AURICULOTHERAPY FOR SLEEP BRUXISM IN CHILDREN: A SERIES OF CASES

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PALAVRAS-CHAVE: Auriculoterapia. Bruxismo. Bruxismo do Sono. Crianças.

RESUMO

Introdução: Bruxismo do sono é definido como um comportamento que causa atividades musculares durante o sono. Na infância, leva a consequências que podem variar de desgaste dentário na dentição decídua a sintomas de disfunção temporomandibular. Não há estudos que demonstrem melhora de casos de crianças com bruxismo do sono durante e após tratamento com auriculoterapia. **Objetivo**: portanto, esta série de casos visou avaliar o efeito da auriculoterapia em crianças apresentando este quadro. **Métodos**: Doze pacientes foram inclusos neste estudo, com a media de idade de 6,9. O diagnóstico foi avaliado pela pergunta "Seu filho range os dentes quando dorme?". O tratamento foi executado por um especialista em acupuntura de forma padronizada. A terapia foi feita por três semanas e o efeito foi avaliado através de um diário do sono, no qual os pais anotavam se a criança rangeu os dentes enquanto dormia antes (baseline) e durante a terapia (T1 a T3). Bruxismo do sono foi categorizado como presença ou ausência de ranger de dentes e a frequência variou de 0 a 7 (baseline), 0 a 5 (T1), 0 a 7 (T2) e 0 a 4 (T3) entre os pacientes. A intensidade foi comparada de acordo com os períodos pelo teste-T pareado (α=0,05). **Resultados**: Foi observado que a frequência de relatos diminuiu significativamente de baseline a T3. **Conclusão**: Estes resultados sugerem que auriculoterapia pode ser uma terapia alternativa para o bruxismo do sono na infância, uma vez que demonstrou reduzir sua frequência neste estudo, embora os pacientes possam apresentar efeitos diferentes devido a variabilidade biológica.

KEYWORDS: Ear Acupuncture. Bruxism. Sleep Bruxism. Children.

ABSTRACT

Introduction: Sleep bruxism is defined as a behavior that causes masticatory muscle activities during sleep. Sleep bruxism in childhood leads to consequences, which may vary from teeth wear in deciduous dentition to temporomandibular disfunction symptoms. There's no data that demonstrates improvement of children with sleep bruxism during and after auricular acupuncture treatment. **Objective**: Therefore, this case report series aimed to evaluate the effect of auriculotherapy on children presenting sleep bruxism. **Methods**: Twelve patients were included in this study, in the mean age of 6,9. The diagnosis was evaluated by the question: "Does your kid grind their teeth while sleeping?". Treatment was performed by an acupuncture specialist in a standardized way. The therapy was given for three weeks and the effect was evaluated through a sleep diary, in which the parents noted whether or not their child grinded teeth while sleeping before (baseline) and during therapy (T1 to T3). Sleep bruxism was categorized as presence or absence of nocturnal teeth grinding and the frequency varied from 0 to 7 (baseline), 0 to 5 (T1), 0 to 7 (T2) and 0 to 4 (T3) between patients. The intensity of the reported sleep bruxism was compared according to the periods by pared T-test (α=0.05). **Results**: It was observed that the frequency of reports decreased significantly from baseline to T3. **Conclusion**: These results suggest that ear acupuncture may be an alternative therapy for sleep bruxism in childhood, once it demonstrated to reduce its frequency in this study, although patients may present different effects to therapy due to biological variability.

Submitted: March 12, 2020
Modification: May 03, 2020
Accepted: May 20, 2020

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INTRODUCTION

Sleep bruxism (SB) is defined as a parafunctional behavior that implicates masticatory muscle activities during sleep.[1] Clinically, it can be detected by signs of accentuated wear of deciduous dentition.[2] Also, masticatory muscles and temporomandibular joint pain and fatigue may be observed, due to the increase of occlusal forces provoked by the parafunctional habit.[3,4] Studies show higher prevalence of this behavior in anxious and hyperactive children with respiratory issues and low quality of sleep.[5]

The cause of this behavior is originated in the central nervous system (CNS) and it's considered multifactorial, since the causal factors can be local, systemic, psychological or hereditary.[6] Therefore, the therapeutic approach should perceive the patient in a holistic and multidisciplinary view, including dentistry, sleep medicine and psychology professional.[7]

Bruxism can be classified as primary or secondary. The first one is idiopathic, as it is not related to any medical cause. Secondary bruxism is related to respiratory and neurological disorders.[7,8]

When it comes to children, conservative treatments should be prioritized.[7] Local therapies, such as occlusal splints, act on the clinical consequences of the bruxism, but not on its etiopathogeny.[9] Alternative and holistic therapies, like acupuncture, however, can be effective for controlling and decreasing the frequency of the affliction episodes, as they act in the central nervous system.[7]

According to Traditional Chinese Medicine (TCM), health is achieved by the balance of the Qi energy, the natural life flow. Problems in emotional and psychological fields can develop an imbalance of the forces of nature (yin and yang) and the Qi energy flow is affected, causing diseases of many kinds.[10] Acupuncture is an alternative therapy used in TCM, focused on the cause rather than the symptom, aiming to energetically balance the patient by reestablishing Qi energy flow. The practice consists on stimulating specific regions of the skin with high concentrations of sensory nerve endings, denominated acupoints.[11] The peripheral stimulation of these points enables direct stimulation to the CNS.[12]

This procedure can be performed in different techniques, such as needling, pressure and heat. Also, it can be applied to the whole body or it can summarize to the ear, method known as auricular acupuncture or auriculotherapy.[13]

Until this point, there is no data that demonstrates improvement of patients with sleep bruxism during and after auricular acupuncture treatment, hence, since this affliction influences children's life quality, there's a need for better understanding of the effect of this therapy in children with SB.[7,13] Therefore, this report of cases aimed to evaluate the effect of auriculotherapy on children presenting SB.

MATERIALS AND METHODS

Case series selection

This series of cases was performed according to the Declaration of Helsinki. The convenience sample of this study was composed by children in the age range of 3 to 10 that sought treatment at the Pediatric Dentistry Clinic at Universidade Federal do Paraná, whose parents agreed to participate on this research and assigned the Informed Consent term. The inclusion criteria was children with probable diagnosis of primary SB that presented clinical signs of temporomandibular disorder (TMD) or wear of dentition.[14,15] Children presenting secondary SB, sleep apnea, in orthodontic treatment or using anxiety or depression medicine were excluded. A total of 12 children were selected.

For the clinical signs, a clinical examination was performed by a pediatric dentistry expert considering mouth opening, teeth wear and presence of TMD symptoms. TMD symptoms were evaluated by a questionnaire according to the American Academy of Orofacial Pain (AAOP)[16]. Dental wear surfaces were analyzed by a trained examiner through visual examination. The probable SB diagnosis was evaluated by the question "Does your kid grind their teeth while sleeping?", added to clinical signs.

Auricular acupuncture treatment

Treatment was performed by an acupuncture specialist in a standardized way and acupuncture points were anatomically identified according to Chinese Traction Medicine (CTM). Those points were selected in order to decrease anxiety and establish the patient's overall balance, therefore, according to each patient's needs individually. They were stimulated by applying mustard seeds weekly for a period of four weeks (Figure 1). The patients and parents were asked to manually stimulate the points three times a day.[17]

Parental report evaluation

Therapy effects were evaluated by a parental report of SB, in which the parents filled in a form daily noting the presence or absence of nocturnal episodes of their children's teeth grinding. To do so, they were previously oriented to take notes a week before therapy (baseline) and weekly during the three weeks of the procedure. The number of episodes per week were computed on baseline, T1, T2 and T3.

Statistical analysis

The data were analyzed on the SPSS software (IBM, USA, version 20.0). The dependent variable (frequency of SB episodes reported) was analyzed as a numerical variable. The independent variables were gender and TMD symptoms. The TMD symptoms were categorized in presence of TMD (in case of positive answers on the American Academy of Orofacial Pain questionnaire) and absence (for negative answers on the questionnaire). The reported SB presented a normal distribution by Shapiro-Wilk test ($p>0.05$). The frequencies of reported SB were compared at different periods (baseline, T1, T2 and T3) by paired T-test. The episodes of SB at baseline were also compared between gender and presence or absence of reported TMD by independent T-test. The significance level of 0.05 was adopted.

RESULTS

The sample consisted on 50% of girls and 50% of boys, in the age range of 4 to 9 years old, with a mean age of 6.9 years old. Regarding the TMD symptoms, there was a higher frequency of children with headache, facial or neck pain (55.6%). None of the children related pain or difficulty chewing, talking or moving the mouth (Table 1).

At baseline, it could be observed that the related SB episodes differ among the patients, varying from 0 to 7 episodes per week, indicating heterogenicity on the severity of the disorder (Figure 2). The episodes of SB did not present difference between genders (p=0.295) at baseline week, however, girls presented a mean of 4.16 episodes, while boys presented a mean of 2.83 episodes.

The mean of SB episodes at baseline week did not present significant difference between presence or absence of TMD symptoms (p=0.320), but children with any TMD symptoms presented a mean of 3.85 episodes per week, while children without TMD symptoms presented a mean of 2.00 episodes per week.

There was a significant decrease of SB episodes during the three weeks of auricular acupuncture (Table 2). It was noticed that there was a gradual decrease of episodes from baseline to T3, demonstrating the cumulative effect of the therapy (Table 2; Figure 3). On T2, a patient presented as outlier, that is, didn't show improvement on that week (Figure 3).

Regarding the individual response to auricular therapy, the outcome varied among patients, however, in most patients, there was a positive reduction of SB episode from baseline to T3. Some of the patients demonstrated episode decreases on T1, others on T2 and others on T3. Due to the therapy's cumulative effect, most patients presented a gradual decrease of episodes each week. One of the patients did not indicate variations on SB frequency at all times (Figure 4).

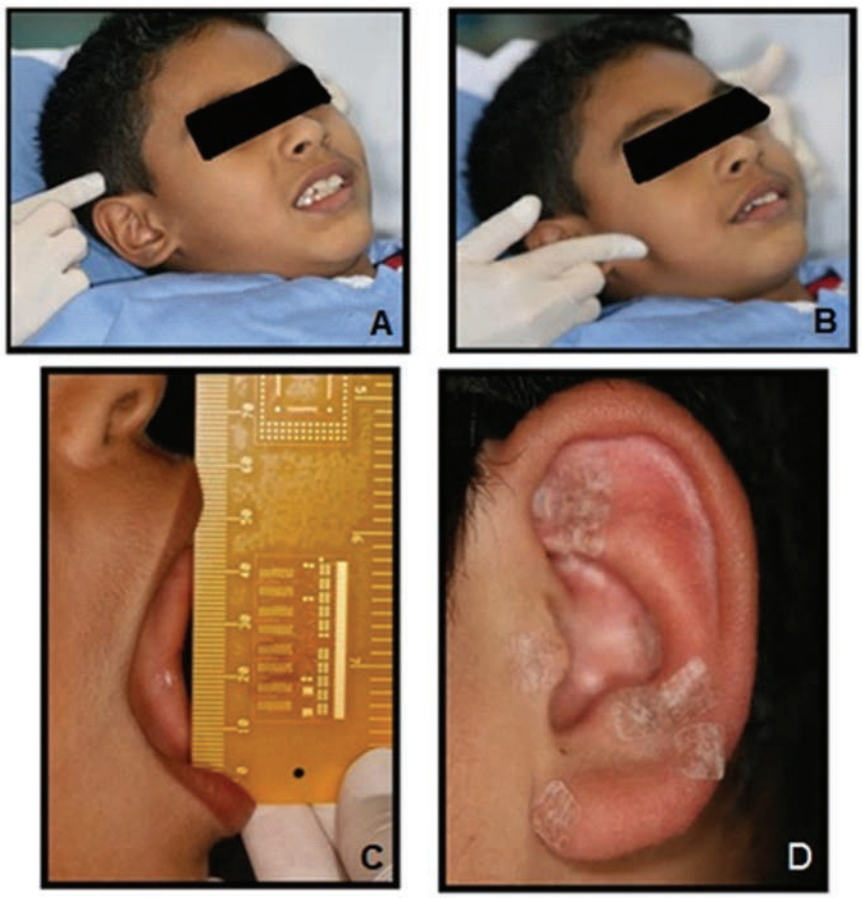


Figure 1: *Initial clinical examination and auricular acupuncture using mustard seeds. (A) palpation of the masseter muscle. (B) palpation of the termporal muscle. (C) mouth opening. (D) auricular acupuncture using mustard seeds.*

Table 1: *Frequencies of temporomandibular disfunction sypmtoms.*

Questions	Frequency n(%)	
	Yes n (%)	No n (%)
Do you have difficulty. pain or both when openining your mouth to yawn. for example?	2 (22.2)	7 (77.8)
Has your mouth ever been “stuck” or has your chin “dropped”?	0	9 (100)
Do you have difficulty. pain or both when chewing. talking or moving your mouth?	0	9 (100)
Do you notice any noise around your ears when opening you mouth or chewing?	4 (44.4)	5 (55.6)
Do you usually feel your face tired. hard or tense?	2 (22.2)	7 (77.8)
Do you feel pain near your ears. on the sides of your head or on the cheeks?	5 (55.6)	4 (44.4)
Do you often have headaches or neck pain?	5 (55.6)	4 (44.4)
Do you often have pain in your teeth? 2 (22.2)	7 (77.8)	
Have you recently had a blow to the head. neck or chin?	3 (33.3)	6 (66.7)
Have you noticed any recent changes in your bite without going to the dentist?	1 (11.1)	8 (88.9)
Have you ever received any treatment for facial pain or other issue around the ear region?	1 (11.1)	8 (88.9)

Table 2: *SB parental report frequency descriptive analysis according to the evaluation period (n=12, Curitiba, Paraná, 2017)*

Period	Mean (SD)	Minimum and maximum values
Baseline	3.50 (2.11)[a]	0 - 7
T1	2.58 (1.83)[b]	0 - 5
T2	2.33 (1.96)[b]	0 - 7
T3	1.91 (1.24)[b]	0 - 4

Note: *SD: Standard Deviation; Different letters indicate differences statistically significant by paired T-test. Significance level of 0.05.*

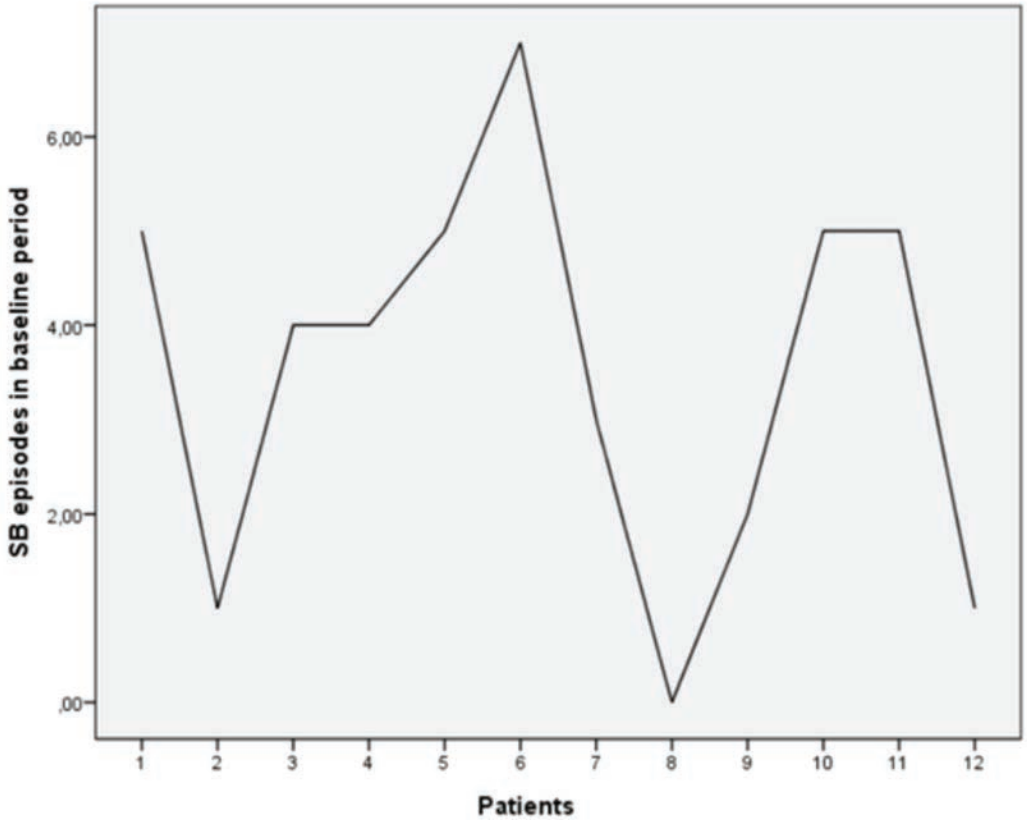


Figure 2: *Frequency of SB episodes in baseline period.*

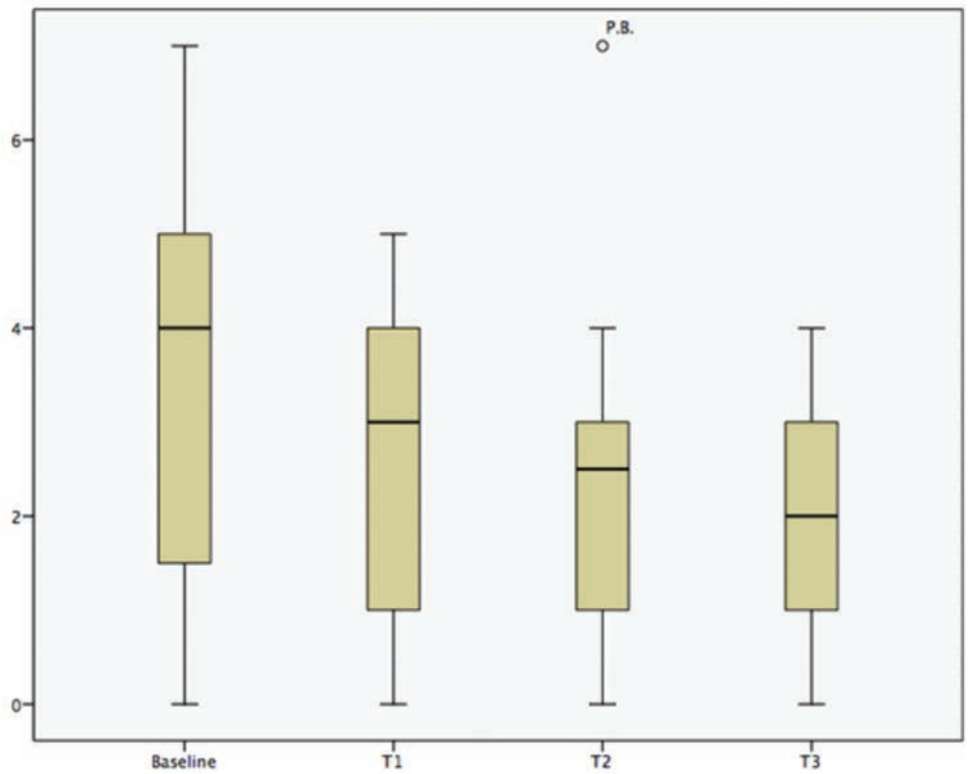


Figure 3: *Description analysis of the SB episodes according to the evaluated periods.*

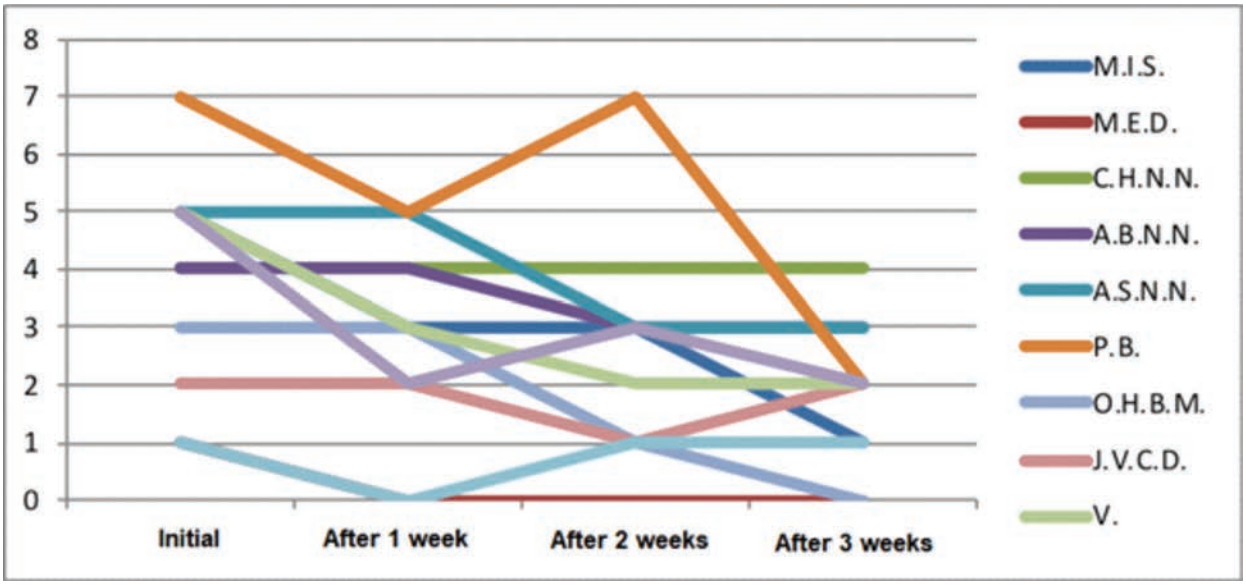


Figure 4: *SB episodes in the evaluated periods.*

DISCUSSION

In this study, children presented probable sleep bruxism diagnosis, frequently reporting grinding of teeth at night and other clinical signs such as dental wearing, temporomandibular dysfunction (TMD), headache, myofascial and neck pain and restless sleep. After auriculotherapy, grinding of teeth decreased in most patients. In general, there was a reduction in the sleep bruxism episodes gradually each week, which can be explained by the cumulative effect of the therapy.

The response varied between the patients: some responded immediately, just after the first week, others responded subsequently. That can be explained by the bruxism severity difference between them or individual biological response.

Regarding the cause of the SB, current literature accepts a multifactorial concept, in which there is CNS mediation.[13] It is well known that anxiety, hyperactivity and psychological factors are associated with grinding of teeth while sleeping, as well as low quality of sleep in children.[18] Although no significant difference was observed between SB episodes and the independent variables, such as gender and TMD symptoms, in this case series, it was observed more episodes of SB in girls and children with TMD symptoms, suggesting a possible relation between these factors.

In the examined sample, one of the cases didn't present improvement of SB in the evaluation period. This can be explained by the presence of perpetuating factors, like breathing disorders, sleep apnea or other extrinsic anxiogenic factors.[5]

So far, there is still lack of longitudinal studies that evaluate treatments for SB in children. There is no gold standard treatment established for this behaviour.[19] From etiology point of view, acupuncture can be considered an effective alternative, since it acts on the anxiety and sleep quality.[7] Plus, it's a holistic and non-invasive approach, which is important especially when it comes to children. It can also act as complementary therapy to other pathologies, such as headaches and muscular pain.

This study demonstrated how acupuncture can be an efficient technique on treating or controlling SB in children. A previous study on acupuncture showed its efficacy on TMD treatment in a 34 year old patient that reported pain in temporomandibular joint and bruxism episodes since the patient was 25 years old. The patient underwent acupuncture and auricular acupuncture sessions and related significant improvement on her sleep quality and no more joint pain.[20] Other studies also indicated pain relief, improvement of life quality and less grinding teeth episodes in most cases, even when combined with other treatments. [21,9] That indicates that acupuncture therapy in dentistry can be beneficial and improve patients qualify of life, whether used as a complementary or single therapy.

Considering the limitations of this study, one important point is that although it was a convenience small sample, it could indicate some tendency of factors associated to episodes of SB. The results suggest that auricular acupuncture using mustard seeds may be a complementary therapy on SB treatment, since it carries a holistic view aiming to reduce anxiety.[13] Further researches with larger samples and longer observation periods are required to obtain a deeper knowledge of mechanism of action and acupuncture efficacy in patients presenting bruxism.

CONCLUSION

• According to the limitations of this study, it could be concluded that:

• Auriculotherapy promotes reduction in SB frequency in children;

• The beggining of therapy efficacy varied between cases; suggesting that the individual response to therapy is influenced by individual biological variability;

• Auricular accupuncture may be a supportive therapy for SB in childhood, in an effective and holistic approach.

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