ARTICLE

Prevalence of dental malocclusions in 12-year-old schoolchildren from Cuenca, Ecuador.

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Abstract: The aim of this paper was to determine the prevalence of malocclusions in 12-year-old schoolchildren from Cuenca, Ecuador. A cross-sectional study was carried out, including a clinical examination of 181 schoolchildren aged 12 years, who were randomly selected from the schoolchildren population. We assessed the presence of malocclusions using the Angles classification. The analysis was performed in the program EpiInfo 7.2. The majority of the patients presented malocclusions (91.7%). There is no significant difference between public and private schools and the male sex was slightly more affected. There was a predominance of the Class II division 1 (30.4%), followed by Class III (25.4%), and Class I (24.9%), with the lowest prevalence reported for Class II division 2 (11%). A high rate of malocclusion was found in in 12-year-old schoolchildren from Cuenca, Ecuador, in both males and females. The dominant malocclusion in this study was Class II division 1.

Keywords: Prevalence, malocclusion, epidemiology

INTRODUCTION

Malocclusion has been classified in multiple ways, but to differentiate a malocclusion it is necessary to know the meaning of normocclusionp; Moyers refers to this when there is a normal molar, canine and skeletal relationship, and an absence of diastemas, crowding, crossbites or open bites *(Moyers, 1988)*.

The World Health Organization (WHO) considers malocclusion as a disease, because it constitutes an aggravating factor for oral health, since it hinders proper oral hygiene, resulting in the accumulation of bacterial plaque and consequently the appearance of caries, gingivitis or periodontitis *(Fernández et al., 2003; Salgado et al., 2017)*.

Malocclusions refer to any variation in the development and growth of the maxillary bones during childhood and adolescence, which leads to an abnormal occlusal relationship between the arches. This can cause alterations in oral function such as: poor mastication, speech difficulties, undesirable development of the jaws, and temporomandibular alterations, even impacting facial aesthetics *(Zhifei et al., 2016; Ruiz et al., 2015; Jerez et al., 2014)*.

Occlusions can be altered by different factors, within which two main components are defined: a genetic predisposition and exogenous or environmental factors. An interrelation of these factors can exist, overlapping one cause on another, which will make its diagnosis difficult.

The most studied etiological factors as a cause of this alteration are the presence of oral parafunctions, loss of space due to dental caries, and the premature loss of teeth, among others *(Espinal et al., 2016; Murrieta et al., 2009; Carrillo et al., 2016; Ramírez et al., 2012)*.

It is reported that the prevalence of malocclusions worldwide is high, ranging from 65% to 89%. Latin America is not the exception, according to the Pan American Health Organization (PAHO), as the prevalence of this pathology exceeds 80%. As a result, the WHO states that malocclusions take the third place among pathologies that affect oral health *(Ramirez et al., 2012; Fajardo & González, 2016; Fundagul et al., 2015)*.

There are many ways to classify malocclusion; however, in the present study, the Angle classification was used. In 1899, Angle devised a fairly simple and universally accepted scheme; this author introduced the term "Class" to name different mesiodistal relationships of teeth, dental arches and jaws, which depend on the sagittal position of the first permanent molars; these were considered fixed points of reference in the cranial facial architecture. This author divided the malocclusions into three major groups: Class I, Class II and Class III. This classification evaluates the position of the mesiobuccal cusp of the first upper molar and its relationship with the mesiobuccal groove of the lower first molar *(Aguilar & Taboada, 2013)*.

The aim of this paper was to determine the prevalence of malocclusions in 12-year-old schoolchildren Cuenca, Ecuador

MATERIALS AND METHODS

This was a cross-sectional study, with a population consisting of 181 12-year-old schoolchildren enrolled in the educational institutions of the San Sebastián urban parish of the city of Cuenca-Ecuador in 2016.

In order to comply with ethical and legal aspects, signed consent from the parents accepting the examination, along with the assent of the child, were obtained.

The clinical examination and data collection was carried out in an environment of good illumination, the technique used in this investigation was clinical observation, and the instrument for data collection was the clinical-epidemiological record provided by the Catholic University of

TABLE 1. Sociodemographic distribution of 12-year-old schoolchildren

Sex	Public		Private		Total	
	n	%	n	%	n	%
Female	58	38.9	18	56.3	76	42
Male	91	61.1	14	43.8	105	58
Total	149	100	82	100	181	100

Cuenca. In addition, buccal mirrors, a periodontal probe, masks, gloves, fields and disposable caps were used. The type of occlusion was established based on the Angle classification.

After the data collection, they were entered into the Epi-Info 7.2 software, for subsequent tabulation and to obtain the final results.

RESULTS.

The study sample of 181 children included schoolchildren of both sexes and school levels, with different types of academic management from the San Sebastián urban parish (Cuenca, Ecuador). The characterization of the participants is shown in Table 1.

In total, 91.7% of schoolchildren presented malocclusion, with 89.5% in females and 93.3% in males (p = 0.35). In public school this was 92% and in private schools it was 91% (p = 0.81).

It can be seen that the molar ratio that presented with the highest prevalence on both the right and left

TABLE 2. Frequency of molar relation ship

	Left		Right	
	n	%	n	%
Class I	85	47	87	**48**
Class II	32	29	49	27
Class III	38	21	39	22
N.A	6	3	6	3
Total General	181	100	181	100

TABLE 3. Malocclusion frequency according to angle clasification

	Male		Female		Total	
	n	%	n	%	n	%
Normocclusion	8	10.5	7	6.7	15	8.3
Class I	13	17.1	32	30.5	45	24.9
Class II-1	27	35.5	28	26.7	55	30.4
Class II-2	10	13.2	10	9.5	20	11
Class III	18	23.7	28	26.7	46	25.4
Total	76	100	105	100	181	100

side, was Class I, while Class III occurred less frequently bilaterally (Table 2). There is a higher frequency of Class II division 1 in men (p = 0.39, Table 3).

DISCUSSION

In the present study, it was determined that the majority of patients presented malocclusion. This result is similar to that of *Murrieta et al. (2017)* with 96%, *Burgos et al. (2014)* with 96.2%, *Pincheria et al. (2016)* with 91.3%, *Aliaga et al. (2011)* with 86.5%, *Fajardo et al. (2016)* with 85% and *Salgado et al. (2017)* with an 88% prevalence of malocclusion. All of these results may vary according to the number of students analyzed, the difference in data recording methods, the different ages of the population studied, and the region in which the research was conducted, among others.

Regarding the incidence of malocclusions according to sex, in the study conducted by *Arocha et al. (2016)* in a population of 150 children in Santiago de Cuba, the male sex predominated; also, authors like *Taboada et al. (2011)*, *Aguilar et al.,(2013)*, and *Ramírez et al. (2012)* conducted studies in schoolchildren from different Mexican regions, obtaining a higher prevalence of malocclusions for this sex, coinciding with this study. On the contrary, in studies carried out by *Zapata et al. (2014)* and *Montiel et al. (2004)*, a higher prevalence was reported for females.

In relation to the prevalence of malocclusions according to the type of school management, the study conducted by *Fajardo et al. (2016)* in a population of 252 schoolchildren, reported a greater number of affected schoolchildren for fiscal schools.

It was determined that Class II division 1 occurred more frequently, being higher than the rates reported for Nepalese children *(Singh & Sharm, 2014)*, adolescents in Lima *(Zapata et al., 2014)*, and Libyan schoolchildren

(Bugaighis & Karanth, 2013). However, *Fundagul et al. (2015)* in the city of Kirikale-Turkey found that Class II division 1 malocclusion was more common in their population, coinciding with this study.

One out of four schoolchildren had Class III, which was similar to studies conducted by *Salgado et al. (2017)* and *Ruiz et al.(2015)*, while *Medina et al. (2010)* and *Arroyo & Morera (2012)* obtained lower proportions. The frequency of Class I malocclusion was lower in studies conducted by *Bugaighis et al. (2013)*, with similar results for *Medina et al. (2010)* and *Arroyo & Morera (2012)* Class II division 2 occurred less frequently; however, it is superior to the results of studies conducted by *Fundagul et al. (2015)*, *(Zapata et al., 2014)* and *(Singh & Sharm, 2014)*.

CONCLUSION

The prevalence of malocclusions found in schoolchildren was high, with no differences by sex or school dependency. Angle Class II malocclusion was present in schoolchildren of both sexes.

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