

MALOCCLUSION STATUS OF NON-MALAYALEE WORKING CLASS ADULT MALES IN KERALA – A CROSS SECTIONAL STUDY

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ABSTRACT

Background and aims of the study: The knowledge of the most prevalent form of malocclusion is essential for a defined community for various reasons including treatment planning and allocation of resources. The immigrant non-Malayalee crowd in Kerala is now contributing to the economic growth of Kerala and many of them are seeking treatment here. The aim of the study was to study the prevalence of most common malocclusion traits among immigrant non-Malayalee adult males in Kerala.

Methods: A cross sectional survey was carried out among the willing participants after obtaining informed consent. Clinical examination under standard oral health survey condition was performed. Various malocclusion traits including molar relation, incisor relation, upper and lower crowding and IOTN – DHC was assessed.

Results: Most subjects showed class I malocclusion, class II was observed in 20% of the sample and class III in 2.4%. Only 12.3% showed class I Bi Maxillary proclination. Index of orthodontic treatment need showed no definite need for treatment in 64.3% of the sample and definite need among 14.8% of the sample. There was a significant difference between the two age groups compared in terms of malocclusion statuses based on IOTN.

Conclusion: Immigrant Adult working class males in Kerala has almost similar treatment need statuses based on IOTN – DHC. However, they may seek orthodontic treatment mostly for class II malocclusion and present with a more possibility of having deep bite and poor oral hygiene which the orthodontist must be cautious while undertaking treatment.

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INTRODUCTION

Kerala is now home to more than 2.5million working class non-Malayalee employees¹. Majority of them work in construction fields, farmlands, industry, business malls etc. They are mostly from West Bengal, Assam, Orissa, Bihar, Chhattisgarh and Jharkhand. No published record of the malocclusion status of these subjects are available. Now that many of them are seeking dental and orthodontic treatment in Kerala, an assessment of their malocclusion status is valid.

The reported prevalence of malocclusion in India shows wide range of variation² mostly due to the inherent diversity within the subcontinent in terms of geography, race, culture etc. and due to the difference in registration criteria³ used. Malocclusion is the third most common oral condition next to dental caries and periodontal disease. WHO recommends periodic assessment of common problems for proper resource planning. There are many studies that reported the prevalence of malocclusion among native Keralite population⁴⁻⁹. Similar studies for the respective states from where these immigrants are coming to Kerala are also available¹⁰⁻¹³, but the malocclusion status of a pool of non-Malayalee from various

states residing in Kerala is unknown. Hence the aim of this study was to estimate the prevalence of various traits of malocclusion and orthodontic treatment need among Non-Malayalee immigrant working class adult males aged between 18 to 35years residing in Kerala.

METHODS

A cross sectional survey was carried out in two taluks of Ernakulam district after obtaining the necessary permissions and informed consent from the subjects. To avoid coercion in consent, subjects were not examined at their workplace where their employer was present. A modified vehicle with a leaning chair for the subject and investigator's examination chair was arranged. Those who are willing to participate were invited to fill up of the proforma followed by dental examination. Dental examinations were performed using a sterile mouth mirror and probe with a light source mounted on the investigator's head. Selected areas where these workers assemble on Sunday and evenings were identified and dental examinations were performed. Procedure was explained to them in Hindi and for those who did not understand Hindi translations were performed among the volunteers within the subjects.

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Subjections from other nationality were excluded. A toothpaste and brush were gifted to the participants at the end of the survey with necessary oral hygiene and other instructions as deemed necessary for each case.

Data was collected on 8 consecutive Sundays at a defined place of two taluks, four days in each taluk. A minimum of 25 to maximum of 30 examinations were carried out per day. Criteria recorded include, molar relation, canine and incisor relation, crowding in upper and lower anteriors, overjet, overbite, open bite other dental anomalies, tooth discoloration and tobacco habits. Overall malocclusion status was also assessed using IOTN- DHC.

Molar relationship was classified as either class I, II or III based on Angle’s criteria with subdivisions and incisor relation as division 1 or 2. Similarly canine relation was also recorded as class I, II or III and incisor relation based on the British Standards Institute criteria as class I, II or III. Crowing was assessed by eyeballing of the upper and lower arches separately by the trained examiner of more than 15 years (EP) who was calibrated prior to the start of the study. The criteria by ProffitWR¹⁴ was followed as mild, moderate or severe. Over jet and overbite was measured using millimeter metal scale specially modified to measure from the labial surface of the lower incisor to the incisal edge of the upper incisor on the labial side. Similarly, anterior cross bite, deep bite and open bite was also measured as per standard definitions according to glossary of orthodontic terms¹⁵. Midline deviations between each arch, and to the facial midlines were assessed. Posterior cross bites and scissors bites were also evaluated and noted as per standard definition. Other dental anomalies like supernumerary, hypodontia, ectopic eruptions and peg shaped teeth were recorded apart from habits like pan chewing and smoking.

Statistical Analysis

Data entry was initially performed in Microsoft excel and later was imported to SPSS 16 (SPSS Inc, Chicago, IL, USA) for statistical analysis. Descriptive statistics of mean and standard deviations were estimated and for statistical inferences for comparison between proportions and means a p<0.05 was considered significant.

RESULTS

Age distribution of the sample is presented in figure 1, and their smoking and pan chewing habit status is presented in figure 2. Class I molar relation was observed in 72.4% (152) of the sample and class II in 20.5% (43) and 2.4% (5) had class III molar relation. This along with other sagittal intra oral features like canine relation, incisor relation, overjet and reverse overjet are presented in table 1. 12.3% of the subjects with class I malocclusion had Bi-maxillary proclination. Upper crowding was present in 22.4% and 77.6% had lower crowding. 33.4% had deep bite, high labial frenum was observed in 10.5% (22) of the sample. Intra arch and vertical inter arch malocclusion traits are presented in table 2. Tooth discoloration due to fluorosis was seen 22.4% (47) of the subjects. Malocclusion assessed using IOTN-DHC showed,64.3%(135) having no need to borderline need (grade 1 and 2) 21%(44) showed moderate need (grade 3) and 14.8%(31) showed definite need for treatment (grade 4 and 5). There was no statistically significant difference (p>0.05) between the age groups (18-25 and 26-35) for the

malocclusion traits studied except for overjet, overbite and IOTN- DHC (p<0.05) (table 3).

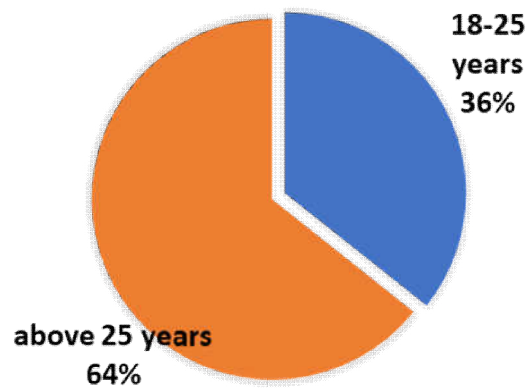


Fig 1 – Age group of the sample

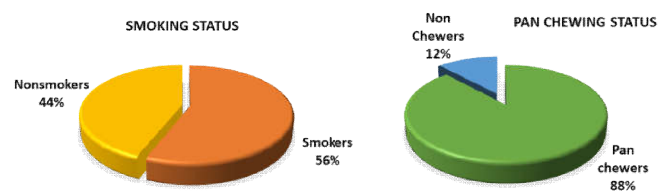


Figure 2 – smoking and Pan chewing status of the sample

Table 1 showing the sagittal malocclusion traits of the sample

Malocclusion trait	Features	n(%)
Molar relation	Class I	152(72.4)
	Class II	43(20.5)
	Class III	5(2.4)
	Unclassified	10(4.8)
Canine relation	Class I	162(77.1)
	Class II	43(20.5)
	Class III	5(2.4)
Incisor relation	Class I	160(76.2)
	Class II	40(19)
	Class III	5(2.4)
Overjet	Normal	117(55.7)
	4.1-6mm	51(24.3)
	6.1-9mm	31(14.8)
	Above 9mm	11(5.2)
Reverse overjet	Normal	197(93.8)
	Edge to edge	8(3.8)
	Up to 2mm	2(1.0)
	Above 2mm	3(1.4)

Table 2 showing intra arch and vertical malocclusion traits

Upper crowding	No crowding	77.6(163)
	Mild	14.3(30)
	Moderate	5.7(12)
	Severe	2.4(5)
Lower crowding	No crowding	22.4(47)
	Mild	45.7(96)
	Moderate s	20.5(43)
Upper Spacing	Severe	11.4(24)
	No spacing	89(187)
	Localized	7.6(16)
Lower Spacing	Generalized	3.3(7)
	No spacing	91.4(192)
	Localized	4.8(10)
Overbite	Generalized	3.8(8)
	Normal	66.7(140)
	Up to 50%	24.8(52)
Anterior open bite	50 to 100%	8.6(18)
	Edge to edge	
	Up to 2mm	2.9(6)
	Greater than 2mm	0.5(1)

Table 3 Comparison of the malocclusion status (IOTN-DHC) in two age categories

	18-25 years	Above 25 years	Pearson Chi-square	Significance
No need	38 (28.1)	97(71.9)	9.826	0.007*
Moderate need	23(52.3)	21(47.7)		
Definite need	14(45.2)	17(54.8)		

*significant

DISCUSSION

This was a preliminary investigation to study the prevalence of common malocclusion traits among non-Malayalee working class adult males in Kerala. A total of 210 subjects participated in the study. The selection of males alone in this study was based on the observation that most of working-class non-Malayalee adults are males and hence the ease for data collection.

There was alarming rate of pan-chewers and smokers among the sample studied. This will cause a real threat during orthodontic treatment in terms of oral hygiene and bracket breakage apart from other problems of oral premalignant conditions. A reported prevalence of 25.9% among Indians¹⁶ is much lower than that observed in this study. This may be due to the sample characteristics of this study where the included subjects were of working-class men, in whom the prevalence is expected to be high.

Current study reported 72.4% having class I molar relation which was similar to the report by Kumar P *et al*,¹⁰ for Maharashtra (75.2%) and Siddhegowda S⁷ for Karnataka (79.2%) and slightly less by Narayanan *et al*,⁵(69.8%) for native Keralites of Calicut. A much less prevalence of Class I molar relation was reported by Vibuthe *et al*,¹² (49.1%) for Maharashtra and a much higher prevalence was demonstrated by Kaur H *et al*,¹⁷ (89.45%) for Karnataka. In an old study for Trivandrum population Jacob PP⁴ reported only 49.2% having class I malocclusion which is much less than the current study. Peter *et al*,⁸ in 2018 reported 73.3% having class I malocclusion in a survey representing 5 districts of Kerala. In a recent study Sundareswaran S *et al*,⁹ reported 74.4% of their sample having class I malocclusion in northern Kerala.

Class II malocclusion was observed in 20.5% of the sample, which was similar to the reported prevalence for Karnataka by Siddhegowda *et al*,¹¹(20.7%), and slightly lesser than the report of Prasanna *et al*,¹⁰ (23%). However, a much lower prevalence of class II was reported by Narayanan⁵ for native Keralites (9.3%) and Jacob PP⁴ (4.9%).

Class III malocclusion was observed in 2.4% of the sample and it was similar to the report by Kaur *et al*,¹⁷ for Karnataka (2.14%). A higher reported prevalence among native Keralites for class III malocclusion by Jacob PP⁴ (4.9%) and Peter *et al*,⁸ (5.1%) is also available. Kharbanda *et al*,¹³ reported 3.4% of North Indians have class III malocclusion which is close to the current study.

Overall malocclusion was assessed using IOTN- DHC, which is very easy to apply in epidemiological surveys even though the validity is questionable for Indian population.

Most subjects belonged to “no or borderline treatment need” (64.3%) when IOTN grade I and II were assessed together. This was similar to the previous report by Peter *et al*,⁸ (65.0%) for the native Kerala population. However, Ashok Kumar *et al*,¹⁸, reported a much higher orthodontic treatment need for

North Indian population when the reported “no treatment need” category need was 33.2% only. Tak M *et al*,¹⁹ reported only 33.3% having no need for orthodontic treatment among a north Indian sample from Udaipur, Rajasthan. Bhardwaj *et al*,²⁰ reported 79.5% of the subjects doesn't need orthodontic treatment among subjects from Simla.

Moderate need (grade 3) was observed in 21% of the sample and this was similar to the report by Peter *et al*,⁸ (22%) for Keralites. Only 14% in the current study showed very great need for orthodontic treatment (grade4 and 5). This is much higher than the report by Kumar N *et al*,²¹ (1.6%), Bhaskaradoss *et al*,²² (1.1%), and Ashok Kumar *et al*,¹⁸ (1.4%). The proportion of sample that showed very great need for orthodontic treatment was similar to the reported “great need” category for the state. There was a statistically significant difference in the malocclusion need among the subjects belonging to different age group in this study. This may be because of the variation in number of subjects in the two categories.

Lower anterior crowding (77.6%) was the most prevalent single deviant trait among the subjects. This was similar to previous reported studies for the native Kerala population^{8,9}. However, a migrant working-class subject may not seek treatment based on the presence of lower anterior crowding. 10.5% of the subjects showed a midline diastema, the esthetic concern attached to this condition may attract patients for undertaking orthodontic treatment. Alarming rate of fluorosis among the immigrant workers need further probing as to the drinking water fluoride levels in their respective native place where they have grownup during the formative stages of teeth. Reports suggests that 15 states in India have high fluoride contents (>1.5ppm) in drinking water²³. The observed proportion is much lower than that reported for Telangana state²⁴ (70.3%). Except in certain areas the prevalence of dental fluorosis is low in Kerala and the findings of current study differed much from the reports for Kerala²⁵. This could be an esthetic concern for them, however seeking cosmetic treatment for this also is highly unlikely. But it will be a concern for orthodontists as the bond strength will be poor on such enamel surfaces.

This preliminary study is not without limitations as the survey sample may not be truly representative. However, an insight into the burden of malocclusion among the non-Malayalee adult working class males was the only objective, hence the results may be interpreted accordingly.

CONCLUSIONS

The overall prevalence of malocclusion assessed using a single deviant trait was high. However, the severity of malocclusion graded using IOTN-DHC showed 35.8% (moderate and great need) of the subjects were of moderate to great need for orthodontic treatment. 88.1% of the surveyed subjects had tobacco use habit and 22.4% of the subjects had enamel discoloration due to fluorosis. The most deviant trait was lower incisor crowding (77.6%). Since many of thesenon-Malayaleeimmigrant adults are seeking orthodontic treatment this data will provide valuable information to plan treatment for them. Bimaxillary proclination is not the prevalent form of malocclusion among immigrant non-Malayalee in contrast to the native Malayalee crowd. Bonding to enamel may be problematic due to fluorosis and pan chewing habits among them. With acceptable profile a single lower incisor extraction

may be considered in treatment planning. However, presence of deep bite may preclude this and consideration for a fixed lingual retainer may be included in treatment planning.

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