

Research Paper: The prevalence of malocclusion and dental caries in 11- to 14- year- old children in Roudsar, Iran



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ABSTRACT

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Introduction: Knowledge of the distribution of different malocclusions in a geographic location could help orthodontics better know the problems in that region. Moreover, giving awareness about the problem and treatment possibilities can help people. This study aimed to determine types of malocclusion and dental caries in children aged 11 to 14 years in Roudsar, Iran.

Materials and Methods: In this cross-sectional study, 114 healthy children aged 11-14 years were randomly selected from five schools in Roudsar. To evaluate the prevalence of dental caries and the types of malocclusion, DMFT index and Angle classification were used, respectively. Overjet, overbite, and crowding were secondary assessed. After collecting the information, data was analyzed by SPSS21 using chi-square and t-test. The level of significance was considered less than 0.05.

Results: The prevalence of normal occlusion was 9.3%, cI malocclusion was 32.7%, cI II div 1 malocclusion was 16.8%, cI II div 2 malocclusion was 4.7%, and cI III malocclusion was 15.9%. The mean DMFT in the children studied was 4.369 ± 2.317 . There was a significant difference between DMFT index and gender ($P=0.027$). There was no significant difference between different types of malocclusion and normal occlusion by gender.

Conclusion: The mean of DMFT index was significantly higher in males compared to females. The most common malocclusion was cI malocclusion and there was no significant relationship between the types of malocclusion and dental caries. Also, no relation was found between gender and malocclusion.

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Introduction

A malocclusion is defined as a mal-relationship of the dental arches and an irregularity of the teeth beyond what is known as normal. Malocclusion is one of the most common dental and oral problems in children. This problem can cause psychosocial problems due to poor dentofacial aesthetics, and also cause disturbances in oral function, such as swallowing, mastication and speech. Susceptibility to trauma and periodontal disease increases in patients with malocclusion. Planning orthodontic treatment in a public health system requires information about the prevalence and distribution of malocclusions. (1)

The prevalence of malocclusion and dental caries varies in different populations and among different age and sex group. Epidemiological studies on malocclusion have reported prevalence ranging between 39% and 93%. (2)

Dental caries is the other most common preventable oral disease. People are susceptible to the dental caries throughout their lifetime. It can be arrested and reversed in its early stages, but without proper care, caries can progress until the tooth is completely destroyed. (3)

Malocclusion causes limited access for tooth cleaning using toothbrush, and also prevents the natural cleansing effect of the teeth by the saliva and tongue. It causes additional retention areas for dental plaques and thereby predisposes the teeth to the development of caries. (4) Previous attempts to demonstrate a possible association of dental caries and malocclusion have shown conflicting results. (5) While some studies reported a positive association between malocclusion and dental caries, (6, 7) others could not demonstrate any significant relationship. (8, 9) This may be attributed to differences in criteria used for defining 'cariou' and 'caries-free' dentitions in caries experience of the study sample. (9)

Knowledge of the distribution of different malocclusions in a certain geographic location could help orthodontics better know the problems in that region. Moreover, giving awareness about the problem and treatment possibilities can help people. This study aimed to assess the prevalence

and types of malocclusion and dental caries in children aged 11 to 14 years in Roudsar, Iran.

Materials and Methods

In this cross-sectional study, 214 healthy children aged 11-14 years were randomly selected from five schools in Roudsar. A cluster random sampling method with primary schools was utilized. Permission to work with school children was obtained from department of education and only consenting students were included in the study. Inclusion criteria was children in age range of 12-14 years with the permanent dentition and none of the subjects invited for participation had a history of orthodontic treatment.

Oral examination was conducted by a single examiner under natural light at one class of each school. Plain disposable mouth mirror was used for examination. To evaluate the prevalence of dental caries, DMFT index was used based on WHO standards. (10) In order to describe the types of malocclusion, Angle classification was used. The assessment of other aspects of malocclusion such as overjet, overbite, and crowding were secondary objectives of the examination. The prevalence of different types of malocclusion was estimated in the study population.

Criteria for each orthodontic assessment were defined as follows: (11)

- Type of malocclusion as described by Angle; based on occlusal relationships of the first molars which are three classes: class one, two or three.
- Overbite is the vertical overlap of incisors and was positive if incisors overlapped vertically. Open bite was negative overbite. Deep bite or excessive overbite was considered when more than 50 percent of lower incisors overlapped by upper incisors.
- Overjet is the distance from the most labial point of the incisal edge of maxillary central incisor to the most labial surface of the corresponding mandibular incisor and was normal in range of 2-3 mm. Excessive overjet was considered >3 mm and decreased overjet was <2 mm.
- Anterior and posterior crossbite was

considered if buccal cusps of the mandibular teeth occluded buccally to the buccal cusps of the maxillary antagonists and recorded as absent, present unilaterally and present bilaterally.

- Crowding was recorded when the contact points of permanent teeth shifted away from arch line > 0.5 mm. It was recorded as minor crowding 2 mm or <2mm, moderate 2.1 to 5 mm and severe >5.1 mm.

- Spacing was recorded when total spaces of the arch were >2 mm

After collecting the information, data was analyzed by SPSS21. In order to determine the relationship of gender and age group variables with the prevalence of types of malocclusion and dental caries in samples, chi-square was used. Moreover, t-test was used to compare the average dental caries, missing and filled teeth in the two genders. The level of significance was considered less than 0.05.

Results

A total of 214 children aged 11-14 years participated in this study consisting of 107 boys with mean age of 12.43±1.13 and 107 girls with mean age of 12.29±1.09. The mean DMFT scores were 4.02±2.064 and 4.72±2.506

in girls and boys respectively. DMFT scores showed a significant difference between boys and girls so that the mean DMFT of girls was lower than that of boys. (P=0.027)

The prevalence of normal occlusion was 12.14 percent of total sample, while Class I malocclusion was 33.17%. Class II div 1 and class II div 2 malocclusion were recorded 16.82% and 4.68% respectively and Class III malocclusion was 15.9%. (Table1) There was not a significant difference between different types of malocclusion and normal occlusion by gender.

In term of overjet, overbite, posterior and anterior crossbite, no statistically significant relation was found between girls and boys. (p=0.135, p=0.404, p=0.159 and p=0.201 respectively) (Table2)

Although, the prevalence of crowding in the subjects was significantly higher compared to spacing and normal intra arch space, there was no significant difference between boys and girls in term of crowding, spacing or normal intra arch space. (Table3)

Table 4 shows the prevalence of caries based on different malocclusion. There was no significant relation between malocclusion and existence of caries.

Table 1- Distribution of malocclusions in children according to gender.

Group	Malocclusion	Class I		Class II			Class III			
		Normal occlusion	Malocclusion	Div.1	Div.2	Sub D (R, L)	Total	True	Sub D (R, L)	Total
Girls	Percent (Number)	6.07% (13)	13.08% (28)	10.28% (22)	3.27% (7)	9.34% (20)	22.89% (49)	7.47% (16)	0.64% (1)	7.94% (17)
Boys	Percent (Number)	6.07% (13)	20.09% (43)	6.54% (14)	1.4% (3)	5.14% (11)	13.08% (28)	8.41% (18)	2.33% (5)	10.74% (23)
Total	Percent (Number)	12.14% (26)	33.17% (71)	16.82% (36)	4.67% (10)	14.48% (31)	35.98% (77)	15.88% (34)	2.8% (6)	18.96% (40)

Table 2- Distribution of overjet, overbite, posterior and anterior crossbite in children according to gender.

Group	Malocclusion	Overjet			Overbite			Posterior crossbite			Anterior crossbite	
		Normal overjet	Increased overjet	Decreased overjet	Normal overbite	Deep bite	Open bite	Unilaterally	Bilaterally	No crossbite	With crossbite	No cross bite
Girls	Percent (Number)	45.8% (49)	21.5% (23)	32.7% (35)	25.2% (27)	39.2% (42)	35.5% (38)	11.2% (12)	2.8 % (3)	85.9% (92)	6.5% (7)	93.5% (100)
Boys	Percent (Number)	32.7% (35)	24.3% (26)	42.9% (46)	29.9% (32)	42.9% (46)	27.1% (29)	15.8% (17)	0.9 % (1)	83.2% (89)	12.1% (13)	87.9% (94)
Total	Percent (Number)	39.3% (84)	22.9% (49)	37.9% (81)	27.6% (59)	41.1% (88)	31.3% (67)	13.6% (29)	1.9 % (4)	84.5% (181)	9.3 % (20)	90.7% (194)

Table 3- Distribution of crowding, spacing or normal intra arch space in children according to gender.

Group	Malocclusion	Normal inter arch space	Crowding			Spacing
			Slight	Moderate	Severe	
Girls	Percent (Number)	8.4% (9)	38.3% (41)	22.4% (24)	25.2% (27)	5.7% (6)
Boys	Percent (Number)	7.5% (8)	38.3% (41)	25.2% (27)	16.8 % (18)	12.1% (13)
Total	Percent (Number)	7.9% (17)	38.3% (82)	23.8% (51)	21.0% (45)	8.9% (19)

Table 4- Distribution of malocclusions in children according to caries

Group	Malocclusion	Overjet		Overbite		Posterior crossbite		Spacing		Crowding		
		Increased overjet	Decreased overjet	Deep bite	Open bite	With crossbite	Without crossbite	With spacing	No spacing	Mild	Moderate	Severe
With caries		16.3% (8)	14.8% (12)	17% (15)	19.4% (13)	15.2% (5)	17.1% (31)	10.5% (2)	17.4% (34)	22% (18)	13.7% (7)	13.3% (6)
Without caries		83.7% (41)	85.2% (69)	83% (73)	80.6% (54)	84.8% (28)	82.9% (150)	89.5% (17)	82.6% (161)	78% (64)	86.3% (44)	86.7% (39)
Total		22.9% (49)	37.9% (81)	41.1% (88)	31.3% (67)	15.4% (33)	84.6% (181)	8.9% (19)	91.1% (195)	38.3% (82)	23.8% (51)	21% (45)

Discussion

In the current study, the mean of DMFT was significantly higher in males compared to females which is in accordance with the study of Eslami pour et al. (12) As opposed, in the study of Angel Alvarez-Arenal et al. and Liompart et al., the mean of DMFT was higher in females. (13,14) The difference in the findings can be explained by different sample size. According to the findings of the present study, it can be stated that the rate of decayed and missing teeth in both boys and girls was high, while the number of restored teeth was very low. This finding may be due to poor hygiene in children and inadequate parental attention to children's dental care.

In the current study the prevalence of malocclusion Class I was higher than Class III, Class II division 1 and Class II division 2 respectively. Also, many studies (15-20) showed that malocclusion Class I was the most prevalent malocclusion. While Gelgora reported Class II Division 1 malocclusions to be the most prevalent type. (21) The difference in the findings can be explained by the difference in the sample age, sample race and method of evaluating malocclusion.

In the current study as in the study of Shen et al. and Gelgora et al. no relation was found between malocclusion and gender. (18,21) As opposed Bugaighis et al., Ciuffolo et al. and Brunelle et al. reported a significant positive association between male gender and malocclusion. (19, 22-23) While Todor et al. and Celikoglu et al. reported that the percentage of malocclusion was significantly higher in females. (17, 20)

The prevalence of overjet and overbite was respectively 60% and 72% in the current study. Asiry et al., Zhou et al. and Aikins et al. reported that the most common type of malocclusion was increased overjet. (19.5%, 34.99 % and 44.6% respectively) (24-26) Gelgora et al. found that overjet relationship was normal in 58.9%, increased in 25.1%, reversed in 10.4%, and edge-to-edge in 5.6%. (21) Different prevalence might be related to the racial differences.

83.2% of patients in the current study had crowding. According to Todor et al., Gelgora

et al., Asiry et al. and Aikins et al., crowding was exhibited as 5.0%, 47.5%, 65.2% and 26.6% respectively. (17, 21, 24, 26)

In the current study, no relation was found between caries and malocclusion. There are controversies over this relation which is related to different sample size and different prevalence of caries in each society. As opposed to the current study, Monirifard et al. found a relation between DMFT and crowding. (27) This different might be due to different DMFT in sample population of their study and the current study.

Conclusion

The mean of DMFT index was significantly higher in males compared to females. The most common malocclusion was cl I malocclusion and there was no significant relationship between the types of malocclusion and dental caries. Also, no relation was found between gender and malocclusion.

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