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Need for orthodontic treatment in a sample of Ecuadorian adolescents from Cojitambo, 2017.

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Abstract: Aim: To determine the need for orthodontic treatment in Ecuadorian adolescents aged 13 to 18 years in Cojitambo, 2017. Materials and methods: A cross-sectional and descriptive study was made including 140 adolescents aged 13 to 18 years, 50% males. For determining the prevalence of malocclusion, a visual clinical examination was performed to obtain the data required using the Dental Aesthetic Index (DAI). Results: 37.14% of the adolescents presented a minor malocclusion (without the need for treatment), 20% a definitive malocclusion (need for elective treatment), 30% a severe malocclusion (highly desirable treatment) and 12.86% a very severe malocclusion (mandatory treatment). No statistically significant differences were found by sex (p =0.53) or by age (p=0.05). Conclusion: There is a higher prevalence of adolescents who had a normal occlusion without the need of orthodontic treatment and the ones with the lowest prevalence were adolescents with very severe malocclusion that needed compulsory treatment, without differences by sex or age.
Keywords: Malocclusions; Need for orthodontic treatment; Dental Aesthetic Index (DAI).

INTRODUCTION

Malocclusion is a difficult problem to determine, since its appreciation differs greatly between people and cultures. Currently, the prevalence of malocclusions worldwide ranges between 35% and 75%. According to the World Health Organization *(WHO)* malocclusions occupy the third place among the most frequent oral problems *(Pérez et al., 2009; Moreno et al., 2016)*.

Worldwide, several indices are used to determine the need for orthodontic treatment. Probably, the most accepted is the Dental Aesthetic Index *(DAI)* designed by Cons, Jenny and Kohout in 1983. The DAI includes a series of occlusal conditions arranged on a scale of degrees, which allows determining the severity of malocclusions *(Pérez et al., 2009; Hernández et al., 2018; Alemán et al., 2012)*.

Initial adolescence is a very useful stage for performing orthodontic treatments, due to the change from temporary to permanent dentition. Several investigations have been able to establish important results by applying the DAI in the adolescent population in order to determine the need for orthodontic treatment.

The aim of this study is to determine the need for orthodontic treatment in Ecuadorian adolescents aged 13 to 18 years in Cojitambo, 2017.

MATERIALS AND METHODS

A cross-sectional study was conducted in a population of 200 13-to-18-year-old students. After applying the selection criteria, the final sample consisted of 140 adolescents. Each patient was informed about the objective of the investigation, the non-existence of risks, and total confidentiality through the Informed Consent.

The data collection began with a visual inspection of the oral cavity with the help of a buccal mirror, a periodontal probe and good natural and artificial illumination using a flashlight. The occlusal features evaluated by the DAI were recorded. The evaluation of the patient was completed, then the need of orthodontic treatment was calculated. The DAI presents 4 categories for its interpretation: Normal occlusion or minimal malocclusion correspond to the lack of treatment, or minor treatment, with a value less than or equal to 25; Definitive malocclusion, which requires elective treatment by the patient, in a scale value of 26 to 30; Severe malocclusion with desirable treatment by the patient, in a value between 31 and 35; Very severe, or disabling, malocclusion with mandatory and priority treatment, in a value equal to or higher than 36. The DAI Index presents a constant of 13 regression coefficients that vary according to the occlusal component that is evaluated *(Delgado et al., 2015)*.

Once the information was collected, a database was prepared in Excel 2017 *(Microsoft Corp., USA)* and then analyzed with SPSS version 19 *(IBM, USA)*. Absolute and relative percentage tables were obtained, and the bivariate analysis was performed using the Chi-square test *(p <0.05)*.

RESULTS

37.14% of the adolescents presented a minor malocclusion *(without the need for treatment)*, 20% a definitive malocclusion *(need for elective treatment)*, 30% a severe malocclusion *(highly desirable treatment)* and 12.86% a very severe malocclusion *(mandatory treatment)*. Table 1 shows the need for orthodontic treatment according to sex and age, no statistically significant differences were found by sex *(p = 0.53)* or by age *(p = 0.05)*.

For men, the upper anterior overjet was the most prevalent trait with 90% *(n = 63)*, followed by the anteroposterior molar ratio with 88.6% *(n = 62)*. For women, it was the upper anterior overjet with 97.1% *(n = 68)*, followed by crowding in the incisal segments with 80% *(n = 56)*. In the group of 13 to 15 years, it was the anterior superior overjet with 91.3% *(n = 73)*, followed by crowding in the incisal segments with 80% *(n = 64)*. In the group of 16 to 18 years, the most affected occlusal features were the upper anterior overjet with 95% *(n = 57)*, followed by the molar ratio with 83.3% *(n = 50)*. No statistically significant differences were found in any of the occlusal features by sex or age *(p>0.05)*.

DISCUSSION

The most prevalent severity of malocclusion was mild, which implies no need for treatment. This result is similar to Alemán *(2012)* in Cuba, Pérez *(2014)* in Chile and Sandoval & Salas *(2017)* in Ecuador and different to the studies of Fernández *(2015)* in Cuba and Vizcaíno *(2015)* in Mexico, where mild severity was the least prevalent. Severe malocclusion, which requires mandatory orthodontic treatment, was the least prevalent, also similar to the studies by Sandoval & Salas *(2017)* and Pérez *(2013)*, but differing from Alemán *(2012)*, performed in children aged 8 and 9, where very severe malocclusion ranked second.

In relation to the occlusal features, anterior overjet

TABLE 1. Percentage distribution for need of orthodontic treatment by sex and age.

Category	Males	Females	13-15 years	16-18 years
Without need	25.00	12.14	21.43	15.71
Elective treatment	8.57	11.43	10.71	9.29
Highly desirable treatment	13.57	16.43	15.71	14.29
Mandatory treatment	2.86	10	9.29	3.57
Total	50	50	57.14	42.86

in the maxilla, anteroposterior molar relation and crowding in the incisal segment were the most frequently altered features. This is similar to the studies of Pérez *(2014)* in Chile, González & Pedroso *(2015)* and Lazo *(2014)* in Cuba. However, this differs from Serra *(2016)* in Cuba, where the number of visible missing teeth was the most affected component and from Sandoval & Salas *(2017)* in Ecuador, where previous irregularities in the maxilla were the most affected.

The analysis of the occlusal characteristics through the DAI in Ecuadorian adolescents will allow replicating them to the rest of the population in that age range. This will help to provide adequate information to the health authorities so that they can take preventive or interceptive public measures in this area. This will benefit an important population group of one of the largest parishes of the Azogues canton, with a cultural history, population diversity and tourist wealth that represents the nation.

CONCLUSION

There is a higher prevalence of adolescents who had a normal occlusion without the need of orthodontic treatment and the ones with the lowest prevalence were adolescents with very severe malocclusion with the need for compulsory treatment, without differences by sex or age.

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