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Prevalence of malocclusion & various variables associated with it in school going children of age 12-16 years native of Hyderabad city, Telangana, India – Cross-sectional study

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Abstract

Introduction: A balanced facial feature is much more pleasing and appealing in majority of races and sexes rather than irregular or protruding teeth. India being a diverse and vast subcontinent, shows large variation in prevalence of malocclusion and has been associated with psychological and psychosocial problems and functions such as mastication, deglutition and impaired esthetics.

Aims and Objectives: To assess the prevalence of malocclusion, proportion of various types of malocclusion and different variables associated with it in 12 – 16 years old school going children in Hyderabad city, Telangana state.

Materials and Methods: A total of 8438 school going children aged 12 – 16 years were examined for various types of malocclusion and its associated variables (overjet, overbite, deepbite, crossbite, individual tooth rotations) and the data was tabulated.

Result: Prevalence of malocclusion was found to be more in boys compared to girls in this age group. With respect to types of malocclusion, Angle's class I was the highest, followed by class II, class III being the least.

Conclusion: The overall prevalence of malocclusion was found to be 86.7% of which Angle's class I malocclusion was the most prevalent, followed by class II and class III malocclusions.

Keywords: Prevalence, Malocclusion, School going children, 12-16 years.

Introduction

Any deviation from the normal arrangement of teeth, which can be presented singly or in combination of multiple traits is referred to as malocclusion[1]. One of the most prevalent oral pathologies, next only to dental caries and periodontal disease is malocclusion and is usually ranked third among worldwide public health dental disease priorities, which may or may not be associated with pathological conditions[2].Well-aligned teeth and a pleasing smile, at all social levels reflects positive status and well-being of any individual per say. A balanced facial feature is much more pleasing and appealing in majority of races and sexes rather than irregular or protruding teeth [3, 4, 5]. India being a diverse and vast subcontinent shows large variation in prevalence of malocclusion in different regions of our country and the various reasons attributed to this can be due to ethnicity, nutritional status, religious beliefs. The prevalence of malocclusion is found to be 20 to 43% in Indian population [6]

Orthodontic indices are used vastly in clinical and epidemiological studies of malocclusion. These indices comprise of numerical values describing the relative status of a population on a graduated scale with definite upper and lower limits and is designed to permit comparison with other populations classified by the same criteria and methods [7]

With respect to the published literature very few studies have been conducted to assess the prevalence of malocclusion in school children aged 12-16 years in Telangana state. Therefore, the present study was undertaken to determine the prevalence of malocclusion and its associated variables in Hyderabad city of Telangana state.

The aim of the present study is to assess the prevalence of malocclusion, proportion of various types of malocclusion and different variables associated with it in 12 to 16 years old school going children in Hyderabad city, Telangana state.

Materials and Methods

The study was conducted in different schools spread over the city of Hyderabad in Telangana state to assess the prevalence of malocclusion in 12 to 16 years old children. A total 8438 children were examined during the months of September, October and November 2018 among which 7412 children satisfied the inclusion criteria. Ethical clearance was obtained from the institutional ethical committee prior to the commencement of the study. Informed consent was obtained from the parents/guardians as well as the school authorities after explaining about the involvement of their ward in the study. The study was conducted as per the World Medical Association Helsinki Declaration.

Inclusion criteria

• Subjects in the age group of 12–16 years

• Subjects who had all the permanent teeth erupted. Subjects native of Hyderabad

Exclusion criteria

• Previous history or ongoing orthodontic treatment

• Uncooperative child

• Medically compromised child.

Examination of the children

The children were examined using World Health Organization (WHO) criteria for oral health assessment. Examination of each child was done using mouth mirror, probe and explorers. A single examiner carried the oral examination of each child. Occlusal relationship was evaluated at centric occlusion. The variables associated with malocclusion which was recorded included crossbite,

open bite, deep bite, protrusion of teeth and tooth rotations.

The normal occlusal group included children with class I molar relationship, normal overbite and overjet (<3mm), proper alignment and no gross irregularities. The statistical software Statistical Packages for the Social Sciences (SPSS) 17 was used in present study. Chi square test was used to analyse the prevalence of malocclusion which was represented in proportions and P value less than 0.05 was considered as statistically significant.

Table 1: Age and Gender distribution of the children examined

Age	Male (%)	Female (%)	Total (%)
12	723 (50.74)	702 (49.26)	1425 (19.23)
13	780 (52.67)	701 (47.33)	1481 (19.98)
14	802 (50.82)	776 (49.18)	1578 (21.29)
15	798 (54.21)	674 (45.79)	1472 (19.86)
16	811 (55.70)	645 (44.30)	1456 (19.64)
Total	3914 (52.80)	3498 (47.20)	7412 (100)

Table 2: Distribution based on gender and Angles class of malocclusion

Occlusion	Male (%)	Female (%)	Total (%)
Normal	481 (48.7)	506 (51.3)	987 (13.3)
Class I	3012 (51.2)	2876 (48.8)	5888 (79.4)
Class II Div 1	198 (49.1)	205 (50.9)	403 (5.4)
Class II Div 2	50 (56.8)	38 (43.2)	88 (1.3)
Class III	30 (65.2)	16 (34.8)	46 (0.6)
Total	3771 (50.9)	3641(49.1)	7412 (100)

Table 3: Overjet and Gender distribution

Overjet	Male (%)	Female (%)	Total (%)
Normal	2952 (52)	2730 (48)	5682 (76.7)
Increased	882 (52.3)	803 (47.7)	1685 (22.7)
Reverse	28 (62.2)	17 (37.8)	45 (0.6)

Table 4: Overbite and Gender distribution

Overbite	Male (%)	Female (%)	Total (%)
Normal	2718 (54)	2319 (46)	5037 (68)
Increased	1326 (57)	1001 (43)	2327 (31.4)
Open Bite	29 (60.4)	19 (39.6)	48 (0.6)

Table 5: Open bite and Gender distribution

Open Bite	Male (%)	Female (%)	Total (%)
Skeletal	6 (60)	4 (40)	10 (35.7)
Dental	12 (66.7)	6 (33.3)	18 (64.3)
Total	18 (64.3)	10 (35.7)	28 (100)

Table 6: Cross bite and Gender distribution

Cross Bite	Male (%)	Female (%)	Total (%)
Complete (Anterior And Posterior)	2 (66.7)	1 (33.3)	3 (0.5)
Anterior Complete Single Tooth	12 (63.2) 227 (59.4)	7 (36.8) 155 (40.6)	19 (3.5) 382 (71.1)
Unilateral Posterior	68 (62.4)	41 (37.6)	109 (20.3)
Anterior And Unilateral Posterior	16 (64)	9 (36)	25 (4.6)
Total	325(60.4)	213 (39.6)	538 (100)

Table 7: Tooth rotation and Gender distribution

Variable	Male (%)	Female (%)	Total (%)
Tooth Rotation	206 (56.1)	161 (43.9)	367 (4.95)

Results

In the present study, the prevalence of malocclusion among the 7412 children examined showed that boys had more prevalence than girls (Table 1). Malocclusion was showed by 86.7% of the total population examined among which 79.4% presented with class I, class II with 6.7% and class III with 0.6%. Class II Division 1 was found to be more prevalent than Class II Division 2 (Table 2).

Among the total children examined, normal overjet and overbite (<3 mm) was found to be 76.7% and 68% respectively, increased overjet and overbite (>3 mm) by 22.7% and 31.4% respectively. Reverse overjet was shown by 0.6% and open bite by 0.6% which was found to be statistically significant based on gender (Table 3 and 4). Among the 28 children who presented with open bite out of which 10 children had skeletal and 18 had dental type of open bite (Table 5)

Crossbite was found to be present in 7.3% of the total children (Table 6). The most commonly affected teeth were single or multiple anterior teeth. Among the single tooth crossbite, maxillary lateral incisors followed by mandibular lateral incisor is mostly found to be in crossbite.

Tooth rotations was found to be the most common malocclusion in the present study which was shown by 5% of the total children examined (Table 7). Most commonly rotated teeth were mandibular second premolars (61.3%). The present study showed that the variables of malocclusion examined presented with overall distribution of deep bite being the most prevalent followed by increased overjet, crossbite, tooth rotation and open bite.

Discussion

Malocclusion seems to be the most common problem today worldwide. It has been found to be associated with psychological and psychosocial problems, problems in the oral functions such as mastication, deglutition, speech, impaired aesthetics, periodontal disease and mostly increased susceptibility to trauma [6].

Numerous studies have been undertaken describing the different types of malocclusion and the prevalence of malocclusion [7-9]. Even in a population of same origin, variations were observed in the distribution of different types of malocclusion [10]. Among the different populations representing Indian population, many cross-sectional studies have been attempted previously to examine the malocclusion [6]. As no studies have been reported on Telangana state of India, so the present study was conducted in the children aged 12-16 years in Hyderabad city being the capital of Telangana to report the prevalence of Malocclusion.

In the present study, 8438 children in the age group of 12-16 years age group were examined during the months of September, October and November 2018 among which 7412 children satisfied the inclusion criteria. Among the 7412 children, 3914 were boys and 3498 were girls. To evaluate the occlusal status of children in the present study, Angles classification of malocclusion was used. Among the 7412 children examined, the prevalence of malocclusion was reported to be 86.7%. The study conducted by Trehan et al. [11] reported a lower prevalence compared to the present study.

On examination of different classes of malocclusion, it was found that Angles Class I malocclusion was the most prevalent which was shown by 79.4% of the population. Lesser prevalence rates were shown in studies done by

Phaphe et al. [12] and Vibhute et al. [13]. The second most prevalent malocclusion was Angles Class II malocclusion shown by 6.7%. Narayan et al. [6] Sridharan et al. [14] confirmed similar findings. The least prevalent malocclusion was Angles Class III malocclusion shown only by 0.6%. This finding is in accordance to Vibhute et al.[13].

In the present study, 76.7% of the children presented with normal overjet of less than 3mm. increased overjet of greater than 3mm was shown by 22.7% of the children, but studies by Siddegowda and Rani [15] reported lower prevalence rates in Karnataka state. Increased overbite was shown by 31.4% of the total population which is found to be lesser prevalent than Siddegowda and Rani study [15]. Phaphe et al. [12] reported a lower prevalence than that in the present study.

Open bite was reported in only 0.37% in this study. Contradictory results were found in study done by Nainani and Sugandh [16] in Nagpur which showed high prevalence rate of 4%. Crossbite was reported in 7.1% of the children which is in accordance with Nainani and Sugandh [16] study. Higher prevalence of crossbite was shown in study by Phaphe et al.[12]. Anterior cross bite was present in 4.25 % which is similar to studies of Narayan et al. [6] and Muppa et al.[17] Tooth rotation was reported in 5% of the children. Studies done by Nainani and Sugandh[16] showed high prevalence rates. The most commonly rotated teeth were mandibular second premolars.

It will be very useful to take up early preventive as well as interceptive measures for the early correction of the developing malocclusion, thereby preventing future complex and complicated treatment protocols in the permanent dentition [6]. The findings from the current study will be helpful in identifying the most prevalent variables of malocclusion that may be prevented or intercepted at the developing stage itself as the study is focused on the growing individuals – school children.

Clinical significance

Serves as the first step in planning, thereby treatment needs of patients can be taken care of at an early and developing stage itself by taking necessary preventive measures followed by interceptive care.

Helps in creating awareness among people about their dental appearance and malocclusion is posed as a public problem.

Quality of life (QoL) of children can be improved as this acts as strong motivator for orthodontic treatment.

Limitations

As this study was done in a period of 3 months which is a short time duration as well as sample size, long time duration studies with a larger sample size might be needed in near future.

Soft tissue discrepancies were not taken into consideration.

Conclusion

The following conclusions were arrived at from the present study.

Prevalence of malocclusion in school going children aged 12-16 years in Hyderabad city of Telangana state was found to be 86.7%. Class I malocclusion was the most prevalent type which was shown by (79.4%) of the population, followed by class II malocclusion (6.7%), class III malocclusion (0.6%). In Class II malocclusion, division 1 was more prevalent than division 2 which was found to be 5.4% and 1.3% respectively.

Prevalence of malocclusion was found to be more in males. However, this difference was not found to be statistically significant. But when malocclusion with respect to esthetics was concerned, females showed more concern than males.

Prevalence of different variables of malocclusion revealed that deepbite was most prevalent malocclusion followed by increased overjet, crossbite, tooth rotation and open bite.

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