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Bruxing and Non-Bruxing Children: A Comparison of Their Personality Traits

Edward V. Kuch, D.M.D., M.S.
Michael J. Till, D.D.S., Ph.D.
Louise B. Messer, B.D.Sc., M.D.Sc.

Abstract

A study of bruxism among 358 five- and six-year-old kindergarten children using a parental history confirmed by an intraoral examination has shown a prevalence of 15% bruxers. A further 15.4% of children showed clinical evidence of bruxism without parental awareness of the habit. Males and females were equally affected by the habit. Using the Missouri Children's Picture Series as the psychological test, a subsample of 50 bruxers and 50 non-bruxers were found not to differ significantly with respect to eight psychological traits: conformity, masculinity/femininity, maturity, aggression, inhibition, activity level, sleep disturbance and somatization. The study suggests that bruxism may be a relatively common childhood habit and at age five or six years this habit appears to have little psychological significance.

Introduction

Bruxism, the habitual grinding, gnashing or clenching of teeth at times other than for the mastication of food, was originally described by Marie and Pietkiewicz in 1907.[1] Since then, the condition has been variously attributed to dental, systemic or psychological factors. In most dental literature it is reported to be secondary to intraoral conditions such as malocclusion or localized conditions including mobile teeth, cuspal interferences, high restorations, premature contacts or occlusal disharmony.[2-5] Systemic factors implicated in bruxism include intestinal parasites, subclinical nutritional deficiencies, allergies and endocrine disorders.[6,7]

The psychological literature has suggested a close association between bruxism and underlying personality problems.[8,9] The condition has been viewed as a nervous habit and as such may represent a "non-adjustive response" to insoluble personal problems,[10] or an inability to express emotions such as anxiety, rage, hate, aggression, sadism or libidinous desires in other ways.[11,12] A dual etiologic background of psychic stress and occlusal interference has been suggested.[13] This is supported by studies of the anxiety states of adult patients with maxillo-facial pain who have been reported to express anxiety in various forms of physical activity, among which bruxism was the most common.[14,15] A concept that bruxism may represent a rudiment of behavioral characteristics previously necessary for maintenance of the species has also been proposed.[16] Neurophysiological experiments on anesthetized rabbits have shown the production of "bruxing-like" mandibular movements on stimulation of the lateral hypothalamus following ablation of the anterior cerebral cortex.[17]

Since studies in adults have suggested a correlation between the habit of bruxism and anxiety or the more aggressive personality traits, a comparative study of children may allow the determination of these traits at an early age. To date, the literature is devoid of such reports on bruxing children. A study was therefore undertaken among a selected group of bruxing and non-bruxing kindergarten children, to determine if any correlations existed between those with a confirmed habit of bruxism and their personality characteristics as determined using a standard psychological test. Children aged five and six years were selected for the study since many of these still have an intact primary dentition, thereby minimizing the possibility of malocclusion due to transient grinding occurring with possible occlusal dysharmony in the mixed dentition.

Materials and Methods

Study Permission: Permission to use human subjects was obtained from the appropriate University and school district authorities.

Study Population: A total of 520 five- and six-year-old children attending 19 kindergarten classes of the Rosemount School District, a southern suburb of Minneapolis, Minnesota, was selected for the study population. The socio-economic status of the area was relatively homogeneous. An explanatory letter was sent to the parents of each child accompanied by a questionnaire (Figure 1) relating to the parental awareness of any bruxing habit. Parental permission was obtained for 431 children to be included in the study.

1. Does your child *currently* grind his/her teeth, other than when eating?	Yes	No	Maybe
2. In the *past*, have you ever noticed your child grinding his/her teeth?	Yes	No	Maybe
3. If your child *currently* grinds his/her teeth, when does grinding occur?	Day	Night	Both day and night
4. Does any member of the child's immediate family grind his/her teeth?	Yes	No	Maybe
5. If yes, when does this family member grind his/her teeth?	Day	Night	Both day and night
6. What is this person's relationship to this child?			

Fig. 1. Questionnaire on bruxism sent to parents of 520 five- and six-year-old kindergarten children.

Intraoral Examination: Intraoral examinations were performed on 358 of the 431 children (the remaining 73 children were unavailable for the examination at the time it was conducted). All of the 358 children examined were Caucasian; 169 were boys and 189 were girls; 125 were five-year-olds and 233 were six-year-olds.

Each child was examined reclining on a cot at school. Equipment included a mouth mirror, explorer and a high intensity portable light held by a dental assistant. Each dentition was examined for caries (after the criteria of Davies and Cadell[18]), restorations, interdental spacing of anterior primary teeth (after the descriptions of Baume[19]), terminal plane of the opposing second primary molars (after the descriptions of Finn[20]), and for an anterior or posterior crossbite. In addition, local occlusal factors which may contribute to bruxism such as loose teeth, cuspal interferences, premature occlusal contacts and high restorations, were recorded. Positive evidence of bruxism was defined as a positive parental history of the habit in addition to the presence of obvious and extensive wear facets on the primary molar teeth which could be verified as being related to the occlusion when the child moved from centric occlusion through eccentric lateral protrusive movements.

Selection of Test and Control Groups: On the basis of parental awareness of the habit and confirmation by oral examination, a test group of fifty bruxing children (25 boys, 25 girls) and a control group of fifty non-bruxing children (25 boys, 25 girls) were identified for comparison of their personality traits. Each test child had a positive parental history of the habit and clinical evidence of molar wear facets; each control child had a negative parental history of the habit and no molar wear facets were clinically evident. Both test and control children were selected on the bases of a low DEFS score, no anterior or posterior crossbite, and the absence of mobile primary teeth, premature occlusal contacts or high restorations.

Determination of Personality Traits: The Missouri Children's Picture Series[21] was administered to the fifty children in each group to compare eight personality traits, defined as follows:[22,23]

Conformity: the correspondence or congruity in character with expected characteristics.

Masculinity/femininity: the characteristics of the masculine or feminine form.

Maturity: the completion of natural growth or development.

Aggression: the trait of vigorous energy or bodily assertion, especially in the use of initiative and forcefulness.

Inhibition: the blocking or holding back of one psychological process by another.

Activity Level: the trait of acting vigorously.

Sleep Disturbance: the interruption of the quiet rest or place of sleep.

Somatization: the conversion of mental experiences or states into bodily symptoms.

The picture test comprised 238 line-drawn black and white cards which depicted scenes involving children in various activities such as playing ball, fishing, pillow-throwing, swimming, school situations, parental actions, etc. In some situations the child in the picture was acting alone and in other pictures, in a group. Some pictures showed adults in addition to children.

The test was administered to the children in groups of eight in a room set aside for the purpose. The children were selected randomly for the administration of the test. For each octet the examiner was unaware of which children were bruxers and which were control children. The children were seated at a table, each with a stack of 119 cards which were not ordered. The second half of the cards was reviewed by each child at a subsequent sitting. Each child was instructed to sort the cards into two piles, those which were desirable to him or that he identified with, and those which were undesirable to him or that he did not identify with. The children were discouraged from interacting with each other while sorting the cards. Approximately 15-20 minutes were required for each child to sort the half-stack.

The cards assembled in the undesirable pile were then scored using the scoring system provided with the test and the results sorted into the eight psychological traits. Also supplied with the test were normal values for each trait for five- and six-year-old boys and girls. The test group mean scores for each trait were compared statistically with control group mean scores and with the established norms using an analysis of variance and the Student's t test (two-tailed) for unpaired data. The criterion for statistical significance was a p value of less than 0.05. The norms provided with the test gave separate scores for five- and six-year-olds. Since these age groups were combined in the kindergarten classes studied, comparisons were made with calculated mean scores for the norms.

Results

Parental Observation of Bruxism: Questionnaire responses were obtained for 431 (83%) children (Table 1). Of these, parental response indicated that 93 (21.6%) had a positive history of the habit, 23 (5.3%) had a possible history, and 311 (72.2%) did not brux. A current history of the habit was provided for 62 (14.4%) children. Four respondents (0.9%) did not answer the questions related to bruxism. Of the 116 children with either a positive or a possible history of the habit (Question 3), 75 (64.6%) were night-time bruxers and 8 (6.9%) bruxed during the day.

Table 1. Distribution of Parental Responses to Observation of Bruxism (Questions 1 and 2)

History of Bruxism	Parental Observation of Bruxism (%)	
	Present History (Question 1)	Past History (Question 2)
Positive	62 (14.4)	93 (21.6)
Negative	341 (79.1)	311 (72.2)
Possible	24 (5.6)	23 (5.3)
No response*	4 (0.9)	4 (0.9)
Total	431 (100)	431 (100)

*Parents did not answer these questions.

Bruxism among Relatives: A total of 124 (28.8% of total) responses indicated that a member of the child's immediate family had either a positive or a possible history of bruxism (Table 2). A further 289 (67%) responses indicated that no immediate family member bruxed and 18 (4.2%) respondents did not answer question numbers 4 and 5. As shown in Table 2, the bruxing relatives exhibited the habit predominantly at night. Among the 112 responses indicating a relative with bruxing habit, there were 25 instances where the child in the study was also recorded as a bruxer. A total of 62 children who did not brux had relatives with a positive or a possible history of the habit. The distribution of responses to question number 6 indicated that no one particular family member demonstrated the habit more frequently than another; parents, siblings, aunts, uncles, grandparents and other family members were all cited as bruxers with approximately equal frequency.

Table 2. History and Timing of Bruxism Among Relatives (Questions 4 and 5)

History of Bruxing Relative (no.)	Timing of Bruxism (%)			
	Night	Day	Both Night and Day	No Response*
Postive (112)	90 (80.3)	12 (10.7)	6 (5.4)	4 (3.6)
Possible (12)	9 (95.0)	1(8.3)	0	2 (1.7)
Total (124)	99 (79.9)	13 (10.5)	6 (4.8)	6 (4.8)

*Parents did not answer these questions.

Clinical Determination of Bruxism: Table 3 shows the distribution of the habit, as reported by the parents, for the 358 children who received a clinical examination. A total of 88 children (24.6% of total examined) had a positive history of the habit. For 54 of these (28 boys, 26 girls) there was clinical evidence of wear facets. The prevalence of bruxism among the 358 children was therefore determined, from a positive parental history confirmed by clinical examination, to be 15.1%. From the 54 bruxing children, the test group of 50 was selected based on the criteria indicated above.

Table 3. Correlation between parental observation of bruxism and clinical diagnosis of wear facets

Parental observation of bruxism among children examined (no.)*	Clinical diagnosis of molars (%)	
	Wear facets present	Wear facets absent
Positive history (88)	54 (61.4)	34 (38.6)
Negative history (257)	55 (21.4)	202 (78.6)
Possible history (13)	0	13 (100)
Total (358)	109 (30.4)	249 (69.6)

*Of the 431 children for whom questionnaire responses were obtained, a total of 358 children was available for clinical examination.

Despite a positive parental history of the habit, 34 children (9.5% of total examined) showed no molar facets (Table 3). However, 20 of these children showed one or more of the following dental findings: mobile primary teeth, broken restorations, anterior or posterior crossbites, or high restorations.

Of the 257 children (71.8% of total examined) with a negative history of the habit (Table 3), 55 showed wear facets and 202 showed no faceting. This suggested that 15.4% of the total children examined could have had a bruxing habit of which the parents were unaware. Among the 13 children with a possible history of the habit, none showed clinical evidence of faceting.

Dental Findings Among Test and Control Groups: The numbers of erupted primary and permanent teeth were very similar for both test and control groups. The test group contained 19 primary dentitions (eleven boys, eight girls) and 31 mixed dentitions (14 boys, 17 girls). The control group contained 23 primary dentitions (11 boys, 12 girls) and 27 mixed dentitions (14 boys, 13 girls). The mean number of primary teeth for all test boys was 19 (control boys: 18.8) and for all test girls, 18 teeth (control girls: 19). The mean number of erupted secondary teeth for all test boys was 2.6 (control boys: 2.4) and for all test girls, 2.9 teeth (control girls: 1.8). As a group, test boys showed a slightly lower mean DEFS score than control boys (1.6 vs 2.0) but test girls showed a slightly higher mean DEFS score than control girls (2.6 vs 1.6)

Table 4. Classification of occlusion of test and control primary dentitions

Group (no.)	Anterior Interdental Spacing		Terminal Plane of Second Molars					
	Baume C1 I	Baume C1 II	*Straight*		*Mesial step*		*Distal step*	
			Rt.	Lt.	Rt.	Lt.	Rt.	Lt.
Test Boys (11)	5	6	11	10	0	1	0	0
Girls (8)	3	5	7	7	1	1	0	0
Total (19)	8	11	18	18	1	2	0	0
Control Boys (11)	5	6	8	8	1	1	1	2
Girls (12)	6	6	12	12	0	0	0	0
Total (23)	11	12	20	20	1	1	1	2

As shown in Table 4, the occlusion of the 19 test and 23 control primary dentitions showed a similar distribution with respect to anterior interdental spacing and the terminal plane relationship of the second primary molars.

Personality Traits: Table 5 shows the test and control group mean scores for the eight personality traits examined for boys and girls in comparison with established norms for this age group. None of the test group mean scores differed significantly from the control group mean scores ($p>0.05$) for either boys or girls. However, several trends were noted.

For boys, the test group mean score exceeded that for both the control group and the norm for the trait of conformity only. Test group mean scores were placed between those of the control group and the norms for the four traits of masculinity/femininity, maturity, aggression and somatization. Test group mean scores were below those of both the control group and the norms for the three traits of inhibition, activity level, and sleep disturbance. In general, the standard deviations of the test mean scores showed little variation from those of either the control group or the established norms. The trait of maturity showed the widest standard deviation among the test group mean scores (mean score 10.5 ± 5.9 SD). Among the control and norm groups, the three traits of conformity, maturity and inhibition all showed wider standard deviations than the remaining five traits.

For girls, test group mean scores exceeded both the control group mean scores and those for the norms for the four traits of aggression, inhibition, activity level and sleep disturbance. Test group mean scores fell between those of the control group and the norms for the four traits of conformity, masculinity/femininity, maturity and somatization. The two traits of conformity and maturity showed the widest standard deviations among the test group mean scores. The two traits of inhibition and activity level showed the widest variation in standard deviations among control group scores, and the three traits of conformity, maturity and inhibition showed wide variations in standard deviations among the normal group scores.

Table 5. Mean scores for test groups versus control groups and established norms for the Missouri Children's Picture Test series

Trait	Mean Scores for Boys			Mean Scores for Girls		
	Test	Control	Norms*	Test	Control	Norms
Conformity	26.2 (2.8)†	24.4 (5.5)	25.0 (5.1)	24.3 (4.9)	25.4 (3.1)	25.1 (4.4)
Masculinity/ femininity	14.4 (3.2)	14.8 (4.8)	14.1 (3.5)	7.7 (3.9)	7.5 (3.8)	8.1 (3.6)
Maturity	10.5 (5.9)	13.0 (5.1)	9.0 (5.1)	8.4 (4.7)	8.7 (3.4)	6.9 (4.4)
Aggression	11.6 (3.1)	10.9 (3.2)	12.0 (3.0)	13.8 (2.6)	13.2 (2.6)	13.3 (2.4)
Inhibition	11.7 (3.9)	13.3 (5.1)	12.8 (5.0)	16.0 (4.4)	15.2 (4.2)	14.6 (4.7)
Activity level	10.2 (3.8)	10.6 (4.4)	12.4 (4.1)	15.4 (3.3)	13.4 (4.1)	14.4 (3.4)
Sleep disturbance	10.5 (2.6)	12.1 (3.9)	10.6 (3.0)	11.4 (3.4)	11.2 (2.5)	10.5 (2.9)
Somatization	15.0 (3.7)	14.6 (2.7)	16.7 (3.3)	18.1 (2.9)	17.8 (2.8)	18.6 (3.3)

*Mean of norms for five- and six-year-olds (Sines, Pauker & Sines, 1974)[21]

†Standard deviation.

Discussion

The present study has shown a prevalence of bruxism of 15% among five- and six-year-old children attending kindergarten in the geographic and socio-economic area studied. The habit appeared to affect both males and females to an equal extent. The figure of 15% is close to the 14.4% reported in 1966 by Reding, Rubright and Zimmerman[24] in a study of 1157 three- to seven-year-old children attending the University of Chicago Laboratory Schools. Studies on older persons by the same workers have indicated that the habit of bruxism decreases with age; a prevalence of 5.1% was reported among a population of 2290 16- to 36-year-old undergraduate and graduate students from the University of Chicago.[24] The questionnaire responses in the present study would tend to support this conclusion, since 26.9% of the children had either a positive or possible past history of the habit and 20% had a positive or possible present history. Anecdotally, both parents and clinicians remark that bruxism tends to diminish following eruption of permanent incisors and/or first permanent molars. In the present study, little significance can be attached to the apparently high number of bruxing relatives, since some of these were also children and none of the histories were confirmed by clinical examination.

In the present study, the prevalence of bruxism may have been higher than the reported 15%, since a further 15.4% of the total sample showed clinical evidence of wear facets but did not have a history of the habit at home. Since the majority of bruxing children exhibited the habit during the night, the timing may have contributed in part to the lack of parental awareness. Although bruxing is frequently audible, a sleeping parent could be unaware of the child's habit. Furthermore, the explanatory letter which accompanied the questionnaire to the parents may have introduced a bias into the study. Parents with a recognized bruxing child may have been reluctant to have the child examined and consequently withheld the child from the study.

The present study suggests that the bruxing habit reported by the parents does not always result in wear faceting of the molars. It is of interest that many of the 34 children in this category had local occlusal factors recognized as contributing to grinding, suggesting that the parents were in fact reporting a habit of a transient or intermittent nature.

Various personality inventories have been used to evaluate the emotional status of persons with a bruxing habit. To date however, these have been used exclusively wih adults. For example, the Rosenweig Picture Frustration Test[25] has been used but a correlation between bruxism and aggression could not be demonstrated.[26] A more recent study using a scale developed from the Maudsley Personality Inventory[27] showed bruxers to have significantly higher symptoms of aggression and anxiety than non-bruxers.[28] The Missouri Children's Picture Series[21] used in the present investigation was designed as a psychological test readily administered by the non-psychologist and easily accomplished by participants too young to have reading skills. The test was readily implemented in the present study and none of the children exhibited any difficulty in following the directions. In addition, rarely did the children demonstrate ambivalence in sorting the cards. The norms for the test were obtained from school age populations in Minneapolis, MN and St. Louis, MO.[22] It is not surprising then, that the control children did not differ significantly from the norms for the traits studied and that the standard deviations were similar for both control and normal groups. The only difficulty in using the picture test occurred during interpretation of the findings, when it was necessary to consult personally with the psychologists who developed the test for clarification of terminology used since this was not provided with the test.

The present study failed to identify either psychological traits or occlusal features which were characteristic of five- and six-year-old bruxing children. The eight psychological traits examined for test, control, and normal groups showed no statistically significant differences, and clearcut trends among the bruxers towards the more aggressive type of personality traits could not be established firmly. In addition, examination of the occlusion of intact primary dentitions in the test and control groups suggested that anterior interdental spacing and the terminal plane relationships of the second primary molars also did not differ significantly. This study suggests that bruxism may be a relatively common childhood habit, and at the age of five or six years, the habit appears to have little psychological significance.

Conclusions

A study of bruxism among five- and six-year-old kindergarten children using parental history of the habit confirmed by intraoral examination has shown a prevalence of 15% bruxers. Males and females were equally affected by the habit. A further 15.4% of children showed clinical evidence of bruxing without the parents being aware of the habit. Bruxing and non-bruxing children did not differ significantly with respect to occlusion of the primary dentition or the eight psychological traits examined. This study suggests that bruxism may be a relatively common childhood habit and at age five or six the habit appears to have little psychological significance.

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Edward V. Kuch, Michael J. Till and **Louise B. Messer** are with the Division of Pediatric Dentistry, School of Dentistry, University of Minnesota, Minneapolis, Minnesota.

Requests for reprints may be sent to Edward V. Kuch, Division of Pediatric Dentistry, University of Minnesota, 515 Delaware Street, S.E., Minneapolis, MN 55455
