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RESEARCH ARTICLE

DIFFERENT TYPES OF MALOCCLUSIONS AND TREATMENT NEEDS AMONG ORTHODONTIC PATIENT: AN INSTITUTION BASED STUDY

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Abstract

The aim of this study was to analyze the different types of malocclusions among patients who visited Department of Orthodontics and Dentofacial Orthopedics of Narsinhbhai Patel Dental College and Hospital, Visnagar, Gujarat as a baseline data for proper treatment planning, teaching and further research.

Materials and methods: This study was conducted on 154 patients who attended the Department of Orthodontic and Dentofacial Orthopedics from June 2012 to August 2015. Information regarding age, sex, type of malocclusion, dentofacial patterns and dentofacial characteristics was obtained from patient records. Orthodontic treatment need was assessed using DHC component of IOTN.

Results: The results of the study showed that the patients age ranged from 9 to 35 years with mean age of 18 years 7 months. There were 86 (55.8%) males and 68 (44.1%) females. Chief complaints of majority of patients were 'irregular teeth' and 'upper front teeth forward'. The commonest type of malocclusion was Angle's class II which was seen in 79 (51.3%) of patients. There was an increased overjet in 78% of subjects. Statistically significant association was found between skeletal and Angle's classes ($p < 0.0001$). Assessment of need for orthodontic treatment using the DHC component of IOTN showed that 41 (26.6%) were in moderate need of treatment, 56 (36.3%) had severe need of orthodontic treatment, and 31 (20.1%) had extreme need of treatment.

Conclusion: The results gave a detailed pattern of malocclusion in orthodontic patients and the commonest type of malocclusion was Angle's class II div1 and this may provide a baseline data for research and planning orthodontic services. .

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Introduction:-

Now days the demand for orthodontic treatment is increasing in most countries. Therefore, rational planning of orthodontic measures is essential in assessing the resources required for such a service. This stresses the importance of studies in order to obtain knowledge about the different types of malocclusion and need for orthodontic treatment.

Instead of differentiating normal and abnormal in a population, determining frequencies of different types of malocclusions in a referred population may also give valuable information. There have been several studies investigating the prevalence of various dentofacial characteristics in different populations but only a few have been conducted on an orthodontic population. A comparison of these results is almost impossible, since studies conducted in a population of the same origin, may also show great variability. [1-7]

The aim of the study was to provide quantitative information regarding the Different types of dentofacial pattern and dentofacial characteristics in orthodontic patients and to find the frequencies of Angle's classes in institution.

Material and mathods:-

This study was done on Orthodontic patients who visited Department of Orthodontics and Dentofacial Orthopedics of Narsinhbhai Patel Dental College and Hospital, Visnagar, Gujarat from June 2012 to August 2015.

Pretreatment orthodontic records of 154 patients were obtained and used for study. Data collection was based on written case history, intraoral and extraoral photographs, dental casts, lateral cephalogram and OPG.

A qualitative analysis with Angle's classification was used to describe the Anteroposterior relationship of maxillary and mandibular first molars.[8,9] Incisor classification was described based on British standard classification of incisor relationship.

The following dentofacial characteristics were recorded using initial records:

1. Angle's malocclusion
2. Arch length discrepancy
   (Crowding and spacing; 0 to 1 mm normal, 2 to 3 mm mild, 4 to 6 mm moderate, >7 mm severe), were measure by using Arch Perimeter analysis.
3. Chief complaint
4. Facial type
5. Facial profile
6. Overjet
   (1-2 mm normal, 3 to 4 mm mild, 5 to 6 mm moderate, >7 mm severe, reverse),
7. Overbite
   (0-2 mm normal, 3-4 mm moderate, 5-7 mm severe, reverse, open bite)
8. Cephalometric skeletal analysis
   (ANB= Skeletal class I: 0-4°, skeletal class II: >4°, skeletal class III: <0°,
   BETA angle= Skeletal class I: 27^0-35°, skeletal class II: <27°, skeletal class III: >35^0)
9. Orthodontic treatment need was assessed by using dental health component (DHC) of index of orthodontic treatment need (IOTN).[10,11]
   Malocclusions were divided into five different groups ranging from Extreme need (grade V) to no need of treatment (grade I).[10,11]

Statistical analysis:-

Descriptive statistics were calculated to find the means and standard deviations. Data collected were pooled to determine frequencies and cross tabulations of dentofacial characteristics with Angle's classes using Chi-square for facial type, facial profile, crowding, spacing, overjet and overbite. Chi-square test was also used to find the association and Cramer's V for correlation between the skeletal and Angle's classes. p-value less than or equal to 0.05 was considered statistically significant. The software used for data analysis was SPSS version 22.

Results:-

Age and Gender:-

Out of 154 patients, 86 (55.8%) were male. Ages of patients ranged from 9 to 35 years with mean age of 18 years and 7 months (SD + 4.0471) as shown in Figure 1.

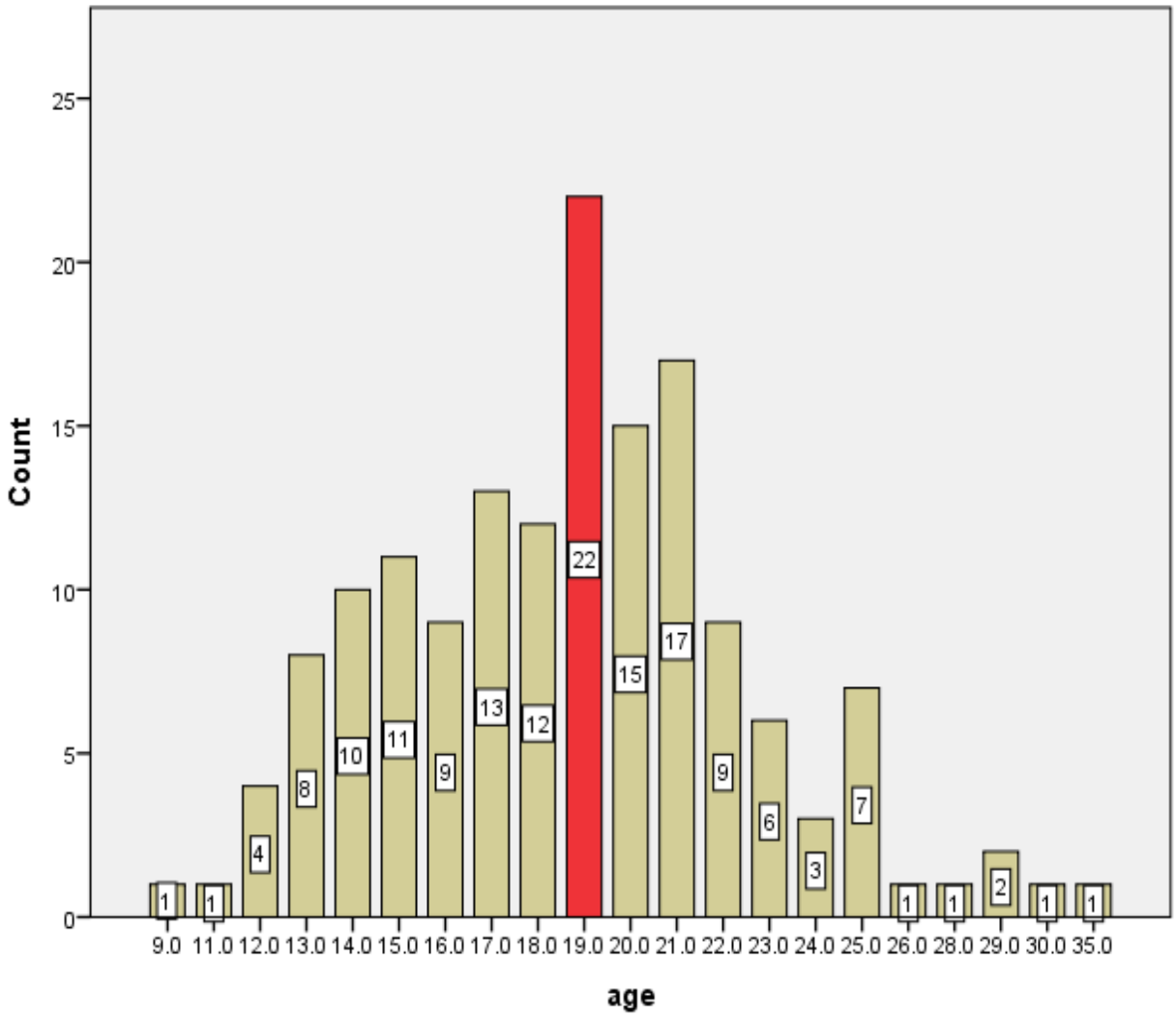


Fig. 1: Chronological age range of the sample showing its frequency distribution

Chief Complaint:-
Chief complaints in majority of patients were 'irregular teeth (51.3%)' and 'forwardly placed front teeth (34.4%)', as shown in Figure 2.

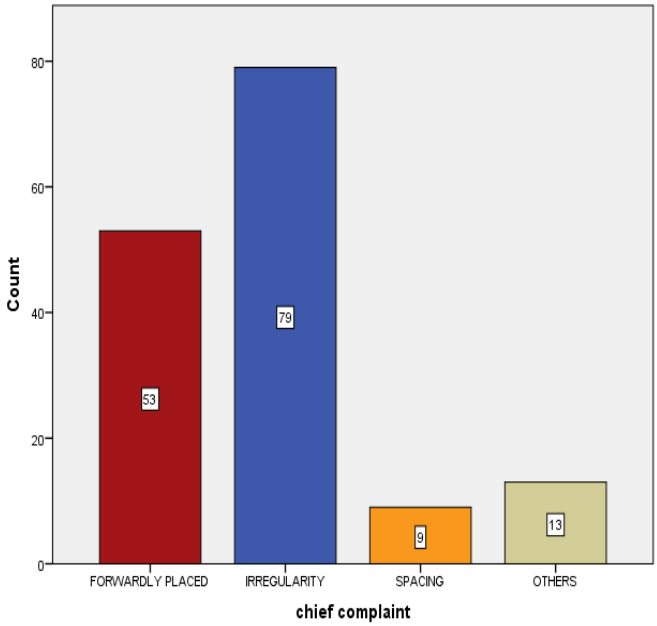


Fig. 2: Chief complaint of the patient

TABLE: 1

Distribution of male and female subject into chief complaint

Chief complaint	n =154 (%)
Forwardly placed	53 (34.4) (Male: 31) (Female: 22)
Irregularity	79 (51.3) (Male: 42) (Female: 37)
Spacing	9 (5.8) (Male: 5) (Female: 4)
Others	13 (8.4) (Male: 8) (Female: 5)

Malocclusion Types:-
Class II malocclusion was found in 79 patients, which represented 51.3% of the sample. Frequencies of class I and III were 46.1% and 2.6% respectively. Incisors class 1 and class II div. 1 (41.6%) was most common feature of the sample.

The distribution of malocclusion according to Angle's and incisor classification is presented in Table 2. Statistically significant associations were observed between Angle's and skeletal classes (Table 3) (x^2 = 33.77, df = 4, p < 0.0001) whereas weak correlation was observed between the two (Crammer's V = 0.350).

TABLE: 2

Angle's classification	n =154 (%)
Class I	71 (46.1)
Class II	79 (51.3)
Class III	4 (2.6)

Incisor classification	n =154 (%)
Class I	64 (41.6)
Class II div 1 Class II div 2	64 (41.6) 18 (11.7)
Class III	8 (5.2)

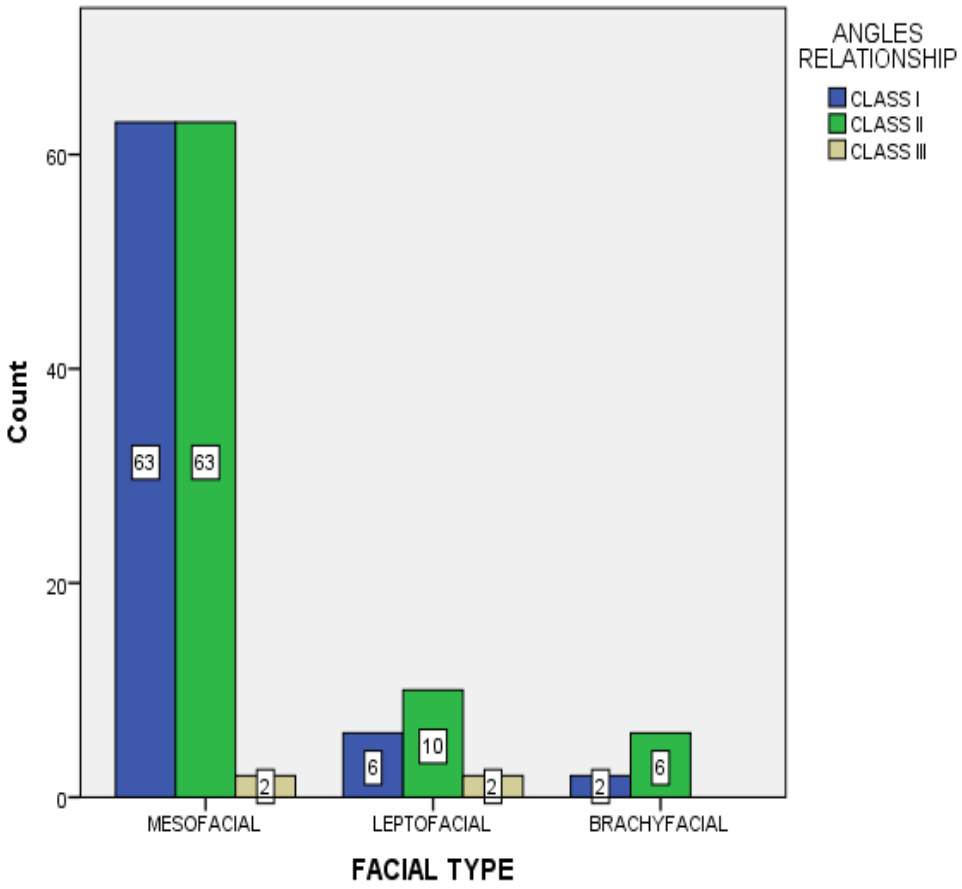
TABLE: 3

Cross tabulation of angle and skeletal classes

Skeletal class	Angle's classes n (%) Class I n =71	Class II n = 79	Class III n = 4	Total n = 154 (%)
Class I	39 (54.9)	30 (37.9)	1 (25)	70 (45.5)
Class II	9 (12.7)	42 (53.2)	-	51 (33.1)
Class III	23 (32.4)	7 (8.9)	3 (75)	33 (21.4)

Dentofacial cherecteristics:-

Most patients had Mesofacial (83%) facial type and Retrognathic (61.0%) profile. Mesofacial (83%) facial type, which was seen in class I and class II patients. The Prognathic profile was predominantly found in class I patients, i.e. 9.7% while Retrognathic profile (61.0%) mainly existed in class II patients. Statistically significant association (x^2 = 14.22, df = 4, p < 0.007) was observed between facial profile sagittal and Angle's classes as shown in Table 4.


ANGLES RELATIONSHIP
CLASS I
CLASS II
CLASS III
Count
60
40
20
0
63
63
2
6
10
2
2
6
MESOFACIAL
LEPTOFACIAL
BRACHYFACIAL
FACIAL TYPE

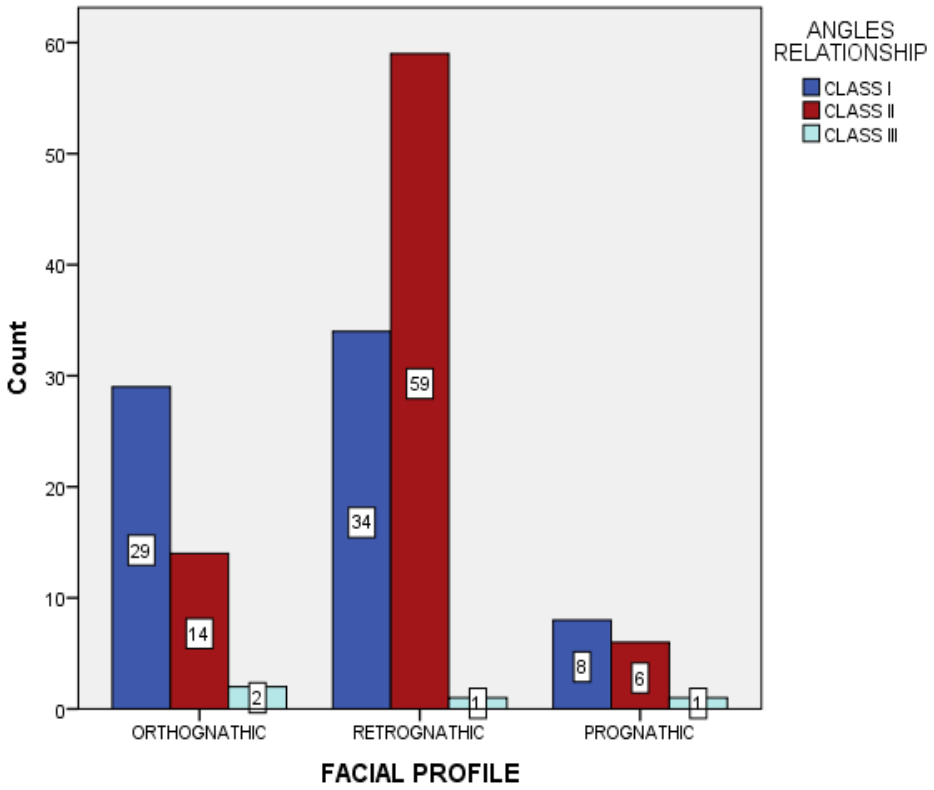


TABLE: 4

Cross tabulation of Dentofacial pattern with angle's classes:

Dentofacial characteristic		Class I n =71	Class II n = 79	Class III n = 4	Total n = 154 (%)
Facial type	Mesofacial Leptofacial Brachyfacial	63(88.7) 6 (8.4) 2 (2.8)	63(79.8) 10(12.7) 6 (7.6)	2 (50) 2 (50) -	128 (83.11) 18 (11.7) 8 (5.2)
Facial profile	Orthognathic Retrognathic Prognathic	29(40.9) 34(47.9) 8 (11.3)	14(17.7) 59(74.7) 6 (7.6)	2 (50) 1 (25) 1 (25)	45 (29.2) 94 (61.0) 15 (9.7)

Dentofacial characteristics:-

There was increased overjet in 78% of the subjects of which 67% belonged to class II malocclusion. There was increased overbite in 61% of the subjects of which 77.2% were in class II malocclusion.

Maxillary crowding was present in 42.8% of the sample and mandibular crowding was present in 52.6% of sample. Maxillary spacing was present in 35.7% and mandibular spacing was present in 23.4% of sample. Statistically significant associations were found between crowding, maxillary spacing, overjet and Angle's classes (Table 5).

TABLE: 5

Cross tabulation of dentofacial characteristics with Angle's classes

PARAMETER	Spacing	CLASS 1	CLASS II	CLASS III	TOTAL
0-1 normal	MAX	46 (46.5)	50 (50.5)	3 (3)	99 (100)
	MAND	51 (43.2)	64 (54.2)	3 (2.5)	118 (100)
2-3 mild	MAX	7 (36.8)	12 (63.2)	0	19 (100)
	MAND	9 (47.4)	9 (47.4)	1 (5.3)	19 (100)
4-6 moderate	MAX	13 (56.5)	9 (39.1)	1 (4.3)	23 (100)
	MAND	8 (61.5)	5 (38.5)	0	13 (100)
> 7 severe	MAX	5 (38.5)	8 (61.5)	0	13 (100)
	MAND	3 (75)	1 (25)	0	4 (100)

PARAMETER	Crowding	CLASS1	CLASSII	CLASSIII	TOTAL
0-1 normal	MAX	36 (40.9)	49 (55.7)	3 (3.4)	88 (100)
	MAND	34 (46.6)	37 (50.7)	2 (2.7)	73 (100)
2-3 mild	MAX	12 (52.2)	11 (47.8)	0	23 (100)
	MAND	14 (38.9)	21 (58.3)	1 (2.8)	36 (100)
4-6 moderate	MAX	13 (52)	11 (44)	1 (4)	25 (100)
	MAND	17 (60.7)	10 (35.7)	1 (3.6)	28 (100)
> 7 severe	MAX	10 (55.6%)	8 (44.4%)	0	18 (100)
	MAND	6 (35.3%)	11 (64.7%)	0	17 (100)

DENTOFACIAL CHARECTERICTICS	CLASS 1	CLASS II	CLASS III	TOTAL
Overjet (mm)				
0-1 normal	16 (51.6%)	13 (41.9%)	2 (6.5%)	31 (100%)
2-3 mild	27 (64.3%)	14 (33.3%)	1 (2.4%)	42 (100%)
4-6 moderate	17 (45.9%)	20 (54.1%)	0	37 (100%)
> 7 severe	9 (22%)	32 (78%)	0	41 (100%)
Reverse	2 (66.7%)	-	1 (33.3%)	3 (100%)
Overbite (mm)				
0-2.9 normal	36 (65.5%)	18 (32.7%)	1 (1.8%)	55 (100%)
3-5.9 moderate	26 (53.1%)	23 (46.9%)	0	49 (100%)
6+ severe	7 (15.6%)	38 (84.4%)	0	45 (100%)
Reverse	2 (50%)	0	2 (50%)	4 (100%)
Openbite	0	0	1 (100%)	1 (100%)

Orthodontic treatment need:-

Out of 154 patients, 31 (20.1%) patients were found to be in extreme need of treatment, i.e. grade V, 56 (36.4%) patients required definite treatment, i.e. grade IV, 41 (26.6%) with moderate need, i.e. grade III and 25 (16.2%) with mild need (Table 6).

TABLE: 6

Distribution of male and female subject into treatment need according to IOTN

GRADE I	1- male (0.6%)
GRADE II	25 (16.2%) Male: 12 Female: 13
GRADE III	41 (26.6%) Male: 21 Female: 20
GRADE IV	56 (36.4%) Male: 31 Female: 25
GRADE V	31 (20.1%) Male: 21 Female: 10

Discussion:-

According to our results, the mean age of the patients was 18.7 ± 4.04 years. The numbers of male patients were more (55.8%) compared to (44.1%) female patients in this study. This is an interesting and contraindicating finding with the finding of other similar study. Other studies showed that the concern of orthodontic treatment need of female are high in our society [7,12] and this finding is because of most patient are visited in our institution from rural area where low literacy rate.

Majority of patients had the chief complaint of 'irregular teeth' and 'forwardly placed upper front teeth'; this is in accordance with the results obtained with other similar studies.[6,7,13]

Angle's class II (79%) and incisor class I and class II division 1 (41.6%) were the most frequent pattern of malocclusion found in the sample, while class I malocclusion was 46.1% and class III 2.6%.

Skeletal class I (45.4%) was the most frequent pattern of malocclusion. Similarly, Lalita Nanjannawar [6], Tanvi bihani [7], Gul- e-Erum, Mubassar Fida [13] and Ijaz A [14] reported Angle's class II division1 and skeletal class II as the most common pattern of malocclusion.

Jones [15] investigated malocclusion and facial types in 132 Saudi Arabian patients referred for orthodontic treatment and reported that 53.8% had class I, 28.8% had class II division 1, 4.5% had class II division 2 and 2.9% had class III malocclusion. Yang [16] evaluated 3305 patients who had visited Department of Orthodontics, Seoul National University Hospital from 1985 to 1989. He reported that percentages of class I, II division 1, class II, division 2, and class III were 35.9, 13.4, 1.5 and 49.1% respectively.

The results of our study showed that most patients had Mesofacial (83%) facial type, Retrognathic facial profiles (61%). Lalita Nanjannaawar [6] et al reported Orthognathic profile as most common profile. Gul-e-Erum, Mubassar Fida [13] reported Retrognathic profile is the most common.

The results of our study showed an increased overjet (78%) and overbite (61%) of the subjects as a major occlusal finding, with an increased frequency and severity in class II patients. This trend in overjet and overbite values is in agreement with the earlier surveys of orthodontic populations.[15]

In the present study, results showed maxillary crowding 42.8%, mandibular crowding 52.6%, and maxillary spacing 35.7% and mandibular spacing 23.4% while Ali Borzabadi [17] found severe crowding in 16.7% maxilla and 10.8% in mandible. Obanubi KO [18] found crowding in 38% and spacing in 42.3% of sample in his Nigerian study. Sayin and Turkkahraman [19] found moderate maxillary crowding and mild mandibular crowding to be the most common finding in all malocclusion types.

Out of 154 patients, 31 (21.1%) were found to be in extreme need of treatment, 56 (36.4%) patients required definite treatment, [12] (26.6%) had moderate need and two (16.2%) had mild need of orthodontic treatment. Bashir Hameed [20] conducted a study to evaluate orthodontic treatment need on sample of 300 patients irrespective of sex with age range of 12 to 17 years. Sixty percent of patients were found to have definite treatment need according to DHC of IOTN.

This study has incorporated a number of variables while evaluating pattern of malocclusion. Differences in malocclusion characteristics between this study and other studies would be expected because of differences in racial and ethnic composition. Results can not be representative of the whole of the Indian population and thus expected to vary in degree of prevalence of dentofacial characteristics.

Conclusion:-

In our institution-based study, the frequency of class I, II and III malocclusion was found to be 46.1, 51.3 and 2.6% respectively. Chief complaints of majority of patients were 'irregular teeth and upper front teeth forward'. The numbers of female patient are less when compared to male patients. Among the entire dentoalveolar problems studied increased overjet was found to be the most common feature. According to DHC component of IOTN, 31 (20.1%) had extreme need of treatment and 56 (36.4%) were in severe need of treatment and 41 (26.6) were in moderate need of orthodontic treatment.

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