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ORIGINAL ARTICLE

Assessment of malocclusion and patients' need for orthodontic treatment.

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ABSTRACT… Objective: To document the frequency of various classes of Angle's malocclusion and its treatment need among children of both gender between 13-17 years age attending government high schools in Peshawar District. **Study Design:** Cross sectional study. **Setting:** Khyber Medical University Institute of Dentistry. **Period:** Jan 2020 to Nov 2021. **Material & Methods:** 900 patients of both genders between the ages of 13 and 17 were used in the current investigation. A performa was used to record malocclusions e.g. Angle's classification, overjet, overbite, open bite and cross bite. For various malocclusions, the Dental Health Component (DHC) of the Index of Orthodontic Treatment Need (IOTN) index was reported. **Results:** We looked at 900 students between the ages of 13 and 17 whose guardians had signed a written consent form. Among the 900 students who were examined, 60% (540) were males, and 40% (360) were females. 175 individuals had normal dental health, 420 had class 1 malocclusions, 265 had class 2s, and 40 had class 3s. Overjet was excessive in 210 cases and reduced in 53. Overbite was excessive in 201 cases and reduced in 34. In 185, there was an open bite. The difference was significant ($P < 0.05$). In 489 cases, DHC grade I and II, 310 cases, grade III, and 101 cases, grade IV, and grade V. The difference was significant ($P< 0.05$). **Conclusion:** The most frequent malocclusion is class 1. DHC grades I and II were more frequently observed in patients. Malocclusion can be identified using the Dental Health Components (DHC) of the Index of Orthodontic Treatment Need (IOTN).

Key words: Angle's Classification, IOTN, Malocclusion, Occlusion.

INTRODUCTION

One of the most prevalent dental issues in people today is malocclusion.[1] Even while malocclusion doesn't always provide a life-threatening risk, it is nonetheless regarded as a significant public health concern because it affects the wellbeing of oral tissues and may also have psychological and social implications.[2] The way a youngster looks on the face is extremely important for their psychosocial development and sense of self-worth. Additionally, it promotes social acceptance, societal integration, and social acknowledgment. Malocclusion can be defined as "The mal-relationship between arches in any plane or a condition characterized by anomalies in tooth position number, form and developmental position of teeth beyond normal limits". Malocclusions can be caused by a number of factors, including inherited, environmental, or a combination of both, as well as regional ones like poor dental cleanliness habits and irregular tooth development in terms of placement, form, and size.[3] Throughout adolescence, as the permanent dentition is beginning to form, malocclusion treatments are usually given. Adolescence is also considered to begin at this age, when a person begins to feel that his or her look is very important and has gained the freedom to unilaterally request or reject orthodontic treatment.[4]

Malocclusion may be caused by a variety of minute deviations from the norm, and these changes together with one another might result in a clinical issue.[5] Malocclusion is caused by a number of local variables, including abnormalities in the quantity, shape, and developmental positions of teeth and dentition, as well as environmental & genetic aspects, or a mix of both.[6] Malocclusion

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can lead to dental cavities, temporomandibular joint issues, and problems with periodontal health.[7] The Index of Orthodontic Treatment Need (IOTN) was created to rank malocclusion according to the importance of different occlusal features for dental health and aesthetic factors. The index includes an aesthetic component as well as a dental health component (DHC) grounded on suggestions made by the Swedish medical board.[2]

Mangat et al (2020)[8] conducted a survey in Hungary on 483 schools going children aged 16-18 years and detected 70.4% frequency of malocclusion in the sample. Chauhan et al (2022)[9], who observed a prevalence of malocclusion in 71% of students in the age group of 15 years school going children in Bangalore, India. Amaral et al (2020)[10] assessed the degree of malocclusion and the requirement for orthodontic management in Indian young people between the ages of 16 and 24. A cross-sectional study with 660 participants, 308 women and 352 men, was carried out in rural areas. The dental aesthetic index (DAI), used in clinical evaluations, was used to gauge the population's overall need for orthodontic handling. Noor et al (2021)[11] who observed a frequency of malocclusion in 75% of sample size in Abbottabad in patients visiting dental section of Ayub medical college.

Though few studies[12,13] have been conducted in hospitals in regard to the incidence and frequency of anyone type of malocclusion with up to 79% malocclusion visiting orthodontic OPD but no study has yet been conducted in community and still there is a terrible deficiency of material regarding prevalence of different types of malocclusion and its treatment need on our population for which community based studies are needed. This study will provide a base to government and orthodontist about current scenario of malocclusion in growing children of Peshawar city.

To document the frequency of various classes of Angle's malocclusion and its treatment need among children of both gender between 13-17 years age attending government high schools in Peshawar District.

MATERIAL & METHODS

Between January 2020 and November 2021, a questionnaire-based descriptive cross-sectional study including 13–17-year-old government high school students in the Peshawar district was carried out at Institute of Dentistry, Khyber Medical University.

Students who had completely erupted first permanent teeth from one arch to the first permanent tooth from another arch were included in the sample. Children who had previously experienced jaw trauma, were experiencing orthodontic therapy, or had already undergone orthodontic treatment were omitted from the sample. The Peshawar Medical and Dental College's IRB granted ethical approval for the study (Prime/IRB/2019-168). Male and female district education officers in Peshawar, Khyber Pakhtunkhwa, granted official authorization (5988/DD (P&D)/NOC). Written conversant consent was acquired from all parents/guardians of the students who fulfilled the eligibility criteria.

Information about the participants, including name, age, gender, etc., was documented. Using a mirror, probe, and twizzer, the dental surgeon performed an extensive oral examination. A performa was used to record Angle's classification, overbite, overjet, crowding, open bite, crossbite and spacing. For various malocclusions, the Dental Health Component (DHC) of the IOTN index was stated. There are three levels of treatment need: "level 1 (no need), level 2 (little or no need for treatment), level 3 (borderline need), level 4 (definite need), and level 5 (severe need)". The data was entered and analyzed using IBM-compatible computer and Statistical Package for Social Sciences software version 24 (SPSS Inc., Chicago, Illinois, USA).

RESULTS

A total of 900 students aged 13-17 years whose parents/guardians had given a written conversant consent were examined. (Table-I) Among the 900 students who were examined, 60% (540) were males, and 40% (360) were females. The mean

age was 15 years with S.D +1.37.

Age	Gender		Total N (%)
	Male N (%)	Female N (%)	
13	103 (19.1)	77 (21.4)	180 (20)
14	118 (21.8)	80 (22.2)	198 (22)
15	140 (26)	40 (11.1)	180 (20)
16	118 (21.8)	80 (22.2)	198 (22)
17	61 (11.3)	83 (23.1)	144 (16)
Total	540 (100)	360 (100)	900 (100)

Table-I. Age distribution of participants

Table-II reveals that 175 patients had normal dental health, 420 had class 1 malocclusion, 265 had class 2, and 40 had class 3 malocclusion.

Age	Gender		Total N (%)
	Male N (%)	Female N (%)	
Angle Class	Normal	175	0.01
	Class 1	420	
	Class 2	265	
	Class 3	40	
Overjet	Normal	637	0.03
	Excessive	210	
	Reduced	53	
Overbite	Normal	665	0.02
	Excessive	201	
	Reduced	34	
Open bite	Present	185	0.05
	Absent	715	

Table-II. Distribution of various occlusal characteristics

DHC grade I & II was noted in 489. The difference was significant (P< 0.05) (Table-III).

DHC Grading	No.	P-Value
Grade I and II	489	0.05
Grade III	310	
Grade IV and V	101	

Table-III. Dental health components grading of IOTN

DISCUSSION

This study was the first epidemiological survey conducted on residents of the Peshawar area with the primary objective of obtaining a precise picture of the malocclusion frequency in students between the ages of 13 and 17. Epidemiological surveys conducted on steady routine may give useful data about changes in pattern and prevalence of malocclusion which can be supportive in design & management. In the current study 900 students were randomly selected through random cluster sampling, from Govt. High Schools of District Peshawar.

In this study, out of 900 students had 80.6% of any form of malocclusion, which is in close proximity to the findings of Noor et al (2021)[11] who observed a frequency of malocclusion in 75% of sample size in Abbottabad. Similarly, Chauhan et al (2022)[9], who observed a prevalence of malocclusion in 71% of students in the age group of 15 years school going children in Bangalore, India. Mangat et al (2020)[8] conducted a survey in Hungary on 483 schools going children aged 16-18 years and detected 70.4% frequency of malocclusion in the sample. Prameswari et al (2021)[15] conducted a study on deaf children and found out a frequency of 69.5% which is in agreement of this study. Alyami et al (2023)[16] conducted a study on Five hundred and two Iranian students were examined and found out a frequency of 77.1% which is agreement to this study.

Hence the frequency of malocclusion came out high and that the incidence of Angle's class I malocclusion was high (46.6%) similar to other studies conducted in Pakistan (59.4%)[11] (59.9%)[14], Iran (41.3%)[17], India (40%)[2](62%)[18], Hungarian (52.8%).[8] Class II malocclusion in the study (25.1 %) was similar to Iran (6%)[17], Pakistan (17.8%)[11]. Class III malocclusion (4.4%) in the current study came out to be parallel to that establish in Karachi and Lahore, Pakistan (7.8%)[14] (10.2%)[19], Turkey (10%)[20],Saudi Arabia (7.61%)[6] and Nigerian children (1.8%).[21] Overjet in this study was established to be normal in 70.7%, excessive in 23.3% and reduced in 5.9%. These findings were identical to Paulo et al (2022)[22] Ribeiro et al (2023).[23] Increased overbite was witnessed in only 22.3 % of the subjects which is in close proximity to studies by Vučić et al (2020)[24] 21.6% and Mylonopoulou et al (2021)[25] 16.7% but significantly fewer than that found in Nugroho et al (2019)[26] 38%.

Malocclusion is caused by a number of local factors, including abnormalities in the quantity, shape, and developmental positions of teeth and dentition, as well as environmental & genetic

aspects, or a mix of both. Malocclusion can lead to dental cavities, temporomandibular joint issues, and problems with periodontal health. The IOTN has a DHC factor that, like all normative indices, can alter over time to reflect developmental changes and is hence fairly trustworthy. The NHS in the UK often uses the IOTN to identify people whose malocclusion-related qualities are regarded appropriate for the investment of resources, such as orthodontic treatment, demonstrating that the IOTN has also been tried and tested. The goal of the current study was to ascertain whether the group under observation needed orthodontic treatment for malocclusion.

CONCLUSION

The most communal malocclusion is class I. DHC grades 1 and 2 were more frequently observed in patients. Malocclusion can be identified using the Dental Health Components of the Index of Orthodontic Treatment Need (IOTN).

LIMITATION

The limitations of this study include small sample size; the study was only conducted in government high schools whereas malocclusion can also be found in students of private sector schools or Madrasas and also those who don't attend any of the above. This limitation may include the generalization of the findings of the population.

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2	Aasim Masood	Conetent overview.	
3	Muhammad Salman Khan	Drafting.	
4	Syed Fahad Ali Shah	Analysis.	
5	Muhammad Haris Zia	IOTN Index, Proofreading.	
6	Kanwal Safeer	Data collection.	