

# Epidemiology of long face pattern in schoolchildren attending middle schools at the city of Bauru - SP

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## Abstract

**Objective:** This study aimed to classify and determine the prevalence of individuals with vertical alteration of facial relationships, according to the severity of discrepancy, especially individuals with long face pattern. **Methods:** The sample was composed of 5,020 individuals of Brazilian nationality, of both genders, aged 10 years to 16 years and 11 months, attending middle schools at the city of Bauru-SP, Brazil. Examination of facial morphology comprised direct observation of the face in frontal and lateral views, always with the lip at rest, aiming to identify individuals presenting vertical alteration of facial relationships. After identification, these individuals were scored, according to severity, into three subtypes, namely mild, moderate and severe. The prevalence of individuals with long face pattern considered only the individuals scored as subtypes moderate and severe. **Results:** There was prevalence of 34.94% of vertical alteration of facial relationships and 14.06% of long face pattern. **Conclusions:** The results obtained in this study revealed that the prevalence of vertical alteration of facial relationships and long face pattern was higher than that reported in the literature.

**Keywords:** Epidemiology. Craniofacial abnormalities. Diagnosis.

## INTRODUCTION

The denomination of long face represents a stigma from the conventional perspective of malocclusion classification,<sup>3</sup> because it suggests the presence of a large morphological deviations in comparison to the normal pattern,<sup>5-10</sup> often with significant esthetic impact.<sup>8</sup> Since a long time, in orthodontic practice, it was more acceptable that for these individuals,

when the face was unattractive, a surgical approach is indicated.<sup>3,5,8,9,26,27,29</sup>

This deformity manifests early in life, maintains the features of the individual,<sup>17</sup> and may magnify or not during adolescence.<sup>12</sup> It may be associated to all anteroposterior dental relationships, although, Class II malocclusion is more predominantly associated.<sup>1,5-14,22,26,29</sup>

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The children and adults that express this excessive vertical facial growth present a characteristic face, labeled in the literature as long face syndrome,<sup>3,22</sup> hyperdivergent face<sup>14</sup> and, recently, long face pattern.<sup>5-10</sup> Other denominations, such as skeletal open bite<sup>4</sup> or open bite face,<sup>17</sup> disregard the primary skeletal error<sup>5,9,10</sup> and are mistaken, since the open bite condition may be less frequent than normal in these individuals.<sup>5,8,10,18</sup>

The main characteristic of these individuals is excessive maxillary incisor exposure—anteroposterior, with the lips at rest, and gummy smile<sup>1</sup>—due to the excessive increase in the lower facial height.<sup>1,22,29</sup> Under a classic perspective, these morphological signs constitute the essence of the deformity, which generally provides unattractive faces. In this context, the orthodontic treatment alone is very limited, and a surgical approach would be more appropriate.<sup>5-10,12,26</sup>

The facial analysis, the first tool in diagnostic hierarchy, provides a more appropriate perspective to the examination and qualification of the long face, the deformity that, despite the vertical component, presents a three-dimensional expression. Thus, besides giving a more realistic tone to the many features common to these individuals, such as increased total anterior facial height,<sup>1,5-10,14,18</sup> as consequence of increased lower anterior facial height,<sup>1,3,5-11,13,14,22,29</sup> which result in an oval<sup>29</sup> or tapered<sup>1</sup> facial appearance associated with normal middle<sup>13,14</sup> and upper facial thirds,<sup>13,14,22</sup> it aggregates the visualization of other characteristics.

The lip incompetence, a mandatory characteristic in long face deformity, caused by the inability of passive lip sealing, is evident with the lips at rest posture.<sup>1,3,11,13,22,29</sup> During lip sealing, it occurs the contraction of perioral musculature, which accentuates the deficiency of the chin contour.<sup>1,3,13,22</sup> This provides a more retrognathic mandibular appearance<sup>14,29</sup> and generates a short chin-neck contour line as well as chin-neck angle.<sup>5</sup>

Excessive teeth and gingival structures are evidenced at smile,<sup>3,13,22</sup> a reflection of anterior and posterior maxillary dentoalveolar growth excess,<sup>1</sup> which provokes overexposure of upper incisors, normally, the chief complain of patients.<sup>1,13,14,22,29</sup>

Also, a deficiency may be observed in the zygomatic prominence<sup>1,29</sup> and chin,<sup>11</sup> besides the accentuated nasolabial depression.<sup>22</sup> The length of the upper lip is normal<sup>13,14,22</sup> and the deformity is aggravated when the patient presents a short upper lip.<sup>9</sup> The lower lip posture often is impaired, with excessive lip vermilion display at rest.<sup>13,14</sup> The nose is long<sup>1,3,13,14</sup> and the nostrils are narrow<sup>1,11,13,14,22,29</sup> with prominent nasal dorsum at facial profile view.<sup>3,13,14,22</sup>

Dental relationship analysis is helpful to understand why long face pattern malocclusions have been evaluated from a different perspective since a long time.<sup>5</sup> The most relevant factor is the impossibility of defining this pattern by molar relationship which can be Class I or Class III, despite the tendency for Class II (prevalence of 13.2%, 15.8% and 71.0%, respectively).<sup>10</sup> In addition, the expressive variation in the dental arch morphology in long face pattern—that fluctuates from open bite to deepbite, negative to significantly positive overjet, even the presence or not of a crossbite<sup>10</sup>—makes the dental parameters useless for its denomination.<sup>5,18</sup> The literature presents varied data with regard to the prevalence of long face pattern. Wolford and Hilliard<sup>29</sup> reported that vertical maxillary excess is the most frequently found facial deformity, and often misdiagnosed as anteroposterior mandibular deficiency, although they have not specified the prevalence. Woodside and Linder-Aronson<sup>30</sup> found lower facial height excess in 18% of young Caucasian males, aged from 6 to 20 years.

In contrast, a survey conducted by the National Center for Health Statistics<sup>15</sup> found a prevalence of approximately 1.5% in a young American population aged from 12 to 17 years.

In this study, the authors reported that a surgical procedure would be necessary for half of these individuals (0.75%), due to facial unattractiveness. This prevalence of 0.75% was very close to the estimate of 0.6% reported by Proffit and White.<sup>20</sup> The low percentages referred in these surveys were probably related to the severity that the deformity imposes on the patients.

Therefore, it seems necessary that the magnitude that the vertical impairment affects the face should be considered in the investigation of the prevalence of long face pattern. From this perspective, the spectrum of variation would be large, ranging from individuals without temporary passive lip sealing, a reflection of imposed functional deviations<sup>2</sup> considered as typical disarrangements during growth in humans,<sup>19</sup> until those individuals traditionally identified as long face due to facial unattractiveness. This may result in a proper understanding of the occurrence of vertically involved malocclusions, and within this broader context, in the correct determination of the prevalence of long face pattern malocclusion.

The literature lacks of epidemiological survey that considers uniquely the facial pattern, correlating the prevalence with the severity in individuals with vertically impaired facial relationships by excess, with emphasis on the absence of lip sealing. This is of great importance for clinicians, especially with regard to the determination of the prognosis for treatment to be approached, whether in the correction of malocclusion or in the management of the effects of malocclusions on intra and perioral functions.<sup>7,18</sup>

## PROPOSITION

This survey, with middle school students in Bauru - SP (Brazil), aimed to classify and determine the prevalence of individuals with vertically impaired facial relationships by excess (according to three levels of severity), and especially, of individuals with long face pattern.

## MATERIAL AND METHODS

This cross-sectional descriptive study, held in Bauru-SP (Brazil), is in accordance with National Health Board 196/96 Resolution, with the Helsinki Declaration and the Nuremberg Code for human experimentation, and was approved by the Ethics Committee of the São Paulo State University at Araçatuba (FOA 2005-01085).

The sample consisted of 5,020 Brazilian ethnicity subjects: 2,480 females (49.40%) and 2,540 males (50.60%). The sample ages ranged from 10 years to 16 years and 11 months, with an average age of 13 years (SD = 1 year and 3 months) for the total sample, 12 years and 11 months (SD = 1 year and 3 months) for females, and 13 years (SD = 1 year and 3 months) for males. This epidemiological survey period comprised from August 17 of 2005 to May 15 of 2006.

This study aimed to evaluate all individuals enrolled in public and private middle schools (5th to 8th grades), regardless of age, dentition and race. The percentage of student participation was 88.4%. The percentage of loss (11.6% - 660 students) in the sample was due to absence on the examination day or, for some reason, unavailability to participate in the survey.

The sample size was calculated assuming a 95% of confidence interval. According to the literature, the estimated prevalence of long face pattern in the population is 1.5%.<sup>15</sup> By assuming a margin of error of 0.35% in the population estimate, a necessary sample size of 4,643 subjects was determined. Added to an estimate of potential loss of approximately 10%, a final sample size of approximately 5,000 subjects was established for achieving the desired accuracy.

In 2005, the Municipal and State Education Secretary reported in a survey that, in all middle schools in Bauru-SP, there were 1,443 students enrolled in the municipal schools, 4,347 students in the private schools and 14,127 students in state schools (Table 1). These amounts are close to those provided by Demographic Census in 2000, which

indicate a coverage of 89.0% of participation in the public sphere in offering this type of education in Brazil.<sup>4</sup> Among the students assessed by the present survey, 3,759 (74.88%) belonged to the state schools, 1,157 (23.05%) to private schools and 104 (2.07%) to the municipal schools (Table 1).

With regard to the sample of this survey, the prevalence and the percentages of the sampled students from the municipal, private and state schools were very similar in relation to the distribution of all enrolled students in the middle school in Bauru (Table 1 and Fig 4). Concerning the amount and the similarity of distributions of the sample in relation to all the students enrolled in middle schools, the sample from this survey can be considered as representative for the population of middle school students in Bauru-SP. From this myriad, 14 schools were selected by convenience—eight state schools, five private and one municipal school—in search of respecting the ratio of students enrolled in middle schools in Bauru.

All students present on the day of evaluation, who agreed to participate in the study, were evaluated with basis only on the facial morphology.<sup>11</sup> The criterion for the identification of individuals with vertically impaired facial relationships by excess was the lack of lip sealing. Assuming that the study concerns the identification of long face patients, the term “by excess” should be implied as a reference to the vertical facial impairment. According to Capelozza Filho<sup>5</sup> diagnostic criteria, first permanent molar anteroposterior relationships as

well as the vertical distance of upper and lower incisors were not considered.

As inclusion criteria, the individual should not present clinically observed syndromes and/or history of surgery or fractures in the facial or skull region. The history of previous or ongoing orthopedic and/or orthodontic treatment was not an exclusion factor for sampling, considering that such treatments are known to be unable to change significantly the facial proportions and relationships.<sup>26,30</sup>

All subjects were evaluated under natural light by one examiner who is experienced in orthodontics and properly calibrated for facial morphology evaluation.<sup>7</sup> The individuals were evaluated in standing natural head posture with the lips at rest without the help of any special equipment.<sup>24</sup>

The diagnosis of patients with vertically impaired facial relationships by excess is morphological, based on the subjective facial analysis.<sup>5,7-10</sup> The subjects of this study were evaluated based on direct observation of the face in the frontal and lateral norms, with their lips always at rest, trying to identify those who had incompetency in this relationship. The rest position was prioritized, since those individuals with vertical excess have a tendency to seal the lip unconsciously and camouflage the deformity.

Once identified, individuals with vertically impaired facial relationships were classified into three subtypes according to the severity: mild, moderate and severe.<sup>7</sup> With proper calibration and training, the classification method by level of severity presented a high reliability.<sup>7,21</sup> That is, the diagnostic conclusion established in the first examination was maintained, with high probability, when the examination was repeated after three weeks.

As classification criteria for mild subtype, there are demanded: presence of lip incompetence, excessive exposure of the upper incisors at rest and/or gummy at smile; presence of, even with postural component, mild disproportion between the middle and lower facial thirds. In summary, these individuals

TABLE 1 - Frequency distribution of the total and sampled middle school students from the municipal, private and state schools at Bauru-SP/Brazil.

Schools	Total students		Sampled students	
	n	(%)	n	(%)
Municipal	1,443	7.24	104	2.07
Private	4,347	21.83	1,157	23.05
State	14,127	70.93	3,759	74.88
TOTAL	19,917	100	5,020	100



FIGURE 1 - Extraoral photographs in frontal, lateral and smiling aspects of a white individual with vertically impaired facial relationship by excess, mild subtype.



FIGURE 2 - Extraoral photographs in frontal, lateral and smiling aspects of a white individual with vertically impaired facial relationship by excess, moderate subtype.



FIGURE 3 - Extraoral photographs in frontal, lateral and smiling aspects of a white individual with vertically impaired facial relationships by excess, severe subtype.

could be considered as transitory long face, postural or even borderline to long face.<sup>19</sup> In this way, they would present good prognosis for conservative treatment (orthodontic and/or orthopedic)<sup>7</sup> (Fig 1).

With regard to moderate subtype, the classification criteria were the presence of a genuine discrepancy between the middle and lower facial thirds, besides the features already described in previous subtype, which characterize, therefore, with certainty, a long face pattern individual. In these individuals, the prognosis is regular for conservative treatment (orthodontic and/or orthopedic)<sup>7</sup> (Fig 2).

Individuals that belong to severe subtype should present a severe disproportion between the middle and lower facial thirds, associated to the features described in previous subtype and summed by more typical signs of long face, to an extent sufficiently to provide unattractiveness. In these individuals, the prognosis is poor for conservative treatment and orthognathic surgery is indicated for normalization of facial relationships<sup>7</sup> (Fig 3).

To determine the prevalence of patients with long face pattern, only the individuals classified as moderate and severe subtypes were considered. This is justified by the brevity of vertical discrepancy in mild subtype individuals. As previously described, the mild individuals could be affected by transitory growth disarrangement,<sup>2,19</sup> or only by postural changes related to functional disturbances that, if eliminated, would allow an adequate growth.<sup>16</sup> From the treatment perspective, it seems inappropriate to include mild subtype individuals in the myriad of long face pattern, although it is important to consider and emphasize the vertical facial impairment, and especially their lip relationships.

For statistical processing, all results were analyzed by the software Statistica 5.1 (Stat Soft Inc., Tulsa, USA). Chi-square ( $\chi^2$ ) test was used, at 5% ( $p < 0.05$ ) of statistical significance level, to compare the frequency ratios of individuals with vertically impaired facial relationships in the total sample, according to the three levels of severity.

It was also used to compare the frequency ratios of individuals with long face pattern in the total sample.

## RESULTS

After data statistical processing, the epidemiological information, in absolute and percentage values, on the prevalence of individuals with vertically impaired facial relationships by excess (according to three levels of severity) and individuals with long face pattern (only those with moderate and severe levels of severity) was organized.

The distribution of the total evaluated sample, with distinction between individuals with vertically impaired facial relationships by excess—according to severity—and long face pattern can be visualized, respectively, in Tables 2 and 3.

## DISCUSSION

### Prevalence of individuals with vertically impaired facial relationships by excess and long face pattern

In this study, we found a prevalence of 34.94% of individuals with vertically impaired facial relationships by excess (Table 2). Such high prevalence seems to be surprising, and no data from surveys executed with similar methods could be used for comparison. Some studies that reported the prevalence of vertical growth pattern may be referred: Siriwat and Jarabak<sup>25</sup> found a prevalence of 10% with hyperdivergent patterns in a sample of 500 patients treated in the private practice of Dr. Jarabak; Willems et al<sup>28</sup> found a prevalence of 29% of heterogeneous age subjects with vertical growth tendency that underwent orthodontic treatment in Belgium. For comparative analysis, the limitation related to the survey of individuals who had sought for treatment should be considered.

Perhaps it is reasonable to compare with 18% of Canadian male Caucasians from Toronto area, evaluated longitudinally from 6 to 20 years, with impaired respiratory function that showed varied

TABLE 2 - Prevalence of individuals with vertically impaired facial relationships by excess, according to levels of severity in the total sample.

	Mild		Moderate		Severe		TOTAL	
	n	%	n	%	n	%	n	%
<b>Vertically impaired facial relationships by excess</b>	1,048	20.88	672	13.38	34	0.68	1,754	34.94
<b>TOTAL</b>							<b>5,020</b>	<b>100.00</b>

TABLE 3 - Prevalence of individuals with long face pattern in the total sample.

Long face pattern		Others		Total sample	
n	%	n	%	n	%
706	14,06	4,314	85.94	5,020	100.00

degrees of excess in lower anterior facial height.<sup>30</sup> These authors consider this excess in anterior facial height, regardless of severity, as responsible for the deterioration or impairment in facial relationships. Considering the population pattern assessed by Woodside and Linder-Aronson,<sup>30</sup> it is reasonable to accept the high prevalence found in Brazilian population.

Actually, for a better understanding, these data should be analyzed under the perspective that motivated this survey and defined the evaluation method. Besides the prevalence of long face pattern which has always been the primary purpose of this study, the investigation of the frequency of individuals with vertically impaired facial relationships and the definition of their magnitudes were secondary, but no less important, objectives. The reason of this motivation may be understood as follows.

The absence of passive lip sealing at rest, a demanded criterion for classification of individuals with vertically impaired face, is very frequent in human during growth. So frequent that it can be considered as normal.<sup>2</sup> The results of the present survey, with a prevalence of 34.94% for all individuals with vertically impaired facial relationships by excess, mirror a frequency that is not described similarly in the literature, although it

appears reasonable. A correct understanding of what that means has an absolute clinical importance for diagnosis and prognosis in these subjects. The first point, and perhaps the most important one, is to understand that the presence of this impairment may be normal. The individual may not have malocclusion, and therefore do not require treatment; or may present a malocclusion regardless of this facial sign, and proposed with a prognosis and treatment which retain no correlation with the vertical facial impairment.

On the other hand, there are circumstances where malocclusion is mandatorily present and retains a close correlation with the vertical impairment; so intense and correlated that, according to the magnitude, the malocclusion could not be treated only by orthodontic and/or orthopedic procedures.<sup>26</sup> This variability determines the need for accurate diagnosis which implies, in the first instance, the determination of the severity and allows the prognosis. This is one of the objectives in this study, which will be elucidated in this section.<sup>7</sup>

The general perspective to be adopted presumes that the inadequate vertical facial relationships, always with lip incompetence, may represent a normal condition or a sign of severely

compromised growth patterns. In this context, there is a chance that orthodontic and/or orthopedic treatment is not indicated—due to the condition of normality—or, at the other extreme, counter-indicated because of the recognized limitations in the management of long face pattern malocclusions.<sup>5,26</sup> It seems clear that there is an extreme importance to predict the prognosis of the malocclusion severity and facial impact that growth will generate. In this thought, interpreting facial deformity and/or malocclusion at an early age only is not enough, but is necessary to recognize the localization and, therefore, the primary cause of the dysplasia.

Within this perspective, a proper diagnosis can be set, as well as prognosis to support or not the indication of therapeutics, targeting for realistic therapeutic goals. In summary, the ranking of the magnitude of impact on the face and localization of facial dysplasia permit more consistent therapeutic approach; or, in other words, correction of malocclusions with vertical facial impairment conducted in consonance with predicted facial attractiveness at the end of growth. This implies conservative treatments in faces that might be acceptable and surgical procedures in faces that would worsen along time and growth.<sup>7</sup>

With regard to the prevalence of different severities on the vertical facial impairment, individuals with mild subtype (20.88%) were predominant (Table 2 and Fig 5). Mild subtype individuals (Fig 1) may be different from each other. For whom it is likely to speculate that the primary etiologic factors are not genetic, but local or general. Identified at an early age, the mild long face could be only postural that represents, morphologically, a mandatory but temporarily inadequacy between the internal and external functional components. This would be proven by the brevity of this vertical discrepancy present in these individuals.

Proffit and Mason<sup>19</sup> described the concept of transitory lip incompetence, among other

functional irregularities that exist between the intra and perioral musculature, such as tongue thrust, resultant from expected asynchronism during the process of normal facial growth. The relationships that were described and recognized as normal could not necessarily be present during growth, which could be manifested only at the end of adolescence and, consequently, of the growth period. This hypothetical concept has been proven by researches and, since the early 90's, has been introduced as the basic core of information recommended by the American Speech-Language-Hearing Association (ASHA)<sup>2</sup> for the conception of diagnosis for intra and perioral musculature disorders.

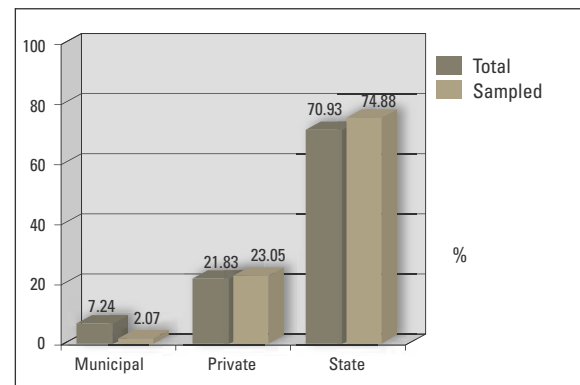


FIGURE 4 - Frequency distribution of the total and sampled middle school students from the municipal, private and state schools at Baruru-SP/Brazil.

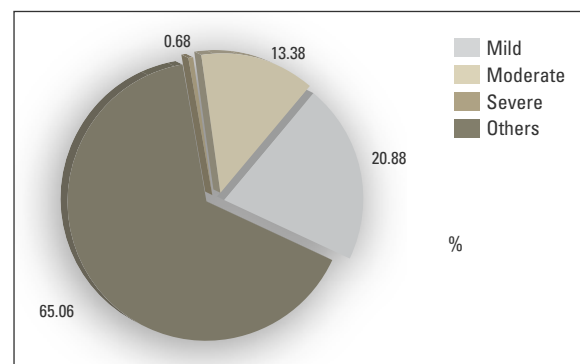


FIGURE 5 - Prevalence of individuals with vertically impaired facial relationships by excess, according to levels of severity in the total sample.



Also, these individuals may present postural changes related to true functional disturbances.

It is recognized that there are much more open-mouthed oral breather than genuine long face pattern individuals. Acquired or mandatory habits, and hypertrophic pharyngeal and palatal tonsils, allergic rhinitis, obstructive sleep apnea, and others,<sup>16</sup> acting on a predisposed face<sup>5,26</sup>, would create, at least, vertically impaired faces with mild level of severity. According to Linder-Aronson and Woodside,<sup>16</sup> these would be the environmental copies from genetic models. As it is known, the change in the breathing and all the possible postural and functional competency that this change allows seem to be able to influence positively on the growth,<sup>16</sup> specially in patients who present the features described as mild subtype.

Individuals with vertically impaired facial relationships by excess with moderate and severe levels were classified as long face pattern individuals. A prevalence of 14.06% of individuals with long face pattern was found in this survey (Table 3), and resulted from the sum of the prevalence of moderate subtype individuals (13.38%) and severe subtype (0.68%) (Table 2). In the composition of the group of patients with long face pattern, individuals with vertically impaired facial relationships by excess with mild subtype were not included, who were classified as having transitory long face, postural or even borderline for long face.

This prevalence for long face pattern (14.06%), in which patients with transient or postural long face were not considered, is lower but close to that found by Woodside and Linder-Aronson.<sup>30</sup> In their study, as discussed earlier, 18% of individuals with vertical impairments were not subdivided according to severity, but described as having discrepancies ranging from mild to severe. Probably the inclusion of persons with mild severity contributed to create this difference between the obtained results.

The main reason for the differences observed in the values from this study—for patients with long face pattern—in comparison to other surveys<sup>15,20</sup> probably is related to the study focus; since this study considered, in addition to severe subtype patients, individuals belonging to moderate subtype. In these individuals, a real disproportion between the middle and lower facial thirds can be observed, which can be classified certainly as long face pattern individuals, who were difficult to be identified in an epidemiological survey with focus on molar relationships.<sup>5</sup>

For individuals with long face pattern classified as moderate subtype (Fig 2), a prevalence of 13.38% was evidenced (Table 2 and Fig 5). In opposition to mild subtype, moderate subtype individuals cannot be considered as an environment's product. The clinician should be conscious about the genetic determinants in the observed facial pattern. More than facial expression and malocclusion, it is imperative to recognize the irreversibility of the facial morphology destiny. The features of the face in individuals considered to have vertically impaired facial relationships, classified as moderate subtype, are more accentuated. In these individuals, as already discussed, a true disproportion between the middle and lower thirds can be observed and may facilitate their identification, in addition to features already described in the mild subtype.

In this context, although a conservative treatment may be indicated, it must follow the rules considered essential for the management of these individuals, always with the intention of not increasing or decreasing the intraoral dental volume and exercise the function of the intra and perioral musculature,<sup>5,18</sup> or, in other words, to facilitate the balance between the internal and external functional components.<sup>26</sup> Additionally, the prognosis is uncertain, necessarily punctuated by periodical follow up to evaluate the therapeutic effectiveness and, thus, to indicate or not the treatment. This is true not only for orthodontic procedures, but to all professionals who are involved in the interdisciplinary effort for treatment.

For long face pattern individuals classified as severe subtype (Fig 3), a prevalence of 0.68% was found (Table 2 and Fig 5). This prevalence is close to the estimate of approximately 1.5% for the U.S. population. These data were collected by "U.S.A. Health Statistics",<sup>15</sup> in a young American population aging from 12 to 17 years. In the sample, the authors reported that a surgical procedure would be necessary, justified by the facial impairment, in approximately half of individuals (0.75%). This percentage of individuals who require surgery was close to the prevalence of 0.68% of long face pattern severe subtype individuals evaluated in the present epidemiologic survey, which corroborates the estimate of 0.6% reported by Proffit and White.<sup>20</sup>

For severe subtype individuals, an interceptive orthopedic procedure is innocuous, in consequence to the unattractiveness of the patient's facial relationships. This should superimpose on other exams, such as cephalometric and clinical dental examination.<sup>7</sup> During the time from first examination until confirmation of a severe subtype, priority must be given to the management of tooth eruption and must be maintained, at each step, the patient and the family members aware about the evolution and possibilities for the complete correction of the face and teeth at the end of the growth period.

A slightly higher prevalence (4.1%) was reported in a retrospective study of 1,460 consecutive patients who sought for treatment in the orthognathic surgery service in North Carolina (USA).<sup>23</sup> These results are difficult to be compared with those found in this study, since the sample consisted of individuals that sought for surgical treatment and, furthermore, the focus of the investigation was facial asymmetry instead of the long face pattern itself.

The extensive material collected in this study in a population of different ethnicity compared to the literature,<sup>30</sup> reported high frequencies of individuals with long face pattern. The difference in

prevalence may be explained by the classification criteria adopted by the examiner during the sampling. But one conclusion is certain: the relationship between the results found by Woodside and Linder-Aronson<sup>30</sup> and those found in this study express a high prevalence of this facial pattern in the population.

## FINAL CONSIDERATIONS

The prevalence of individuals with vertically impaired facial relationships by excess was significant (34.94%), and probably higher than expected. Considering that the prevalence was obtained from a sample of individuals with growth potential that properly represents Brazilian population, the reliability of the present study seems probable. The described arguments for the vertical impairments in the facial relationships in growing individuals, even postural or transitory, support the concentration of prevalence evidenced in mild subtype (20.88%).

For the prevalence of long face pattern (14.06%), the results appear to be logical and predictable specially when analyzed under proper perspective. The characteristics of the facial morphology of Brazilian population as a whole, and particularly black and pardo races, seem to predispose to the occurrence of vertical discrepancies, helping to increase the prevalence of long face pattern. From the practical standpoint or the meaning of prevalence obtained in this epidemiologic study, it seems clear that the minimum percentage values such as described in about 1.5% should be considered,<sup>15</sup> for the occurrence of long face pattern. Based on the literature review, this low percentage refers to the most severe cases, those with significant facial impairment.

This is an erroneous generalization, adopted until now due to the lack of data, and should be avoided. The comparison of this minimum value, that was described and accepted in the

literature, shows the similarity with the prevalence obtained for long face pattern severe subtype patients (0.68%). In other words, this minimum percentage of prevalence is referred to long face individuals with the presence of facial features able to create unattractiveness and indicated for orthognathic surgery.

## CONCLUSIONS

This survey, which aimed to classify and determine the prevalence of individuals with vertically impaired facial relationships by excess,

according to the severity of the discrepancy, and specially of long face pattern individuals, in 5,020 students from middle schools in Bauru/SP (Brazil), showed the following conclusions:

- » There was a total prevalence of 34.94% of individuals with vertically impaired facial relationships by excess including all three levels of severity.
- » The prevalence of long face pattern was 14.06%; 13.39% for moderate subtype and 0.68% for the severe subtype, and this value (14.06%) was higher than that presumed by literature.

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Submitted: December 2010  
Revised and accepted: February 2011

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