Prevalence of Malocclusions in a Young Brazilian Population

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Abstract: *Malocclusions are generally treated in adolescents and adults, but they are established at an early age. The purpose of this study was to determine the prevalence of malocclusions in a young Brazilian population. The sample included 926 children, 8 to 12 years old, attending 5 public schools in the state of Goias, Brazil. The type of occlusion was visually determined during the oral exam and statistical analysis, Chi-square test, was performed to correlate the prevalence of malocclusion with gender and with age. 819 patients out of the 926 patients had some type of malocclusion. From those, 513 patients had a class I malocclusion, 201 patients were classified as class II malocclusion, and 105 patients were class III malocclusion. Vertically, 62 patients showed a deep bite and 61 patients had an open bite. Transversely, 40 patients presented a bilateral posterior crossbite, 54 patients had a posterior crossbite on the left side, and 39 patients had a posterior crossbite on the right side. No significant correlation between gender and malocclusions was found and the number of patients with malocclusions between boys and girls were similar. Considering the three spatial planes, there is a high prevalence of malocclusions among the young Brazilian population. Therefore, the dental community must improve health policies and treat malocclusions earlier.*

Introduction

Malocclusion is an oral condition which has increased its prevalence over the last centuries.[1] The presence of malocclusion causes functional problems in the cranio-mandibular system,[2-5] as well as a significant negative impact on both children's and their families' quality of life.[6-7] Therefore, determining its prevalence in a particular population may help in developing health policies to prevent, intercept and treat the most prevalent problems in that population.

Although malocclusions are generally treated in adolescents and adults, they are established at an early age.[8-9] In developed countries, such as the United States of America, 65% of the adult population has some kind of malocclusion and about 59% of each ethnic group has some degree of orthodontic treatment need.[10] In Brazil, the prevalence of malocclusions seems to be higher than that in the United States of America. Some studies report that 75.5% to 89.3% of the Brazilian population may have some kind of malocclusion.[11-14] Regarding young population, there are few reports in the United States of America,[15] whereas the prevalence in that kind of population appears to be high in other countries.[16-20]

According to some previous studies in Brazil, class I malocclusion seems to have the highest prevalence, followed by class II malocclusion, and class III malocclusion respectively.[11-14] Those studies in Brazilians report a high prevalence of malocclusions when considering the sagittal relationship of the permanent molars. However, the prevalence of sagittal (including the canine relationship), vertical (deep bite/anterior open bite) and transverse discrepancies (unilateral/bilateral posterior crossbite) among young Brazilians has not been fully determined. Therefore, the objective of this study is to determine the prevalence of malocclusions in a young Brazilian population, discriminating how the malocclusion is associated with sagittal, vertical and transverse discrepancies. Furthermore, any correlation between malocclusion, gender, and age will also be determined.

Material and Methods

Ethical approval (No 05/71) for this study was obtained from the Ethics Committee of the University of Araras (Authorization Ministry of Health, Brazil, No 196/1996).

Oral exams were performed in 959 children, 8 to 12 years old, attending 5 public schools in the state of Goias, Brazil. Children in mixed or permanent dentition with no previous or concurrent orthodontic treatment and with no craniofacial deformities or dental aberrations, such as agenesis or hypodontia were included in the study. Furthermore, the first permanent molars and either primary molars or

premolars had to be present for the child to be included in the study. Thus, 477 boys and 449 girls met the inclusion criteria, and a total sample of 926 patients were analyzed in this study.

The type of occlusion was visually determined during an oral exam by two of the co-authors and the data was recorded by two of the other co-authors. Thus, the sagittal, vertical and transverse relationships of the occlusion in each patient was determined by the position of the teeth, as other means such as x-rays were not available at the moment of the exam.

Sagitally, class I occlusion was considered when the maxillary and mandibular molars were in a correct relationship, with the mesio-buccal cusp of the permanent first maxillary molar occluding at the groove between the mesio-buccal and central cusp of the permanent first mandibular molar and the distal ridge of the lower canines were in relation to the mesial ridge of the upper canines (Canines class I). Therefore, a class I malocclusion was considered when the molar and canine situation was sagitally correct, but there was tooth crowding or teeth misaligned. Class II malocclusion was considered when the permanent first mandibular molar occluded distally to the maxillary molar and the lower canines were placed either in a cusp-to-cusp or distal relation to the upper canines. Finally, class III malocclusion was recorded when the permanent first mandibular molar occluded mesially to the maxillary molar and, the lower canines were placed mesially to the lower canine. When a different situation was present between both sides, the most deviated side was considered for the sagittal relationship.

Vertically, a normal overbite was considered where the permanent maxillary incisors overlap 10-35% of the buccal aspect of the permanent mandibular incisors. An open bite was recorded when there was either less than 10% overlapping between the permanent incisors or no contact between them was present. A deep bite was recorded when there was an overlapping of 40% or higher of the permanent maxillary incisors over the mandibular incisors.

The presence of posterior crossbite as well as anterior crossbite was also recorded. Unilateral crossbite was recorded in all those cases where one or more teeth from the canine to the last posterior teeth occluded in an inverted relationship, with the maxillary tooth occluding inside of its corresponding mandibular tooth. Anterior crossbite was recorded when one or more anterior teeth in the maxilla occluded behind their corresponding mandibular incisors.

Statistical analysis, Chi-square test, was performed to correlate the prevalence of malocclusion with gender and with age. A statistical package (Statistical Analysis Software – SAS, AT Solutions, Sao Paulo, Brazil) was used for this purpose.

Results

The sample included in this study showed that 819 patients out of the 926 patients had some type of malocclusion. The other 107 were classified as normal occlusion patients, as they had a class I sagittal relationship with a normal overbite and overjet, and no tooth crowding or misalignment were observed.

Out of the 819 patients with some type of malocclusion, 513 patients had a class I malocclusion which was associated either with tooth crowding, deep or open bite, or posterior crossbite. 201 patients were classified as class II malocclusion, and 105 patients were class III malocclusion. The percentages for each group regarding the sagittal relationship is shown in Table 1.

When the vertical relationship was analyzed, 62 patients showed a deep bite and 61 patients had an open bite. Regarding the transverse relationship, 40 patients presented a bilateral posterior crossbite, 54 patients had a posterior crossbite on the left side, and 39 patients had a posterior crossbite on the right side (Table 2).

Statistical analysis showed no significant correlation between gender and malocclusions. The number of patients with malocclusions between boys and girls were similar, with 264 boys and 249 girls having class I malocclusion; 101 boys and 100 girls with a class II malocclusion; and, 51 boys and 54 girls with a class III malocclusion. Similarly, when age and malocclusion was statistically correlated, there was no significant correlation between them.

Discussion

A sample of 926 young Brazilian patients involved in this study showed that there is a high prevalence of malocclusions in this population. Although the higher

Table 1
Number of patients and percentage of the sample for each type of malocclusion evaluated in the study. Class I, II and III refer to the sagittal first permanent molar relationship. Normo-occlusion means no malocclusion observed when the 3 dimensions, sagittal, vertical and transverse, were evaluated.

Type of Malocclusion	No. of Patients	Percentage
Class I	513	55.40%
Class II	201	21.71%
Class III	105	11.34%
Normo-Occlusion	107	11.56%
Total	926	100.00%

Table 2

Number of patients and percentage of the sample for each type of vertical malocclusion (deep bite and open bite), and transverse malocclusion (posterior crossbite either unilateral or bilateral); R = Right Posterior Crossbite; L = Left Posterior Crossbite. The number of patients and the corresponding percentage of Anterior Crossbite found in the sample is also shown.

Variable	Deep bite	Open bite	Posterior Crossbite			Crossbite
			Unilateral		Bilateral	
			R	L		
No. of Patients	62	61	54	39	40	43
Percentage	6.47%	6.36%	5.63%	4.07%	4.17%	4.48%

number of patients had a class I sagittal relationship, which may be interpreted as a normal molar and canine relationship, it was associated with either vertical or transverse discrepancies in a high percentage of these patients. Thus, class I malocclusion appears to be the malocclusion with the higher prevalence in young Brazilians, followed by class II malocclusions, and class III malocclusions with the lowest prevalence among this population. According to these results, Brazil appears to have a similar prevalence of malocclusions to that reported for other developing countries.[16-20]

This study confirms the results of other studies with Brazilians, where malocclusions appear to have a high prevalence[11-14] when either the sagittal relationship between maxilla and mandible or only the molar teeth relationship was considered. However, when each type of malocclusion is separately considered, the present results tend to partially agree with those other reports in Brazil. Regarding to class I malocclusion, Silva Filho[14] reported a prevalence of class I malocclusion of 55%, which is the same as reported in the study, but in different other reports there appears to be a higher prevalence in Brazilians for this type of malocclusion.[11-13] The results for class II malocclusion (about 21%) in this study are similar to those reported by Teixeira,[12] but higher than those reported by others.[11,13,14] Even though class III malocclusion has the lowest prevalence in the present as well as in those other reports, the prevalence reported here is higher (about 11%) than that of the previous studies in a young population (close to 1%) for this type of malocclusion.[11-14] It appears that the prevalence of malocclusions among the young Brazilian population is high, where class I malocclusion has the highest and class III malocclusion the lowest prevalence. However, the percentages of prevalence for each malocclusion may vary according to the area where the study may be performed.

An important issue reveled by this study is the considerable prevalence of vertical and transverse discrepancies in the young Brazilian population. Vertical discrepancies were present in approximately 12% of the sample studied here, and transverse discrepancies were present in about 14% of this sample. As sagittal malocclusions, vertical and transverse discrepancies in the craniofacial structures may cause functional problems[2-5] and their appearance may vary the plan of treatment. These types of malocclusion must be accounted for when the prevalence of malocclusions are investigated with the purpose of developing health policies in a young population.

These results confirm that malocclusions are present at an early age in Brazilians as it has been reported in other countries.[8,9] Therefore, there is no reason for the dental community to wait for treating malocclusions until the permanent dentition is already in place. Thus, treatment must be initiated at early ages with techniques designed to treat this problem either on the primary or early mixed dentition.

Conclusions

The present study shows that there is a high prevalence of malocclusions among the young Brazilian population. Sagitally, class I malocclusion is the most prevalent malocclusion among this population, followed by class II malocclusion. Class III malocclusion has the lowest prevalence. Vertical and transverse discrepancies also showed a considerable prevalence. These results confirm that malocclusions are established at an early age and must encourage the dental community to treat this pathology earlier.

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