

Dental Aesthetic Index of school students in Telangana region - An epidemiological study

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ABSTRACT

Background: Malocclusion should be identified at its earliest before it produces any detrimental effects. The objective of this study is to evaluate the orthodontic status and treatment need of school children in Telangana region, Andhra Pradesh, using Dental Aesthetic Index.

Materials & Methods: One thousand children in the age group of 12 - 14 years who fulfilled the inclusion and exclusion criteria were considered. The demographic details of the students along with the information on the orthodontic status were collected using a predesigned questionnaire by a single orthodontist. The information on orthodontic status was obtained using Dentofacial Anomalies with the criteria of Dental Aesthetic Index (W H O Oral Health Assessment form 1997).

Results: Results were subjected to ANOVA, Tukeys test and chi square test using SPSS, version 16. 86.1% of the subjects had DAI score of less than 25, suggesting 'no treatment'; 10% had DAI score of 26-30, suggesting 'elective treatment'; 3% had DAI score of 31-35, suggesting 'highly desirable treatment'; 0.9% had DAI score of >36, indicating 'mandatory treatment'; Higher prevalence of malocclusion among females than males.

Conclusion: It is necessary to identify this abnormality at its earliest before it produces detrimental effects. It is also essential to know the prevalence of malocclusion in any society, as it reveals the true extent of the problem and guides in overcoming it. The general public can, then, be educated on widespread occurrence of malocclusion and its deleterious effects, so that appropriate preventive and corrective measures can be instituted.

Key Words: Dental Aesthetic Index, malocclusion, orthodontic treatment.

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Introduction

Oral health is an essential component and is associated with the development of a healthy personality, perceptions and the overall experiences of pleasure. In modern countries, attention is given to the development of dentofacial disorders and treatment of malocclusions.¹ Treatment usually takes place during

the adolescent years when the patient's motivation and co-operation are at their peak.

According to Dr. G. Dale,² if deciduous teeth are retained beyond time of exfoliation, they are known to cause delay in eruption of permanent teeth and thus lead to malocclusion and other orthodontic problems

which will then need expensive corrective measures. The evaluation of different types of malocclusions existing within a population is important in order to plan orthodontic treatment and determine the resources required for the service.³

Measuring and recording the severity and prevalence of malocclusion is not only important for evaluating the occlusal status of subjects in a community and establishing the treatment priority, but it can be used as an epidemiological tool for preventive procedures or for training orthodontic specialty.⁴ DAI (Dental Aesthetic Index) is one of the most effective methods which is recommended by the WHO, Oral Health Surveys-basic methods.⁵

It is essential to know the prevalence of malocclusion in any society, as it reveals the true extent of the problem and the general public can be educated, so that appropriate preventive and corrective measures can be instituted. For us, the orthodontists, prevalence studies help in establishing proper preventive and treatment need in a given region.

Several investigators have published data on the relative frequency of various types of malocclusion, generally classified according to Angle's original criteria. These usually have been based on small or selected samples from which generalization results to the population at large was not possible.

The objective of the study was to evaluate the prevalence and orthodontic treatment needs in a sample of 12-14 year old school children of Telangana region in Andhra Pradesh.

Materials and Methods

Selection of study participants

The study was conducted on a sample of 1000 school children, in the age group of 12 – 14 years, who fulfilled the inclusion and exclusion criteria were considered for examination. Multiphase random sampling technique was used. The Telangana region schools were selected randomly from both rural and urban areas, among which the students were further selected randomly from different selected age group.

Ethical clearance and consent for study: The consent for examination of school children was obtained from the respective heads of the selected schools after they

were fully informed about the purpose and the method of examination.

The exclusion criteria employed in the study were:

- Gross facial asymmetry
- Variable path of closure of mandible
- Developmental deformities
- History of orthodontic treatment
- Abnormalities in tooth size shape and number

Collection of data

The information on the orthodontic status were collected using a predesigned questionnaire by a single examiner. The information on orthodontic status was obtained using Dentofacial Anomalies with the criteria of Dental Aesthetic Index (W H O Oral Health Assessment form 1997).

The descriptions of the various components in the index are as under

1) *Missing incisor, canine and premolar teeth:*

The number of missing permanent incisor, canine and premolar teeth in the upper and lower arches were counted. There should be 10 teeth present in each arch. If there are less than 10, the difference is the number missing. The number of missing teeth in the upper and lower arches should be recorded in boxes of the assessment form. Teeth should not be recorded as missing if spaces are closed, if a primary tooth is still in position and its successor has not yet erupted, or if a missing incisor, canine or premolar tooth has been replaced by a fixed prosthesis.

2) *Crowding in the incisal segments:*

Crowding in the incisal segments is recorded as follows:

- 0 – No crowding
- 1 – One segment crowded
- 2 – Two segments crowded

If there is any doubt, the lower score should be assigned.

Results

The study consisted of 1000 school children, 537 male and 463 female belonging to 12-14 years age group. The numbers of males were more compared to females. The total number of children in 12 year age group was

more than other age groups. The difference in the sex and age distribution of the population was statistically significant ($P < 0.005$).

The results revealed a higher prevalence of definite, severe and very severe malocclusion among females than males. The difference was statistically significant ($P < 0.001$).

The mean DAI score was more among females compared to males, the finding was statistically significant ($P = 0.001$) (Table 1)

The percentage of population having DAI score of 26-30, 31-35, and 36 or more increased with increasing age. The finding was statistically significant ($P < 0.001$).

The mean DAI score increased with increasing age group suggesting the increase in prevalence and severity of malocclusion with increasing age.

About 10% had one or more missing anterior teeth. The percentage of population having missing teeth was more in 13 years (45%) and 14 years (42%) group than compared to 12 years group and the finding was statistically significant. ($P < 0.001$)

60% of the females and 40% males had one or more missing teeth. The difference was statistically significant. ($P < 0.005$)

52.3% of the females and 47.7% males had some evidence of crowding in either the maxillary or the mandibular arch or both. The difference was statistically significant. ($P < 0.001$) (Table 2)

The prevalence of crowding in the incisal segments decreased with increasing age and the finding was statistically significant ($P = 0.000$) (Table 3)

The mean score for anterior maxillary irregularity was more among females (0.27 ± 0.86) than males (0.16 ± 0.65). The difference was statistically significant ($P = 0.004$)

There was no significant difference in the distribution of anterior mean maxillary irregularity score between different age groups ($P > 0.05$).

The mean score for anterior mandibular irregularity was more among females (1.14 ± 1.44) than males (0.79 ± 1.30). The difference was statistically significant ($P < 0.001$) The anterior mean mandibular irregularity was more in 14 years group than compared to other two groups and the findings were statistically significant ($P = 0.001$)

The difference in the percentage distribution of spacing in the incisal segments between males (44.1%) and females (55.9%) was statistically significant. ($P < 0.05$)

The prevalence of spacing in the incisal segments was more in 13 years than compared to other age groups and finding was statistically significant. ($p < 0.001$)

The mean score for diastema was more among females (0.16 ± 0.726) than males (0.08 ± 0.486). The difference was statistically significant ($P < 0.05$)

The mean midline diastema score increased with increasing age and the finding was statistically significant ($P < 0.001$)

Table 1: Distribution of mean DAI (Dental Aesthetic Index) scores between males and females in the study

Gender	Mean	SD
Male	20.63	3.54
Female	21.99	5.12

Table 2: Prevalence of crowding in the incisal segments between males and females in the study

DAI scores	Gender	Mean	Total
Absent	297(59.8%)	200(40.2%)	497(100%)
Present	240(47.7%)	263(52.3%)	503(100%)
Total	537(53.7%)	463(46.3%)	1000(100%)

Table 3: Prevalence of crowding in the incisal segments between different age groups in the study

DAI scores	12 years	13 years	14 years	Total
Absent	273(54.9%)	160(32.2%)	64(12.9%)	497(100%) (49.7%)
Present	173(34.4%)	180(35.8%)	150(29.8%)	503(100%) (50.3%)
Total	446(44.6%)	340(34%)	214(21.4%)	1000(100%) (100%)

The mean score for maxillary overjet difference was not statistically significant ($P>0.05$)

The study found no statistically significant difference in the distribution of mean maxillary overjet scores between different age groups ($P>0.05$)

There was no statistically significant difference between males and females in terms of mandibular overjet scores ($P>0.05$)

There was no statistically significant difference between different age groups in terms of mandibular overjet scores ($P=0.829$)

There was no statistically significant difference between males and females in terms of vertical anterior open bite scores ($P=0.853$)

There was no statistically significant difference between different age groups in terms of vertical anterior open bite scores ($P=0.418$)

There was no statistically significant difference in the distribution of molar relation scores between males and females ($P=0.05$)

There was no statistically significant difference in the distribution of molar relation scores between different age groups ($P<0.05$)

Discussion

Malocclusion is considered the second commonest disorder and it is gaining global awareness. The DAI scores indicate prevalence rates of different types of malocclusion by examining the occlusal characteristics of permanent dentition which include.

1. Missing incisor, canine and premolar teeth.
2. Crowding in the incisal segments,
3. Spacing in the incisal segments,
4. Diastema,
5. Largest anterior maxillary irregularity,
6. Largest anterior mandibular irregularity,
7. Anterior maxillary overjet,
8. Anterior mandibular overjet,
9. Vertical openbite and
10. Anteroposterior molar relation

in 12 to 14 year old school children This study also compares our findings with other population groups previously studied by other researchers.^{1,6}

The age group of 12-14 years was selected, since most malocclusions are manifested to their full extent during this time. The results revealed a higher

prevalence of definite, severe and very severe malocclusion among females than males. The percentage of population having definite to severe malocclusion increased with increasing age.

The mean DAI score increased with increasing age group suggesting the increase in prevalence and severity of malocclusion with increasing age.

In our study about 10% of the sample had one or more missing anterior teeth. The percentage of population having missing teeth was more in 13 years and 14 years group 60% of the females in the study had one or more missing teeth where as the corresponding value for males was 40%.

52.3% of the females in this study had some evidence of crowding in either the maxillary or the mandibular arch or both. The corresponding value for males was 47.7%. When compared with Sven Helm⁷ study there was less crowding in girls than in boys and in both sexes, more crowding was found in lower arch than in upper arch. The study by Louis J.Baume⁸ and Hill PA's⁹ also supports that crowding was the relatively most frequent of all the traits of malocclusion. Study by Nisula KK et al^{10, 11} showed that girls showed more mandibular crowding more often than boys. The present study results also showed nearly same results as above one in girls.

In total, 14.5% of the population had some spacing in the incisal segment. 55.9% of the females and 44.1% males had some evidence of spacing in either the maxillary or the mandibular arch or both. In a study by Sven Helm⁷ more spacing in the upper arch was observed in the boys than in girl. Tschill P et al¹² study showed spacing in 67.5% of the subjects.

According to SM Hashim, Nainar and N Gnanasundaram¹³⁻¹⁵, 1.6% of subjects showed maxillary diastema which was greater than that of true mandibular diastema 0.3%. According to Gelgor IE et al¹⁶ median diastema of 7.0% was seen in both sexes. In our study 0.15% in males and 0.35% in females showed median diastema and this is slightly less compared to the previous studies.

Largest anterior maxillary irregularity was found in the study by AA Singh et al¹⁴ which was of 5.4% in maxilla where as in our study it is lesser, i.e 0.2%. According to Nisula KK et al¹⁰ study, anterior crowding was detected in maxillary arch (11.6%) and

largest mandibular anterior crowding (38.9%). Girls showed more crowding often than boys. According to Farahani AB et al¹⁷, 16.8% of subjects showed severe crowding in the maxillary arch.

According to various studies, overjet ranged from 2mm to 4mm.^{18, 19} According to Tausche et al²⁰, overjet more than 3.5mm was found most frequently in early mixed dentition.

There was no statistically significant difference between males and females in terms of vertical anterior open bite scores ($P>0.05$).

There was no statistically significant difference between different age groups in terms of vertical anterior open bite scores ($P>0.05$) in present study.

According to Sven Helm⁷, vertical deviations were found more in boys. overbite ranged from -5mm to 8mm with mean of 2.8mm in 33.8% of children. deep overbite more than 3.5mm affecting 46.2% of children and an anterior openbite was registered in 17.7% in mixed dentition.²⁰

There was no statistically significant difference in the distribution of molar relation scores between different age groups in the present study ($P>0.05$).

As we used DAI, the molar relation cannot be differentiated between Class II and Class III malocclusion because the score for Class I molar relation is 0, Score = 1 in case of half cusp i.e the lower first molar is half a cusp mesial or distal to its normal relation and Score = 2 in case of Full cusp i.e the lower first molar is one cusp or more mesial or distal to its normal relation. In this way we got a total of 92% normal, 3.9% half cusp mesial or distal, 3.3% full cusp mesial or distal relation.

54.6% boys had normal molar relation, 46.2% half cusp mesial or distal relation and 36.4% full cusp mesial or distal relation was found. In girls 45.4% have normal relation, 53.8% half cusp mesial or distal cusp, 63.6% full cusp relation in mesial or distal was found.

12 years males and females had 45.5% normal molar relation, 23.1% half cusp mesial or distal relation and 45.5% full cusp mesial or distal to normal molar relation was found, 13 years, 33.3% normal molar relation, 51.3% half cusp mesial or distal and 33.3% of full cusp mesial or distal molar relation was found. Whereas 14 years, 21.9% have normal molar relation,

25.6% half cusp mesial or distal and 7% of full cusp mesial or distal molar relation was found.

Conclusion

Malocclusion is a deformity affecting the human population since ages; therefore it is necessary to diagnose this abnormality at its earliest before it produces detrimental psychological effect and alters the physiology of oral cavity and temporomandibular joint.

It is essential to know the prevalence of malocclusion in the society, as it reveals the true extent of the problem and guides in preventing it. The general public can be educated on widespread occurrence of malocclusion and its deleterious effects, so that appropriate preventive and corrective measures can be instituted.

For the orthodontist prevalence studies help in establishing proper treatment need. These types of surveys help to recognize the prevailing malocclusion condition to instill preventive and corrective measures. These studies also help the orthodontist in establishing his private practice based on the needs of the society.

References

1. Das UM, Beena JP, Azher U. Oral health status of 6-12 year old school going children in Bangalore city: An epidemiological study. *J Indian Soc Pedod Prev Dent* 2009;27(1):6-8.
2. Dale G. Guidance of Occlusion: Serial Extraction. In: Graber YM, Swain BF. *Orthodontic Current Principles and Technique*. St. Louis: CV Mosby Company, 1985. p. 284-95.
3. Ajayi EO. Prevalence of malocclusion among school going children in Benin City, Nigeria: A peer-review. *J Biomed Sci* 2008;7(1&2):5-11.
4. Tulin U, Semra C, Ata A, Asli T. An epidemiological survey using the Treatment Priority Index (TPI). *Eur J Orthod* 1998;20:189-93.
5. WHO. *Oral health surveys-basic methods*, 4th edition. WHO, Geneva, New Delhi, India: AITBS Publishers and Distributors, New Delhi; 1999.
6. Jose A, Joseph MR. Prevalence of dental health problems among school going children 287 in rural

- Kerala. J Indian Soc Pedod Prev Dent 2003;21(4):147-51.
7. Helm S. Malocclusion in Danish children with adolescent dentition: An epidemiologic study. Am J Orthod 1968;54:352-66.
 8. Bhardwaj VK, Veerasha KL, Sharma KR. Prevalence of malocclusion and orthodontic treatment needs among 16 and 17 year-old school-going children in Shimla city, Himachal Pradesh. Indian J Dent Res 2011;22:556-60.
 9. Hill PA. The prevalence and severity of malocclusion and the need for orthodontic Treatment in 9, 12 and 15 years old Glasgow school children. J Orthod 1992;19:87-96.
 10. Kesiki-Nisula K, Lehto R, Lusa V, Kesiki-Nisula L, Varrela J. Occurrence of malocclusion and need of orthodontic treatment in rarely mixed dentition. Am J Orthod Dentofacial Orthop 2003;124:631-8.
 11. Jung MH. Evaluation of the effects of malocclusion and orthodontic treatment on self-esteem in an adolescent population. Am J Orthod Dentofacial Orthop 2010;138(2):160-6.
 12. Tschill T, Bacon W, Sonko A. Malocclusion in the deciduous dentition of Caucasian Children. Eur J Orthod 1997;19:361-7.
 13. Hashim SM, Gnanasundaram N. Incidence and etiology of midline diastema in a population in South India (Madras). Angle Orthodontist 1988;59:277-82.
 14. Corruccini RS: An epidemiologic transition in dental occlusion in world populations. Am J Orthod 1984;86:419-26.
 15. Gelgör IE, Karaman AI, Ercan E. Prevalence of malocclusion among adolescents in central anatolia. Eur J Dent 2007;1:125-31.
 16. Singh AA. Malocclusion and its traits in rural school children. J Indian Orthod Soc 1998;31:76-80.
 17. Borzabadi-Farahani A, Borzabadi-Farahani A, Eslamipour F. Malocclusion and occlusal traits in an urban Iranian population. An epidemiological study of 11- to 14-year-old children. Eur J Orthod 2009;3:477-84.
 18. Burgersdijk R, Truin GJ, Frankenmolen F, Kalsbeek H, van't Hof M, Mulder J. Malocclusion and orthodontic treatment need of 15-74 years old Dutch adults. Community Dent Oral Epidemiol 1991;19(2):64-7.
 19. Mugonzibwa EA, Eskeli R, Kuiipers-Jagtman AM, Laine-Alava MT, Van't Hof MA. Occlusal characteristics during different emergence stages of the permanent dentition in Tanzanian Bantu and Finnish children. Eur J Orthod 2004;26:251-60.
 20. Tausche E, Luck O, Harzer W. Prevalence of malocclusion in the mixed dentition and Orthodontic treatment need. Eur J Orthod 2004;26:237-44.