

Assessment of the nasolabial angle in young Brazilian black subjects with normal occlusion

Verificação do ângulo nasolabial em jovens brasileiros melanodermas com oclusão normal

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ABSTRACT: Black individuals present craniofacial characteristics which differ from those of other races, especially the white race, whose cephalometric analyses are usually considered as the standard in routine orthodontic diagnosis and treatment planning. Further studies are therefore needed to enable more accurate and specific diagnoses for this ethnic group. The present study was conducted in order to assess average values for the nasolabial angle in young Brazilian black individuals with normal occlusion, and to assess the occurrence of sexual dimorphism. Thirty-six lateral skull, extraoral radiographs from Brazilian black individuals were selected from the archives of the Scientific Recordings Department, Orthodontics Graduate Program, School of Dentistry of Piracicaba, State University of Campinas (UNICAMP). The patients' ages varied from 10 to 14 years, they presented normal occlusion upon clinical examination, and had not been submitted to orthodontic treatment. The cephalometric landmarks from which the nasolabial angle was obtained and measured were traced by a single researcher. Statistical analysis and evaluation of the results led to the conclusion that the nasolabial angle of young Brazilian black individuals is sharper, i.e., the soft tissue profile is more protruded. The average value for the whole sample was $88.14^\circ \pm 12.52^\circ$. The nasolabial angle was statistically smaller among females ($p < 0.05$), demonstrating the occurrence of sexual dimorphism.

DESCRIPTORS: Cephalometry; Dental occlusion; Orthodontics; African continental ancestry group; Nasolabial angle.

RESUMO: Os indivíduos melanodermas possuem características craniofaciais diferentes das apresentadas pelas demais raças, principalmente por leucodermas que, normalmente, são considerados como padrão nas análises cefalométricas utilizadas rotineiramente no diagnóstico e planejamento dos tratamentos ortodônticos. São, portanto, necessárias novas pesquisas que permitam um diagnóstico mais acurado e específico para esse grupo étnico. Os pesquisadores desenvolveram esta pesquisa com o objetivo de verificar valores médios do ângulo nasolabial em jovens melanodermas brasileiros com oclusão clinicamente normal e de verificar a ocorrência de dimorfismo sexual. Foram selecionadas 36 telerradiografias de cabeça, tomadas em norma lateral, de indivíduos brasileiros melanodermas, na faixa etária de 10 a 14 anos, de ambos os sexos, com oclusão clinicamente normal e que nunca se submeteram a tratamento ortodôntico, provenientes dos arquivos do Setor de Documentação Científica do Curso de Pós-Graduação em Ortodontia da Faculdade de Odontologia de Piracicaba da Universidade Estadual de Campinas. Sobre essas radiografias foram delimitados os pontos e as linhas que dão origem ao ângulo nasolabial, o qual foi traçado e medido por um único pesquisador. Após análise estatística e avaliação dos resultados, concluiu-se que o ângulo nasolabial em indivíduos jovens brasileiros melanodermas apresenta-se mais agudo, ou seja, o perfil tegumentar apresenta-se mais protruso. Os valor médio obtido para a amostra toda foi $88,14^\circ \pm 12,52^\circ$. O ângulo nasolabial foi estatisticamente menor no sexo feminino ($p < 0,05$), demonstrando a existência de dimorfismo sexual.

DESCRIPTORES: Cefalometria; Oclusão dentária; Ortodontia; Grupo ancestral do continente africano; Ângulo nasolabial.

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INTRODUCTION

The related literature has demonstrated that skeletal, dental and facial profile differences exist when subjects from distinct ethnic groups are compared. Thus, each group should be evaluated differently, considering their racial characteristics, in order to produce better diagnoses and treatment planning.

Investigations comparing ethnic groups have shown that the cranial and soft tissue dimensions of African descendents are different from those of whites. Cotton *et al.*⁶ (1951) observed that black subjects had a facial convexity angle larger than that of whites. As for the soft tissue profile, it was demonstrated that black subjects' faces are wider, their mouths are larger and wider, and their noses are flatter as compared to whites²³. Altemus^{2,3} (1968, 1963) compared the soft tissue profile of black and white children of both genders. He observed that the facial profile of black children was more protruded. The anterior position of the maxilla and upper lip in African-American subjects were discoveries of Drummond⁷ (1968); Fonseca, Klein¹⁰ (1978), and Alexander, Hitchcock¹ (1978). Jacobson, Oosthuizen¹³ (1970) also observed the same anterior relationship of the maxilla in South African black subjects. In Brazil, Magnani, Sakima¹⁴ (1981) detected a higher facial prognathism in a group of black subjects with excellent occlusion.

The improvement of facial aesthetics has been one of the main objectives of orthodontic treatment. However, criteria for evaluation seem to be influenced only by the individual aesthetic concept of the professional.

Studies on facial profile have demonstrated that facial balance should have been obtained if a proportional relationship between nose, upper lip and chin exists^{4,11,12}. Thus, the nasolabial angle became a clinical and cephalometric parameter for the determination of soft tissue profile alterations, and it is related to the anteroposterior position of the maxilla²¹. Capelozza⁵ (1989) showed that the nasolabial angle indicates the actual sagittal position of the maxilla, thus being considered of great clinical importance.

Owen¹⁸ (1984) reported that an arbitrary value for the nasolabial angle adopted by plastic surgeons and orthodontists ranged from 90° to 110°. However, McNamara Jr.¹⁵ (1984) and McNamara, Brudon¹⁶ (1993) used the nasolabial angle in their cephalometric evaluations and observed a value

of 102° ± 8°. The nasolabial angle, given by the relationship between the upper lip and columella nasi, has great importance even when isolated of other soft tissue points. Fitzgerald *et al.*⁹ (1992) found a mean value of 114° ± 10° in young white adults, and Scheideman *et al.*²⁰ (1980) found a mean value of 111.04°.

In order to evaluate the clinical application of the nasolabial angle in orthodontic diagnosis and treatment planning, Silva Filho *et al.*²¹ (1990) found an angle of 104° ± 11,50° in white individuals with normal occlusion, without sexual dimorphism. In addition, it was observed that craniofacial growth did not alter the nasolabial angle significantly. Prah-Andersen *et al.*¹⁹ (1995) observed a small decrease in the value of the nasolabial angle with age, but with subsequent stabilization of this value in adolescence.

Siqueira *et al.*²² (2003) studied the changes of the nasolabial angle as a result of deviations in the upper incisors position induced by craniofacial growth. It was concluded that facial and dental alterations that occurred during the craniofacial growth in Brazilian white youths did not influence the nasolabial angle significantly.

The nasolabial angle is representative of the soft tissue profile and remains an excellent clinical and cephalometric parameter to reveal the anteroposterior position of the maxilla and consequently to establish the treatment planning of dental and skeletal malocclusions⁸, thus the concern among authors in assessing the contour of the soft tissue profile as well as in understanding the modifications that happen in this facial profile as a consequence of growth.

Taking into account the different ethnic groups, the objective of the present study was to determine the mean value of the nasolabial angle in a group of Brazilian black subjects of both genders.

MATERIAL AND METHOD

The following protocol (number 042/2003) was approved by the Ethical Committee in Research, School of Dentistry of Piracicaba, State University of Campinas, and is in agreement with the Resolution 196/96 of the National Committee of Health, Ministry of Health, Brazil.

The sample examined in the present study was made of 36 lateral cephalometric radiographs of the head belonging to the files of the Section of Scientific Documentation of the Orthodontics Mas-

ter's Degree Course, School of Dentistry of Piracicaba, State University of Campinas. The selected radiographs were obtained from Brazilian black subjects residing in Piracicaba city, with ages of 10 to 14 years, of both genders, with normal occlusion and that had never undergone orthodontic treatment.

The lateral radiographs were divided in two groups according to gender (male or female). In a dark room, a single operator drew the cephalograms using the following materials: a transparency viewer; "ultraphan" paper with the standard size of 17.5 x 17.5 cm and 0.07 mm of thickness; a 0.3 mm pencil case; a transparent ruler with 0.5 mm subdivisions; a protractor with an approach of 0.1 degree; a template; adhesive tape. The intra-examiner error did not exceed 3%; according to Midtgard *et al.*¹⁷ (1974), this means that the applied method of measuring was appropriate.

The anatomical structures of the skull and face were delimited, and lines and planes were drawn to obtain the cephalometric landmarks used in the study.

The following cephalometric landmarks were used: pronasal point (Prn), on the anterior nasal apex; subnasal point (Sn), in the middle of the inferior border on the anterior nasal aperture; and upper lip (Ls), the most anterior point on the vermillion of the upper lip (Figure 1).

A cephalogram with the variables used in the present study can be seen in Figure 1.

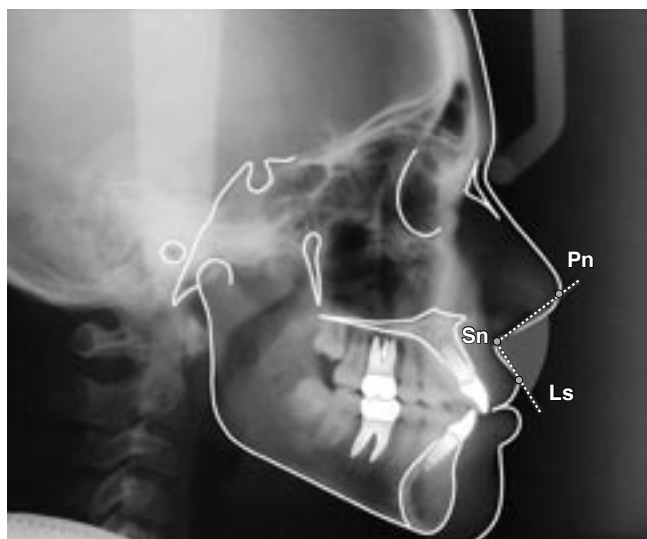


FIGURE 1 - Landmarks used for measurements of the nasolabial angle. Prn: pronasal point; Sn: subnasal point; Ls: upper lip.

Student's *t* test analysis and a significance level of 5% were applied to determine averages, standard deviation, and minimum and maximum values of the nasolabial angle, as well as to support an evaluation of sexual dimorphism.

RESULTS

As we can observe in Table 1 and Graph 1, the mean value of the nasolabial angle for the total sample of Brazilian black subjects, was 88.14° with a standard deviation of 12.52°. For females the mean value was 85.05° with a standard deviation of 11.93°; for males the average was 92° with a standard deviation of 12.52°. The nasolabial angle was significantly smaller ($p < 0.05$) in females.

DISCUSSION

Orthodontic diagnosis should not be accomplished based solely on hard tissue information since changes in dental positions cause alterations in the facial profile. Modern orthodontics adds elements of facial analysis to the diagnosis effort.

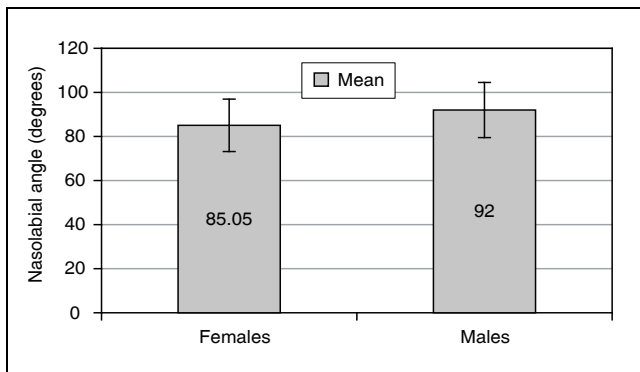
Holdaway^{11,12} (1983, 1984) stated that the orthodontic treatment plan should include the perspectives of orthodontic alterations based on soft tissue analysis, taking into account the soft tissue profile.

The nasolabial angle is an important auxiliary parameter in the diagnosis of anteroposterior maxillary discrepancies, and is a strategic area of the composition of facial profiles. As a consequence, the clinical application of this angle contributes to the differential diagnosis of skeletal malocclusions, particularly of Class II malocclusions. Burstone⁴ (1958) defined the nasolabial angle as representative of maxillary inclination, suggesting that when this variable is increased it reflects a maxillary

TABLE 1 - Means, standard deviations (SD), minimum (Min.) and maximum (Max.) values of the nasolabial angle.

	Gender		Total sample
	Females	Males	
Mean	85.05° B	92.00° A	88.14°
SD	11.93°	12.52°	12.52°
Min.	64.00°	70.00°	64.00°
Max.	113.00°	113.00°	113.00°

Means with different letters are significantly different at $p < 0.05$.



GRAPH 1 - Mean value of the nasolabial angle in males and females.

retrusion, and when decreased, a maxillary protrusion.

The related literature indicates that the value of the nasolabial angle related to harmonious faces varies considerably. Among the cited values are $114.08^\circ \pm 9.58^\circ$; 102° ^{15,16}; $105^\circ \pm 8^\circ$ ¹⁸; 111.04° ²⁰; $104^\circ \pm 11.5^\circ$ ²¹ and from 108.76° to 114.40° ²².

The mean value observed in our study was 88.14° , which is smaller than that reported by authors referred in studies accomplished with white individuals. However, as our sample was composed of young black subjects, the observed nasolabial angle was smaller, suggesting that this ethnic group presents a more biprotruded profile and a reduced interincisive angle, which is in agreement with others studies^{1,2,3,6,7,10,13,14}, whose authors compared white and black subjects.

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As can be observed in Table 1, the nasolabial angle presented variation according to gender; in females it was significantly smaller, confirming the existence of sexual dimorphism. This result differs from those of Silva Filho *et al.*²¹ (1990) and Fitzgerald *et al.*⁹ (1992), who found that black individuals showed similar angular and linear measurements in both groups, male and female.

According to Prahl-Andersen *et al.*¹⁹ (1995) the tendency of the nasolabial angle is to decrease with age, specially until adolescence, when the growth of nose, chin and lips is expressed more intensely. Some studies have demonstrated that soft tissues that vary in thickness are the main factor in the determination of full facial profile^{4,12,15,21}.

CONCLUSION

Based on the obtained results, it was concluded that the mean value of the nasolabial angle found in our sample of Brazilian black youths was $88.14^\circ \pm 12.52^\circ$, which is in agreement with others studies. The smaller value of the nasolabial angle suggests that black individuals present a more protruded profile and a reduced interincisive angle.

The value of the nasolabial angle was significantly smaller ($p < 0.05$) in females, characterizing sexual dimorphism.

Since one of the objectives of orthodontic treatment is to achieve facial aesthetics, specific soft tissue measures which respect the facial pattern of each race should be considered during the diagnosis phase.

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