

# Dental Caries and Children with Attention Deficit Hyperactivity Disorder (ADHD) – A Review

**Suhaz Manoharan**

*BDS Student, Saveetha Dental College and Hospitals  
No.162 , PH road  
Chennai - 600077*

**Dr. Karpagam Krishnamoorthy**

*Saveetha Dental College and Hospitals  
No.162 , PH road  
Chennai - 600077*

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## Abstract

### Aim

Dental caries in adolescents with attention deficit hyperactivity disorder - A Review

### Objective

Attention deficit hyperactive disorder (ADHD) adolescents have higher prevalence of caries.

### Background

Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental psychiatric disorder in which there are significant problems with executive functions (e.g., attentional control and inhibitory control) that cause attention deficits, hyperactivity, or impulsiveness which is not appropriate for a person's age. ADHD is diagnosed approximately three times more in boys than in girls. About 30–50% of people diagnosed in childhood continue to have symptoms into adulthood and between 2–5% of adults have the condition.

### Reason

My cousin being suffering from this disorder, encouraged me to undertake this research.

**Keywords-** Attention , ADHD

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## INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is defined as a life-long neurodevelopment disorder that often becomes apparent before age seven.<sup>[5]</sup> This disorder of the brain affects almost 4 to 9% of children in the U.S.<sup>1</sup> Prevalence of this disorder has been found to be as extensive as 2 to 18% of the world population.<sup>2</sup> Around 10 million cases are found in India itself every year. It is a chronic condition that begins in childhood and may continue up to adulthood. ADHD is found 3-6 times more in boys than in girls.<sup>[3]</sup> Moreover, girls with ADHD are mostly under-diagnosed because due to less notable hyperactivity and less observable complications.<sup>[4]</sup> The characteristic features of ADHD includes lots of motor activity, inappropriate developmental activity level, low frustration tolerance, impulsivity, poor organisational behaviour, distractibility, and inability to sustain attention and concentration.

Many studies have been conducted which support the evidence that children with ADHD have higher prevalence of dental caries compared to normal children. Methylphenidate, and dextroamphetamine medications and non-stimulant medications such as serotonin reuptake medicines and tricyclic antidepressants are commonly used to suppress the symptoms of ADHD. Xerostomia or dry mouth is a major side effect of intake of such medications and hence it has been hypothesised that xerostomia may contribute to a higher prevalence of dental caries.<sup>[2]</sup>

Saliva secreted by the salivary glands has a lubricating function on the oral tissues, protects the oral soft tissues from abrasion during mastication, facilitates the digestion of carbohydrates, antibacterial activity against foreign

microorganisms, flushes the oral cavity to clear and remove food particles and debris from the tissues, and chemically maintains an environment rich in calcium, phosphate and acid buffering agents. The latter function has been recognised as having the ability to reduce the incidence of dental caries.<sup>[9]</sup>

Proper and healthy saliva flow is essential for prevention of dental caries. Due to uptake of medication required to manage the symptoms of ADHD, there may be changes in the composition of saliva and reduction in the flow of saliva which may effect the risk of occurrence of dental caries among children with ADHD.<sup>[6-8]</sup>

Stimulant medications are potent in treating ADHD by promoting the release of dopamine and nor epinephrine thereby helping unstimulated areas of the brain to regain their functionality.<sup>[1]</sup> Although medical management brings down the symptoms drastically, a combination of pharmacological and behavioral therapy is generally more effective.

This focal point of this review is to establish a correlation between dental caries and ADHD and also provide useful information about the management of ADHD patients in a dental setting.

## METHODS

A PubMed search was done using the key words; ADHD, ADHD medications and dental caries to investigate the relationship between them. Additional information was collected using the terms xerostomia, saliva and dental caries from various sources. Studies were reviewed for relevant data to establish a connection between children with ADHD and the dental caries.

### Studies Conducted to Establish a Relationship Between ADHD and Dental Caries

Most early researches were conducted with small case studies to confirm that children with ADHD have higher risk of caries than children of the same age group without ADHD. Broadbent et al<sup>[2]</sup> performed a study to find out a relationship between dental caries and children with ADHD. This study was one of the first studies to be conducted. This study gave four explanations. One view is that the complexion of the disorder may itself lead to lack of desire to maintain proper oral hygiene. Second explanation is that the parents of ADHD affected children may be tempted to offer the child carcinogenic treats. Another fair reason is that the medications used to manage the symptoms of ADHD may cause xerostomia or dry mouth which may indirectly increase the intake of sugary and carcinogenic soft drinks which may lead to poor oral health. A fourth view was that parents of children with ADHD may report the need for dental treatment than parents of children without any disorders.

From this study, it can be concluded that ADHD affected children are 12 times more at risk of having a higher DMFT index than those of children without ADHD. DMFT or decay missing filled teeth index is common method for assessing prevalence of dental treatment.

Grooms et al<sup>[6]</sup> conducted a cross sectional study. In this study, a visual dental examination was done on a group of children aged between six to ten years with ADHD to check for prevalence of caries. Parents of each child was asked to complete a questionnaire regarding the child's past medical history, oral health, habits and demographic information. ADHD children aged between six to ten years had notably more enamel caries in primary and secondary dentition, but on an average mean caries experience in primary dentition didn't differ much between ADHD children and non- ADHD children.

Bloomquist et al<sup>[11-13]</sup> conducted three clinical and retrospective, double cohort studies (2006, 2007 and 2011). All three studies were evaluated for prevalence of dental caries in children with ADHD in contrast to children without ADHD. The same population pool was used for all three tests. All children were aged eleven. In the first study, tests were done to examine the child's oral health, dental anxiety and behavioural management. The tests clearly showed that there is notably much higher rate of dental caries among children with ADHD. Moreover, it was found that children without ADHD had a higher degree of dental anxiety when compared with ADHD affected children. The ADHD group though had lots of behaviour management problems. The 2007 study that tested for oral health behaviour and dental caries didn't find a significant difference in the prevalence of dental caries among group of thirteen year olds affected with ADHD against the control group which consisted of ADHD unaffected children. However, the study found poor oral health behaviour than the control group. In the 2011 study, the ADHD group was divided into two; medicated group and a

non-medicated group. This study assessed oral hygiene and prevalence of caries among 17 year olds affected with ADHD. The results clearly showed very poor oral hygiene and higher prevalence of dental caries along with increased consumption of sugary foods.

Another study was done by Chandra et al<sup>[10]</sup> in which Children, aged 6 to 14 years of age with ADHD were found to experience more caries (DMFT) in the primary dentition than in secondary dentition in contrast with children not diagnosed with ADHD. Thus, supporting the theory that the newly erupted teeth had not been in the oral environment for a sufficient length of time for dental caries to develop.

These studies would provide some support to the theory that children with ADHD tend to have more prevalence of dental caries and poor oral hygiene when compared to children without ADHD of the same age group. However, larger sample size is required to confirm this theory.

### Management of ADHD patients in a dental setting

Treating ADHD affected children can be a challenging aspect due to their inability to stay focused on the treatment. Consultation from the child's paediatrician or other medical professional is always helpful. Also, Scheduling appointment during the mornings is advisable because if the child is under any stimulant medication, it is during the morning when medication levels are optimal. Moreover, the child will be less fatigued, more attentive and be able to remain seated on a dental chair.<sup>[14]</sup> Atmella et al (2006)<sup>[14]</sup> found that children with ADHD more difficult to manage in the dental office due to the difficulty in establishing a good conversation, especially with regard to oral hygiene instruction. It is essential to keep the child focused throughout the examination or treatment by giving specific feedback and clear instructions. It is also recommended that all instructions are kept simple and repeated numerous times. Felicetti and Julliard (2000) et al<sup>[16]</sup> observed the behaviour of children with ADHD and without ADHD. Using the Frankl behavior scale, it was found that "Tell show do" was the most effective behavior management technique. "Tell-show-do" is effective because it reduces the erratic behaviour of ADHD children, stirring co-operative behaviour and centralize their attention on the procedures. Charles et al<sup>[16]</sup> suggested that small tokens of appreciation could be given during the procedure and they could be traded for a larger reward at the end. Granting the child breaks is another important strategy. The child should be informed before hand about such brief breaks and should be allowed to bring his favourite or activity for the appointment. Marshall et al (1999) found that giving ADHD children midazolam for oral sedation had little advantage but warned of the possibility of idiosyncratic reactions. Hence, If managed correctly, children with ADHD can be successfully treated in the chair by a general dental practitioner.

### CONCLUSION

The fact that ADHD affected children more susceptible is still unclear despite several studies have shown such an association. Although as this group of children are susceptible to caries regular appointments with dentist are recommended with extra attention to preventive dental care such as fluoride treatment , fissure sealants , oral hygiene and dietary advice. Dentists shouldn't misinterpret the restlessness and inattentiveness of such patients rather should view it as a sign of disorder. Considering the high prevalence of this disorder among the population it is a vital for dentist to be familiar with this condition and also management of such patients in order to continue a successful dental practice.

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