

WEST AFRICAN JOURNAL OF ORTHODONTICS

VOLUME 6, NUMBER 1

ISSN 2315-9502

JUNE 2017

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Occlusal Characteristics of Orthodontic Patients Seen at a Tertiary Health Facility in Bamako, Mali.

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Abstract

Introduction: This study was carried out to study the orthodontic profile of patients receiving Orthodontic care at the University Hospital Center, National Center of Odonto-stomatology in Bamako, Mali.

Methods: This was a cross-sectional descriptive study. We evaluated the occlusion of patients receiving treatment at the University Hospital Center, National Center of Odonto-stomatology in Bamako. We observed the various orthodontic abnormalities in patients received at the Orthodontic department.

Results: The total study population comprised 432 patients, with 81% having Class I malocclusion, 6.9% in class II division 1, 4.2% in class II division 2 and 7.9% in class III. In addition, 53.7% with maxillary protrusion and 55.6% spacing. Dental abnormalities were in lower proportions (less than 7%).

Conclusion: Dento-alveolar disproportion in form of spacing, was the main anomaly observed in the population surveyed, whether or not associated with other anomalies. An epidemiological study is recommended to determine the prevalence of orthodontic malocclusions in the Malian population.

Key words: Malocclusions, orthodontic population, Bamako

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Introduction

Malocclusion is defined as an abnormality of teeth or inter-arch relationships deviating from normal. It is highly prevalent in populations and ranks third after tooth decay and periodontal disease¹.

Orthodontic malocclusion affects social, psychological and physical functioning, and its negative impact can therefore affect a person's quality of life by triggering physical and

psychosocial effects on the individual.

Consequently, the patient perceives orthodontics as a way to improve dentofacial aesthetics, in the hope of improving their social interactions, self-esteem, confidence and self-image¹⁻².

In Mali, demand for orthodontic treatment is now very popular despite its high cost, compared to the country's economic context. This treatment, which was initially and largely reserved for children and adolescents, has attracted more adults in recent years. The university hospital center and national center of Odonto-stomatology (CHU-CNOS) is the third reference structure which brings together various specialists including one orthodontist. The country has three qualified orthodontists for its nineteen (19) million citizens. This highlights the importance of early treatment and the involvement of general practitioners in order to avoid more complex orthodontic treatments.

Several studies have determined the prevalence of orthodontic malocclusions in different populations¹⁻⁸. As no official figure has yet reported orthodontic anomalies in Mali, it seemed appropriate

to us to collect data about the various malocclusions encountered in orthodontic consultation at our tertiary facility. Thus, the objectives of our study were to identify the main malocclusions seen in orthodontic consultation, determine the frequency of these malocclusions and to compare our data with those found in orthodontic and general populations around the world.

Materials and Methods

This was a descriptive, cross-sectional study based on the clinical records of patients who came for an orthodontic consultation at the CHU-CNOS from January to June 2018. The study population comprised of all patients received for an orthodontic consultation.

All clinical records of patients received for orthodontic consultation at the University Hospital Center, National Center of Odonto-stomatology from January to June 2018 were reviewed. Only the

records of patients of Malian nationality, who had not received previous orthodontic treatment and who had complete records including pre-treatment photographs, study models and panoramic radiographs.

The variables studied include socio-demographic details such as age, gender, occupation, ethnicity. A detailed orthodontic assessment was also carried out and the orthodontic variables assessed areas listed in the table 1 below and as described in Figs A1 to E3. Anteroposterior relationship was assessed with Angle's Classification, while other occlusal anomalies in the three planes of space were also assessed, in addition to dental anomalies such as supernumerary teeth, impacted teeth and missing teeth. (Table 1)

Statistical analysis was performed using SPSS software version 10.0. The chi square test was used to compare the frequency of abnormalities with gender.

Orthodontic variables analyzed	Study criteria
Spacing	Presence of space of more than 1 mm between the upper and lower incisors
Crowding	Presence of overlap of at least 1 tooth compared to the others
Supernumerary teeth	Presence of a supernumerary or additional tooth
Impacted teeth	Absence of a tooth on the arch and whose presence is confirmed in the jawbone by the orthopantomogram
Missing teeth	Absence of a tooth on the arch and whose absence is confirmed by the orthopantomogram
Angle class	According to Angle classification
Anterior open bite	End to end incisor or lack of incisor contact
Overbite	Upper coverage = 3 mm
Maxillary protrusion	Overjet greater or equal to 3 mm
Transverse direction	Presence of exoalveolus or endoalveolus



Figure 1: Normal occlusion

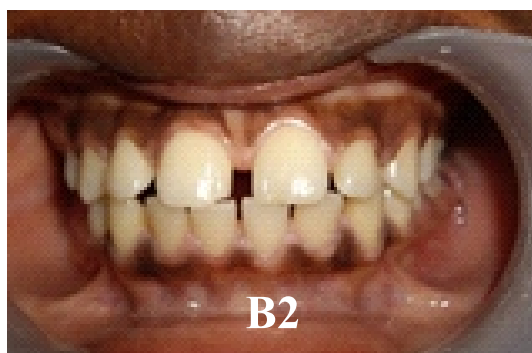
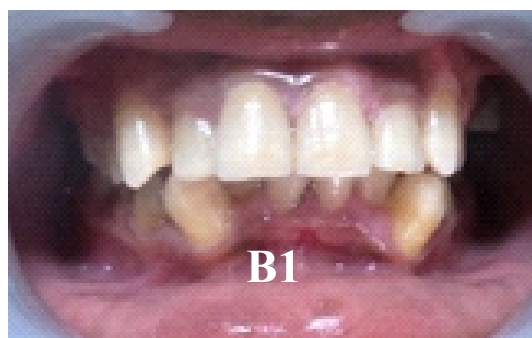
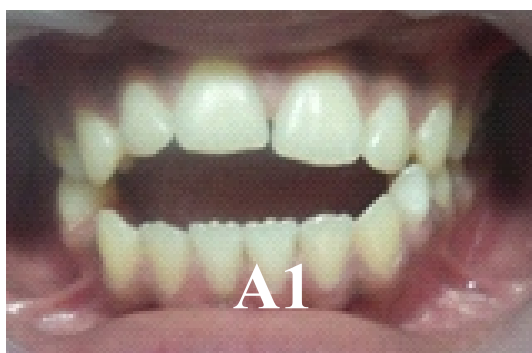
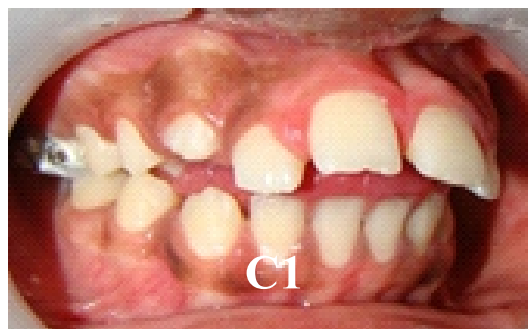




Figure 2: Different malocclusions

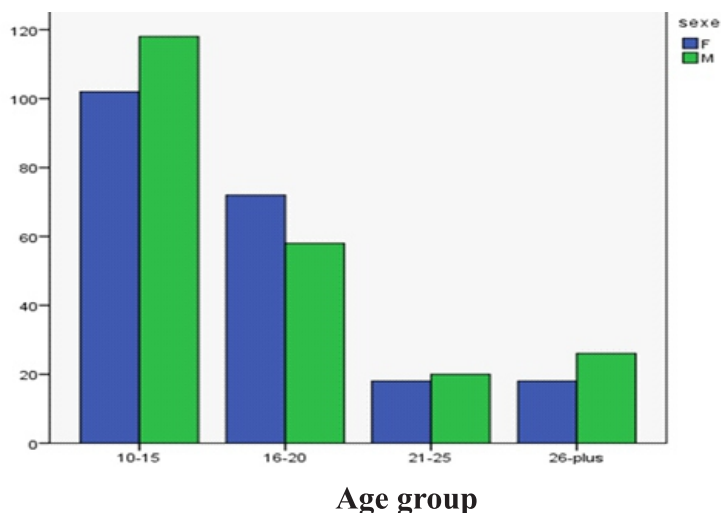
- A₁: Anterior openbite A₂: Deepbite
 B₁: Crowding B₂: Spacing
 C₁: Maxillary protrusion C₂: Maxillary retrognathism
 D₁: Supernumerary teeth D₂: Missing teeth
 E₁: Angle class III E₂: Angle class II

Results

Our sample was made up of four hundred thirty-two (432) subjects, comprising two hundred ten females (210, 48.6%) and two hundred twenty-two males (222, 51.4%).

In our population, 81% of our patients were in the 10-20 age group with more than 50% of the respondents in the 10-15 age group (Fig 3). Students made up 88.9% of our patients, against 6.5% of paid workers. The 432 patients were distributed among 10 ethnic groups with a predominance of Fulani people or Peulhs.

Figure 3: Distribution of the population by sex and age groups



The most frequent anomalies were dento-maxillary disharmonies due to dental defect (spacing) with 55.6%, followed by 53.7% of patients with maxillary protrusions. Crowding was observed in 33.6% of patients. Regarding dental anomalies, we observed 6.9% missing teeth and 0.5% supernumerary teeth. We found 14.4% anterior open bite and 6.9% overbite..

According to Angle's classification, 81% of our patients were in class I, 7.9% in class III, and 11.1% in class II (including 6.9% in class II division1 and 4.2% in class II division2).

Orthodontic anomalies	Total population			
	Total	Percent age	Female	Male
Spacing	240	55.6	124	116
Crowding	146	33.8	60	86
Impacted teeth	30	6.9	10	20
Missing teeth	30	6.9	16	14
Supernumerary teeth	2	0.5	2	0
Anterior openbite	62	14.4	34	28
Overbite	30	6.9	10	20
Transverse direction	46	10.6	16	30
Maxillary protrusion	232	53.7	118	114

Discussion

The lack of data in orthodontics in Mali prompted us to make this first observation on the main anomalies encountered in orthodontic consultation at the CHU-CNOS of Bamako. The data studied come exclusively from patients' medical records.

The study of our population showed an almost uniform proportion of both sexes, 48.6% of women and 51.4% of men. We note a predominance of the male sex at the level of all age groups except in the 16-20 group where the female sex is predominant. This can be explained by the strong aesthetic demand among young women of this age group.

Thermac³ found a similar result with an almost equal distribution between the two genders (47% girls, 53% boys) in an orthodontic population of Lyon. In their study, after 16 years, we find more women, which can be explained by an aesthetic demand and a

a higher awareness among women. Diop-Ba et al.,² found 59% girls and 41% boys in a similar study carried out in Senegal.

In terms of ethnic origin, Thermac,³ found a predominance of the North African (42%), Caucasian (34.3%), and African (17.3%) populations, well in agreement with the diversity of the French population. In our study, we found a majority of Fulani who nevertheless represent the second ethnic group in Mali in terms of representativeness in the population.

The most frequent abnormality in our study was dento-maxillary disharmony with the presence of diastemas (spacing) in 55.6% of our patients. Aka et al.,⁴ found the same result in an orthodontic population in Abidjan with 48% diastemas. Onyiaso,⁵ found 37% diastemas in adolescents in Ibadan, Nigeria. These diastemas are quite frequent in black populations and sometimes are a sign of beauty in certain ethnic groups in Mali.

We found 33.8% crowding. This result is close to that of Celestin,⁶ in Côte d'Ivoire who found 40.5% tooth-arch disharmony in an orthodontic population, and that of Aka,⁴ with 41% crowding. daCosta and Utomi,⁷ found up to 43.2% mandibular crowding in a Nigerian population.

Maxillary protrusion was found in 53.7% of patients. This figure is much higher than the 20.7% observed by Celestin⁷. In Morocco, Bourzgui et al.,⁸ reported a prevalence of 27.2% of overjet greater than 4 mm in schoolchildren aged 8 to 12 years. Ouedraogo et al.,⁹ found 22.8% of exaggerated positive overjet thus making this anomaly the most frequent in their study. This disparity between the figures could be explained on the one hand by the ethnicity and the criteria used to define the variables. On the other hand, the aesthetic impairment linked to this anomaly could explain its higher prevalence in orthodontic consultation in our study.

Our study found 81% of subjects in class I, 6.9% in class II division 1, 4.2% in class II division 2 and 7.9% in class III. Our figures are consistent with those found by Sonan et al.,¹⁰ in a school population in the Abidjan region. Ousehal et al., found 52.90% of class I. Uslu et al.,¹¹ in Turkey and a Nigerian study,⁷ found a predominance of class I among their patients received for orthodontic consultation. In Senegal Diop-Ba² found 41.28% class I, 34.86% class II and 14.68% class III. These values show that class I has a higher frequency in general, although this observation is contrary to that of Thermac et al.,³ who found only 23% of patients in class I and 69% in Class II.

Our study found 14.4% anterior open bite and 6.9% with deep overbite in population surveyed.. These figures are comparable with those of daCosta and Utomi⁷ and Thermac³, respectively with values of 11.2% and 14% of anterior open bite. Oneyaso⁵ reported 5.2% anterior open bite and 3.8% deep bite in a Nigerian population. In Senegal, Diop-Ba et al.,² found 34.26% anterior open bite and 25.93% overbite. These values are significantly higher than our figures.

The low rates of supernumerary teeth (0.5%) and agenesis (6.9%) are also found in Turkey and Brazil in orthodontic populations¹¹⁻¹². There were no significant gender differences observed in our study in the occlusal traits and abnormalities studied. The disparities observed between our values and those of other populations through this study could be explained on the one hand by ethnic origins, the age of the patients and on the other hand by the method of data collection.

Conclusion

It emerges from this observation that dento-alveolar disproportion in form of spacing, was the main anomaly observed in the population surveyed, whether or not associated with other anomalies. We also noted that class I was the most common of the Angle classes observed in the study population. Dental abnormalities had a relatively low frequency. This study carried out in an orthodontic population does not reflect the real prevalence of orthodontic malocclusions in the Malian population.

An assessment should therefore be carried out in a well-targeted population to compare with other populations in order to identify the real treatment needs in our country.

Contributors

All authors contributed equally

Funding/Grants

Funded by the authors

Conflict of Interest

None declared

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