

EPIDEMIOLOGICAL STUDY OF MALOCCLUSIONS IN SCHOOLCHILDREN BETWEEN 6 AND 14 YEARS OLD FROM OLT COUNTY, ROMANIA

Stelian-Mihai-Sever Petrescu¹, Ionela Teodora Dascălu², Mihaela Jana Țuculină², Constantin Dăguci², Felicia Ileana Mărășescu², Horia Octavian Manolea², Andreea Nicola², Ruxandra Voinea-Georgescu³, Oana Cella Andrei⁴, Laura-Maria Neamțu⁵, Mihaela Ilenuța Mihalescu⁶, Felicia Militaru⁷

¹PhD Student, University of Medicine and Pharmacy of Craiova, Faculty of Dentistry, 2-4 Petru Rareș Str., 200349, Craiova, Romania

²University of Medicine and Pharmacy of Craiova, Faculty of Dentistry, 2-4 Petru Rareș Str., 200349, Craiova, Romania

³Titu Maiorescu University, Faculty of Dentistry, 67A Gheorghe Petrascu Str., 031593, Bucharest, Romania

⁴Carol Davila University of Medicine and Pharmacy, Faculty of Dentistry, 37 Dionisie Lupu Str., 030617, Bucharest, Romania

⁵Orthodontics Resident, Clinical Emergency County Hospital of Craiova, 1 Tabaci Str., 200642, Craiova, Romania

⁶Orthodontics Resident, Victor Babeș Hospital for Infectious Diseases and Pneumology, 126 Calea București Str., 200515, Craiova, Romania

⁷University of Medicine and Pharmacy of Craiova, Faculty of Medicine, 2-4 Petru Rareș Str., 200349, Craiova, Romania

Correspondence author: Ruxandra Voinea-Georgescu – Email: ruxi0372@yahoo.com
Andrei Oana Cella – Email: cella.andrei@gmail.com

All the authors equally contributed to the drawing up of the present paper.

Abstract

The aim of this study is to determine the prevalence of malocclusions in a group of schoolchildren from both urban and rural areas of Olt County, Romania. The study included 1255 schoolchildren aged between 6 and 14 years old, who were enrolled in randomly selected public schools from Olt County, Romania. The data were collected from December 2019 to February 2020, based on the project „Educație pentru sănătate orală. Cercetări privind anomaliile dento-maxilare și leziunile odonto-parodontale la școlarii din Oltenia”, in which several institutions were involved. The study was interrupted before it was completed due to the COVID-19 pandemic outbreak. In data collection and centralization we used: Angle’s classification of malocclusions and the distribution of malocclusions according to gender, age groups and origin. We obtained a prevalence of 40.47% for malocclusions. Of the total number of schoolchildren with malocclusions, the highest prevalence was recorded for those included in Angle’s class I (51.18%). We found the highest prevalence of malocclusions in female gender (41.9%). Regarding the origin, there is a higher prevalence of malocclusions in urban areas (40.85%).

Keywords: Angle’s classification, malocclusion, prevalence, gender, origin

Introduction

According to data provided by the World Health Organization, malocclusions represent the third most common pathology of the dento-maxillary apparatus, after caries and periodontal disease [1-4].

Malocclusions affect both the oral functions (chewing, swallowing and phonation) and the quality of life [5,6]. Their great variety is due to the differences in gender, age and origin of the subjects included in studies.

Periodic assessment of the prevalence of malocclusions is an important health policy in all countries in order to establish prevention programs. In order to obtain the best possible results, it is necessary to implement them at an early age [7-10].

The ever-increasing prevalence of this pathology of the dento-maxillary apparatus suggests an intensification of the action of etiological factors. At the same time, climate change, soil, air and water pollution have adverse effects on the nutrition pattern, leading to structural and growth changes [11,12].

Due to the large number and complexity of pathology in the oral cavity, there is a need to raise awareness among patients about prophylaxis, regular assessment of oral status and establishing the appropriate time to start dental treatment.

Material and Methods

The study was approved by the Ethical Committee of the University of Medicine and Pharmacy of Craiova, Romania, in accordance with the ethical guidelines for research with human participants. Also, all participants and parents/relatives expressed their informed consent.

The statistical study we conducted in order to establish the prevalence of malocclusions used a cross-sectional epidemiological investigation. The study took place in southwestern Romania, in Olt County. Its period was from December

2019 to February 2020, when it was interrupted due to the COVID-19 pandemic outbreak. The study involved 1255 schoolchildren enrolled in public schools from Olt County, Romania. The schoolchildren included in our study were aged between 6 and 14 years old. Of these, 957 schoolchildren were from urban areas (Caracal) and 298 from rural areas of Olt County (Cezieni and Fărcașele). The subjects were divided according to Angle's classification of malocclusions, but also according to gender, age groups and origin.

None of the classifications used in orthodontics is complex enough. Although there are several classifications of malocclusions, in our study we opted for Angle's classification. It is currently the most used, considering the fixed position of the permanent first molars. Therefore, in Angle's class I are included malocclusions with a neutral relation of permanent first molars (the alignment between the most mesial intercusp groove from the buccal surface of the first permanent lower molar and mesio-buccal cusp of the first permanent upper molar). Angle's class II contains malocclusions with a distal relation of permanent first molars (the most mesial intercusp groove from the buccal surface of the first permanent lower molar is distally positioned when in occlusion with the mesio-buccal cusp of the first permanent upper molar). In Angle's class III are included malocclusions with a mesial relation of permanent first molars (the most mesial intercusp groove from the buccal surface of the first permanent lower molar occludes mesially to the mesio-buccal cusp of the first permanent upper molar) [13].

Using Microsoft Excel we processed all the information obtained during the research. Thus, the results of our study were concentrated in representative graphs.

For statistical analysis, we used the Chi-square Test (χ^2). It is used to determine

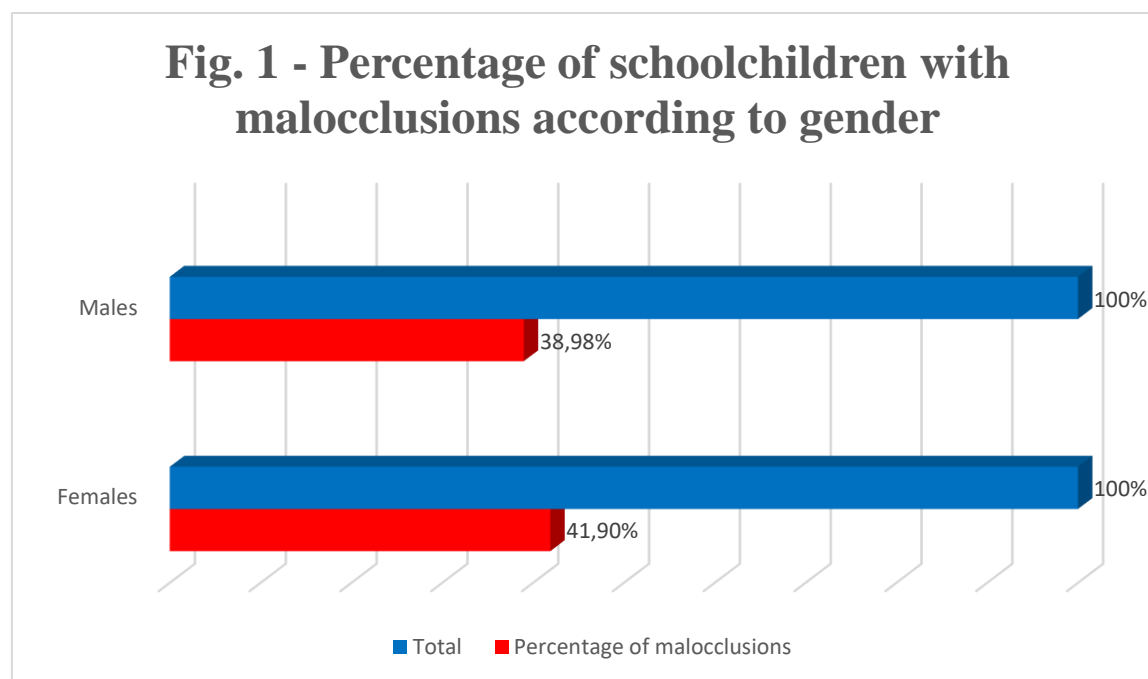
whether there is a statistically significant difference between the expected and observed frequencies in one or more categories of a contingency table [14,15].

According to gender, the percentage of schoolchildren with malocclusions was 38.98% for males (239 boys presented malocclusions out of 613) and 41.90% for females (269 girls presented malocclusions out of 642) (Table 1 and Fig. 1).

Results

Table 1 – Distribution of the number of children according to gender

Patients	Males	Females
Total no. of schoolchildren	613	642
Schoolchildren with malocclusions	239	269
Percentage of malocclusions	38.98%	41.9%

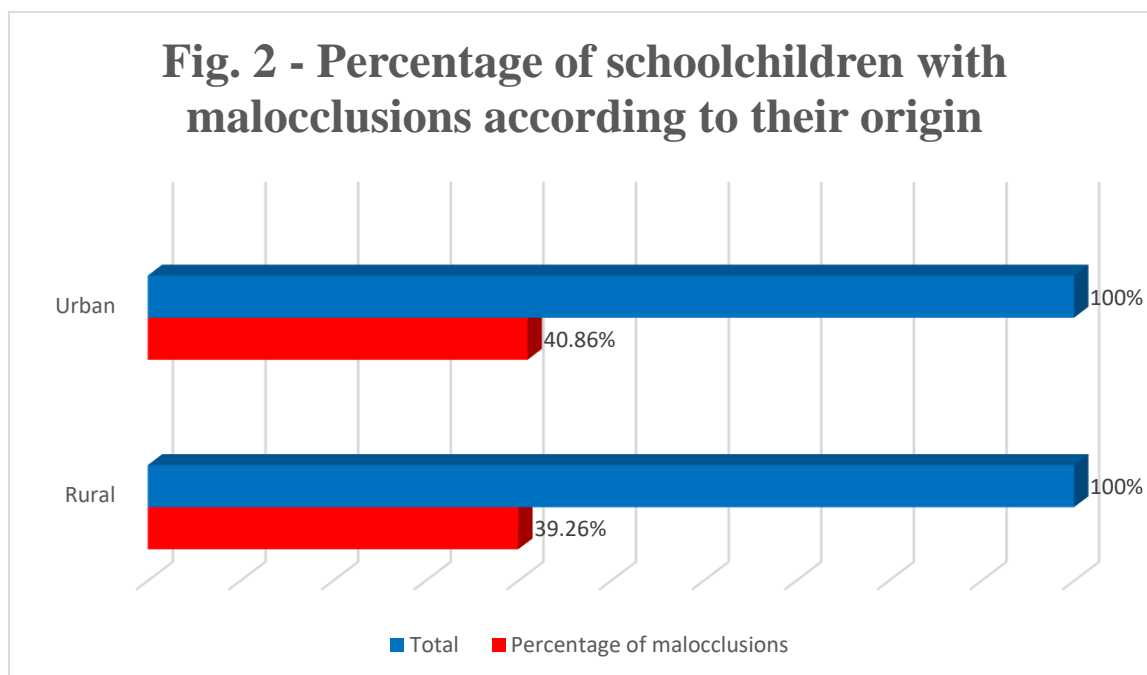


In terms of origin, the schoolchildren from the urban areas presented malocclusions in a higher percentage (40.86%) than those from the rural areas (39.26%). In the urban areas (Caracal), we examined a number of 957 schoolchildren (391 presented malocclusions) and from the rural areas (Cezieni and Fărcașele) 298 schoolchildren (117 presented malocclusions) (Table 2 and Fig. 2).

Table 2 – Distribution of the number of schoolchildren with malocclusions according to their origin

Patients	Urban	Rural
Total no. of schoolchildren	957	298
Schoolchildren with malocclusions	391	117

Percentage of malocclusions	40.86%	39.26%
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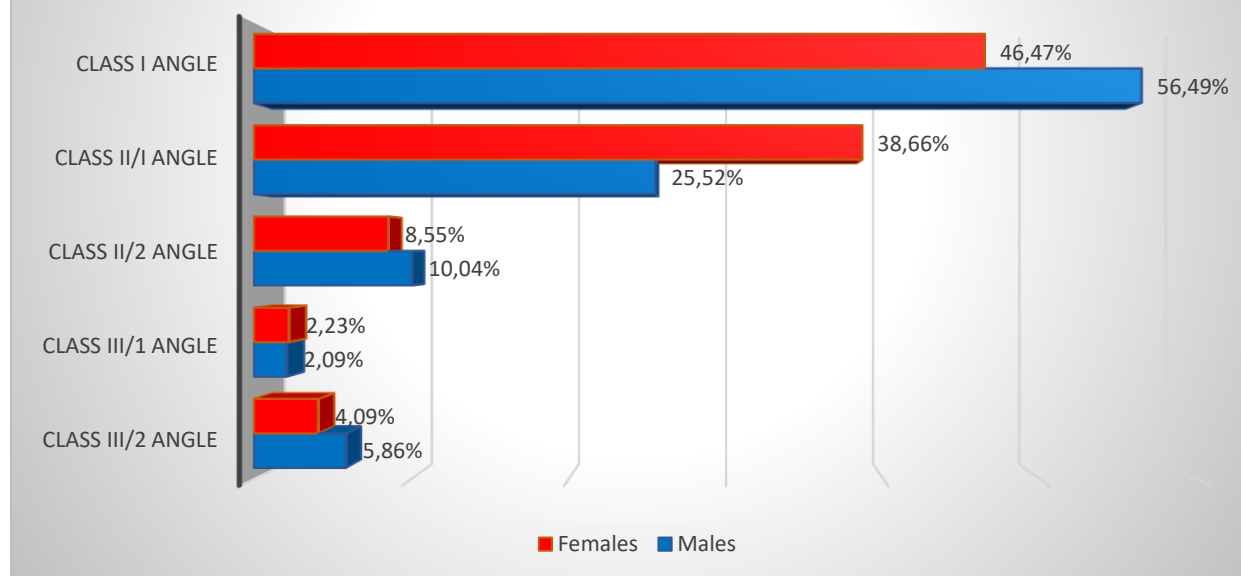


Regarding Angle’s classification of malocclusions and gender, we identified from the total number of schoolchildren: 135 boys (56.49%) and 125 girls (46.47%) with Angle’s class I malocclusions; 61 boys (25.52%) and 104 girls (38.66%) with Angle’s class II/1 malocclusions; 24 boys (10.04%) and 23 girls (8.55%) with Angle’s class II/2 malocclusions; 5 boys (2.09%) and 6 girls (2.23%) with Angle’s class III/1 malocclusions; 14 boys (5.86%) and 11 girls (4.09%) with Angle’s class III/2 malocclusions (Table 3 and Fig. 3).

Table 3 - Total number of schoolchildren with malocclusions according with Angle’s classification of malocclusions and their percentage distribution according to gender

Angle’s classification of malocclusions	No. of cases		Percentage	
	Males	Females	Males	Females
Class I Angle	135	125	56.49%	46.47%
Class II/1 Angle	61	104	25.52%	38.66%
Class II/2 Angle	24	23	10.04%	8.55%
Class III/1 Angle	5	6	2.09%	2.23%
Class III/2 Angle	14	11	5.86%	4.09%
Total	239	269	100%	100%
χ^2 Test	p=0.035262 (S – significant)			

Fig. 3 - Schoolchildren with malocclusions according to Angle's classification of malocclusions and their percentage distribution according to gender



Following our epidemiological research, we found the highest prevalence for Angle's class I malocclusions in male gender (56.49% of the total number of schoolchildren with malocclusions) and the lowest prevalence for Angle's class III/1 malocclusions in male gender (2.09% of the total number of schoolchildren with malocclusions).

Chi-square Test (χ^2) was applied and a statistically significant result was obtained ($p=0.035262$) (Table 3 and Fig. 3).

Discussions

A similar epidemiological study conducted in Gorj County, also located in southwestern Romania, found the highest prevalence at girls with Angle's class I malocclusions (65.63%) and the lowest incidence was recorded for girls with Angle's class III/1 malocclusions (0%) [16]. Our results show the highest prevalence at boys with Angle's class I malocclusions (56.49%) and the lowest incidence is recorded

for boys with Angle's class III/1 malocclusions (2.09%).

In 2001, a study conducted by Valentina Dorobăț and Dragoș Stanciu identified the highest prevalence of class I Angle malocclusions (44.7%), followed by class II Angle malocclusions (24.6%) and class III Angle malocclusions (2.3%) [17].

Another study conducted in the mining areas of the Apuseni Mountains found the same distribution of malocclusions: 56.4% represent Class I Angle, 37.9% class II Angle and 5.7% Class III Angle [18].

A statistical analysis performed in Bucharest, Romania indicated the highest prevalence of class II Angle malocclusions (60%), followed by class I Angle malocclusions (28.6%) and class III malocclusions (11.5%). For female gender, the highest incidence of malocclusions was recorded in class II Angle (66.4%), followed by class I Angle (18.7%) and class III Angle (14.9%). For male gender,

the highest prevalence was also found in class II Angle (55.7%), followed by class I Angle (35.4%) and class III (8.9%) [19]. The results of this research are not consistent with the data we obtained and, implicitly, with the studies mentioned above.

The global prevalence for Angle's class I malocclusions is the highest ($74.7 \pm 15.17\%$ from the total number of patients with malocclusions) and for Angle's class III malocclusions is the lowest ($5.93 \pm 4.69\%$ from the total number of patients with malocclusions) [20].

Conclusions

Malocclusions affect the functions of the dento-maxillary apparatus, as well as the patients' mental state. In Romania, there is a varied prevalence of malocclusions depending on gender, geographical areas and Angle's classification. Also, the increased prevalence of this pathology in Olt County, Romania (40.47%) suggests a lack of prevention and reduced addressability of patients for orthodontic treatment.

The results of epidemiological studies should be a wake-up call in order to establish public health policies in orthodontics.

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