



Attention Deficit / Hyperactivity Disorder and Paediatric Dentistry

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Key words

Attention deficit disorder with hyperactivity; dentistry; paediatric dentistry, oral health

Abstract

Aim: Attention Deficit/Hyperactivity Disorder (ADHD) restlessness one of the most frequently diagnosed neurodevelopmental and neurobehavioral disorders in children, with a higher incidence observed in boys compared to girls. The fundamental characteristics of ADHD include three main symptoms: pronounced lack of attention, excessive hyperactivity, and impulsive behaviour. **Materials and Methods:** The diagnostic process for ADHD is complex and multidimensional, involving a thorough analysis of behaviour, collection of extensive and detailed information, comprehensive evaluation of the child's developmental history, and intensive collaboration between various specialists, including educators, psychologists, paediatricians, dentists as well as active participation of parents or guardians. With the increasing number of diagnosed cases of ADHD globally, it becomes increasingly important to timely recognize the symptoms and symptomatology of the disorder and to apply appropriate therapeutic strategies and treatment methods tailored to the individual needs of each child. **Results:** Dental care requires special attention in the context of ADHD. Chil-

dren with ADHD face greater challenges in maintaining oral hygiene, leading to an increased risk of dental caries, more frequent oral traumas, and generally poorer oral health conditions. **Conclusion:** It is crucial to ensure a tailored approach during dental treatment, which may include establishing special communication and techniques adapted to the child, as well as increasing the frequency of preventive check-ups and interventions to preserve and enhance oral health.

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Introduction

Attention Deficit/Hyperactivity Disorder (ADHD), is a behaviour disorder conditioned by genetics and neurology, most commonly emerging in childhood. It has significant long-term effects on a child's educational path, as well as their social and emotional development. ADHD is recognized as a disorder that can substantially affect a child's academic abilities, success in school, and their capability to form social relationships [1].

The disorder is categorized into three types: predominantly inattentive, predominantly hyperactive-impulsive, and combined type. This classification is based on the Diagnostic and Statistical Manual of Mental

Disorders (DSM-IV), and the diagnosis is made based on a significant number of symptoms. Additionally, circumstances such as difficulties at home or school, and the presence of impairments in social, academic, or occupational functioning are considered [2]. Concentration problems and constant restlessness tend to decrease with maturity, but other types of problems may arise. If children with ADHD are not treated on time, there is an increased likelihood they will not act in accordance with social norms upon reaching puberty, and there is a higher chance the disorder will persist into adulthood [3].

Besides the previously mentioned classification, there is also a classification where the hyperkinetic disorder (HKD) is divided into an attention disorder without hyperactivity and an attention disorder with hyperactivity. This disorder falls into the category of behavioural and emotional disorders that develop in childhood and adolescence. According to the International Classification of Diseases (ICD-10), there are five subtypes of the disorder: predominantly inattentive, predominantly hyperactive, combined type, and specified and unspecified hyperkinetic disorder. The American Psychiatric Association has adopted this classification and introduced innovations in the diagnostic approach to the disorder. Innovations include symptom development by age 12, the presence of several symptoms in two life settings, symptom presence in adults, and the criterion that for diagnosing the disorder in individuals older than 17 years, at least five symptoms must be present, according to DSM-5 diagnostic guidelines. All symptoms must be present for at least six months and be inappropriate for the child's developmental level [4]. Some symptoms of inattention, hyperactivity, or impulsivity are listed in the table (Table 1).

Primary symptoms

Children and adults with ADHD are most often characterized by difficulties in attention and/or impulsivity or hyperactivity. The first symptoms often appear very early, as inappropriate behaviour for a certain age of the child or their mental development.

One of the symptoms is inattention. According to the definition, children with ADHD show difficulties in maintaining attention compared to children of the same age and sex. Therefore, in the author's research, it is stated that these children have the greatest difficulties with maintaining attention in solving certain tasks [5]. However, other researchers state in their research that there is no significant difference in the level of distraction when solving certain tasks and that deviations in the execution of tasks are not significant [6].

Such behaviour, which is manifested by problems maintaining attention, is most often described at school and at home with common phrases specific to that behaviour, such as: "daydreaming", "can't work independently", "confusion, feeling foggy", "easily distracted", "fails to complete tasks", etc. These phrases, i.e. terms, are often used when diagnosing attention disorders.

One of the frequently mentioned symptoms of ADHD is impulsivity. Impulsivity is manifested as uncontrolled behaviour and the inability to delay reaction and response to certain situations. Clinically speaking, children with ADHD often respond and react to the situation quickly and recklessly, without waiting for the instructions to be fully spoken. These children have a greater tendency to take unnecessary risks, often damage other people's things for no reason, have difficulty waiting their turn during play, tend to choose easier tasks and show a lack of effort and interest in more difficult tasks,

Table 1. Symptoms of ADHD

Symptoms of inattention	Symptoms of hyperactivity/impulsivity
Problem keeping attention on tasks at school, not fulfilling obligations.	Fidgeting in the chair, tapping legs and hands.
Not listening during a direct conversation.	Struggles to wait for their turn.
Problem with organizing tasks.	Interrupting other's speech or play.
Avoiding tasks that require mental effort (schoolwork, housework).	Inability to play quietly or participate in leisure activities, excessive mobility and talkativeness.
Forgetfulness in daily activities.	Running around or climbing in inappropriate situations.
Losing things needed for assignments (school supplies, pencils, keys, glasses).	Speaking suddenly and recklessly.
Easily distracted.	When expected, inability to sit still for long periods of time.

considering them boring. Cooperation with other children is difficult, and verbal communication itself is reduced to careless choice of words, regardless of whether it will hurt someone [7].

The third primary characteristic of children with ADHD is hyperactivity, which can manifest itself as motor or vocal. It is most often noticeable through constant and unnecessary body movements that are unrelated to the current activity and are considered inappropriate. Parents and teachers describe such behaviour with different phrases, such as “can’t sit still”, “behaves as if it is on a motor”, “talks constantly”, etc. On the other hand, during classes at school, it is difficult for the child to stay focused. In class, they constantly move their legs and arms while writing or drawing, talk regardless of whether it is others’ turn and often making unusual sounds [8-11].

ADHD and oral health in children

Considering the growing number of children with ADHD symptoms, the role of the dentist is becoming more and more important. It is extremely important to recognize these symptoms in a timely manner, continuously monitor their changes, and choose the most appropriate method of treatment within the dental office.

Attention deficit/hyperactivity disorder can affect a child’s oral health. In addition, visits to the dentist and dental treatments can cause or intensify symptoms of impulsivity and inattention. In such situations, it is important to have enough patience and understanding to carry out dental treatments successfully. It is recommended to organize visits to the dentist in the morning, because then children usually feel more rested and cooperative [12]. In addition, it is important to emphasize the role of parents in preparing the child for a visit to the dental office, to create the conditions for a successful dental examination and treatment.

Considering the previously mentioned symptoms of the disorder, it is believed that as a result oral health in children is worse. Distracted attention and insufficient concentration can negatively affect the performance of routine oral hygiene such as proper tooth brushing, which can lead to greater oral health problems. Therefore, the role of parents and dentists is crucial in the timely recognition of such situations and the implementation of preventive measures to preserve oral health [13,14].

Poorer oral hygiene can cause an increased incidence of tooth decay, which leads to a greater need for dental treatments, including possible tooth extractions and other oral diseases. Current research indicates that children with ADHD symptoms do not have the same ability to take care of oral hygiene as children without these symptoms. Particularly significant is the research

that indicates that children with ADHD symptoms have a higher plaque index, which indicates poorer oral hygiene, and that there is no statistically significant difference between boys and girls [15-17]. These data indicate the importance of education and support of parents and dentists in providing adequate oral care to children with ADHD symptoms.

Researches have shown that children with ADHD symptoms have a greater presence of gingivitis, but no significant differences in the frequency of caries and dental trauma were observed [18].

On the other hand, in some studies, it is stated that there is a greater possibility of tooth decay in children with ADHD, which indicates the need for further research [19]. Furthermore, research points out that the incidence of caries is under the influence of more frequent intake of cariogenic carbohydrates, poorer eating habits as well as less systematic and shorter tooth brushing [20-22]. Furthermore, impairment in emotion processing is considered to affect the uncontrolled intake of cariogenic food products and a lower ability to self-regulate motivation. This makes it difficult for the patient to predict the consequences of their actions, which is essential for maintaining good oral health [23]. It can also be noted that the number of teeth with new carious lesions decreases with age, although no differences in oral hygiene and nutrition are observed between healthy children and children with ADHD [14]. Partial remission of ADHD symptoms in adolescence can have a positive impact on improving oral hygiene and nutrition in adolescents.

However, it is important to emphasize that children with ADHD are more prone to dental trauma and soft tissue injuries. For this reason, it is important to recognize, treat and prevent dental problems in time [24].

To improve diagnostic methods in children with ADHD, it is necessary to monitor children at risk of oral diseases. From the patient’s side, the action of arresting dental plaque deposit may start from regular, proper tooth brushing and mouth rinsing. Preventive strategies include brushing with a suitable toothbrush and toothpaste, the use of mouthwashes and oral gels, as well as interdental cleaning with dental floss or interdental brushes. Choosing the right products for oral hygiene is extremely important; they can stop demineralization and stimulate remineralization and prevent any side effects in case of swallowing. Biomimetic ingredients should be favoured, especially those with proven benefits for oral health and comparable to fluoride in terms of their ability to remineralization but without the additional risks connected to fluoride [25].

Professional dental diagnostics is a requirement for a timely and accurate assessment of oral health, in which case we usually use a visual and tactile examination, as

well as radiographic recordings (X-ray). A timely diagnosis can influence the planning of further treatments depending on oral hygiene, the condition of the gums, the activity of carious lesions and other diseases that require dental treatment. The motivation and cooperation of the patient, as well as the parent or guardian, affects the outcome of dental therapy. With the improvement of oral hygiene, regular visits to the dentist and preventive measures, and with adequate and proper nutrition, we can also expect an improvement in oral health.

Conclusion

Children with attention deficit hyperactivity disorder (ADHD) require special attention and access in the dental office. In order to maintain good oral health in children with ADHD, early strategies and patient therapy planning are needed, as well as the selection of prod-

ucts for proper oral hygiene, if necessary, and for remineralization. Communication and cooperation between paediatricians, neuropaediatricians and psychiatrists with children's dentists is crucial in assessing the child and, if necessary, planning treatment. Timely education of parents and/or guardians about preventive dental examinations leads to less frequency and need for treatment of the teeth and oral cavity.

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Conflict of interest

None to declare.

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