How to Cite:
Chauhan, A., Azam, A., Vashishta, V., Patil, C., Nikhil, S., & Sneha, E. (2022). Prevalence of malocclusion and orthodontic treatment need among 15 year old school children of rural Central India. *International Journal of Health Sciences*, *6*(S2), 2734–2741. https://doi.org/10.53730/ijhs.v6nS2.5656

Prevalence of malocclusion and orthodontic treatment need among 15 year old school children of rural Central India

Ashish Chauhan
Reader, Department Of Orthodontics & Dentofacial Orthopedics, Saraswati Dental College, Lucknow
Email: docortho2022@gmail.com

Aftab Azam
Professor, Department Of Orthodontics & Dentofacial Orthopedics, Saraswati Dental College, Lucknow

Vaibhav Vashishta
Associate Professor, Department Of Orthodontics & Dentofacial Orthopedics, Sardar Patel Post Graduate Institute of Medical & Dental Sciences, Lucknow

Chaitra Patil
Reader, Department of Oral and Maxillofacial Surgery, Krishnadevaraya College of Dental Sciences and Hospital, Bangalore

Nikhil S
PG Student, Department Of Orthodontics & Dentofacial Orthopedics, SVS Institute of Dental Sciences, Mahbubnagar

Sneha E
PG Student, Department Of Orthodontics & Dentofacial Orthopedics, SVS Institute of Dental Sciences, Mahbubnagar

***Abstract*---**Objective: To assess the prevalence of malocclusion and orthodontic treatment need among the rural school going 15-years-old children Materials and Methods: A descriptive cross sectional study was carried out among 400 school going children in the central part of India. Occlusal features such as overjet, overbite, crossbite, crowding, and spacing were documented using a structured proforma and the need for orthodontic treatment was evaluated using the index of orthodontic treatment need dental health component. Results: It was found that the prevalence of malocclusion among the study participants was 70%, and the overall treatment need was

International Journal of Health Sciences ISSN 2550-6978 E-ISSN 2550-696X © 2022.
***Corresponding author**: Chauhan, A.; Email: docortho2022@gmail.com*
Manuscript submitted: 18 Feb 2022, Manuscript revised: 09 March 2022, Accepted for publication: 01 April 2022

29.5%.Conclusion: This study offers baseline data on the need and demands for orthodontic treatment within the sample, which is critical for public orthodontic and dental service planning.

***Keywords*---**malocclusion, crowding, treatment, planning, adolescents, prevalence.

Introduction

Malocclusion is a kind of occlusion in which there is a misalignment of the arches in any three planes of space or abnormalities in tooth position that go beyond permissible "norms."[1] The look of the mouth and smile has a considerable impact on facial beauty perceptions.[2] As a result; malocclusion has significant physical, social, and psychological consequences for both individuals and society.[3] Even though malocclusion currently affects the majority of the population, it is not considered normal. There is strong evidence that its prevalence is many times greater today than a few hundred years ago.[4] There have been several studies on the frequency of malocclusion in various groups. The prevalence of various forms of malocclusions has been documented in various surveys, indicating that the vast majority of children have mal-aligned teeth.[5] In spite of the abundance of literature on the topic, epidemiological studies concerning Indian children in rural areas are very few.

Orthodontic treatment is influenced by psychosocial and facial considerations. In recent years, both the public and private sectors have seen a steady growth in the number of juvenile and adult patients seeking orthodontic treatment. It appears that the severity of the malocclusion and the necessity for therapy are related. When estimating treatment needs for population groupings, this assumption is required. Epidemiological studies are critical for defining the scope of health issues, gathering data, and creating and assessing hypotheses of links, if any exist. Priorities are determined and health plans are formed using this essential information. As a result, the quality of these epidemiological researches must be carefully assessed, and it will be beneficial to pool their findings wherever feasible.[6] The objective of the present study was to identify the various forms of malocclusions among rural children of the central part of India, as well as their treatment requirements.

Material and Methods

The present cross sectional study was carried out among the 15-year-old School children attending various educational institutes placed in rural parts of central India. Children between the age group of 15- 16 years were included in this study. Students who were undergoing orthodontic therapy and those who already received any kind of orthodontic treatment were excluded. Clearance was obtained from the institutional ethical committee and permission was procured from the head of the institutes from where the study participants were enrolled. An informed consent was obtained from all the parents/guardians of the study participants.

The study proforma was comprised of two parts:

- It included the demographic information including, name, age, gender, name of the institution
- It consisted of clinical parameter – Index of orthodontic treatment need (IOTN).

The IOTN dental health component was adapted to observe and recognize the malocclusions. Patients can be categorized into five grades using this index. Grades 1 and 2 denote that there is no or little need, Grade 3 categorizes as moderate or borderline need and Grades 4 and 5 suggest extreme/need for treatment. The degree of crowding in the maxillary and mandibular jaws was assessed and it was classified as mild (≤4 mm), moderate (5 to 9 mm), and severe (≥10 mm). Similarly, the overjet was assessed and it was classified as 2 to 4 mm, 4 to 6 mm , and more than 7 mm. The overbite was also recorded in millimeter and documented as ≤2 and ≥3 mm. Spacing was recorded as 4 mm and lesser and more than 4 mm.

A total of 400 students aged 15 years were evaluated among which 210 (52.5%) were male students and 190 (47.5%) were female students. The proforma was administered to all the eligible study participants and the clinical evaluation was carried out in the mobile dental van which was parked in the school premise.

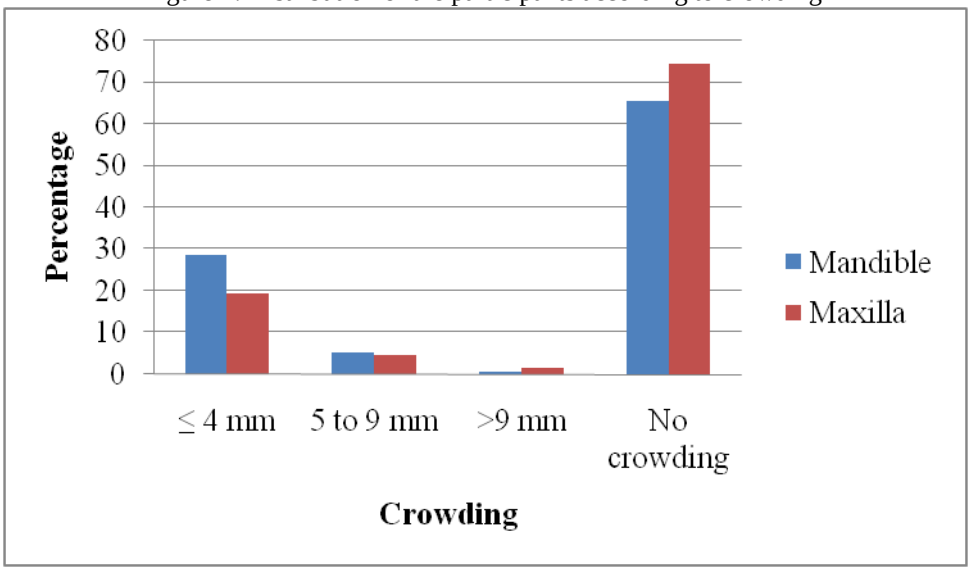
Statistical analysis

The obtained data were compiled and entered in a Microsoft excel spreadsheet and then exported to data editor page of Statistical Package for the Social Sciences version 21.0 (SPSS Inc., Chicago, Illinois, USA). Categorical variables were represented by frequency tables.

Results

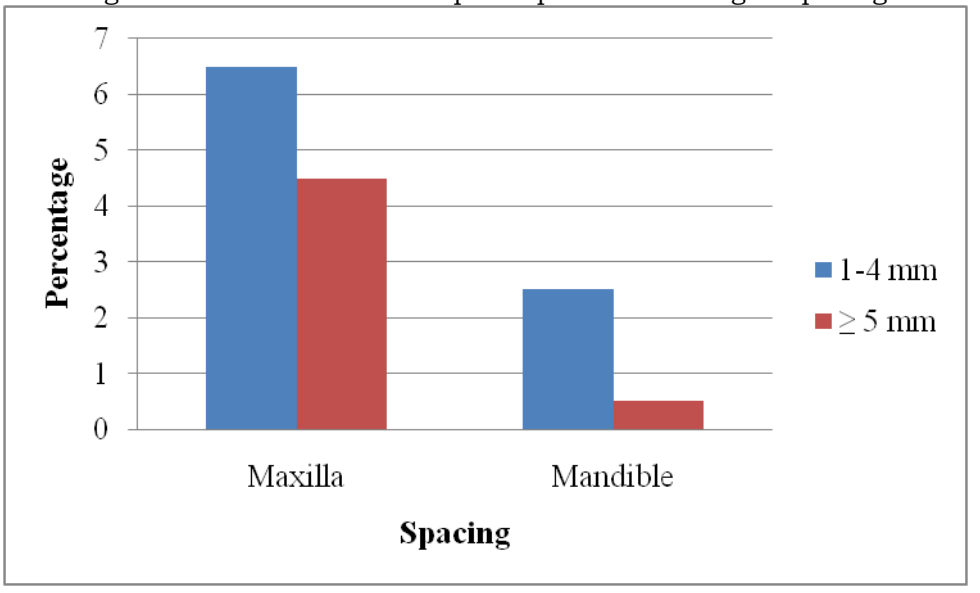
A total of 280 participants' were observed with malocclusion, which was 70% of the whole population. One hundred twenty participants were not observed with any kind of malocclusion which was 30% of the whole population. Out of the total population crowding was not present in 65.5% and 74.5% of participants in mandibular and maxillary jaws respectively. Crowding of 4mm and below was the most common finding in both the jaws (Figure 1).

Figure 1: Distribution of the participants according to crowding



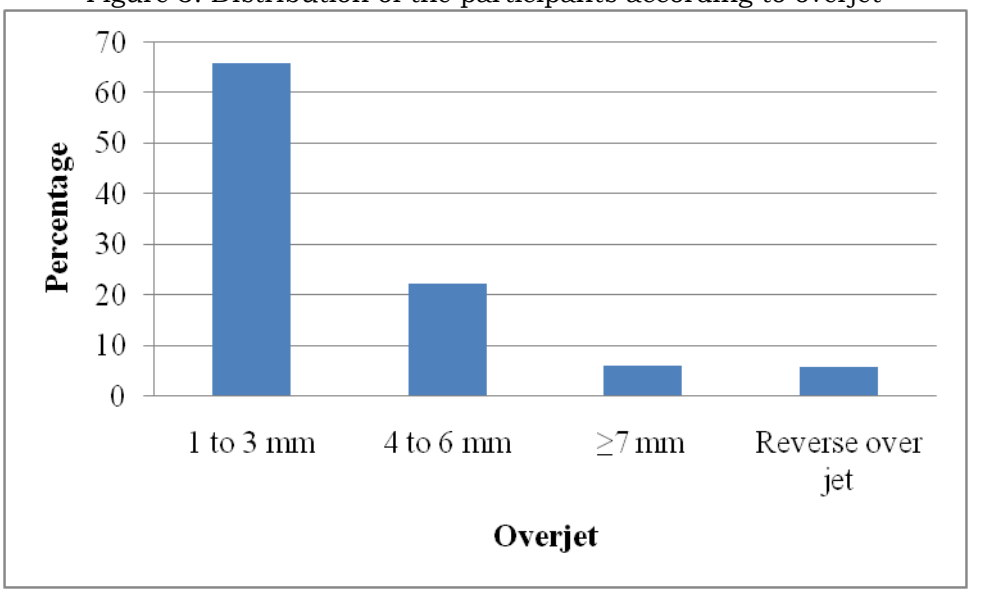
Spacing of 1 to 4 mm was noted in 6.5% of participants in maxilla and 2.5% of participants in mandible. Similarly spacing of 5 mm and above was noted in 4.5 % of participants in maxilla and 0.5% of participants in mandible (Figure 2).

Figure 2: Distribution of the participants according to spacing



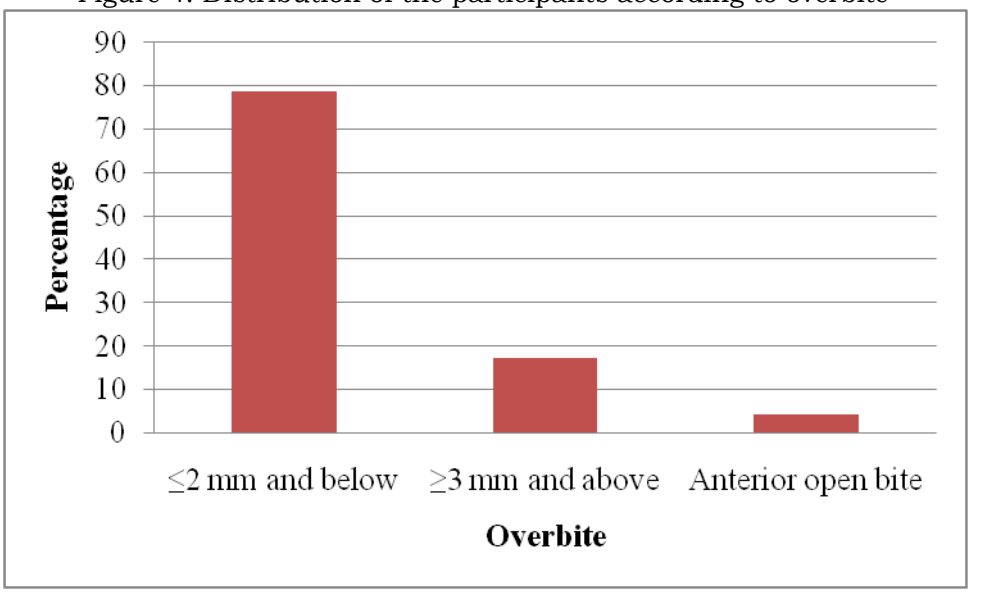
An overjet of 1 to 3 mm is most common finding, which was seen in 66% of participants followed by an overjet of 4 to 6 mm which was seen in 22.25% of participants and reverse over jet is seen in 5.75% of participants (figure 3).

Figure 3: Distribution of the participants according to overjet



An overbite of ≤2 mm is most common finding, which was seen in 78.75% of participants followed by an overjet of ≥3 mm which was seen in 17.25% of participants and anterior open bite was noted in 4% of participants (figure 4).

Figure 4: Distribution of the participants according to overbite



IOTN Grades 1 and 2 does not require treatment and IOTN Grades 3, 4, and 5 require orthodontic treatment. A total of 118 subjects were identified with orthodontic treatment need which was 29.5% of the whole population.

Discussion

Malocclusion epidemiology evaluation at the global, regional, and racial levels is critical because it offers crucial data for determining the kind and distribution of occlusal features. Such information can help to determine and set priorities for malocclusion treatment needs, as well as the resources needed to provide therapy - in terms of work capacity, skills, agility, and materials. Furthermore, the incidence of malocclusion in various groups and regions may represent the presence of deciding genetic and environmental variables.[7] Malocclusion is a developmental defect that, if detected and treated early enough, can be corrected efficiently. Despite the fact that malocclusion is a morphological difference and not an illness, it has a substantial detrimental influence on a person's life. As a result, it is critical to detect malocclusion at an early age in order to enhance a person's quality of life.[8]

For decades, researchers have been interested in developing a standardized way of epidemiological examination and grading of malocclusion. An orthodontic index is a numerical scale generated by rating particular elements of a malocclusion in order to objectively measure various criteria, such as how far a malocclusion differs from an ideal occlusion.[9] In orthodontics, occlusal indices are important for research, audit, practice management, and quality assurance.[10] The DHC of the IOTN was used to assess the necessity for orthodontic therapy in this study, which is considered an objective and synthetic technique.

According to the findings of this study, 70% of the participants had some sort of malocclusion and according to the IOTN, however, just 29.5% of participants need orthodontic treatment. Orthodontic therapy has become more popular in India during the last few decades. Due to the increased understanding of aesthetics, it was discovered that young adults demanded more. Because there are only a few institutions that give orthodontic treatment to the general population, it is critical to define the orthodontic treatment requirement.

The prevalence among Indian rural 15 year old school children was similar to the Srilankan and United Kingdom school children. In a study from United Kingdom which was conducted among students of 15 year old, 21% of students were noted to have definite orthodontic treatment need[11] and in a similar study in Srilanka only 26.6% of students were identified to have orthodontic treatment need.[12] In a prevalence study carried out in Rajasthan, the treatment need was found to be 33.3%, the needs were assessed adapting the Dental Aesthetic Index [13]

Despite its advantages, the study had several drawbacks. The examination was only clinical and no radiographs were taken. Dental x-rays might have been beneficial in confirming the lost and affected teeth. Children who have previously had orthodontic treatment were not included in the research. It would have been beneficial if they had been included in the research, which would have shown the percentage of people who had already been treated.

Children' dental health-related quality of life is negatively impacted by malocclusion. When compared to a minimum malocclusion group based on the IOTN, younger children with malocclusion had considerably greater "impacts," i.e.

a lower quality of life.[14] Chuldren who have completed orthodontic treatment report less dental health effects in their everyday activities than those who have not. Children who require orthodontic treatment have much more negative effects on their mental and social well-being.[15,16]

Conclusion

There appears to be a disparity in the proportion of children who require orthodontic treatment for both aesthetic and dental reasons. It implies that rural school going students are generally unaware of the severity of their current malocclusion. This is due to the lack of oral health education as well as their parents' negligence of malocclusion.

References

1. Sanadhya S, Chadha M, Chaturvedi MK, Chaudhary M, Lerra S, Meena MK, et al. Prevalence of malocclusion and orthodontic treatment needs among 12–15-year-old schoolchildren of fishermen of Kutch coast, Gujarat, India. Int Marit Health. 65(3):106–113.
2. Prabhakar RR. Prevalence of malocclusion and need for early orthodontic treatment in children. J Clin Diagn Res. 2014;8(5):60–61.
3. Akbari M., Lankarani K.B., Honarvar B., Tabrizi R., Mirhadi H., Moosazadeh M. Prevalence of malocclusion among Iranian children: a systematic review and meta-analysis. Dent Res J. 2016 Sep;13(5):387–395.
4. Goose DH, Thompson D.G, Winter F.C. Malocclusion in School Children of the West Midlands. Brit Dent J. 1957;102:174–178.
5. Balachandran P, Janakiram C. Prevalence of malocclusion among 8-15 years old children, India - A systematic review and meta-analysis. J Oral Biol Craniofac Res. 2021;11(2):192-199. doi:10.1016/j.jobcr.2021.01.011
6. Alhammadi, Maged Sultan et al. “Global distribution of malocclusion traits: A systematic review.” Dental press journal of orthodontics vol. 23,6 (2018): 40.e1-40.e10. doi:10.1590/2177-6709.23.6.40.e1-10.
7. Lombardo G, Vena F, Negri P, et al. Worldwide prevalence of malocclusion in the different stages of dentition: A systematic review and meta-analysis. European Journal of Paediatric Dentistry. 2020 Jun;21(2):115-122. DOI: 10.23804/ejpd.2020.21.02.05. PMID: 32567942.
8. Singh S, Sharma A, Sandhu N, Mehta K. The prevalence of malocclusion and orthodontic treatment needs in school going children of Nalagarh, Himachal Pradesh, India. Indian J Dent Res 2016;27:317-22
9. Ansai T, Miyazaki H, Katoh Y, Yamashita Y, Takehara T, Jenny J, et al. Prevalence of malocclusion in high school students in Japan according to the dental aesthetic index. Community Dent Oral Epidemiol 1993;21:303-5
10. Proffit WR, Fields HW Jr., Moray LJ. Prevalence of malocclusion and orthodontic treatment need in the United States: Estimates from the NHANES III survey. Int J Adult Orthodon Orthognath Surg 1998;13:97-106.
11. Chestnutt IG, Burden DJ, Steele JG, Pitts NB, Nuttall NM, Morris AJ. The orthodontic condition of children in the United Kingdom, 2003. Br Dent J 2006;200:609-12.
12. Gunatissa CN, Pathirage SL, Ratnayaka N. The prevalence of malocclusion and orthodontic treatment need among 15-year-old school children in Galle

district in Sri Lanka: An epidemiological study. APOS Trends Orthod 2016;6:256-60.
13. Tak M, Nagarajappa R, Sharda AJ, Asawa K, Tak A, Jalihal S, et al. Prevalence of malocclusion and orthodontic treatment needs among 12-15 years old school children of Udaipur, India. Eur J Dent 2013;7 Suppl 1:S45-53.
14. de Oliveira CM, Sheiham A. The relationship between normative orthodontic treatment need and oral health-related quality of life. Community Dent Oral Epidemiol 2003;31:426-36.
15. Sundareswaran S, Kizhakool P. Prevalence and gender distribution of malocclusion among 13–15-year-old adolescents of Kerala, South India. Indian J Dent Res 2019;30:455-61
16. Alhaija E, Al-Khateeb SN, Al-Nimri KS. Prevalence of malocclusion in 13-15 year-old North Jordanian school children. Community Dent Health 2005;22:266-71