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Clinical-statistical study on the use of articulators in orthodontic practice

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ABSTRACT

Dental-maxillary anomalies are accompanied by changes in the interbasal maxillary ratio in all reference planes, with influences on the functionality of articular structures. These joint changes not detected in time and not included in the treatment plan may worsen while wearing fixed appliances, as orthodontic treatment changes the cranio-mandibular position and causes cranio-mandibular reshaping. The articulator is an instrument that reproduces more or less all mandible movements.

TMJ characteristics of skeletal dento-maxillary anomalies, especially class II sagittal pattern mainly reflected in condylar position rather than morphology. TMJ of different vertical patterns differed more in joint spaces, position of condyle and glenoid fossa than in morphologic measurements. Vertical position of glenoid fossa and proportion of posterior condyle increased gradually from hypodivergent to hyperdivergent. Highest glenoid fossa position, maximum ratio of posterior positioned condyle, smallest joint spaces, shallowest glenoid fossa depth, and narrowest condylar long axis diameter were found in skeletal class.

The patients with high angle have considerable joint instable factors, and we should especially pay attention when orthodontic treatment is carried out on them. The condyle-fossa position and morphology differ with various vertical facial patterns in individuals with skeletal Class II mandibular retrognathism. These differences could be considered during temporo-mandibular diagnosis and orthodontic treatment

Keywords: TMJ, anomalies, condyle, facial arch, orthodontic treatment

INTRODUCTION

Dental-maxillary anomalies are more frequent in these periods and they are accompanied by changes in the interbasal maxillary ratio in all reference planes, with influences on the functionality of articular structures [1,2]. Dental articulators can be in different shapes and sizes, each has a particular design depending on the purposes for which they are used. The facial arch is a tool used mainly in Prosthodontics, but in recent years it is increasingly used by Orthodontists in diagnosing malfunctions occurring in the temporo-mandibular joint, and in correlation with the articulator it aims to transfer the correct position of the maxillar relative to the mandible. Combined, the facial arch and the articulator provide the optimal premises for a dental restoration that is not only aesthetic, but also functional [3].

The facial arch and the articulator are used together to record clinical data describing a patient's masticatory positions, so that the dental arches are

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perfectly functional in the oral-facial assembly. The facial arch is an instrument that records the relationship of the maxillar jaw to the axis of rotation of the mandible jaw, allowing, by placing a maxillary gypsum transferred to this equivalent relationship on the articulator [4].

In Orthodontics both semi-adaptable and fully adaptable articulators are used to analyze centric relation and maximal intercuspal position of each patient with TMJ disfunctions consecutive dento-maxillary anomalies. Also, there are useful tools in assessing the intercondylar inclination and intercondylar distance, as well as the Bennet angle [5].

The analysis of static and dynamic occlusion is the basis of any dental treatment, but especially in the case of orthodontic and prosthetic treatment. At the end of any orthodontic treatment, the biggest challenge is the stability of the result. Before starting treatment, the teeth of the two jaws are in positions that are dictated by bone and soft tissue pressures. During orthodontic treatment, tooth displacement occurs, which increases the potential for a future relapse. The forces of the perioral muscles and the alveolar fibrous system continue to influence the movement of the teeth to their initial position. The stability of the occlusion at the end of the orthodontic treatment is also influenced by the type of occlusion contacts, their number and intensity [6].

The fully adaptable articulator is the most sophisticated instrument in dental medicine that can replicate the mandibular movements, being used to realize a treatment plan that requires TMJ repositioning and complex orthodontic treatment. Due to the numerous adjustments that are possible, this articulator is able to repeat the most accurately the condilian movements of each patient. Thus, we can determine: Condylar tilt, lateral translation movement (Bennett angle), condylar rotation movement and intercondylar distance.

The purpose of this study is to assess the frequency of use of various articulation machines in the private orthodontic practice of 2 dental offices in Bucharest, in correlation with the type of dento-maxillary anomaly.

MATERIAL AND METHOD

The study was conducted on a non-homogeneous group of patients aged 9-40 years, male and female, with various dento-maxillary anomalies that requested orthodontic treatment in two private clinics in Bucharest between 2019 and 2022. The consultation sheets were analyzed in a number of 63 patients, aged 9-40 years, with various types of dento-maxillary anomalities.

The criteria for selection of subjects/patients were the following:

- age between 9 and 40 years old
- absence of edentation/dentures
- lack of orthodontic treatment in the background
- no joint pathology

The informed consent of the subjects was obtained and properly signed, the patients receiving written information in connection with the details of the scientific research. The data obtained from the patient records were entered in an Excel table and analyzed statistically.

Statistical analysis included descriptive statistical elements (frequency, percentage). The square Chi test was applied to determine the association between qualitative variables. The threshold of significance chosen for the p value was 0.05. The statistical analysis was performed using the GraphPad demo version utility. All parameters are included in the Excel table (Table 1).

RESULTS

As shown in Table 1a, the highest frequency is 42.86% of patients in the 9-12 years old group, followed by the 12-18 years old group with 30.16%. This is, in fact, the most favorable period for orthodontic treatment, and the addressability in specialized services is increased (Figure 1).

In terms of the environment of origin, the highest percentage is represented by the urban area compared to the rural area (Table 2, Figure 2).

TABLE 1a. The distribution of patients by age

Age	Frequency	Percentage
9-12 years old	27	42.86%
12-18 years old	19	30.16%
19-40 years old	17	26.98%
Total	63	100.00%

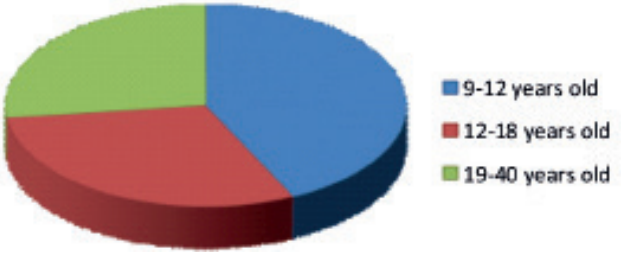

FIGURE 1. The distribution of patients by age

TABLE 2. The distribution of patients by environment

Environment	Frequency	Percentage
Rural	21	33.33%
Urban	42	66.67%
Total	63	100.00%

TABLE 1 (EXCEL). Analyses parameters according with age, gender and environment

Sex F	Sex	9 -12 years	12-18 years	19-40 years	Urban	Rural	Angle cl. I	Angle Cl.II/1	Angle cl. II/2	Mandib. Laterog.	Angle cl. III	Anatomic Articulator AD2	Cinematic Articulat. Slavicek	Facial arch Axioprisa
LM	AT M		X		X						x		x	
	IC F	X				x		x				X		
TD	MB F			x		x					x		x	
BV	KL M	X			X			x				X		
OR	PT F	X			X			x					x	
	RF M			x	X					x			x	
	KJ F	X			X		x							x
SC	FD F		X		X			x				x		
	PR M	X			X				x					x
HL	GP F		X			x				x				x
	SE F			x		x					x		x	
SO	VD M			x	X					x				x
FG	OT M	X			X		x					x		
	GH M		X		X		x						x	
DE	SE F	X			X			x				x		
	RE F	X			X				x					x
AS	LP M		X			x	x						x	
BD	IR F	X			X		x							x
	JL M			x		x			x				x	
SE	PM F	X			X				x				x	
	TU M	X				x				x				x
AS	RS F	X			X			x				x		
FE	GH F		X			x				x		x		
GF	LP F	X			X			x				x		
	VF F		X			x	x							x
	BH M	X			X			x				x		
SA	CL M		x			x					x		x	
	CD F	X			X			x				x		
JT	AO F		X		X			x				x		
	FV M	X			X		x							x
EA	RH F		X		X		x						x	

Sex F	Sex	9 -12 years	12-18 years	19-40 years	Urban	Rural	Angle cl. I	Angle Cl.II/1	Angle cl. II/2	Mandib. Laterog.	Angle cl. III	Anatomic Articulator AD2	Cinematic Articulat. Slavicek	Facial arch Axioprisa
BN	LT F	X	X				x			x		x		
	GI F	X			X					x			x	
NM	AO F	X			X		x					x		
SA	NT M			x	X		x						x	
VF	EL F		X			x		x						x
	HT F		X		X		x							x
JT	VF M	X				x	x					x		
ZD	DE F		X		X		x							x
	UO F	X			X		x					x		
EL	AI M	X			X			x					x	
AP	PN F			x		x		x						x
	ZS F	X			x						x			x
LM	SC F		X			x		x					x	
CL	BR F	X			x					x		x		
	OT M			x		x		x						x
VD	ZE F		X		x		x						x	
GT	ER M	X			x		x							x
	UG F	X			x		x					x		
PR	HN M			x	x				x				x	
	SD F			x		x		x						x
AZ	AP F			x		x			x			x		
EF	UM M			x	x						x		x	
	GD F		X		x						x	x		
PK	VF F			x		x			x					x
TO	CM F			x	x			x				x		
	CM M			x	x		x							x
	JV F			x	x			x					x	
AI	JR M		X			x		x				x		
RD	FR F		X	x					x					x
	PM M	X			x						x	x		
AI	LV F			x	x					x				x
	SE F		X			x				x			x	

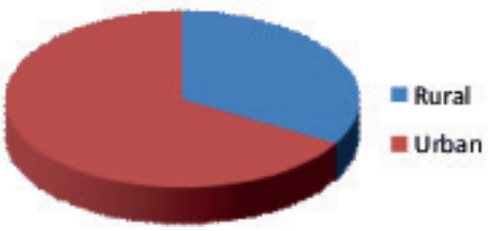

FIGURE 2. The distribution of patients by environment

TABLE 3. The distribution of patients by gender

Gender	Frequency	Percentage
Female	40	63.49%
Male	23	36.51%
Total	63	100.00%

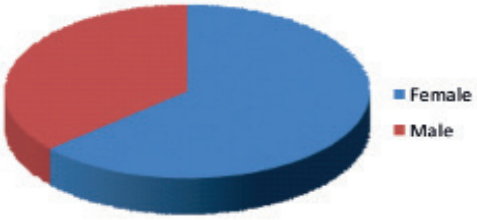

FIGURE 3. The distribution of patients by gender

As shown in Table 3 and Figure 3, the distribution of patients by gender is represented by a high percentage: 63.49%, for female patients aged 40 years, followed by male patients aged 23 years, in a percentage of 36.51%.

TABLE 4. The distribution by type of anomaly

	Frequency	Percentage
Angle CLASS I	26	37.55%
Angle CLASS II/1	19	33.14%
Angle CLASS II/2	10	16.21%
Angle CLASS III	8	13.10%
Total	63	100.00%

Table 4 shows the percentage distribution by type of anomaly of the batch taken into the study. The largest share is the Angle Class I anomaly, with a percentage of 37.55%, then the malocclusion Angle Class II/1, with a percentage of 33.14%, followed by malocclusion Angle Class II/2 with a percentage of 16.21%. This proportion shall be retained in all age groups, except for group 19-40, where Class II/1 has a higher weight than Angle Class I (Figure 4).

Analyzing the percentage distribution of dental-maxillary anomalies on the three age groups, we noticed that in malocclusion class I Angle the highest percentage is kept in the group of 9-12 years: 52.63%, followed by 47.37% for Class II/1 angle anomaly, 37.50% for Class II/2 angle and 25.00% for Class III (Table 5).

For the age group 12-18 years, the highest percentage is also held by malocclusion Class I, with 36.84%, followed by Angle Class III with a fairly high percentage: 34.50%, Angle Class II/1 with 26.32%, and the lowest percentage is for malocclusion Class II/2 with 12.50%.

The increased percentage of patients with Angle Class III malocclusion is explained at this age by residual growth, post-puberty, especially in male gender and by the higher degree of addressability of the orthodontic patients, due to the alteration of the facial appearance (prognathic profile).

There is no statistically significant association between age groups and the class of anomaly.

Analyzing the distribution of anomalies on the environment of origin, a higher percentage is observed for patients in urban areas, in all age groups (Table 6, Figure 5).

As shown in Table 6 and Figure 5, patients in Angle Class I are found mainly in urban areas, in a percentage of 84.21%, followed by rural patients, with a percentage of 15.79%. For patients in Angle Class II/1, the majority of 63.16% is in urban areas, followed by patients in rural areas, with a percentage of 36.84%. From the table, we find out that the patients in Angle Class II/2 are dispersed in both rural and urban areas, at a rate of 50%.

As for the patients in Angle Class III, they are the majority in urban areas, at a rate of 62.50%, fol-

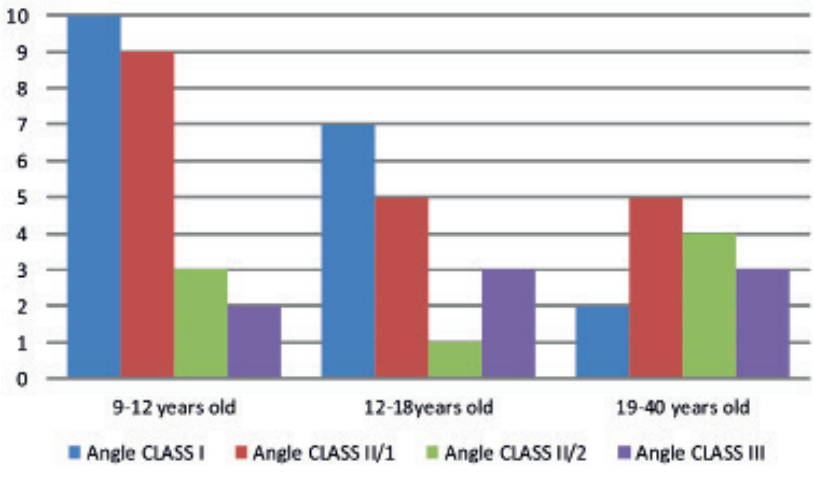

FIGURE 4. The frequency of dental-maxillary anomalies by age

TABLE 5. The distribution of dental-maxillary anomalies by age

Age	Angle Class I	Angle Class II/1	Angle Class II/2	Angle Class III	P value
9-12 years old	10 (52.63%)	9 (47.37%)	3 (37.50%)	2 (29.00%)	**0.3805**
12-18 years old	7 (36.84%)	5 (26.32%)	1 (12.50%)	3 (34.50%)	
19-40 years old	2 (10.53%)	5 (26.32%)	4 (50.00%)	3 (36.50%)	
Total	19(100.00%)	19 (100.00%)	8 (100.00%)	8 (100.00%)	

TABLE 6. Correlation between types of anomalies and environment

Environment	Angle CLASS I	Angle CLASS II/1	Angle CLASS II/2	Angle CLASS III	P value
Rural	3 (15.79%)	7 (36.84%)	4 (50.00%)	3 (37.50%)	**0.2806**
Urban	16 (84.21%)	12 (63.16%)	4 (50.00%)	5 (62.50%)	
Total	19 (100.00%)	19 (100.00%)	8 (100.00%)	8 (100.00%)	

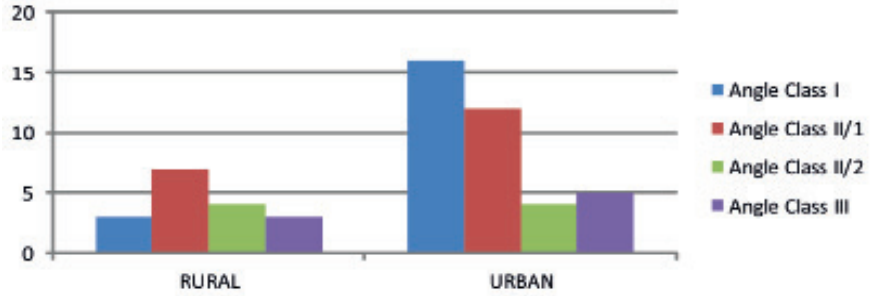

FIGURE 5. The frequency of dental-maxillary anomalies on the environment

lowed by patients in rural areas, with a percentage of 37.50%.

Analyzing the frequency of use of various methods of occlusion evaluation and TMJ, we can say that the most used complementary method of evaluation of mandibular cinematic is the anatomic articulator AD2 (in a percentage of 34.9%), followed by the facial arch Axioprisa (in a percentage of 33.33%) and the cinematic articulator Slavicek (in a percentage of 31.75%) (Table 7, Figure 6).

TABLE 7. The frequency of TMJ evaluation

	Frequency	Percentage
Anatomic articulator AD2	22	34.92%
Kinematic articulator Slavicek	20	31.75%
Facial arch Axioprisa	21	33.33%
Total	63	100.00%

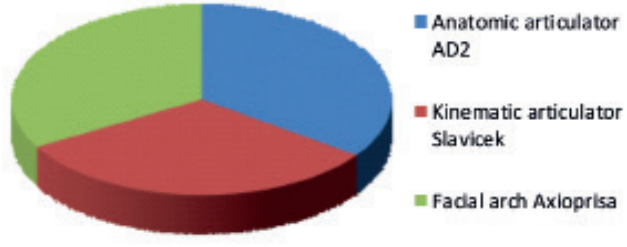

FIGURE 6. The frequency of use of various methods for the evaluation of occlusion and TMJ

As seen in Table 8, the recording of the centric relation is performed by anatomic articulator AD 2, the highest frequency being for the patients in the age group 9-12 years old, in a percentage of 68,18%, followed by patients in the age group 12-18 years old with a percentage of 22,73 % and patients in the age group 19-40 years old, with a percentage of 9,09%.

For Kinematic articular examination, the highest frequency being for the patients in the age group 12-18 years old and 19-40 years old, with a percentage 40%.

For Facial arch Axioprisa the highest frequency being for the patients in the age group 9-12 years old, in a percentage of 38,10%, following by patients in 19-40 age group in a percentage of 33,33%.

TABLE 8. Distribution of different method of TMJ evaluation according by age

Age	Anatomic articulator AD2	Kinematic articulator Slavicek	Facial arch Axioprisa	P value
9-12 years old	15 (68,18%)	4 (20,00%)	8 (38,10%)	**0.0256**
12-18 years old	5 (22,73%)	8 (40,00%)	6 (28,57%)	
19-40 years old	2 (9,09%)	8 (40,00%)	7 (33,33%)	
Total	22 (100,00%)	20 (100,00%)	21 (100,00%)	

There is a statistically significant association between age groups and the type of registration (Figure 7).

As shown in Table 9 and Figure 8, the use of anatomic articulator AD2 recording is represented in a majority of 50.00% by Angle Class II/1 patients, followed by Angle Class I patients with a percentage of 27.27% and Angle Class III patients with a percent-

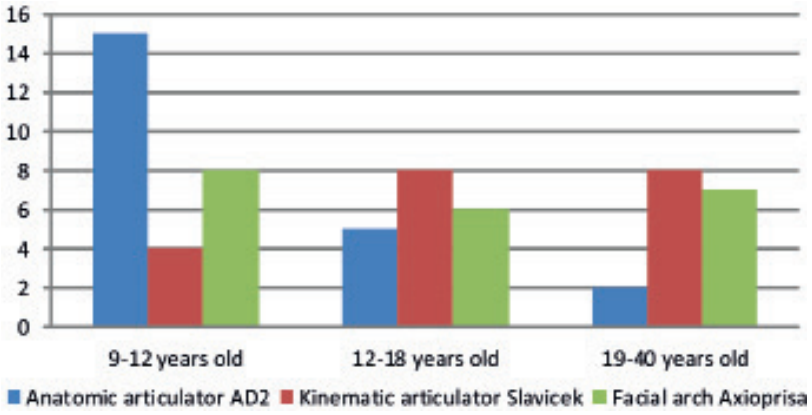

FIGURE 7. The distribution of the use of articulators by age group

age of 9.09% and Angle Class II/2 with a percentage of 4.55%.

For patients using the Slavicek kinematic articulator, the highest frequency is among patients in Angle Class I and Angle Class III with a percentage of 25.00%, followed by patients in Angle Class II/1, with 20.00% and those in Class II/2 angle, by 15.00%.

For patients using Axioprisa facial arch recording, the majority of 38.10% is in Angle Class I, followed by Angle Class II/1 and Angle Class II/2 patients with 19.05%,, respectively in Angle Class III patients with 4.76%.

TABLE 9. The distribution of the use of articulators by class of anomalies

	Anatomic articulator AD2	Kinematic articulator Slavicek	Facial arch Axioprisa	P value
Angle CLASS I	6 (27.27%)	5 (25,00%)	8 (38,10%)	
Angle CLASS II/1	11 (50.00%)	4 (20,00%)	4 (19,05%)	
Angle CLASS II/2	1 (4.55%)	3 (15,00%)	4 (19,05%)	**0.1059**
Angle CLASS III	2 (9.09%)	5 (25,00%)	1 (4,76%)	
Total	22 (100.00%)	20 (100,00%)	21 (100,00%)	

There is no statistically significant association between the Angle anomaly class and the type of articulation used.

As shown in Table 10 and Figure 9, the recording with the use of the AD2 anatomical articulator is represented in a majority of 77.27%, by urban patients, followed by rural patients, with a percentage of 22.73%. For patients using the kinematic articulator Slavicek, the highest frequency is among urban people, with 65.00%, followed by rural people with 35.00%.

For patients using recordings with the facial arch Axioprisa, the highest percentage is in urban people, with 57.14%, followed by rural people, with a percentage of 42.86%.

As shown in table 11 and Figure 10, the use of anatomic articulator AD2 registration is represented in a majority of 72.73% in female patients, followed by male patients with a percentage of 27.27%. For patients using the Slavicek kinematic articulator, they are split into 50.00%, both female and male. For patients using Axioprisa facial arch recording, the highest frequency is female with 66.67%, followed by male with a percentage of 33.33%.

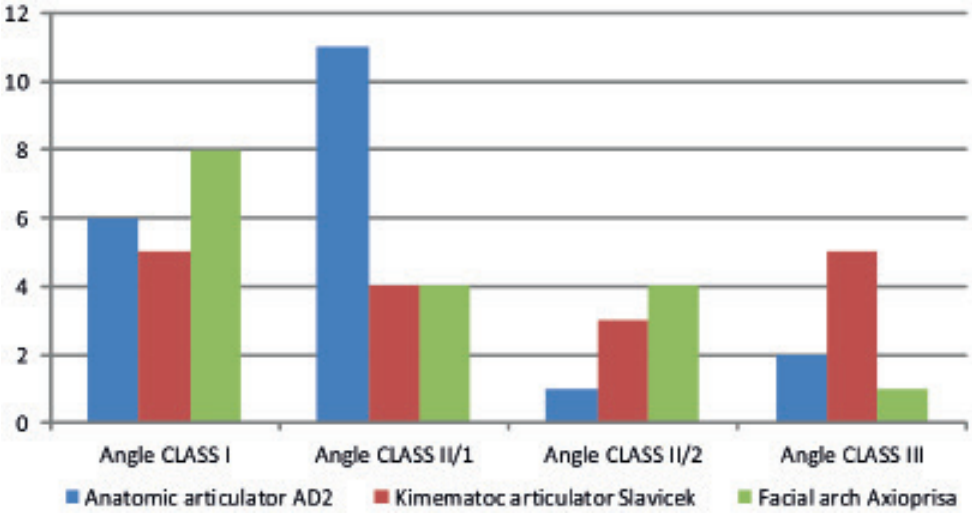

FIGURE 8. The distribution of the use of articulators by anomalies class

TABLE 10. The distribution of the use of articulators by environment

Environment	Anatomic articulator AD2	Kinematic articulator Slavicek	Facial arch Axioprisa	P value
Rural	5 (22.73%)	7 (35.00%)	9 (42.86%)	**0.3687**
Urban	17 (77.27%)	13 (65.00%)	12 (57.14%)	
Total	22 (100.00%)	20 (100.00%)	21 (100.00%)	

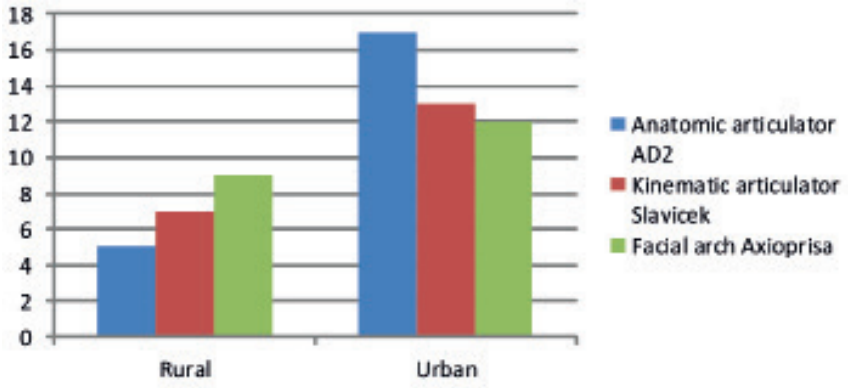

FIGURE 9. The distribution of the use of articulators by environment

TABLE 11. The distribution of the use of articulators by gender

Gender	Anatomic articulator AD2	Cinematic articulator Slavicek	Facial arch Axioprisa	Value p
Female	16 (72,73%)	10 (50,00%)	14 (66,67%)	0.2906
Male	6 (27,27%)	10 (50,00%)	7 (33,33%)	
Total	22 (100,00%)	20 (100,00%)	21 (100,00%)	

By analyzing the presence of laterognation as a single abnormality or associated with another malocclusion, a relatively low frequency can be observed (only 10 of the 63 patients showed this dysmorphosis) (Table 11). There is a higher percentage of 40% in the age group 9-12 years old (Figure 11).

There is no statistically significant association between age groups and the presence or absence of mandibular laterognathism.

Also, by analyzing Table 13, it appears that the highest frequency for patients with mandibular laterognathism is among patients in urban areas with a percentage of 60%, compared to a percentage of 40% in rural areas.

TABLE 12. The distribution of mandibular laterognathism by age groups

Age	With mandibular laterognathism	Without mandibular laterognathism	P value
9-12 years old	4 (40.00%)	23 (43.40%)	**0.9691**
12-18 years old	3 (30.00%)	16 (30.19%)	
19-40 years old	3 (30.00%)	14 (26.42%)	
Total	10 (100.00%)	53 (100.00%)	

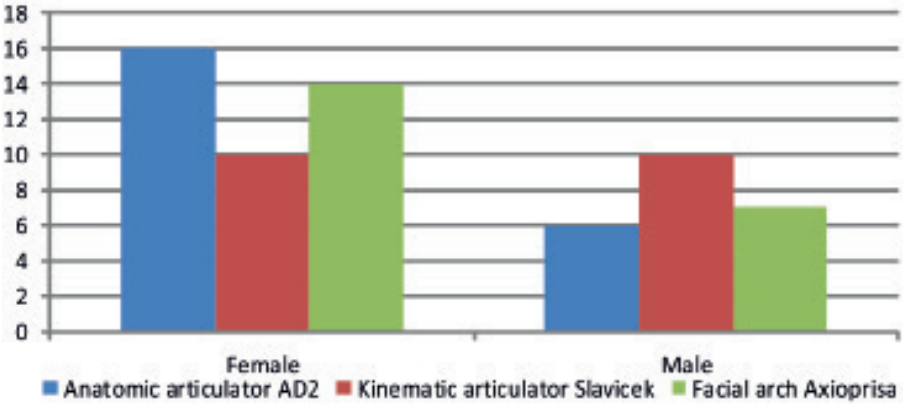

FIGURE 10. The distribution of the use of articulators by gender

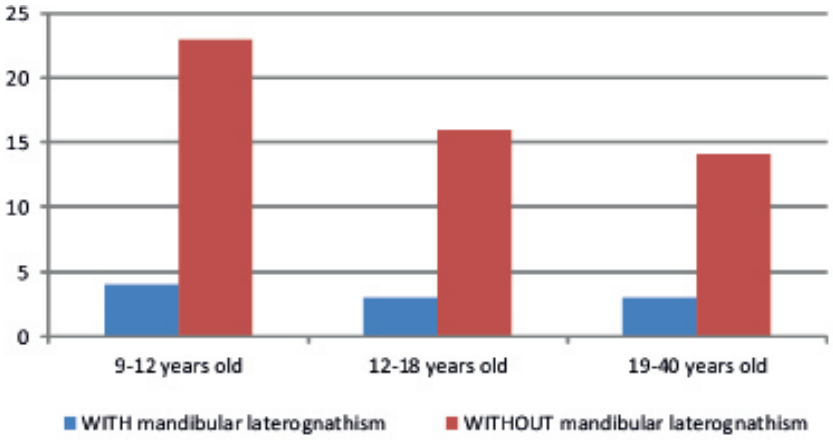

FIGURE 11. The distribution of mandibular laterognathism by age groups

TABLE 13. The distribution of mandibular laterognathism by environment

Environment	With mandibular laterognathism	Without mandibular laterognathism	P value
Rural	4 (40,00%)	17 (32,08%)	RR=1.333 IC(95%): 0.4214-4.219 **p=0.7193**
Urban	6 (60,00%)	36 (67,92%)	
Total	10 (100,00%)	53 (100,00%)	

In conclusion, we can affirm that there is no statistically significant association between environment and the presence or the absence of mandibular laterognathism (Figure 12).

As shown in Table 14 and Figure 13, for patients with mandibular laterognathism, the highest percentage is female patients with a percentage of 70.00%, followed by male patients with a percentage of 30.00%.

TABLE 14. The distribution of mandibular laterognathism by environment

Gender	With mandibular laterognathism	Without mandibular laterognathism	P value
Female	7 (70.00%)	33 (62.26%)	RR=1.342 IC(95%): 0.3837-4.691 **p=0.7341**
Male	3 (30.00%)	20 (37.74%)	
Total	10 (100.00%)	53 (100.00%)	

There is no statistically significant association between gender and the presence or absence of mandibular laterognathism

DISCUSSIONS

In recent decades, epidemiological studies have been conducted, which have revealed a trend of increasing prevalence of Dental-Maxillary Anomalies in our country. Thus, in 2001, a research conducted by Valentina Dorobat identified the highest prevalence in Angle Class I malocclusion (44.7%), followed by Angle Class II (24.6%) and Angle Class III (2.3%), [7]

Another study conducted in the mining areas of the Apuseni Mountains found the same distribution of the prevalence of Dental-Maxillary Anomalies: 56.4% are in Angle Class I, 37.9% in Angle Class II and 5.7% in Angle Class III [8].

A statistical analysis conducted in Bucharest, Romania, indicated the highest prevalence of Angle Class II malocclusions (60%), followed by Angle Class II (28.6%) and Angle Class III malocclusions (11.5%). Depending on the gender, the highest incidence of Dental-Maxillary Anomalies in female, was recorded in Angle Class II (66.4%), followed by Angle Class I (18.7%) and Angle Class III (14.9%). In males, the highest prevalence was also found in Angle Class

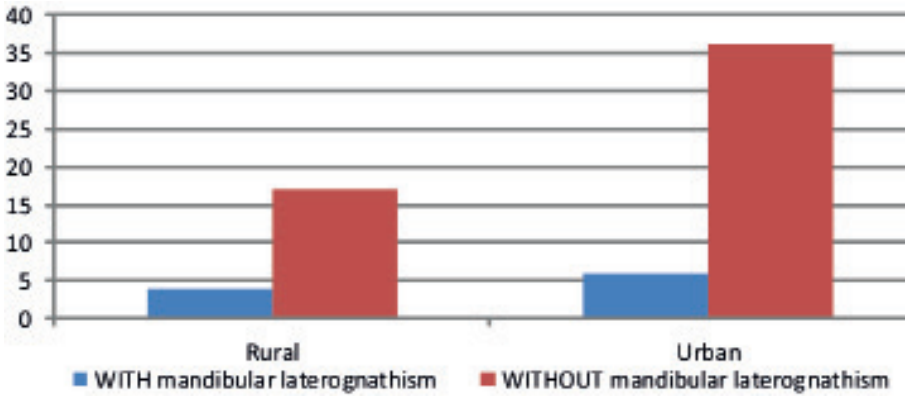

FIGURE 12. The distribution of mandibular laterognathism by environment

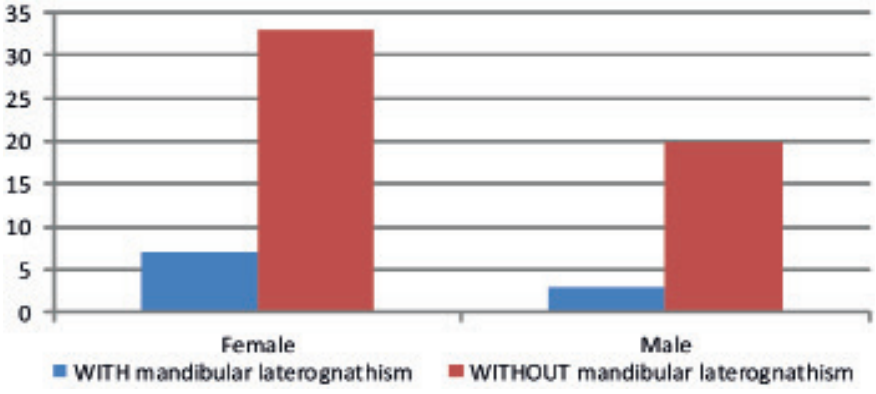

FIGURE 13. The distribution of mandibular laterognathism by gender

II (55.7%), followed by Angle Class I (35.4%) and Angle Class III (8.9%). [9] The results of this research are not consistent with the data obtained by us, given the non-homogeneous lot analyzed. Epidemiological studies on the prevalence of Dental-Maxillary Anomalies in different age groups have also been carried out in other European countries. Thus, a prevalence of malocclusion Angle Class I of 47.3%, Angle Class II 45.1% and Angle Class III 5.4% was found in Croatia [10].

The temporo-mandibular or cranio-mandibular joint is the most complex joint of the human body by its specific features, and as a posterior anatomical determinant of the mandibular kinematics acts pluriaxially guided within the limits conditioned by the means of capsulo-ligamentary union, with a role in the exercise of the essential functions of the dental system: mastication, deglutition and phonation. The correct record of the condyles' position in the glenoid cavity, the determination of MI (maximal intercuspation) and CR (centric relation) before orthodontic therapy is an important element for occlusion success and stability [11].

The articulators are frequently used in Prosthetics to establish correct occlusion raports, and lately they are used more and more frequently in Orthodontic practice. They can be used as part of a complex treatment plan that requires TMJ repositioning and orthodontic treatment. These devices allow for a greater reproduction of condylar movements. It can be used as part of a complex treatment plan that requires ATM repositioning and orthodontic treatment [12].

Orthodontic treatment or prosthetic restorations should not interfere with mandibular movements: closing, opening, protrusion or laterality: if there is an intereference at the level of even a single tooth, this will alter the mandibular kinematics. Proper positioning of the condyle at the TMJ level is important for all dental specialties, including orthodontics. It is very important to harmonize the occlusion according to mandibular kinetics. The centric relation (CR) is a position determined by the TMJ anatomy that can be reproduced and recorded with the help of the articulator and facial arch. The CR is the most stable and comfortable position of the mandible. Gibbs and Lundeen consider this position to be the essence of TMJ's optimal form and function [13].

Studies by Bell W et Droter JR support the accuracy of the recordings made with the Cadiax Compact II axiographer both in terms of the graphs obtained and the values used for programming the semi-adaptable articulator (the latter compared to the wax recordings used for programming the articulator) [14,15]. Computerized axiography can also be a tool for monitoring orthodontic treatment by analyzing graphs at different time intervals, as suggested by the study conducted by Okeson JP et Henry C . However, this can also be done through musculo-articular clinical examinatio [16,17].

The functional assessment of TMJ can also be carried out using high-resolution ultrasound. A single study by Kurita H et al. compared the two investigations. The conclusion of this study was that ultrasound performs a better functional assessment of TMJ, but does not provide data on the inclination of the condylar slope and Bennett angle. A number of studies highlight the importance of associating clinical examination with computerized axiography, suggesting that axiography should be an extension of clinical examination, never dissociated from clinical analysis [18-20].

Disc displacement is accepted as one of major findings in temporomandibular disorders (TMD). However, the associations of disc positions with morphological and positional changes of temporomandibular joint (TMJ) components and lateral pterygoid (LP), TMD clinical symptoms, and occlusion have rarely been discussed quantitatively, especially in orthodontic examination.

Against the background of malocclusions, the association of multiple hearing risk factors may trigger cranio-mandibular disorders accompanied by bruxism, recurrent muscle contraction or migraine headache, which has a worrying frequency not only in adults but also in children or adolescents, A fact

that led the orthodontists specialist and prosthetics specialists to support the need to know the morpho-physiology and morpho-pathology of TMJ (Pullinger AG, Rocabado) [21,22].

CONCLUSIONS

The most common dental-maxillary anomaly is the Angle Class I malocclusion, followed by the Angle Class II/1 malocclusion for the age group of 9-12 years old and 12-18 years old.

Articulators are used more frequently for Angle Class III malocclusion in the age group of 19-40 years old, where the occlusion problems are more serious.

The anatomic articulator is most commonly used for the Angle Class II/1 malocclusion for the age group of 9-12 years old, while the Slavicek articulator is used more in Angle Class III malocclusion, especially in adult patients.

The facial arch Axioprisa is manly used in Angle Class I in age group of 9-12 years old, due to its ease of handling and versatility.

For the patients with mandibular laterognathia, the most used recording tool is the facial arch Axioprisa, which can analyze several parameters: centric relation, maximal intercuspidal position.

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