# Original Research

# Prevalence of Most common Dental Malocclusions in Orthodontic Patients Among Adolescents and Adults in Nashik District Population: A Cross-Sectional Clinical Study

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**ABSTRACT:**
**Introduction:** The purpose of this study was to determine the prevalence of dental malocclusion among adolescents and adults in the people who are living in Nashik district population. **Methods:** Participants were chosen from among those aged 10 and above, by attending dental public health events hosted by our Institute in and around the Nashik area, as well as from patients who come to our Dental Hospital in Nashik for an orthodontic therapy symptomatic evaluation. Dental occlusion in adults and adolescents was assessed using diagnostic casts, clinical images, panoramic radiographs, and lateral cephalograms. **Results:** With a mean age of 17.37, 131 (42.8%) of the 306 exhibited Class I molar relation, 23.6% revealed Class II div 1 molar relation, 8.5% showed Class II div 2 molar relation, and 2.9% showed Class III molar relation. Mesial step Classification of malocclusion was seen in 19.9% of the deciduous dentition on the Analogue. **Conclusion:** Mesial step malocclusion in adolescents and Angles Class I malocclusion in adults were both substantially more common in the Nashik district population.

## INTRODUCTION

"Any deviation from normal occlusion of teeth" is known as malocclusion.

The teeth are positioned incorrectly in respect to the base of the process of the alveoli, to the nearby teeth and/or to the teeth on the other side.

Occlusion, according to Angle, is the typical relationship between the occlusal inclined planes of the teeth upon closing the mouth. The ideal occlusion and spacing in primary dentition act as mirror for the prevalence of malocclusion in the permanent dentition.

The properly placed teeth in dental arch help in maintaining the better health of oral cavity and the supporting structures, but also influence the personality of the children.

Malocclusion not only compromises maintaining better hygiene and also the health of investing tissue, but can also lead to behavioural (psychological) and social problems.

Malocclusion is a problem affecting a disproportionately large number of Indian children. Numerous hereditary and environmental factors can lead to dental abnormalities. While genetic flaws in some genes are the most significant, causative incidents in the foetal and Anomalies in postnatal periods have also been attributed to tooth size, shape, location, quantity, and structure, resulting in malocclusion.

MCCALL (1944) [1]: Malocclusion symptoms recorded include: molar relationship, posterior cross-bite, anterior crowding, rotated incisors, excessive overbite, open-bite, labial or lingual version, tooth displacement, constriction of arches.

No definition of these symptoms was specified. Symptoms were recorded in all or none manner. The World Health Organization defines malocclusion as a

handicapping dentofacial defect that involves aberrant occlusion and/or altered craniofacial interactions.

It can impact facial harmony, function, aesthetic appearance, and psychosocial well-being. Orthodontics is the most common treatment for various malocclusions and is essential for resolving patients' oral health and aesthetic problems, especially during adolescence and early adulthood [2].

According to several experts, its high prevalence ranges from 20% to 100%, making it one of the most prevalent dental issues. The severity of malocclusion and its influence on oral functions and facial aesthetics is becoming a great concern to health authorities and families as well [3].

Differences in the geographic location, age of the included groups, registration processes, and other factors may be the cause of discrepancies in the recorded data [4].

Malocclusions that are commonly observed in clinics include deep overbite, midline deviation, severe overjet, anterior crossbite, mal-alignment, space, and open bite.

Dental problems are a major contributing component to the multifactorial aetiology of malocclusion, which can be caused by environmental causes, genetic factors, or a combination of these in the affected individuals. In order to establish a normal dentition from the eruption of the first deciduous tooth to the achievement of a final good occlusion, orthodontic and paediatric dentistry clinic work focusses on managing oral health from the early childhood stage and preventing and treating a variety of oral diseases in children and adolescents.

This paper attempts to give a general understanding of the management of occlusal development in dental orthodontic &Paediatric clinics by primarily examining prevalent dental disorders in children and adults and their impact on malocclusion, as well as the prevention, treatment, and management of these conditions.

Epidemiological studies of malocclusion not only help in orthodontic treatment planning and evaluation of dental health services but also offer a valid research tool for ascertaining the operation of distinct environmental and genetic factors in the aetiology of malocclusion.

Despite the paucity of information regarding orthodontic knowledge and treatment requirements, malocclusion is clearly a public health issue among young people.

There isn't many research to calculate the percentage of the population that needs Dental care in India.

## MATERIALS AND METHODS
### Study population
Individuals who visited the institute in Nashik for an orthodontic diagnostic evaluation between July2024 and December 2024 are a part of the recent studies.
The project received approval from the ethics committee.

The study's objectives were communicated to college administrators and the parents of the sampled children in the case of adolescents and the samples in the case of adults.

A total of 306 patients were included in the study. The existence of most common malocclusions along with crossbites, open bite, crowding, increased overjet (Proclination), midline diastema, rotation, and spacing, were identified by reviewing the initial diagnostic data.

### The Inclusion criteria employed for selection of samples were:
1. Patients who are 10 years of age or older
2. (Patients who are reported to the orthodontics department at
3. Residents of Nashik district
4. There are no significant systemic or local issues or traumas that impact the development of the body or facial tissues.
5. Common malocclusions - spacing, rotations, midline diastemas
6. Malocclusion in vertical (open bite) and transverse (crossbite) planes.

### Exclusion Criteria
The following groups were excluded from the study:
1. Interceptive or orthodontic therapy was performed.
2. Presence of any dental prosthesis
3. Missing tooth

The final sample (which needed patients to be at least 10 years old) not fulfilling the stated criteria was excluded from the study.

The following malocclusions were determined after reviewing the samples clinically, pretreatment tdiagnostic data, which included diagnostic casts, clinical pictures:

Radiographs such as intra-oral periapical radiographs, orthopantomograph, occlusal radiographs and lateral cephalograms were advised if the condition demanded
1. Angles class I - The mesiobuccal cusp of maxillary 1st permanent molar occludes in the buccal groove ofmandibular 1st permanent molar.
2. Angles class II - The distobuccal cusp of the upper 1st permanent molar occludes in the buccal groove of the lower 1st permanent molar
3. Angles class II, division 1 - Angles class II molar relation along with Proclined upper incisors
4. Angles class II, division 2 - Angles class II molar relation along with presence of lingually inclined upper central incisors and labially tipped lateral incisors overlapping the central incisors
5. Angles class III - The mesiobuccal cusp of the maxillary 1st permanent molar occluding in the interdental space between the mandibular 1st and 2nd molars.
6. Mesial step terminal plane - The distal surface of the lower second deciduous molar is more mesial than that of the upper 2nd deciduous molar.

7. Flush terminal plane - The distal surface of the upper and lower second deciduous molars is in one vertical terminal plane.
8. Distal step terminal plane -The distal surface of the lower 2nd deciduous molar being more distal to that of the upper 2nd molar
9. Spacing - Interdental spaces and lack of contact points between teeth.
10. Midline diastema - The anterior midline spacing between the two maxillary central incisors.
11. Crowding - Result of disproportion between tooth size and arch length.
12. Rotation - Tooth movement that occur around their long axis
13. Open bite - Malocclusion that occurs in the vertical plane, characterized by lack of vertical overlap between the maxillary and mandibular anterior.
14. Crossbite - Abnormal occlusion in transverse plane.

Graber, has defined crossbite as a condition where one or more teeth may be abnormally Malposed buccally or lingually or labially with reference to the opposing tooth or teeth.

One group of orthodontists performed the examinations in the orthodontics department at, with two to three samples in total were looked upon every day, while the subject was seated in a chair with sufficient natural light.

Simple methods for preventing infections in personal hygiene and PPE, or personal protective equipment, was adopted.

The tools and materials utilized included, disposable mouth masks, kidney trays, cheek retractors, PMT sets (probe, mirror, and tweezer), disposable gloves. PMT sets were used once and then discarded.

An antibacterial solution based on alcohol Following hand washing with (3 M Hand Rub), hand hygiene was performed using water and soap. All of the reusable tools were chemically sterilized or autoclaved following each day's survey.

Data were coded and entered into excel sheet. To maintain the data quality (validity) rechecking and crosschecking were done during data entry phase. Later, data were transformed into SPSS windows version16, where coding, recording, crosschecking, processing and analysis of data were done.

Simple descriptive statistics were used to describe the study variables. Where appropriate, appropriate statistical tests of significance were applied. Malocclusion prevalence was

evaluated by calculating the proportion of adults and adolescents included in the study.

## RESULTS
Out of 306, 131 (42.8%) were males and 175 (57.2%) were females with mean age of 17.37.

65.0% showed Class I molar relation, 23.6% showed Class II div 1 molar relation, 8.5% showed Class II div 2molar relation and 2.9% showed Class III molar relation.

On analyzing deciduous dentition 19.9% showed mesial step classification of malocclusion.

On analyzing crossbite, it was found that 3.6% showed presence of anterior crossbite and 0.7% showed presence of posterior crossbite.

Open bite tendencies were seen in 3.9% Anteriorly.

48.6% showed increase in overjet than normal.

Midline diastema was present in 12.1%.

8.2% showed spacing in maxillary and mandibular anterior and 9.5% showed spacing in maxillary and mandibular posteriors.

Rotation tendencies were seen in 3.5% in maxillary and mandibular anterior and 4% in Maxillary and mandibular posteriors region.

0.3% showed presence of cleft lip and palate.

18.9% of overall sample showed crowding in maxillary and mandibular anterior and 4.3% showed crowding in maxillary and mandibular posteriors.

| Malocclusions | PRESENT | Maxillary and mandibular anterior | Maxillary and mandibular posteriors | TOTAL |
|---|---|---|---|---|
| Increased overjet | 149 | -------- | --------- | 149 |
| Crowding | --------- | 58 | 13 | 71 |
| Spacing | --------- | 41 | 21 | 62 |
| Midline diastema | 37 | ----------- | -------- | 37 |
| Rotation | --------- | 11 | 13 | 24 |
| Crossbite | ---------- | 11 | 2 | 13 |
| Open bite | 12 | --------- | -------- | 12 |
| Cleft lip and palate | 1 | ---------- | ---------- | 1 |

**Distribution as per OVERJET**

| OVERJET | Frequency | Percent |
|---|---|---|
| Average | 157 | 51.4 |
| Increased | 149 | 48.6 |
| Total | 306 | 100.0 |

## Distribution as per OVERJET
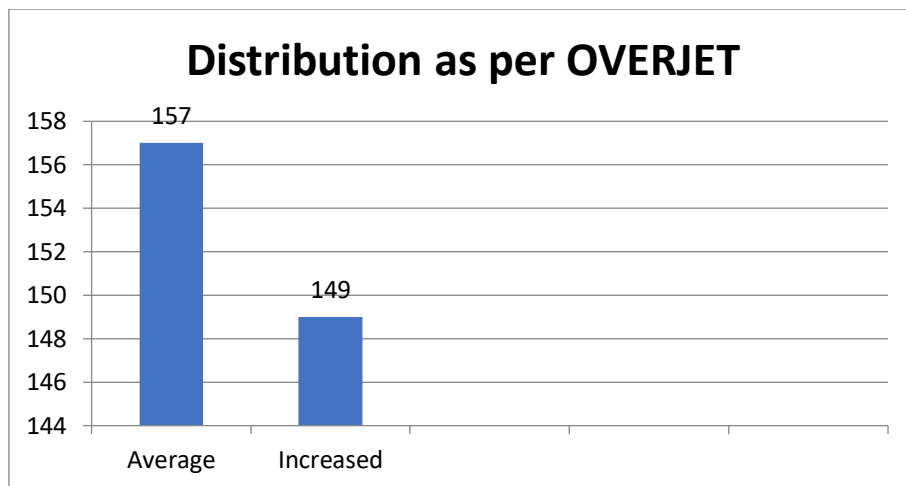


**Distribution as per CROWDING**

| CROWDING | Frequency | Percent |
|---|---|---|
| Absent | 235 | 76.8 |
| Maxillary and mandibular anterior | 58 | 18.9 |
| Maxillary and mandibular posteriors | 13 | 4.3 |
| Total | 306 | 100.0 |
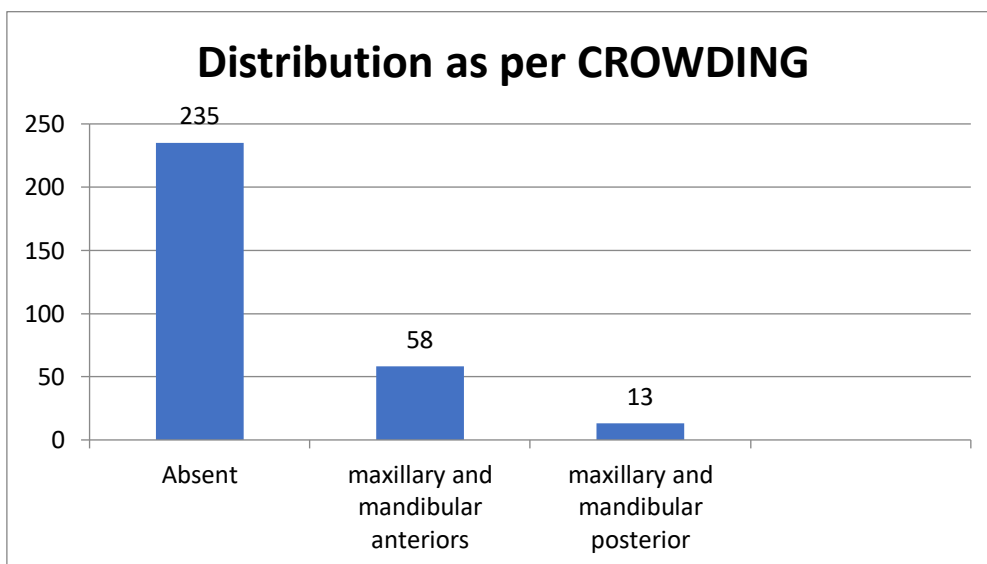


**Distribution as per SPACING**

| SPACING | Frequency | Percent |
|---|---|---|
| Absent | 244 | 80.1 |
| Maxillary and mandibular anterior | 41 | 8.2 |
| Maxillary and mandibular posteriors | 21 | 9.5 |
| Total | 306 | 100.0 |

## Distribution as per SPACING
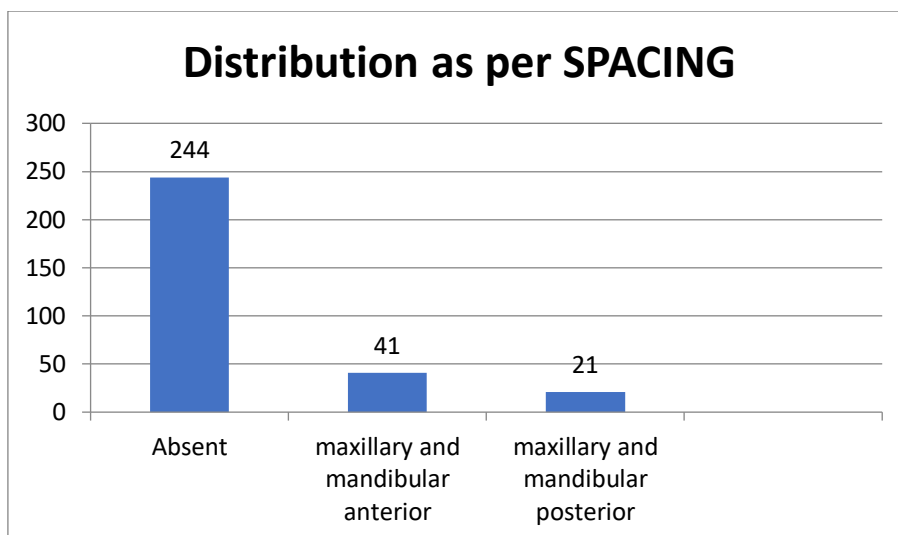


**Distribution as per MIDLINE DIASTEMA**

| MIDLINE DIASTEMA | Frequency | Percent |
|---|---|---|
| Absent | 269 | 87.9 |
| Present | 37 | 12.1 |
| Total | 306 | 100.0 |

## Distribution as per MIDLINE DIASTEMA
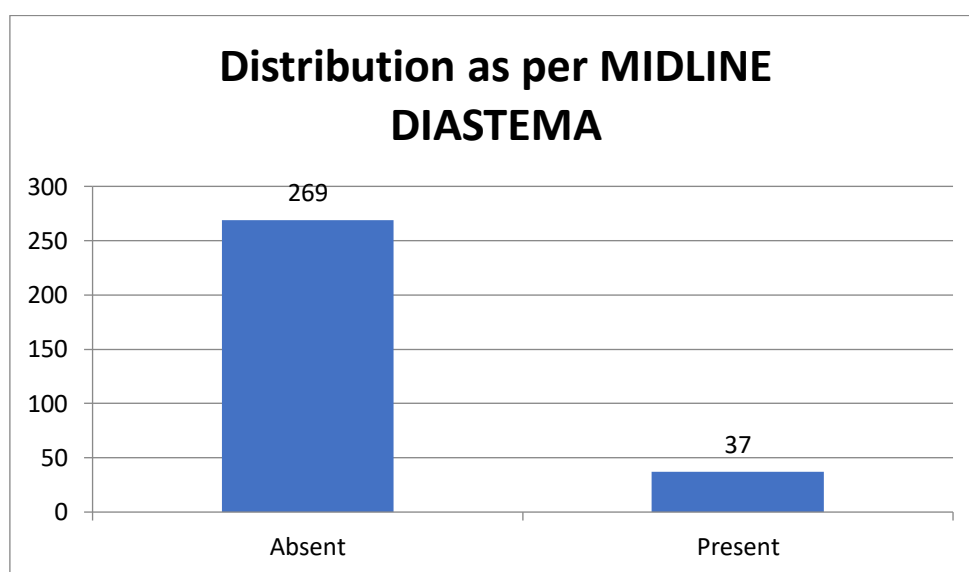


**Distribution as per ROTATION**

| ROTATION | Frequency | Percent |
|---|---|---|
| Absent | 282 | 92.2 |
| Maxillary and mandibular anterior | 11 | 3.5 |
| Maxillary and mandibular posterior | 13 | 4 |
| Total | 306 | 100.0 |

## Distribution as per ROTATION
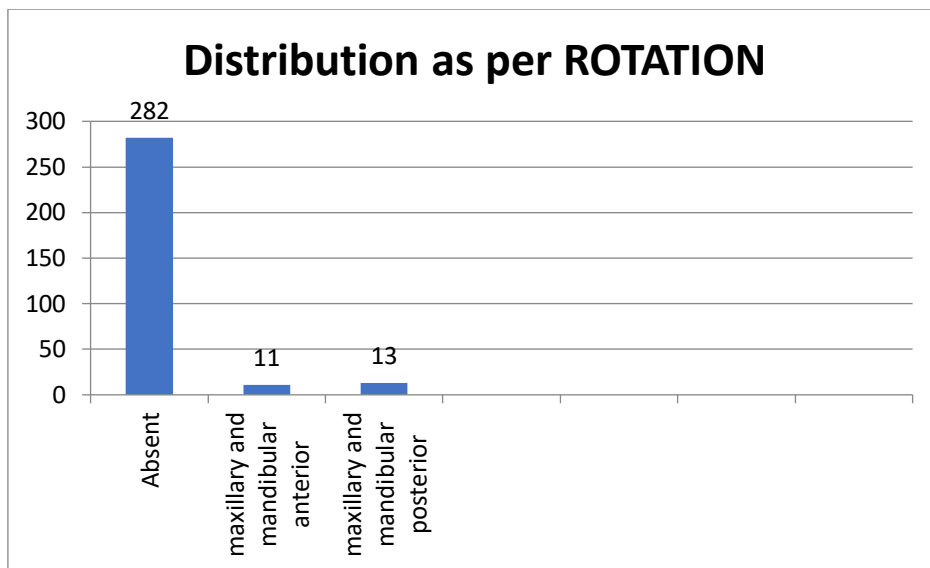


**Distribution as per CROSSBITE**

| CROSSBITE | Frequency | Percent |
|---|---|---|
| Absent | 293 | 95.7 |
| Posterior crossbite | 2 | 0.7 |
| Anterior crossbite | 11 | 3.6 |
| Total | 306 | 100.0 |

## Distribution as per CROSSBITE
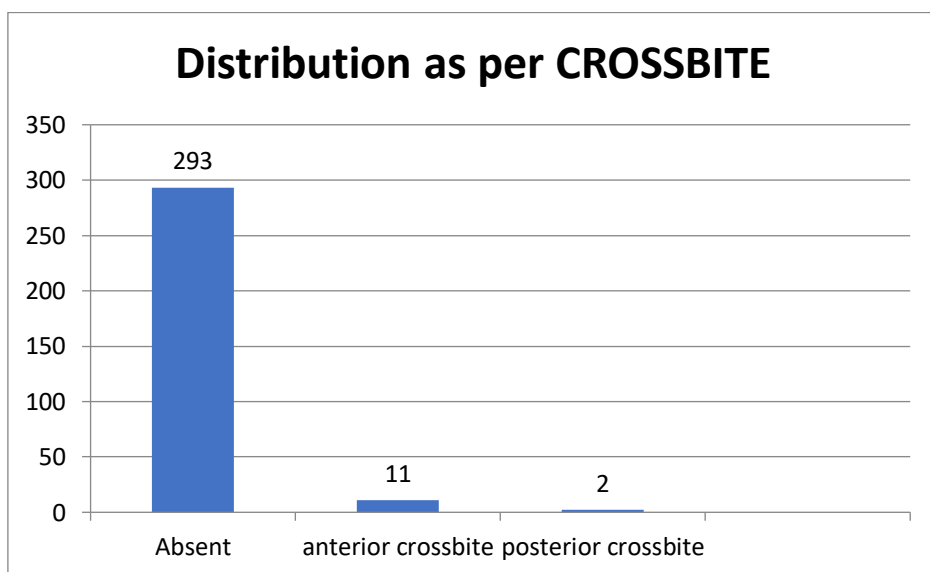


**Distribution as per OPENBITE**

| OPENBITE | Frequency | Percent |
|---|---|---|
| Absent | 294 | 96.1 |
| Anteriorly present | 12 | 3.9 |
| Total | 306 | 100.0 |

## Distribution as per OPENBITE
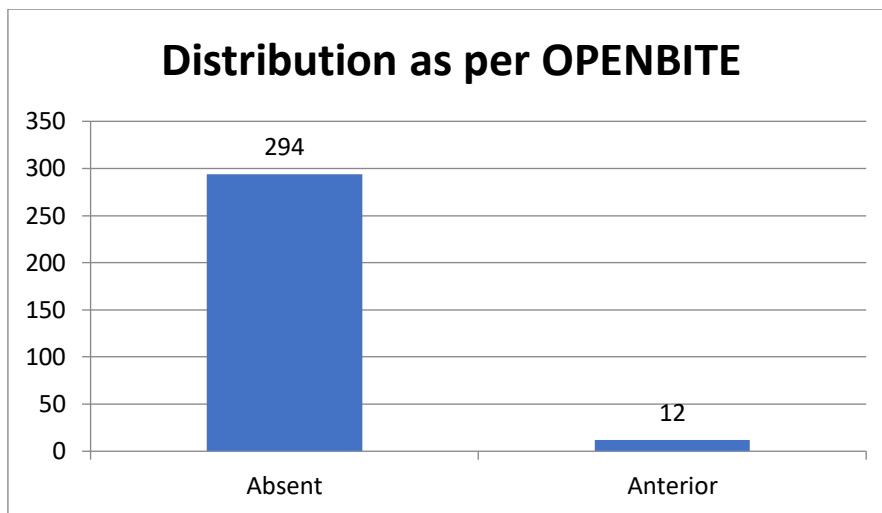


**Distribution as per Cleft lip cleft palate**

| C/L C/P | Frequency | Percent |
|---------|-----------|---------|
| Absent | 305 | 99.7 |
| Present | 1 | 0.3 |
| Total | 306 | 100.0 |

## Distribution as per Cleft lip cleft palate
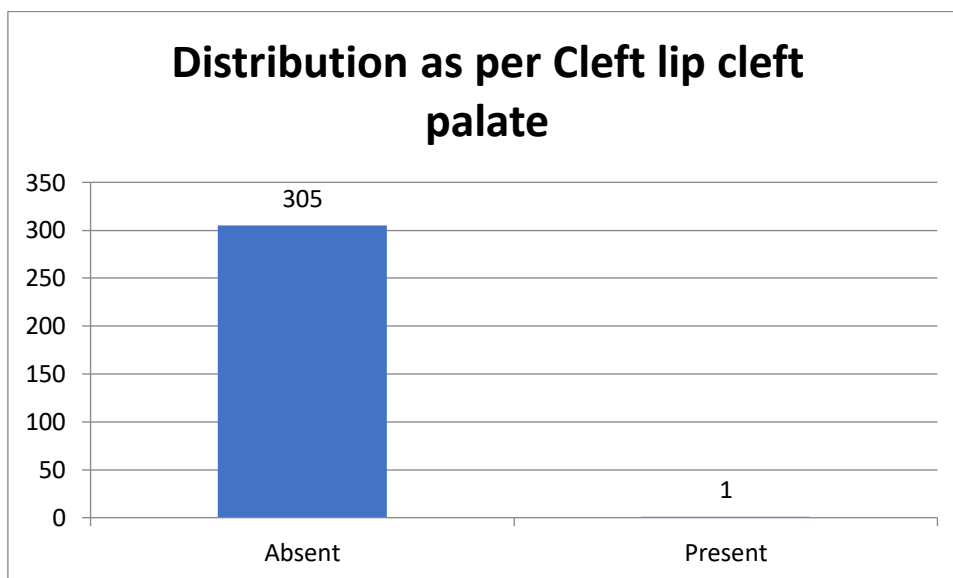


## DISCUSSION

The primary goal of this survey was to detect prevalence of malocclusions needing orthodontic treatment in the population of adults and adolescents in Nashik District population.

In a sample of orthodontic patients from Nashik, this study gives practitioners access to a database that shows the percentages of incidence of each form of dental anomaly and the teeth that are most affected by each type.

Malocclusion is not just an invariable disease state, but a continuous spectrum of occlusal variation, occurring as a myriad of combinations and permutations of a number of heterogeneous traits or symptoms, each with its own wide range of severity and implications in creating a particular manifestation of occlusion.

In general prevalence of malocclusion is considered to be on increase with evolution and civilization. Although Angle's method has been used in recording the malocclusion it does not reflect the actual orthodontic treatment needs of the society.

Significant percentage of the samples are in need for orthodontic treatment [5]. When Malocclusions are identified early, orthodontic treatment may be planned to minimize discomfort and difficulty [6].

In Adolescents reason for early detection of malocclusion is prevention of tooth trauma in patients with class II malocclusion with increased overjet [7]

And this prevalence will help Orthodontists, public health dentists to educate the parents of child how important it is to see your dentist as early as possible and basically to prevent the further malocclusion.

Early diagnosis of Malocclusions enables optimal planning of orthodontic treatment, reducing side effects, the complexity of treatment and the cost of the treatment [8].

However, if left untreated, they can lead to asymmetric growth of the maxilla or mandible and dental complications that are difficult and costly to treat. The epidemiological data on the prevalence of malocclusion is an important determinant in planning appropriate levels of orthodontic services [9-11].

This study showed that the main occlusal anomalies responsible for classifying students as having a high need for orthodontic treatment were an increased overjet, a deviation of the molar relationship from Class I, an increased overbite, and crowding.

Severe caries and early extraction of deciduous teeth may become a cause of contact point displacement and migration of the permanent first molars, leading to the inclination and rotation of permanent teeth.

The inclination of the tooth or an imbalance between the maxillary and the mandibular arch widths may cause a crossbite. These conditions are preventable, early treatment of second deciduous molars that are still functioning can prevent arch length discrepancies.

Spacing seen in most adolescents is the result of habit they have acquired through this study it will be easy and more effective for the parents to know understand the reason of future problems child might suffer from.

The limitation of this study is the selection bias. Due to logistical constraints, we were unable to include people from all the districts of Nashik. Additionally, the number of participants are the people from OPD in Department of Orthodontics so sample selection is limited which may have affected the accuracy of our result.

If all the population will be undergone investigation from all the districts of Nashik results might differ

## CONCLUSION
1. The prevalence and patterns of dental abnormalities vary throughout the various types of malocclusions.
2. The most common type of malocclusion seen in Adults Angles Was Angles Class I malocclusion.
3. In adolescents the most common type of malocclusion seen was Mesial step malocclusion.
4. Among other malocclusions, patients with elevated overjet have a noticeably higher occurrence.

5. Increased overjet, crowding and spacing are most prevalent malocclusion seen in patients residing in Nashik district population.

## REFERENCES
1. Sarabjeet Singh Sandhu1 , Nidhi bansal2 , Navreet Sandhu: Incidence of Malocclusions in India - A Review. 2023, 10:
2. Od Bayarsaikhan 1, Ochirbal Munkh-Erdene 2, Tungalagtamir Boldbaatar 3, Oyundari Gantulga 4, Eiji Tanaka : Prevalence of Malocclusion and Orthodontic Treatment Need in 9- to 12-Year-Old Schoolchildren in Ulaanbaatar, Mongolia. 2024,
3. Guttal KS, Naikmasur VG, Bhargava P, Bathi RJ: Frequency of developmental dental anomalies in the Indian population.. 2010, 4:263-9.. 10.1055/s-0039-1697838
4. Ayhab BA, Fayez KS, Esam O (ed): THE PREVALENCE OF MALOCCLUSION AND ORTHODONTIC TREATMENT NEED IN A SAMPLE OF SYRIAN CHILDREN. 2014, 10:
5. Col Prasanna Kumar a, Brig S.M. Londhe b, Col Atul Kotwal SM c: Col Rajat Mitra dMJAFI. : Prevalence of malocclusion and orthodontic treatment need in schoolchildren - An epidemiological study.. 2013, 69:369-74. 10.1016/j.mjafi.2012.02.003
6. Dr. SunilkumarNagmode,Dr: Hrishikesh Aphale , Dr. Rohit Jagtap, Dr. Vaishnavi Ingle.: Prevalence of Most Common Dental Malocclusions and Dental Anomalies in Ahmednagar District Population. 2023, 1637-1640 .
7. Tausche E, Luck O, Harzer W: Eur J Orthod. : Prevalence of malocclusions in the early mixed dentition and orthodontic treatment need. . 2004, 26:237-44.. 10.1093/ejo/26.3.237
8. 8Ja Hyeong Kua ByoulHanbJaehyun Kima Jiyoung Oha Yoon-Ah KookaYoonji Kim: Common dental anomalies in Korean orthodontic patients: An update. 2022, 52:324-333. 10.4041/kjod21
9. Dr. Sakshi Sharma , Dr. Avijit Avasthi , Dr. Sanchit Kumar , Dr. Neetika Singh : Epidemiology of Malocclusion: An Indian Perspective-Review Article . 2019, 6:32-35.. 10.36347/sjds.2019.v06i03.012
10. 10Sureshbabu AM, Chandu GN, Shafiulla MD: orthododontic treatment need among 13-15yrs old school going children and adolescents of Davangere, Karnataka, India. . 2005, 6:32-35.. 10.4103/2319-5932.184849
11. Shavi GR, Hiremath NV, Shukla R, Bali PK, Jain SK, Ajagannanavar SL. : Prevalence of spaced and non-spaced dentition and the occlusal relationship of primary dentition and its relation to malocclusion in school children of Davangere.. 2015, 9:75-78.