

PREVALANCE OF ANTERIOR OPEN-BITE IN KANPUR POPULATION

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ABSTRACT

Introduction: The aim of this study was to check the prevalence of Anterior Open Bite Malocclusion in children of ages 8-12 in the population of Kanpur

Methods & Methods: Clinical Examination & Records (Study Models) were taken of patients at Rama Dental College Kanpur. Patients aged 8-12 were chosen as all incisors have usually erupted fully.

Results: Among the 138 examined patients, the prevalence of Anterior Open bite was 25 (18.11%), normal overbite was 92 (66.66%) while 21 (15.21%) of the population had increased overbite

Conclusions: Prevalence of Anterior open bite is relatively low in the population with no gender predilection. Majority had a normal overbite.

INTRODUCTION

Normal occlusion is defined as the relationship between maxillary and mandibular teeth at rest and mastication. Proper evaluation of dental occlusion during childhood has an impact on the need on future orthodontic treatment. ¹

Open bite is one of the most challenging & difficult malocclusions to treat. Early diagnosis and treatment is related to a period of growth and development especially in deciduous and mixed dentition stages.

Open bites can be classified into dental, which results from the obstruction of the normal eruption of the anterior teeth without compromising the dentoalveolar height and skeletal open bites, with manifested craniofacial dysplasia, of similar pattern, but variable severity. ²

Anterior open bite (AOB) is multifactorial in origin. It has various causes such as: tongue thrusting, non-nutritive sucking, airway obstruction, neurological disturbances, muscular dystrophy, iatrogenic and pathological open bite. ²

Resting tongue position during function defines the determination of altered occlusal patterns such as those observed in AOB. ³

The current study was performed to evaluate the prevalence of AOB and its etiological factors amongst group of Kanpur children in the mixed dentition stage, aged 8 to 12 years.

MATERIAL AND METHODS

This study was conducted in the Orthodontics Department of Rama Dental College, Hospital & Research Centre, Kanpur.

Sample size calculation

Assuming that 53% of the subjects in the population have the factor of interest, the study would require a sample size of: **138** for estimating the expected proportion with 95% confidence level, Z score roughly 1.96 & precision of 0.0834.

Participants

Eligibility criteria

Children fulfilling the following criteria were included in the study:

Inclusion Criteria:

1. Age from 8 to 12 years old
2. Mixed dentition
3. Fully erupted upper central incisors
4. Cooperative patients and compliant parents
5. No current/previous history of orthodontic treatment.

Exclusion criteria:

1. Unerupted permanent central incisors.
2. Any facial trauma

Procedures

Dental examination was conducted while the subject was sitting on the dental chair under the dental unit light source using sterile dental mirrors. Alginate impressions for upper and lower arches were taken, using impression trays size 1 or 2, and then poured. Wax bite was taken to place the dental casts at maximum intercuspation. The vertical and horizontal relations were then measured directly on the dental casts using a digital caliper and read to the nearest tenth of a millimeter. Overbite is considered normal when the inter-incisal distance was larger than 0.5 mm and smaller than 4.5 mm. Increased overbite was noted when the inter-incisal distance was larger than 4.5 mm. The bite was considered open when its measure was negative. When the incisal edges are in contact, edge to edge bite is considered.⁴

Tongue thrusting was checked by asking the patient to swallow while the lips were apart. During normal swallowing, tongue tip is placed at the curvature of palate just behind maxillary incisors. Abnormal tongue position is detected when tongue tip is placed at the lower incisors, according to *Dean et al*⁵.

Mouth breathing was examined by asking the patients to take a deep breath from the nose. Mouthbreathers were unable to close their lips or hold water between them and were aware that they had nasal problems, according to *Pacheco et al*⁶

The patient with thumb sucking habit have extraordinarily cleaned and chapped digit, according to *Shetty et al*⁷

The lips and the vermilion border might be chapped, dried or eroded, according to *Barberia et al*⁸. Upper lip biting was examined by upper lip biting test. The presence or absence of the habit depended on the ability of the lower incisor to touch mucosa, according to *Shah et al*⁹.

Nail biting was evaluated as the tissues around the nail were checked for presence of infection or distortion, according to *Ghanizadeh*¹⁰

Statistical analysis

The data was analyzed with SPSS software package (version 21 SPSS Inc., Chicago, USA). Comparison was performed using Chi square test while taking P values of less than 0.05 as statistically significant.

RESULTS

Among the 115 examined patients, the prevalence of AOB was 25 (18.11%), normal overbite was 92 (66.66%) while 21 (15.21%) of the population had increased overbite, as shown in Table 1.

TABLE (1): Prevalence of anterior open bite, normal overbite and increased overbite in(percentage) in the study population

	AOB	Normal Overbite	Increased Overbite
Total %	18.11%	66.66%	15.21%

There was a slight difference between the amount of AOB, in (mm), between boys and girls; where it was slight higher in girls than in boys with a ratio of 1.19: 1, as shown in Table 2.

TABLE (2): Mean differences and standard deviation values in (mm) for amount of anterioropen bite in boys and girls in the study population

	Gender				P-value
	Girls		Boys		
	Mean	SD	Mean	SD	
AOB (mm)	-2.7	2.30	-2.9	0.93	0.3124
Ratio	1.19 : 1				

P-value > 0.05 is considered insignificant.

Increased overjet values in (mm) were divided and distributed as (4-5), (<6), (<7) and (<9.7) mm as 20 (17.3%), 19 (16.7), 5 (4%) and 7 (6.4%) respectively, as shown in Table 3.

TABLE (3) Values in (mm), frequency and percentages (%) of increased overjet in the study population

	Values (mm)	Frequency	Percentage
Increased Overjet	From 4 to 5	20	17.3%
	< 6	19	16.7%
	< 7	5	4%
	< 9.7	7	6.4%
	Total %	51	44.4%

Among the study population, 18 (13.04%) exhibited tongue thrust habit, 10 (7.24%) were mouth breathers, 9 (6.5%) were thumb suckers, 3 (2.17%) of them exhibited lip biting habit

while 19 (13.76) of them exhibited nail biting habit as shown in table 4.

TABLE (4) Frequency and percentages of abnormal oral habit among study population

		Frequency	Percentage
Tongue Thrust	Yes	18	13.04%
	No	120	86.96%
	Total %	138	100%
Mouth Breathing	Yes	10	7.24%
	No	128	92.76%
	Total %	138	100%
Thumb Sucking	Yes	9	6.5%
	No	129	93.5%
	Total %	138	100%
Lip Biting	Yes	3	2.17%
	No	135	97.83%
	Total %	138	100%
Nail Biting	Yes	19	13.76%
	No	119	86.24%
	Total %	138	100%

Comparison between boys and girls regarding abnormal oral habits revealed higher percentages of tongue thrust 12 (16%), mouth breathing 5 (6.7%), thumb sucking 7 (9.4%) and lip biting 2 (2.7%) in girls. On the other hand, boys revealed higher percentages in nail biting 15 (23.81%), as shown in Table 5.

TABLE (5) Frequency, percentages (%) and comparison between abnormal oral habits in boys and girls

		Gender				P-value
		Girls		Boys		
		Frequency	Percentage	Frequency	Percentage	
Tongue Thrust	No	63	84%	57	90.4%	0.46
	Yes	12	16 %	6	9.6%	
Mouth Breathing	No	70	93.3%	58	92.06%	0.99
	Yes	5	6.7%	5	7.93%	
Thumb Sucking	No	68	90.6%	61	96.82%	0.420
	Yes	7	9.4%	2	3.18%	
Lip Biting	No	73	97.3%	62	98.41%	0.90
	Yes	2	2.7%	1	1.59%	
Nail Biting	No	71	95.9%	48	76.19%	0.170
	Yes	4	4.1%	15	23.81%	

P-value > 0.05 is considered insignificant

DISCUSSION

Anterior open bite (AOB) is one of the most prevalent & complex malocclusions to treat

Early diagnosis and treatment are related to the period of growth and development, especially in deciduous and mixed dentition stages, to achieve better prognosis. Therefore, the current study was performed to evaluate the prevalence of AOB and its etiological factors among a group of Kanpur children in mixed dentition stage.

The age of the patients ranged from 8 to 12 years, to assure full eruption of the permanent central incisors so that measurement of AOB is reliable, as a transient temporary AOB malocclusion could be due to the lack of full eruption of the permanent central incisors.¹¹

Measurements in the current study were done on study cast models stabilized into occlusion; as digital models require time to get familiar with the software programs during measurement which may lead to inter examiner variability, in addition to the high cost and also technique error is likely to occur in the identification of reference points.¹² This was confirmed by the study of *Radeke et al*¹² who stated that there were no significant differences between the digital and manual measurement methods.

The results of the current study showed that the prevalence of AOB amongst Kanpur children was 18.11% as shown in Table 1.

In the present study, out of the 138 examined subjects, there was slight difference between girls and boys having AOB with a ratio of (1.19:1), as shown in Table 2. This was complementary with *Ovia et al*¹³ which reported an insignificant gender association in prevalence and severity of AOB.

The amount of AOB recorded in this study equals -2.8 ± 2.31 mm and -2.7 ± 0.94 mm in girls and -2.9 ± 2.2 mm in boys respectively, with a minimum of 0.71 mm and a maximum of 9.1 mm (only 1 case had AOB 9.1 mm). This result was complementary to the findings of *El Motaleb*,¹⁴ who showed AOB of 4.1 ± 2.3 mm with a minimum of 1.5 mm and a maximum of 14 mm.

The increased overjet was 51 (44.4%) divided and distributed as (4-5), (<6), (<7) and (<9.7) mm and (17.3%), (16.7), (4%) and (6.4%) respectively, as shown in Table 3. This was nearly similar to those reported by *Ferro et al*¹⁵ in Italy reported (48%) increased overjet whereas *Bourzgui et al*¹⁶ in Morocco, reported overjet of 4-6 mm in (17.2%) and >6 mm in (10%).

The present study revealed that 18 (13.04%) were tongue thrusters, 10 (7.24%) were mouth breathers, 9 (6.5%) were thumb suckers, 3 (2.17%) were lip biters & 19 (13.76%) were nail biters.

Tongue thrust, thumb sucking, mouth breathing and lip biting showed higher percentages in girls, on the other hand, boys revealed higher percentages of nail biting.

CONCLUSIONS

It can be concluded that;

1. Prevalence of AOB is relatively low (25 out of 138) with no gender predilection.
2. Majority population had a normal overbite (92 out of 138)
3. Tongue thrusting, thumb sucking, mouth breathing and lip biting showed higher percentages in girls, on the other hand, boys revealed higher percentages of nail biting.

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