ORIGINAL RESEARCH

Prevalence of Malocclusion and Orthodontic Treatment Needs among 12 - 13 Year Old School Going Children in Chennai City, Tamilnadu, India

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ABSTRACT

Background: Considerable importance is placed on dental aesthetics and pleasant dental appearance is perceived as an important factor for physical well-being for both parents and their children. Malocclusion has a large impact on an individual in particular and society at large in term of discomfort, quality of life, social and functional limitations. **Objective:** To assess the prevalence of malocclusion and orthodontic treatment needs among 12 - 13 year old school going children in Chennai city, TamilNadu, using Dental Aesthetic Index (DAI). **Method:** A descriptive cross-sectional study was conducted among 1800, 12 - 13 year old school going children in Chennai city, using Dental Aesthetic Index to assess the prevalence and severity of malocclusion after prior permission from the concerned authorities. Chennai city was divided into 3 zones based on its parliamentary constituency - North Chennai, Central Chennai, and South Chennai. Schools were selected using lottery method in each zone. All the children who were present on the day of examination were examined. A specially designed proforma was used for data collection which consisted of a pre-tested questionnaire and Dental Aesthetic Index components. The collected data was subjected to statistical analysis. **Results:** Among the 1,800 children examined, 906 (50.5%) were males, and 894 (49.5%) were females. 86.9% of the children felt that they had nice looking teeth while 8.4% felt that they needed orthodontic treatment. 78.9% (1421) children had a DAI score of ≤ 25 representing no or minor malocclusion requiring no or little treatment, 15.8% (285) had DAI scores of 26-30 indicating definite malocclusion requiring elective treatment, 4.7% (85) had DAI scores of 31-35 representing severe malocclusion requiring highly desirable treatment and 0.6% (9) had DAI scores ≥ 36 indicating handicapping malocclusion requiring mandatory treatment. **Conclusion:** While 78.9 % children required no or little treatment, 21.1% had definite malocclusion requiring definite orthodontic treatment. Prevalence of malocclusion was significantly more in males when compared to females. Children residing in South Chennai zone had less malocclusion when compared to other two zones.

KEYWORDS: Malocclusion, Dental Aesthetic Index, Orthodontic Treatment Needs

INTRODUCTION

Phillip Diller has stated "A Smile is a curve that sets everything straight". A pleasant smile is essential not only for aesthetic reasons but also in improving the quality of life of a person in a variety of spheres.

It has long been observed that those persons, who have perceived themselves as aesthetically appealing, brim with confidence. It is a well documented fact that, considerable importance is placed on dental aesthetics, and that, both parents and their children feel that a dental appearance is an important factor for physical well being. Children with crowded dentitions are not only considered less attractive, but also are perceived to be less intelligent, whereas children with well-aligned teeth are thought to be friendlier, of a higher social class, more popular and more intelligent.[1]

Brook and Shaw [2] stated that the assessment of a patient's treatment needs must include aesthetic impairment and by inference, the psychological need for orthodontic treatment. Sticker et al [3] have concluded that the psychological consequences of malocclusion due to

How to cite this article:
Sushanth VH, Krishna M, Suresh Babu AM, Prashant GM, Madan Kumar PD, Shivakumar M. Prevalence of Malocclusion and Orthodontic Treatment Needs among 12 - 13 Year Old School Going Children in Chennai City, Tamilnadu, India. Int J Oral Health Med Res 2015;2(2):32-38.

unacceptable aesthetics may be as serious, or even more serious than the biological problem. Thus malocclusion has a large impact on an individual in particular and society at large in term of discomfort, quality of life, social and functional limitations.

Commonly recognized causes of malocclusion are heredity, environmental factors like maternal diet, oral habits, nutritional deficiencies, temporomandibular joint injuries, abnormal pressure habits, birth injury, developmental defects and accidents which are grouped under general factors.[4] A literature search reveals the prevalence of malocclusion in India varies between 19.6% to 55.3%. The World Health Organization, in an attempt to establish a universally acceptable index, has recommended Dental Aesthetic Index (DAI) as an effective tool which can be used in epidemiological surveys to assess unmet orthodontic treatment need and also as a screening tool for orthodontic care.[5]

However, data regarding prevalence of malocclusion using Dental Aesthetic Index among school children in India is inadequate. Hence, the present study was undertaken to assess the prevalence of malocclusion among 12 - 13 year old school going children in Chennai city, TamilNadu. The above data can be used as baseline information for planning oral health care programs focused on prevention and treatment of malocclusion.

Objective: To assess the prevalence of malocclusion and evaluate orthodontic treatment needs among 12 - 13 year old school going children in Chennai city, TamilNadu.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted to assess the prevalence of malocclusion and orthodontic treatment needs among 12 - 13 year old school going children in Chennai city. The study was conducted during November 2007 to August 2008.

Sampling: Chennai city is divided into 3 zones based on its parliamentary constituencies - North Chennai, Central Chennai, and South Chennai. Chennai city has around 480 high schools catering to the growing needs of around 3 lakh children. The study samples for the present study were selected using lottery method based on location and type of the schools. The final sample size was determined to be 1800 (600 from each zone, with equal representation from private and government schools)

Ethical Clearance: Ethical clearance to conduct the study was obtained from the Institution Review Board of Ragas Dental College and Hospital. Further, permission was also obtained from the Department of Education, Chennai city and also from the Head of the institutions where the study was carried out.

Inclusion and Exclusion Criteria: School going children of 12-13 years of age in Chennai city with permanent dentition and who were present on the day of examination were included in the study. Children with mixed dentition and who were undergoing and had undergone orthodontic treatment including preventive and interceptive orthodontic measures were excluded from the study.

Pilot Study: A pilot study was carried out in school premises on 100 students to determine the feasibility of the study. The data obtained from the pilot study was not included in the main study.

Data Collection: Data collection was carried out using a survey proforma, which consisted of two parts. The first part contained the demographic information i.e., name, age, sex and the pre-tested, closed-ended questionnaire which consisted perceptions regarding individuals' appearance and aesthetic concerns. The second part of the proforma consisted of components of Dental Aesthetic Index score.

Examination Procedure: Before the actual field examinations, the investigator was calibrated by applying the DAI on 30 patients with known malocclusion in the Department of Orthodontics, Ragas Dental College and Hospital.

The field examinations were carried out by a single examiner and recordings were done with the help of an assistant scribe. At the end of each day of the examination, 10% of the study subjects were re-examined to assess the intra-examiner reproducibility and it was found to be adequate (Kappa value = 0.86). After a brief description about the purpose of the study, the investigator personally administered the questionnaire to study participants and provided appropriate guidelines to answer them.

Assessment of malocclusion was done using Dental Aesthetic Index (DAI) [6] (Annexure-4) as described by World Health Organization, Basic Oral Health Survey Methods (1997) using a Community Periodontal Index (CPI) probe and plane mouth mirror. For scoring the DAI, the Community Periodontal Index (CPI) probe was modified by adding a rubber stopper at the working end for measurement in millimeters. The clinical examination was carried out under the adequate natural light in school premises. Type-III clinical examination as recommended by American Dental Association (ADA) was followed.

Sterilization: Sufficient numbers of instruments were carried to the examination site to avoid interruptions during the study. Cold sterilization method was followed using Korsolex ® chemical solution

Oral Health Education and Feedback Referral: Immediately after the survey, an oral health education program was conducted in the local language (Tamil) by the principal examiner to all the children using audio-visual aids. The findings of the survey were reported immediately to the respective school authorities and those school children requiring treatment were also referred as and when required, to Dept of Orthodontics, Ragas Dental College and Hospital, Chennai.

Statistical Analysis: The data recorded was computed in Microsoft ® Excel (2003) for the purpose of the data analysis. SPSS version 13 was used for statistical

analysis. Along with the measures of central tendency, the prevalence of malocclusion was calculated using the standard DAI regression equation.

The Chi-square test (χ^2) was used for comparisons of mean DAI scores between sex, zones and category of school. A probability value of 0.05 or less was considered for statistical significance.

RESULTS

Table I shows the distribution of the study subjects according to zones, gender and school category.

Response when asked regarding their appearance among 1800 study participants, 1565 (86.9%) felt that they had nice looking teeth. Among these 810 (51.7%) were females while the rest were males [755 (48.3%)] 8.4% (152) study participants felt that they needed orthodontic treatment. Among them, 65 (4.3%) were females and 87 (5.7%) were male participants. Regarding the benefits of orthodontic treatment, 323 (18.2%) children believed that orthodontic treatment could improve their smile, 283 (15.7%) subjects believed that it will improve the chewing or mastication, while 68 (3.8%) children were of the view that phonation will improve. Majority of the students 1126 (62.3%) were not aware of the benefits of orthodontic treatment.

	Government Aided School Children		**Private Aided School Children**		**Total**
	Males	Females	Males	Females	
Z 1 (North Chennai)	141 (31.7%)	159 (35.7%)	140 (30.9%)	160 (35.8%)	600
Z 2 (Central Chennai)	162 (35.6%)	138 (30.9%)	157 (34.8%)	143 (31.9%)	600
Z 3 (South Chennai)	151 (33.2%)	149 (33.4%)	155 (33.3%)	145 (32.3%)	600
Total	454 (100%)	446 (100%)	452 (100%)	448 (100%)	1800

Table I: Zone, School and Sex wise distribution of study population

Table II shows the response when asked regarding their appearance. Among 1800 study participants, 1565 (86.9%) felt that they had nice looking teeth. Among these 810 (51.7%) were females while the rest were males [755 (48.3%)].

Do You Have Nice Looking Teeth	Males	Females	Total
	Number Of Children (%)	Number Of Children (%)	Number Of Children (%)
Yes	755 (48.3%)	810 (51.7%)	1565 (86.9%)
No	151 (64.3%)	84 (35.7%)	235 (13.1%)

Table II: Response of study population based on their perception regarding their appearance.

Table III shows the response when asked regarding the felt need of orthodontic treatment. 8.4% (152) of study participants felt that they needed orthodontic treatment. Among them 65 (4.3%) were females and 87 (5.7%) were male participants.

Do You Feel You Need To Undergo Orthodontic Treatment	Males	Females	Total
	Number Of Children (%)	Number Of Children (%)	Number Of Children (%)
Yes	87 (5.7%)	65 (4.3%)	152 (8.4%)
No	819 (90.3%)	829 (92.7%)	1648 (91.6%)

Table III: Response of study population based on need to undergo orthodontic treatment.

Table IV shows the response when asked regarding the benefits of orthodontic treatment, 323 (18.2%) children believed that orthodontic treatment could improve their smile, 283 (15.7%) subjects believed that it will improve the chewing or mastication, while 68 (3.8%) children were of the view that phonation will improve. Majority of the students 1126 (62.3%) were not aware of the benefits of orthodontic treatment.

Benefits Of Orthodontic Treatment	Males	Females	Total
	Number Of Children(%)	Number Of Children(%)	Number Of Children(%)
Improve Smile	143(44.3%)	180(55.7%)	323(18.2%)
Chewing	133(47%)	150(53%)	283(15.7%)
Phonation	38(55.8%)	30(44.2%)	68(3.8%)
Don't Know	526(46.7%)	600(53.3%)	1126(62.3%)

Table IV: Response of study population regarding the benefits of orthodontic treatment

Table V represents the frequency distribution of malocclusion traits according to DAI components. There was a statistically significant difference between males and females with respect to all the traits.

Sl. No	**DAI components**		**Males**	**Females**	**Total**	**χ^2 val.**	**p val.**
1.	Missing anterior teeth	0	758(83.7)	850(95.1)	1608(89.3)	65.085	0.00 (S)
		>1	148(16.3)	44(4.9)	192(10.7)		
2.	Incisal segment crowding	0	484(53.4)	619(69.2)	1103(61.3)	53.472	0.00 (S)
		1-2	422(46.6)	275(30.8)	697(38.7)		
3.	Incisal segment spacing	0	714(78.8)	804(89.9)	1518(84.3)	42.442	0.00 (S)
		1-2	192(21.2)	90(10.1)	282(15.7)		
4.	Midline diastema (mm)	0	727(80.2)	797(89.1)	1524(84.7)	38.765	0.00 (S)
		≥1	179(19.7)	97(10.8)	276(15.3)		
5.	Max. ant. irregularity (mm)	0	616(68.0)	770(86.1)	1386(77.0)	103.79	0.00 (S)
		≥1	290(31.9)	124(13.9)	414(23.0)		
6.	Mand. ant. irregularity (mm)	0	699(77.2)	776(86.8)	1475(81.9)	29.257	0.00 (S)
		≥1	207(22.8)	118(13.2)	325(18.1)		
7.	Maxillary overjet (mm)	0-2	810(89.4)	862(96.4)	1672(93.0)	91.071	0.00 (S)
		≥ 3	96(10.6)	32(3.6)	128(7.1)		
8.	Mand. overjet (mm)	0	900(99.3)	892(99.0)	1782(99.6)	2.622	0.00 (S)
		≥1	6(0.7)	2(1.0)	8(0.4)		
9.	Anterior open bite (mm)	0	879(97.0)	878(98.2)	1757(97.6)	4.583	0.00 (S)
		≥1	27(3.0)	16(1.8)	43(2.4)		
10.	Ant.post. molar rel. (mm)	Normal	765(84.0)	857(95.9)	1622(90.1)	66.119	0.00 (S)
		½ cusp	76(8.4)	18(2.0)	94(5.2%)		
		Full cusp	65(7.2)	19(2.1)	84(4.7)		

Table V: Frequency distribution of malocclusion traits according to DAI components

Table VI depicts that out of 1,800 school going children examined, 1421 (78.9%) had ≤ 25 DAI scores with no abnormality or little malocclusion requiring no or slight orthodontic treatment, 285 (15.8%) had 26 – 30 DAI scores with definite malocclusion requiring elective orthodontic treatment, 85(4.7%) had 31 – 35 DAI scores with severe type of malocclusion requiring highly desirable orthodontic treatment, 9 (0.6%) had ≥ 36 DAI scores with very severe or handicapping malocclusion requiring mandatory type orthodontic treatment.

Number Of Children (%)	Dai Score	Severity Of Malocclusion	Treatment Need
1421 (78.9%)	≤ 25	No Abnormality Or Minor Malocclusion	No Or Slight Need
285 (15.8%)	26-30	Definite Malocclusion	Elective
85 (4.7%)	31-35	Severe Malocclusion	Highly Desirable
9 (0.6%)	≥ 36	Very Severe Or Handicapping	Mandatory

Table VI: Prevalence of malocclusion and orthodontic treatment needs of study population

Table VII depicts school wise distribution of DAI scores among the study population. Among 900 government school children 661 (73.4%) had no abnormality or minor malocclusion, 181 (20.1%) had definite malocclusion, 65 (7.1%) had severe malocclusion and 7 (0.8%) had very severe or handicapping malocclusion. In contrast to the 900 private school children, 760 (84.4%) children had no abnormality or minor malocclusion, 104 (11.6%) had definite malocclusion, 34 (3.8%) had severe malocclusion and 2(0.2%) had very severe malocclusion or handicapping malocclusion. The difference in the frequency of malocclusion based on school wise was statistically significant [$\chi^2 = 47.237$, p=0.00 S].

Dai Score	**Government School**	**Private School**
	Number Of Children (%)	Number Of Children (%)
No Abnormality	661 (73.4%)	760 (84.4%)
Definite Malocclusion	181 (20.1%)	104 (11.6%)
Severe Malocclusion	51 (5.7%)	34 (3.8%)
Very Severe / Handicapping	7 (0.8%)	2 (0.2%)

Table VII: School wise distribution of Dental Aesthetic Index Score among study population
χ2= 47.237, p=0.00, S* , df = 3

DISCUSSION

The DAI is a WHO approved orthodontic index used on socially defined aesthetic norms. DAI is a regression equation that links mathematically the subjects perceptions of dental aesthetics with the objective physical measurements of the occlusal traits associated with malocclusion.

Missing anterior teeth: 10.7 % of the study population had one or more missing anterior teeth either in maxilla or mandible with males 16.3% predominating the females 5.0%. A score of 6.9% was observed by Esa R, Razak IA and Allister JH (2001)[7]. 13.9% of Rao DB, Hegde AM, Munshi AK (2003)[5] study population had one or more missing teeth. In contrast Johnson M and Harkness M (2000)[8] observed a high of 20.4% total missing anterior teeth.

Incisal segment crowding: 38.7 % of children had incisal segment crowding, 27.5 % children had crowding in one segment and 11.2 % crowding in two segments. Similar findings were reported by Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9] and Rao DB, Hegde AM and Munshi AK (2003).[5] However the results of Johnson M and Harkness M (2000) [8] [80.2%], Chi J, Johnson M, and Harkness M (2000) [10][82.2%]. Esa R, Razak IA and Allister JH (2001) [11] [50.3%], Garcia AB, Bravo M, Baca P, Baca A and Junco P (2004) [12] [76.3%], Suresh Babu AM, Chandu GN and Md.Shafiulla (2005)[13] [60.2%], were higher when compared to present study results. This difference could be due to the abnormal tooth positions, racial, genetic composition of the study groups.

Incisal segment spacing: 15.7% children had incisal segment spacing either in one or both the arches, 13.7% had spacing in one segment and 2.0% had presented with two segment spacing. Similar findings of 13.8% were observed by Onyeaso CO (2003) [14], Garcia AB, Bravo M, Baca P, Baca A and Junco P (2004) [12] [13.3%]. However 22.2% incisal segment spacing was reported by Esa R, Razak IA and Allister JH (2001).[11]

Higher spacing in incisal segment was observed by Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9] [44.2%] Johnson M and Harkness M (2000)[8] [59.5%], Chi J, Johnson M and Harkness M (2000) [10] [45.0%]. This difference may be attributed due to missing or undersized lateral incisors, para functional habits such as thumb sucking habits, mouth breathing and tongue thrusting, rotated incisors, anodontia, macroglossia, dento-alveolar discrepancies and true tooth size and jaw size discrepancies.

Midline diastema: Of the 1,800 school going children examined, 15.3 % had midline diastema (≥ 1mm), a finding similar to the one observed by Suresh Babu AM, Chandu GN, Md.Shafiulla (2005) [13] [16.8%]. However Esa R, Razak IA and Allister JH (2001) [11], Garcia AB, Bravo M, Baca P, Baca A and Junco P (2004) [12] observed a low of 9.8% and 9.2% respectively. In their study, Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999) [9] observed 24.9% midline diastema. Chi J, Johnson M and Harkness M (2000) [10] observed a high occurrence of 42.5% and 45.9% midline diastema respectively.

Largest anterior maxillary irregularity:23.0% of the study subjects had ≥ 1 mm of maxillary anterior irregularity. Similar values of 31.2% and 33.6% were observed by Esa R, Razak IA and Allister JH (2001)[11] and Rao DB, Hegde AM and Munshi AK (2003)[5] respectively. In contrast, lesser occurrence of largest

anterior maxillary irregularity was observed by Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9] [12.1%]. Whereas higher occurrence was observed by Suresh Babu AM, Chandu GN, Md.Shafiulla (2005) [13] [55%], Johnson M and Harkness M (2000)[8] [75.6%], This difference could be attributed due to genetic difference and environmental factors of the sampled population.

Largest anterior mandibular irregularity: In the present study, 18.1% had ≥ 1 mm anterior mandibular irregularity, similar to studies by Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9] [29.2%] and Rao DB, Hegde AM and Munshi AK (2003)[5] [35.5%].

However higher values of largest anterior mandibular irregularity were observed by Suresh Babu AM, Chandu GN, Md.Shafiulla (2005)[13] [60%], Chi J, Johnson M and Harkness M (2000)[10] [84.3%] and Onyeaso CO (2004)[14] [68.7%] This difference could also be due to the racial, genetic composition of the study groups, variation in development and maturation of the arches, dento-alveolar discrepancies of the jaws and deleterious oral habits like mouth breathing, tongue thrusting etc.

Anterior maxillary overjet: It was observed that 2.2% of school going children in Chennai city presented with 0 mm (edge to edge) and 97.8% presented with an overjet ≥ 4 mm, a finding higher compared to that of Johnson M and Harkness M (2000)[8] [61.3%], Esa R, Razak IA and Allister JH (2001)[11] [54.4%] and Garcia AB, Bravo M, Baca P, Baca A and Junco P (2004)[12][41.5%].

Anterior mandibular overjet: Mandibular overjet ranged from 1 – 2 mm in the present study. 0.4 % study population showed ≥ 1 mm mandibular overjet. However in a study by Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9] a high of 29.2% anterior mandibular overjet was observed. Though higher than the present study similar results were observed in the studies conducted by Esa R , Razak IA and Allister JH (2001)[11] [3.1%] and Onyeaso CO (2004)[14] [4.5%],

Vertical anterior openbite: In this study, 2.4% of children presented with vertical anterior openbite ranging from 1 – 3 mm. Similar findings were observed by Johnson M and Harkness M (2000)[8] [4.2%], Chi J, Johnson M and Harkness M (2000)[10] [4.6%], and Garcia AB, Bravo M, Baca P, Baca A and Junco P (2004)[12] [3.6%], however Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9] observed a high occurrence of 10.2%. Higher vertical anterior openbite differences could be due to variation in development and maturation of the arches and the children may have different deleterious oral habits like mouth breathing, tongue thrusting, and dento-alveolar discrepancies of the jaws.

Antero-posterior molar relationship: 90.1% of the school going children in Chennai city had normal antero-posterior molar relationship Class-I and 9.9% were presented with antero-posterior molar discrepancies. Among the children with malocclusion, 5.2% had half cusp deviation and 4.7% had full cusp deviation. This finding was less when compared to the studies by Onyeaso CO (2004)[14] [18.3%] and Suresh Babu A M, Chandu GN, Md.Shafiulla (2005)[13] [22.9%].

DAI score distribution: In the present study, 78.9% of school going children in Chennai city had ≤ 25 DAI score, which indicated no abnormality or minor malocclusion requiring no or slight orthodontic treatment need. This finding was similar to the studies of 70.9% Khanehmasjedi M, Bassir L, Haghighizadeh M (2007)[15], Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9] [77.4%], 70.1% by Danael SM, Amirrad A, Salehi P (2007)[16], 77% by Marques CR, Couto GB, Cardoso SO (2007)[17]. However lesser occurrence were observed by Esa R, Razak IA and Allister JH (2001)[11] [62.4%], 51.2% by Abdullah MSB and Rock WP (2001) [18], 59.6% by Onyeaso CO (2003) [14], 59.5% by Onyeaso CO and Sanu OO (2005) [19] , 59 and 47% by Hlongwa P, Plessis JB (2005).[20]

15.8% of school going children in Chennai city had definite malocclusion represented by a DAI score 26 - 30 requiring, elective orthodontic treatment. Similar findings were observed by Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9] [13.4%]. 13.3% prevalence of definitive malocclusion was reported in National Oral Health Survey and Fluoride Mapping-India (2004).[21] Similar findings of 17%, 19.6% and 17.1% were reported by Otuyemi OD and Noar JH (1996) [22], Onyeaso CO and Aderinokun GA (2003) [23] respectively. Onyeaso CO (2003)[14] also observed the occurrence of definite malocclusion among 17.1% of his study population similar to Onyeaso CO and Sanu OO (2005)[19] [18%], Khanehmasjedi M, Bassir L, Haghighizadeh M (2007) [15] [19.2%]. Further higher occurrence of definite malocclusion was reported by Johnson M and Harkness M (2000)[8] [21.4%], Hlongwa P, Plessis JB (2005)[20] [20%] whereas a less of 11.2% was observed by Garcia AB, Bravo M, Onyeaso CO (2004).[12]

4.7% of the study population had 31 – 35 DAI score which represents severe malocclusion requiring highly desirable orthodontic treatment. Similar findings were reported (5.5%) by Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9], 4.1% was reported in National Oral Health Survey and Fluoride Mapping-India (2004)[21], 4.2% by Danael SM, Amirrad A, Salehi P (2007).[16] Much higher occurrence was observed by Otuyemi OD and Noar JH (1996) [22] [18.9%], Johnson M and Harkness M (2000)[8] [22.8%] and Chi J, Johnson M and Harkness M (2000)[10] [21.5%]. Abdullah MSB and Rock WP (2001)[18] reported 14.2%, Onyeaso CO and Aderinokun GA (2003)[23] [12.9%], Onyeaso CO and Sanu OO (2005)[19] [9.3%], Suresh Babu AM, Chandu GN and Md.Shafiulla (2005)[13] [10.7%]. These findings were higher to the results of the present study and lower when compared to the observations of Otuyemi OD and Noar JH (2000) [22] [16.3%], Johnson M and Harkness M (2000)[8] [14.4%] and Hlongwa P, Plessis JB (2005)[20] [13%]. The reason for this difference in DAI scores could be due to inherited difference in tooth size and arch size,

since DAI includes measurements of the most relevant orthodontic traits such as crowding that affects the dental aesthetics.

About 0.6% had ≥ 36 DAI score representing very severe/handicapping malocclusion requiring mandatory orthodontic treatment. Handicapping malocclusion was reported by Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC and Jenny J (1999)[9] [3.7%], Suresh Babu A M, Chandu GN and Md.Shafiulla (2005)[13] [3.7%]. Similar to these 2.1% and 2.9% was reported by Khanehmasjedi M, Bassir L, Haghighizadeh M (2007)[15], National Oral Health Survey and Fluoride Mapping-India (2004)[21] respectively. Higher occurrence was observed by Esa R, Razak IA and Allister JH (2001)[11] [7.2%], Onyeaso CO (2003)[14] [9.9%], Onyeaso CO and Sanu OO (2005)[19] [13.3%] and Hlongwa P and Plessis JB (2005)[20] [14%]. In contrast to this a much higher occurrence was observed by Otuyemi OD and Noar JH (1996)[22] [49%], Johnson M and Harkness M (2000)[8] [40%], Chi J, Johnson M and Harkness M (2000)[10] [30%].

The subjective perception of orthodontic need of study population was assessed through a pre-tested questionnaire. These findings were compared with the objective assessment by Dental Aesthetic Index scores.

Among the 1800 participants, 1565 (86.9%) children felt that they had nice looking teeth [males 755 (48.3%) and 810 (51.7%) females].

Although 64.3% males and 35.7% females felt that they don't have nice looking teeth, only 31.1% males and 11% females presented with malocclusion. Onyeaso CO (2003)[14], reported a significant association between Dental Aesthetic Index score and orthodontic concern, self-esteem among the secondary school children in Nigeria.

Although 152 (8.4%) [87 (5.7%) males and 65 (4.3%) female] school going children felt that they were in need of orthodontic treatment due their appearance, only 11% females and 31.4% males were found to be in need of orthodontic treatment. Onyeaso CO, Sanu OO (2005)[19] reported a significant association between orthodontic treatment need and their appearance. This difference in objective orthodontic needs versus the individual's subjective need arises due to various psychosocial factors such as peer group pressure, social desirability and acceptance.

CONCLUSION

Malocclusion is not a single entity but rather a collation of situations, each in itself constituting a problem and any of the situations are complicated by a multiplicity of genetic and environmental causes.

The Dental Aesthetic Index (DAI) provides a single score linking the public's perceptions for dental aesthetic along with objective measurements associated with malocclusion. It is relatively simple, reproducible and a valid index. The index requires minimum time for examination. It can be used as a practical tool for epidemiologists and other dental personnel for screening orthodontic treatment need and also to assess the prevalence of malocclusion categories.

In this current study, a total of 1800 school going children age 12 to 13 years of Chennai city were examined to assess the prevalence of malocclusion using Dental Aesthetic Index. From the results of this study, it is concluded that 1,421 (78.9%) of school going children had little or no malocclusion requiring no or little orthodontic treatment need. 379 (21.1%) of school going children had definite malocclusion requiring definite orthodontic treatment.

This baseline data is essential for planning dental public health programs and /or preventive orthodontic treatment programs. Further studies are encouraged to provide a more comprehensive understanding of the relationship between social factors and malocclusion.

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Source of Support: Nil
Conflict of Interest: Nil