WEST AFRICAN JOURNAL OF ORTHODONTICS

ISSN 2315-9502

VOLUME 11, NUMBER 2

December 2022

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OFFICIAL PUBLICATION OF ORTHODONTIC ASSOCIATIONS IN THE WEST AFRICAN SUB-REGION

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

Malocclusion and Occlusal Traits of Trainee Dental Surgery Technicians in a Nigerian Teaching Hospital

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Abstract

Background: An individual's occlusal status is generally described by two major characteristics; intra-arch and inter-arch relationship. The purpose of this study was to determine the prevalence of normal occlusal traits and different types of malocclusions among trainee dental surgery technicians undergoing clinical posting at the Orthodontic unit of the University of Benin Teaching Hospital, Benin City, Nigeria.

Methods: This cross-sectional study was carried out among trainee dental surgery technicians undergoing clinical posting at the orthodontic unit of the University of Benin Teaching Hospital, Benin City. 100 (One hundred) constituted the study population. The study participants were assessed by one examiner (JON) at the orthodontic clinic of the Hospital. Intra-examiner reliability (kappa score) was 0.80, indicating a good agreement. Assessment of the antero-posterior relationship of the arches was based on Angle's classification. Data was computed and analyzed using SPSS version 21.0 software. Statistical significance was set at $P<0.05$.

Results: There were 11 (11%) males and 89 (89%) females. The mean age of the participants was 21.87±3.17 years. The prevalence of normal occlusal traits was 22.0 % and class I malocclusion was 51.0 % among the study participants. Prevalence of Class II div 1 malocclusion was 17.0 %, Class II div 2 was 4.0 % and Class III was 6.0 %. There was crowding in 26.0 % of the population while 44.0 % had spacing.

Conclusion: Class I malocclusion was most prevalent, followed by Class II division 1 and Class III. Class II Div 2 malocclusion showed the least prevalence.

Key words: Malocclusion, occlusal traits, Trainee Dental Surgery Technicians

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ORIGINAL ARTICLE

Introduction

An individual's occlusal status is generally described by two major characteristics; intra-arch relationship and inter-arch relationship.[1] A physiologic occlusion differs from a pathological occlusion in which the components function efficiently and without pain, and remains in a good state of health.[2]

Malocclusion is defined as any mal-relationship of dental arches with or without an irregularity of the teeth.[3] A large number of epidemiological studies have been carried out to determine the prevalence of malocclusion in different racial and ethnic groups and the outcome was different for several populations.[4-8]

Research publications on the distribution of malocclusion in Nigeria were by Richardson and Ana[9] and Isiekwe and Logan,[10] which were clinical studies. Several epidemiological surveys were further carried out to determine prevalence of malocclusion among Nigerian children and adolescents.[11-13]

In a study[14] conducted among 441 school children, aged 11-18 years old in Benin City, Nigeria to assess the prevalence of malocclusion among school children in Benin City, Nigeria. Results showed that Angle's Class I malocclusion had the highest frequency of 80.7 %, while other classes were rare. Normal overbite and overjet were frequent findings, while nearly a quarter had increased overjet. A normal dentoalveolar relationship was found in the

upper and lower arches with frequencies of 60.0 % and 77.3 % respectively. The frequency of crowding in both arches were similar while 29.9 % had spacing of the upper anterior segment and 10.7 % had spacing in the lower anterior segment. Anterior open bite was present in 4.1 % while anterior and posterior crossbite was found in 7 % and 4.5 % of the subjects. 19.5 % had midline diastema, 2.7 % had malformed teeth and there was missing teeth in 1.1 %.[14]

A study[15] was carried out in Ibadan among students in the junior and senior secondary classes (age range, 12–17 years). The aim of the study was to determine the prevalence of malocclusion among adolescents in Ibadan and compare the results with findings of other authors. Results showed that normal occlusions were found in 24.5 % of subjects, and 50.3 % had class I malocclusions. Normal overbite and overjet values were the most common. Anterior open bite was found in 7.1 % of the subjects. Anterior crowding was found in 20 % of the subjects, and midline diastema was found in 63.2 %.[15]

A study[16] was carried out in the North East of India among 432 students aged 18 – 25 years studying in the Dental College and College of Nursing at a tertiary care medical institute. The aim of the study was to find out the prevalence of normal occlusal traits and different types of malocclusion among dental and nursing students of these institutions. Results showed that the prevalence of normal occlusal traits was 48.4 % and that of malocclusion was 51.6 %. Among these occlusal traits with malocclusion (51.6 %), Angle's Class I malocclusion was found in 36.8 %, Class II in 10.4 % and Class III in 4.4 %. Among those with Angle's Class II malocclusion (10.4 %), 9.0 % were Class II div 1 and 1.4 % were Class II div 2.[16]

The purpose of this study was to determine the prevalence of normal occlusal traits and different types of malocclusions among trainee Dental Surgery Technicians undergoing clinical posting at the University of Benin Teaching Hospital, Benin City, Nigeria.

Materials and Methods

This cross-sectional study was carried out between March and May 2023. Trainee dental surgery technicians undergoing clinical posting at the Dental Centre of the University of Benin Teaching Hospital, Benin City, Nigeria constituted the study population. The students were from the Institute of Health (63 trainees), University of Benin Teaching Hospital, Benin City, South South of Nigeria, School of Health, Ado-Ekiti (6 trainees), South West of Nigeria, School of Health, Akure (12 trainees), South West of Nigeria and Pogil School (19 trainees) of Health Ogun State, South West Nigeria. The total number of participants was 100 (hundred). Their minimum age was 17 years, and maximum age was 37 years and mean age was 21.87±3.17 years. One Orthodontist (JNO) examined the students after obtaining informed consent from the participants. This research was approved by the Research Ethics Committee of the University of Benin Teaching Hospital. Participants in this study experienced no direct benefit and no compensation was paid to them. The students were examined at the Orthodontic clinic of the University of Benin Teaching Hospital, Benin City. Each participant was seated on a dental chair with chair light, and were examined with a dental mouth mirror, a sterile wooden spatula, and a metal ruler. In assessing the occlusal classification, overjet and overbite, the teeth were in centric occlusion. This was achieved by asking the subject to swallow and then to bite his or her teeth together.

Assessment of the antero-posterior relationship of the dental arches was based on Angle's Classification.[3] Inclusion criteria included consent of each participant, no previous orthodontic treatment. Exclusion criteria included those with loss of anterior teeth due to trauma, extraction, previous orthodontic treatment and lack of consent. The intra examiner reproducibility was assessed by re-examination of 10 randomly selected final year trainee dental technicians two weeks apart. The kappa score was 0.80, indicating a good agreement. The horizontal relationship of the upper and lower incisors with the teeth in centric occlusion was measured from the labial surface of the lower incisor, to the labial surface of the upper incisor. The distance is measured in mm as the overjet using a metre rule. Any value above 3 mm was taken as increased overjet and less than 1 mm as reduced overjet.[17]

The overbite is the relationship between the upper and lower incisors in centric occlusion and was measured using the degree of upper incisal coverage of the lower incisors.[18] It was regarded as reduced if the coverage was less than one third of the crown of the lower incisors and increased if it was more than one half. It was regarded as open bite if there was an actual vertical gap between the upper and lower incisors.[18]

An edge to edge incisor relationship was recorded when the maxillary and mandibular incisors occluded on their incisal edges. Posterior crossbite was considered lingual when the buccal cusp of the upper tooth occluded lingual to the maximum height of the buccal cusp of the opposing lower tooth. Buccal posterior crossbite (scissors bite) was recorded when the lingual cusp of the upper tooth occluded buccal to the maximum height of the buccal cusp of the opposing lower tooth.

Crowding was defined as overlapping of erupted teeth as a result of insufficient space or lack of space for teeth to erupt in a segment. Spacing was recorded to be present when there was no approximal contact between teeth in a range of 1 mm or more within a segment. Maxillary median diastema was recorded when a space of 2 mm or more existed between the maxillary central incisor. Missing permanent teeth was recorded when a permanent tooth that should have been erupted considering the subject's dental development was missing in the mouth.

Data entry and analysis was carried out using Statistical Package for the Social Sciences (SPSS) version 21.0. Frequency distribution was generated for all variables, measures of central tendency and dispersion was generated for numerical variables. P values ($P < 0.05$) were regarded as significant.

Results

This was a cross-sectional study among trainee dental surgery technicians undergoing clinical posting at the University of Benin Teaching Hospital, Benin City, Nigeria. The total population of participants was 100 (hundred). There were 11 (11.0%) males and 89 (89.0%) females. The mean age was 21.87±3.17 years. There was no statistically significant difference between occlusal characteristics and sex/age ($P>0.05$).

Table 1 showed the occlusal classification of the participants. Normal occlusion was recorded among 22(22%) , 51(51%) had Class I malocclusion, 17(17%) had Class II div 1 malocclusion, 4(4%) had Class II div 2 malocclusion and 6(6%) had Class III malocclusion. Table 2 showed the distribution of overjet among the participants. 65(65%) had normal overjet, 18(18.0%) had increased overjet, 16(16.0%) had reduced overjet and 1(1%) had reversed overjet.

Table 3 showed the distribution of overbite among the participants. 70(70%) had normal overbite and 2(2.0%) had anterior open bite. Table 4 showed the distribution of spacing and crowding among the participants. 30(30.0%) had normal dentoalveolar relationship (no space, no crowding), 26(26%) had crowding and 44(44%) had spacing.

Table 5 showed the distribution of midline diastema, missing teeth and posterior crossbite among the participants. 12(12.0%) had midline diastema, 3(3.0%) had missing teeth which were maxillary canines and 3(3.0%) had posterior crossbite.

Table 1: Occlusal Classification of study Population

Occlusal classification	n	%
Normal occlusion	22	22.0
Class I	51	51.0
Class II Division 1	17	17.0
Class II Division 2	4	4.0
Class III	6	6.0
Total	100	100.0

Table 2: Distribution of Overjet among the study population

Overjet	n	%
Normal	65	65.0
Increased	18	18.0
Reduced	16	16.0
Reversed	1	1.0
Total	100	100

Table 3: Distribution of Overbite among the study population

Overbite	n	%
Normal	70	70.0
Increased	10	10.0
Reduced	7	7.0
Edge to Edge	10	10.0
Reversed	1	1.0
Anterior Open bite (AOB)	2	2.0
Total	100	100.0

Table 4: Distribution of Spacing and Crowding among the study population

	n	%
Normal	30	30.0
Crowding	26	26.0
Spacing	44	44.0
Total	100	100.0

Table 5: Distribution of Midline diastema, Missing teeth and Posterior Crossbite among the study population

	Midline Diastema		Missing Teeth		Posterior Crossbite	
	n	%	n	%	n	%
Present	12	12.0	3	3.0	3	3.0
Absent	88	88.0	97	97.0	97	97.0
Total	100	100.0	100	100.0	100	100.0

Discussion

An individual's occlusal status is generally described by two major characteristics; intra-arch relationship and inter-arch relationship.[1] A physiologic occlusion differs from a pathologic one in which the components function efficiently and without pain, and remains in a good state of health (Ross, 1970).

In this study, the prevalence of normal occlusion was 22%, this was lower than values recorded in previous studies,[15,16] but higher than results obtained by other authors.[14,19]

This study recorded a prevalence of 51% of Class I malocclusion, this was lower than the values recorded in previous studies,[14,19] and higher than values recorded by other authors.[15,16] This study recorded higher prevalence values for Class II malocclusion when compared to previous studies,[14-16] and lower values when compared to a previous study.[20]

There was a reduction in the prevalence of Class III malocclusion in this study when compared to previous studies,[15] and higher than values recorded in other studies.[14,20-23]

Normal overjet values were recorded in the majority of the participants in this study (65%). This was a similar finding in previous studies.[14,15,17] There was increased overjet among 18% of the participants. Previous studies[14,15] recorded 24.7%, and 15.7% respectively.

This study recorded a high prevalence of normal overbite. This was a similar finding in previous studies.[11,15,24-26] In this study, the occurrence of reduced overbite was 7.0%, 10.0% for deep overbite, 10.0% for edge to edge, reversed overbite of 1.0% and anterior open bite was 2.0%. Previous study[14] recorded 9.8% for increased overbite, 8.4% for reduced overbite, and 2.0% for edge to edge, anterior open bite of 4%, and 7.0% for reverse overbite. In another study[15], the prevalence of increased overbite was 14.1%, reduced overbite was 9.1%, edge to edge, 3.2%, and anterior open bite was 7.1%.

Thirty (30.0%) participants in this study had normal dentoalveolar relationships in the upper and lower arches (no crowding and spacing), 26(26.0%) had crowding and 44(44.0%) had spacing. A previous study[15] recorded 79.9% normal dentoalveolar relationship (no crowding and spacing), 7.2% crowding while another study[14] recorded a normal dentoalveolar relationship of 77.3%, 12.0% crowding, and 10.7% spacing.

Prevalence of midline diastema in this study was 12.0%, which was lower than values recorded in previous studies[11,14,15] was 19.5%, 17.0% and 36.8% respectively. Prevalence of missing teeth and posterior crossbite in this study was 3.0%, and the maxillary canines were the frequently missing teeth. Previous study[14] recorded 1.1% for missing teeth and 4.5% for posterior crossbite, the maxillary lateral formed the majority of the missing teeth.

Conclusion

The prevalence of normal occlusal traits was 22% and Class I malocclusion was 51.0% among trainee dental surgery technicians in a Nigerian Teaching Hospital. Prevalence of Class II div 1 malocclusion was 17.0%, Class II div 2 was 4.0% and Class III was 6.0%. There was crowding in 26.0% of the participants and spacing occurred in 44.0%.

Contribution to Authorship: All authors contributed significantly to the conceptualization and design of the research framework, data collection, analysis and write up.

Funding: The research was self-sponsored.

Conflict of Interest: The authors declare that there was no conflict of interest.

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