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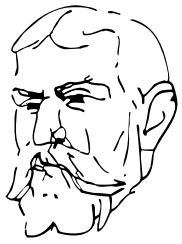

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PECULIARITIES OF TEETH SIZE IN ADOLESCENTS WHO ARE DIAGNOSED TO HAVE ANGLE'S CLASS I MALOCCLUSION AND DISPLAY DIFFERENT SOMATOTYPES

Lyubov V. Smahliuk, Dmytro V. Sheshukov
UKRAINIAN MEDICAL STOMATOLOGICAL ACADEMY, POLTAVA, UKRAINE

ABSTRACT

Introduction: The issues on identifying criteria for teeth aesthetic and teeth size evaluation regarding body constitutional characteristics are still remaining undeveloped.
The aim of this study was to specify the peculiarities of teeth size in adolescents who were diagnosed with Angle's Class I malocclusion and display different somatotypes.
Materials and methods: The study included 63 male and 66 female subjects diagnosed with Class I malocclusion by E. Angle classification (1906).
Results: It has been determined that the 33rd tooth in hypersthenic female individuals is of a greater mesiodistal size than in normosthenic and asthenic body types ($p < 0.05$). Left maxillary incisor in hypersthenic individuals is of a larger size than in asthenic and normosthenic ($p < 0,05$). The normosthenic male individuals have been found out to have significantly larger size of all canines than that in the females ($p < 0,05$). The asthenic male adolescents compared with females of the same somatotype there has been revealed the difference in the size of the left mandibular canine ($p < 0.05$). The hypersthenic male adolescents demonstrate an increase in the size of the lateral maxillary incisors and the first right premolar ($p < 0,05$) compared with those in female individuals of the same somatotype.
Conclusions: Some peculiarities of mesiodistal size typical for adolescents with Angle's Class I malocclusion and their somatotypes should be taken into account in treatment planning and maintaining the stability of orthodontic treatment results.

KEY WORDS: teeth, mesiodistal size, Angle's Class I malocclusion, somatotype

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INTRODUCTION

Investigating constitutional characteristics of anatomical components of the body as well as their somatometric characteristics provides more specific and detailed information on the morphological risk factors, which might be typical for a particular somatotype, and hereditary predisposition to certain pathology [1,2]. It has been reported that Angle's Class I malocclusion described as a normal mesiodistal relationship between upper and lower teeth but front teeth occlusion is impaired ranks the leading position among the dentofacial abnormalities [3, 4]. I Class anomalies have been diagnosed in 72.3% of adolescents who were determined based the presence of the "key of occlusion" by E. Angle to have 7 different types of abnormally positioned individual teeth, and namely, supraposition, infraposition, medial and distal position, vestibular and oral position of teeth [5]. Correspondence, or balance between the teeth size of the upper and lower dental arches is considered a key criterion for developing optimal functional occlusion as the main purpose of orthodontic treatment [6]. Different sizes of teeth are known as one of the etiological factors contributing to malocclusions. In our previous reports we have determined the characteristics of mesiodistal teeth size in adolescents in connection with their constitutional typology [7]. However, the issues on identifying criteria for teeth size in adolescents with Angle's Class I malocclusion regarding their body constitutional characteristics are still undeveloped.

THE AIM

The aim of this study was to specify the peculiarities of teeth size in adolescents who were diagnosed as having Angle's Class I malocclusion depending on their somatotype.

MATERIALS AND METHODS

The study included 63 male subjects (mean age 23.30 ± 0.29 years) and 66 female subjects (mean age 23.24 ± 0.16 years) diagnosed with Class I malocclusion according to E. Angle classification (1906). Each patient underwent the procedure of taking impressions to manufacture models for control and diagnostic. To identify occlusal problems, the irregularities in the teeth positioning and dentoalveolar arch abnormalities, we carried out the three-dimensional biometric assessment of plaster casts of the jaws (in three mutually transverse planes). To assess diagnostic models, we measured mesiodistal dimensions of 12 teeth of the upper and lower jaws. We used electronic calipers for measuring the models.

Clinical dental examination was carried out according to the elaborated algorithm with following fixation in the form №043-1 /o with addendum on evaluating individual typological parameters. The individuals included into the study were fully informed about the course of the research and then signed informed voluntary consents on their participation in the research.

Table I. Parameters of mesiodistal teeth size in female adolescents of different somatotypes

Dental formula	Tooth size, M±m			
	Somatotype			Mean size
	Asthenic group	Normosthenic group	Hypersthenic group	
16	9,88±0,11	9,76±0,08	9,87±0,17	9,79±0,07
15	6,16±0,11	6,13±0,07	6,3±0,19	6,15±0,05
14	6,19±0,49	6,26±0,2	6,4±0,11	6,26±0,18
13	7,48±0,11	7,37± 0,08	7,62±0,15	7,41±0,06
12	6,45±0,17	6,49 ±0,09	6,15±0,17	6,46±0,07
11	8,16±0,14	8,23±0,09	8,4±0,18	8,22±0,07
21	8,24±0,14	8,26±0,09	8,25±0,19	8,25±0,07
22	6,46±0,13	6,53± 0,08	6,20±0,18	6,49±0,06
23	7,46±0,12	7,39±0,06	7,57±0±,13	7,42±0,05
24	6,72±0,09	6,67±0,07	6,57±0,15	6,67±0,06
25	6,25±0,11	6,05±0,14	6,25±0,22	6,1±0,11
26	9,79±0,15	9,6±0,14	9,62±0,23	9,64±0,11
36	9,87±0,79	10,16±0,24	10,55±0,21	10,12±0,24
35	6,72±0,17	6,68±0,09	6,75±0,08	6,69±0,07
34	6,55±0,14	6,73±0,06	6,65±0,12	6,68±0,05
33	6,25±0,09	6,25±0,05	6,72±0,23*,**	6,28±0,05
32	5,67±0,07	5,58±0,07	5,62±0,06	5,6±0,05
31	5,21± 0,09	5,09±0,07	5,07±0,02	5,12±0,06
41	5,12± 0,09	5,06±0,08	4,9±0,11	5,06±0,06
42	5,67± 0,11	5,56±0,08	5,52±0,14	5,58±0,06
43	6,32± 0,08	6,29±0,07	6,47±0,15	6,31±0,05
44	6,79± 0,13	6,74±0,07	6,50±0,08	6,74±0,06
45	6,58± 0,17	6,49±0,16	6,65±0,17	6,52±0,12
46	9,87± 0,78	10,07±0,23	10,55±0,17	10,06±0,23

Note:
* - difference is probable when comparing between asthenics and hypersthenics, p<0,05
** - difference is probable when comparing between normosthenics and hypersthenics, p<0,05

The constitutional type of male and female individuals was assessed by the W. L. Rees and H. J. Eysenck index, 1945, including the following anthropometric characteristics as height, weight, transverse chest diameter, etc.). The index was calculated by the formula: body length x 100 / transverse chest diameter x 6. Based on the index values obtained and to sex, all subjects were divided into three somatotypes: hypersthenic group (index value was less than 96), normosthenic (index value ranged from 96 to 106) and asthenic (index was over 106) groups.

The quantitative indices obtained during the examination of patients were analyzed by applying the methods of mathematical statistics and calculating sample average (M), dispersion (σ), and errors of mean values (m). The probability of differences in the findings obtained for different groups was calculated by Student's t-test. To assess the relationships between semi-quantitative and qualitative indicators, we calculated non-parametric Spearman correlation coefficient. Correlation coefficients were considered statistically significant when error probability was p <0,05.

The statistical analyses were performed by computerized software of Microsoft Excel 2007, NCSS 2004 and SPSS for Windows. Release 13.0.

RESULTS AND DISCUSSION

The examination of the adolescents with Angle's Class I malocclusion revealed that the normosthenic body type was found to be predominant and seen in 48 female (72.73%) and 31 male (49.21%) individuals. Nearly the equal number of the individuals, 14 females (21.2%) and 15 males (23.8%) were of asthenic body type. The hypersthenic body type was more often common in male individuals (17 patients) that made up 26,98%, vs. 4 female individuals (6,06%) (p<0,05).

The measurements of mesiodistal teeth sizes in female individuals according to their somatotypes, is presented in Table I.

Table II. Parameters of mesiodistal teeth sizes in male adolescents of different somatotypes

Dental formula	Tooth size, M±m			
	Somatotype			Mean size
	Asthenic group	Normosthenic group	Hypersthenic group	
16	9,91±0,12	10,03±0,11	9,88±0,16	9,96±0,07
15	6,48±0,15	6,22±0,22	6,38±0,11	6,32±0,12
14	6,73±0,09	6,82±0,06***	6,75±0,1***	6,78±0,05
13	7,57±0,11	7,73± 0,08***	7,96±0,15*	7,76±0,06
12	6,47±0,15	6,51 ±0,11	6,68±0,14***	6,55±0,07
11	8,45±0,13	8,54±0,09***	8,55±0,22	8,52±0,08
21	8,33±0,13	8,56±0,11***	8,55±0,18	8,5±0,08
22	6,43±0,15	6,52± 0,1	6,90±0,15*,**,***	6,6±0,08
23	7,51±0,13	7,74±0,09***	7,99±0,14*	7,75±0,07
24	6,7±0,09	6,86±0,07	6,85±0,11	6,82±0,05
25	6,41±0,07	6,21±0,23	6,26±0,13	6,27±0,12
26	9,83±0,16	9,59±0,34	9,69±0,2	9,68±0,18
36	9,97±0,73	10,76±0,14***	10,15±0,65	10,41±0,25
35	7,05±0,14	6,44±0,33	6,88±0,13	6,71±0,17
34	6,85±0,14	7,02±0,07***	6,85±0,14	6,94±0,06
33	6,57±0,11***	6,53±0,1***	6,82±0,17	6,62±0,07
32	5,54±0,12	5,62±0,08	5,73±0,12	5,63±0,06
31	5,16± 0,11	5,21±0,09	5,1±0,11	5,17±0,06
41	5,14±0,12	5,23±0,08	5,14±0,11	5,18±0,06
42	5,68± 0,12	5,72±0,1	5,69±0,11	5,7±0,06
43	6,63± 0,15	6,68±0,09***	6,8±0,16	6,7±0,07
44	6,86± 0,06	6,93±0,07	6,93±0,15***	6,91±0,05
45	6,96± 0,1	6,83±0,27	6,79±0,16	6,58±0,14
46	9,98± 0,73	10,47±0,33	10,2±0,65	10,28±0,29

Note:
* - difference is probable when comparing between asthenics and hypersthenics, p<0,05
** - difference is probable when comparing between normosthenics and hypersthenics, p<0,05
*** - difference is probable when comparing between male and female subjects within the same somatotype, p<0,05

The comparative analysis of the teeth size in the adolescents of different somatotypes has enabled to find out the following peculiarities. The 33rd tooth of hypersthenic females is of a greater mesiodistal dimension than that in the normosthenic (p <0.05) and asthenic females (p <0.001).

When comparing the mesiodistal teeth size of male subjects who had Angle's Class I malocclusion, we revealed the probable difference between the maxillary canines: they were of less size in asthenics than in hypersthenics (Table II). The upper left incisor in hypersthenic male subjects was larger than that of the asthenics and normosthenics (p <0.05)

By comparing the mesiodistal dimensions of the teeth of the upper and lower jaws in female and male subjects diagnosed with Angle's Class I malocclusion within the same constitutional body type, we have established that the most significant difference in parameters is observed normosthenic individuals. The dimensions of all canines in normosthenic males are probably larger than those in female subjects (p <0,05). The larger sizes have been found out as typical for the lower first right and left premolar, upper incisors and lower left molar (p <0,05).

The male adolescents of asthenic somatotype, in comparison with the females of the relevant somatotype show a difference in the size of the lower left canine (p <0.05). The hypersthenic male individuals when comparing with the females, demonstrate the large size of upper lateral incisors and the first right premolar (p <0,05).

CONCLUSIONS

Some peculiarities of mesiodistal size typical for adolescents with Angle's Class I malocclusion and their somatotypes should be taken into account in treatment planning and maintaining the stability of orthodontic treatment results.

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Authors' contributions:
According to the order of the Authorship.

Conflict of interest:
The Authors declare no conflict of interest.

CORRESPONDING AUTHOR

Dmytro V. Sheshukov
Ukrainian Medical Stomatological Academy
Shevchenko 23 str., 36011 Poltava, Ukraine
tel: +38095171145
e-mail: dimsheshukov@gmail.com

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