The relationhip between occlusal factors and bruxism in permanent and mixed dentition in Turkish children

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The aim of this study was to investigate the relationship between occlusal factors (overjet, overbite, Angle's Classification of molars and cuspids, the relationship of the primary molars, openbite, lateral openbite, scissorbite and crossbite) and bruxism in permanent and mixed dentition in Turkish children. For this reason 182 children with mixed dentition and 212 children with permanenth dentition were included in this study. Occlusal conditions were examined clinically and bruxism was assesed by using interview and questionnaires. Z Test was used to compare the results. It was found that in both dentition some occlusal factors related with bruxism (overjet > 6 mm, overbite > 5 mm, negative overjet, openbite in permanent dentition; overjet > 6 mm, overbite > 5 mm, scissorbite, anterior-posterior multiple teeth crossbite, Angle Class I occlusion in mixed dentition.
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INTRODUCTION

The American Sleep Disorder Association (ASDA) has defined bruxism as a periodic, stereo-typed movement disorder of the masticatory system that involves tooth grinding or clenching during sleep.[1] The etiology of bruxism has been atributed to systemic factors such as intestinal parasites, subclinical nutritional deficiencies, allergies, and endocrine disorders[2,3] to local factors, especially malocclusion[4,5]; and to psychological factors.[6,7] However, the relationship between bruxism and malocclusion is still unclear. It would be useful to know this relationship inorder to prevent bruxism developed by occlusal disorders.

The purpose of this study was to investigate the relationship between occlusal factors (such as overjet, overbite, Angle's classification of molars and cuspids, the relationship of the primary molars, openbite, lateral openbite, scissorbite and crossbite) and bruxism in permanent and mixed dentiiton in Turkish children.

MATERIAL AND METHODS

A total of 394 Turkish children (between 9 to 14 years old) with mixed (80 girls, 102 boys) and permanent dentition (114 girls, 98 boys) were included in this study.[8] The children were interviewed and parents were questioned for bruxism. It was recorded as present or absent.[9]

The following occlusal factors were clinically investigated in the children in both dentition with or without.[10]

1. Angle's Classification of molars and cuspids: The relationship of the primary molars were recorded as flush terminal plane, mesial step or distal step. Permanent first molars and the primary cuspid relations were recorded as Class I, II or III in the mixed dentition. In the permanent dentition, Angle's Classification were determined with the relation of first permanent molars.
2. Overjet or the horizontal distance between the facial surface of the upper central incisors and the facial surface of the lower central incisors were recorded using a periodontal probe. Overjet exceeding 6 mm was recorded as extreme overjet.
3. Overbite or the vertical distance between the mesial edge of the upper central incisor and the lower central incisor was examined using a periodontal probe and recorded as a deepbite if it was over 5 mm.
4. Anterior and posterior crossbite was recorded as a single tooth or multiple teeth.
5. Scissor bite or buccal crossbite was recorded.
6. Lateral open bite was recorded.

To test for the significance of differences, the Z Test was used.

RESULTS

The evaluation of the results has showed that; the relation between overjet > 6 mm ($p<0.05$), negative overjet ($p<0.05$), overbite > 5 mm ($p< 0.01$), openbite ($p<$

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Table 1. The relationship between occlusion and bruxism in permanent dentition.

	Class I	Class II	Class III
With Bruxism N=31	22	5	4
Without Bruxism N=181	138	17	26

Table 2. The relationship overjet, overbite and bruxism in permanent dentition.

	Overjet			Overbite		
	> 6 mm	<6	Negative	>5	<5	Openbite
With Bruxism N=31	2	27	2	3	24	4
Without Bruxism N=181	2	176	3	2	178	1

Table 3. The relationship scissor bite, lateral openbite and bruxism in permanent dentition.

	Scissorbite	Lateral Openbite
With Bruxism N=31	1	1
Without Bruxism N=181	22	13

Table 4. The relationship crossbite and bruxism in permanent dentition.

	With Bruxism N=31	Without Bruxism N=181
Anterior Single Tooth	1	12
Anterior Multiple teeth	1	9
Posterior Single Tooth	-	7
Posterior Multiple teeth	-	3
Anterior-Posterior Multiple teeth	1	2

0.01), and bruxism was statistically significant in the permanent dentition group. In the mixed dentition group; the relation between Angle Class I occlusion for the first molar teeth ($p<0.05$), overjet > 6 mm ($p<0.01$), overbite > 5 mm ($p< 0.01$), scissorbite ($p<0.05$), crossbite for anterior-posterior multiple teeth ($p<0.01$), and bruxism were statistically significant.

Complete results are presented in Tables 1 to 8

DISCUSSION

Two approaches have been developed to explain the origin of bruxism. The first one supports the view that bruxism has a central origin,[6] while the other one states that bruxism has a peripheral origin like occlusal interferences.[4] Epidemiological studies (cross-sectional and longitudinal) have been conducted to investigate the relationship between bruxism and malocclusion. However, the role of occlusion in bruxism is still debated.[11,12] For this reason, this relationship was aimed to investigate in this study.

The information was obtained by interviewing the children and evaluating the questionnaires answered by the parents. As bruxism appears during sleep, the children are not aware of this habit.[13] Similarly parafunctions like thumb sucking and nail biting can be also hidden by the children during interview because of embarrasment of herself or himself. As a result, the occurrence of this parafunctions can be underreported.[13] So obtaining data from the parents is very important for the validitiy of the study.

The reviewed studies indicated different techniques to record bruxism.[14,15] One of them is the evaluation of the dental attrition, either from direct visual observations in the mouth,[16] from occlusal appliances[17] or from dental study casts.[18-20] However, it is very difficult to be sure if it is a consequence of a parafunctional or a functional habbit.[21] Especially in the decidious teeth as the occlusal surfaces are grinded physiologically the reliability of this technique is contraversial.

Another remarkable point is the time regarded for the attrition of the teeth surface, so there is a risk of recording bruxism while the subjects have recently begun bruxism may not show signs of attrition. The same risk exist if bruxism is disappeared but the attrition is observed.[22] Also , dental wear can be caused by many factors other than bruxism.[23]

The measurement of masticatory muscle activities by means of EMG in a sleep labaratory or in the patient's own home is another commonly used technique to evaluate bruxism.[15,24,25] However, this holds true only if audio and video recording are obtained in parallel with all-night polygraphic recordings.[15,26] Such an experimental setup is almost impossible using an ambulatory (home) recording system, leaving the sleep labaratory as an expensive and time-consuming alternative.[25]

In this study although the validity has been questioned by some authors,[14] the interview and the questionnaire method which are the most used technique in the literature were used being so easy the collection of the information.

Krogh-Poulsen and Olsson[27] concluded that occlusal interferences are major causes for bruxism by " triger-

Table 5. Relationship between occlusion and bruxism in mixed dentition.

		With Bruxism N= 52	Without Bruxism N=130
PRIMARY MOLAR TEETH	Mesial	37	89
	Distal	1	2
	Flush Terminal Plane	14	39
PRIMARY CANINE TEETH	Class I	40	94
	Class II	12	28
	Class III	-	8
PERMANENTFIRST MOLAR TEETH	Class I	41	85
	Class II	11	30
	Class III	-	15

Table 6. Relationship between overjet, overbite and bruxism in mixed dentition.

	Overjet			Overbite		
	> 6 mm	<6	Negative	>5	<5	Openbite
Wth Bruxism N=52	4	48	-	4	47	1
Without Bruxism N=130	-	126	4	-	129	1

Table 7. Relationship between scissorbite, lateral openbite and bruxism in mixed dentition.

	Scissorbite	Lateral Openbite
With Bruxism N=52	9	-
Without Bruxism N=130	12	8

Table 8. Relationship between crossbite and bruxism in mixed dentition.

	With Bruxism N=52	Without Bruxism N=130
Anterior Single Tooth	1	12
Anterior Multiple teeth	1	9
Posterior Single Tooth	3	6
Posterior Multiple teeth	1	3
Anterior - Posterior Multiple teeth	2	-

ring" parafunctional activity via a propioceptive feedback mechanism.

Widgorowicz-Makowerowa *et al.*[28] examined 2100 children (10 to 15 years old) to investigate the relationship between malocclusion and bruxism. Statistically significant differences were found in the prevalence of bruxism between children with and without malocclusion but the type of malocclusion was not defined in the study. Nilner[29] studied the relationship between occlusal factors and bruxism on 440 children aged 7 to 14 years. Statistically significant correlations were found between Cl II and III molar relationship, and bruxism. Nilner[30] also examined same relationship on 309 adolescents. Significant correlation was reported between deepbite and clenching and frontal dental wear. Same investigator asserted that the need for occlusal treatment in young people with occlusal interferences combined with oral parafunctions.

Brandth[31] investigated 1342 children and adolescents aged 6 to 17 years old to study the association between morphological malocclusion and bruxism. The results showed statistically significant association between right molar relationship overjet, overbite, and tooth grinding.

Henrikson *et al.*[32] reported that clenching and grinding were higher in the Cl II group than in the normal group which suggests a relationship between parafunctions and malocclusion.

In our study, we also found that some occlusal factors are related with bruxism in both of dentitions.

However, Rugh *et al.*[33] demonstrated that experimentally placed deflective occlusal contacts in bruxism patients tend to reduce masticatory muscle activity during sleep rather than to enhance it. In addition, Baily and Rugh[34] showed that occlusal accustments do not stop bruxism. Egermark- Eriksson[35] investigated the relationship between bruxism and morphological malocclusion on 402 children (aged 7 to 11 and 15 years). The results showed significant negative correlation between bruxism and morphologic malocclusion. No other correlation was reported.

Clarke[36] also asserted that occlusal factors are not involved in the etiology of bruxism.

Clark and Adler[37] concluded that no reliable evidence has been presented to demonstrate that occlusal interferences can cause bruxism.

Gunn *et al.*[38] found that no statistically significant relationship between any type morphologic malocclusion and tooth grinding.

Vanderas[13] also found that the frequency of grinding and clenching is significantly higher in the not calm group and significant differences on the prevalance of occlusal interferences are not found between the two groups .

Vanderas *et al*.[39] also asserted that emotional stress is a prominent factor in the development of bruxing behavior.

CONCLUSION

1. It can be concluded that some occlusal factors may play a role on the development of bruxism in permanent and mixed dentition.
2. There is a need of other longitudinal studies to know if there is a relationship between occlusion and bruxism.

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