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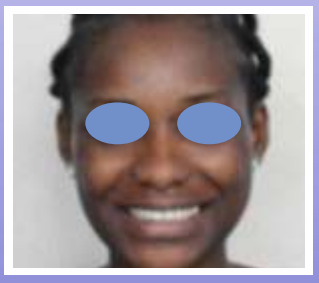

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Transverse occlusal discrepancy in Orthodontic patients

Psychological impact of malocclusion

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"DENTISTRY'S FIRST SPECIALTY JOURNAL IN SUB SAHARAN AFRICA"

Assessment of Transverse Occlusal Discrepancy in the First One Hundred Orthodontic Patients Seen at the University of Calabar Teaching Hospital, Calabar, Nigeria.

Adekoya MN[a], Ayedun OS[b], Adeyemi TE[c]

Abstract

Background: Dental occlusion is examined in three planes, the vertical, antero-posterior, and transverse planes. The objective of this study was to evaluate the prevalence of transverse discrepancy seen in the first one hundred orthodontic patients who visited the clinic, between the period of 2016 and 2020, at the University of Calabar Teaching Hospital, Cross River state.

Methods: A retrospective study on the transverse occlusal discrepancy of the first 100 patients who visited the orthodontic unit of the University of Calabar Teaching Hospital for four years. The data on the patients were obtained from the clinical record book of the unit and these include age, sex, molar relationships, and transverse occlusal variables; crossbite and scissors bite.

Results: The prevalence of scissors bites was 2% and the crossbite was 8% in the study population. Crossbite was predominant in males and it occurred more in children. Scissors bite, in this study population, was not common.

Conclusion: The study has provided the baseline prevalence of scissors bite and crossbites in Cross River state. This will increase the clinician's ability to make rational decisions in the prevention and treatment of transverse discrepancies and also add to the body knowledge.

Keywords: Scissors bite, crossbite, constricted arches, molar relationships

Authors' Affiliation

[a] Department of Child Dental Health, Faculty of Dentistry, College of Medical Sciences, University of Calabar/University of Calabar Teaching Hospital, Calabar, Nigeria

[b] Department of Child Dental Health, Faculty of Dental Sciences, College of Medicine, University of Lagos, Lagos Nigeria

[c] Department of Child Dental Health, Faculty of Dentistry, College of Health Sciences, Bayero University, Kano/Aminu Kano Teaching Hospital, Kano, Nigeria.

***Correspondence:**
Name: Dr. Adeyemi Tope Emmanuel
Address: Department of Child Dental Health, Faculty of Dentistry, College of Health Sciences, Bayero University, Kano/Aminu Kano Teaching Hospital, Kano, Nigeria.
Phone numbers: +2348060152099
E-mail address: topmost007@yahoo.com

ORIGINAL ARTICLE

Introduction

The transverse discrepancy between the maxilla and mandible results in a mismatch, causing either a crossbite or scissors bite. Crossbite occurs when the buccal cusp of the upper tooth occludes lingually to the opposing lower tooth, while scissor bite refers to the presence of total maxillary buccal crossbite with the mandibular dentition completely contained within the maxillary dentition in habitual occlusion.[1,2]

The aetiological factors involved in posterior crossbite and scissors bite could be classified into dental, skeletal, and muscular.[3] Displaced teeth as a result of deficient arch length, retained deciduous teeth, deranged eruption sequence, and anomaly in tooth structure are the dental factors implicated in posterior crossbite.[3] Skeletal factors causing posterior crossbite include a true maxillary constriction which exists when the maxillary skeleton and/or teeth is narrow in width, on its own[4], or a relative maxillary constriction existing when the maxillary skeleton is normal in width, but the mandibular skeleton and/or teeth are too wide. On the other hand, a narrow mandible or an excessively wide maxilla or a combination of both would result in

a scissors bite[4]. Oral habits like sucking of digits/thumb or tongue thrusting are muscular causative factors of posterior crossbite and scissor bite respectively.[3,5]

Crossbite and scissors bite can be classified, according to their position, unilateral or bilateral, while crossbite can further be anteriorly or posteriorly located.[6,7]

Common features associated with transverse discrepancy are functional shift of the mandible, leading to a negative cosmetic and functional impact on patients, especially when it is a unilateral crossbite[1,8], total disocclusion of the posterior teeth, narrow mandibular arch with an increase in the Curve of Wilson, asymmetric mandibular growth in case of a unilateral crossbite or scissors bite.[5]

The possible orthodontic treatment modalities range from removable appliances, and fixed appliances, combined with the extraction of some teeth and use of intermaxillary elastics, to orthognathic surgical procedures.[9,10,11]

There is very little literature published on transverse discrepancy nationwide, and none have been carried out in the South-south region of Nigeria. It is, therefore, necessary to evaluate the incidence of crossbite and scissors bite in the first set of orthodontic patients seen at the orthodontic unit of the university of Calabar Teaching Hospital. The study will provide base line values for this South-South region, and at the same time be beneficial in improving patient care comparable to international standards.

Materials and Methods

The study was carried out at the Orthodontic unit of the Department of Child Dental Health, University of Calabar, Calabar, Cross River State

A retrospective study on the first one hundred patients (44 males and 56 females) who presented at the University of Calabar Teaching Hospital for a period of 4 years spanning from 2016 to 2020. Patients' data were obtained from a standard orthodontic diagnostic record book. The patient's information such as age, gender, presence or absence of crossbite and scissors bite were all retrieved from the orthodontic record book for new patients and recorded in the data form as dependent variables. All the patients who presented with one or more teeth in crossbite or scissors were included in this study.

Crossbite was classified as anterior or posterior, unilateral or bilateral. Anterior crossbite was recorded as present when one or more upper incisors and canines occluded lingually to their lower counterparts.

Posterior crossbite, which is a transverse discrepancy, was recorded when the buccal cusps of the upper premolars and molars occluded lingually to the opposing teeth.

Data Analysis

The data were analyzed using the Statistical Package of Social Science version 20. Descriptive statistics such as frequencies and percentages were used to analyze the transverse discrepancies. Summary statistics such as the mean was used to represent continuous variables together with the standard of deviations.

Results

Table 1 shows the demographic distribution of the first 100 Orthodontic patients seen at the orthodontic unit of the Teaching Hospital, 57 were females and 43 were males. The age range was from 6 years to 35years, with a mean age of 14.77±6.9(SD) years, table 2.

Angle's class I molar relationship was recorded in more than 70% of the study population, with the females having more than the males. More males appeared to have Angle's class II than females. Though the prevalence of class II was low, the same low value was recorded for class III, as seen in table 3a.

Angle's molar relationship I was seen more in patients with crossbites, whereas Angle's class II was more frequent in patients with scissors bites, Table 3b.

The incidence of scissors bite in the first hundred orthodontic patients seen in the orthodontic unit of the University of Calabar Teaching Hospital was 2%, and there was no significant sex predilection. Table 4.

When age was stratified against scissors bite, it was found in 11-year and 28-year-old patients, figure 1.

Crossbite was recorded in 8 of the 100 patients. There was a male preponderance, 5:3 (table 4). When crossbite was stratified against age, it revealed that crossbite was seen more in the first 2 age groups and the 21-25 age group (figure 4).

Table 1: Sex Distribution of Respondents

SEX	n	(%)
Male	43	(43.0)
Female	57	(57.0)

Table 2: Age Classes

		Frequency	Percent(%)	Valid (%)	Cumulative (%)
Valid	6-10	29	29.0	29.0	29.0
	11-15	39	39.0	39.0	68.0
	16-20	13	13.0	13.0	81.0
	21-25	8	8.0	8.0	89.0
	26-30	8	8.0	8.0	97.0
	31-35	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

The age ranged from 6 to 32 years with a mean of 14.77 and a standard deviation of 6.87

Table 3A: Stratification of Angle's classification into age and gender

(A) Angle classes

Variable: Angle Classes Stratification: Age	I n(%)	II n(%)	III n(%)
Stratification:			
Age	22 (22.0)	6 (6.0)	1 (1.0)
6-10	24 (24.0)	9 (9.0)	5 (5.0)
11-15	12 (12.0)	0 (0.0)	1 (1.0)
16-20	7 (7.0)	1 (1.0)	0 (0.0)
21-25	8 (8.0)	0 (0.0)	0 (0.0)
26-30	3 (3.0)	0 (0.0)	0 (0.0)
31-35			
Gender:			
Male	30 (30.0)	9 (9.0)	4 (4.0)
Female	46 (46.0)	8 (8.0)	3 (3.0)

Table 3B. Stratification of transverse variables by Angle's classification

	Angle Classes				
Variable (n=100)	**I**	**II**	**III**	**Chi-square**	**P-Value**
Crossbite				0.912	0.634
Present	5	2	1		
Absent	71	15	6		
Scissors bite				8.249	0.016*
Present	0	1	1		
Absent	76	16	6		

Table 4. Transverse variables

Variable: Scissors Bite	**Present n(%)**	**Absent n(%)**
Age groups:		
6-10	0 (0.0)	29 (29.0)
11-15	1 (2.0)	38 (38.0)
16-20	0 (0.0)	13 (13.0)
21-25	1 (1.0)	7 (4.0)
26-30	0 (0.0)	8 (8.0)
31-35	0 (0.0)	3 (3.0)
Gender:		
Male	1 (1.0)	42 (42.0)
Female	1 (1.0)	56 (56.0)
Variable Crossbite		
Age Groups		
6-10	2 (2.0)	27 (27.0)
11-15	5 (5.0)	34 (34.0)
16-20	0 (0.0)	13 (13.0)
21-25	1 (1.0)	7 (7.0)

26-30	0 (0.0)	8 (8.0)
31-35	0 (0.0)	3 (3.0)
Gender		
Male	5 9.6	38 (38.0)
Female	3 5.8	54 (54.0)

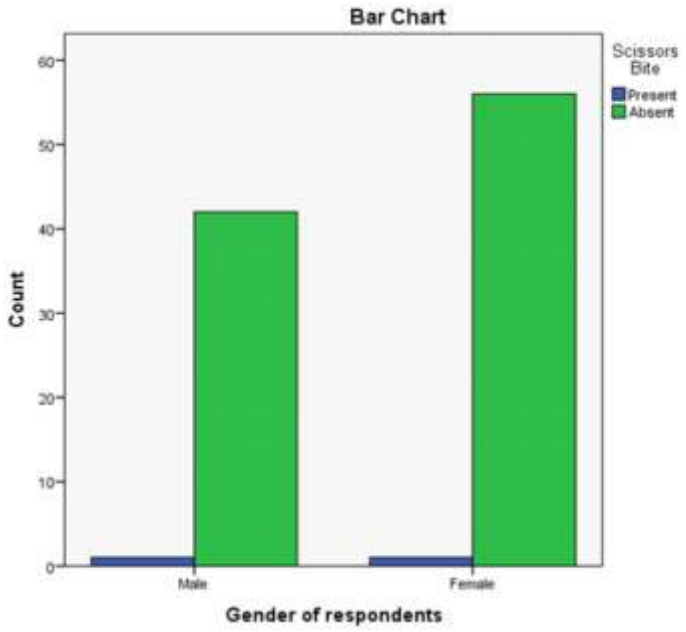

Figure 1. Gender distribution of scissors bite

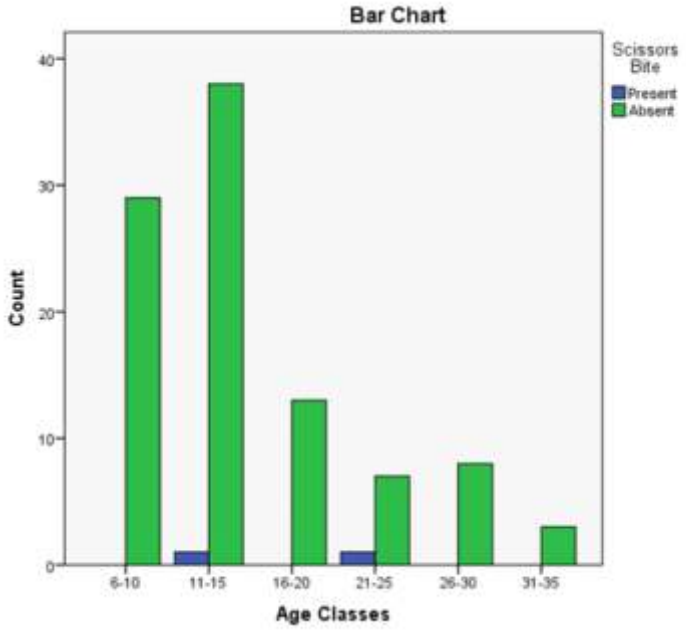

Figure 2: Age distribution of scissors bite

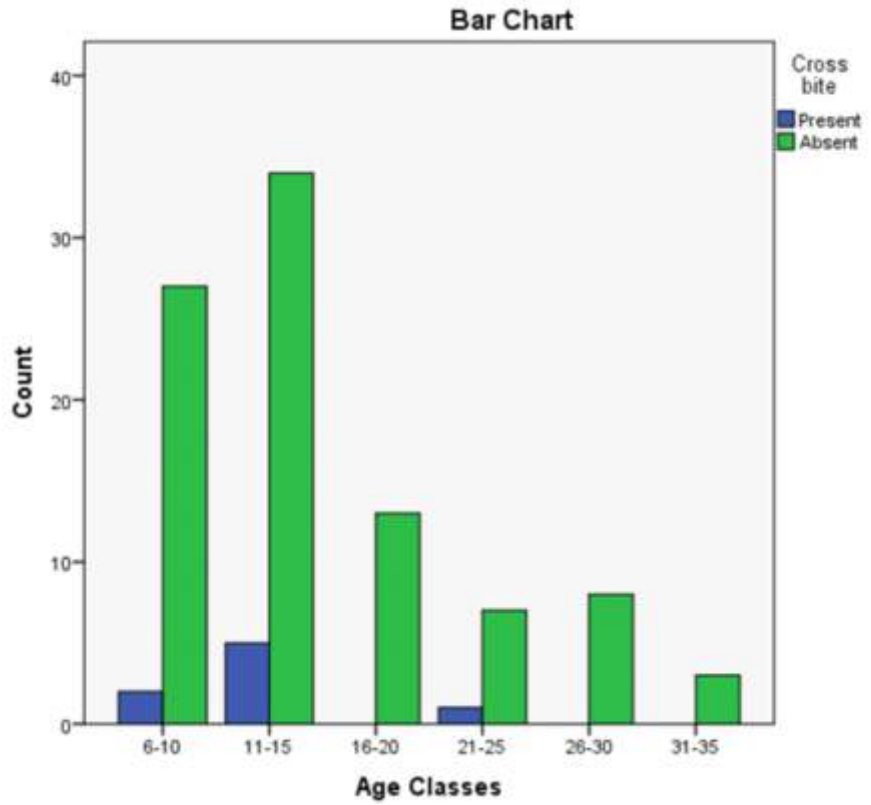

Figure 3: Age distribution of crossbite

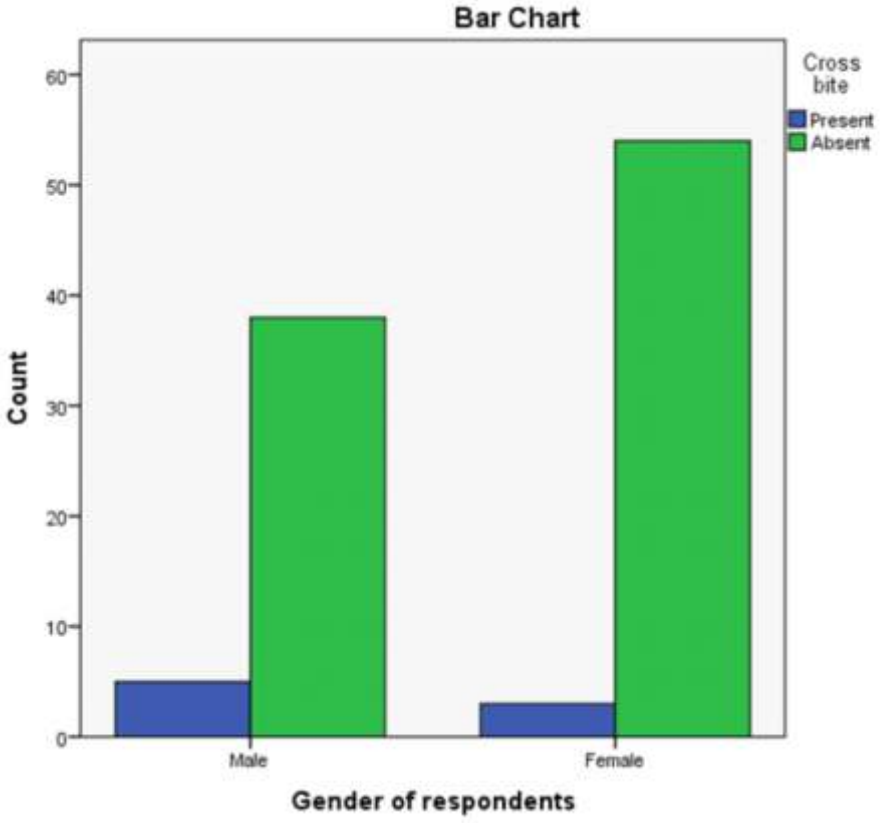

Figure 4: Gender distribution of crossbite

Discussion

Crossbite, either anterior or posterior, and scissors bites are important malocclusion traits. When they are left untreated, the result could be devastating, leading to a disrupted oral cavity milieu and this can cause severe aesthetic disharmony and compromised function.[12]

The findings of this study revealed that crossbite was found in 8 per cent of the study population. This finding is slightly lower than that reported by daCosta and Utomi[3], who revealed that 10 per cent of the study population had a posterior crossbite. These values are much higher than the findings reported by Adekoya et al,[13] and Alharbi,[14] they reported a prevalence of 3.7% and 3.8% respectively. Alogaibi et al[15] reported 25%, which is far higher than the previous findings. This could be due to the difference in sample sizes and the variations in the method of measurement. Vindikas and Roberts[16] and Harrison et al.,[17] reported that in the primary and mixed dentitions, posterior crossbite is one of the most prevalent transverse occlusal variations. Skeletal posterior crossbite is associated with a smaller maxillary to mandibular dental arch widths ratio and lower facial height.[18,19]

Patients with crossbite were found to have more angle's class I molar relationship when compared with patients with scissors bite, who presented more with Angle's class II molar relationship. This is not surprising, as many studies, both local and international, have confirmed that Angle's class I molar relationship is more common.[3,13,15,20,21]

About 7% of the study population who presented with crossbite were children and 1 was an adult. This result is the exact opposite of the findings by daCosta and Utomi[3], who reported that almost a third of the patients in their study were adults. This could be attributed to the large sample size used in their study. When crossbite is managed early in the deciduous or mixed dentition stage, it makes way for the spontaneous correction of the permanent teeth. Lidner,[22] reported that early management of crossbite will eliminate the possibility of alveolar ridge warp which can occur as a compensatory change to accommodate the malocclusion.

This study revealed a sex predilection, with crossbite occurring more in males. The finding is not in agreement with the reports by Allen, who in his study, showed that crossbite occurred twice more in females than in males. Although in the study by daCosta and Utomi[3], there was no difference in the frequency between the genders. Some other studies also reported the absence of significant gender bias.[2,23]

Scissors bite was present in about 2% of the study population. The finding of this study is in accordance with what Sodagar et al.,[24] reported as the prevalence of scissors bites being between 1-1.5%. Scissors bite is a complication of malocclusion that is uncommonly encountered routinely. Scissors bite cannot be resolved by itself, and if left untreated, can affect chewing, and impair the normal growth and development of the mandible. There was no significant difference in age or gender when stratified with scissors bite.

Early management of both crossbite and scissors bite is advocated, either in the deciduous or mixed dentition stage, this will encourage the spontaneous correction of the permanent teeth.[3,24] It was reported by Kutin and Hawes[2] that crossbite occurring in the deciduous dentition usually translated into the permanent dentition.

Various treatment modalities are available for the treatment of crossbite and scissors bite. They range from simple removable appliances, and arch expansion appliances to more complex ones like orthodontic appliances with intra-oral cross elastics, and orthognathic surgeries in complex cases.[24,25] A major limitation of this study was the small population size used. A larger population is therefore advocated for future studies.

Conclusion

The prevalence of scissors bite was 2% and the crossbite was 8% in the study population.

Crossbite was recorded more in males and children while Scissors bite was not common in this study population.

This study, being the only literature on the transverse discrepancy of dental malocclusion in this region, has provided the baseline prevalence of scissors bite and cross bite in Cross River state, Nigeria. The reports from this study would increase the clinician's ability to make rational decisions in the prevention and treatment of transverse discrepancies. The findings will also help the government and hospital management to plan their budgets for dental and orthodontic training and treatments.

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Authors contribution: All the authors were involved in the conceptualization of the study, data analysis, results, discussion, conclusion, and manuscript writing. Dr M.N. Adekoya collected the data.

Conflict of interest: None declared

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