

Original Article

Malocclusion status in Mixed and Permanent dentition of school children in Karnataka state: An Epidemiological Survey

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Abstract

Background: Malocclusion can compromise the oral health tissues and can lead to social and psychological problem. Hence an investigation of the malocclusion status at the developing stages of the dentitions to intercept the same is required.

Aim: To assess the status of malocclusion in mixed and permanent dentition of school children in Karnataka state.

Methods and Material: A cross-sectional epidemiological survey was conducted in all the 30 districts of Karnataka. School children in the age group of 10-16 years were the target population. Population proportionate technique was employed for the sample size estimation. A total sample of 9505 was randomly selected from 102 schools all over Karnataka. Ackermann-Proffit classification of malocclusion was used to record the malocclusion. Simple Descriptive statistical analysis was carried out.

Results: Prevalence of crowding is 52.3% in mixed dentition and 50.2% in permanent dentition. Cross-bite was reported in 17.4% and 18.3% in mixed and permanent dentition respectively. Increased over-jet was reported in 15.3% and 7.7% in mixed and permanent dentitions respectively.

Conclusion: Estimating the malocclusion and its prevalence in mixed dentition and permanent dentition at the earliest age may help the Practitioners to understand their aetiology and manage them with the best treatment possibilities.

Key words: Prevalence, Malocclusion, School children, Mixed dentition, Permanent dentition, Ackermann-proffit system.

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Introduction

Malocclusion can be defined as an occlusion in which there is mal-relationship between the arches in any of the three planes or anomalies in tooth position beyond normal limits. If a malocclusion is identified early, simple, preventive and interceptive measures can alleviate a developing malocclusion. The incidence of various

categories of malocclusion in a particular population is necessary to provide a basis for planning preventive and interceptive orthodontics. The recognition of malocclusion as an important problem in the public dental health services for children implies a need for rational planning of preventive and therapeutic orthodontic measures.

According to the World Health Organization, the main oral diseases should be subjected to periodic epidemiological surveys. It is necessary to carry out epidemiologic studies of malocclusion in all regions at various stages of development of dentition and from different geographic areas. Analysis of the prevalence rates of malocclusion in such groups may also contribute to an understanding of the causes of malocclusion.¹ Few studies by Nagaraj Rao et al,² Prasad AR et al,³ KM Shivakumar⁴ and Usha Mohan Das⁵ are carried out in some parts of Karnataka but no study has reported the malocclusion prevalence in mixed and permanent dentition. Knowledge about the different malocclusions at the earliest may help the Orthodontists and Pedodontists better understand the existent problem in a geographic location and help them in the proper orientation and manage them with the best treatment possibilities. With this background we undertook a survey to assess the prevalence of malocclusion in mixed dentition and permanent dentition of 10-16 year school children in Karnataka state.

Aim

To assess the prevalence of malocclusion in mixed dentition and permanent dentition of 10-16 year school children in Karnataka state.

Materials and Methods

A cross-sectional epidemiological survey was conducted in the State of Karnataka, with prior permission from the Ministry of Higher Primary and Secondary Education Board of Karnataka. The survey was carried out in selected schools in all the district head quarters. Children in the age group of 10-16 years were included in the study and they constituted the study population. Population proportionate technique was employed for sample size estimation.

According to the population census 2011, the total population in Karnataka is 6,11,30,704, out of which 10-16 years old children constituted 29% (According to National Family Health Survey-2, India [1998-99], child population in the age group of 10-16 years was taken as a reference). With 95% confidence level, the estimated sample size was 9505. In the first stage of sampling, three categories of schools, namely, Government schools, Aided schools, and Private schools in each district were selected from a list of schools provided by the Karnataka Higher Primary and Secondary Education Board by simple random sampling. In the second stage, 102 schools all over Karnataka were surveyed. The study period was eight months from July 2012 to February 2013. Inclusion criteria were all the children in the age group of 10-16 years, from the selected schools in each district all over Karnataka and children who obtained written informed consent from parents to participate in the study. Exclusion criteria used were- history of previous orthodontic treatment, rampant caries, multiple missing teeth, mutilated malocclusion and other craniofacial anomalies like cleft lip and palate, facial hemiatropy, cleidocranial dysplasia etc.

Ethical clearance to conduct the survey was obtained from the Vokkaligara Sangha Dental College and Hospital Review and Ethical Committee. Prior permission to conduct the survey was taken from the concerned school authorities.

The oral examination was done by an Orthodontist in day light using mouth mirror and dental probe. The observations were recorded in the assessment form and later transferred to the PC. Ackermann-Proffit^[6] classification of malocclusion was used to record the malocclusion. The Dental Health check-up was done for the remaining children and an oral health education lecture was given to all the children in the school to

create awareness about Dental health and Orthodontic treatment.

Statistical Analysis

Data was coded and entered into excel sheet. To maintain the data quality (validity) rechecking and cross checking was done during data entry phase. Later, data was transferred into SPSS windows version 16, where cleaning, coding, recording, crosschecking, processing and analysis of the data were done. Simple Descriptive statistics was applied to describe the study variables. Scheffee's Post hoc test was used.

Results:

The frequency and percentage of the malocclusion variables are represented in the tables 1-7 and graphs 1-6.

Discussion

Rolling⁷ pointed out that it is valuable to collect information on the state of dental health before planning any future dental care programs in the society. Distribution of different type of malocclusion may show great variability even in a population of same origin.⁸

In our survey, mixed dentition had 80.3%, 16.4% and 3.3% of Angle Class I, Class II and Class III malocclusions respectively which is similar to the findings with Antanas et al⁹ and Das et al⁵. Permanent dentition showed 78.8%, 17.6% and 3.6% of Class I, Class II and Class III malocclusions respectively which are in agreement with the studies of Profitt et al,¹⁰ Grew et al,¹¹ Steigman et al¹² and Jacob and Mathew.¹³

Table 1: Distribution of midline discrepancy

Dentition		Midline			Total
		Co-inciding	<1/2 Lower Incisor width	>1/2 Lower Incisor width	
Mixed	F&%	1983(67.8%)	766(26.2%)	175(6.0%)	2924(100.0%)
Permanent	F&%	4355(66.2%)	1771(26.9%)	455(6.9%)	6581(100.0%)
Total	F&%	6338(66.7%)	2537(26.7%)	630(6.6%)	9505(100.0%)

Contingency Coefficient =.020, P=.147

Table 2: Spacing discrepancy

Dentition		Spacing				Total
		Absent	Diastema	Anterior spacing	Generalized spacing	
Mixed	F&%	2408(82.4%)	248(8.5%)	241(8.2%)	27(.9%)	2924(100.0%)
Permanent	F&%	5699(86.6%)	339(5.2%)	485(7.4%)	58(.9%)	6581(100.0%)
Total	F&%	8107(85.3%)	587(6.2%)	726(7.6%)	85(.9%)	9505(100.0%)

Contingency Coefficient =.067, P=.000(HS)

Table 3: Prevalence of Protrusion of teeth

Dentition		PROTRUSION OF TEETH				Total
		Absent	Upper teeth	Lower teeth	Both	
Mixed	F&%	1565(53.5%)	843(28.8%)	15(.5%)	501(17.1%)	2924(100.0%)
Permanent	F&%	3370(51.2%)	1806(27.4%)	30(.5%)	1375(20.9%)	6581(100.0%)
Total	F&%	4935(51.9%)	2649(27.9%)	45(.5%)	1876(19.7%)	9505(100.0%)

Contingency Coefficient =.044 P=.000

Table 4: Prevalence of Retrusion of teeth

DENTITION		RETRUSION OF TEETH				Total
		Absent	Upper teeth	Lower teeth	Both	
Mixed	F&%	2569(87.9%)	336(11.5%)	3(.1%)	16(.5%)	2924(100.0%)
Permanent	F&%	5828(88.6%)	678(10.3%)	27(.4%)	48(.7%)	6581(100.0%)
Total	F&%	8397(88.3%)	1014(10.7%)	30(.3%)	64(.7%)	9505(100.0%)

Contingency Coefficient =.032; P=.020

Table 5: Distribution of Open-bite

DENTITION		OPENBITE			Total
		Absent	<2mm	>4mm	
Mixed	F&%	2840(97.1%)	37(1.3%)	47(1.6%)	2924(100.0%)
Permanent	F&%	6374(96.9%)	113(1.7%)	94(1.4%)	6581(100.0%)
Total	F&%	9214(96.9%)	150(1.6%)	141(1.5%)	9505(100.0%)

Contingency Coefficient =.018; P=.215

Table 6: Skeletal deviation of maxilla in the Dentitions

DENTITION		MAXILLA			Total
		Normal	Prognathic	Retrognathic	
Mixed	F&%	2742(93.8%)	146(5.0%)	36(1.2%)	2924(100.0%)
Permanent	F&%	6163(93.6%)	327(5.0%)	91(1.4%)	6581(100.0%)
Total	F&%	8905(93.7%)	473(5.0%)	127(1.3%)	9505(100.0%)

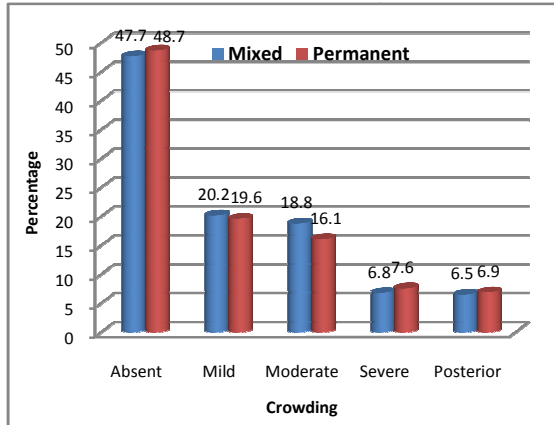
Contingency Coefficient =.006; P=.838

Table 7: Skeletal deviation of mandible

DENTITION		MANDIBLE			Total
		Normal	Prognathic	Retrognathic	
Mixed	F&%	1422(48.6%)	19(.6%)	1483(50.7%)	2924(100.0%)
Permanent	F&%	2974(45.2%)	45(.7%)	3562(54.1%)	6581(100.0%)
Total	F&%	4396(46.2%)	64(.7%)	5045(53.1%)	9505(100.0%)

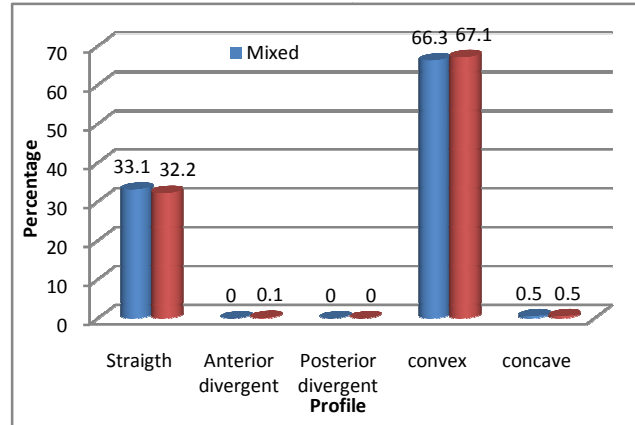
Contingency Coefficient =.032; P=.008

Graph 1: Distribution of crowding



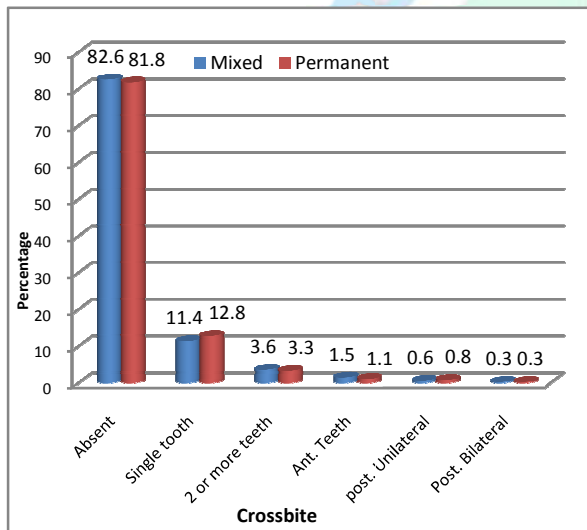
Contingency Coefficient =.037, P=.010

Graph 2: Distribution of Profile



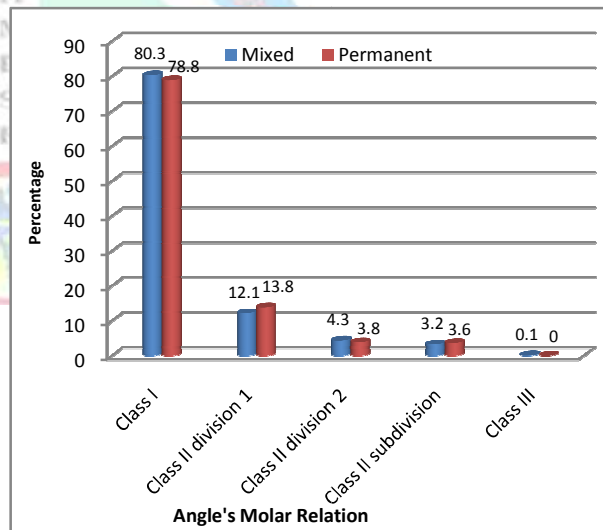
Contingency Coefficient =.019; P=.504

Graph 3: Distribution of cross-bite



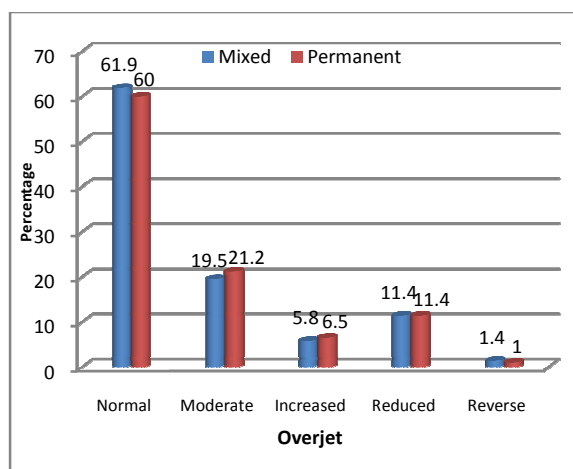
Contingency Coefficient =.029; P=.155

Graph 4: Distribution of Angle's Molar relation



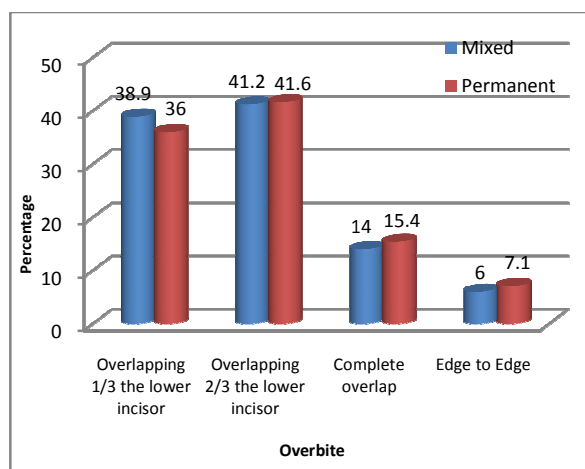
Contingency Coefficient =.031; P=.063

Graph 5: Distribution of Over-jet



Contingency Coefficient = .029; P=.083

Graph 6: Distribution of Over-bite



Contingency Coefficient = .034; P=.013

Crowding was observed to be 40% in permanent dentition in our study which is in correspondence with the studies of Thilander et al¹⁴ and Gardener and Valiathan.¹⁵ We found increased over-jet in 27.7% of the children with permanent dentition which is similar to the results of Antanas and Kristina⁹ and Bharadwaj et al.¹⁶ Deep-bite is reported to be 57% in our study but some of the studies have shown lesser prevalence.^{17,18} The most important single factor that has influenced extreme of variation in prevalence of malocclusion is differences in methodology in recording the traits of malocclusion.

Our survey included children of 10-16 years age group of both mixed and permanent dentitions which reports distribution of malocclusion in mixed and permanent dentition. Ackermann-Proffit classification of malocclusion is used to record the severity of malocclusion which is not generally used in prevalence studies. This classification overcomes the limitations of the Angle system. Malocclusion is recorded in all the three planes of space (i.e, sagittal, transverse and vertical planes). Results of our survey could not be directly related to other reported

studies on prevalence of malocclusion as they were conducted either on deciduous dentition, mixed dentitions or permanent dentition.

Conclusion

The following conclusions were drawn from the present survey.

- The prevalence of malocclusion reported in mixed dentition were 52.3% of children with crowding, 8.5% of midline diastema, 17.4% of cross-bite, 25.3% of increased overjet and 55.2% of deepbite.
- The prevalence of malocclusion in permanent dentition reported were 50.2% of children with crowding, 5.2% of midline diastema, 18.3% of cross-bite, 27.7% of increased overjet and 56.6% of deepbite.

Clinical Significance

Estimating the malocclusion and its prevalence in mixed dentition and permanent dentition at the earliest age may help the Practitioners to understand their aetiology and manage them with the best treatment possibilities.

References

1. Helm S. Malocclusion in Danish children with adolescent dentition: an epidemiologic study. *Am J Orthod.* 1968; 54: 352-366.
2. Nagaraj Rao et al. Oral health status of 500 school children of Udupi. *J Indian Orthod Soc;* 1980;52:367-370.
3. Prasad AR et al. epidemiology of malocclusion- a report of a survey conducted in Bangalore. *J Indian Orthod Soc;* 1971;3:43-55.
4. KM Shivakumar, GN Chandu, MD Shafiullac. Severity of Malocclusion and Orthodontic Treatment Needs among 12- to 15-Year-Old School Children of Davangere District, Karnataka, India. *Eur J Dent* 2010; 4: 298- 307
5. Usha Mohan Das, Venkatsubramanian and Divya Reddy. Prevalence of Malocclusion among School Children in Bangalore India. *Int J Clinical Pediatric Dent* 2008; 1(1):10-12.
6. Ackerman JL and Proffit WR. The characteristics of malocclusion: A modern approach to classification and diagnosis. *Am J Orthod* 1969;6:443-54.
7. Rolling S. Hypodontia of permanent teeth in Danish school children. *Scandinavian J Dental Res* 1980; 88:365-9.
8. Sayinand MO, Turkkahraman H. Malocclusion and crowding in an orthodontically referred turkish population. *Angle Orthodontist* 2004; 74:635-9.
9. Šidlauskas A and Lopatienė K. The prevalence of malocclusion among 7-15-year-old Lithuanian schoolchildren. *Medicina (Kaunas)* 2009;45(2):147-152.
10. WR Proffit and H. W. Fields, *Contemporary Orthodontics*, Mosby, St. Louis, Mo, USA, 2007.
11. Grewe JM, Cervenka J, Shapiro B and Witkop CI, Jr. Prevalence of Malocclusion in Chippewa Indian Children. *J Dental Research* 1968;47(2):302-5.
12. Steigman, Kawar M, Zilberman Y. Prevalence and severity of malocclusion in Israeli Arab urban children 13 to 15 years of age. *AJO-DO* 1983:337-43.
13. Jacob PP and Mathew CT. Occlusal pattern study of school children [12-15 years] of Trivandrum city. *J Indian Dental Assoc* 1969; 41: 271-274.
14. 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 Orthodont* 2001;23(2):153-67.
15. Gardener JH, Valiathan A. A survey of malocclusion and orthodontic treatment needs in South Canara. *J Indian Orthod Soc* 1990;21:1-9.
16. Bharadwaj VK, Veeresh KL and 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 Dental Rese* 2011; 22(4):556-560.
17. Kharbanda OP, Sidhu SS, Sundaram KR and Shukla DK. Prevalence of malocclusion and its traits in Delhi children. *JIOS* 1995;26(3):98-103.
18. Onyeaso CO. Prevalence of malocclusion among adolescents in Ibadan, Nigeria. *AJO-DO* 2004; 126: 604-7.

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