

ORIGINAL ARTICLE



Angle's classification among Brazilian racial biotypes: A university-based observational study

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Abstract

Background: The purpose of this study is to determine demographic profile and the pattern of malocclusion from the initial clinical records of patients who sought the dental clinics for orthodontic treatment and to determine difference in Angle's classification among racial biotypes.

Materials and Methods: Between the years 2011 and 2014, 1576 clinical records were selected and reviewed by one examiner to identify epidemiological characteristics. Angle's classification, age, dentition, and others were scored, and after tabulation, data were grouped to find percentiles.

Results: Class I was found at 57.9%; Class II, 31.4%, and Class III, 10.8%; there was no significant difference in gender distribution (49.6% of men and 50.4% of women); the orthodontic treatment plan indicated was comprehensive (77.4%) and the sample was composed, mainly, by white and mulatto biotypes (40.8% and 41.1%, respectively) and by youth aged 5–10 y.o. (32.1%) and aged 11–15 y.o. (29.4%).

Conclusion: There was a high incidence of Class I and indication for comprehensive treatment. There were differences in the incidence of malocclusion for the Afro-Brazilian ethnic group.

Introduction

Misalignment of teeth and jaws is called malocclusion and is among the major oral problems, according to the World Health Organization, which considers it a public health problem due to its high incidence in the population.

This high incidence associated with a declination of dental caries has changed epidemiologically oral health,^[1] and orthodontic treatment has become one of the reasons for pursuing dental care all around the world, especially for individuals who present high malocclusion severity and experience a reduction in social acceptance and self-misconception regarding facial appearance and attractiveness.^[2]

Public health studies about the prevalence of malocclusion provide important epidemiological data for assessing the type and classification of occlusal relationship for diagnosis and treatment plan.^[3]

Different populations have been investigated as Chinese,^[4] Turkish,^[5] Nepalese,^[6] Brazilian,^[1,7,8] and American,^[2,9] and these epidemiological studies provide important information about etiology and dental care.

In Sao Paulo city, USP Dental School is well known for its high-quality research, education, and dental care on all specialities, and a large number of persons seek the clinic of this school daily, particularly in the Department of Orthodontics, triage occurs on a weekly basis.

The pre-designed report used in the triage includes facial and dental characteristics and provides a valuable record of occlusal characteristics and Angle's classification of malocclusion.^[10]

The data richness present in the clinical records motivated us to conduct an observational study, aiming the assessment of prevalence of malocclusion and the differences in Angle's classification among racial biotypes.

Materials and Methods

For this study, all participants seeking to University of Sao Paulo School of Dentistry's dental service during years 2011–2014, for orthodontic needs, were recruited because of their clinical records and formed the study sample. Ethical clearance was obtained by number 1.235.281.

A total of 1576 clinical records, previously filled by calibrated graduate orthodontic residents during patient's initial appointment, were selected and reviewed by one examiner to identify epidemiological characteristics.

Individuals went to the orthodontics clinic for free demand because they were seeking low-cost treatment. Some of them were referred by professionals from other departments, while others by professionals from private dental offices. There were no prerequisites for enrollment in the triage department, other than their self-perception or parents' perception of orthodontic treatment needed. The pre-designed report by the Orthodontic Department includes facial and dental characteristics from Foster and Hamilton index,^[11] most important characteristics from diffuse axonal injury,^[12] and ordered mesoporous silica suggested index for caries and dentition characteristics.^[13]

Orthodontic clinical records were related to gender, age, racial biotype, dentition, caries, diastemas, molar relationship, crowding, overjet, open bite, crossbite, facial profile, and treatment plan. Facial characteristics were analyzed visually under artificial illumination and occlusal classification was assessed with spatulas and clinical mirrors when teeth were in centric relation.

Racial biotypes were identified by the graduate orthodontic residents according to the division made by the IBGE (Brazilian Institute of Geography and Statistics).^[14] The Angle classification was used to classify permanent first molar relation into Class I, Class II, and Class III.^[10] The treatment plan was defined as interceptive, comprehensive, or surgical by each graduate orthodontic resident, who had undergone calibration during the postgraduate course. Personal information was not collected for this study to maintain confidentiality.

After tabulation, the results were analyzed through basic descriptive statistics, using Microsoft Excel 2013 (Microsoft, Redmond, WA, USA).

Results

The Angle classification was distributed in Figure 1. Results according to ethnic/racial biotypes are showed in Figure 2, with most the sample belonged to mulattos and whites.

Although there was a high incidence of Class I in this sample, malocclusion was present in the vertical and/or transversal relations of the maxilla or mandible; therefore, 13.7% of the sample was indicated for interceptive orthodontic treatment; 77.4% for comprehensive; and 8.9% for surgical treatment.

Furthermore, the incidence of Class I malocclusion for Afro-Brazilians was high (65.3%) when compared to the other biotypes. Moreover, Class II presented much lower values than the other groups, and Class III had a higher incidence, showing that this group presented different malocclusion characteristics [Table 1].

The gender distribution was 49.6% for male, and 50.4% for female, and the subjects were aged 5–53 years. The age distribution is presented in Figure 3, showing high prevalence for individuals between 5 and 10 years.

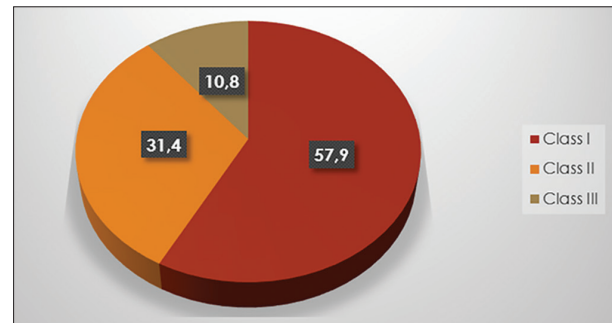


Figure 1: Distribution of sample according to Angle's classification

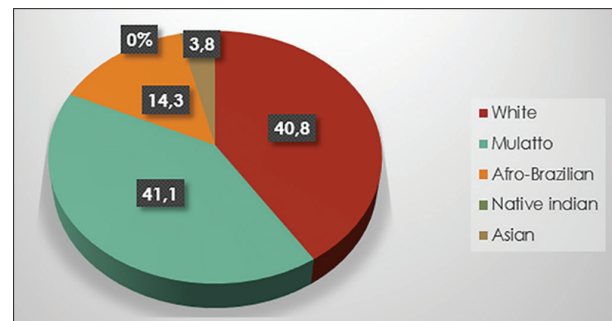


Figure 2: Distribution of sample by race/ethnic group

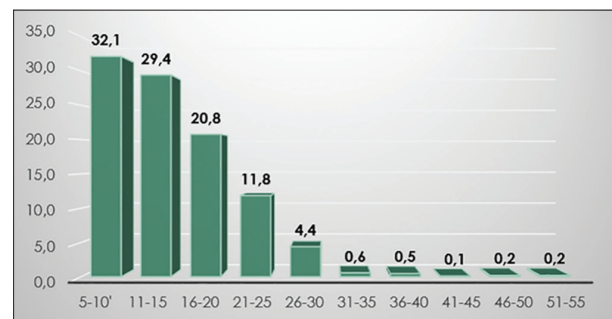


Figure 3: Distribution of sample by patient age

When age was distributed according to gender, as shown in Table 2, the standard deviation was higher for the female sample, revealing greater differences in the female's age. For both genders, data series regarding age was positive skew, then median can express better the central tendency of age. The minimum age for both genders was 5 years, and the maximum age was higher for female (53 years against 46 years for male).

Regarding subject's dentition, 0.5% had primary dentition, 44% showed mixed dentition, and 54% permanent dentition.

Different studies show Angle's classification in Table 3.

Discussion

The term malocclusion is the misalignment of teeth and jaws that encompass all types of deviations.^[15] To identify this, the Angle classification^[10] uses the molar relation as a systematic

process to define the positioning of dental arches. Although this classification has its limitations for not considering all the problems of the teeth and jaws, it is widely used in dentistry and it became a calibration tool among dentists all over the world to specify the relation of the teeth and jaws. Moreover, it is reliable, repeatable and minimizes subjectivity.^[16,17] Even though, several occlusal indexes and their variants have been developed to increase the degree of precision in the nomenclature and standardization of malocclusions.^[18]

Due to the decrease in methodological discrepancies, Angle's classification is used in many epidemiological studies,^[19,20] simplifying complexity and individuality of the malocclusion. The molar relation is not a reason for seeking orthodontic treatment because patients are unaware that it is a problem. Dental and facial deviations are responsible for this, as the result shows a high incidence of Class I at 57.9%. This result reiterates that even in a dental relation that would indicate a normal occlusion, other dental deviations such as crowding, giroversion, crossbite, and gummy smile may be present.

Even though many studies have differences, such as age range and sample size, they share a characteristic that makes the comparison possible: The Angle classification [Table 3].

Table 1: Distribution of malocclusion according to Angle's classification and racial/ethnic group

Angle's classification	White	Mulatto	Afro-Brazilian	Asian
Class I	53.1	50.0	65.3	47.6
Class II	36.6	40.3	20.0	40.5
Class III	10.4	9.7	14.7	11.9

Table 2: Age and gender distribution of study participants

Gender	Percentage	Mean age±SD	Max	Min	Median	Mode
Male	49.6	14.0±5.9	46	5	13	10
Female	-	15.5±7.0	53	5	14	9
Total	100.0	14.8±6.5	53	5	13	10

SD: Standard deviation; Max: Maximum; Min: Minimum

Table 3: Comparison based on Angle's classification

Author	n	Angle's classification (%)		
		Class I	Class II	Class III
Arashiro et al.	660	39.7	36.0	11.7
Bittencourt and Machado	3267	40.6	21.6	6.2
Silva and Kang	507	62.9	21.5	9.1
Celikoglu et al.	1507	41.5	38.1	16.7
Silva Filho et al.	2416	55.0	42.0	3.0
Castro et al.	1076	54.4	31.0	14.6
Gelgör et al.	2329	34.9	44.7	10.3
Singh and Sharma	2010	48.5	32.7	4.3
Khan and Horrocks	676	27.8	46.0	26.2
Onyeaso et al.	289	76.5	15.5	8.0

When these data were compared with previous Brazilian epidemiologic studies who assessed the same age range and dentition, Class I incidence was similar.^[7,8,17] For Class II incidence (31.4%), the result was not only the same with all of them but also was the same as found for Nepalese children^[18] and comparable to that reported by Castro et al.^[7] Class III incidence was lower at 10.8%, with the same result as studies investigating different ethnic populations.^[17,18,21]

Onyeaso et al. published an epidemiological study with Nigerian subjects seeking treatment at an Orthodontic Department.^[16] The results found for molar relation differed consistently (Class I, 76.5%, Class II, 15.5%, and Class III 8%) with this data. Although the other studies' rates differed greatly from the results, Silva Filho et al. affirmed that all populations obey the same Angle classification's proportion.^[8] This affirmation was not found in a study with Turkish subjects, presenting Class II as predominant by genetic influence.^[5]

Differences were found in Angle classification's distribution for the racial biotypes. The Afro-Brazilian group had higher rates for Class I (65.3%) and Class III (14.7%) compared with 50% (Class I) and 9.7% (Class III) for Mulattos subjects, 53.1% (Class I) and 10.4% (Class III) for white subjects, and 47.6% (Class I) and 11.9% (Class III) for Asian-Brazilian subjects. The incidence of Class II malocclusion was much lower (20%) than the others ethnic groups (36.6% for white, 40.3% for Mulatto, and 40.5% for Asian-Brazilian subjects).

The treatment chosen is dependent on the malocclusion severity,^[9] and due to rates in age range and Angle classification in the present study, the treatment plan most indicated was comprehensive (77.4%). For orthosurgical cases, the incidence was lower at 8.9% compared with Khan and Horrocks (18.8%),^[22] who investigated adult patients only.

The gender distribution showed no differences in this study, in agreement with Chu et al. study.^[4] The distribution is equal in the Brazilian population, suggesting that the perception of malocclusion and dental appearance was not greater in female participants, as assumed by Breece and Nieberg^[23] and Bailey et al.^[2]

Although Khan and Horrocks concluded that the perception of malocclusion and appearance increases with age,^[22] and the incidence of adults in this study seeking evaluation and orthodontic treatment was low. The high level of demand by teenagers and children appears to be influenced by their parents will in promoting their children's health and dental care.^[24] Comparing the perception of the need for orthodontic treatment,^[24] parents also indicated the highest rates, when compared with clinicians.

The results of this study are relevant due to the possibility of guiding and directing parents about orthodontic actions for a precise treatment plan performed in a shorter time.

The number of examiners who had participated in this study could represent a limitation; however, the quantity of patients who sought orthodontic treatment and difficulty to provide schedule availability allowed us to collect all data available to perform this study and to learn more about the patients who seek orthodontic treatment.

Conclusion

In the sample of 1576 subjects who sought the Orthodontic Department, we found high incidence for Class I (57.9%); indication of comprehensive treatment (77.4%); and differences in the incidence of malocclusions (Class I, Class II, and Class III) for the Afro-Brazilian biotype.

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