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## FEATURES LINEAR COMPUTED TOMOGRAPHY SIZES OF LARGE MOLAR TEETH AND THEIR ROOTS IN PRACTICALLY HEALTHY MEN FROM UKRAINE WITH DIFFERENT TYPES OF FACES

**Summary.** *In practically healthy men of Ukraine with a middle face type in the upper jaw, in most cases smaller values of the following sizes of large angular teeth are found: mesio-distal size of crowns of teeth than those with wide and narrow facials, mesio-distal size of the neck of the right second tooth, than those with wide faces, the height of the crown of the right and left first teeth, than those with narrow and very narrow faces, the length of the palatal root of the right second tooth than the representatives of wide face; and men with a very narrow face have lower values the mesio-distal size of the neck of the right and left second teeth, than those with wide faces, the mesio-distal size of the crown of the right second tooth than those of the representatives with a wide face and the length of the vestibular distal root of the right second tooth than those with narrow and medium faces. In the lower jaw in men with average face type, in the majority of cases smaller values of the following sizes of large angular teeth are set: the height of the right and left second teeth than those with very narrow and narrow faces, the length of the distal root of the right and left other teeth than the representatives with wide, very narrow and narrow types of faces, the length of the near root of the left second tooth than those with a very narrow face, the vestibular-lingual size of the crown of the right and left second teeth than the representation with a wide type of person.*

**Key words:** *large molar teeth, linear computed tomography, practically healthy men, face type.*

### Introduction

The development of instrumental research methods and the improvement of knowledge about variations, features of the structure of the teeth improved the ability to provide dental care [14, 15, 20, 22]. However, despite this, the introduction of new data from pilot studies has not yet become widely used, especially in Ukraine. One of the reasons for this is the inadequate depth of research that does not take into account all the indicators necessary for a full-fledged work with the patient [3, 10, 17].

Restoration of teeth requires taking into account many anthropological features of the patient to create complete harmony between his face and teeth. That is why the aesthetic result is evaluated only when it is considered not an isolated portion of the oral cavity, but the whole person's face [12, 19]. That is why cephalometric studies should be used at all stages of orthodontic treatment [2].

Currently, morphometric parameters of the tooth-jaw system are studied in great detail, depending on the cephalometric indices at different pathological conditions [4, 13, 16]. At the same time, information on the linear dimensions of large angular teeth and their roots in a practically healthy population of Ukraine with physiological occlusion, depending on the types of person to the present moment, are not complete and systematic.

The *purpose* of the study is to determine the features of CT-sizes of large molar teeth in practically healthy men of Ukraine with different types of faces.

### Materials and methods

On the basis of the medical center "Wini ntermed LTD", 200 somatologically healthy men aged from 19 to 35 years from different administrative regions of Ukraine done a cone-ray computer tomography using the Veraviewepocs-3D dental cone beam tomograph (Morita, Japan). The volume of a three-dimensional image is a cylinder - 8x8 cm, a layer thickness - 0,2/0,125 mm, an irradiation dose - 0,011-0,048 mSv, a voltage and current strength - 60-90kV/2-10mA. The study of a three-dimensional model of bone structure of the tooth-jaw complex was carried out in the i-Dixel One Volume Viewer (Ver. 1.5.0, J Morita Mfg. Cor.). Bioethics Committee of National Pirogov Memorial Medical University, Vinnytsya (protocol № 8 dated 10.09.2013) found that the studies fully met ethical and moral-legal requirements in accordance with the order of the Ministry of Health of Ukraine № 281 of 01.11.2000 and do not contradict the basic bioethical norms of the Helsinki Declaration, the Council of Europe Convention Human Rights and Biomedicine (1977).

On cone-ray computer tomograms of large angular teeth of the upper and lower jaws measurements were made: height of the corresponding tooth (HZ); length of palatine (HRZ1), vestibular of nearest (HRZ2) and distant (HRZ3) roots of large angular teeth of upper jaw; the length of the neighbor's (HRZ4) and distant (HRZ5) roots of the large angular teeth of the mandible; height of the crown of the corresponding tooth (HKZ); vestibular-lingual crown sizes

(VO\_K) and neck (VO\_S) of the corresponding tooth; mesio-distal dimensions of the crown (MD\_K) and neck (MD\_S) of the corresponding tooth.

The cephalometric study consisted of determining the parameters of the cerebral and facial sections of the head with the help of a large sliding compass with a scale in the real size of the Martin system and soft centimeter ribbon. Cephalometric studies were conducted taking into account the generally accepted recommendations and anatomical points [1, 5]. The value of the face index (Garson morphological index) was obtained by the corresponding formula [18]. At the meaning of the indicator by 78.9 men were grouped to very broad face; 79,0-83,9 - wide face; 84.0-87.9 - middle face; 88,0-92,9 - narrow face; 93.0 and more - very narrow face. The following distribution established: with a very wide face - 4; with a wide face - 17; with middle face - 36; with a narrow face - 53; with a very narrow face - 90.

Statistical processing of the obtained results was carried out using the statistical software package "Statistica 6.1" using nonparametric methods. Mean values and their standard deviations were determined. The reliability of the difference between independent quantitative values was determined using the Man-Whitney U-criterion.

### Results. Discussion

In the analysis of CT-size large angular teeth and their roots in men with *different types of faces* established (Table 1):

on the *upper jaw - in men with middle face type*, in most cases the mesio-distal size of the crown of the large corner teeth (with the exception of the left second) is significantly lower or tends to lower values than those with a *wide* (by 3,10-4,45 %,  $p < 0,05$ ) and *narrow* (except for the right second by 2,74 and 1,28 %,  $p < 0,05$ ,  $p = 0,054$ ) face types, the mesio-distal size of the neck of the right second large corner tooth is significantly lower, than in the representatives with *wide* (4,77 %,  $p < 0,05$ ) face, height of the crown of the right and left first large angular teeth tend to lower values than those with *narrow* (by 5,34 and 4,01 %,  $p = 0,073-0,080$ ) and *very narrow* (only right 5,69 %,  $p = 0,066$ ) face, and vestibular-lingual the size of the neck of the right second large angular tooth, on the contrary, tends to be higher than that of the representatives with a *narrow* (6,30%,  $p = 0,066$ ) and *very narrow* (5,32%,  $p = 0,071$ ) faces, palatine length the root of the right-hand second large corner tooth tends to be lower than that of the representatives with a *broad* (by 7,60%,  $p = 0,073$ ) face type; in men with a *very narrow face* the mesio-distal size of the neck of the right and left other large angular teeth is significantly lower than that of the representatives with *wide* (by 4,69 and 4,37%,  $p < 0,05$ ) faces, mesio-distal crown size the right of the second large corner tooth tends to lower values than those with a *broad* face (by 3,21%,  $p = 0,058$ ), and the length of the vestibular distant root of the right second large molar tooth is significantly lower or tends to be lower than that of representatives with a *narrow* (6,85%,  $p < 0,05$ ) and *average* (by 6,28 %,  $p = 0,052$ ) face types;

on the *lower jaw* - in men with *middle face type*, the

**Table 1.** Differences in CT-sizes of large angular teeth and their roots in practically healthy men of Ukraine with different types of faces.

Indexes	Maxilla				Mandible				Indexes
	Wf	Af	Nf	VNf	Wf	Af	Nf	VNf	
17_HZ						▼		▲	37_HZ
17_HKZ									37_HKZ
17_MD_K	▲↑	▼		↓					37_MD_K
17_MD_S	▲	▼		▼					37_MD_S
17_VO_K					↑	↓			37_VO_K
17_VO_S		↑	↓	↓					37_VO_S
17_HRZ1	↑	↓				↓		↑	37_HRZ4
17_HRZ2					▲	▼		▲	37_HRZ5
17_HRZ3		↑	▲	▼↓					
16_HZ									36_HZ
16_HKZ		↓	↑	↑					36_HKZ
16_MD_K	▲	▼↓	↑						36_MD_K
16_MD_S									36_MD_S
16_VO_K									36_VO_K
16_VO_S									36_VO_S
16_HRZ1									36_HRZ4
16_HRZ2									36_HRZ5
16_HRZ3									
26_HZ									46_HZ
26_HKZ		↓	↑						46_HKZ
26_MD_K	▲	▼	▲						46_MD_K
26_MD_S									46_MD_S
26_VO_K									46_VO_K
26_VO_S									46_VO_S
26_HRZ1									46_HRZ4
26_HRZ2									46_HRZ5
26_HRZ3									
27_HZ						▼↓	↑	▲	47_HZ
27_HKZ									47_HKZ
27_MD_K									47_MD_K
27_MD_S	▲			▼					47_MD_S
27_VO_K					↑	↓			47_VO_K
27_VO_S									47_VO_S
27_HRZ1									47_HRZ4
27_HRZ2					↑	▼↓	↑	▲	47_HRZ5
27_HRZ3									

**Note:** Wf - wide face; Af - average face; Nf - narrow face; VNf - very narrow face; 16- - upper right first large angular tooth; 17- - upper right second large angular tooth; 26- - the upper left first large angular tooth; 27- - the upper left second large angular tooth; 36- - the lower left first large angular tooth; 37- - the lower left second large angular tooth; 46- - the lower right first large angular tooth; 47- - lower right second large angular tooth.

height of the right and left second large corner teeth is significantly lower or tends to lower values than those with

*very narrow* (by 3,74 and 4,25%,  $p < 0,05$ ) and *narrow* (only the left at 3,33%,  $p = 0,070$ ) face, the length of the distant root of the right and left second large angular teeth is significantly lower or tends to lower values than those with *broad* (by 5,45 and 5,04 %,  $p < 0,05$ ,  $p = 0,078$ ), *very narrow* (by 4,96 and 5,11%,  $p < 0,05$ ) and *narrow* (by 4,97%,  $p = 0,079$ ) face types, and length the nearest second lower left root large corner tooth tends to lower values than those with a *very narrow* face (4.04%,  $p = 0.052$ ), the vestibular-lingual size of the crown of the right and left other large corner teeth tends to be lower than that of the representatives with a *broad* (by 4,43 and 5,23%,  $p = 0,067-0,078$ ) face type (see Table 1).

According to the results of the research A. A. Glushak [7-9] and L. M. Lomiashvili and D. V. Pogodaev [11] it is known that the proportionality of individual parts of the face in relation to the dimensional characteristics of the teeth most often manifests itself in the area of the anterior group of teeth. And the results of studies by other scientists [6, 19] indicate that the size of the chewing group of teeth is more closely related to the size of the mandible: mesio-distal and vestibular-lingual dimensions of large angular teeth have a direct relationship with the longitudinal dimensions of the lower branch jaws, and the length of the roots of the teeth - with the height of the alveolar part of the mandible.

It should be noted that M. M. Shinkaruk-Dykovytska and V. O. Orlovskyy [21] in practically healthy men with different facial types have established a small number of differences in the linear dimensions of small angular teeth and their roots: vestibular-lingual size of the cervix of the left and right upper second small angular teeth in men of average face type are significantly higher in comparison with men with wide and narrow and very narrow faces and the mesio-distal size of the neck of these teeth in narrow-faced men is significantly more comparable in man with a wide face.

## Conclusions and perspectives of further development

1. In the upper jaw of men with average face type, in the majority of cases smaller values of the following sizes of

large angular teeth are established: the mesio-distal size of the crown of the teeth, than in the representatives with wide (by 3,10-4,45 %,  $p < 0,05$ ) and narrow (except for the right second by 2,74 and 1,28 %,  $p < 0,05$ ,  $p = 0.054$ ) face types, mesio-distal size of the neck of the right second tooth than those with wide (4,77 %,  $p < 0,05$ ) face; the height of the crown of the right and left first teeth than the representatives with narrow (by 5,34 and 4,01 %,  $p = 0,073-0,080$ ) and very narrow (only right 5,69 %,  $p = 0,066$ ) face, length of palatine root of the right second tooth than that of the representatives with a broad (7,60%,  $p = 0,073$ ) face type; and men with a very narrow face have lower values - mesio-distal size of the neck of the right and left second teeth than those with wide (4,69 and 4,37 %,  $p < 0,05$ ) faces, mesio-distal dimensions crowns of the right second tooth than those with wide faces (3,21 %,  $p = 0,058$ ) and the length of the vestibular distant root of the right second tooth than those with narrow (6,85 %,  $p < 0,05$ ) and the average (by 6,28 %,  $p = 0,052$ ) types of faces.

2. In the lower jaw in men with average face type, in the majority of cases smaller values of the following sizes of large corner teeth are set: the height of the right and left second teeth than those with very narrow (3,74 and 4,25 %,  $p < 0,05$ ) and narrow (only left by 3,33 %,  $p = 0,070$ ) face, the length of the distant root of the right and left second teeth than those with broad (5,45 and 5,04 %,  $p < 0,05$ ,  $p = 0,078$ ), very narrow (4,96 and 5,11 %,  $p < 0,05$ ) and narrow (4,97 %,  $p = 0,079$ ) facial types, the length of the neighbor root of the left second tooth than those of very narrow (by 4,04 %,  $p = 0,052$ ) face, vestibular-lingual crown-size of right and left second teeth than that of a broad (by 4,43 and 5,23 %,  $p = 0,067-0,078$ ) face type.

The prospects for further research are that the study of the differences in the linear dimensions of large corner teeth and their roots in a practically healthy population of Ukraine with different types of face will reveal the patterns of their anatomical-topographical and constitutional variability in persons with physiological bite, which, in turn, will allow to improve the aesthetic result of restoration of teeth.

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#### ОСОБЛИВОСТІ ЛІНІЙНИХ КОМП'ЮТЕРНО-ТОМОГРАФІЧНИХ РОЗМІРІВ ВЕЛИКИХ КУТНИХ ЗУБІВ ТА ЇХ КОРЕНІВ У ПРАКТИЧНО ЗДОРОВИХ ЧОЛОВІКІВ УКРАЇНИ З РІЗНИМИ ТИПАМИ ОБЛИЧЧЯ

**Резюме.** У практично здорових чоловіків України із середнім типом обличчя на верхній щелепі в більшості випадків встановлені менші значення наступних розмірів великих кутніх зубів: мезіо-дистального розміру коронки зубів, ніж у представників із широким та вузьким типами обличчя, мезіо-дистального розміру шийки правого другого зуба, ніж у представників із широким обличчям, висоти коронки правого і лівого перших зубів, ніж у представників із вузьким та дуже вузьким обличчям, довжини піднебінного кореня правого другого зуба, ніж у представників із широким типом обличчя; а у чоловіків із дуже вузьким обличчям встановлені менші значення - мезіо-дистального розміру шийки правого і лівого других зубів, ніж у представників із широким обличчям, мезіо-дистального розміру коронки правого другого зуба, ніж у представників із широким обличчям та довжини присінкового дальнього кореня правого другого зуба, ніж у представників із вузьким та середнім типами обличчя. На нижній щелепі у чоловіків із середнім типом обличчя в більшості випадків встановлені менші значення наступних розмірів великих кутніх зубів: висоти правого і лівого других зубів, ніж у представників із дуже вузьким та вузьким обличчям, довжини дальнього кореня правого і лівого других зубів, ніж у представників із широким, дуже вузьким та вузьким типами обличчя, довжини ближнього кореня лівого другого зуба, ніж у представників із дуже вузьким обличчям, присінково-язикового розміру коронки правого і лівого других зубів, ніж у представників із широким типом обличчя.

**Ключові слова:** великі кутні зуби, лінійні розміри, комп'ютерна томографія, практично здорові чоловіки, тип обличчя.

**Шинкарук-Диковицькая М.М., Коцюра О.А., Черкасова Е.В.**

#### ОСОБЕННОСТИ ЛИНЕЙНЫХ КОМПЬЮТЕРНО-ТОМОГРАФИЧЕСКИХ РАЗМЕРОВ БОЛЬШИХ КОРЕННЫХ ЗУБОВ И ИХ КОРНЕЙ У ПРАКТИЧЕСКИ ЗДОРОВЫХ МУЖЧИН УКРАИНЫ С РАЗНЫМИ ТИПАМИ ЛИЦА

**Резюме.** У практически здоровых мужчин Украины со средним типом лица на верхней челюсти в большинстве случаев установлены меньшие значения следующих размеров больших коренных зубов: мезио-дистального размера коронки зубов, нежели у представителей с широким и узким типами лица, мезио-дистального размера шейки правого второго зуба, нежели у представителей с широким лицом, высоты коронки правого и левого первых зубов, нежели у представителей с узким и очень узким лицом, длины небного корня правого второго зуба, нежели у представителей с широким типом лица; а у мужчин с очень узким лицом установлены меньшие значения - мезио-дистального размера шейки правого и левого вторых зубов, нежели у представителей с широким лицом, мезио-дистального размера коронки правого второго зуба, нежели у представителей с широким лицом и длины преддверного дальнего корня правого второго зуба, нежели у представителей с узким и средним типами лица. На нижней челюсти у мужчин со средним типом лица в большинстве случаев установлены меньшие значения следующих размеров больших коренных зубов: высоты правого и левого вторых зубов, нежели у представителей с очень узким и узким лицом, длины дальнего корня правого и левого вторых зубов, нежели у представителей с широким, очень узким и узким типами лица, длины ближнего корня левого второго зуба, нежели у представителей с очень узким лицом, преддверно-язикового размера коронки правого и левого вторых зубов, нежели у представителей с широким типом лица.

**Ключевые слова:** большие коренные зубы, линейные размеры, компьютерная томография, практически здоровые мужчины, тип лица.

Reviewer - Prof. Gunas I.V.

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