

OCCLUSION CHARACTERISTICS OF PRIMARY DENTITION IN CHILDREN AGE 3-5 YEARS IN PESHAWAR

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ABSTRACT

Objective: The aim of this study was to describe occlusion characteristics of children age 3-5 years studying in different schools in Peshawar, Pakistan.

Materials and Methods: These children were examined by single operator using standardized recording criteria; the results were analyzed using Statistical Package for Social Sciences (SPSS) software version-16. Occlusal characteristics of primary dentition were recorded which included molar and canine relationship, over jet, overbite, open bite, anterior and posterior cross bite, incisor spaces and primate spaces. The study sample consists of 234 children of schools in University town and Hayatabad Peshawar, Pakistan. 66.2% children were male and 33.8% were female, while 5 years old children dominated the study with frequency of 72.6%.

Results: Flush terminal plane was the predominant molar relationship whereas class I canine relationship was found in majority of children. 92.3% children had over jet less than 3 mm, 58.5% with normal overbite, 6.4% posterior cross bite and 4.7% children with anterior cross bite.

Conclusion: The present study provides data pertaining to the state of dentition, occlusal pattern, spacing, and crowding in the primary dentition in a group of children in Peshawar. Further studies needs to be done in other regions and population of country for predicting any future malocclusion in the permanent dentition.

Keywords: Occlusal Characteristics, Primary teeth, Molar relationship, Canine relationship.

INTRODUCTION

Occlusion in the primary dentition plays an important role in determining the space and establishment of normal occlusion in the succeeding permanent dentition.^{1,2} The characteristic features of this dentition to a large extent lay the base for proper

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eruption and alignment of the succeeding dentition. On the basis of these observations of important features of occlusion in the child's dentoalveolar system during the developmental years, the characteristics of the permanent dentition occlusion can be predicted. Analysis of the occlusion of primary dentition should consider occlusal relationship of anterior and posterior segments of both dental arches along with arrangement of deciduous teeth. Normal occlusion patterns in deciduous dentition and identification of morphologic changes during eruption of permanent teeth is important for treatment planning in pediat-

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ric dentistry.³ Some malocclusions that arise at the age of 3 years may improve over subsequent years (open bite), but others may worsen (distocclusion, unilateral cross bite and unfavorable vertical occlusal conditions).^{4,5} Many factors are associated with malocclusion like Genetic factors, ethnic factors, nonnutritive sucking habits, impaired nasal breathing and functional atrophy of the maxilla due to the underdevelopment of dental arches.⁶⁻⁹

Deciduous dentition have common feature of spacing between the teeth and the second molars to have flush terminal plane relationship. At the time of first permanent molar eruption, the initial occlusion depends on the terminal plane relationship of deciduous second molars.^{2,3} At 6 years of age, mesial step predominates at flush terminal plane, providing a favorable molar relationship. The deciduous canine relationship is also an important diagnostic reference and criterion for the assessment of anteroposterior occlusal relationship, especially if the second deciduous molars are lost.^{2,10,11}

Studies on the occlusion of primary dentition have been carried out widely among children with different age groups in various regions of the world. Very few studies have been carried out in our region to determine the occlusal characteristics of primary teeth in 3-5 years old children. Considering the scarcity of such studies, the aim of this study was to determine the occlusion characteristics of primary teeth of children age 3-5 years of different schools in Peshawar.

MATERIALS AND METHODS

This cross sectional study was carried out through clinical examination and completion of a simple questionnaire. The study sample consists of 234 children attending different schools of University town and Hayatabad Peshawar. Consent was taken from parents through school principals before carrying out the examination. All children who were cooperative and consented to participate in the study with all 20 deciduous teeth present and with no carious teeth were included in the study while uncooperative children and those children with presence and past sucking habits, with missing deciduous teeth and carious lesions present were excluded from the study. All children were examined while sitting in an upright position and biting in centric occlusion, using pen light, mouth mirror, and metal

millimeter rulers, gloves and masks according to the international standards of infection control protocol. The results were analyzed using Statistical Package for Social Sciences (SPSS) software version-16. The criteria of Foster & Hamilton 12 were used for defining the occlusion:

1. Terminal plane relationship
 - Flush terminal plane: The distal surfaces of the deciduous maxillary and mandibular second molars are in the same vertical plane in centric occlusion.
 - Mesial step: The distal surface of the mandibular deciduous second molar is mesial to that of the maxillary deciduous second molar in centric occlusion.
 - Distal step: The distal surface of the mandibular deciduous second molar is distal to the distal surface of the maxillary deciduous second molar in centric occlusion.
2. Primary canine relationships
 - Class I: The cusp tip of the maxillary deciduous cuspid is in the same vertical plane as the distal surface of the mandibular deciduous cuspid.
 - Class II: The cusp tip of the maxillary deciduous cuspid is mesial to the distal surface of the mandibular deciduous cuspid.
 - Class III: The cusp tip of the maxillary deciduous cuspid is distal to the distal surface of the mandibular deciduous cuspid.
3. The degree of overbite was recorded as
 - Normal: the upper primary central incisors covering of less than or equal to 50% of lower primary incisors in centric occlusion
 - Increased: the upper primary central incisors covering of more than 50% of lower primary incisors in centric occlusion
 - Edge-to edge upper and lower primary incisors relation
 - Anterior open bite: there is no vertical overlap between upper and lower deciduous incisors in centric occlusion.
4. Over jet: Amount of over jet measured from the lingual surface of the mesial corner of the most protruded maxillary incisor to the facial surface of the corresponding mandibular incisor recorded in millimeters.
5. Anterior cross bite: One or more of the maxillary

incisors occluded lingual to the opposing mandibular incisors in centric occlusion.

6. Posterior cross bite: One or more of the maxillary primary canine or molars occluded palatally to the buccal cusps of the opposing mandibular teeth in centric occlusion (either unilateral or bilateral)".

RESULTS

The subjects of this cross sectional study were 234 children attending schools of university town and Hayatabad Peshawar. Table 1 shows distribution of children in terms of gender and table 2 shows age of children. The flush terminal plane was the most predominant molar relationship followed by mesial step relationship shown in table 3. Table 4 shows most of children have normal overbite while majority of children have over jet below 3mm. 9% of children have anterior open bite while 6% children have unilateral cross bite and only 4.7% children having only anterior cross bite shown in table 4. Primate space 95.3% and incisor spacing 84.2% was also found in majority of children shown in table 4. Regarding canine relationship there was a significant difference with Pearson Chi-square Value of 0.025 on right canine relationship and 0.033 on left canine relationship shown in table 5 and 6 respectively.

Table: 1 Gender

Gender	Frequency	Percentage %
Male	155	66.2
Female	79	33.8
Total	234	100.0

Table: 2 Age of Children

Age	Frequency	Percentage %
3	3	1.3
4	61	26.1
5	170	72.6
Total	234	100

Table: 5 Relationship of Right Canine with Age in Primary Dentition

Age	Class I	Class II	Class III	Total	Pearson Chi Square
3	1	0	2	3	0.025
4	45	7	9	61	
5	135	20	15	170	
Total	181	27	26	234	

Table: 3 Molar and Canine Relationship in Primary Dentition

Occlusion Characteristics	Categories	Percentage %
Molar relationship left	Flush terminal plane	62
	Mesial Step	32.9
	Distal Step	5.1
Molar relationship Right	Flush terminal plane	56
	Mesial Step	35.9
	Distal Step	8.1
Canine Relationship Right	Class I	77.4
	Class II	11.5
	Class III	11.1
Canine Relationship Left	Class I	39.5
	Class II	9.8
	Class III	10.7

Table: 4 Occlusion Characteristics in Primary Dentition

Occlusion Characteristics	Categories	Percentage %
Over jet	<1mm	18.3
	1-3mm	74
	>3mm	7.7
Overbite	Normal	58.5
	Increased	21.4
	Zero	20.1
Open bite	Yes	9
Incisor Spacing	Yes	84.2
Edge to Edge	Yes	20.9
Primate Space	Yes	95.3
Posterior Cross bite	Unilateral	6
	Bilateral	.4
Anterior Cross bite	Yes	4.7

Table: 6 Relationship of Left Canine with Age in Primary Dentition

Age	Class I	Class II	Class III	Total	Pearson Chi Square
3	1	0	2	3	0.033
4	47	7	7	61	
5	138	16	16	170	
Total	186	23	25	234	

DISCUSSION

Various epidemiological studies^{4, 5, 12-15, 18} have been carried out to document the characteristics of occlusion of the primary dentition observed in various populations. These studies and data are very important because they often reflect the need and importance for interceptive and corrective orthodontic treatment. The lack of such statistical data of the Pakistani population prompted us to undertake this study in Peshawar. The development and presence of malocclusion starts from the primary dentition, so it is very important to know the occlusion characteristics in the primary dentition, as well as the changes and modifications of occlusal pattern which takes place during the period of deciduous dentition.^{13, 14} In the present study most of the children had flush terminal plane followed by mesial step molar relationship, which was consistent with findings of other studies.^{13, 14, 16, 17} Regarding canine relationship in our study, 11.5% had class II and 11.1% had class III on right side and 9.8% had class II and 10.7% had class III relationship on left side while the rest of children had class I canine relationship on both sides. Although majority of children had class I canine relationship, but frequency of other relationships is also quite significant and this might be the reason of increased over jet and few children having open bite, which results in significant values. The prevalence and frequency of Class II and III canine relationships were consistent with the findings of Qtuyemi et al,¹⁴ Abu Alhaija ESJ et al,¹⁵ and Yilmaz Y et al.¹⁶ The prevalence and frequency of over bite was normal in 58.5%, increased in 21.4% and edge to edge in 20.1% children, which are in consistent with previous findings.^{13, 14, 15, 19}

In our study, 84.2% children had incisor spacing and 95.3% had primate spaces, these readings are comparatively more as compare to previous studies done by Qtuyemi et al in Nigerian children and Abu Alhaija ESJ et al in Jordanian population. The preva-

lence of posterior crossbite was 6.4%, which was less than that reported by Abu Alhaija and Qudeimat¹⁵ (7% for Jordanian children), and Infante¹ (7.1% for the white children), but higher than that reported by Qtuyemi et al¹⁴ (4.8% in Nigerian children), and Farsi and Salam¹³ (4% in Saudi children).

CONCLUSION

The present cross sectional study provides an insight into patterns of occlusal relationship and its changes in a specific population of Peshawar. The study confirms the finding reported earlier that flush terminal plane and class I canine relationship are the most predominant relationships in primary dentition. Regarding canine relationship there was a significant difference on both right and left relationships. Incisor spacing and primate spaces were also found in majority of children. Few children were also found to have posterior cross bite and anterior open bite.

Further studies are needed to assess the changes in normal occlusion in primary dentition in our region, if not intercepted at earlier stages in primary dentition through interceptive orthodontics; they may further result in malocclusion in permanent dentition.

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