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ASSESSMENT OF ORTHODONTIC TREATMENT NEEDS AMONG CHILDREN IN DOIWALA REGION, UTTARAKHAND, INDIA

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ABSTRACT

Background: Orthodontic treatment needs are increasing day by day as a consequence of changing life style pattern and increased demand for a better personality. As orthodontic treatment is more effective if diagnosed and performed in early stages of life, hence current study attempted to assess orthodontic treatment need amongst school going children.

Materials and Methods: A cross-sectional community based study was conducted in the Doiwala block of Dehradun, Uttarakhand. 587 school going children were randomly selected for the study. Orthodontic treatment need was assessed by using two indices: Aesthetic component (AC), Dental Health Component (DHC) of Index of Orthodontic Treatment Need (IOTN) through dental casts.

Results: Study results show immediate need for orthodontic treatment in 12% cases of children. An increasing pattern of need was observed in increasing age of children. The most prevalent severe occlusal feature was increased overjet (51%).

Conclusion: The need for orthodontic treatment among children of Doiwala region is comparable to other populations. In this region, there is high prevalence of severe occlusal features in older age groups.

Keywords: Orthodontic, children, treatment need, Aesthetic

INTRODUCTION

Good dental appearance makes people confident and people presumed that it is a step towards success [1]. Because of this fact, demand of orthodontic treatment is increasing. Consequently, the importance of performing epidemiological studies in order to obtain knowledge about the need for orthodontic treatment among populations is evidenced [2,3].

People requiring orthodontic treatment means they have malocclusion [4]. The malocclusion can

be defined as an occlusion in which there is a malrelationship between the arches in any of the planes or in which there are anomalies in tooth position beyond the normal limits [5]. The malocclusion effects oral health, increases prevalence of dental caries and can cause temporomandibular joint disorders [6].

Many occlusal indexes have been developed [7]. Among these indices, the Index of Orthodontic Treatment Need (IOTN) consists of two separate components which can be used for assessing dental and functional health - Dental Health

Component (DHC) as well as aesthetic impairment due to malocclusion - Aesthetic Component (AC) ⁸.

However, evaluation of the orthodontic treatment need should consider not only the severity of malocclusion traits, but also age group and dentition period of the children to be treated ⁹. This way, treatment initiated early on during the late mixed dentition or at the beginning of the permanent dentition can avoid further damage to the latter ¹⁰. The present study aimed to evaluate the need for orthodontic treatment in school children who live in Doiwala.

MATERIAL AND METHODS

Materials: A community based study was conducted in randomly selected block of Doiwala of Dehradun district in the state of Uttarakhand. A list of all the junior high school in the block was prepared. 5 schools were randomly selected from the list. All the children in these schools were given equal opportunity for being included as study participants. Children were included in the study after informed consent from their parents.

Total 673 children were included in this study. However, in 86 cases, dental casts could not be prepared, hence present research paper analyses the observations made for only 587 children. Dental casting was done by trained investigators from the institute in January 2009.

Methods: Orthodontic treatment need was assessed on dental casts using the IOTN ⁷. The index incorporates two components: the Aesthetic Component (AC) and the Dental Health Component (DHC). The AC consists of 5 photographs showing different levels of beautiful smile. Grade 1 represents the most and grade 10 the least esthetic arrangements of the anterior teeth. The DHC of the index records the various occlusal features of malocclusion. There are five grades ranging from grade one "No need of treatment" to grade five "Very great need". In this study, the DHC was determined on the dental casts using the so called DHC ruler. Molar occlusion according to the Angle classification recorded separately as this occlusal characteristic is not included in the IOTN. Neutral occlusion (Class I) was registered when the mesio-buccal cusp of the maxillary first permanent molar occluded in the mesio-buccal groove of the mandibular first permanent molar. Distal (Class II) or mesial (Class III) occlusion were recorded when there

was a deviation of at least one half a cusp width distally or mesially at both sides, otherwise it was considered to be Class I. For the primary dentition, the molar relationship was classified as Class I, II or III when the distal plane of the second primary molars in centric occlusion was straight, or showed a distal or mesial step, respectively.

Thorough methodology training for IOTN measurements was done prior to the data collection at HIHT University in January 2009.

RESULTS

This study shows the need of orthodontic treatment from AC and DHC component of IOTN at different levels. [Table 1] shows the age and sexwise distribution of study population.

Table 1: Distribution of children according to age and gender

Age Group	Male (%)	Female (%)	Total (%)
3-5	86 (56.6)	66 (43.4)	152 (25.9)
6-8	86 (50.2)	85 (49.7)	171 (29.1)
9-11	93 (51.7)	87 (48.3)	180 (30.7)
15-16	53 (63.1)	31 (36.9)	84 (14.3)
Total	318 (54.17)	269 (45.83)	587 (100)

From [Table 2], we observed that 87% of study population is having class 1 occlusion and only 10.2% were having class 2 occlusion, 2% were having class 3 occlusion which means that 12% of children require immediate orthodontic treatment. Table 2 also shows that prevalence of class 2 malocclusion increases with age until the late mixed dentition (from 5.3 % up to 18.3%) and then decreased in the permanent dentition (14.3%). But prevalence of class 3 malocclusion also increases with age until late mixed dentition. Percentages of need for orthodontic treatment according to AC of IOTN are presented in [Table 3]. The moderate/borderline need significantly decreases with age. Need for orthodontic treatment (AC Grades 8-10) is low in youngest age groups (6.6%).

According to [Table 4], the percentage of children with need (DHC Grade 4-5) is low in youngest age group. The need for orthodontic treatment increases with age between age group 9-11 yrs and 15-16 yrs. 44.7% of total population do not require orthodontic treatment according to DHC of IOTN.

Table 2: Molar occlusion (Angle) among children in different age groups (n=587)

Classification	3-5 Year (%)	6-8 Year (%)	9-11 Year (%)	15-16 Year (%)	Total (%)
I	141 (92.8)	160 (93.6)	143 (79.4)	71 (84.5)	515 (87.8)
II	8 (5.3)	7 (4.1)	33 (18.3)	12 (14.3)	60 (10.2)
III	3 (2)	4 (2.3)	4 (2.3)	1 (1.2)	12 (2)
Total	152 (25.9)	171 (29.1)	180 (30.7)	84 (14.3)	587 (100)

Table 3: Need for orthodontic treatment according to AC of IOTN (n=587)

Classification	3-5 Year (%)	6-8 Year (%)	9-11 Year (%)	15-16 Year (%)	Total (%)
1-4 (no need)	70 (46.1)	56 (32.7)	82 (45.6)	47 (56)	255 (43.4)
5-7 (Moderate-need)	72 (47.4)	85 (49.7)	73 (40.6)	26 (30.9)	256 (43.6)
8-10 (Great Need)	10 (6.6)	30 (17.5)	25 (13.9)	10 (11.9)	76 (12.9)
Total	152 (25.9)	171 (29.1)	180 (30.7)	84 (14.3)	587 (100)

Table 4: Need for orthodontic treatment according to the DHC of the IOTN (n=587)

Classification (With DHC grades)	3-5 Year (%)	6-8 Year (%)	9-11 Year (%)	15-16 Year (%)	Total (%)
No Need(1)	81 (53.3)	51 (29.8)	44 (24.4)	31 (36.9)	207 (35.3)
Little Need(2)	12 (7.9)	16 (9.4)	24 (13.3)	3 (3.6)	55 (9.4)
Borderline(3)	30 (19.7)	65 (38)	72 (40)	20 (23.8)	187 (31.9)
Need(4)	23 (15.1)	39 (22.8)	32 (17.8)	26 (31)	120 (20.4)
Great Need(5)	6 (3.9)	0	8 (4.4)	4 (4.8)	18 (3.1)
Total	152 (25.9)	171 (29.1)	180 (30.7)	84 (14.3)	587 (100)

Table 5: Need for orthodontic treatment according to DHC subcategory with DHC grades 4-5

DHC Sub category	3-5 Year	6-8 Year	9-11 Year	15-16 Year	Total
Inc. over jet	3 (10.3)	16 (41)	22 (55)	10 (33.3)	51 (37)
Ant/ Post Cross bite	15 (51.7)	10 (25.6)	8 (20)	9 (30)	42 (30.4)
Contact point displacement	0	3 (7.7)	2 (5)	3 (10.0)	8 (5.8)
Open bite	4 (13.8)	3 (7.7)	3 (7)	2 (6.7)	12 (8.7)
Extensive hypodontia with restorative implications	2 (6.9)	2 (5.1)	0	0	4 (2.9)
Impeded eruption	3 (10.3)	5 (12.8)	3 (7.5)	5 (16.7)	16 (11.6)
Reverse over jet with masticatory and speech difficulties	2 (6.9)	0	1 (2.5)	1 (3.3)	4 (2.9)
Partially erupted teeth, tipped, impacted	0	0	1 (2.5)	0	1 (.7)
Total	29	39	40	30	138 (100)

Figure in parenthesis indicate percentage

The percentage of need for orthodontic treatment according to DHC subcategories in children with need of orthodontic treatment (DHC grade 4-5) are presented in [Table 5]. The most prevalent severe occlusal feature placing the children in all age groups in the need category is increased overjet (51%). Anterior/ Posterior cross bite is the next most common in the youngest two age groups with prevalence of about 42% among children in need of treatment. The next most prevalent severe occlusal feature is impeded eruption of teeth (11.6%). Contact point displacement feature is most prevalent in oldest age group (10%).

DISCUSSION

This study clearly shows high prevalence of class 1 occlusion in early, late mixed and permanent dentition which is in agreement with findings reported previously in Tanzanian children¹¹ and children of Davangere city, India¹².

In this study, the need for orthodontic treatment was determined in a sample of Indian children who never had orthodontic treatment. The need for orthodontic treatment according to aesthetic component (grades 5-7) decreases with age probably indicating that the aesthetics improves with development of the dentition. AC grades from 8-10 which means great orthodontic treatment need remains almost stable from age group 6-8 yrs to 15-16 yrs. It reflects the strength of AC of IOTN when developmental changes are taken

into accounts which are occurring during these three age groups. AC grades 8-10 for orthodontic treatment show 11.9% - 13.9% in the two oldest age groups which is similar to the study done in Tanzanian children¹¹ slightly higher compared to Nigerian children (7%)¹³

About 19-35.8% of the children have severe irregular teeth with DHC grades 4-5 increasing significantly between the two oldest age groups. This is comparable to other studies done by using IOTN^{13, 14, 15}

In this study, more children indicate need for according to DHC than the AC of IOTN. If we combine the results of AC grades 8-10 and DHC grades 4-5, it shows that about 3-20% of the children absolutely require orthodontic treatment increasing with age which is within the range of absolute need reported in Tanzanian study¹¹

The main severe occlusal feature which is responsible for allocation of children into the category of need (DHC 4-5) for orthodontic treatment was increased overjet as compared to Tanzanian children where the most severe occlusal feature is cross bite¹¹

Other results show that cross bite is the next common occlusal feature and partially erupted tooth is the least common occlusal feature.

CONCLUSION

The result of the present study shows that need for orthodontic treatment among children of Doiwala region is comparable to other populations. In this region, there is high prevalence of severe occlusal features in older age groups. This study provides baseline data that may be useful for public oral health service to determine priority for orthodontic treatment as part of comprehensive child oral health care in Doiwala region.

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