their difficulties with attention, self-regulation, and consistency in daily routines often lead to inadequate oral hygiene practices, irregular tooth brushing, and more frequent consumption of cariogenic snacks. The evidence highlights the importance of implementing personalized and preventive approaches in dental care for children with ADHD. Regular dental visits, structured oral health education programs, and the use of simple and effective brushing techniques are essential components of management. Equally important is the active involvement of parents and caregivers, who play a crucial role in reinforcing good habits and monitoring dietary patterns. Preventive orthodontic programs may also be beneficial, given the higher prevalence of malocclusion and parafunctional habits in this group.

Although current findings are consistent in showing poorer oral health outcomes in children with ADHD, there remain gaps in knowledge regarding the underlying mechanisms, such as the quality of tooth brushing or the impact of early life factors like breastfeeding duration.

Further large-scale and longitudinal studies are therefore needed to clarify these associations and to design effective preventive strategies.

Summing up, ADHD should be regarded as a significant risk factor for oral health problems in childhood and adolescence. Addressing these challenges through tailored prevention, early intervention, and multidisciplinary collaboration between dental professionals, medical practitioners, and families is vital. Considering the growing prevalence of ADHD, oral health must be recognized as an integral part of the overall well-being of affected children. It can be concluded that ADHD in children and adolescents is linked to a greater oral health problem, although the underlying determinants still need to be explored in depth.

All authors have read and agreed with the published version of the manuscript.

Funding statement: Not applicable.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability: Not applicable.

Acknowledgments: Not applicable.

Conflict of interest statement: Authors declare no conflict of interest.

Declaration of generative AI and AI assisted technologies in the writing process

During preparing this work the authors have used ChatGPT for the purpose of improving language and readability. After using this tool, the authors have reviewed and edited the content as needed and accept full responsibility for the substantive content of the publication.

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