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Research Article

ADDITIONAL DIAGNOSTIC METHODS IN THE PROCESS OF ORTHODONTIC TREATMENT

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Abstract:

The aim of the study was to improve the efficiency of the final stage of orthodontic treatment.

The study included 32 patients. Patients of medical group were divided into two groups of 16 people in everyone. In this case –in each group there was a peer number of men and women. To all patients orthodontic treatment with use of breket-system of an active self-ligation of the equipment of a direct arch, with use at a stage of an adjustment of anthropometric system of quantitative assessment (The ABO Model Grading System) developed by the American Society of Orthodontists (The American Board of Orthodontics) in 1999 was carried out.

The first group was carried out treatment with conventional protocol. In the second group was conducted over fixing braces by indirect bonding in the early stages adjustment, after anthropometric measurements ABO methods.

Estimates of the efficiency of orthodontic treatment on the ABO system in the late stages of adjustment the second group was significantly lower than in the first ($p = 0,002248$; $p=0,023431$, respectively).

Thus, the application of the final stage anthropometric system quantify ABO followed over fixing incorrectly positioned brackets by indirect bonding, will provide decreasing the chance of emergence occlusion interference and will achieve accurate results of orthodontic treatment.

Key words: *orthodontic treatment, diagnosis, anthropometric studies, adjustment, central occlusion, centric relation*

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INTRODUCTION:

The structural features of the dentition and bones a facial skull [1, 2] diagnostics and treatment of pathologies the dentofacial of anomalies are studied rather in detail (Fadeyev R. A., 2002; Tokarevich I. V., 2005; Malygin Yu. M., 2011; Horoshilkina F. Ya., 2011; Arsenina O. I., 2012; Persin L. S., 2013), however a question of criteria of the end of orthodontic treatment remains poorly studied.

In 1879 one of the founders an orthodontia Edward Angle the first published the articles on classification of anomalies of an occlusion in which great attention is paid to a natural occlusion of dental. Then, in 1972 Lawrence Andrews offered six keys of a normal occlusion which became one of postulates by which many orthodontists at the final stage of orthodontic treatment are guided [3].

Desire of the American society of orthodontists (American Board of Orthodontics became a starting point of studying of an optimum occlusion — ABO) to frame system of criteria for evaluation of complete results of treatment, by assessment of plaster models and orthopantomograms [9]. At the moment this system has rather widespread use for the western colleagues [4, 5, 6, 7, 8] and is a little coverage in our country.

In literature available to use the insufficient amount of material concerning criteria of the end of orthodontic treatment was revealed. The analysis the Russian literature shows that else it is necessary to solve a series of the tactical tasks devoted to this question. Thus, insufficient amount of information how to define criteria of completeness of orthodontic treatment irrespective of preferences of the researcher formed the basis for this scientific research.

Measurements were performed on the following indicators:

1. Alignment of crowns of frontal teeth in the vestibulo-oral direction (fig. 1. a, b).

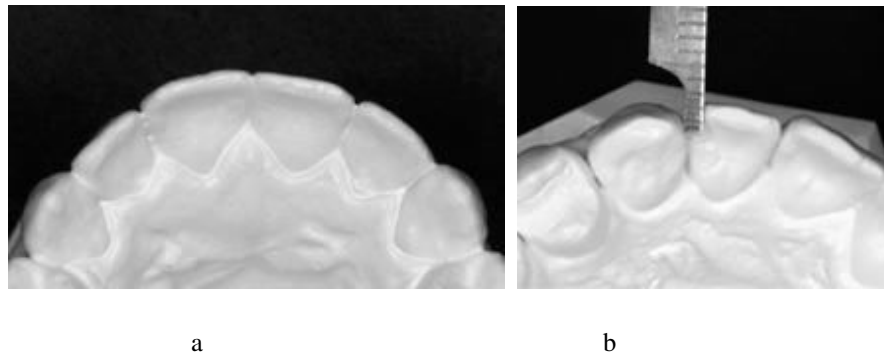


Fig. 1. Alignment of crowns of frontal teeth in the vestibulo-oral direction (a), an aberration (b).

Purpose

Improving the efficiency of orthodontic treatment, by use at the final stage of anthropometric system of quantitative assessment of diagnostic models.

MATERIALS AND METHODS

When performing a research 58 patients aged from 14 up to 35 years old with the diagnosis - dense position of teeth in the top and a mandible without disturbance of provision of gnathic bones were examined, of which 32 patients were included in medical group.

At selection in group the following criteria were used:

1. Age of patients of 14-35 years, period of a constant occlusion.
2. Patients at the orthodontist weren't treated earlier.
3. Dentoalveolar form an orthognathic occlusion.
4. Symmetric growth maxilla and mandible.
5. Dense position of teeth on maxilla and a mandible does not exceed 4 mm.
6. Lack of the impacted teeth according to an orthopantomography, except for the third molar teeth maxilla and a mandible.
7. Sanitized oral cavity. Safe anatomy of crowns of teeth.

Patients of medical group were divided into two groups of 16 people in everyone. In this case –in each group there was a peer number of men and women. To all patients orthodontic treatment with use of breket-system of an active self-ligation of the equipment of a direct arch, with use at a stage of an adjustment of anthropometric system of quantitative assessment (The ABO Model Grading System) developed by the American Society of Orthodontists (The American Board of Orthodontics) in 1999 was carried out.

2. alignment of crowns of side teeth in the vestibulo-oral direction (fig. 2. a, b).

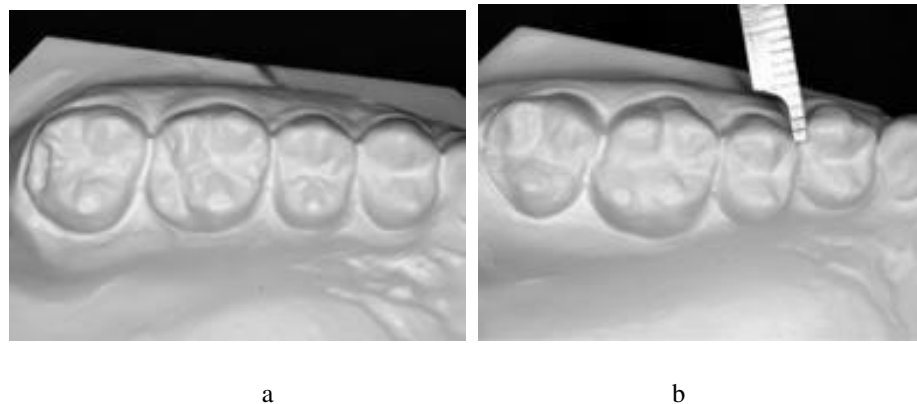


Fig. 2. Alignment of crowns of side teeth in the vestibulo-oral direction (a), an aberration (b).

3. Alignment of regional crests of side teeth in the vertical direction (fig. 3. a, b).

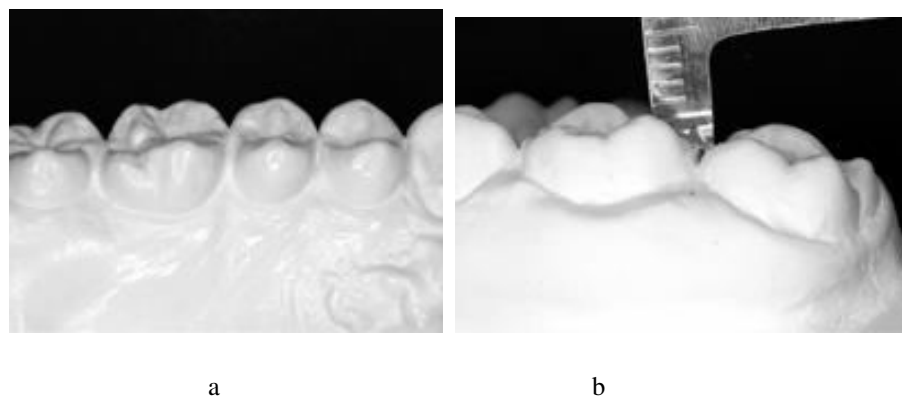


Fig. 3. Alignment of regional crests of side teeth in the vertical direction (a), an aberration (b).

4. Correct buccolingual inclination of side teeth (fig. 4. a, b).

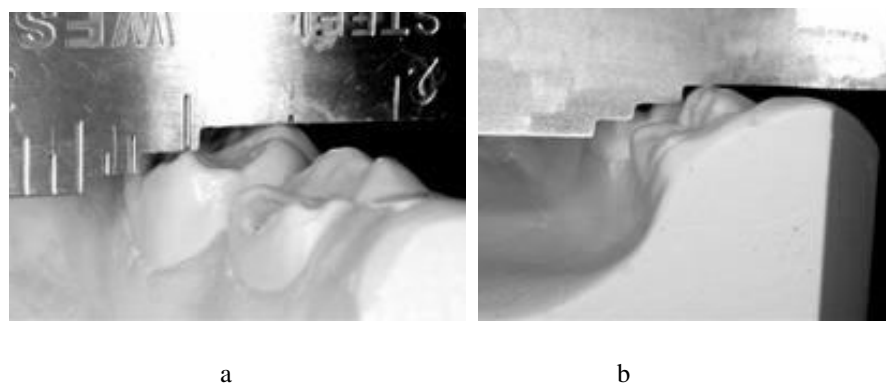


Fig. 4. A correct buccolingual inclination of side teeth on the lower jaw (a), an aberration (b).

- 5. Occlusal contacts in side departments (fig. 5 a, b).



Fig. 5. A correct occlusal contact in side departments (a), an aberration (b).

- 6. Occlusal relationship in side departments (fig. 6 a, b).

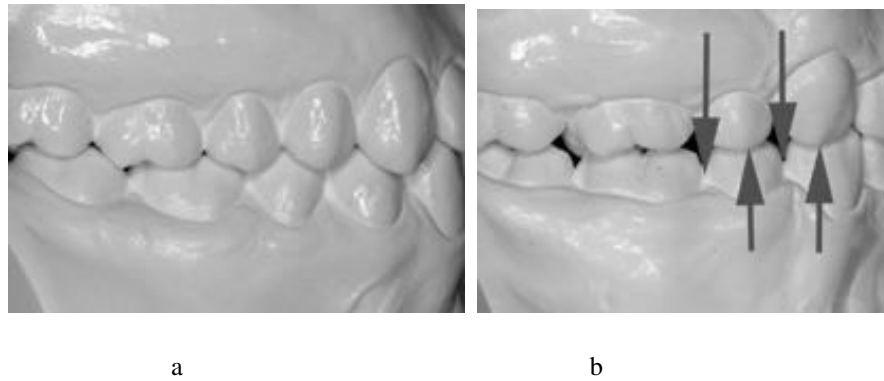


Fig. 6. A correct occlusal relationship in side departments (a), an aberration (b).

- 7. Interproximal contacts (fig. 7 a, b).

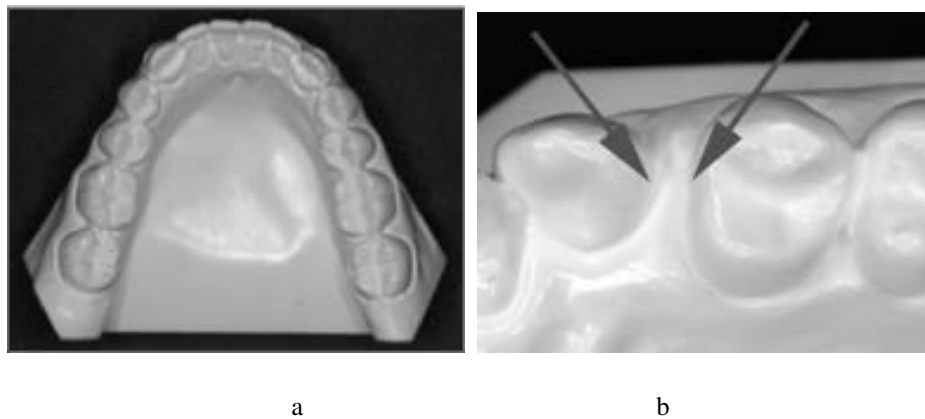


Fig. 7. Correct interproximal contacts (a), an aberrations (b).

The Variation and the statistical handling are carried out by the methods, commonly accepted for medicobiological researches: calculation of arithmetic averages of sizes, an average square

deviation, representativeness error for each parametes, comparison of the average sizes by criterion of U-Mann-Whitney and T-Wilcoxon with reliability of distinctions in case of ($p < 0,05$) by

means of a software package of EXEL 14.1.0 (Microsoft).

RESULTS AND DISCUSSION:

According to statistical handling, the researching groups at the beginning of the final stage of the treatment were uniformed in expressiveness of criteria of the ABO system.

When carrying out an anthropometrical research on the ABO system in 1 and 2 groups the following indicators of a percent age ratio of mistakes were revealed:

1. Violation a provision of crowns of teeth in the vestibulo-oral direction (rotation) (93,75%)
2. Violation of a ratio of regional crests of side teeth in the vertical direction (56,25%)
3. Buccolingual inclination of side teeth (75%)

4. Violation the oclusal of contacts in side departments (81,25%)

As showed on this research, the most amount of mistakes is are allowed in case of equalization of a provision of side group of teeth on the upper and lower jaw:

- Equalization of longitudinal fissures of the first painters on the upper jaw (96%),
- Equalization of longitudinal fissures of the second painters on the upper jaw (82%),
- Equalization of longitudinal fissures of the first painters on the lower jaw (63%),
- Equalization of longitudinal fissures of the second painters on the lower jaw (68%).

The efficiency evaluation of orthodontic treatment on the ABO system which at the end of a stage of an adjustment shown that in both groups statistically significant decrease in quantitative indices of mistakes at the final stage of treatment (tab. 1, 2).

Table 1: Quantitative indices of criteria of orthodontic treatment (ABO system) in a group 1 at the final stage of treatment

Criteria of ABO	Beginning of a stage of an adjustment		Finish of a stage of an adjustment		T-Wilcoxon	p- lever
	M	s	M	s		
equalization of crowns of frontal teeth in the vestibulo-oral direction	2,375	0,619139	0,5	0,516398	<0,00001	0,000438
equalization of crowns of lateral teeth in the vestibulo-oral direction	3,34375	0,768521	1,34375	0,831039	<0,00001	0,000438
equalization of marginal crests of lateral teeth in the vertical direction	1,65625	0,72385	0,5	0,7302	<0,00001	0,000655
correct bucco-lingual inclination of lateral teeth	2,125	0,903696	0,5625	0,629153	<0,00001	0,000438
occlusal contacts in side departments	2,03125	0,991106	0,625	0,82664	<0,00001	0,000438
occlusal ratios in side departments	2,25	1,032796	0,5625	0,981071	<0,00001	0,000438
interdental contacts	1,03125	1,175709	0,25	0,447214	0,00001	0,007686

Table 2: Quantitative indices of criteria of orthodontic treatment (ABO system) in a group 2 at the final stage of treatment

Criteria of ABO	Beginning of a stage of an adjustment		Finish of a stage of an adjustment		T-Wilcoxon	p-lever
	M	s	M	s		
equalization of crowns frontal teeth in the vestibulo-oral direction	2,40625	0,52341	0,1875	0,359398	<0,00001	0,000438
equalization of crowns lateral teeth in the vestibulo-oral	3,375	0,806226	0,4375	0,512348	<0,00001	0,000438
equalization of marginal crests of lateral teeth in vertical direction	1,65625	0,72385	0,34375	0,507239	<0,00001	0,000655
correct bucco-lingual inclination of lateral teeth	2,125	0,763763	0,03125	0,125000	<0,00001	0,000438
occlusal contacts side departments	2	0,774597	0,3125	0,478714	<0,00001	0,001474
occlusal ratios in side departments	2,25	0,816497	0,03125	0,125000	<0,00001	0,000438
interdental contacts	1,03125	0,921389	0,000000	0,000000	<0,00001	0,005062

However, it should be noted, at the end of the final stage of treatment an error of equalization of crowns of side teeth in the vestibulo-oral direction and a correctness of a buccolingual inclination of side teeth in group 2 were significantly lower in comparison with group 1 ($p=0,002248$; $p=0,023431$, respectively). Thus, in the 2nd group in the course of treatment of an error of equalization of crowns of side teeth in the vestibulo-oral direction and a correctness of a buccolingual inclination of side teeth decreased significantly more intensively in comparison with group 1 (fig. 8, 9) that can be regarded as an indicator of bigger efficiency of treatment in the 2nd group.

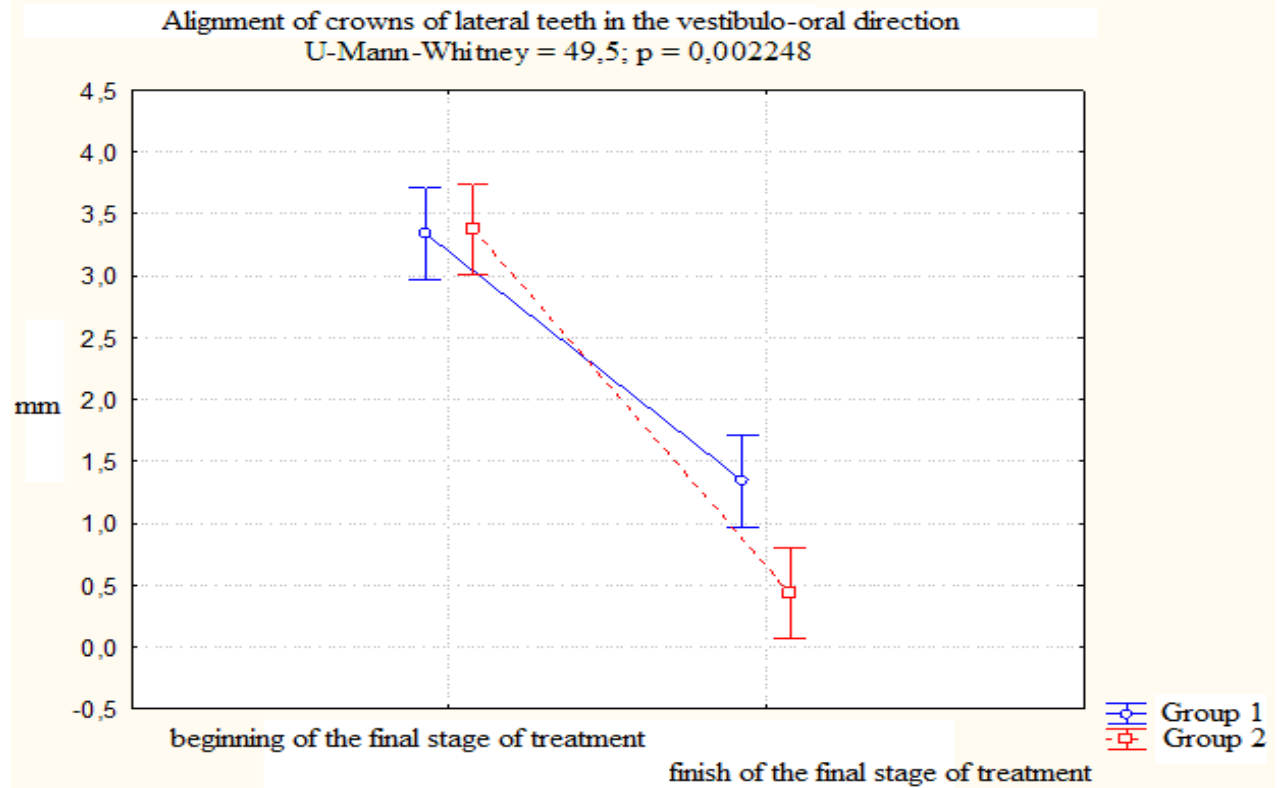


Fig. 8. Comparison of an indicator "alignment of crowns of side teeth in the vestibulo-oral direction" at patients 1 and 2 groups at the beginning and on the end of treatment.

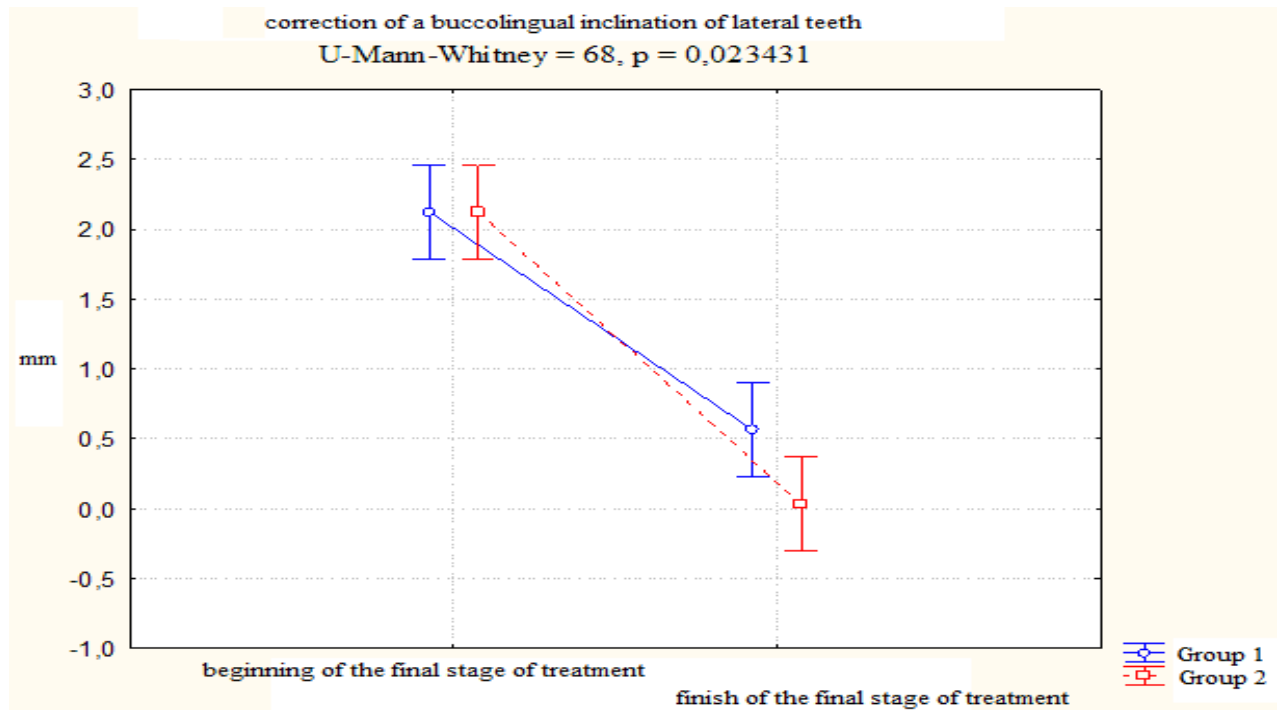


Fig. 9. Comparison of an indicator "a correct buccal and lingual inclination of side teeth" at patients 1 and 2 groups at the beginning and on the end of treatment.

CONCLUSION

Thus, the application of the final stage anthropometric system quantify ABO followed over fixing incorrectly positioned brackets by indirect bonding, will provide decreasing the chance of emergence occlusion interference and will achieve accurate results of orthodontic treatment.

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