

Prevalence of Malocclusion in Rural and Backward Area (Seemanchal) in Bihar-India.

Abhishek¹, Manish Goyal²

¹Assistant Professor, Department of Dentistry, Katihar Medical College, Katihar, Bihar, India.

²HOD & Professor, Department of orthodontic & dentofacial Orthopaedic, Teerthanker Mahaveer Dental College & Research Centre, Moradabad, UP, India.

Received: May 2019

Accepted: May 2019

Copyright: © the author(s), publisher. It is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Malocclusion is the biggest challenge in the world and its existence varies. Diagnosis and treatment Plan predict the occlusal Problem and its occurrence. Interceptive and preventive treatment needs more manpower for prediction of malocclusion. In Katihar (Seemanchal) area there is no any malocclusion related studies. The aim of this study is to evaluate the existence of different types of dental malocclusion in this rural and backward area. **Methods:** The study was done in 2109 patient who have visited the dental department of dentistry, of Katihar medical college in between September 2015 to February 2019. The different parameter was recorded and analysed. Chi Square test is done for the significance of gender and it the difference is $p < 0.05$. **Results:** In our study it is found that angle class I malocclusion is 59.5% with Class II malocclusion is 36.8% and 8.2% of class III malocclusion. The most problem in this area is crowding 81.1% followed by increased overjet, deep bite, crowding and spacing. Except deep bite there is no gender significance difference exist. **Conclusion:** The result in this study shows the prevalence of malocclusion and decreased of awareness which set a base line for awareness programme and interceptive and preventive orthodontic service and future study in Katihar (SEEMANCHAL) population.

Keywords: Malocclusion, Angle Classification.

INTRODUCTION

Houston et al in 1992 in his study found that malocclusion is the deviation from ideal occlusion that may result aesthetically unsatisfactory. Due to this condition there is imbalance in the size of teeth & its position with relative structure like cheeks, lips and tongue.^[1] Malocclusion is a common condition in the modern civilization due to adoption of soft food and lack of stimulus of the proper jaw growth, and proximal attrition of teeth, which otherwise helps to accommodation of teeth in dental arches in aligned manner.

Beautiful Smile comes from balanced & well-organized teeth in the jaw which gives positive attitude to a person.^[2] Majority of people or community have balanced teeth which gives them pleasing smile while protruding & crowded teeth reflects bad smile and negative status.^[3,4] India is a diverse and vast subcontinental show large

status religious belief, diet may be attributed to variation in prevalence of malocclusion. The prevalence of malocclusion in India is found to be 20 to 43 %.^[5-8] In India, very few studies have been reported on prevalence of malocclusion. The World Health Organisation (1987) had included malocclusion under the heading of Handicapping Dentofacial anomalies defined as an anomaly which causes designment or which impedes function and requiring treatment. "if the disfigurement or functional defect was likely to be an obstacle to patient physical or emotional wellbeing."^[9]

Orthodontist is a specialized branch which is able to diagnose the prevalence of malocclusion. Developed countries have their specialist for diagnosis of prevalence of malocclusion in a given population.^[10-16] India is a developing country which lack specialist in a given population regarding the prevalence of malocclusion.^[17] It is the indeed to collect more and more information from patient regarding malocclusion in rural and backward area in India. There are many studies in the world which is published regarding the malocclusion prevalence in different population. The results say's that prevalence of malocclusion ranges from 39 to 98 percent which is shown in [Table 1].^[18]

Name & Address of Corresponding Author

Dr. Abhishek,
Assistant Professor,
Department of Dentistry,
Katihar Medical College, Katihar,
Bihar, India.

variation in procedure of malocclusion in different region of country variation in ethnicity nutritional

India is a large country it's in orbital being multi-racial and multi ethnic.^[19] Indian population has been largely divided into seven ethnic groups based on anthropometric measurement and skin colours. These are Indo Aryans, Sytho Dravidian, Mongolo Dravidian, Dravidians, Mongoloids, Dravidian, Arya Dravidian and Turko Indians. In India only few studies have been conducted¹⁹ to check malocclusion prevalence and orthodontic treatment needs. The studies which have been added to the first study carried in 1942 until date. The studies are isolated to Nagpur, Bombay, (Maharashtra),^[20] Bangalore (Karnataka),^[21] Madras (Tamil Nadu),^[22] Trivandrum (Kerala),^[23] Patiala (Punjab).^[24]

The patient occlusal relationship was assessed at a centric occlusal position, which was carried out by asking the patient to open his mouth widely and close it by swallowing the saliva. After achieving the maximum occlusal contact, it is classified as Normal Occlusion and Malocclusion.

Therefore, the purpose of the present study was to assess the acuteness or severity of malocclusion, with respect to age and sex in the age-group of 13 and 16 years in rural and backward areas of Katihar city (Seemanchal) of Bihar state in India.

Aim and objective:

1. To evaluate the malocclusion Prevalence in 13 to 16 years age children visiting our Institution.
2. To know the ratio of various types of malocclusion.
3. To check the different malocclusion variation like crossbite, open bite, protrusion of teeth, deep bite, and rotation of teeth.

MATERIALS AND METHODS

A sample of consecutive persons was identified through the dental screening program was conducted in the Dental Department of Katihar medical college, Katihar district. A total number of 2245 were examined among which 2109 (male - 1121 and female - 988) satisfied in the inclusion criteria. The Patient is told about the study and Informed consent was obtained from the parent/guardian after explaining about the involvement of their children in the study.

Inclusion Criteria:

1. Age group in between 13 to 16 years.
2. All first permanent molars should be present.

Exclusion Criteria:

1. Previous history or ongoing Orthodontic Treatment.
2. Un co-operative child
3. Medically Compromised Child.

The following parameters were recorded. The relationships of the maxillary and mandibular first permanent molars in maximum intercuspation by Angle's classification²⁵; crowding; spacing; increased overjet (more than 3 mm), increased

overbite (more than 3 mm), open bite; deck bliss pattern of incisors; and mandibular prognathism as evaluated clinically. The data were obtained through direct clinical examination by an orthodontist. Various classes of malocclusion according to Angle's classification & other parameters studied are as described below.^[26]

Angle's Class I relation: The mesio-buccal cusp of the maxillary permanent first molar articulates in the mesio-buccal groove of the mandibular permanent first molar.

- Angle's Class II relation: The mesio-buccal cusp of maxillary permanent first molar articulates mesial to mesio-buccal groove of mandibular first molars.

Angle's Class II subdivision 1: A molar class II relationship in which maxillary incisors are proclined with increased overjet.

Angle's Class II subdivision 2: A molar class II relationship in which maxillary central incisors are retroclined, and maxillary lateral incisors have tipped labially and mesially, covering the distal of central incisors. The overjet is reduced, and there is deep bite of partial / complete / traumatic / more than 100% nature.

- Angle's Class III relation: The mesiobuccal cusp of maxillary first permanent molar occludes distal to mesiobuccal groove of mandibular first molars.
- Class IV relation: When there is Angle's molar Class II relation on one side & Class III relation on other side of the dental arches in occlusion.
- Deck bliss: It is the upper incisors arrangement in div 2 pattern while molar relation is Angle's class I.
- Overbite medically refers to the extent of vertical (superior-inferior) overlap of the maxillary central incisors over the mandibular central incisors. It was recorded as increased when the maxillary central incisors covered the mandibular central incisors by more than 3 mm.
- Overjet is the extent of horizontal (anterior-posterior) overlap of the maxillary central incisors over the mandibular central incisors. It was measured with a graduated scale and evaluated to the nearest 0.5mm. An overjet greater than 3 mm was increased. Anterior open bite was calculated when tip of the maxillary incisors did not overlap the incisal edges of the mandibular incisors.
- Crowding was defined as overlapping of erupted teeth due to lack of space or insufficient for teeth to erupt in the dental arch.
- Spacing was recorded to be present when there was no approximal contact between 2 teeth in a dental arch. However, no quantitative or qualitative measurement for crowding & spacing was done in any arches. It was just recorded as either present or absent in either of the dental arch. No segregation was done for upper or lower arch.

RESULTS

The results were given in a expressive fashion using absolute numbers & the percentage of different types of conditions for both sexes separately. Pooled data was also evaluated for finding the distribution of various conditions. Statistical significance for any sexual dimorphism between different parameters was assessed with the chi-square test and $p < 0.05$ was regarded as significant. Results have been presented in [Tables 2 & 3]; and [Figure 1 & 2]. There was significant difference between occurrence of the 3 classes of Angle's malocclusions [Table 2], chi square test, at $P < 0.01$. There were no significant gender differences among all the parameters studies except deep bite ([Table 3], chi square test, at $P < 0.05$) which was found to be more in males as compared to female.

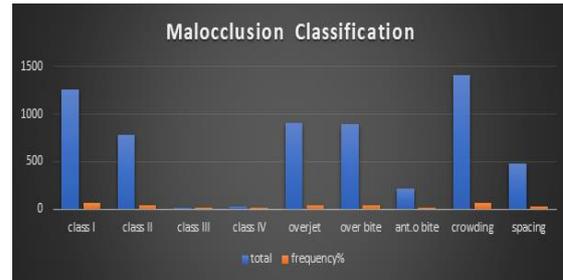


Figure 1: Malocclusion Classification

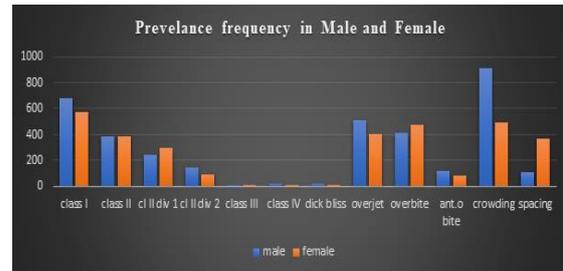


Fig 2: Prevalence Frequency in male and Female

Table 1: Percentage distribution of malocclusions in children and adolescents in different ethnic groups.

Author	Population	Subjects		Registration	Percentage
		n	Age		
Thilander and Myberg (1973)	swedish	5459	13	Bjork et al.(1964)	73.8
Al-Emran et al.(1990)	Saudi Arabia	500	14	Björk et al. (1964)	Up to 51
Kerosuo et al. (1991)	Finish	458	12-18	Angle classification	88
Kerosuo et al (1991)	Tazanian	642	11-18	Angle classification	45
Lew et al. (1991)	Chinese	1050	12-14	Foster and day (1974)	92.9
Ng'ang'a et al. (1996)	Kenyan	919	13-15	Bjork et al. (1964)	72
Silva and Kang (2001)	American-Latino	507	12-18	Angle classification	93
Thilander et al. (2001)	Colombian	1441	13-17	Bjork et al.(1964)	88
Mugonzibwa et al.(2004)	Tanzanian	869	3-16	Bjork et al.(1964)	Up to 51
Onyeaso (2004)	Nigerian	636	12-17	Angle Classification	76
Abu Alhajjia et al. (2005)	Jordanian	1003	13-15	Bjork et al (1964)	92
Behbehani et al(2005)	Kuwaiti	1299	13-14	Angle classification	86
Ciuffolo et al.(2005)	Italian	810	11-14	Criteria by US National Health and Nutrition Examination Survey (Brunelle et al., 1996)	93
Gabris et al.(2006)	Hungarian	483	16-18	Dental Aesthetic Index (Cons et al., 1986)	70.4
Rwakatema et al. (2006)	Tanzanian	289	12-15	Bjork et al (1964)	97.6
Dhar et al (2007)	Indian	812	11-14	World Health Organization (1999)	38.9

Table 2: (Malocclusion Classification)

S.No	Parameter	Total N (male+ female = 2109)	Frequency %
1	Class I	1255	59.5**
2	Class II	778	36.8**
3	Class III	18	8.2**
4	Class IV	29	1.3
4	Overjet	911	43.1
5	Overbite	887	42.0
6	Anterior Open Bite	210	9.9
7	Crowding	1403	66.7
8	Spacing	482	22.8

Table 3: Prevalence of malocclusion in Male and Female

S.no.	Malocclusion Classification	Male N = 1121	Frequency %	Female N = 988	Frequency %
1	Class I	682	60.8	573	57.9
2	Class II	388	34.6	390	39.4
3	Class II div 1	245	21.8	295	29.8
4	Class II div 2	143	12.7	95	9.6
5	Class III	12	1.07	6	6.07
6	Class IV	18	1.6	11	1.11
7	Dick bliss	21	1.8	08	0.8
8	Overjet	510	45.4	401	40.5
9	Overbite	410	36.5	477	48.2*
10	Anterior Open Bite	122	10.8	88	8.9
11	Crowding	910	81.1	493	49.8
12	Spacing	110	9.8	372	37.6

DISCUSSION

There is existence of malocclusion which is 39% to 93% in different parts of the world²⁷. Planning of orthodontic treatment for evaluation of patients may give valuable information. The malocclusion existence varies from one geographical area to another and differs from one country to another country and even from one city to another city. Angle's classification is very much helpful and useful for easy assessment which gives a common channel of knowledge among dental professionals.^[25] It is an easy and rather accurate way to categorize malocclusions and is globally used in dental profession.

In the present study, it is found that Angle's Class I malocclusion prevalence was the most common malocclusion with 59.5 % followed by 36.8% Angle's class II and 8.2 % Angle's class III among the orthodontic patients examined. This finding is consistent with other studies. Proffit et al,^[28] found in untreated White Americans of 8 - 50 years age, the Angle's Class I malocclusions was most prevalent, i.e., 52.2%, while Angle's Class II is 42.4% and less than 10% were Angle's Class III malocclusions. Another study on the pattern of malocclusion in Africa (Nigeria),^[29] states that Angle's Class I malocclusion is 76.5%, Class II having 15.5% and Class III is 8.0%.

Increased crowding (81.1 %) in the sample studies was very high and thus the causes of crowding should be looked into in the future studies, so that proper preventive actions could be taken by creating awareness campaigns. Although frequency of crowding was almost same in females as compared to males, but the difference was not statistically significant. Drummonds found only 40 % children having crowding in the study done in South Africa.^[30] Migration of first permanent molar, inclination and rotation is caused by carious teeth exfoliation and space closer due to lack of diagnosis which leads to high percentage of crowding. Genetics and racial differences controlling the growth of jaws; evolutionary trends in jaw growth; premature extractions of baby teeth without any space maintenance; unrestored caries

and space loss; Ibyinyo (a type of oral mutilation i.e. a traditional practice in some parts of Katihar (SEEMANCHAL) and Africa where the deciduous teeth of certain baby are extracted in early days without preventing them out in early age to prevent GIT infections, fever and pain in a child); iatrogenic malocclusion created by extraction of certain deciduous teeth by non – orthodontists & other dentists etc can be some of the factors which may have contributed to increased crowding, which should be looked into in future studies. Loss of space in the posterior teeth is due to early loss of deciduous teeth. On the other hand, spacing was found to be present in only 22.8 % cases, thus showing the general trend worldwide that crowding is more prevalent than spacing due to evolutionary trends and dietary habits. However, the presence of spacing needs to be studied to find out the related causes.

CONCLUSION

In this hospital-based study, the frequency of Angle's Class I, Class II and Class III malocclusion was found to be 59.5%, 36.8% and 8.2% respectively. Out of all the problems studied, crowding was found to be the most common feature, followed by increased overjet, deep bite and anterior open bite in that order. To know occlusal problems and their occurrence need the treatment and it can help to determine the appropriate treatment plan and manpower needed in orthodontics. Such epidemiological surveys are extremely important as they can help in finding the factors leading to malocclusion, and thus help in planning the preventive and interceptive actions and awareness programs for the population.

After conducting the study, following recommendations can be enumerated:

- The causative factors of the irregularity of teeth and other malposition's should also be evaluated simultaneously so that preventive and interceptive measure could be planned.
- There is a strong need to conduct epidemiological studies on the population of SEEMANCHAL to find out the prevalence of malocclusion.

- More studies should be used in future involving the large number of subjects with random sampling, multi-centric studies should be conducted.
 - The ENT surgeon needs to be associated in the study to evaluate the patients for chronic nasal allergy and mouth breathing habits to associate their relationship with the open bite etc.
 - Proper awareness programs should be started to educate the masses and the school children to avoid the causative factors leading to malocclusion e.g. prevention of caries, trauma, early extraction of Deciduous teeth etc.
 - The dental health manpower should be educated and trained so that they can manage the space left after premature extraction of baby teeth, or they should be sensitized to refer such patients to specialist for space management.
 - The resources for minor and major orthodontic treatments; space maintainers and other preventive therapies should be made available in the hospitals and clinical settings.
 - Since the early treatment can be done for some of these conditions so that their severity does not increase with age. This shows that children should be diagnosed and checked by their orthodontist at mixed dentition phase. Early Orthodontic treatment might decrease the occurrence of malocclusion and improve the aesthetic and psychological wellbeing of the children.
 - The insurance providers should be educated & sensitized that they should not insist that orthodontic intervention can only be done in permanent teeth. There are certain conditions which need to be treated during mixed dentition period also to prevent the future development of skeletal, functional and aesthetic problems.
- Acknowledgement
- The authors would like to acknowledge the Administrative authorities and Research and Publication committee of the ** at Katihar, Bihar in India for giving permission to conduct this study. Thanks to the Colleagues of Dentistry department of ** for co-operation, parents for giving authorization, all pupils who have participated in this study.

REFERENCES

1. Houston W, Stephens C, Tulley W. A textbook of orthodontics. Bristol: Wright Pub Co, 1992.
2. Shaw WC. The influence of children's dentofacial appearance on their social attractiveness as judged by peers and lay adults. *Am J Orthod* 1981;79:399-415.
3. Shaw WC, Rees G, Dawe M, Charles CR. The influence of Dentofacial appearance on Social attractiveness of young adult. *Am J Orthod* 1985;87:21-26.
4. Bravo LA. Soft tissue Facial profile Changes after orthodontic treatment with four premolars extracted. *Angle Orthod* 1994;64:31-42.
5. Soh J, Sandham A, Chan YH. Occlusal status in Asian male adults: Prevalence and ethnic variation. *Angle Orthod* 2005;75:814-20.
6. Rajendra PA, Savadi SC. Epidemiology of malocclusion-a report of a survey conducted in Bangalore city. *J Indian Orthod Soc* 1971;3:43-55.
7. Jalili VP, Sidhu SS, Kharbanda OP. Status of malocclusion in Tribal children of Mandu (Central India). *J Ind Orthod Soc* 1993;24:41-6.
8. Kharbanda OP, Sidhu SS. Prevalence studies on malocclusion in India - retrospect and prospect. *J Ind Orthod Soc* 1993;24:115-8.
9. World Health Organization (1987). Oral Health surgery: Basic method 3rd Oral Health Unit.
10. Bjork A. The face in profile: an antropological X ray investigation on swedish children and conscripts. *Sverisk Tand-Tidsk* 1947; 40(suppl 5B): 180.
11. Sclare AR. Orthodontics and the school child: a survey of 680 children. *Br Dent J* 1945;79:278-80
12. Goose DH, Thompson DG, Winter FC. Malocclusion in school children of west midlands. *Br Dent J* 1957; 102:174-8.
13. Gardiner JH. A survey of malocclusion and some aetiological factors in 1000 sheffield school children. *Dent Practit* 1957;6:187-98.
14. Altemus L. The frequency of incidence of malocclusion in America Negro Children aged 12-16. *Angle Orthod* 1959 Oct; 29(4): 189-200.
15. Roberts EE, Goose DH. Malocclusion in north wales population *Br Dent J* 1979 Jan; 146(1): 17-20.
16. Massler M, Frankel JM. Prevalence of Malocclusion in children aged 14 to 18 years. *Am J Orthod* 1951 oct; 37(10): 751-768.
17. Onyeaso CO. Prevalence of malocclusion among adolescent in Ibadan, Nigeria. *Am J Orthod Dentofacial Orthop* 2004 Nov; 126(5): 604-7.
18. Mtaya M, Brudvik P, Astrom N. Prevalence of malocclusion and its relationship with socio- demographic factors, dental caries, and oral hygiene in 12 to 14-year-old Tazarian school children. *Eur J Orthod* 2009;31:467-476.
19. Kharbanda OP, Sindhu SS. Prevalence studies on malocclusion in India – Retrospective and prospect. *J Ind Orthod Soc* 1993;24(4):115-8.
20. Sheikh HS. Varieties of Malocclusion amongst orthodontic patient. *J Ind Dent Assoc.* 1966; 38:201.
21. Prasad AR, Savadi SC. Epidemiology of malocclusion. A report of a survey conducted in Bangalore city. *J India Orthodont Soc* 1971;3(3):43-55.
22. Miglani DC, Kharbanda OP, Epidemiological Studies of dental disorder amongst various age group in the city of Madras. *J Int Col Dent.* 1965;52:3.
23. Jacob PP and Mathew CT. Occlusal Pattern study of school children (12-15 years) of Trivendrum city. *J Indian Dent Assoc* 1969;41:271-4.
24. Shourie KL. Malocclusion in school children. Thesis submitted to university of punjab, 1942.
25. Angle EH: Classification of malocclusion, Dental Cosmos, Vol.41, pp. 243-264, 1899.
26. Moyers RE: Handbook of orthodontics. 4th edition. Chicago: year book medical publisher; 1988.
27. Thilander B, Pena L, Infante C, Parada SS, de Mayorga C. Prevalence of malocclusion and orthodontic treatment need in children and adolescents in Bogota, Colombia. An epidemiological study related to different stages of dental development. *Eur J Orthod.* 2001; 23:153-167.
28. 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.
29. Onyeaso CO, Aderinokun GA, and Arowojolu, MO: The pattern of malocclusion among orthodontic patients seen in Dental Centre, University College Hospital, Ibadan, Nigeria. *African Journal of Medicine and Medical Sciences*, vol. 31, no. 3, pp.207-211:2002.

30. Drummond, RJ. Orthodontic status and treatment need of 12-year-old children in South Africa: An epidemiological study using the Dental Aesthetic Index. 2003. 128 f. Dissertação (Mestrado em Odontologia)-School of Dentistry, University of Pretoria, Pretoria, 2003.

How to cite this article: Abhishek, Goyal M. Prevalence of Malocclusion in Rural and Backward Area (Seemanchal) in Bihar-India. Ann. Int. Med. Den. Res. 2019; 5(4):DE34-DE39.

Source of Support: Nil, **Conflict of Interest:** None declared