PREVALENCE OF BRUXISM IN CHILDREN WITH SPASTIC CEREBRAL PALSY- A CROSS SECTIONAL STUDY

PREVALENȚA BRUXISMULUI LA COPIII CU PARALIZIE CEREBRALĂ SPASTICĂ – STUDIU TRANSVERSAL

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Keywords: Spastic cerebral palsy, Bruxism, Spastic diplegic, Spastic quadriplegic, hemiplegic

Cuvinte cheie: paralizie cerebrală spastică, bruxism, diplegie spastică, patrupedie spastică, hemiplegie

Abstract

Introduction. Sleep Bruxism is a para-functional oromotor habit that can pose a threat to the integrity of the masticatory system and it can have a significant effect on the patient's quality of life. Children with Cerebral Palsy are at greater risk of a wide range of oral conditions than their peers.
Aim. Thus this study sought to determine the prevalence of Bruxism in children with Spastic Cerebral Palsy.
Method: This was a cross-sectional study done on 100 children with Spastic Cerebral Palsy between the age group of 3-18 years. A self designed questionnaire comprising of 49 questions like total amount of sleep, regular bed time, grinding and clenching teeth at day or night or both, pain at temporomandibular joint was explained to the parents of the subjects in their vernacular language and the results were converted in English and filled on the data collection sheets by the investigator.
Results: The results revealed the significant relationship between amount of sleep and prevalence of bruxism. Bruxism was reported in 47.06 % Spastic Diplegics , 13.04 % Spastic Hemiplegics and 35% in spastic quadriplegics.
Conclusion: Prevalence of bruxism is 54% in Spastic Cerebral Palsy children.

Rezumat

Introducere. Bruxismul în somn este un obicei oromotor parafuncțional care reprezenta o amenințare pentru integritatea sistemului masticator şi care poate avea un efect semnificativ asupra calității vieții pacientului. Copiii cu paralizie cerebrală prezintă un risc mare de dezvoltare a afecțiunilor orale, comparative cu copiii sănătoşi.
Scop. Studiul dorește să determine prevalența bruxismului la copiii cu paralizie spastică.
Metode: Acest studiu transversal a fost efectuat pe 100 de copii cu paralizie cerebrală spastică, cu vârste cuprinse între 3 – 18 ani. Un chestionar alcătuit din 49 de întrebări privind orele de somn, ora de culcare, scârțîitul şi scrâşnitul dinților pe perioada zilei şi nopții, durerea la nivelul articulației temporomandibulare a fost explicat părinților în limba de origine, iar răspunsurile s-au tradus în limba engleză şi s-au complectat chestionarele.
Rezultate: Rezultatele au demonstrat o relație semnificativă între numărul de ore de somn şi prevalența bruxismului. Bruxismul a fost raportat la 47.06% dintre copiii spastici diplegici, 13.04 % copiii spastici hemiplegici şi 35% dintre copiii cvadriplegici.
Concluzii: Prevalența bruxismului este de 54% la copiii cu paralizie cerebrală spastică.

Introduction

Cerebral palsy is a non-progressive but often changing motor impairment syndromes that may or may not involve sensory deficits that are caused by a non-progressive defect, lesion or anomaly of the developing brain. [1] The global prevalence of cerebral palsy is approximately 2.4 per 1000 live births [2] and the incidence is higher in males than in females.[3]

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Spastic cerebral palsy is the most common type of cerebral palsy. [4] Clinical manifestation of the cerebral palsy depends on which part of the brain is affected. [5] Cerebral palsy patient may also display the problems like epilepsy, mental retardation, sensorial deficiencies, persistent primitive reflexes, memory attention, learning and emotional problems, speaking disturbance and language. [6] Children with cerebral palsy display various dental problems similar to typically developing children. They present a higher susceptibility to oro dental diseases like periodontal disease, dental trauma, dental caries, malocclusion, temporomandibular joint disorders, enamel hypoplasia, abnormal or oral habits-tongue thrust, drooling and mouth breathing, as well as high rates of bruxism. [7]

Sleep bruxism is an oromotor activity that is characterized by the clenching or grinding of the teeth during sleep which is habitually associated with micro-arousals and is generally accompanied by sound which was defined by International classification of sleep disorders (2005). It is also defined as a diurnal or nocturnal para-functional activity that includes unconscious clenching, grinding or bracing of the teeth by American Academy of orofacial pain (2008).

The prevalence of Sleep Bruxism (SB) in children is around 14 to 20% and in young individual between the age of 18 to 29 is 13%.[8] However prevalence in cerebral palsy is unknown.[2] Current polysomnographic and clinical studies have linked sleep related bruxism to sleep disorders. Bruxism occurs primarily during the rapid eye movement phase of sleep. It occurs once or twice per hour of sleep at a frequency of approximately 1 Hz, especially in phases 1 and 2 of non-rapid eye movement sleep.[2] SB can occur during the day or night. However, nocturnal bruxism has found to be more frequent. [10]

The etiology and characteristics of bruxism are not well understood. Many factors may be associated with bruxism like spasticity, back bone dysfunction with head projected forward, unbalanced oral myofunctional disturbances which changes the contact between the teeth and inclines hyperactivity of the main masticatory muscles (masseteric and temporal), lack of control of posture of mandible which can worsen in periods of emotional stress, use of neuroleptics, sleep disorders and malocclusion. These changes are common in children with cerebral palsy.[2] As compared to typically developing children with cerebral palsy are more susceptible to bruxism and other oral cavity disease due to poor oral hygiene, type and consistency of food, use of medications, tonicity of facial muscles. [11] Literature reports various studies on oral health in cerebral palsy, however less number of reported studies on prevalence of bruxism in cerebral palsy especially spastic cerebral palsy as less attention is paid to oral health in these children, hence the need for study.

Materials and methods

An approval for the study was obtained from Institutional Ethical Committee. It was a cross-sectional study conducted on 100 children with spastic cerebral palsy between the age group of 3-18 years. Children were taken from tertiary care unit, day care centers and special schools. Informed assent was obtained from parents before conducting the study. Cases with mixed cerebral palsy, denture, temporo-mandibular joint disorders and oral injuries were excluded.

A self-designed questionnaire on bruxism comprising of 49 questions was used to obtain information from parents. The questionnaire was in English language and included questions like total amount of sleep, regular bed time, difficulty in breathing while sleeping, snoring, day time sleepiness, periodic leg movements, grinding and clenching teeth at day or night or both and pain at temporomandibular joint. These questions were explained to the parents in their vernacular language and the answers were recorded as dichotomous. In addition information pertaining to any dental, physiotherapy and medical treatment for grinding/clenching of teeth was obtained from the parents. Pain at temporo-mandibular joint was assessed on Wong Baker Scale. [12]

Statistical analyses

Data were analyzed by the Statistical Programs. Numerical data were reported as mean and standard deviation. Chi-square test was used to assess correlation between bruxism, amount of sleep, chronological age and types of cerebral palsy. *P value* of less than 0.05 was considered significant.

Results

Chi-square test was used to assess correlation between bruxism, amount of sleep, chronological age and types of cerebral palsy. In children less than 7 years of age, the rate of bruxism was found to be 54.24% and in children more than 7 years the prevalence of bruxism was found to be 53.66%. Prevalence of bruxism varied in different types of spastic cerebral palsy, 47.06% in spastic diplegics, 13.04% in spastic hemiplegics and 81.40% in spastic quadriplegics.

The association between bruxism with amount of sleep in children showed significant correlation. It was reported that less the amount of sleep more was the rate of bruxism. There was no significant correlation between age of children and bruxism.

Table 1. Percentage of cerebral palsy children with and without bruxism

Variables		With Bruxism		Without Bruxism	
		N	%	N	%
Chronological age	< 7 years	32	54.24	27	45.76
	> 7 years	22	53.66	19	46.34
Gender	Male	39	54.17	33	45.83
	Female	15	53.57	13	46.43
Sleep	< 9 hours	30	73.17	11	26.83
	> 9 hours	24	40.68	35	59.32
Types of CP	Spastic Diplegia	16	47.06	18	52.94
	Spastic Hemiplegia	3	13.04	20	86.96
	Spastic Quadriplegia	35	81.40	8	18.60

Variables		With Bruxism		Chi-square (σ)	p-value
		N	%		
Chronological age	< 7 years	32	54.24	0.0033	0.9545
	> 7 years	22	53.66		
Gender	Male	39	54.17	0.0029	0.9572
	Female	15	53.57		
Sleep	< 9 hours	30	73.17	10.2815	0.0014*
	> 9 hours	24	40.68		
Types of CP	Spastic Diplegia	16	47.06	29.1831	0.00001*
	Spastic Hemiplegia	3	13.04		
	Spastic Quadriplegia	35	81.40		

Discussion

Bruxism has been reported to exist in many children with cerebral palsy; however, only a few studies confirm this fact but its prevalence in spastic cerebral palsy is unknown. The purpose of this study was to find the prevalence of bruxism in children with spastic cerebral palsy which was found to be around 54%. The prevalence of bruxism in the general population has been reported to be 21%. This para-functional activity could be due to factors such as spasticity, unbalanced myofunctional disturbance, backbone dysfunction with head projected forward

which changes the contact between the teeth and predisposes hyperactivity of the main masticatory muscle. The masticator muscle spasticity in cerebral palsy interferes with daily activities such as tooth brushing cleaning of oral activity and eating.[13] Prevalence of bruxism is 42% in Down syndrome[14] and 44% in Autism Spectrum Disorders which is comparatively less than spastic cerebral palsy. [15]

Our findings are concurred with studies that have reported a higher prevalence of oral habits in boys compared to girls in children with cerebral palsy. [16,17] Tooth eruption and shedding variation across sexes, which may be one of the reason of these reported differences or a contributing factors. When comparing the prevalence of bruxism by age subgroups, higher prevalence was found in children below 7 years (54.24%) which coincides with the study which reported that the frequency of the grinding appears to increase up to the age of seven. Most investigators agree that bruxism increases during the mixed dentition stage and decreases with age. [18]

Day time bruxism was found to be more common in Spastic cerebral palsy children.

Stress has been correlated with day time grinding. Child is hyperactive or taking medications these factors increases the risk of teeth grinding during the day. [19] Similar result was found in a study which reported that day time bruxism was more common in children with downs syndrome due to spasticity.

Children with total body involvement, Spastic Quadriplegics were significantly more affected. As they are more prone to sleep breathing disorders, difficulty in initiation and maintaining sleep that is micro arousals, fragmented sleep, increase behavioral, psychological and adaptive difficulties. as a result of increased behavioral, psychological and adaptive difficulties. [20]

Gastroesophageal reflux disease presented a higher percentage of quadriplegics individuals. It is associated with bruxism episodes, having more mandibular movements at the time of low PH on the esophagus. [21,22] Hence in the present study bruxism in quadriplegics was found to be 64.81% and that of diplegics 29.62% and hemiplegics as 5.55%.

Inverse ratio was found between the amount of sleep and bruxism in the present study that is less the amount of sleep more was the bruxism rates in children. The children with bruxism had irregularity in the bed time. The rate of bruxism in children sleeping less than 9 hours was found to be 73.17% and those children sleeping hours more than 9 hours had 40.68% of bruxism. Strong positive correlation was found between disturbance of sleep habits and psychological stress. [23] Children who sleep less will have poor quality sleep and greater cortisol response to stress. [24]

Limitations. As we were limited to small sample size and unequal size in the subgroups

Conclusion

The prevalence of bruxism in children with spastic cerebral palsy was found to be 54% of which quadriplegics were found to have the higher frequency compared to other types of cerebral palsy.

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