Original Research Paper

Dentistry

ASSESSMENT OF PREVALENCE OF MALOCCLUSION USING ANGLE'S CLASSIFICATION OF MALOCCLUSION (1899) AMONG 8 TO 14 YEAR OLD SCHOOL CHILDREN IN CHHATRAPATI SAMBHAJINAGAR - A CROSS-SECTIONAL STUDY

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ABSTRACT **Background:**Malocclusion, or the misalignment of teeth and dental arches, is a common issue that can impact both function and aesthetics. This study aimed to assess the prevalence of malocclusion among 8 to 14-year-old schoolchildren in Chhatrapati Sambhajinagar. A descriptive cross-sectional study was conducted, involving 480 students who met the inclusion criteria. Various occlusal characteristics, including Angle's classes of malocclusion (class I, II, and III), overjet, overbite, midline diastema, and tooth rotation, were recorded. The study found that 58.75% of participants were male and 41.25% were female. Class I malocclusion was the most common, observed in 81.46% of children, while class II and class III malocclusions were seen in 16.67% and 1.67%, respectively. Among class II cases, 12.92% were division 1 and 3.75% division 2. A normal overjet (<3 mm) was found in 87.1% of children, while 12.9% had an increased overjet (>3 mm). A normal overbite was present in 47.9%, with 52.1% having an increased overbite. Midline diastema, occurring only in the upper arch, was found in 2.7% of children, and 12.7% had tooth rotation, with the maxillary right lateral incisors being the most affected. The study highlights the high prevalence of malocclusion in this age group, stressing the importance of early detection and treatment to prevent future dental and facial irregularities.

KEYWORDS : Prevalence, Malocclusion, Overjet, Overbite, Midline Diastema, tooth rotation.

INTRODUCTION:
Malocclusion exists on a spectrum from perfect occlusion to substantial deviations from normal alignment, significantly affecting both

MATERIAL AND METHODOLOGY: A descriptive cross-sectional study was undertaken to assess the prevalence of malocclusion among school children aged 8 to 14 years in Chhatrapati Sambhajinagar, using Angle's Classification of Malocclusion (1899). The study received approval from the institutional ethics committee, and informed consent was obtained from the legal guardians of all participants involved.

To fulfill the proposed objectives, we took into account the following criteria for inclusion in the study: children's age must be between 8 to 14 years old; the children must be students of the selected educational units; informed consent must be obtained from the legal guardians of the children; the children must give their verbal consent for examination; the participation must be voluntary, and the children must be cooperative.

WE EXCLUDED FROM THE STUDY: children below 8 and above 14 years old; children for whom a legalguardian did not provide informed consent; children with a psychiatric condition; and those who are not willing to be examined (uncooperative children). Therefore, following the application of these criteria, we obtained the study group, consisting of 480 school children.

EXAMINATION OF THE CHILDREN:
The individuals were examined under natural light and away from direct sunlight using :

Sr. No	Disposable	Non- Disposable
1	Head Cap	Standard Mouth Mirror
2	Mask	Straight probe
3	Gloves	Cotton holder
4	Cotton	Cotton receiver
5		Kidney tray
6		Artificial light

During the clinical examination, the child was sitting on a chair in front of the doctor, who was also sitting on a chair. Occlusal relationships were evaluated in the centric occlusion position, achieved by instructing the child to swallow and then bite down on their back teeth. The class of malocclusion, based on Angle's classification, along with factors such as overjet, overbite, tooth rotation, and midline diastema, were documented. Children with a Class I molar relationship, normal overbite and overjet, proper alignment, and no major tooth irregularities were categorized as having normal occlusion.

The data collected during the examination were documented in a file, which included the child's age, gender, type of malocclusion (according to Angle's classification of malocclusion- 1899), midline diastema, overjet, overbite, and tooth rotation.

RESULTS: Among the 480 children assessed for malocclusion, 58.75% were male and 41.25% were female. The distribution of age and gender is presented in (Table 1).

Table1: Descriptive statistics of the children examined

Age (in years)	Male no.	Female no.	Total no.	Male (%)	Female (%)	Total (% of 480)
9	2	0	2	100.00%	0.00%	0.42%
10	36	25	61	59.02%	40.98%	12.71%
11	22	35	57	38.60%	61.40%	11.88%
12	82	50	132	62.12%	37.88%	27.50%
13	73	52	125	58.40%	41.60%	26.04%
14	67	36	103	65.05%	34.95%	21.46%
	282 (58.75%)	198 (41.25%)	480			

Regarding the categorization of malocclusion, 81.46% of the children had class I malocclusion, 16.67% had class II malocclusion, and 1.67% had class III malocclusion. Within class II malocclusion, 12.92% were identified as division 1, while 3.75% were division 2 (Graph 1 and Table 2).

Table2: The classification of the subjects based on Angles class of malocclusion

Class	Subdivision	Male n	Female n	Total n	Male (%)	Female (%)	Total (% of 480)
I		235	156	391	60.10%	39.90%	81.46%
II	Division1	37	25	62	59.68%	40.32%	12.92%
II	Division2	7	11	18	38.89%	61.11%	3.75%
III		2	6	8	25.00%	75.00%	1.67%

Graph1: Prevalence of malocclusion

In terms of overjet, 87.1% of the children had a normal overjet (<3 mm), while 12.9% exhibited an increased overjet (>3 mm) (Table 3).

Table3: Distribution of overjet among the subjects

Overjet	Male n	Female n	Total n	Male (%)	Female (%)	Total
Normal (<3mm)	245	173	418	58.61%	41.39%	87.10%
Increased (>3mm)	37	25	62	59.68%	40.32%	12.90%

As for overbite, 47.9% had a normal overbite (<3 mm), and 52.1% had an increased overbite (>3 mm) (Table 4).

Table 4 : Distribution of overbite among the subjects

Overbite	Male n	Female n	Total n	Male (%)	Female (%)	Total
Normal (<3mm)	142	88	230	61.74%	38.26%	47.90%
Increased (>3mm)	140	110	250	56.00%	44.00%	52.10%

For midline diastema, 2.70% of the children presented with this condition, all of which occurred in the maxillary arch (Table 5). Tooth rotation was the most prevalent individual tooth irregularity observed, with 12.70% of the children showing rotated teeth (Table 5). Lateral incisors were the most frequently rotated teeth, with maxillary right lateral incisors being the most commonly affected.

Table 5 : Distribution of midline diastema and tooth rotation

Variable	Male n	Female n	Total n	Male (%)	Female (%)	Total
Midline diastema	9	4	13	69.23%	30.77%	2.70%
Tooth rotation	37	24	61	60.66%	39.34%	12.70%

DISCUSSION:
Malocclusion is a common dental issue that affects a large portion of the population. Misaligned teeth can lead to both psychosocial problems due to poor dental aesthetics and functional challenges like difficulties in chewing, swallowing, and speaking, as well as an increased risk of injury and gum disease. Numerous studies have examined the prevalence of malocclusion across various populations, but the results have varied significantly. These variations are likely due to differences in age groups, sample sizes, and classification methods used in the studies. While several studies over the past decade have aimed to evaluate malocclusion on a broader scale across India, few have specifically focused on the population of Chhatrapati Sambhajinagar. This study, conducted among 480 school children aged 8 to

14 years, aimed to assess the prevalence of malocclusion in this region.

The prevalence of Class I malocclusion observed in this study (81.46%) is comparable to the findings reported by Ajayi in Nigeria (80.7%). This rate is higher than that reported by Phaphe et al. in Bagalkot, India (17.8%), but lower compared to the prevalence reported by Mtaya et al. in Tanzania (93.6%).

The prevalence of Class II malocclusion in this study (16.67%) aligns closely with the findings of Abu Alhaija et al in Jordan (18.8%). However, it is higher than the prevalence reported by Mtaya et al. in Tanzania (4.4%) and lower than that observed by Phaphe et al. in Bagalkot, India (30.1%). Within class II malocclusion, (12.92%) was division 1 type and (3.75%)was division 2 type. The prevalence of Class III malocclusion found in this study (1.76%) is similar to the rate reported by Abu Alhaija et al. in Jordan (1.4%). It is higher than the prevalence reported by Das et al. in Bengaluru, India (0.6%) and lower compared to the findings of Farahani et al. in Iran (7.8%).

An overjet of less than 3 mm was classified as normal. It was found that 12.90% of the subjects had an increased overjet. This prevalence is lower compared to the findings of Abu Alhaija et al. in Jordan (24.7%) and Gelgor et al. in Central Anatolia (25.1%). Conversely, higher prevalence

rates of increased overjet were reported by Farahani et al. in Iran (31.7%) and Hemapriya et al. in Kancheepuram, India (61.4%).

In this study, an overbite of less than 3 mm was considered normal. It was observed that 52.10% of the subjects had an increased overbite, which is higher compared to Cedikoglu et al. in Turkey (36.6%), Nainani and Sugandh in Nagpur, India (38.0%), and Tausche in Dresden (46.2%). Siddegowda and Rani in Karnataka, India (51.75%) reported a similar prevalence of increased overbite. In contrast, lower prevalence rates were found in studies by Rwakatema in Tanzania (20%) and Phaphe et al. in Bagalkot, India (9.2%).

A midline diastema is defined as a gap of at least 2 mm between the maxillary central incisors. In this study, only 2.70% of the subjects had a midline diastema, which is notably lower compared to findings by Phaphe et al. in Bagalkot (18%), Hemapriya et al. in Kancheepuram (35.2%), and Ajayi in Nigeria (19.5%). Additionally, the prevalence of rotated teeth among the children in this study was 12.7%, which aligns closely with the rates reported by Vibhute et al. in Mumbai (13.1%) and Nainani and Sugandh in Nagpur (15.3%). Identifying and addressing a wide range of occlusal deviations early is crucial, as unresolved functional issues can develop into more severe skeletal problems with significant psychosocial impacts as the individual grows. The results of this study are valuable for implementing early interceptive treatments and correcting malocclusions, potentially reducing their severity in permanent dentition.

CONCLUSION:
From the analysis of 480 children assessed for malocclusion, the following conclusions can be made:

1. GENDER DISTRIBUTION: Malocclusion was more common in males (58.75%) compared to females (41.25%).

2. MALOCCLUSION TYPES: The majority of children (81.46%) had class I malocclusion, indicating normal occlusion. Class II malocclusion was present in 16.67% of children, predominantly in division 1 (12.92%) and less frequently in division 2 (3.75%). Class III malocclusion was rare, affecting only 1.67% of the children.

3. OVERJET AND OVERBITE: Most children (87.1%) had a normal overjet (<3 mm), while 12.9% had an increased overjet (>3 mm). Regarding overbite, the distribution was nearly even, with 47.9% having a normal overbite (<3 mm) and 52.1% having an increased overbite (>3 mm).

4. TOOTH IRREGULARITIES: Midline diastema was relatively rare (2.70%) and occurred only in the maxillary arch. Tooth rotation was more common, affecting 12.70% of children, with the maxillary right lateral incisors being the most frequently rotated.

Overall, most children had class I malocclusion and a normal overjet, but there were notable instances of increased overbite and tooth

rotation, emphasizing the need to monitor these aspects in malocclusion management.

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