FREQUENCY OF MALOCCLUSION IN GOVERNMENT HIGH SCHOOL GOING CHILDREN AGED 13-17 IN PESHAWAR

Ariffullah Khan[1], Asif Rehman[1], Aamir Hameed[1], Shadab Adil[2], Muhammad Salman Khan[3], Ayesha Malik[4]

[1]Department of Community Dentistry Peshawar Dental College

[2]Department of Orthodontics Peshawar Dental College

[3]Department of Physiology Gomal Medical College D.I.Khan

[4]RHC Reggi KP Health Department

ABSTRACT

Objective: *To determine the frequency of malocclusion in Govt. high school children of District Peshawar.*

Materials and Methods: *About eight hundred and fifty school children of both genders were randomly selected through random cluster sampling, from Government High Schools of District Peshawar. The study participants were examined in their school staff rooms using wooden spatulas, disposable gloves, millimeter ruler, and torchlight. Angle's classification was used for recording various traits of malocclusion besides overbite, overjet, maxillary midline diastema, crowding, open bite, and crossbite. A special proforma was used for recording the data. Data were analyzed using SPSS-20 while Chi-square test was applied for association.*

Results: *A total of 850 subjects were included in the study, of which there were 600 (70%) males, and 250 (30%) were females. The mean age of the participants was 15 + 1.37 years. The overall frequency of malocclusion was 73.1%. Angle's class I malocclusion had the highest frequency of 372 (43.8%) followed by normal occlusion 229 (26.9%), class II division 1 as 88(10.4%), class II division 2 as 59(6.9%), class III as 64(7.5%). Angle's Class I malocclusion (43.8%) and crowding (37.9%) was more frequently found followed by normal occlusion (26.9%) among the school going children of the Peshawar, Pakistan.*

Conclusion: *Angle's Class I malocclusion and crowding were more frequently found, followed by normal occlusion among the school going children of the Peshawar, Pakistan.*

Keywords: *Occlusion, Malocclusion, Angle's classification*

INTRODUCTION

The facial appearance plays a vital role in the confidence and psychosocial aspect of a child. It also facilitates social recognition, integration, and acceptance in society.[1] Malocclusion is considered a problem related to the maturation of mandibular and maxillary bones during childhood. This type of abnormality can have functional, aesthetic, or psychosocial impacts, with a negative effect on the daily life of those affected. Malocclusion can be estimated as a public health problem, given its high Prevalence and its capability for anticipation and treatment.[2] Malocclusion can lead to functional problems, with adverse concerns for dental aesthetics and psychosocial features of the lives of youngsters[3], and it is the second most common dental anomaly after caries.[4]

Malocclusion can be defined as "The mal-relationship between arches in any plane or a condition characterized by anomalies in tooth position,

Correspondence:
Dr. Ariffullah Khan
Assistant Professor, Comunity Dentistry, Bacha Khan Dental College Mardan, KP, Pakistan
Email: khan5578@hotmail.com
Contact: +923325755578

number, form and developmental position of teeth beyond normal limits".[5] The reasons for developing a malocclusion may be genetic or environmental and a combination of both elements with several local components such as faulty oral habits, shape, form, and position of tooth development that can cause malocclusion.[6] Malocclusion treatments are commonly carried out during teenage years when the permanent dentition is appearing.[7] At this particular age; adolescence is also seen as the moment when the individual has started to feel that his / her appearance is of great importance and that he/she has acquired the liberty to request or refuse orthodontic treatment independently.[8]

Presently, there is a shortage of evidence in the literature on the frequency of malocclusion in the Peshawar region in broad and mainly among school children in the city who are of age variety that could gain themselves of orthodontic amenities. Therefore, this study aimed to determine the Prevalence of malocclusion among government high school children in Peshawar city that would provide base-line data for the planning of orthodontic services and treatment measures on a population basis in this region.

MATERIALS AND METHODS

Study design and study population

A questionnaire-based descriptive cross-sectional study was conducted from October 2019 to November 2019 between 13-17 years old government high school-going children in the Peshawar district.

The study population consisted of 13-17 years old children attending schools in the Peshawar education division. Students who had completed their 13th birthday but not reached their 17th birthday and with the complete eruption of permanent 1st molar of one arch to permanent 1st molar of another arch were considered in the sample.

Children with past of jaw trauma or who were receiving orthodontic treatment and those who have received orthodontic treatment, including those with tooth malformation/ tooth discoloration/presence of filling, were excluded from the sample.

Sampling design

Data of government high schools was obtained from the EDO office through proper channels. The Peshawar education division comprises 82 government high schools, of which 58 are boy's high schools, and 24 are girl's high schools. The total student population was 52212 out of which 37324 were boys, and 14888 were girl's students.

Random cluster sampling technique with probability proportionate to size was used to select the sample. As the cluster sampling technique was used, the design effect was considered, and a sample size of 850 was obtained.

In the first stage of cluster sampling, the stratification on boys and girls students was done. 70% of Govt. high schools are for boys in Peshawar, so 70% of the sample will come from boy's schools. Similarly, 30% of Govt. high schools are for girls in Peshawar, so a 30% sample will come from girls' schools.

In the second step, sample stratification was done, i.e., 70% of 850 = 595 number of boy's students. 30% of 850 = 255 number of girls students.

In the third step, high schools were selected through the cumulative process. Seventeen clusters were chosen out of which twelve were boy's high schools, and five were girl's high schools.

Ethical clearance, official permission, and informed consent

Ethical approval for the study was taken from the Institutional Review Board (IRB), Peshawar Medical and Dental College, Peshawar.

Official permission was obtained from both male and female District Education Officer in the Peshawar district, Khyber Pakhtunkhwa.

Written conversant consent was obtained from all parents/guardians of the students who fulfilled the eligibility criteria.

Pro forma details

Occlusal characteristics, including Angle's malocclusion, crowding, overjet, overbite, crossbite, open bite, and maxillary midline diastema, were recorded using Pre-structured data collected sheet.

Methodology

Three examiners collected data. The investigators visited the selected schools on two occasions. On the first occasion, eligible children were recognized as per above-specified sampling design and given

informed consent forms to get them signed from their parents/ guardians who were also notified through a letter written in Urdu by the investigators about the examination process and even by the class teachers on request of the investigator. A total of 850 students aged 13-17 years whose parents/guardians had given a written conversant consent were examined.

The cheeks were fully retracted by a disposable tongue depressor to obtain a direct lateral view of Angle's Classes on each side. Other characteristics measured were overjet (O.J.), overbite (O.B.), crowd¬ing, midline diastema, and crossbite according to the defined limitations mentioned in (Table 1).

Clinical examination was carried out in the staff room of the high school. Occlusal contact was assessed using latex gloves, head torch, millimeter ruler, and a tongue depressor.

Statistical analysis

The data was entered and analyzed using IBM-compatible computer and Statistical Package for Social Sciences software version 20 (SPSS Inc., Chicago, Illinois, USA).

RESULTS

Among the 850 subjects who were examined, 70% (600) were males, and 30% (250) were females. The mean age was 15 years with S.D +1.37. Furthermore, 17.8% (151) was 13 years, 23.1% (196) was 14 years, 18.2% (155) was 15 years, 22.8% (194) were 16 years, and 18.1% (154) were 17 years old children respectively. (Table 2)

(Table 3) shows the gender distribution with normal occlusion and malocclusion classes. A Chi-square test was applied to compare gender differences in the malocclusion status of the school children. A highly statistically significant (P-value <0.01) difference identified. (Table 4) show the occlusal classifications and of the subjects. Normal occlusions were found in 26.9% of subjects, and 73.1% had malocclusions. Angle's class I malocclusion had the highest frequency of 43.8%. In comparison, normal occlusion was 26.9%, and class II division 1, class II division 2, class III, Class II subdivision, and Class III subdivision were 10.4%, 6.9%, 7.5%, 4%, and 0.5% respectively. (Figure 1) shows the distribution of various types of malocclusion according to Angle's classification.

The normal overbite and overjet values were frequent findings (Table 5). Crowding was present in 37.9%, while Max Midline Diastema was present in 16.5 % of the subjects (Table 6).

The anterior open bite was present in 2.9%, while the anterior and posterior crossbite was found in 7.4% and 0.9% of the subjects, respectively. (Table 7)

DISCUSSION

The study represented the first epidemiological survey carried out on a Peshawar district population with the prime goal of attaining an accurate image of the orthodontic situations of the students aged between 13-17 years. Epidemiological surveys conducted on a steady routine may give essential data about changes in pattern and Prevalence of malocclusion, which can be supportive in design & providing treatment. Angles classification had been a topic of several debates in literatures9 as it does not involve vertical and transverse irregularities, but it is still a globally accepted system that decreases subjectivity.[10] Angle's classification that is consistent, dependable, recapitulate,[11] and truthfully concerned for a wide population study[12] was used for examination of sagittal occlusion. In this study, out of 850,

Table 1: VARIABLES AND METHOD OF REGISTRATION

Serial No.	Variable	Method of registration
1	Sagittal occlusion	Angles classification.
2	Overjet	Normal Overjet: 1-3mm, More than 3 mm was measured as increased, and less than 1mm was recorded as reduced.
3	Overbite	Normal Overbite: 1-2mm, More than 2 mm was measured as increased, and less than 1mm was recorded as reduced.
4	Crowding	Overlapping of one tooth with respect to other
5	Maxillary Midline Diastema	Space of more than 1mm between central incisors of the upper arch
6	Crossbite	If one or more maxillary teeth are placed palatal/lingual to the mandibular teeth.

Table 2: AGE

Mean+SD 15+1.37		
Age	**N**	**%**
13	151	17.8
14	196	23.1
15	155	18.2
16	194	22.8
17	154	18.1
Total	850	100.0

Table 3: GENDER CROSS TABULATION

Angle's Malocclusion		Total	P-value
Normal	Count	229	<0.01
	% within Gender	26.9%	
Malocclusion	Count	625	
	% within Gender	72.1%	
Total	Count	850	
	% within Gender	100.0%	

Table 4: OCCLUSAL CLASSIFICATION

Angle's Classification	N	%
Normal Occlusion	229	26.9
Class I	372	43.8
Class II (Div 1)	88	10.4
Class II (Div 2)	59	6.9
Class III	64	7.5
Class II subdivision	34	4.0
Class III subdivision	4	0.5
Total	850	100.0

Table 5: OVERJET AND OVERBITE

	Overjet		Overbite	
	N	%	N	%
Reduced	103	12.1	99	11.6
Normal	643	75.7	673	79.2
Increased	104	12.2	78	9.2
Total	850	100.0	850	100.0

Table 6: CROWDING AND MAXILLARY MIDLINE DIASTEMA

	Crowding		Max Midline Diastema	
	N	%	N	%
Normal/Absent	528	62.1	710	83.5
Present	322	37.9	140	16.5
Total	850	100.0	850	100.0

Table 7: OPEN BITE AND CROSS BITE

	Anterior Open bite		Anterior Cross bite		Posterior Crossbite	
	N	%	N	%	N	%
Absent	825	97.1	787	92.6	842	99.1
Present	25	2.9	63	7.4	8	0.9
Total	850	100.0	100	100.0	100	100.0

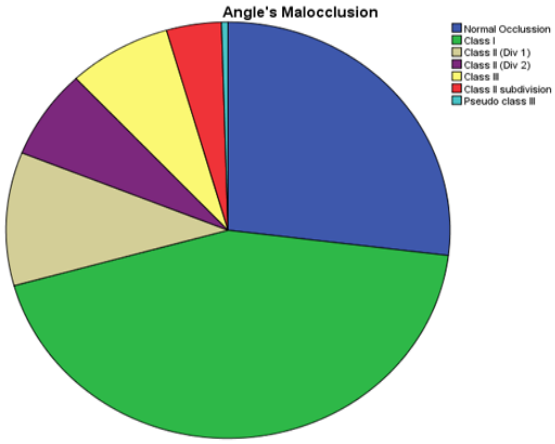

Fig 1: Prevalence of malocclusion of the study population according to Angle's Malocclusion

only 26.9% had normal occlusion, which was similar to that in white Americans,[11] Egyptians,[13] Iranians[14] but less then Nadim et al[15] Pakistan and Iman et al[16] in Libya.

Hence the frequency of malocclusion came out high, and the most prime was class I malocclusion (43.8%), almost similar to other studies conducted in Pakistan[15, 17, 18] Iranian[14], and Egyptian[13] but less than reported by Gardner[5] and Iman et al.[16]

Class II malocclusion in the study (10.4% in division 1 and 6.9% in division 2) was similar to Gardner's[6] observation but higher to Iman et al[16] and Nadim et al.[15]

Class III malocclusion (7.5%) in the current study came out to be parallel to that established in Egyptian[13] but complex to that found in Danish,[21] British,[22] Indian,[23] and Nigerian[24] subjects.

Overjet in this study was established to be normal (1-3mm) in 75.7%. Excessive (>3mm) in 12.2% and reduced in 12.1 %.(< 1mm).These findings were the same to Nadim et al[15] but unlike those observed by Proffit et al,[12] who stated that 29.6% had normal and 45.2% had increased overjet.

The increased overbite was witnessed in only 9.2 % of the subjects, which was significantly fewer than that in Libyans[16] and Iranians,[14] while overbite was reduced in 11.6% school-going children, which were more than that in Turkish population[25] and Black Americans.[26]

The Prevalence of diastema was found to be 16.5%, similar to Nadim et al.,[15] Ajaiy[24] in Karachi, Pakistan, and South Nigerian population, respectively.

Crowding was present in 62.1% of the study, similar to H. Kaur et al[27] in Indian population, Nadim et al.,[15] and of Lauc. T[28] in Hvar island, Croatia.

The anterior crossbite was observed in 7.4 %, almost similar to that observed by H. Kaur[27] in the Indian population. Still, it was two times that of discovered by E. Rajendra et al[29] in Nalgoda school children. On the other side, the posterior crossbite was documented in 0.9%, which was much less than to E. Rajendra et al,[29] Rio de Janeiro State, Brazil,[28] Lahore, Pakistan,[30] and Karachi, Pakistan.[15]

CONCLUSION

This study revealed the majority of Class I malocclusion and crowding among the school going children of the Peshawar, Pakistan. No statistically significant masculinity difference was spotted for any occlusal traits measured in this survey.

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