Is There an Association Between Bruxism and Intestinal Parasitic Infestation in Children?

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ABSTRACT

Purpose: Multiple factors have been considered in the etiology of bruxism in pediatric patients, among which are infestations by intestinal parasites suggested by some authors. No empirical evidence exists, however, of such association. Therefore, this study's purpose was to investigate the existence of an association between bruxism and intestinal parasitic infestation in children.

Methods: Fifty-seven 6- to 11-year-olds (30 cases and 27 controls) who had not used anthelminthics 2 months before the baseline examination were enrolled in the study. A diagnosis of bruxism was based on an intraoral clinical examination performed by a single trained examiner and on the parent/guardian's report of any perceived parafunctional habits (questionnaire-based interview). Bruxism cases were defined as those children with a report of currently perceived habits of eccentric or centric bruxism (tooth-grinding and tooth-clenching, respectively) combined with clinical evidence of nonphysiologic wear facets. The volunteers were required to collect 3 fecal samples (1 every 2 to 3 days). Parasitologic analysis was performed using the spontaneous sedimentation method. Data gathered from the intraoral clinical examination, questionnaire, and parasitologic analysis were tabulated and submitted to statistical analysis using the chi-square test and student's t test.

Results: Intestinal parasitic infestation was observed in 30% (N=9) of cases and 41% (N=11) of controls, but no statistically significant association was observed (P=.40).

Conclusion: This study's findings do not support the existence of an association between intestinal parasitic infestation and bruxism among the evaluated pediatric population. **(J Dent Child 2008;75:276-9)**

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Bruxism is a common parafunctional habit characterized by involuntary and unconscious movements resulting in clenching and grinding of the teeth, which affects approximately 30% of children up to 10 years old.[1,2] Among the consequences of bruxism are tooth surface wear, tooth fracture, dentin hypersensitivity, masseter muscle hypertrophy, hypertonicity and sensitivity of masticatory muscles, and limitation of jaw movements.[3] Bruxism has also been considered one of the causes of temporomandibular disorders, although a causal relationship has not yet been clearly demonstrated.[4]

Bruxism has a multifactorial etiology that includes malocclusions, occlusal interferences, psychogenic factors, and some systemic conditions such as allergies, endocrinological disturbances, malnutrition, and gastrointestinal disorders.[5] Among these gastrointestinal disorders, intestinal parasitism has been reported as a possible risk factor for bruxism. Popular beliefs and some literature reports[6,8,9] have suggested the existence of a possible association between bruxism and infestation by intestinal parasites. Marks[5] stated that eradication of intestinal parasitic infestations might reduce or even eliminate bruxism. Ahmad[6] suggested that intestinal infestation with *Enterobius*, for example, would play a role in the etiology of bruxism. Van Wyk et al[9] speculated that tooth-grinding could be a component of the clinical syndrome observed in *Schistosoma matthei* infection in cattle. The biological feasibility of such a correlation, however, has not yet been established. Some authors have attempted to explain this association based on similarities between parasitism and allergies, which are a known risk factor for bruxism. Sleeping disorders are a common consequence of both allergies and parasitic infestation due to digestive pain.[10]

In spite of the biological plausibility, there is a lack of empirical evidence demonstrating that parasitic infestation is actually associated with bruxism. In fact, the reports of such an association are from studies based only on common characteristics among children infected with parasites without comparison groups.[6,8,9]

Intestinal parasites are still a very common health problem in underdeveloped and developing countries.[11] In Brazil, it has been estimated that approximately 11% to 20% of children have some type of parasites, mostly *Giardia lamblia* and *Ascaris lumbricoides.*[11,12] Given the public health importance of both intestinal parasitic infestation and bruxism, this study's purpose was to investigate the existence of an association between bruxism and intestinal parasitic infestation in children.

METHODS

This clinical study was conducted with children admitted to the Pediatric Dentistry Clinic of the School of Dentistry of Ribeirão Preto, University of São Paulo, Ribeirão Preto, São Paulo, Brazil) for regular dental treatment (mostly dental caries treatment and prevention). All parents/guardians signed an informed consent authorizing the enrolment of their children in the study after approval by the Ethics in Research Committee (process no. 2002.1.1104.58.0), in compliance with the Brazilian National Health Council Resolution 196/96. All 6- to 11-year-olds referred for dental treatment during the first semester of 2006, and who had not taken anthelminthics in the previous 2 months before examination,[8] were screened for the study. Information on perception of children's bruxism characteristics was obtained by a questionnaire-based interview with the parents/guardians.

Clinical evidence was gathered by means of detailed intraoral clinical examination. A total of 80 children were screened for the study and classified as cases (with bruxism) or controls (without bruxism). Children with a history of bruxism, but no current manifestation of this parafunctional habit was excluded from the study and only individuals with active bruxism at the time of evaluation was enrolled.

CASE DEFINITION

Cases of bruxism (N=30) were defined as those children whose parents/guardians had reported currently perceived habits of eccentric or centric bruxism (tooth-grinding and tooth-clenching, respectively), combined with clinical evidence of nonphysiologic wear facets. Perceived habits of bruxism included a parental report of having heard "rasping" or "scratching" sounds produced by tooth-grinding while the children were asleep or having noticed the presence of this parafunctional habit by observing suggestive muscular and mandibular movements during grinding and/or clenching of the teeth.

Controls (N=30) were those children whose parents/guardians reported no lifetime tooth-grinding/clenching or presence of nonphysiologic wear facets.

CLINICAL EXAMINATION

Intraoral clinical examination was performed by a single trained examiner. Wear facets were evaluated by direct observation and graded 1, 2, and 3, according to the severity of the dental wear, as described by Nilner and Lassing.[13] When more than 1 grade was given to the same patient, the highest grade prevailed.

PARASITOLOGIC ANALYSIS

All children underwent parasitologic analysis for detection of intestinal parasites. The children and their parents/guardians were instructed to collect 3 stool samples at 2- to 3-day intervals. The 3 samples were required to increase the likelihood of detecting an intestinal parasitic infestation.

For collection of the stool samples, the participants were given 3 Coprotest kits (NL Comércio Exterior Ltda, São Paulo, Brazil), which are commercially available devices for stool analysis, containing 10% formalin as a preservative. The latter allows for conservation of the fecal material for over 30 days until the parasitologic analysis is completed. Analyses were performed according to the spontaneous sedimentation method, proposed by Hoffman et al.[14] The parasitologic analyses were performed at the Department of Clinical, Toxicological, and Bromatological Analysis of the School of Pharmaceutical Sciences of Ribeirão Preto, University of São Paulo, Brazil.

STATISTICAL ANALYSIS

Association between bruxism and presence of intestinal parasites was tested by chi-square, and the student's t test was used for comparison of the means. The significance level was set at $P<0.5$. All analyses were performed using SAS statistical software 8.0 (SAS Institute, Inc, Cary, NC).

Table 1. Bruxism Characteristics (Group 1; n=30)

Bruxism characteristics	n (%)
Noticeable grinding sounds during sleep	25 (83)
Bruxism type	
Centric	2 (7)
Eccentric	22 (73)
Centric and eccentric	6 (20)
Occasion of occurrence	
Sleep bruxism	19 (63)
Wakeful bruxism	3 (10)
Sleep and wakeful bruxism	8 (27)
Wear facets - degree 1	8 (27)
Wear facets - degree 2	17 (57)
Wear facets - degree 3	5 (17)

RESULTS

A total of 30 cases and 30 controls were included in this study. Three children from the control group were excluded, however, because they failed to collect the fecal samples for the parasitologic analysis.

Case and control groups were statistically similar to each other regarding gender (p=.70) and age (p=.62) distribution. Among the cases, there were 54% of males compared to 48% of males in the control group. The mean age for cases and controls was 8.1 (Standard Deviation, SD=1.5) and 7.9 (SD =1.6), respectively.

Among the children with bruxism, 22 presented eccentric bruxism, 2 presented centric bruxism, and the remaining 6 children presented both types of bruxism. Data on Table 1 show that the most commonly attributed grade of dental wear was 2 (N=17), followed by grade 1 (N=8) and grade 3 (N=5).

Intestinal parasitic infestation was observed in 30% (N=9) of cases and 41% of controls (N=11; Figure 1). Results from the parasitologic analyses among cases revealed that: 7 children tested positively for *Giardia lamblia*; 1 child tested positively for *Enterobius vermicularis*; 1 child tested positively for *Giardia lamblia* and *Enterobius vermicularis*; and the remaining 21 children tested negatively for enteric parasites (Table 2). Results from the parasitologic analysis among controls revealed that: 9 children had tested positively for *Giardia lamblia*; 1 tested positively for *Ascaris lumbricoides*; 1 tested positively for *Hymenolepys nana*; and the remaining 16 children tested negatively for enteric parasites (Table 2).

No statistically significant difference (P =.40) was found between cases and controls regarding the presence of an intestinal parasitic infestation.

DISCUSSION

This study's findings did not show a statistically significant association (P=.40) between bruxism and infestation by intestinal parasites. These results, however, should be addressed with caution. A possible explanation for the lack of statistical significance could be the type 2 error, as the study population was relatively small considering the high prevalence of exposure. The present study had the capacity of identifying an odds ratio of 2.5 with a power of 80%, with the expected 20% of exposure. For the actual findings, however, the power was reduced to 50%. In addition to the lack of power, it should be considered that controls were identified in the pediatric dental clinic and that it is possible they were not from the same population from which cases emerged, resulting in a selection bias. Still, confounder factors were not measured and the possibility of interaction of parasites with other factors cannot be disregarded.

This study's outcomes, however, are consistent with those of Gilman et al,[15] who reported that symptoms frequently attributed to *Enterobius vermicularis* infections, such as perianal itching, enuresis, and tooth-grinding, occurred in a similar proportion of infected children (15%, 17% and 13%, respectively) and noninfected individuals (11%, 13%, and 11%, respectively). Likewise, our findings agree with those of Castro et al,[8] who studied 120 1- to 14-year-old children and observed that, although bruxism was a symptom predominantly observed in children suffering from ascariasis (63% of the cases), the proportion of this parafunction in children with enterobiasis, giardiasis, and without parasitosis (27%, 20%, and 27%, respectively) was very similar.

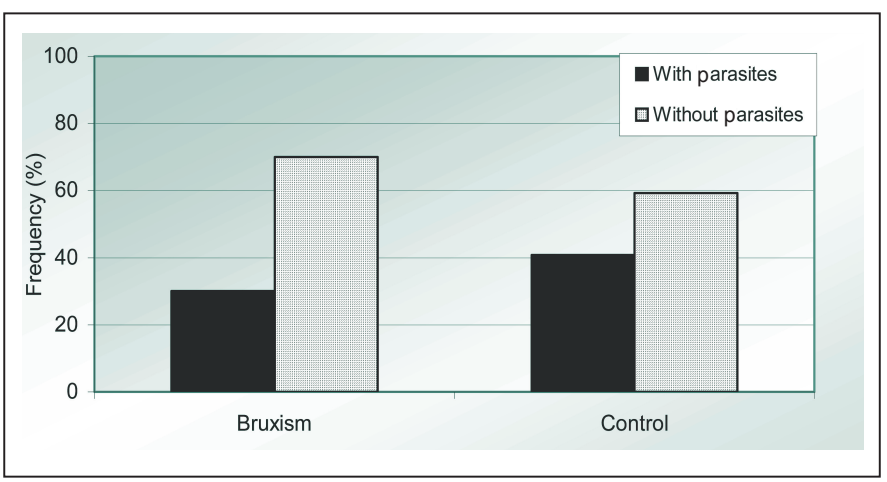

Figure 1. Distribution of intestinal parasites in children with and without bruxism.

Table 2. Presence of Intestinal Parasites in Groups 1 and 2

Intestinal parasites	Group 1 (with bruxism) n=30		Group 2 (without bruxism) n=27	
	n	(%)	n	(%)
Giárdia lamblia	7	(23)	9	(33)
Enterobius vermicularis	1	(3)	0	(0)
Giardia lamblia and Enterobius vermicularis	1	(3)	0	(0)
Hymenolepys nana	0	(0)	1	(4)
Ascaris lumbricoides	0	(0)	1	(4)

These outcomes are consistent with our assumption that an association between bruxism and intestinal parasitic infestation does not seem to exist.

Giardia lamblia was the intestinal parasite most frequently detected in the parasitologic analysis of both cases (27%) and controls (33%). According to Ish-Horowicz et al,[7] parasitic infestation with *Giardia lamblia* is usually asymptomatic, which would possibly explain the absence of bruxism, even in infected children.

Moreover, individuals suffering from *Ascaris lumbricoides* intestinal infestation are usually asymptomatic.[16] It may be speculated that bruxism did not manifest in control group patients infected with *Ascaris lumbricoides* because of this. The parasitologic analysis also detected *Enterobius vermicularis* in fecal samples of 2 patients (7%) with bruxism and *Hymenolepys nana* in fecal samples of 1 patient (4%) without bruxism.

CONCLUSIONS

This study's findings did not show evidence of a positive association between bruxism and intestinal parasitic infestation in the surveyed pediatric population. Further research, perhaps with a larger population and addressing other issues, should be conducted to investigate whether the association of these conditions is consistent.

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