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Malocclusion, fingerprints and blood group



Cephalometric measurements and Photogrammetry

Pattern of malocclusion seen at AKTH



Artificial Intelligence in Orthodontics

Talon Cusps: Conservative management



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# Pattern of Malocclusion seen at Aminu Kano Teaching Hospital, Kano Nigeria: A 5 Year Review

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## Abstract

***Background:*** Malocclusion involves irregular tooth alignment or occlusion beyond normal limits, influenced by genetic, environmental, and ethnic factors. It is a multifactorial condition without a single cause. Understanding malocclusion patterns across populations is essential for orthodontic treatment planning, especially as demand for corrective care continues to rise globally.

***Methods:*** This retrospective cross-sectional study analysed data from 106 orthodontic patients aged 8 to 40 years seen at Aminu Kano Teaching Hospital (AKTH) from 2019 to 2024. All patients who presented at the Orthodontic clinic of AKTH were included in the study sample. Angles malocclusion types, overjet, overbite, crowding, diastema, and oral habits were assessed. Data was cleaned and processed in MS Excel and all statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 20, SPSS Inc., Chicago, IL, USA. (SPSS).

***Results:*** The 5-year study at Aminu Kano Teaching Hospital included (106) patients, predominantly female (65.7%), with an average age of 14.5 years. Most patients (40%) were aged 11-15 years. A large proportion of the subjects (64.4%) had Class I malocclusion, with low diastema prevalence (89.5% at 0-1 mm). Increased overjet affected 51.4% and 50.5% were affected by increased overbite. This shows that a small majority had increased overjet (51.4%) and increased overbite (50.5%), a few 16.2% had crossbite, and 7.6% anterior open bite, while a majority of the subjects 69.2% had tooth rotations. Malocclusion distribution showed no gender differences but varied by age. Class I malocclusion was highest in age groups <10 and >25 years, while anterior open bite was more prevalent in older age groups. Significant associations were found with overbite and anterior open bite. Approximately 31.4% of patients exhibited oral habits, with nail biting being most common. No significant gender differences were observed in the prevalence of oral habits. Oral habits were not significantly associated with malocclusion types except for anterior open bite, where 87.5% of affected patients exhibited habits. Consider the only significant relationship between oral habits and malocclusion type was observed between anterior open bite (AOB) where 87.5% of subjects who had AOB gave a positive history of oral habits.

***Conclusion:*** This study highlights the prevalence of malocclusion, different malocclusion types, low diastema rates, and significant occurrences of increased overjet, overbite, and tooth rotations, emphasising the need for regional assessments to address the dental needs of the population.


ORIGINAL ARTICLE


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## Introduction

Malocclusion refers to an irregularity concerning teeth alignment and/or their relationship during dental occlusion beyond the range of what is accepted as normal.[1] Malocclusion ranks amongst the top 3 oral pathologies and oral public health priorities.[2] Numerous etiological factors have been suggested for malocclusion, with genetics, environmental influences, and ethnic background being primary contributors.[3] Functional adaptations to environmental factors can impact surrounding structures, such as dentition, bone, and soft tissues, ultimately leading to various malocclusion issues. Consequently, malocclusion is considered a multifactorial condition without a single definitive cause.[4]

Several studies[4,5,6.] on malocclusion have reported varied findings across different populations worldwide.[7] There is clear evidence of ethnic variation in prevalence and types of malocclusion. As the demand for orthodontic treatment increases in many countries,[7] with data showing the negative impact of malocclusion on quality of life, understanding the patterns of common malocclusions in specific populations will aid orthodontic practitioners in planning effective treatment.

There is limited data regarding the pattern of malocclusion in Northern Nigeria. The aim of this study was to determine the types of malocclusion based on gender and age among orthodontic patients at Aminu Kano Teaching Hospital (AKTH), Kano, and to determine the pattern of distribution of the anterior posterior relationships of the jaws and the effects of oral habits on these malocclusion patterns. Furthermore, the data will be valuable for comparing the results of this study with findings reported in other populations.

## Materials and methods

This descriptive retrospective study analysed data collected from pre-treatment records of patients seen between January 2019 to July 2024 at the Orthodontic Unit of the Child Dental Health Department, Aminu Kano Teaching Hospital (AKTH) in Kano, Records of a total of 106 patients aged 8 to 40 years were reviewed and collected.

The inclusion criteria for the study were as follows:

1. Patients who presented at the Orthodontic Unit of between January 2019 and July 2024 with compliant of malocclusion or related symptoms
2. Subjects who had complete pre-treatment records
3. Presence of first permanent molars and canines
4. No prior history of orthodontic treatment

The exclusion criteria were:

1. Patients with incomplete orthodontic records
2. Patients without first permanent molars or canines
3. Patients with significantly deteriorated first permanent molars

Demographic data (age and gender) and malocclusion type were recorded for each patient. Molar relationships were classified using Angle's classification of malocclusion into Class I, Class II, or Class III malocclusion. Overjet was measured in millimetres from the edge of the upper central incisor to the labial surface of the lower central incisor; 1–3 mm was considered normal, greater than 3 mm was classified as increased, and less than 1 mm was reduced. Overbite was also measured in millimetres as the perpendicular distance from the edge of the lower central incisor to the upper central incisor. A normal range was 0–3 mm; values above 3 mm indicated a deep bite, and values below 0 mm indicated an open bite.

Crowding in the upper and lower arches was measured in millimetres and categorised as follows: 0 mm (no crowding), 1–3 mm (mild crowding), 4–6 mm (moderate crowding), and 7 mm and above as severe crowding. A maxillary midline diastema was diagnosed when there was a space of at least 1 mm between the upper central incisors. Oral habits were noted as present or absent, with specific types documented.

Ethical clearance for the study was obtained from the institutional Health research and Ethics board of Aminu Kano Teaching Hospital.

Data was cleaned and processed in MS Excel and statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 20, SPSS Inc., Chicago, IL, USA. (SPSS).

## Results

Socio-demographic data of the study participants

The orthodontic patient population at the Aminu Kano Teaching Hospital, Kano, Nigeria, over the 5-year period from 2019 to 2024, comprised 106 patients. Female patients outnumbered their male counterparts, accounting for 65.7% of the total patient population (Table 1). The age range of these patients spanned from 8 to 40 years, with a mean age of 14.5 ± 5.6 years. The largest proportion of patients (40%) fell within the 11-15 years age bracket. This

was followed by the <10 years age group, which accounted for 26.7% of the patients. The remaining age groups had smaller proportions, with the oldest age group (>25 years) comprising only 5.7% of the patients.

**Table 1. Age and sex distribution of orthodontic patients at the Aminu Kano Teaching Hospital, Kano (2019 – 2024)**

| Sex | n (%) | Range | Mean ± SD | P-value |
|---|---|---|---|---|
| Female | 69 (65.7) | 7 – 40 | 14.7 ± 5.6 | 0.72 |
| Male | 36 (34.3) | 8 – 32 | 14.3 ± 5.6 | |
| Total | 105 (100) | 7 – 40 | 14.5 ± 5.6 | |

P-value estimated using Independent t-test

A comparison of age group distribution by sex (Figure 1) indicates that female patients were more prevalent in the younger age groups, while the proportions of male and female patients were more evenly distributed in the older age groups. However, there was no statistically significant difference in the mean age between male and female patients ($p$ = 0.72).

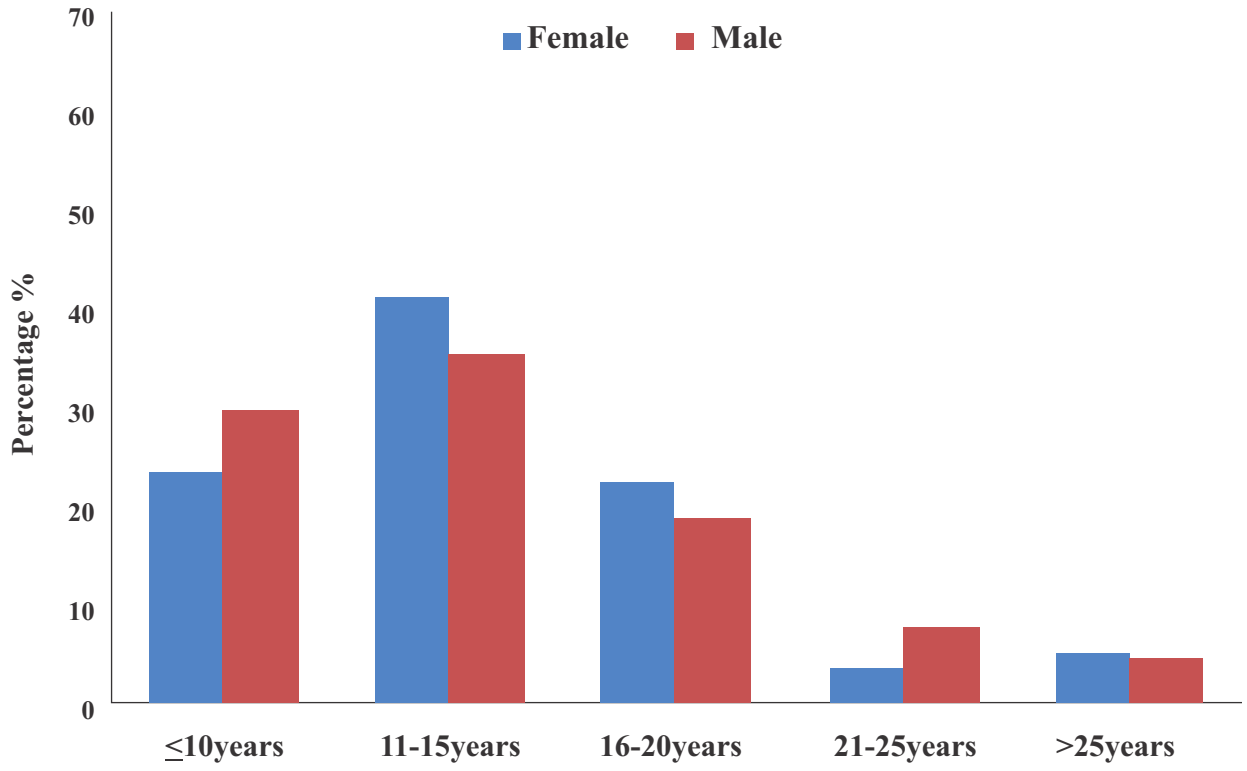



**Figure 1. Age group distribution by sex among orthodontic patients at the Aminu Kano Teaching Hospital, Kano (2019 – 2024)**

Overall prevalence and distribution pattern

Table 2 summarises the pattern of malocclusion among orthodontic patients treated at the Aminu Kano Teaching Hospital, Kano, Nigeria, between 2019 and 2024. Based on Angle's Classification of Malocclusion, the majority of patients (64.4%) exhibited Class I malocclusion, followed by Class II (29.8%) and Class III (5.8%) malocclusions.

The prevalence of diastema, defined as spacing between the teeth of more than 1mm was low, with 89.5% of patients having a diastema of 0 to 1 mm. Overjet was recorded in 51.4% of patients, with 44.8% having an overjet of 0 to 4 mm. Regarding overbite, 50.5% of patients had an overbite of 2 to 3 mm, while 45.7% exhibited an overbite of 4 mm or more. Crossbite was present in 16.2% of patients. Additional findings revealed that 7.6% of patients had an anterior open bite, and 69.2% showed tooth rotations (Table 2).

**Table 2. Pattern of malocclusion among orthodontic patients at the Aminu Kano Teaching Hospital, Kano (2019 – 2024)**

| Malocclusion | Frequency, n | Percentage, % | 95% CI |
|---|---|---|---|
| **Angle's Class** | | | |
| Class I | 67 | 64.4 | 54.8 – 73.0 |
| Class II | 31 | 29.8 | 21.0 – 39.2 |
| | | | |
| **Diastema** | | | |
| <1 mm | 94 | 89.5 | 82.0 – 94.6 |
| >1 mm | 11 | 10.5 | 5.3 – 18.0 |
| **Overjet** | | | |
| 0 – 4 mm | 47 | 44.8 | 35.0 – 54.8 |
| > 4 mm | 54 | 51.4 | 41.5 – 61.3 |
| Reverse | 4 | 3.8 | 1.0 – 9.5 |
| **Overbite** | | | |
| 0 – 1 mm | 4 | 3.8 | 1.0 – 9.5 |
| 2 – 3 mm | 53 | 50.5 | 40.5 – 60.4 |
| ≥ 4 mm | 48 | 45.7 | 35.9 – 55.7 |
| **Crossbite** | | | |
| Absent | 88 | 83.8 | 75.3 – 90.3 |
| Present | 17 | 16.2 | 97.2 – 24.6 |
| **Anterior Open Bite** | | | |
| Absent | 97 | 92.4 | 85.5 – 96.7 |
| Present | 8 | 7.6 | 33.5 – 14.5 |
| **Rotations** | | | |
| Absent | 32 | 30.8 | 21.9 – 40.2 |
| Present | 72 | 69.2 | 58.8 – 77.3 |

Distribution of malocclusion according to gender and age

The distribution of malocclusion in the study population was analysed by sex and age groups (Tables 3 and 4). There was no statistically significant difference in the distribution of Angle's Classification, diastema, overjet, overbite, crossbite, anterior open bite, and rotations between male and female patients.

In contrast, analysis by age groups revealed notable differences. The highest proportion of Angle's Class I malocclusion was observed in the <10 years (75%)

and >25 years (83.3%) age groups. Conversely, Class III malocclusion was more prevalent in the 16–20 and 21–25 age groups (17.4% and 16.7%, respectively, p = 0.06).

Additionally, younger age groups (<10 years and 11–15 years) had a significantly higher proportion of increased overbite (≥4 mm) compared to older age groups (p = 0.003). The analysis also revealed a significant association between age and anterior open bite (p = 0.05), with the prevalence of anterior open bite being highest among older age groups: 33.3% in patients aged 21–25 years and 16.7% in those above 25 years.

**Table 3. Pattern of Malocclusion according to gender and age among orthodontic patients at the Aminu Kano Teaching Hospital, Kano (2019 – 2024)**

| Malocclusion | Sex, n (%) | | Age (years), n (%) | | | | |
|---|---|---|---|---|---|---|---|
| | Female (n = 68). | Male (n = 36) | <10 (n = 28) | 11 – 15 (n = 42) | 16 – 20 (n = 23) | 21 – 25 (n = 6) | >25 (n = 6) |
| **Angle's Class** | | | | | | | |
| Class I | 43(63.2). | 24 (66.7) | 21(75.0) | 28(68.3) | 11(47.8) | 2(33.3) | 5(83.3) |
| Class II. | 21(30.9). | 10 (21.8) | 6(21.4) | 13(31.7) | 8(34.8) | 3(50.0) | 1(16.7) |
| Class III | 4(5.9) | 2 (5.6) | 1(3.6) | 0 | 4(17.4) | 1(16.7) | 0 |
| | $p = 0.94$ | | | $p = 0.06$ | | | |
| **Diastema** | | | | | | | |
| <1mm | 63(91.3) | 31(86.1) | 24(58.7) | 37(88.1) | 23(100) | 5(83.3) | 5(83.3) |
| >1mm | 6(8.7) | 5(13.9) | 4(14.3) | 5(11.9) | 0 | 1(16.7) | 1(16.7) |
| | $p = 0.41$ | | | $p = 0.23$ | | | |
| **Overjet** | | | | | | | |
| 0 – 4 mm | 30 (43.5) | 17(47.2) | 15(53.6) | 16(38.1) | 9(39.1) | 4(66.7) | 3(50.0) |
| > 4 mm. | 37(53.6) | 17(47.2) | 12(42.9) | 25(59.5) | 12(52.2) | 2(33.3) | 3(50.0) |
| Reverse | 2 (2.9) | 2(5.6) | 1(3.6) | 1(2.4) | 2(8.7) | 0 | 0 |
| | $p = 0.66$ | | | $p = 0.73$ | | | |

P-value estimated using Chi-square test and Fisher's exact test

**Table 4. (Continuation) Pattern of malocclusion according gender and age among orthodontic patients at the Aminu Kano Teaching Hospital, Kano (2019 – 2024)**

| Malocclusion | Sex, n (%) | | Age (years), n (%) | | | | |
|---|---|---|---|---|---|---|---|
| | Female (n = 68). | Male (n = 36) | <10 (n = 28) | 11 – 15 (n = 42) | 16 – 20 (n = 23) | 21 – 25 (n = 6) | >25 (n = 6) |
| **Overbite** | | | | | | | |
| 0 – 1 mm | 2 (2.9) | 2 (5.6) | 0 | 0 | 4 (17.4) | 0 | 0 |
| 2 – 3 mm | 33 (47.8) | 20 (55.6) | 19 (67.9) | 14 (33.3) | 12 (52.2) | 4 (66.7) | 4 (66.7) |
| ≥ 4 mm | 34 (49.3) | 14 (38.9) | 9 (32.1) | 28 (66.7) | 7 (30.4) | 2 (33.3) | 2 (33.3) |
| | | $p = 0.50$ | | $p = 0.003$ | | | |

**Table 4. (Continuation) Pattern of malocclusion according gender and age among orthodontic Patients at the Aminu Kano Teaching Hospital, Kano (2019 – 2024) (contd)**

| Malocclusion | Sex, n (%) | | Age (years), n (%) | | | | |
|---|---|---|---|---|---|---|---|
| | Female (n = 68). | Male (n = 36) | <10 (n = 28) | 11 – 15 (n = 42) | 16 – 20 (n = 23) | 21 – 25 (n = 6) | >25 (n = 6) |
| **Crossbite** | | | | | | | |
| Absent | 58 (84.1) | 30 (83.3) | 22 (78.6) | 37 (88.1) | 18 (78.3) | 6 (100) | 5 (83.3) |
| Present | 11 (15.9) | 6 (16.7) | 6 (21.4) | 5 (11.9) | 5 (21.7) | 0 | 1 (16.7) |
| | | $p = 0.92$ | | $p = 0.62$ | | | |
| **Anterior Open Bite** | | | | | | | |
| Absent | 64 (92.7) | 33 (91.7) | 27 (96.4) | 38 (90.5) | 23 (100) | 4 (66.7) | 5 (83.3) |
| Present | 5 (7.2) | 3 (8.3) | 1 (3.6) | 4 (9.5) | 0 | (33.3) | 1 (16.7) |
| | | $p = 1.00$ | | $p = 0.05$ | | | |
| **Rotations** | | | | | | | |
| Absent | 23 (33.3) | 9 (25.7) | 10 (37.0) | 11 (26.2) | 8 (34.8) | 2 (33.3) | 1 (16.7) |
| Present | 46 (66.7) | 26 (74.3) | 17 (63.0) | 31 (73.8) | 15 (65.2) | 4 (66.7) | 5 (83.3) |
| | | $p = 0.43$ | | $p = 0.81$ | | | |

P-value estimated using Chi-square test and Fisher's exact test

Prevalence of Oral Habits

Table 5 presents the prevalence and distribution of oral habits among the study population. Approximately one-third of the patients (31.4%) exhibited at least one oral habit. The most common habit was nail biting, observed in 33.3% of patients with oral habits (Figure 2). Tongue thrusting and lip biting were also frequent, each affecting 18.2% of patients. Other habits, such as thumb sucking, mouth breathing, and teeth gnashing, were less prevalent.

When analysed by gender, oral habits were found in 27.5% of female patients and 38.9% of male patients. However, this difference was not statistically significant (p = 0.23), indicating a comparable prevalence of oral habits between male and female patients.

**Table 5. Prevalence and distribution of oral habits by gender**

| Gender | N | Oral Habit, n (%) | | 95% CI of Prevalence | P-value |
|---|---|---|---|---|---|
| | | Absent | Present | | |
| Female | 69 | 50 (72.5) | 19 (27.5) | 17.5 – 39.6 | 0.23 |
| Male | 36 | 22 (61.1) | 14 (38.9) | 23.1 – 56.5 | |
| Overall | 105 | 72 (68.6) | 33 (31.4) | 22.7 – 41.2 | |

P-value estimated using Chi-square test

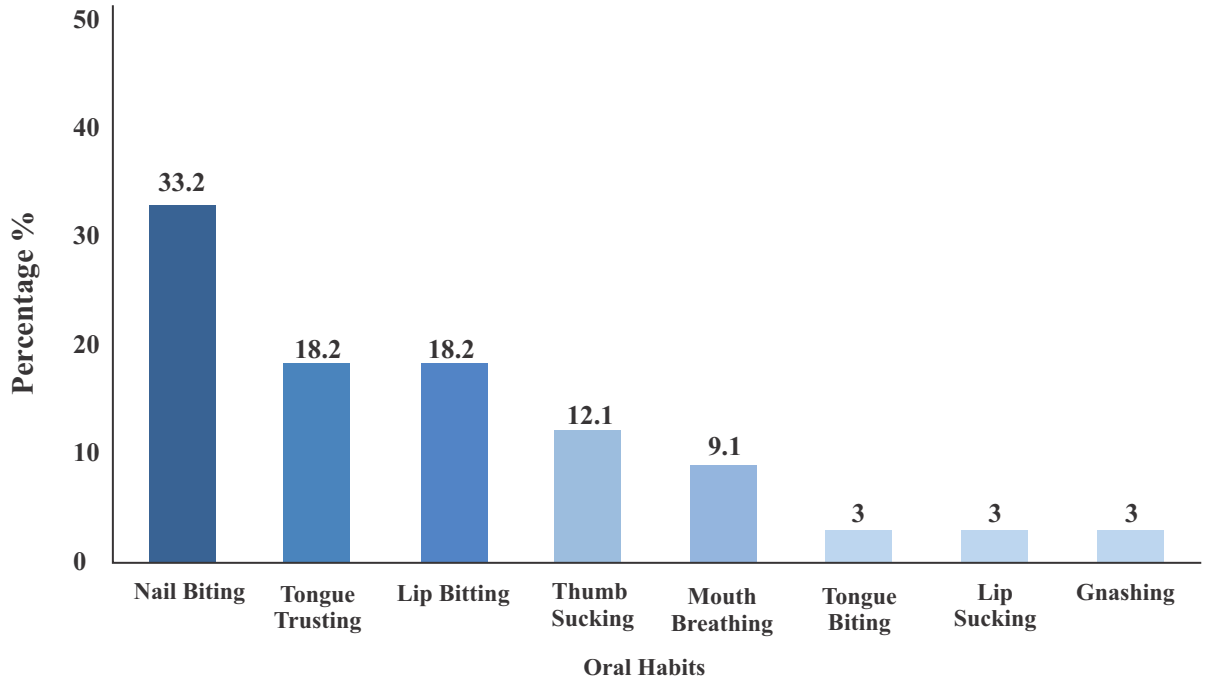



**Figure 2. Type of oral habit among orthodontic patients at the Aminu Kano Teaching Hospital, Kano (2019 – 2024)**

Association Between the Presence of Oral Habits and Malocclusion

Table 6 illustrates the association between oral habits and malocclusion. The findings indicate that oral habits were not significantly associated with Angle's Classification ($p = 0.37$), overjet ($p = 0.21$), overbite ($p = 0.21$), or crossbite ($p = 0.44$).

However, a marginally significant association was observed between oral habits and diastema ($p = 0.10$). Over half (54.5%) of patients with a larger diastema (2–4 mm) exhibited an oral habit, compared to 28.7% of patients with normal spacing (0–1 mm).

The only significant association identified was between oral habits and anterior open bite ($p < 0.001$). A striking 87.5% of patients with anterior open bite had an oral habit, compared to 26.8% of those without anterior open bite.

**Table 6. Association between the presence of oral habits and malocclusion among orthodontic Patients at the Aminu Kano Teaching Hospital, Kano (2019 – 2024)**

| Malocclusion | N | Oral Habit, n (%) Absent | Present | P-value |
|---|---|---|---|---|
| **Angle's Class** | | | | |
| Class I | 67 | 43 (64.2) | 24 (35.8) | 0.37 |
| Class II | 31 | 24 (77.4) | 7 (22.6) | |
| Class III | 6 | 5 (83.3) | 1 (16.7) | |
| **Diastema** | | | | |
| < 1mm | 94 | 67 (71.3) | 27 (28.7) | 0.10 |
| > 1mm | 11 | 5 (45.4) | 6 (54.5) | |

| | | | | |
|---|---|---|---|---|
| **Overjet** | | | | |
| 0 – 4 mm | 47 | 28 (59.6) | 19 (40.4) | 0.21 |
| > 4 mm | 54 | 41 (75.9) | 13 (24.1) | |
| Reverse | 4 | 3 (75.1) | 1 (25.0) | |
| **Overbite** | | | | |
| 0 – 1 mm | 4 | 3 (75.0) | 1 (25.0) | 0.21 |
| 2 – 3 mm | 53 | 32 (60.4) | 21 (39.6) | |
| ≥ 4 mm | 48 | 37 (77.1) | 11 (22.9) | |
| **Crossbite** | | | | |
| Absent | 88 | 59 (67.0) | 29 (32.9) | 0.44 |
| Present | 17 | 13 (76.5) | 4 (23.5) | |
| **Anterior Open Bite** | | | | |
| Absent | 97 | 71 (73.2) | 26 (26.8) | < 0.001 |
| Present | 8 | 1 (12.5) | 7 (87.5) | |
| **Rotations** | | | | |
| Absent | 32 | 22 (68.7) | 10 (31.2) | 0.94 |
| Present | 72 | 50 (69.4) | 22 (30.6) | |

P-value estimated using Chi-square test and Fisher's exact test

## Discussion

The pattern of malocclusion varies globally, regionally, and even between cities.[8] Evaluating orthodontic patients provides valuable insights for planning treatment and assessing malocclusion distribution. Understanding these patterns is essential for guiding treatment priorities and developing effective orthodontic services and preventive programs tailored to specific populations.[9]

The majority of participants in this study were female, a finding consistent with previous studies,[10,11] indicating that women are more likely to seek orthodontic treatment. This trend can be attributed to the greater emphasis that females typically place on dental aesthetics and appearance, compared to males. Social and cultural factors may also play a role, as women are often subjected to societal expectations regarding physical appearance, which can influence their health-seeking behaviours, including pursuing treatments to enhance their smiles. Additionally, studies[12,13] have suggested that females may have a higher level of self-awareness and concern about oral health, contributing to their proactive approach toward orthodontic care.

Angle's Class I malocclusion was the most prevalent pattern observed in 64.4% of participants who sought treatment at the Orthodontic Unit of the Child Dental Health Department, Aminu Kano Teaching Hospital. This finding is consistent with studies conducted in the southern regions of Nigeria,[10,14-16] other African countries,[3,17] and globally.[1,5] The global prevalence of Angles class 1 Malocclusion could be related to the wide range of malocclusion traits within this class.

In this study, Angle's Class II malocclusion was observed in 29.8% of participants, a value comparable to the findings reported by Borzabadi-Farahani *et al*.[18] among urban Iranian adolescents but lower than those reported by Guclipaneni *et al*.[19] among Saudi adolescents. Class II malocclusion has been found to be the most common pattern among individuals of Northern European descent[20] and Pakistani[21] populations. The proportion of subjects

with Angles Class II malocclusion in our study was higher than reported in some studies from Southern Nigeria,[6,14,22] but similar to results from another study in Lagos, Nigeria.[11] Angle's Class III malocclusion was the least common in this study, found in 5.8% of participants. This is higher than the findings reported by Ajayi[22] (1.8%) among schoolchildren in Benin City and Obanubi *et al*.[11] (4.1%) among patients at the Lagos State University Teaching Hospital. However, it is lower than findings by Onyeaso *et al*.[6] (8.0%) at the University College Hospital Ibadan and Folaranmi and Okeke.[10] (24.3%) at the University of Nigeria Teaching Hospital, Enugu. The variations in malocclusion patterns across studies may be attributed to differences in sample selection techniques, the diversity of local ethnic groups, and cultural practices. Overall the relatively low frequency of Class III malocclusion aligns with craniofacial norms reported in sub Saharan Africa.

Overall, the findings from this study is similar with the studies reported in other parts of Nigeria,[9,10] Africa,[3,17] and globally,[1,5] where Class I malocclusion remains the most common, followed by Class II and Class III malocclusions. These results provide valuable insights for orthodontic practitioners to develop targeted treatment strategies tailored to the specific needs of different populations.

In the present study, 74.3% of participants had Skeletal Class I pattern, indicating a normal skeletal relationship between the upper and lower jaws. Skeletal Class II and Class III patterns were observed in 19.0% and 6.7% of patients, respectively.

The present study also found a low prevalence of diastema, (space greater than 1mm) in *10.5%,* contrasting with higher rates reported in studies from the South-Southern[22] and South-Western[6] regions of Nigeria. The variations noticed in diastema prevalence may be attributed to differences in demographics, age groups, and cultural or genetic factors. Our study recorded high values of both overjet and overbite, with overjet being more prevalent than overbite. These findings differ from studies conducted in the southern regions of Nigeria and among Tanzanian children,[23] where higher occurrences of normal overjet and overbite were reported. The variations in findings may be partially attributed to differences in the criteria used to define increased overjet in various studies. Discrepancies in sample selection, measurement techniques, and population demographics could also contribute to these differences. In this study, crossbite was observed in 16.2% of participants, a prevalence higher than the values reported by Ajayi [22] (11.5%) and Onyeaso *et al*.[6] (12.8%). However, it was lower compared to the findings by Otuyemi *et al*.[24] (17.8%) and Utomi *et al.*[25] (20.4%).

Furthermore, the study revealed that 7.6% of patients had an anterior open bite, a value comparable to the 7.1% reported by Aikins and Onyeaso in Rivers State.[15] However, it was higher than the values reported by Ajayi[21] (4.1%) in Benin and Gudipaneni *et al*.[19] (4.6%) among Saudi subjects. Anterior open bite is clinically significant due to its impact on aesthetics, speech, and biting efficiency. Additionally, 69.2% of the participants exhibited tooth rotations. The high prevalence of tooth rotations emphasises the need for corrective interventions to improve occlusion, dental hygiene, and overall smile aesthetics.

This study found no significant association between malocclusion patterns and participants' age or gender, consistent with findings from Obanubi *et al*.[11] and Kashif *et al*.[26] However, a higher prevalence (75%) of Angle's Class I malocclusion was observed among participants under 10 years compared to older age groups. This difference may be attributed to parental influence or peer pressure, as younger children are more likely to receive treatment at the recommendation of their parents or caregivers.

These results highlight the importance of regional assessments to inform tailored orthodontic treatment strategies. In addition, given the limited resources for healthcare provision, tailored preventive strategies may be developed along these identified areas. These differences could be attributed to differences in sample size, age distribution, regional factors, and

diagnostic criteria used in each study. Environmental factors, dietary habits, and genetic variations could also play a role in influencing the development of crossbite in different populations.

## Conclusion

This study provides important insights into malocclusion patterns among orthodontic patients at Aminu Kano Teaching Hospital, Kano, Nigeria. Angle's Class I malocclusion was the most prevalent, followed by Class II and Class III, aligning with regional and global trends. Diastema was uncommon, but there were notable occurrences of overjet, overbite, crossbite, and tooth rotations, emphasising the need for corrective interventions. Furthermore, 7.6% of patients exhibited anterior open bite, a condition with significant implications for aesthetics and oral functionality. While no significant relationship was found between malocclusion patterns and age or gender, Class I malocclusion was more prevalent among participants under 10 years. These findings underscore the importance of regional assessments and tailored orthodontic strategies to address the specific dental needs of the population.

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**Conflict of Interest** - None to declare

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