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Occlusal Features for a Sample of 9-11 Year Old Students from Ramadi City

Zena Hekmat Altaee¹⁾, Fakhri A. Al Fatlawi²⁾

ABSTRACT

Objective: The study was conducted to assess the occlusal features of an Iraqi student's sample residing in Ramadi city in the west of Iraq.

Materials and Methods: The investigation was carried out on 900 subjects, 525 males and 375 females, who had mixed dentition. Their age range is 9-11 years. The assessment procedures of occlusal features were done by direct intraoral measurement to obtain the desired results.

Conclusion: Class I molar occlusion was reported to have the highest frequency, while class III had the lowest frequency. The highest number of the subjects had over jet and over bite (2-4 mm). Mandibular over jet showed small percentage and the frequency increased with age. The frequency of scissor bite was very little. The frequency of rotation and maxillary midline diastema was high and displacement was low. The frequency of spacing was higher in upper anterior segments, while the frequency of crowding was higher in lower anterior segments. Lastly, there was no significant difference between males and females during mixed dentition period in terms of the occlusal features.

KEY WORDS

occlusal features, Ramadi city, students

INTRODUCTION

Epidemiology studies of occlusion are the first step in planning therapeutic service for the population. Since malocclusion affects a large number of population, it is by definition a public health problem. As in the case of any other phase of public health, it is essential to have accurate and updated information on the prevalence and the incidence of the condition as up to date prevalence information obtained from previous studies vary. Moreover, the most recent epidemiological study of incidence of malocclusion in a particular population dated back to early 1900¹⁾.

The investigation of the occurrence of malocclusion among school-children would be of considerable importance in the planning of orthodontic treatment in Public Dental Health Services. It is necessary to acquire detailed information on the prevalence of individual malocclusion among boys and girls at different ages distributed regionally. Moreover, an analysis of the need for orthodontic treatment in different school classes also needs to be assessed²⁾.

Studies on the awareness of malocclusion and the demand for treatment provide information on the nature and prevalence of occlusion anomalies in several communities. It can also provide a base for dental health service planning. The results of such studies would also be of benefit for comparison purposes with other studies that target other racial groups.

This study was carried out in Ramadi city. It is triggered by the fact that no previous study has been conducted on mixed dentition. Hence, the present study is designed to provide a base line data on the malocclusion of male and female samples during mixed dentition utilizing direct intraoral measurement.

MATERIALS AND METHODS

The ample of this study was recruited from fourth classes in 30 primary schools, randomly selected from primary schools in Ramadi city. The subjects were chosen from different parts of the city to include urban as well as rural parts of the city. The age of the sample ranges from 9 to 11 years. The sample consists of 900 students (525 males and 375 females). The sample was selected based on the following criteria:

- No previous orthodontic treatment.
- No severe caries teeth or extraction.
- No severe facial disfigurement due to trauma or pathology.

Each subject was seated on an ordinary chair taken from the host school with her or his head supported in an upright position against the wall. The clinical examinations were performed with the aid of the mouth mirror. The molar relation, over jet over bite, present of anomalies and present the spacing and crowding in the dental arches were all considered in the clinical examination.

RESULTS

The results obtained in the present study are shown in tables, which represent the data collected from the sample. The data was analyzed by the use of statistical measure. The results of the occlusal features are displayed in table 1-5 present the molar relationship, over jet, over bite, distribution of anomalies, spacing, and crowding respectively.

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Table 1. Molar relation according to age and sex.

| | Sex | 9 y % | 10y %. | 11 y %. | Total % | P value |
|--------------|-----|----------|-----------|------------|------------|------------|
| class I | M | 67.2 | 7.5 | 68 | 70.7 | N.S |
| | F | 62.5 | 46.9 | 72.7 | 64.5 | |
| | T | 65 | 72 | 69.4 | 68.2 | |
| classIii | M | 17.9 | 10.7 | 18 | 15.5 | N.S |
| | F | 16 | 16 | 11.4 | 15.2 | |
| | T | 16.8 | 12.8 | 15.9 | 15.3 | |
| Class Iiii | M | 2.1 | 1.6 | 1 | 1.7 | N.S |
| | F | 1.5 | .80 | .80 | 1.3 | |
| | T | 1.5 | 1.2 | 1.3 | 1.5 | |
| Cusp to cusp | M | 10.5 | 7.5 | 8 | 9 | N.S |
| | F | 13.5 | 14.5 | 11.4 | 13.6 | |
| | T | 11.8 | 10.3 | 9 | 10.8 | |
| class III | M | 2.5 | 3.2 | 5 | 3.2 | N.S |
| | F | 6.5 | 3.8 | 4.5 | 5.3 | |
| | T | 4.3 | 3.4 | 4.8 | 4.1 | |

DISCUSSION

There was no previous study in Ramadi city conducted on samples during their mixed dentition, so this study is supposed to act as a database of occlusion during mixed dentition in Ramadi city. This study shows a predominant molar relationship in Class I (68.2%), and this result is similar to some other studies such as³⁻⁶.

Class II was (16.8%) as shown in Table 1, and this is close to Khanal *et al*³. However, it was less than the value obtained in other studies such as⁴⁻⁷. On the other hand, class III molar relation was 4.11%, which is similar to the value obtained in⁸⁻¹², but lower than the values obtained in^{4,7,13}. This difference may be due to race and variation in environmental factors in addition to age group. This study added the cusp to cusp molar relation as a new item because this subject is related to mixed dentition, and it is normal for mixed dentition stage of occlusion development to find such relation of flash terminal plane. So, the permanent mandibular and maxillary first molar emerges into cusp to cusp relationship simply. By the time of exfoliation of lower primary second molar, at about 11 years of age, the permanent mandibular first molar migrates mesially into the excess lee way space provided by the difference in the mesiodistal dimension of the primary second molar and the second premolar. Again, this reduces arch length, converts the straight terminal plain to mesial step, and provides for a class I relationship of permanent first molars. This case has been referred to as the late mesial shift.

The mean value of the overjet is 3.467 mm (Table 2), which is nearly close to that of Kinaan conducted on Iraqi samples¹⁴, and others such as^{15,16}. Yet, this value is less than the value of English mean value obtained in¹⁷, and higher than that in^{12,18}. This difference may be the result of difference in age. Thus, the overjet is reduced with age and this reduction is attributed to the forward and downward reduction of mandibular growth and the forward displacement of lower incisors as well.

The mandibular overjet was small in this sample (Table 2) and the percentage was about 2.5%. This percentage is more than the ones obtained in^{6,11}. The frequency of mandibular over jet increases with age as shown in Table 2. Nevertheless, this increase has no statistical significance. The skeletal, dental and functional factors, and also the forward and downward direction of mandibular growth may cause this increase.

The mean value of overbite was 1.97 mm, which is close to that of Farah conducted on Iraqi people¹⁹ during mixed dentition and Jordanians²⁰, yet it is less than the values obtained in^{4,12,16}. This could be the result of differences in ethnic and age group, or could be due to the skeletal, dental and functional factors, and the forward and downward direction of mandibular growth as well.

The distribution of the overbite ranges for whole sample is illustrated in Table 3. The deep bite condition was 0.5%, which agrees with^{19,21} and less than that in^{13,22}.

Table 2. Distribution of overjet according to age and sex.

| Overjet | Sex | 9 y % | 10y %. | 11 y %. | Total % | P value |
|-------------|-----|----------|-----------|------------|------------|------------|
| 0-2 mm | M | 5.8 | 5.8 | 13 | 7.2 | N.S |
| | F | 8.5 | 6.1 | 9 | 7.7 | |
| | T | 7.1 | 5.9 | 11 | 7.4 | |
| (2-4) mm | M | 70.5 | 75.6 | 64 | 71.2 | N.S |
| | F | 76.5 | 72 | 75 | 70.1 | |
| | T | 96.1 | 74 | 67.3 | 70.7 | |
| (4-6) mm | M | 17.5 | 13.3 | 15 | 15.4 | N.S |
| | F | 19 | 13.7 | 6.8 | 15.7 | |
| | T | 18 | 13.3 | 12.5 | 15.5 | |
| > 6-9 mm | M | 5 | 3.7 | 4.5 | 5 | N.S |
| | F | 4.5 | 6.1 | 6.2 | 5 | |
| | T | 4.7 | 4.7 | 4.9 | 5 | |
| > 9 mm | M | 1.2 | 1.1 | 1 | 1 | N.S |
| | F | 0.5 | 1.5 | 2.2 | 1.1 | |
| | T | 0.1 | 1.25 | 1.3 | 1 | |
| Reverse jet | M | 2.5 | 1 | 4.3 | 2.6 | N.S |
| | F | 2.5 | 1.5 | 3.2 | 2.4 | |
| | T | 2.5 | 1.25 | 3.75 | 2.5 | |

Table 3. Distribution of over bite according to age and sex.

| Overbite | Sex | 9 y % | 10 y %. | 11 y %. | Total % | P value |
|----------|-----|----------|------------|------------|------------|------------|
| Openbite | M | 7.1 | 6.9 | 15 | 8.5 | N.S |
| | F | 9 | 10.6 | 6.8 | 9.3 | |
| | T | 7.9 | 8.2 | 12.5 | 8.8 | |
| < 1 mm | M | 18.4 | 14.9 | 29 | 19.2 | N.S |
| | F | 19 | 19 | 22.9 | 20 | |
| | T | 18.7 | 8.2 | 26.3 | 19.7 | |
| (2-4) mm | M | 76.8 | 81.2 | 65 | 76.1 | N.S |
| | F | 75.5 | 70.2 | 77 | 73.8 | |
| | T | 76.2 | 76.7 | 68.1 | 75.2 | |
| > 4 mm | M | 4.6 | 3.7 | 67.1 | 4.5 | N.S |
| | F | 5.5 | 6.8 | 2.2 | 5.6 | |
| | T | 5 | 5 | 4.8 | 5 | |

As shown in Table 3, the percentage of anterior open bite was 8.8%, which is in agreement with¹⁹; yet, it is higher than that in^{4, 12,21}, but less than that in¹⁶. This difference may be due to ethnic group, incomplete growth of the jaws during this age or due to varying prevalence of bad oral habits.

Based on Table 4, the percentage obtained for cross bite which is closer to^{14,16,23} but different from^{4,5,7,11,12,21}. This study shows that there was no statistically significant difference between the three age groups because the permanent teeth erupted in the same cross bite relationship as the deciduous teeth, and the permanent dentition erupted palatally to the deciduous dentition. Furthermore, this defect develops early and is not self-corrected with age.

As shown in Table 4 the percentage of scissor bite was 0.7%, which is closer to that in⁵, and lower than those in^{11,15,24}. There was no significant difference between both sexes.

Table 4 shows the percentage of rotation which is (67.5%), and this is closer to²⁴ and more than^{21,24} this high percentage may be due to ugly duckling stage.

The percentage of displacement was (6.7%), which is lower than those in^{4,12}. The frequency of this anomalies increases at 11 years of age,

Table 4. Distribution of dental anomalies according to age and sex.

| | Sex | 9 y % | 10 y % | 11 y % | Total % | P value |
|-----------------------|-----|----------|-----------|-----------|------------|------------|
| Cross bite | M | 0.4 | 2.1 | 5 | 1.9 | N.S |
| | F | 1.5 | 2.2 | 2.2 | 1.8 | |
| | T | 0.9 | 2.2 | 4.1 | 1.8 | |
| Scissor bite | M | 0.8 | 0.5 | 5 | .70 | N.S |
| | F | 0.5 | 0.7 | 2.2 | 0.8 | |
| | T | 0.6 | 0.6 | 4.1 | 0.7 | |
| Rotation | M | 66.8 | 68.4 | 71 | 68.1 | N.S |
| | F | 66 | 67.1 | 68.1 | 66.6 | |
| | T | 66.4 | 67.9 | 70.1 | 67.5 | |
| Displacement | M | 3.36 | 8 | 18 | 7.8 | N.S |
| | F | 2.5 | 6.1 | 15.9 | 5.1 | |
| | T | 2.9 | 7.2 | 17.3 | 6.7 | |
| Diastema | M | 34 | 32 | 31 | 32.7 | N.S |
| | F | 31 | 30.5 | 20.5 | 29.6 | |
| | T | 32.6 | 31.6 | 27.6 | 31.4 | |
| Mid line displacement | M | 24.3 | 24 | 14 | 22.2 | N.S |
| | F | 19.5 | 23.6 | 22.6 | 21.3 | |
| | T | 22.1 | 23.8 | 16.8 | 21.8 | |

which could be attributed to the mesial drift of first molar or the early loss of deciduous molar that cause reduction of available space for the premolar or canine. It can also result from genetic factors or displacement of lateral incisor.

The percentage of maxillary median diastema is shown in Table 4 (31.4%). It is higher than percentages obtained in^{4,12,21}. This difference may have taken place due to ugly duckling stage. There is no significant difference in the results based on gender.

The percentage of maxillary midline displacement was 21.8% as shown in Table 4. This percentage is close to the ones obtained in^{6,25}, but different from those obtained in^{4,12,21}. This may decrease with age as it happens due to drifting of the teeth, which affects midline displacement.

Table 5 shows that the maxillary anterior spacing was more than that in other segments. This could be attributed to ugly duckling stage and proclination of maxillary anterior teeth. This result agrees with^{19,26}, yet it disagrees with^{6,12}.

The mandibular anterior segments show the highest frequency of crowding (Table 5). This agrees with the results obtained in^{4,12,21,27}, but disagrees with those in^{26,28}. There was no significant difference between males and females, which disagrees with Al Dailami⁴, who reported a significant difference between males and females. The major reasons for the malocclusion may be due to the modern diet, which results in decreased inter-proximal wear and jaw growth, in addition to habits such as mouth breathing, thumb sucking which might also be responsible for that²⁹.

CONCLUSIONS

Class I molar occlusion had the highest frequency, while Class III had the lowest frequency.

The greatest number of subjects had over jet and over bite (2-4 mm).

- Mandibular over jet showed small percentage and the frequency was noticed to increase with age.
- The frequency of cross bite did not change significantly with age.
- The frequency of scissor bite was very little.
- The frequency of rotation and maxillary midline diastema was high and displacement was low.
- The frequency of spacing was higher in upper anterior segments, while the frequency of crowding was higher in lower anterior segments.

Table 5. Distribution of space and crowding according to age and sex.

| | Sex | 9 y NO. | 10 y NO. | 11 y NO. | Total NO. | P value |
|----------------------|-----|------------|-------------|-------------|--------------|------------|
| Space in Max.ant | M | 96 | 83 | 34 | 213 | N.S |
| | F | 82 | 47 | 19 | 148 | |
| | T | 178 | 130 | 53 | 361 | |
| Space in Max.post | M | 22 | 15 | 7 | 44 | N.S |
| | F | 10 | 6 | 5 | 23 | |
| | T | 32 | 18 | 12 | | |
| Space in Man.ant | M | 27 | 17 | 13 | 58 | N.S |
| | F | 19 | 18 | 3 | 39 | |
| | T | 36 | 35 | 16 | 97 | |
| Space in Man.post | M | 11 | 11 | 6 | 28 | N.S |
| | F | 12 | 8 | 5 | 25 | |
| | T | 23 | 19 | 11 | 53 | |
| Crowding in Max.ant | M | 51 | 40 | 21 | 112 | N.S |
| | F | 33 | 35 | 11 | 79 | |
| | T | 84 | 75 | 32 | 191 | |
| Crowding in Max.post | M | 6 | 5 | 3 | 19 | N.S |
| | F | 3 | 5 | 1 | 9 | |
| | T | 9 | 10 | 4 | 23 | |
| Crowding in Man.ant | M | 127 | 89 | 52 | 268 | N.S |
| | F | 86 | 50 | 22 | 158 | |
| | T | 213 | 139 | 74 | 426 | |
| Crowding in Man.post | M | 5 | 10 | 9 | 24 | N.S |
| | F | 6 | 5 | 1 | 12 | |
| | T | 11 | 15 | 10 | 36 | |

ments.

- There was no significant difference between males and females during mixed dentition period in the occlusal feature.
- Finally, determining the malocclusion at its early age and early intervention procedure helps in preventing problems at later stages

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