

## **A STUDY ON CONGRUITY BETWEEN CLINICAL AND METRIC NORMS IN HUMAN DENTITION**

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### **SUMMARY:**

The relationship between dental-jaw system morphologic deviations and functional and esthetic disturbances, which may lead to aggravation of both general organism disorders and local periodontal pathologic alterations and early tooth loss, has focused the increasing attention of orthodontists. Our study aimed at examining the congruity between normal occlusion-articulation relations in permanent dentition of a patient sample defined as normal on prophylactic examinations and some metric methods used in orthodontics and anthropology, in order to establish if there were any metric changes in the dental arch, although the availability of normal occlusion relations. Our examinations in a sample of 60 subjects (aged between 14 and 30 years) found that for the norm of occlusion-articulation relations defined by Gerlach's method, congruity was observed in 75% of the cases; for the norm of transversal relations defined by Korkhaus' method, congruity was observed in 53.3% and for the norm of sagittal relations defined by Korkhaus' method – in 71.2% of the cases.

The anthropometric examinations showed that concerning palatal indices, the examined palates were most frequently brachystaphylic (85.6%) and mesostaphylic (14.4%), in conformity with the previously observed results for the Bulgarian population (2).

Palatal expansion was predominant in males and palatal compression – in females, a fact that could be related to general individual development.

The results showed that from a clinical point of view, the differentiation of a "normal group" including children with normal occlusion-articulation relations, is justifiable, although the availability of some metric deviations.

**Key words:** norms, human dentition, anthropometric examinations.

### **INTRODUCTION**

In recent years, the development of new differential-diagnostic methods for evaluation of jaw-facial disturbances has achieved marked success.

The relationship between dental-jaw system

morphologic deviations and functional and esthetic disturbances, which may lead to aggravation of both general organism disorders and local periodontal pathologic alterations and early tooth loss, has focused the increasing attention of orthodontists.

The tendency for precision in orthodontic diagnostics and the development of complex examination methods have allowed broadening of the term "norm".

According to Maliigin (5), the term "clinical norm" in the orofacial system has passed through several developmental stages – "norm", "average norm", "average individual norm", "integral norm", etc.

In their attempts to explain dental-jaw deformations, Grott and Korkhaus (5) have opposed the term "biometric norm" to that of "integral norm".

Katz has proposed the introduction of the term "functional norm".

According to Maliigin, the main tendency in orthodontic treatment process should be focused on achieving a morphological, functional and esthetic balance in the orofacial system.

Our present study aimed at examining the congruity between normal occlusion-articulation relations in permanent dentition of a patient sample defined as normal on prophylactic examinations and some metric methods used in orthodontics and anthropology, in order to establish if there were any metric changes in the dental arch, although the availability of normal occlusion relations.

### **MATERIALS AND METHODS**

Our sample included 60 subjects of both genders, aged between 14 and 30 years, and with normal occlusion-articulation relations. Maxillary and mandibular alginate dental impressions were taken from all subjects. Metric examinations on plaster dental casts following the methods of Korkhaus (1), Gerlach (6) and Martin-Saller (2) were carried out. For precise assessment of the deviations from the raphe-median line, an apparatus for symmetric measurement Korkhaus was used in performing the measurements after Korkhaus; a caliper-palatometer after Krumova (4) was used for the anthropometric examinations.

In performing the measurements after Korkhaus, a

1mm-deviation was accepted as normal.

Using the method of Gerlach, the ratio between the anterior segment (the sum of the mesiodistal maxillary and mandibular ratios) and the chords of lateral segments (canine, premolar and first molar) were assessed. As stated by the author, a 3%-deviation was accepted as normal.

According to the method of Tonn, the ratio of 1.35 could be accepted as an average norm.

Following the method of Martin-Saller, 6 palatal and 8 cephalic-facial dimensions were measured and 2 palatal and 4 cephalic-facial indices (a cephalic index, a morphological facial index, a morphological upper-facial index and a cheek-bone-jaw index) were calculated.

## RESULTS AND DISCUSSION

The performed complex metric examinations showed that the method of Gerlach had the highest value for a normal relation. In our sample of 60 individuals, the anterior segment-lateral segments ratio was within the normal range in 75% of the patients. A lower value of anterior segment deviations was detected in 20.5% and a higher value – in 4.5% of the patients. These results confirmed the regular shape of the dental rows and the symmetry of their segments.

More expressed deviations from the accepted norm were found as compared to Korkhaus' method, which is a basic diagnostic method in orthodontics (**table 1**). For the maxillary premolar region, no deviations were found in 53.3% of the cases, while for the maxillary molar region, normal ratios and asymmetric expansion were established in an equal number of cases - 31.1%. For the maxilla, the

total number of expansion and asymmetric expansion cases were higher than the number of compression cases, the latter being mostly asymmetric too. For the mandible, normal ratios were established for an almost equal number of premolar and molar segments (51.1% : 42.2%, respectively). The difference between the number of mandibular compression and expansion cases was insignificant, with a slight prevalence of compression cases. The results showed that compression was more frequently observed in mandible while expansion – in maxilla. In metric examinations after Korkhaus, a difference by gender was established: the expansion was predominant in males and compression – in females.

The sagittal measurements after Korkhaus showed that for the maxilla, normal values were assessed in 71.2%, retrusion in 20% and protrusion in 8.8% of the cases. For the mandible, normal values were found in 75.6%, retrusion in 13.3% and protrusion in 11.1% of the cases.

The anthropometric examinations showed that concerning palatal indices, the examined palates were most frequently brachystaphylic (85.6%) and mesostaphylic (14.4%), in conformity with the results for the Bulgarian population observed by Yordanov (2). As for facial indices, our sample presented mean values close to the established for the Bulgarian population (3). According to the cephalic index, the subjects were mesocephalic and brachycephalic; according to the morphological facial index, most frequent were the mesoprosopic and europrosopic characteristics; and according to the cheek-bone- jaw index, the subjects were of average and short facial type.

**Table 1**

Indices		Maxilla		Mandible	
		P : P	M : M	P : P	M : M
Norm		53.3	31.1	51.1	42.2
Expansion	symmetric	8.9	8.9	2.2	6.7
	assymmetric	22.2	31.1	17.8	24.4
Compression	symmetric	6.7	6.6	2.2	6.7
	assymmetric	8.9	22.2	26.7	20.0

## CONCLUSIONS

1. The performed examinations found that for the norm of occlusion-articulation relations defined by Gerlach's method, congruity was observed in 75% of the cases; for the norm of transversal relations defined by Korkhaus' method, congruity was observed in 53.3% and for the norm of sagittal relations defined by Korkhaus' method in 71.2% of the cases.

2. A certain correlation between the transversal and

sagittal relations was observed: in compression cases, protrusion was more frequent while in expansion cases, retrusion was more common.

3. Palatal expansion was predominant in males and palatal compression – in females, a fact that could be related to general individual development.

4. In both jaws, asymmetric deviations were more frequent, an observation that was associated with the asymmetric widths (mesiodistal diameters of teeth) and the

overall asymmetry of the human body.

5. The obtained results and the predominance of certain metric deviations showed that the differentiation of a “normal group” including children with normal occlusion-articulation relations is justifiable from a clinical point of view.

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