Pattern and Distribution of Malocclusion using Deweys Modification in New Delhi, India

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Abstract

Aim: To estimate the distribution and pattern of malocclusion, so as to recognize, intercept and to minimize the potential irregularities in the developing dentofacial complex.

Materials and Methods: The sample consisted of 2007 patients (876 males and 1131 females) in the age group of 12-26 years selected from patients reporting to the Department of Orthodontics and Dentofacial Orthopaedics. The total sample was divided into two groups: Group 1- Including subjects in the age group of 12-17 years, Group 2- Including subjects in the age group of 18-26 years. The distribution and pattern of malocclusion in patients was assessed using Deweys modification. Chi-square test was employed for statistical analysis.

Results: Distribution of Angle's Class I malocclusion was 62.18% as compared to Class II malocclusion 34.87% and Class III malocclusion 2.93%. The Angle's Class I type 2 malocclusion was found in 30.9% with a higher percentage of females presenting with this pattern of malocclusion as compared to males. The Angle's Class II Division 1 was found in 28.7%, with a higher percentage of males presenting with this pattern of malocclusion as compared to females.

Conclusion: There was a significant number of female patients reporting with malocclusion in both the groups i.e. adolescents and adults. Distribution of Angle's Class I malocclusion was more as compared to the other types of malocclusion. Class I type 2 malocclusion was found to be maximum followed by Class II Division 1 and then class I type 1. Class I type 2 was more apparent in adults while Class II Division 1 was more apparent in adolescents.

Key Words: Dentofacial characteristics, Deweys modification, Distribution, Malocclusion, Pattern of malocclusion

Introduction

Well aligned teeth not only contribute to the health of the oral cavity and stomatognathic system, but also influence the personality of the individual [1]. A malocclusion compromises the health of oral tissues and also can lead to psychological and social problems [2].

The morphogenetic nature of most malocclusions assures us that this dento-facial problem will continue to demand the best that dentistry can offer for a long time, indeed [3]. Many organized population surveys have been carried out in different parts of the world with the objective of estimating pattern and distribution of malocclusion [4]. A systematic and well–organized dental care program for any target population in a community requires some basic information, such as the pattern of the condition. In more developed parts of the world, where the specialties of Orthodontics have been established, adequate basic information is available. In developing nations, such information is still lacking [5]. With increasing interest in the early detection and treatment of malocclusion and a corresponding emphasis on preventive procedure, it would be beneficial to collect more information about patients [6].

A series of epidemiological studies were performed by Kharbanda et al. in the 1990s reporting the prevalence of malocclusion in Delhi. Since then, no substantial research has reported the status of the concerned geographical area, thus proving a lacuna in the same [7]. As there is a lack of statistical data on malocclusions in this particular geographical area, the present study was conducted on 2007 patients in the city of Delhi, the capital of India, to identify the pattern and distribution of malocclusion. Though there is no single way to classify malocclusion, the most commonly and universally accepted Angle's classification [8] was used, due to its simplicity.

Therefore, the aim of this study was to estimate the distribution and pattern of malocclusion in patients reporting to the Department of Orthodontics and Dentofacial Orthopaedics, so as to recognize, intercept and to minimize the potential irregularities in the developing dento-facial complex.

Materials and Methods

The study was approved by the Institutional ethical committee. The sample consisted of 2007 patients (876 males and 1131 females) in the age group of 12-26 years selected from patients reporting to the Department of Orthodontics and Dentofacial Orthopaedics of our institute. The study was conducted over a period of 6 months. The total sample of 2007 was divided into two groups: Group 1- Including subjects in the age group of 12-17 years, and Group 2- Including subjects in the age group of 18-26 years. None of the subjects had previous orthodontic treatment and all had their first permanent molars. All the students were examined by a single operator after obtaining the informed consent from the subjects and their parents. The subjects were examined using sterile mouth mirror and explorer. All occlusal relationships were evaluated at Maximum Intercuspation. The occlusion was then classified into normal occlusion or malocclusion using the first permanent molars as described by Angle [8]. The cheeks were fully retracted to obtain a direct lateral view of the dentition in occlusion on

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each side. Patients with Class I molar relationship, minimal overbite and overjet, proper alignment, and minimal crowding were classified as normal and excluded from the study.

Further the criteria for selection and grouping of the subjects were as follows:

1. All permanent teeth present in each arch (excluding third molars) and in a sufficient state of eruption.

2. No previous history of orthodontic treatment in either arch.

3. No large coronal restoration that might have altered both coronal shape and size.

The malocclusion in the subjects was classified as under:

Class I: Presence of bilateral Angle's Class I molar relationship divided into Deweys [9] types crowded incisors (Dewey type 1), protruded maxillary incisors (Dewey type 2), anterior cross-bite (Dewey type 3), unilateral or bilateral posterior cross-bite (Dewey type 4,) mesial drift of molars (Dewey type 5).

Class II: Division 1 malocclusion,

Class II: Division 2 malocclusion,

Class III: Malocclusion.

The collected data were tabulated and analysis was performed using SPSS statistical software version 16.

Results

The total number of patients reported was 2007 in the age range of 12-26 years, with the mean age being 17.79 ± 3.71 years. Out of the total patients, 43.6% were males with a mean age of 17.59 ± 3.62 years and 56.4% were females with a mean age of 17.94 ± 3.77 years.

Out of total samples of 1039 in Group 1, 476 (45.8%) were males and 563 (54.2%) were females. Group 2 Comprised of 968 patients out of which 400 (41.3%) were males and 568 (58.7%) were females. There was a significant difference (Chi-Square and P value of 4.12 and 0.04 respectively) between the percentage of male and female patients reporting with malocclusion in both groups.

Table 1 depicts the distribution of patients by type of malocclusion and sex. It was observed that Class I type 2 pattern of malocclusion was predominant (30.9%) as compared to other patterns. Also, the results revealed that a higher percentage of females presented with this pattern of malocclusion as compared to males, and the difference observed was found to be highly significant statistically ($p<0.001$). The prevalence of Class II Division 1 (28.7%) malocclusion was next to Class I type 2, but a higher percentage of males presented with this pattern of malocclusion as compared to females, and the difference observed was found to be statistically non-significant ($p>0.05$). The prevalence of Class I type 1 malocclusion (27.5%) followed the Class I type 2 and Class II Division 1 types. The other types of malocclusion were found in a further lesser percentage as compared to the above mentioned three types.

Table 2 shows the distribution of patients by Type of malocclusion and age. It was observed that in both the Groups the most common malocclusion to be found was class I type 1, Class II type 2 and Class II Division 1. However no significant difference between group 1 and group 2 was observed in Class I type 1 malocclusion. There was a significant difference of $p<0.005$ between Group 1 and Group 2 in both Class I type 2 and class II division 1.

Table 1. *Distribution of patients by type of malocclusion and sex.*

Malocclusion	Sex		Total	Chi-square, P-value
	Male	Female		
Class I type 1	242	310	552	
	27.6%	27.4%	27.5%	
Class I type 2	243	378	621	28.78,
	27.7%	33.4%	30.9%	<0.001
Class I type 3	25	34	59	
	2.9%	3.0%	2.9%	
Class I type 4	8	8	16	
	0.9%	0.7%	0.8%	
Class II division 1	264	313	577	1.46,
	30.1%	27.7%	28.7%	>0.05
Class II division 2	52	71	123	
	5.9%	6.3%	6.1%	
Class III	42	17	59	
	4.8%	1.5%	2.9%	
Total count	876	1131	2007	
% within sex	100%	100%	100%	

Discussion

The evaluation of orthodontic patients with many variables (age, gender and type of malocclusion) may give valuable information for planning orthodontic treatment. Angle's class I malocclusion (62.18%) was more common than Angle's class II malocclusion (34.87%) and Angle's class III malocclusion (2.93%). Class II division 1 was 28.7% while Class II division 2 was 6.1%.

This is similar to the findings of Trehan et al. [10] who reported Angle's class I malocclusion was more common than Angle's class II division 1 malocclusion. This is also similar to the findings of Das et al. [11] who reported higher Class I malocclusion than Class II Division 1 malocclusion. The distribution of Class II Division 2 and Class III malocclusion were low respectively in all the above studies. This is similar to the findings of Kharbanda et al. [7] who reported prevalence of class II Division 2 malocclusion of 5.85% and prevalence of class III malocclusion of 3.17% in his study of distribution

Table 2. *Distribution of patients by types of malocclusion and age.*

Malocclusion	Group 1	Group 2	Total	Chi-square, P-value
	12-17 years	18-26 years		
Class I type 1	276	276	552	0.95,
	26.6%	28.5%	27.5%	>0.05
Class I type 2	292	329	621	8.12,
	28.1%	34.0%	30.9%	<0.005
Class I type 3	34	25	59	
	3.3%	2.6%	2.9%	
Class I type 4	12	4	16	
	1.2%	0.4%	0.8%	
Class II division 1	329	248	577	8.94,
	31.7%	25.6%	28.7%	<0.005
Class II division 2	70	53	123	
	6.7%	5.5%	6.1%	
Class III	26	33	59	
	2.5%	3.4%	2.9%	
Total	1039	968	2007	
	100%	100%	100%	

of malocclusion among North Indians seeking orthodontic treatment.

Out of the total patients, 43.6% were males with a mean age of 17.59 ± 3.62 years and 56.4% were females with a mean age of 17.94 ± 3.77 years. There was a significant number (Chi-Square and P value of 4.12 and 0.04 respectively) of female patients reporting with malocclusion in both groups. However no gender difference was observed in the study conducted by Trehan et al. [10]. The increased number of female subjects reporting with malocclusion can be attributed to the aesthetic concerns as also guided by psycho-social factors.

It was observed that out of all the malocclusion Class I type 2 was found to be maximum i.e. 30.9%. A higher percentage of females reported with this pattern of malocclusion as compared to males with the difference being highly significant ($p<0.001$). The number of Class II Division 1 patients was next highest i.e. 28.7%. Following these was class I type1 malocclusion comprising of 27.5% out of total sample. The other types of malocclusion were found in a lesser percentage. There was a significant difference of $p<0.005$ between Group 1 and Group 2 in both class I type 2 and Class II division 1. In the present investigation Class I type 2 was found more in adults (Group 2) while Class II division 1 was more in adolescents (Group 1).

The treatment needs of a society cannot be known from the data on the pattern/distribution of malocclusion alone. Mere existence of a dental irregularity like a diastema or rotation of a tooth may not warrant orthodontic treatment until there is a concern for it. The concerns for the similar type of dental deformity may be least for one individual while it may cause anxiety in another. The same dental malocclusion may be of no significance in an individual at a given age but may be of great concern at a different point of time/age. To prioritize malocclusion for the treatment point of view, many indices have been developed, of which IOTN is the widely used. The IOTN may not provide a true picture of orthodontic needs for a country like India for its limitation in recording bimaxillary protrusion [12,13].The existing proforma could have been more elaborative if it included detailed indices such as IOTN, and thus would have increased the scope of the present study.

Conclusion

From this study, the following conclusions have been drawn:

1. Distribution of Angle's Class I malocclusion was more as compared to the other types of malocclusion i.e. Class I malocclusion (62.18 %), Angle's class II malocclusion (34.87%) and Angle's Class III malocclusion (2.93%).

2. There was a significant number of female patients reporting with malocclusion in both the groups i.e. adolescents and adults.

3. It was observed that out of all the malocclusion Class I type 2 was found to be maximum followed by Class II Division 1 and then class I type1.

4. Class I type 2 was more apparent in adults while Class II division 1 was more apparent in adolescents.

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