Original Article

The Occlusal Status of 6 to 12 Years Old Saudi Arabian Children: A Cross-sectional Study

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Abstract

Background: Malocclusion may cause frequent biting of the inner cheeks or tongue, aesthetic issues, discomfort when chewing or biting, speech problems, or development of mouth breathing therefore affecting the overall quality of life. Aim: To estimate the prevalence of different degrees of malocclusion associated dental complications among children aged 6-12 years. **Materials & Method:** A cross-sectional study was conducted among 526 children aged 6-12 years old after consents obtained from their parents. The Saudi children were selected from certain cities using proportional allocation technique by dividing these cities into districts where children were selected from malls and gardens with high attendance rate. **Results:** Based on molar relation, the prevalence of malocclusion in children aged 6-12 (children with mixed dentition) was 35.4%, of them 55% had class II division I with or without subdivisions and 34% had class III with or without subdivisions. The remaining 11% of children had different types of malocclusion include class II division II and combination of class II and class III malocclusions. Normal bite was reported in 34.8% of the children, other types of bites include open bite, deep bite, edge to edge bite which were recorded in 40.1%, 21.3%, 3.8% of children respectively. **Conclusion:** This study found more than one third of Saudi children affected by different types and degrees of malocclusion, malalignment and crowding. Significant associations were detected between age of children and prevalence of malocclusion and crowding.

Keywords: Children; Crowding; Diastema; Malocclusion; Prevalence; Saudi

Introduction

It has been demonstrated that type of occlusion of deciduous teeth is important in determining the occlusion in permanent teeth. [1] The treatment of malocclusion has been a major challenge to dental professionals given the complicated and costly treatment involved, thus the emphasis is on early diagnosis and prevention. Determining prevalence of malocclusion in children leading to early diagnosis and establishing societal need for treatment helps orthodontists and pedodontists in devising a proper treatment plan and planning preventive and interceptive protocols. [2,3]

Several studies have been published about occlusion of primary dentition in many countries, [4-10] however in Arab countries the amount of literature that has been published is limited. [11-13] Occlusion in primary dentition was found affected by various types of malocclusion, an old study noticed that as high as three quarters of 3-year-age children acquire flush occlusal relationship. [4] Clinic reported a prevalence of 43% of asymmetric molar relationship among 61 children. [14] Similarly, other Indian and Israeli studies reported more than half of children had flush terminal relationship with prevalence of 52% and 68% respectively. [9,15] In Saudi children, a study found a prevalence of flush terminal relationship as high as 80% among 3-5 years old children. [16] In addition, other malocclusions such as mesial and distal step have reported among Saudi children. Malocclusion refers to a number of possible conditions. It could be improper alignment of the teeth, or alteration in the appearance of the face. Malocclusion may cause frequent biting of the inner cheeks or tongue, aesthetic issues, discomfort when chewing or biting, speech problems, or development of mouth breathing therefore affecting the overall quality of life. [17]

This study aimed to estimate the prevalence of different degrees of malocclusion associated dental complications among children aged 6-12 years. The findings of this study can help us to understand the societal need for treatment and helping all stakeholders to devise preventive measures and treatment plans accordingly.

Methods

A cross-sectional study was conducted among 526 children aged 6-12 years old after obtaining the consents from their parents. The Saudi children were selected from certain cities using proportional allocation technique by dividing these cities into districts where children were selected from malls and gardens with high attendance rate. The examination disposable kits with pen, pencils and rulers were used to assess the occlusion status of the study participants. Subjects were categorized as having Class I, Class II and Class II malocclusion using Angle's Classification of molar relationship.

Inclusion/Exclusion criteria

All children of age 6 to 12 years, willing to participate in the study were included. Children with cranio-facial anomalies, those who were medically compromised and who had undergone any orthodontic treatment were excluded from the study.

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The diagnosis was reported in data collection sheet along with the demographic data of subjects. Data thus collected was entered into Microsoft excel sheet and put to statistical analysis using SPSS version 19 (statistical package of social science). Prior to the conduct of the study, ethical clearance was obtained from college of dentistry.

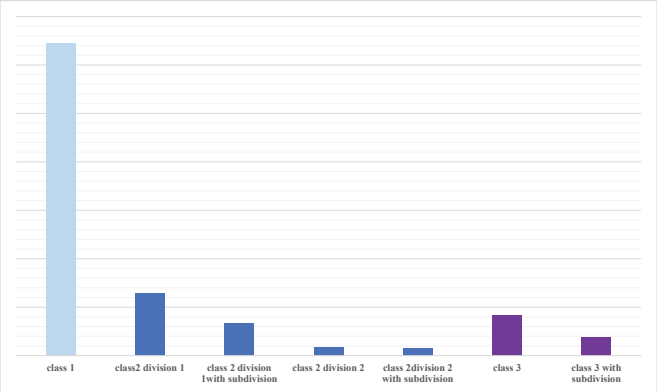

Figure 1: Main types of malocclusion in Saudi 6-12 aged children based on molar relation.

Table 1: Socio-demographics of included children.

Demographics		Frequency	Percent
Sex	Male	116	22.1
	Female	410	77.9
Residence	Khamis	290	55.1
	Abha	164	31.2
	Others	72	13.7
Father education level	Less than Secondary	106	20.2
	Secondary	191	36.3
	More than Secondary	229	43.5
Mother education level	Less than Secondary	177	33.7
	Secondary	106	20.2
	More than Secondary	243	46.2

Table 2: Distribution of malocclusions among children aged 6-12 years old in Asser region.

Category		Frequency	Percent
Occlusion	Malocclusion	186	35.4
	Normal occlusion	340	64.6
Type of malocclusions based on molar relation	Class 1	342	65.0
	Class 2 division 1	68	12.9
	Class 2 division 1 with subdivision	35	6.7
	class 2 division 2	9	1.7
	Class 2 division 2 with subdivision	8	1.5
	class 3	44	8.4
	Class 3 with subdivision	20	3.8
Type of malocclusions based on vertical relation	Normal Bite	183	34.8
	Open Bite	211	40.1
	Deep Bite	112	21.3
	Edge to edge	20	3.8
Type of malocclusions based on transverse relation	Normal bite	395	75.1
	Anterior crossbite	53	10.1
	posterior crossbite (unilateral)	50	9.5
	posterior crossbite (bilateral)	16	3.0
	posterior crossbite (total)	7	1.3
	Over Jet (anterior)	5	1.0

Table 3: Prevalence of teeth spacing and crowding in 6-12-year-age children in Aseer region.

Category		Frequency	Percent
Teeth crowding	Absent	334	63.5
	Present (Upper)	20	3.8
	Present (Lower)	116	22.1
	Present (Upper and lower)	56	10.6
Diastema	Absent	312	59.3
	Present (Upper)	134	25.5
	Present (Lower)	5	1.0
	Present (Upper and lower)	9	1.7
	Physiological (Upper)	66	12.5
Premature tooth loss	No	436	82.9
	Yes (Deciduous)	22	4.2
	Yes (Permanent)	62	11.8
	Yes (Deciduous and permanent)	6	1.1

Results

A total sample of 526 children aged between 6-12 years old was included in this study, where 78% were females and 22% were males. More than half of children were from Khamis while about a third of children were selected from Abha city [Tables 1-3]. Based on molar relation, the prevalence of malocclusion in Saudi children aged 6-12 (children with mixed dentition) was 35% represented by 184 children, of them 55% had class II division I with or without subdivisions and 34% had class III with or without subdivisions. The remaining 11% of children with malocclusions had different types of malocclusion include class II division II and combination of class II and class III malocclusions [Figure 1].

The vertical relation between upper and lower dentations, normal bite was reported in 34.8% of the children, other types of bites include open bite, deep bite, edge to edge bite which were recorded in 40.1%, 21.3%, 3.8% of children respectively. The transverse relation between dentations was normal in 75.1% of children, while 10.1% and 13.8% of children had anterior and posterior cross bite respectively. The prevalence of diastema and tooth crowding were 40.7% and 36.5 respectively, in the subjects.

Only children aged 10-12 years old had significantly higher malocclusion prevalence than 6-9 years old children (p=0.011). Other associations between demographics of studied children and the presence of malocclusion were found statistically non-significant.

Discussion

Several studies have reported a high prevalence of malocclusion among school children which varied between populations. In Saudi Arabia, the seeking for orthodontic treatment has been grown in the last decade. [18]

In the present study, the antero-posterior molar relationship showed the prevalence of 35% of malocclusion in Saudi children aged 6-12. Similarly, Alzubair and Ghandour found 30.6% prevalence of discrepancies in antero-posterior molar relationship in 12-year-age Yemeni children. [12] Johannsdottir et al. found 33% and 36% prevalence of malocclusions in 6-year-age children. [19] A study among Lithuanian 7-15 years aged children found that only 15.3% had normal occlusion. [20] Thailander found that malocclusions found in 88% of 5-7 years old children. This difference in malocclusion prevalence can be attributed to the genetic factors and different criteria used to define malocclusions.

In the present study, 22.8% of studied children had class II and 12.2% had class III, while Johannsdottir et al. found 27% of boys and 32% of girls aged 6 years old had class II in Iceland, while 6.2% and 4.8 had class III in boys and girls respectively. [19] Thilander et al. found a 21% and 3.7% prevalence of class II and class III malocclusion in 5-17 years old students [21]. In Lithuanian children, class I, class II and class III occlusions were seen in 68.4%, 27.7% and 2.8% of them. [20]

The present study found normal bite in 34.8% of the children, other types of bites include open bite, deep bite, edge to edge bite which were recorded in 40.1%, 21.3%, 3.8% of children respectively. Similar results of Thilander et al. who found 21.6% prevalence of deep bite in 5-17-years-old boys. [21] These findings were different in Lithuanian children where the prevalence of deep bite (>3.0 mm) was 14.5% and the prevalence of open bite was only 3.5% [20]. The transverse relation between dentitions in the studies children were normal in 75.1% of children, while 10.1% and 13.8% of children had anterior and posterior cross bite respectively. In Lithuania, posterior cross bite was found in 8.8% of schoolchildren. [20]

In the present study, the prevalence of diastema was 40.7%, while Alzubair and Ghandour found 14.2% prevalence of diastema with 1 mm or more in 12 years children. Thilander et al. reported a prevalence of 13.5% in early mixed dentition that have been decreased with dentition development to be 3.7% in adolescents. [21] Another study among Swedish school children found 5% prevalence of medial diastema. The prevalence of sucking habits among Saudi children was found as high as 48.36%, [22] which explained to some extent the high prevalence of spacing in upper dentition. The prevalence of tooth crowding in our study was 36.5% while Alzubair and Ghandour found 31.4% prevalence of crowding. [12] Thilander et al. found the crowding as the most common problem affected more than half of the studied 5-17 years aged students. [21] In Lithuanian children, the prevalence of crowding in the upper and lower dentitions was 38.4% and 35.5% respectively. This prevalence was found significantly increased with age of children. [20] This is in accordance with our study that found older children had significantly higher malocclusion prevalence than younger children.

Conclusion

This study found more than one third of Saudi children affected by different types and degrees of malocclusion, mal-alignment and crowding. Significant associations were detected between age of children and prevalence of malocclusion and crowding. These findings will highlight the high treatment needs of orthodontic treatment among Saudi children.

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Conflict of Interest

The authors disclose that they have no conflicts of interest.

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