

Primary tooth wear in children from different social environments

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ABSTRACT

Bilingual schools have more hours and high levels of academic demands. **Aims:** To compare the degree of dental wear and frequency of severe wear facets between children from public rural schools (RG) and children from private bilingual schools in Buenos Aires City (PG). To compare the presence of facets to parents' reports on bruxism and their opinion on the importance to health of bruxism and snoring. **Materials and Method:** The sample (n=90) consisted of 5- and 10-year-old children. Their parents/guardians were asked to complete a structured questionnaire on bruxism and snoring. Children's degrees of dental wear on primary incisors, canines and molars were identified and recorded. The data were analyzed statistically. **Results:** The relative risk of wear between PG and RG was 1.82. Bruxism and snoring were reported by 22.9% of the parents/guardians of 5-year-olds and 8.8% of the parents/guardians of 10-year-olds. In 10-year-olds, significant differences were found between RG and PG for canine wear degree 3 (p=0.01). **Conclusions:** Children from highly demanding schools presented more dental wear. Higher frequency of severe dental wear was observed in primary canines and molars late in the tooth replacement period regardless of whether sleep bruxism was reported. Parents/guardians from different social conditions considered that bruxism and snoring are important to health to similar degrees.

Keywords: bruxism - children - dental wear

Desgaste de piezas dentarias primarias en niños de diferente ámbito social

RESUMEN

Las escuelas bilingües tienen mayor carga horaria y altos niveles de exigencia académica. **Objetivos:** Comparar en niños preescolares y escolares de escuela pública rural (GR) y de colegios privados bilingües de la Ciudad Autónoma de Buenos Aires (GP) el grado de desgaste dentario y la frecuencia de facetas de desgaste severo. Comparar la presencia de facetas con el reporte de los padres sobre el bruxismo y su opinión sobre la importancia de bruxar y roncar. **Materiales y Método:** Muestra (n=90) conformada con niños de 5 y 10 años, cuyos responsables completaron un cuestionario estructurado. Fueron registrados y analizados estadísticamente los grados de desgaste dentario en incisivos, caninos y molares primarios. **Resultados:** El riesgo relativo de desgaste entre GP y GR fue 1,82. El 22,9% de los responsables de los niños de 5 años y el 8,8% de los de 10 años reportaron que bruxan y roncan. En relación a la muestra de 10 años, se hallaron diferencias significativas para caninos desgaste grado 3 entre GR y GP (p=0.01). **Conclusiones:** Los niños de escuelas con alta exigencia presentaron más desgaste. Se observó mayor frecuencia de desgaste dentario severo en caninos y molares primarios al final del recambio dentario independiente al reporte de bruxismo nocturno. Los cuidadores de diferente condición social revelaron valoración semejante sobre la importancia en la salud del bruxismo y el ronquido.

Palabras clave: bruxismo - niños - desgaste dental

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INTRODUCTION

At different times over the years, and according to different specialties, bruxism has been considered a habit, a parafunction, and a parasomnia (according to sleep medicine). In 2013, an international group of experts published a consensus with the aim of proposing a definition and diagnostic classification system for bruxism which could be adopted by researchers and clinical professionals. They defined bruxism as a repetitive jaw-muscle activity characterized by clenching or grinding teeth and/or thrusting the mandible. They distinguished two different circadian manifestations: sleep and awake bruxism. With regard to diagnostic criteria, they established the terms “possible” bruxism when it is self-reported, “probable” when complemented by clinical findings, and “definitive” when confirmed by studies such as polysomnography and/or electromyography¹. However, polysomnography and electromyography are expensive and invasive, and Berrozpe et al. consider them excessive for diagnosing parasomnias, which can usually be detected clinically². In the same document, Lobbezoo et al. distinguish primary or idiopathic bruxism as being that which is not associated to medical comorbidities, and secondary bruxism when it is related to psychosocial or medical conditions such as breathing-related sleep disorders, neurological problems, psychiatric conditions and drug or medication use¹.

The multifactorial etiology of bruxism involves factors related to the central nervous system and possible influence of socioenvironmental factors.

Sleep and awake bruxism are currently considered to be different muscular activities. Sleep bruxism may be rhythmic or non-rhythmic. It should be noted that in healthy individuals it should not be considered disorder, although in some situations, bruxism may be a risk behavior, and in other situations a protective factor, mainly against sleep apneas. Individual diagnosis is therefore necessary³.

Most studies on children report prevalence of sleep bruxism (SB) as 14 to 36.8%. However, and given the difficulties in diagnosing awake bruxism (AB), its prevalence has been estimated only among adults as 5 to 31%⁴.

In a previous study on children of mean age 11 years, we found reports of 35.3% SB, 35.3% SB + AB, and 29.4% AB. Subjects with both types of bruxism had high emotional instability⁵, which is a personality trait involving anxiety, a high degree of worry, and

distorted perception of negative situations, causing changes in neurotransmitters such as dopamine and serotonin, which are the main causes of bruxism⁶⁻⁷.

Esparza and Rodríguez studied a sample of 6- to 11-year-old children by applying the Reynolds & Kamphaus Multidimensional Behavior Assessment Scale, concluding that academic demand is a factor associated to the presence of states of anxiety. Serra Negra et al. found higher prevalence of sleep bruxism in children from better socioeconomic conditions⁷⁻⁸.

With regard to wear, our findings in a previous study showed that primary tooth wear should be considered according to age and series. The presence of exposed dentin at early ages could be considered as an indicator of parafunction⁹. In a recent study on 48 children, Martins et al. concluded that those with more severe facets have possible sleep and awake bruxism¹⁰.

The aims of this study were (a) to compare degree and frequency of severe wear facets in preschoolers and schoolchildren from a half-day public rural school to those in children from a full-day private bilingual school who visit private pediatric dentistry practices in Buenos Aires City, and (b) to compare the presence of facets with parent/guardian-reported bruxism and opinion on the importance to health of bruxism and snoring.

MATERIALS AND METHOD

This was a cross-sectional study. It was approved by the FOUBA Ethics Committee (009/2022-CETICA FOUBA).

A structured questionnaire was answered on a voluntary basis by parents/guardians of patients from private bilingual schools seeking care at two practices in Buenos Aires City (PG), and parents/guardians of children enrolled at a public rural school in Buenos Aires Province (RG). The questionnaire consisted of 3 items: reporting on bruxism, reporting on snoring, and providing an opinion on whether bruxism and snoring are important to the child's health. The questionnaire had been used previously Fridman et al. in a study on degree of wear in children's teeth before and after completing the tooth replacement period¹¹ (Fig. 1).

The sample consisted of 5-year-olds whose first permanent molars had not yet erupted and 10-year-olds with mixed dentition, whose parents/guardians

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5 years (first molars not erupted) and 10 years.

Sex: Age:

Child's family name and given name:

Phone number:

1) Does the child make noise with teeth while asleep?

Never <input type="checkbox"/>	1 to 3 nights/week <input type="checkbox"/>	4 to 7 nights/week <input type="checkbox"/>	Don't know <input type="checkbox"/>
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2) Does the child snore while asleep?

Never <input type="checkbox"/>	1 to 3 nights/week <input type="checkbox"/>	4 to 7 nights/week <input type="checkbox"/>	Don't know <input type="checkbox"/>
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3) Do you think that either of the following are important to the child's health?

	Yes	No	Don't know
Grinding teeth			
Snoring			

Tooth wear
 Specify the highest degree of tooth wear observed in each of the following tooth groups, considering 0= no wear, 1= facet on enamel, 2= facet with exposed dentin, 3= facet in deep dentin.

	Degree
Incisors	
Canines	
Molars	

Fig. 1: Form used for recording

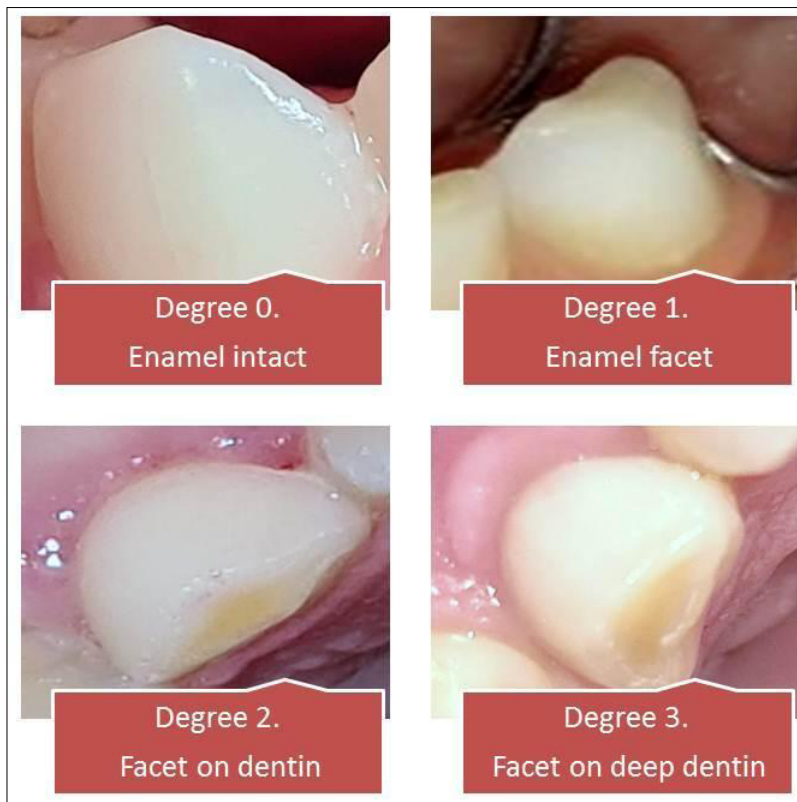


Fig. 2: Degrees of wear according to Smith and Knight's Index

provided consent. Data were collected from May to July 2023.

Three pediatric dentists, with Kappa concordance coefficient 0.92 for determining the Smith and Knight index, recorded degrees of wear for incisors, canines and primary molars in both groups for both 5-year-olds (PG-5 and RG-5) and 10-year-olds (PG-10 and RG-10) (Fig. 2). Any children with multiple caries that interfered with the evaluation of wear in any of the tooth groups, children medicated with neuroleptics, or medically compromised children were excluded.

Data were analyzed using R software (<https://www.R-project.org/>) and VGAM package.

Relative risk (RR) was used to compare the presence of wear between PG and RG. The degree of wear for each tooth group (incisors, canines and molars) was compared between PG and RG for each age using ordinal logistic regression with proportional odds.

Categorical variables were compared using the chi square test when at least 80% of the cells had an expected value greater than 5 and all of them had an expected value of at least 1.

RESULTS

Samples PG-5 and PG-10 consisted of 26 and 24 children, respectively, while RG-5 and RG-10 comprised 20 children each.

- The RR for presence of wear between PG and RG was 1.82.
 - For incisors, there were significant differences in degree of wear between PG-5 and RG-5 ($p = 0.002$). In PG-5, all teeth had wear degree 1 or 2, while in RG-5, there was predominance of teeth without wear or teeth with worn enamel only (Table 1).

Table 1. Percentages of different degrees of incisor wear in both groups.

Age	Group	N	Incisor wear			
			G0 %	G1 %	G2 %	G3 %
5 years ($p = 0.02$)	PG	26	0	65.4	34.6	0
	RG	20	45	50	0	5

- For canines, there were significant differences at both ages ($p < 0.001$), with lower degrees of wear in RG (Table 2).

Table 2. Percentages of different degrees of canine wear in both groups at ages 5 and 10 years.

Age	Group	N	Canine wear			
			G0 %	G1 %	G2 %	G3 %
5 years ($p < 0.001$)	PG	26	7.69	34.6	57.7	0
	RG	20	50	50	0	0
10 years ($p < 0.001$)	PG	24	0	8.70	60.9	30.4
	RG	20	50	10	40	0

- For molars, no significant difference was found in degree of wear between RG-5 and PG-5 ($p = 0.1863$). In both groups, there was predominance of unworn teeth, followed by teeth with wear degree 1. At age 10 years, the differences were significant ($p = 0.004$), with predominance of teeth with wear degree 1 in PG-10, and unworn teeth in RG-10 (Table 3).
- Among parents/guardians, 22.9% reported that 5-year-olds presented bruxism and snoring, 8.8% reported that 10-year-olds did so, and 10.4% said they did not know.
- There was no difference in reported grinding between groups with or without tooth wear in RG at both ages (RG-5 $p = 0.068$, RG-10 $p = 0.582$). It was not possible to analyze this in PG because all the children presented facets. Fig. 3, 4, 5 and 6 show the association between wear recorded by dentists and tooth grinding reported by parents/guardians in the four subgroups.
- There was no difference between PG and RG regarding the importance assigned by parents/guardians to bruxism ($p = 0.58$) or snoring ($p = 0.68$).
- The frequencies of degree 3 facets were: 30.4%

Table 3. Percentages of different degrees of molar wear in both groups at ages 5 and 10 years.

Age	Group	N	Molar wear			
			G0 %	G1 %	G2 %	G3 %
5 years ($p = 0.1863$)	PG	26	50	42.3	7.69	0
	RG	20	70	25	5	0
10 years ($p = 0.004$)	PG	24	9.09	54.5	27.3	9.09
	RG	20	52.9	35.3	11.8	0

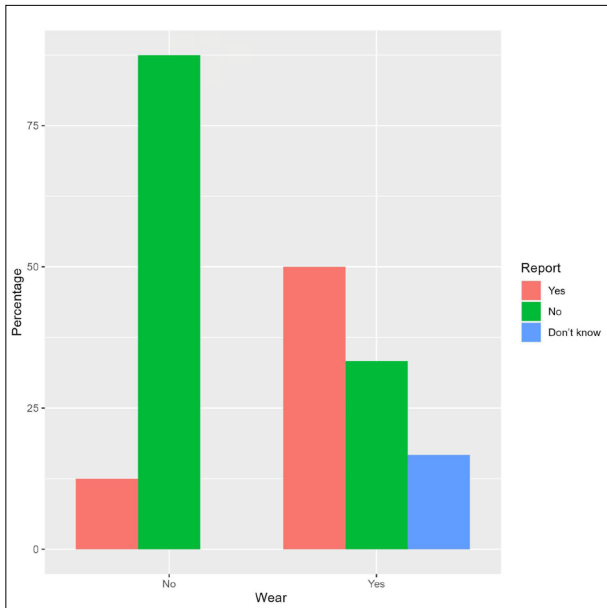


Fig. 3: Comparison of tooth grinding reported by parents/guardians of rural school 5-year-olds with and without wear

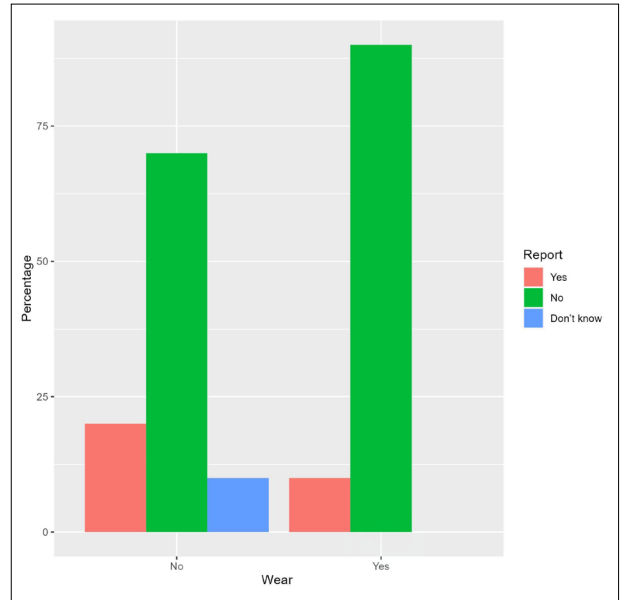


Fig. 5: Comparison of tooth grinding reported by parents/guardians of rural school 10-year-olds with and without wear

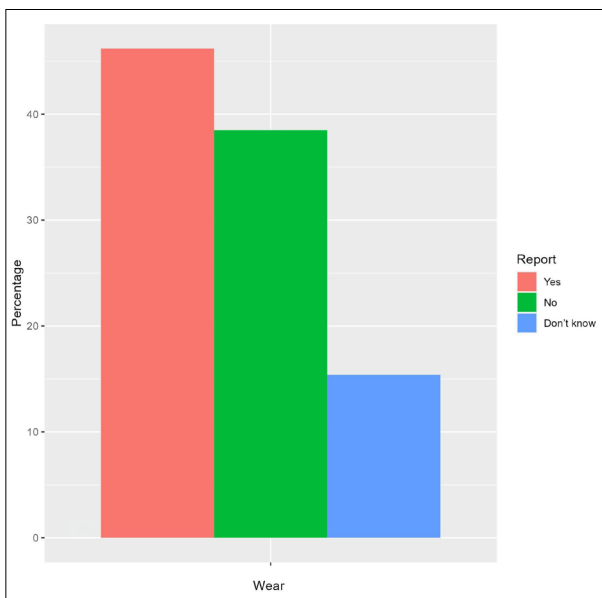


Fig. 4: Tooth grinding reported by parents of bilingual school 5-year-olds with wear. In this group, all the children presented wear.

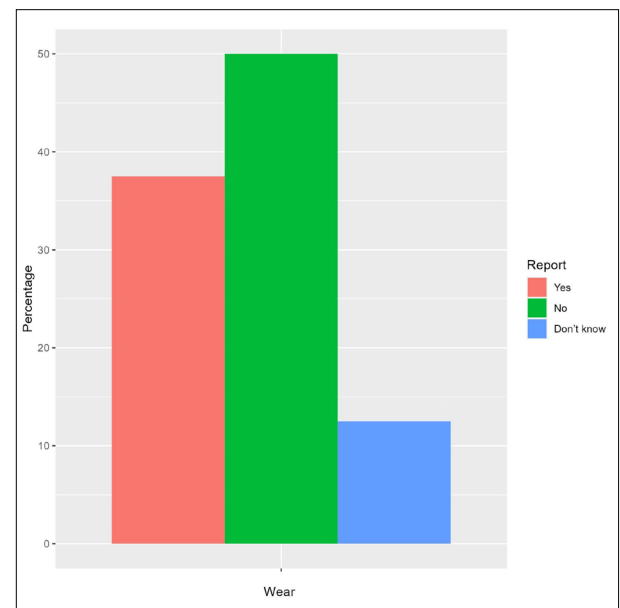


Fig. 6: Tooth grinding reported by parents of bilingual school 10-year-olds with wear. In this group, all the children presented wear.

for canines and 9.1% for molars in PG-10, and 5% for incisors in RG-5. No severe wear was recorded in the other groups. Fisher’s test showed significant differences between RG-10 and PG-10 for canines ($p=0.01$), and non-significant differences between RG-5 and PG-5 for incisors ($p=0.43$), and between RG-10 and PG-10 for molars ($p=0.50$).

DISCUSSION

The ages included in the sample were selected because preschoolers (5-year-olds) are frequently reported on, and 10-year-olds have mixed dentition, so it is still possible to evaluate present primary teeth. The decision to compare children according to schooling type arose from the marked socioenvironmental differences observed between sites located less than 100 kilometers away from each other. The rural schoolchildren live in the district Exaltación

de la Cruz, Buenos Aires Province, where over 95% of the population consists of rural workers. In contrast, the children from private bilingual schools have long days at highly academically demanding schools, urban family habits and health insurance. Bulanda et al. emphasize that socioeconomic and cultural features may be associated with the onset of sleep bruxism, which occurs more frequently in children from families with higher socioeconomic level. This might be related to the greater number of duties and demands these children have compared to children from poor environments. It is consistent with the findings on dental wear in the current study¹².

Different authors consider that SB is related to stress, anxiety, and behavioral and personality disorders, among others, as a result of serotonin and dopamine release which increases brain activity, heart rate and muscle tone, thereby affecting sleep quality. There is also an association between obstructive sleep apnea and bruxism, and it is currently believed that bruxism may be a protective factor that maintains airway patency, which is why snoring has been investigated¹².

Awake bruxism is associated to the inability to express emotions and to states of anxiety¹³. The current

study observed significant differences in primary tooth wear between PG and RG. In PG, all children presented at least one facet at age 5 years. Our results found that the major difference was in canines, in agreement with Soares et al., who report canines as being the teeth most highly affected¹⁴.

Adult self-reporting is considered to differ from parental reporting on sleep bruxism, and parents' reports may not always be accurate since they often sleep at a distance from the children and do not hear them. Nevertheless, in the current study, the number of "don't know" answers were low, although reports were not consistent with presence of facets³.

The use of a questionnaire plus clinical examination is consistent with current recommendations. Research thus has a multifactorial approach, providing greater consistency, thereby identifying useful information for preventing consequences¹⁵.

In the sample used in the current study, children from academically demanding schools had higher degrees of wear and greater frequency of severe wear in primary canines and molars late in the tooth replacement period. These values were independent of reported sleep bruxism. Parents/guardians from different social conditions evaluated the importance of bruxism and snoring to health similarly.

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