

Occlusal Characteristics of Patients Treated in the Orthodontic Department of the Department of Odontology

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Abstract

Background: The objective of this study was to determine the occlusal characteristics of the patients treated in the dentofacial orthopedics department of the Department of Odontology of Dakar.

Methods: A retrospective cross-sectional descriptive study was carried out, based on the files of patients who came to the Dentofacial Orthopedics Department for consultation. Patients who had not received prior orthodontic treatment were included in this study. On each selected file, sociodemographic data as well as clinical data constituted by the reason of the consultation and the occlusion in the 3 dimensions were collected. A data entry form was set up with the epi info 7 and analyzed using the epi 2000 software. A t test on independent sample was used to compare the age-sex variable.

Results: 109 cases were selected in a total of 222 identified. The average age was 9 years $\pm$ 2.27. 41% of patients were in Angle class I against 34% in class II and 14% in class III. Vertically, 39.81% of the patients were in normocclusion while 25% had a deep overbite and 34% an open bite. Regarding the transversal dimension, 91.74% of the patients had a normocclusion whereas 3% and 4% presented respectively a posterior crossbite and a scissors bite.

Conclusion: These occlusal features are different from those found in other geographical areas. The ethnicity, the age of the patients and the method of recording occlusal data may explain these disparities. It is necessary to take into account the occlusal characteristics in order to undertake an adequate interceptive treatment.

Keywords: Occlusion, Prevalence, Epidemiological profile.

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Introduction

Orthodontic treatment is generally justified by the search for the potential improvement of the social and psychological well-being of the patient, which is related to the improvement of his or her appearance. In addition, it has been proven to improve the periodontal health and masticatory efficacy of the patient^{1,2}. The profile of patients in the context of dental emergency has been studied in the United Kingdom³, Northern Europe⁴, France⁵ Brazil⁶, Nigeria⁷ etc. In Turkey, the profile of patients who

received endodontic treatment was also evaluated⁸ and tests were carried out in order to optimize the service rendered to the patient and thus enter into a quality assurance process. To our knowledge, there is no existing data showing the profile of orthodontic patients. In the Department of Dentistry of the Faculty of Medicine, Pharmacy and Odontology of Dakar, there is an odontological polyclinic where dentofacial orthopedics care is provided by students in the 5th year and supervised by teachers. The occlusal features of patients have rarely been evaluated⁹. The objective of this work was to study the occlusal characteristics of the patients treated in the Dentofacial Orthopedics Department of the Department of Odontology of Cheikh Anta Diop University in Dakar during the period dating from January 2010 to October 2014.

Material and Methods

This is a retrospective cross-sectional descriptive study on files of patients who came to the Dentofacial Orthopedics Department of the Odontology Department for consultation. Requirements and recommendations outlined in the World Medical Association Declaration of Helsinki, were followed, and informed consent was obtained from parents and

patients after properly explaining the study objectives, data collection procedure, confidentiality of data collected, benefits, risks, and discomfort of the procedure. Participants were informed of the voluntary nature of participation and that they had the freedom to withdraw from the study at any time.

Selection criteria

To be included in the study, the files should meet the following criteria:

- records of Senegalese patients from 100% Senegalese parents
- files whose clinical examination is signed and consequently validated by a teacher of the department;
- complete patient files for an orthodontic check-up (x-rays castings)
- records of patients who have not received prior orthodontic treatment

Study variables

Those variables comprise the sociodemographic data of patients relating to age and sex; the initiator of the consultation and clinical data constituted by distribution according to the reason of the consultation and dental diagnosis. In the case of dental diagnosis, we noted:

- Transversally: the presence of posterior crossbite, scissors bite, or normocclusion.

Posterior crossbite (a palatal displacement of the maxillary affected tooth or teeth as it relates to the antagonistic tooth or teeth); scissors bite (when one or more of the adjacent posterior maxillary tooth or teeth are positioned completely buccally to the antagonistic teeth and exhibit a vertical overlap); normocclusion (is present when posterior teeth occlude in a normal buccolingual relation with the antagonistic teeth)

- Vertically, the overbite (the amount of overlap of the mandibular anterior teeth by the maxillary anterior teeth measured perpendicular to the occlusal plane.) is noted: Open bite (when there is no vertical overlap of the maxillary and mandibular anterior teeth or no contact between the maxillary and mandibular posterior teeth); Deepbite (when the amount of overlap of the mandibular anterior teeth by the maxillary anterior teeth exceeds 50%); normal overbite (when the amount of overlap of the mandibular anterior teeth by the maxillary anterior teeth is equal to 30%)

- Sagittally: The Angle molar relationships are noted. The classification is based on the relationship of the mesiobuccal cusp of the maxillary first molar and the

buccal groove of the mandibular first molar: Angle classe I (when the mesiobuccal cusp of the maxillary first molar is aligned with the buccal groove of the mandibular first molar); Angle classe II (when the molar relationship shows the buccal groove of the mandibular first molar distally positioned when in occlusion with the mesiobuccal cusp of the maxillary first molar); Angle class III (when the molar relationship shows the buccal groove of the mandibular first molar mesially positioned to the mesiobuccal cusp of the maxillary first molar when the teeth are in occlusion).

Collection of data

The data was collected from files of patients' of the Dentofacial Orthopedics Department of the Department of Odontology from January 2010 to October 2014. It was a retrospective study and the collected data were based on a clinical examination of the oral cavity supplemented by an oral interview of older patients (over 12 years old who could answer the questions) or the parents of the patients who could not answer questions accurately (school-age patients under 12 years). This interview was done in the Dentofacial Orthopedics Department during the clinical examination. Parents and children were all available and the objectives of the interview was to determine the initiator of the consultation and the age of the patients; and to seek the reason for consultation

Data analysis

A data entry form was set up and analyzed using the Epi 2000 software for windows Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia (US). An independent sample t test was used to compare the age variable according to sex. The significance was set at $p = 0.05$.

Results

The population concerned consisted of all Orthodontic patients whose files were clinically examined, from January 2010 to October 2014. Of the 173 files identified, 109 were selected for the study having met the selection criteria while 38 were referred to specialist orthodontists for multi-attachment treatment and 26 files were invalid

Sociodemographic data of patients

Age

The average age is 9 years with a standard deviation of 2.27. Figure 1 shows the age group distribution of the sample.

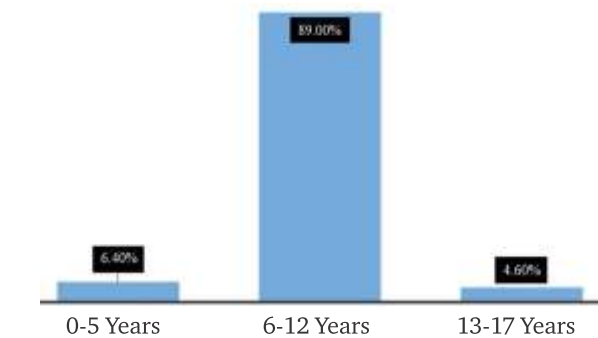


Figure 1: Distribution by age group

Sex

Patients who come to the Dentofacial Orthopedics Department were 59% female (N = 64) compared to 41% male (N = 45) (Figure 2)

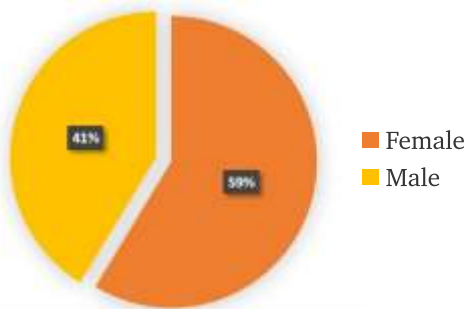


Figure 2: Distribution by gender

Age by sex

The average age was higher for girls than for boys with 9.12 +/- 2.39 years and 8.98 +/- 2.13 years respectively. The difference between the two sexes was not significant (p= 0.07)

Initiator of the consultation

The initiator of the consultation was in 58% of the cases the parents, 27% the dentist, 7% the child and 8% other people namely the otorhinolaryngologists, the speech therapist and a friend of the family (Figure 3)

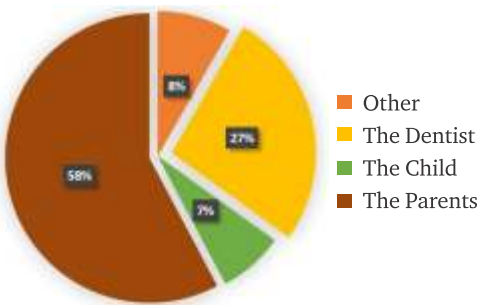


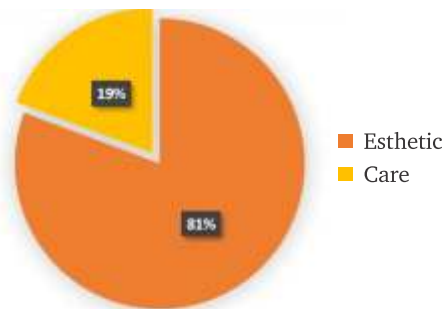
Figure 3: Distribution according to the initiator of the consultation

Clinical data

Reason for consultation

The reason for consultation was 81% esthetic (Figure 4).

Figure 4: Distribution by reason of consultation



Dental diagnosis

In the sagittal dimension, 41% of patients were in Angle Class I compared to 34% in Class II and 14% in Class III (Table I).

Table I: Sample distribution according to dental diagnosis in the antero-posterior dimension		
Antero-Posterior Dimension	Frequency	Percentage
Angle Class I	45	41.28%
Angle Class II	38	34.86%
Angle Class III	16	14.68%
Unspecified	10	9.17%
Total	109	100.00%

Regarding the vertical dimension, 39.81% of the patients were in normocclusion while 25% had an increased overbite and 34% had an open bite (Table II).

Table II: Sample distribution according to dental diagnosis in the vertical dimension		
Vertical Dimension	Frequency	Percentage
Openbite	37	34.26%
Normal	43	39.81%
Deepbite	28	25.93%
Total	108	100.00%

For the cross-sectional dimension, 91.74% of patients had normocclusion while 3% and 4% had

posterior crossbite and scissors bite, respectively (Table III).

Table III: Sample distribution according to dental diagnosis in the transverse dimension

Transverse Dimension	Frequency	Percentage
Posterior crossbite	4	3.67%
Scissors bite	5	4.59%
Normal	100	91.74%
Total	109	100.00%

Discussion

This retrospective work enabled us to identify the occlusal characteristics of the patients who were referred to the Dentofacial Orthopedics Department at the Department of Odontology of the Faculty of Medicine, Pharmacy and Odontology of Cheikh Anta Diop University in Dakar (Senegal). Of the 222 patients surveyed from January 2010 to October 2014, 109 met the criteria for selection for this study.

Sociodemographic data of patients

About gender, more than half of the population in this study (58.7%) were girls, just like studies conducted in the United States, Northern Ireland, Island, France and Nigeria that concluded that orthodontic treatment was slightly more common among girls than boys¹⁰⁻¹⁴, moreover, girls were more critical of their smile than boys, in a sample of young Americans aged 8 to 11.¹⁵ In addition, among those who received orthodontic treatment, girls were more satisfied with the treatment decision than boys¹⁶. On the other hand, a study in Senegal shows that the prevalence of orthodontic treatment was higher among boys¹⁷.

As for age, the average was 9 years, with extremes of 3 years and 17 years. The 6-12 age group was the most representative with 89%. This high percentage in this age group is due to the fact that the ODF service offers only a few types of treatment namely prevention, and the interception of functional, alveolo-dental and skeletal abnormalities. It is interesting to note that in this age group, the corrections made are part of the growth dynamic.

Clinical data

All the children who made up the population had been cared for in the ODF clinic of the department of odontology where the initiator of the consultation was

57.8% the parents of the patient, with as a reason for consulting aesthetics at 80.70%. This once again shows the importance that parents attach to the appearance of their child.

Several studies have shown the prevalence of malocclusions in different population groups. The results of these studies revealed large variations between populations. With regard to openbite, in Nigeria, Africa, Onyeaso et al¹⁸ found a prevalence of 5.2% in a population of Ibadan. This value was significantly lower than the one found in our study. The difference may be related to the age of our younger patients, so they are more likely to experience non-nutritive sucking habits such as thumb sucking that leads to long-term infarction. The subjects in our study were schoolchildren while those in the Ibadan population were college students. In Morocco, Bourzgui et al¹⁹ found in a population of 7 to 15 year-olds in Tirana a prevalence of 1.7%. In Europe, Turkey, Demir et al²⁰ found a prevalence of 7% in a population aged between 10 and 19 years (with an average age of 14 years and eight months). Similar results were found in Iran in a college population by Ramezanzadeh et al²¹ who found a prevalence of 7.3%. Farahani et al²² found that urban schoolchildren in Iran had an even lower prevalence of 1.6%. In Northern Jordan, Abu A et al²³ found a prevalence of 2.9% in children aged between 13 and 15 while in Lithuania, Kasparaviciene K et al²⁴ found a 5.2% rate in preschool children aged 5 to 7 years. In addition to ethnicity, the difference with our study may be related to the fact that in our study, the patients surveyed were consulted for orthodontic care. As a result, they potentially have orthodontic abnormalities.

Regarding the prevalence of overbite, the study by Ajayi et al²⁵ in Nigeria showed a fairly high rate of 81.3% among 441 schoolchildren including 229 boys and 212 middle-aged girls of 13. 52 years $\pm$ 1.83 years old. Mtaya et al²⁶ in Tanzania had a prevalence of 65.9% in a group of 12- and 14-year-old schoolchildren with no history of orthodontic treatment. In Morocco, Bourzgui et al²⁰ found a rate of 23.6% among schoolchildren in the city of Casablanca between the ages of 8 and 12. In Pakistan, Nadim et al²⁷ found a prevalence of 61. 40% among Karachi residents aged 12 to 15 years. Similar results (in the order of 60.4%) were found by Farahani et al²² among 502 Iranian children from an urban school population.

A higher rate (76%) was found in Saudi Arabia by Asiry MA²⁸ in 1825 Saudis including 1007 men and 818 women aged 12 to 16 selected and randomly examined. In Lithuania, Kasparaviciene K et al²⁴ found a prevalence of 31% in 503 infants from 5 to 7 years old

(with an average age of 5.95 ± 0.61 years). Except for the study conducted in Morocco, all other studies had higher prevalences than those found in our study. The size of the sample, the inclusion criteria, the age and ethnic characteristics of each geographic region may explain these differences.

In the sagittal dimension, concerning Class I, II and III anomalies, Abu Alhaija et al²³ in Northern Jordan found prevalences of 79.8%, 18.8% and 1.4%, respectively, in older children between 13 and 15 years of age. Behbehani F et al²⁹ respectively found, among a Kuwaiti population aged between 13 and 14, prevalences of 57.8%, 31.2% and 11%. Borzabadi-Farahani et al²² found a prevalence of 41.8% Class I, 27.5% Class II and 7.8% Class III in Iranian children aged 11 to 14, while in Saudi Arabia, Asiry MA et al²⁸ found respectively, 60.11%, 17.12% and 10.13% prevalence of class I, II and III in 12-16 year old children in Riyadh in permanent dentition. In Morocco, the cross-sectional study conducted by Bourzgui et al²⁰ showed a prevalence of 61.4% class I, 24% class II and 10% class III in school children aged 7 to 15 years. In black Africa, the work done by Mtaya M et al²⁶ among Tanzanian schoolchildren aged 12-14 showed that the prevalence of Class II malocclusion was 4.4% while that of Class III was 2.0%. These prevalences were very low compared to those found in our study.

Regarding the transversal dimension, Ajayi in Nigeria found in 441 schoolchildren a rate of 4.5% of subjects with a posterior crossbite²⁵. In Iran, Ali Borzabadi et al found in 502 children between the ages of 11 and 14 years, that a posterior crossbite was observed in 12.4% of subjects³⁰. Demir et al. (2005) studied Turkish subjects aged 10 to 19 years and reported prevalence rates of 9.8% for posterior cross joints²⁰. The presence of a posterior crossbite was reported in 16% of children³¹⁻³³. In a study on malocclusions in Tehran Ravanmehr and Rashidi-Birgani³⁴ reported corresponding values of 10.8%. Josefsson et al.³⁵ in a survey of Swedes and immigrants aged 12 to 13 years, reported respective values of 16.6%. These found values indicate the presence of an posterior crossbite and, compared to the values found in our study, we can deduce that the abnormalities in the transverse direction of posterior crossbite were less frequent in Senegalese subjects even if they had come for orthodontic needs.

These 3-way variations in space may be due to differences in sample size, ethnicity, age, and methods of recording subjects.

Conclusion

The prevalence of class I, class II, and class III malocclusions was 41%, 34%, and 14%, respectively. In the vertical direction, 39.81% of the patients were in normocclusion while 25% had an overbite and 34% had an open bite. In the transverse direction, 91.74% of the patients had a normocclusion whereas 3% and 4% had respectively an posterior crossbite and an scissors bite. The prevalence of subjects with posterior crossbite in this study was lower than the one reported in the literature. The same goes for the prevalence of overbite except for Moroccans, whose values were lower than those found in our study. On the contrary, the prevalence of open bite was greater in Senegalese subjects than in other populations. As in most studies, the prevalence of class III malocclusions was lower than that of class II, which was also lower than that of class I malignancies observed in Caucasians.

Contributors

All the authors contributed to the design, data collection, analysis and writeup of the manuscript.

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Self

Conflict of Interests

Nil

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