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CASE REPORT

Use of supplemental melatonin to improve sleep bruxism in a child with attention deficit hyperactivity disorder: a case report

RELATO DE CASO

Uso de melatonina suplementar na melhora do bruxismo do sono em uma criança com transtorno de déficit de atenção e hiperatividade: relato de caso

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Abstract

Sleep bruxism has been investigated among sleep-related movement disorders, highly prevalent in children with Attention Deficit Hyperactivity Disorder (ADHD). Children and adolescents with ADHD tend to have more sleep disorders compared to those with neurotypical development. Although there are still no specific guidelines for the treatment of bruxism in this population, it is believed that exogenous melatonin may contribute to improving sleep quality and reducing bruxism episodes. Therefore, the present study aimed to report the case of a 13-year-old male adolescent diagnosed with ADHD and frequent episodes of sleep bruxism. The patient had a history of talking and agitation during sleep, in addition to daytime fatigue. He reported grinding his teeth at least three times a week, in addition to fatigue in the facial muscles and tooth sensitivity when consuming cold foods. To improve sleep quality, it was decided to administer 3 mg of melatonin for a period of 60 days, together with sleep hygiene recommendations. A significant improvement in sleep quality and a reduction in bruxism-related symptoms were observed. Although this is a single case, the findings suggest that melatonin may represent a promising therapeutic alternative, reinforcing the need for larger and more controlled clinical studies to investigate its efficacy and safety in this population.

Keywords:
Attention Deficit Hyperactivity Disorder;
Sleep bruxism;
Melatonin.

Resumo

O bruxismo do sono tem sido investigado entre os distúrbios de movimento relacionados ao sono, altamente prevalentes em crianças com Transtorno de Déficit de Atenção e Hiperatividade (TDAH). Crianças e adolescentes com TDAH tendem a apresentar mais distúrbios do sono em comparação àqueles com desenvolvimento neurotípico. Embora ainda não existam diretrizes específicas para o tratamento do bruxismo nessa população, acredita-se que a melatonina exógena possa contribuir para a melhora da qualidade do sono e para a redução dos episódios de bruxismo. Diante disso, o presente estudo teve como objetivo relatar o caso de um adolescente do sexo masculino, de 13 anos, diagnosticado com TDAH e episódios frequentes de bruxismo do sono. O paciente apresentava histórico de fala e agitação durante o sono, além de fadiga diurna. Havia relato de ranger os dentes ao menos três vezes por semana, além de fadiga nos músculos faciais e sensibilidade dentária ao consumir alimentos gelados. Para melhorar a qualidade do sono, optou-se por administrar 3 mg de melatonina por um período de 60 dias, juntamente com recomendações de higiene do sono. Observou-se melhora significativa na qualidade do sono e redução dos sintomas relacionados ao bruxismo. Embora se trate de um único caso, os achados sugerem que a melatonina pode representar uma alternativa terapêutica promissora, reforçando a necessidade de estudos clínicos mais amplos e controlados que investiguem sua eficácia e segurança nessa população.

Palavras-chave:
Transtorno de Déficit de Atenção e Hiperatividade;
Bruxismo do Sono;
Melatonina.

Introduction

Attention deficit hyperactivity disorder (ADHD) is a neurobiological dysfunction of genetic origin, which occurs in childhood and can continue actively throughout life, characterized by inattention, restlessness and impulsivity. ADHD is a neurodevelopmental disorder more common among children and adolescents, with an estimated 7.2% incidence in this population[1,2]. This disorder can cause problems such as: oppositional defiant disorder, conduct disorder, mood disorder, anxiety and sleep disorders[1,2].

Studies indicate that sleep disorders are common in children and adolescents, indicating that between 20% and 30% of this age group experience some change in their sleep. This percentage is significantly higher – 25% to 86% – when related to the incidence of neurodevelopmental disorders among children and adolescents[3,4]. Children with ADHD may experience disturbances in the quality or quantity of sleep, related to breathing and movement disorders. Sleep disorders in children with ADHD generate neurobehavioral deficits that resemble the symptoms of the disease or that worsen them[1,2].

Treatment for ADHD is multidisciplinary, with behavioral, educational, psychological and pharmacological interventions. The most common drug therapy for ADHD is methylphenidate, the trade name for Ritalin, a nervous system stimulator that can help cognitive development, improve a child's intelligence quotient, attention and balance skills, and agility. The medication, as it is a stimulant, has been associated with bruxism[1-4].

Bruxism is a physiological condition characterized by the clenching or grinding of teeth, through repetitive muscular activity of the jaw, which can lead to tooth abrasion, pain, spasms in the chewing muscles, headaches and problems in the temporomandibular joint, all of which negatively affect quality. of life[4,5]. This disorder is regulated by the central nervous system and influenced by peripheral factors, with dopamine being the main neurotransmitter involved in the process, due to its function of inhibiting involuntary muscle movements, therefore, this bruxism can occur during sleep or during wakefulness[4,6]. Sleep bruxism (SB) is an involuntary and repetitive activity, rhythmic (phasic) or non-rhythmic (tonic)[6], and can be divided into primary type, when there are no associated comorbidities, and secondary type, when there are comorbidities, as occurs with sleep disorders and ADHD[2].

Bruxism, a sleep-related movement disorder, has a strong correlation with ADHD. Children and adolescents with this diagnosis are more likely to experience bruxism[2,3]. There is currently no treatment for sleep bruxism, and its damage to the stomatognathic system must be managed through behavioral strategies, intraoral devices, electrical stimulation and medications[8-12]. It is worth noting, however, that in children it is not recommended to use medications for this purpose, due to their common side effects, such as dry mouth and dizziness, among others[16].

Among the treatment options for children and adolescents with ADHD and sleep-related bruxism are: behavior modification (sleep hygiene), intraoral devices to protect teeth and pharmacotherapy[2,8-11]. Melatonin has been studied for the treatment of sleep disorders in children, due to the low risk of adverse effects compared to other pharmacological agents[12-16], considering that conventional drugs generally have a half-life short and a lethargic residual effect[14]. It is observed that the release of the hormone called melatonin is closely related to the initiation and maintenance of sleep in humans and is used in a supplementary way to control some sleep disorders related to the circadian rhythm[16].

Melatonin, an organic chemical compound N-acetyl-5-methoxytryptamine, is an indole hormone naturally synthesized in humans, secreted mainly by the pineal gland, whose main function is to regulate the circadian cycle, also acting on the immune system and as an antioxidant. This hormone is of great importance in regulating behavioral and physiological processes, including the sleep and wake cycle and adaptation to seasonal changes[15].

There are no guidelines on the best approach to sleep disorders in children, but it is known that, when treated, they tend to improve the quality of life not only for the patient, but for the entire family[12]. Thus, it is suggested that sleep quality can be improved with melatonin supplementation, in order to prevent or reduce the occurrence of SB in children with ADHD[6,9,10,16].

Case Report

A 13-year-old male patient was referred to a university clinic for treatment of TMD and Orofacial Pain due to frequent episodes of grinding his teeth

during the night, as reported by his mother. During the anamnesis, it was identified that the patient had a previous diagnosis of Attention Deficit Hyperactivity Disorder (ADHD), confirmed by psychological tests and follow-up with a psychologist. Physical examinations, both extraoral and intraoral, showed no abnormalities in relation to normality and patient had no history of respiratory problems.

The patient reported a history of sleep talking and nocturnal agitation, in addition to daytime fatigue, regardless of the number of hours slept. With the help of his mother, he answered a specific questionnaire about sleep bruxism, in which it was reported that he grinded his teeth at least three times a week, had fatigue in the facial muscles upon waking, tooth sensitivity when consuming cold foods and drinks, and that his parents frequently heard noises compatible with teeth grinding during the night.

Following the international consensus on bruxism assessment[7], based on the clinical findings and family reports, a diagnosis of sleep bruxism was established. The patient received written instructions on sleep hygiene and, considering the sleep disorder associated with ADHD, it was decided to introduce melatonin supplementation. A sublingual dose of 3 mg of melatonin (based on his body weight of 50 kg) was prescribed, compounded at the Apparenza pharmacy, to be administered 30 minutes before bedtime, for a period of 60 days. The prescription was issued on April 2, 2022, and treatment began on April 12, 2022.

Ten days after starting the supplementation, the patient returned to the clinic and his mother reported a noticeable reduction in bruxism episodes and nocturnal awakenings. One month after starting treatment, the questionnaire was reapplied and the patient reported that bruxism episodes had decreased to approximately once every two weeks, in addition to demonstrating greater willingness to carry out his daily activities.

Two months after the start of treatment the questionnaire was answered again. At the end of the 60-day treatment, episodes of bruxism became quite sporadic. According to the mother's report, there was a significant improvement in sleep onset latency, as well as a continuous reduction in nocturnal awakenings. The daytime fatigue reported at the beginning was replaced by increased energy and engagement in daily tasks. No adverse effects related to the use of melatonin were observed or reported throughout the follow-up. Supplementation was removed weekly until complete removal.

Discussion

Drowsiness in children may manifest as irritability, behavioral problems, learning difficulties, and poor academic performance—symptoms that can be mistaken for those of ADHD itself [1,2,3,12]. In children, episodes of sleep bruxism occur mainly during stage 2 of non-REM sleep and REM sleep, potentially compromising both sleep quality and its restorative functions. It is worth noting that memory and learning consolidation occur during REM sleep, a phase essential for the neuronal, cognitive, and emotional development of young individuals[19].

Children and adolescents with typical growth and development may also experience sleep disorders, which generally tend to diminish with age[20]. In healthy children, these disorders are frequently linked to behavioral factors—such as fear—that interfere with sleep onset and maintenance[12,13,17,20]. Behavioral causes of insomnia may include excessive use of electronic devices, caffeine intake, irregular sleep schedules, and physical inactivity[10-13]. Interventions such as raising caregiver awareness about structured routines and promoting sleep hygiene are effective and often sufficient to improve these conditions[20]. Additionally, puberty and the hormonal changes associated with it can also negatively affect sleep quality in adolescents[17].

In this age group, sleep disorders are often associated with delayed sleep phase syndrome, which is characterized by difficulty waking up in the morning and remaining alert during the early hours of the day due to a tendency to fall asleep later than ideal. This condition arises when internal biological rhythms and external environmental cues in the sleep-wake cycle become desynchronized[12,20]. Some authors[6,20] associate this syndrome with inadequate melatonin secretion and recommend hormonal supplementation combined with sleep hygiene. However, other researchers[18,21] question the efficacy of melatonin in treating insomnia in children and adolescents with typical development, citing the lack of large-scale, randomized, well-controlled studies. For these scholars, the recommended approach includes sleep hygiene, limited daytime napping, regular sleep and wake times, and cognitive-behavioral therapy.

An additional argument supporting non-pharmacological interventions, as advocated by these researchers[18,21], is that the United States Food and Drug Administration (FDA) has not approved any specific medication for the treatment of insomnia in pediatric patients. Thus, medications currently prescribed for this purpose are used off-label[21].

As the harmful effects of sleep disorders become increasingly evident, the importance of melatonin in the human physiological system has also gained recognition-especially based on findings from recent studies involving children with neurodevelopmental disorders, which have shown positive outcomes from melatonin supplementation. Nonetheless, there is still no scientific consensus regarding the use of exogenous melatonin in children and adolescents with typical development.

Most research on melatonin supplementation has focused on individuals with neurodevelopmental disorders, who tend to experience higher rates of sleep disturbances. The ideal melatonin dosage for children and adolescents with ADHD—as well as the optimal timing for its administration—remains to be clearly defined, as effective dosages vary widely across studies. The Canadian Pediatric Society recommends doses ranging from 0.5 mg to 10 mg for children with special needs, to be administered 30 to 60 minutes before bedtime. A study conducted in the Netherlands[20], involving 101 children with ADHD aged 6 to 12 years, prescribed melatonin based on body weight: 3 mg for children weighing up to 40 kg and 6 mg for those over 40 kg.

In the present case report, a 3 mg dose of melatonin was prescribed, taking into account the patient's age (13 years), body weight (50 kg), and existing ADHD diagnosis. The results were promising: the frequency of sleep bruxism episodes significantly decreased, and both sleep quality and quantity improved, leading to better daytime functioning without any reported side effects.

Although melatonin is not primarily indicated for the treatment of sleep bruxism, a recent study reported success in using it to treat three school-aged children diagnosed with this condition[16]. The author observed a notable increase in bruxism cases among children who exhibited delayed sleep patterns, suggesting a potential link to insufficient melatonin secretion[6,16]. Although the exact mechanism of melatonin in bruxism therapy has not been fully elucidated, it is believed that its regulatory effects on sleep onset latency and sleep quality play a role in symptom improvement.

In the clinical case analyzed, the patient exhibited both sleep disturbances and signs consistent with sleep bruxism, a condition that can impair the restorative functions and quality of sleep. According to the mother's report, following melatonin supplementation, the noises associated with teeth grinding were significantly reduced, and the adolescent began to show increased energy.

This study's main limitation lies in its description of a single clinical case of a patient with ADHD and associated sleep bruxism, in which melatonin supplementation yielded positive results. As an isolated observation, the findings cannot be generalized nor considered conclusive in terms of efficacy or safety for this specific use. However, the outcomes reinforce melatonin's potential as a complementary therapeutic strategy, especially when combined with non-pharmacological interventions such as sleep hygiene. It is also worth noting the limited number of recent studies in literature addressing this specific association, which emphasizes the need to further explore the topic. Thus, this report contributes to the scientific discussion on the topic and highlights the importance of further research through controlled clinical studies with larger sample sizes and long-term follow-up, which may help validate melatonin use standardized treatment protocols for pediatric patients with ADHD and sleep bruxism.

Conclusion

The intervention with 3 mg of exogenous melatonin, combined with sleep hygiene measures, was associated with an improvement in sleep quality and a reduction in bruxism related symptoms in a patient with ADHD. Although the findings are limited to a single case and cannot confirm the overall efficacy or safety of melatonin for this purpose, the case contributes to the literature on this topic, suggests that melatonin may be a promising option and reinforces the need of more studies to explore this approach.

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