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PECULIARITIES OF THE SHAPE AND SIZE OF THE MANDIBLE AND THE LOWER DENTITION WITH TAKING INTO ACCOUNT GENDER AND CRANIOTYPE

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The aim of the study: *establishment of actual intravital craniometric characteristics of the shape and dimensions of the mandible and lower dentition of an adult person depending on gender and craniotype.*
Research materials and methods: *the work used dry bone preparations of whole or fragmented human skulls of both sexes in the amount of 39 units, from the collection of the Department of Human Anatomy of the Kharkiv National Medical University, and the results of CT studies of the head of adult people without existing bone tissue pathologies, totaling 85 observations. The basis of establishing a craniotype is the principle of calculating the general facial or facial index, which allows classifying anatomical objects according to the shape of the head structure.*
Research results: *the straight length of the mandible in adult leptoprosops males is from 88.5 mm to 102.4 mm, for women – from 86.3 mm to 100.7 mm; in mesoprosops men, this parameter gradually decreases to the level – from 81.3 mm to 95.7 mm, in women – from 80.7 mm to 94.9 mm; in euryprosops, the index is the smallest and ranges from 79.7 mm to 91.5 mm in males and from 78.5 mm to 90.8 mm in females. The opposite trend with significant ranges of variation is established for the angular width of the bone. Thus, in male leptoprosops, this parameter was determined from 84.6 mm to 97.5 mm, in female representatives – from 83.6 mm to 96.3 mm; in mesoprosops men, it increased from 89.1 mm to 105.3 mm, in women – from 87.9 mm to 103.1 mm; in euryprosops, regardless of sex, it reached its peak values, from 94.5 mm to 116.1 mm and from 92.7 mm to 114.1 mm, respectively. The height of the mandibular body also showed a certain dependence on the type of skull structure, in leptoprosops men it tended to the highest values and was fixed at the level from 29.1 mm to 38.9 mm, as well as in women – from 27.5 mm to 37.8 mm; at the same time, in mesoprosops men, the size decreased from 25.9 mm to 36.3 mm, in women, in turn, from 24.6 mm to 35.1 mm; in euryprosops men, this parameter ranged from 22.3 mm to 33.1 mm, and next to women – from 21.9 mm to 31.9 mm, it was at the level of the lowest indicators. When analyzing such a complex and multidirectional parameter as the arch of the mandible, it was also possible to obtain a characteristic of its dependence on the type of structure of the facial department of the skull. It was established that the range with the smallest values of the length of the arc is characteristic of leptoprosops, ranging from 135.8 mm to 149.4 mm in males and from 133.5 mm to 147.3 mm in females; average indices are characteristic of men – from 139.1 mm to 154.6 mm and women – from 136.4 mm to 151.2 mm with a mesoprosopic craniotype; in euryprosops of both sexes, the index tends to the greatest values at the level of 141.2 mm to 158.3 mm and from 139.7 mm to 155.7 mm, respectively.*
Conclusions*: the main craniometric parameters of the mandible are significantly dependent on the type of structure of the facial department of the skull. Thus, the leptoprosopic craniotype is characterized by maximum values of longitudinal and height dimensions with minimal indicators of width and arc length. Mesoprosops are characterized by the definition of intermediate, averaged values equidistant from marginal, terminal forms. In representatives with the euryprosopic type of skull structure, a significant decrease in the length and height of the jaw with a significant increase, up to the maximum values, width and length of the arch was observed. At the same time, unlike leptoprosops, which had a shortened and pointed arch, in euryprosops, the arch tended to be smoothed and lengthened. The assessment by sex leads to the fact that all sizes of the lower jaw predominate in men, but, nevertheless, a certain number of differences in indicators were within the limits of statistical error, which does not allow making absolute conclusions in this matter*
Keywords: *individual anatomical variability, craniotype, craniometry, mandible, lower dentition*

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1. Introduction

The lower jaw is the largest unpaired and the only movable bone of the facial part of the skull, which plays an important role in the formation of the face, due to the lower dentition, as its component, takes a direct part in the formation of the properties of the maxillofacial apparatus [1]. Each structural element of the lower jaw is characterized by a certain range of variations depending on gender and age [2, 3]. Considering the complexity of the structure of the visceral skull and the location in it of a number of extremely important organs and vascular-nerve bundles, this area will always be the focus of attention of specialists in maxillofacial, plastic surgery, orthodontics, from the standpoint of developing and performing the latest methods of surgical manipulations [4, 5]. Separately, it should be noted that the actual problem of practical medicine is the individualization or personalization of the approach to the treatment of each patient, therefore, morphological studies of individual anatomical variability of the structural elements of the skull are becoming increasingly relevant [6, 7]. In addition, it is necessary to consider the rapid development of modern systems of instrumental research, which make it possible to obtain intravital craniometric characteristics of any structural component of the skull, and to determine all the necessary data regarding its shape, size or position [8, 9]. Thus, the work devoted to the intravital analysis of the features of the shape and dimensions of the lower jaw and the lower dentition, considering gender and craniotype, is extremely relevant and necessary.

The aim of the research. To establish the actual lifetime craniometric characteristics of the shape and dimensions of the lower jaw and the lower dentition of a mature person, depending on gender and craniotype.

2. Materials and methods of the research

The material for the study was 39 dry bone preparations of a complete or fragmented human skull of both sexes, from the collection of the Department of Human Anatomy of the Kharkiv National Medical University, and 85 results of CT scans of the head of mature people without existing bone tissue pathologies. The conducted research (2020-2024) was carried out in accordance with the recommendations on "Observance of ethical and legislative norms and requirements when performing scientific morphological research". The conclusions of the Commission on Biomedical Ethics of the Kharkiv National Medical University of the Ministry of Health of Ukraine (protocol No. 9 of September 14, 2020) were received, which stated that the materials provided for the examination were scientifically substantiated, the research methods described in the dissertation were used with respect for human rights, in accordance with the current legislation in Ukraine, meet international ethical requirements and do not violate ethical norms in science and standards for conducting biomedical research.

In our work, a classification of the age periodization of a person's life is used, where men are 22–60 years old, and women are 21–55 years old. This classification is recommended by the Ministry of Health of Ukraine (letter No. 08.01-22/2472 dated December 9, 2008).

While carrying out craniometric studies of dry bone preparations, a set of measuring equipment was used, which was metrologically provided during the performance of research work. To carry out craniometric analysis of the results of CT studies, we used the software Ez3D Plus 3D CD Viewer ver. 1.2.6.20, which was included in the license package of programs used on the tomograph where the research was conducted. To clarify the obtained data or to carry out more complex measurements of the results of CT studies, a modern system of three-dimensional anatomical visualization Anatomage table was used, which is located based on the department of human anatomy, clinical anatomy and operative surgery of KNMU with the installed Launching Table 6.0 Application program. This system allows for the analysis of craniotomograms with high resolution, which is extremely necessary when measuring small structures and significantly expands the possibilities of the researcher.

Our work is devoted to establishing signs of individual anatomical variability of structures related to the facial part of the skull, therefore it is not advisable to use craniotyping by the main index. For these structures, a more favourable craniotyping obtained by calculating the main facial index according to the Garson-Kolman formula:

The height of the facial part of the skull:

$$\text{Ind}_{m.f.i.} = \frac{\text{Face height } (n-gn)}{\text{Face width } (zy-zy)} * 100.$$

This index makes it possible to divide the material according to the following craniotypes: euryprozopes (broad-faced) – 84.9 and less; mesoprosopes (medium forms) – from 85.0 to 89.9; leptoprosopes (long or narrow face shapes) – 90.0 or more.

In some cases (absence of the lower jaw or teeth), a different formula was used to calculate the facial index:

$$\text{Ind}_{f.i.} = \frac{\text{The height of the upper part of the face } (n-pr)}{\text{Face width } (zy-zy)} * 100.$$

According to this formula, craniotyping takes place according to other values, namely:

euryprozopes (broad-faced) – 49.9 and less;

mesoprosopes (medium forms) – from 50.0 to 54.9;

leptoprosopes (long or narrow face shapes) – 55.0 or more.

We determined a number of sizes of the lower jaw, generally recognized among craniologists, which include:

a) straight length – the distance from the gnathion (gn) to the gonion (go);

b) projection length from the corners – the size from the pogonion (pg) to the middle of the line connecting both gonions (angular width);

c) the arch of the lower jaw is not a linear dimension that runs from one gonion on the outer surface through the pogonion to the gonion on the other side;

d) angular width is the distance between two gonions;

e) the chin protrusion angle is the angle formed by the pogonion line (pg) – the infradental point (id) and the ear-orbital horizontal line;

f) the angle of the branch of the lower jaw is the angle formed by the lines passing in the basal plane and the plane tangent to the back surface of the branch of the jaw;

g) the height of the body of the jaw is the direct distance from the lower edge to the outer alveolar edge at the level of the chin opening;

h) the height of the branch of the lower jaw is the size from the gonion (go) to the highest point of the condyle of the lower jaw, which is parallel to the back edge of the branch.

A schematic representation of the measurements performed on the lower jaw and the lower alveolar process is presented in Fig. 1.

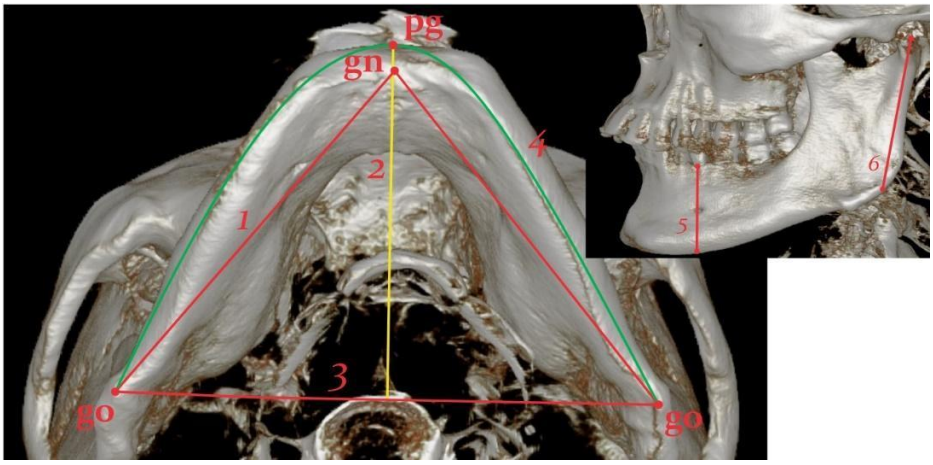

Fig. 1. Determination of craniometric parameters (dimensions) of the lower jaw: 1 – straight length; 2 – projection length from the corners; 3 – angular width; 4 – arch of the lower jaw; 5 – height of the jaw body; 6 – the height of the branch of the lower jaw

Statistical processing of the digital array of the received data was carried out using Statistica 13.5.0.17 (trial version) and Microsoft Excel corporate package MS 365. To process the received data, statistical methods of summary and grouping, tabular and graphic methods, as well as the method of variation research were used. Student's criterion was used in the work.

3. Research results

The lower jaw refers to the movable, unpaired bones of the facial part of the skull, which has a complex structure, is a receptacle for the lower tooth row and directly affects the shape and structure of the face and the dento-maxillofacial apparatus. In our study, we established the ranges of the total sizes of this bone, considering the gender and the existing craniotype (Table 1).

Table 1

The range of sizes of the lower jaw of a mature person (mm)

Studied indicator \ Craniotype		Leptoprosopes	Mesoprosopes	Euryprosopes
Straight length	m.	88.5–102.4	81.3–95.7	79.7–91.5
	w.	86.3–100.7	80.7–94.9	78.5–90.8
Projection length from the corners	m.	79.4–88.9	75.9–86.6	68.9–81.2
	w.	77.5–87.4	73.9–85.1	67.5–78.6
Angular width	m.	84.6–97.5	89.1–105.3	94.5–116.1
	w.	83.6–96.3	87.9–103.1	92.7–114.1
The height of the body of the jaw	m.	29.1–38.9	25.9–36.3	22.3–33.1
	w.	27.5–37.8	24.6–35.1	21.9–31.9
The height of the branch of the lower jaw	m.	59.6–75.1	54.3–69.9	48.3–67.2
	w.	57.4–73.1	52.4–67.4	46.8–63.8
Arch of the lower jaw	m.	135.8–149.4	139.1–154.6	141.2–158.3
	w.	133.5–147.3	136.4–151.2	139.7–155.7

It was found that the straight length of the lower jaw in mature leptoprosopes males is from 88.5 mm to 102.4 mm, in females – from 86.3 mm to 100.7 mm; in mesoprosopes men, this parameter gradually decreases to the level – from 81.3 mm to 95.7 mm, in women – from 80.7 mm to 94.9 mm; in euryprosopes, the index is the smallest and ranges from 79.7 mm to 91.5 mm in males and from 78.5 mm to 90.8 mm in females. A similar slope to changes was obtained in the projection length of the lower jaw from the angles, the maximum values, from 79.4 mm to 88.9 mm, were observed in men with a leptoprosopic craniotype, the same as in women for their gender – from 77.5 mm up to 87.4 mm; intermediate – in mesoprosopes, when the variation in men ranged from 75.9 mm to 86.6 mm, in women – from 73.9 mm to 85.1 mm; minimum – in euryprosopes, in men the size

was from 68.9 mm to 81.2 mm, in women – from 67.5 mm to 78.6 mm. The opposite trend with significant ranges of variation is established for the angular width of the bone. Thus, in male leptoprosopes, this parameter was determined from 84.6 mm to 97.5 mm, in female representatives – from 83.6 mm to 96.3 mm; in mesoprosopes men, it increased from 89.1 mm to 105.3 mm, in women – from 87.9 mm to 103.1 mm; in euryprosopes, regardless of sex, it reached its peak values, from 94.5 mm to 116.1 mm and from 92.7 mm to 114.1 mm, respectively. The height of the jaw body also showed a certain dependence on the type of skull structure, in leptoprosopes men it tended to the highest values and was fixed at the level from 29.1 mm to 38.9 mm, as well as in women – from 27.5 mm to 37.8 mm; at the same time, in mesoprosopes men, the size decreased from 25.9 mm to 36.3 mm, in women, in turn, from 24.6 mm to 35.1 mm; in euryprosopes men, this parameter ranged from 22.3 mm to 33.1 mm, and next to women – from 21.9 mm to 31.9 mm, it was at the level of the lowest indicators. For the height of the branch of the lower jaw, the maximum variations are established from 59.6 mm to 75.1 mm in men, and from 57.4 mm to 73.1 mm in women with a leptoprosopic craniotype, with a decrease in mesoprosopic men to the level of 54.3 mm to 69.9 mm, in women – from 52.4 mm to 67.4 mm, and reaching the minimum values in euryprosopes men from 48.3 mm to 67.2 mm, in women – from 46.8 mm to 63.8 mm. When analyzing such a complex and multidirectional parameter as the arch of the lower jaw, it was also possible to obtain a characteristic of its dependence on the type of structure of the facial part of the skull. It was established that the range with the smallest values of the length of the arc is characteristic of leptoprosopes, ranging from 135.8 mm to 149.4 mm in males and from 133.5 mm to 147.3 mm in females; average indices are characteristic of men – from 139.1 mm to 154.6 mm and women – from 136.4 mm to 151.2 mm with a mesoprosopic craniotype; in euryprosopes of both sexes, the index tends to the greatest values at the level of 141.2 mm to 158.3 mm and from 139.7 mm to 155.7 mm, respectively. Thus, all the dimensions of the lower jaw have a certain dependence on the craniotype, which leads to the formation of various bone structures (Fig. 2).

All mandibular measurements used in the study were subject to statistical analysis considering gender and craniotype. The obtained results for leptoprosopes are shown in Table 2.

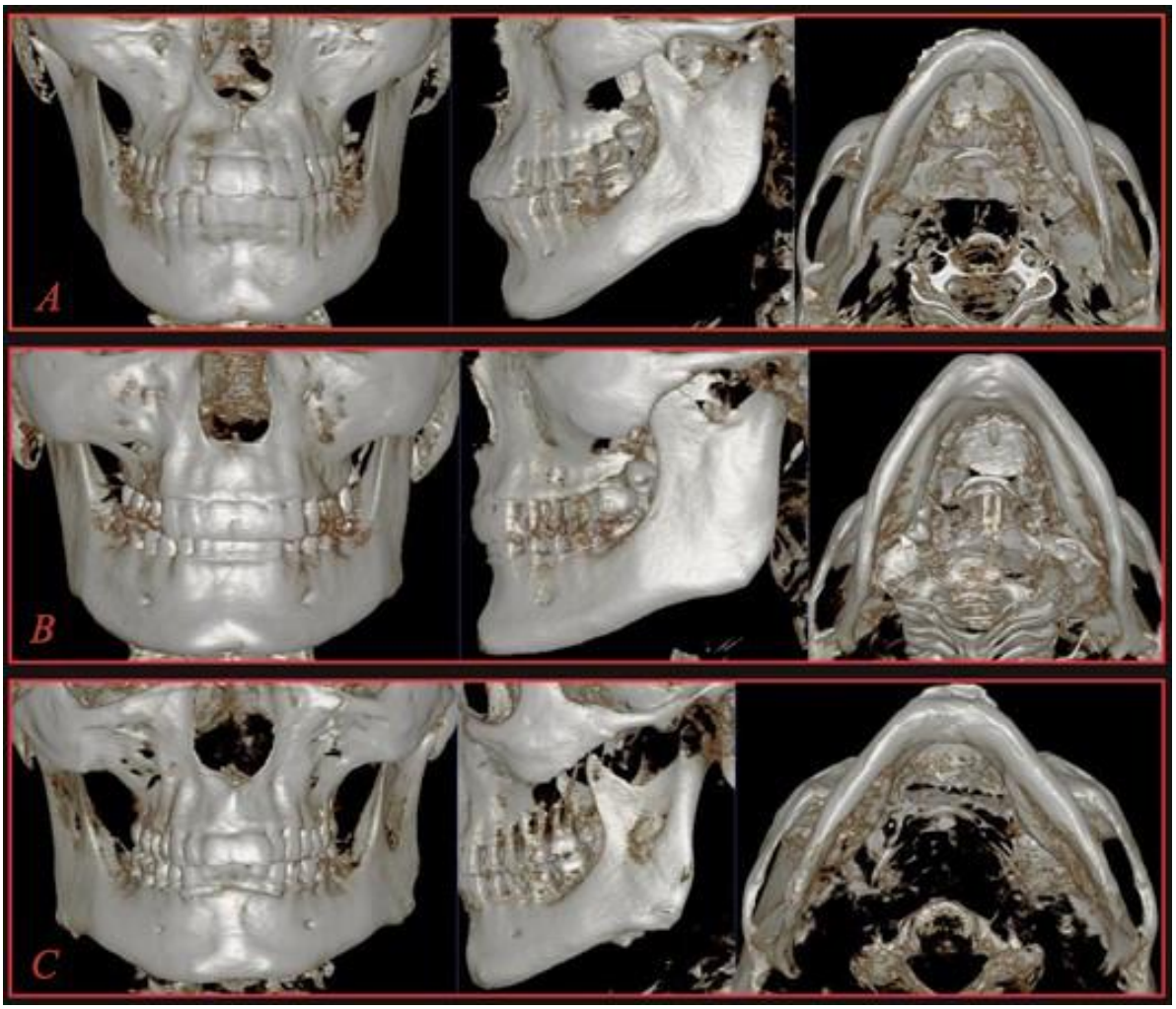

Fig. 2. Individual anatomical variability of the lower jaw of a mature person: A – leptoprosopes (CT #641448); B – mesoprosopes (CT #623919); C – euryposopes (CT No. 092817)

Table 2

Statistical indicators of the dimensions of the lower jaw of a person with a leptoprosopic type of skull structure

Craniotype		Leptoprosopes		Mesoprosopes		Euryprosopes	
Statistical indicator		n	M±m	n	M±m	n	M±m
Size	Sex						
Straight length	m.	13	96.4±1.45*	21	90.7±1.06***	29	85.3±0.68***
	w.	11	94.8±1.60*	22	88.4±1.06***	28	83.9±0.82***
Projection length from the corners	m.	13	83.7±1.40	21	80.4±1.04	29	76.1±0.78***
	w.	11	82.1±1.53	22	79.1±1.05	28	73.7±0.75
Angular width	m.	13	90.9±1.32**	21	97.4±0.97**	29	103.4±0.82*
	w.	11	89.3±1.49**	22	95.6±0.98**	28	101.9±0.89
The height of the body of the jaw	m.	13	34.2±1.35	21	31.3±0.96	29	28.7±0.74
	w.	11	32.8±1.61	22	30.7±0.97	28	27.6±0.82
The height of the branch of the lower jaw	m.	13	68.1±1.29	21	62.9±1.06	29	58.9±0.71*
	w.			22	61.7±1.07***	28	57.6±0.74
	m.	11	66.4±1.53	21	147.4±1.05**	29	150.8±0.71
Arch of the lower jaw	w.	13	141.3±1.45*	22	143.0±0.99	28	149.1±0.74
	m.	11	140.5±1.58*	22	30.7±0.97	29	103.4±0.82*

*Note: * – significant difference in comparison with mesoprosopes at p<0.05; ** – significant difference in comparison with euryprosopes at p<0.05; *** – significant difference in comparison with leptoprosopes at p<0.05*

It was established that the straight length of the lower jaw in males of leptoprosopes is 96.4±1.45 mm (significant difference compared to mesoprosops at p<0.05), in females it is 94.8±1.60 mm (significant difference in comparison with mesoprosopes at p<0.05), while the projection length of the jaw from the corners in men of this craniotype is 83.7±1.40 mm (p>0.05), in women – 82.1±1.53 mm (p>0.05), it should be noted that these two parameters, regardless of gender, showed a maximum in comparison with other types of skull structure. The angular width in this group tended to the minimum and in men did not exceed 90.9±1.32 mm (significant difference compared to euryprosopes at p<0.05), and in women – 89.3±1.49 mm (significant difference compared to euryprosopes at p<0.05). On the contrary, height parameters in leptoprosopes were again inclined to increase and reach peak values in comparable categories. For example, the height of the body of the jaw in men reaches 34.2±1.35 mm (p>0.05), in women – 32.8±1.61 mm (p>0.05), while the height of the branch of the lower jaw in men it was equal to 68.1±1.29 mm (p>0.05), in women –66.4±1.53 mm (p>0.05). The length of the arch of the lower jaw in representatives of the leptoprozopic type was not large and was determined within the range of 141.3±1.45 mm (significant difference compared to mesoprozopics at p<0.05) in men and 140.5±1.58 mm (significant difference the difference compared to mesoprosopes at p<0.05) – in women. Based on the received, statistically confirmed data, it can be said that the longitudinal and vertical dimensions of the lower jaw, with the smallest width and length of its arch, prevail in leptoprosopes. In addition, each parameter, on average, was 0.8–1.8 mm larger in male representatives, however, other characteristics of the ranges do not allow us to recognize such a difference as reliable.

Three-dimensional reconstruction of the features of the shape and structure of the lower jaw and the appearance of the lower dentition on a tomogram in representatives of the leptoprosopic craniotype is presented in Fig. 3.

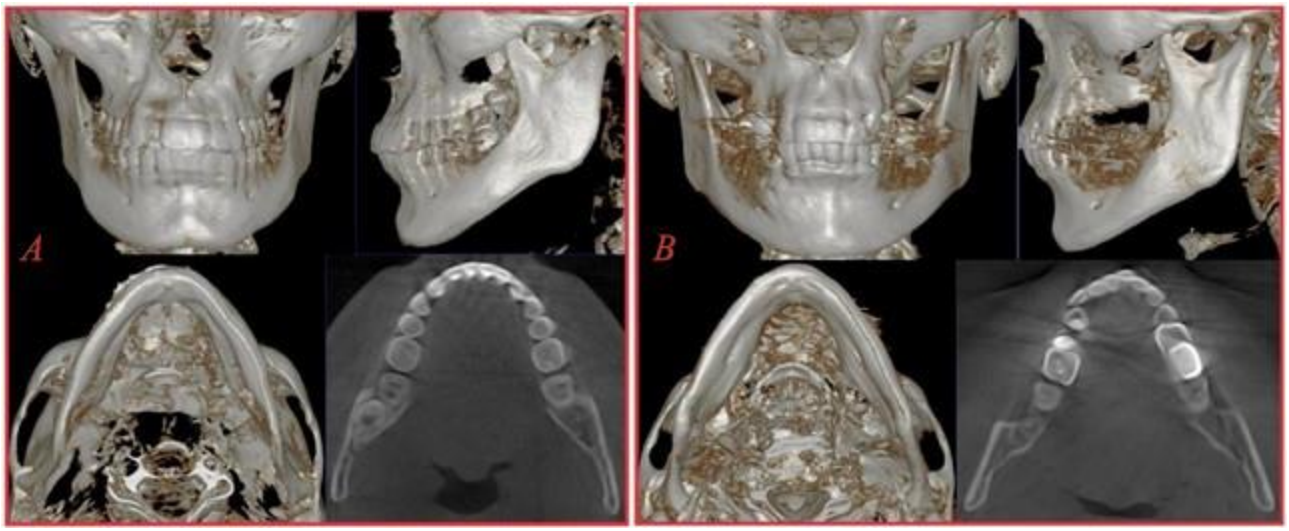

Fig. 3. Gender features of the shape and structure of the lower jaw of a person with a leptoprosopic type of skull structure: A – male (CT #641448); B – female (CT No. 154485)

In mature people with a mesoprosopic type of skull structure, a digital data array of craniometric characteristics of the lower jaw was obtained, which was subjected to statistical processing to confirm the established features.

It was found that the straight length of the jaw in males of mesoprosopes is 90.7±1.06 mm (significant difference compared to leptoprosopes at $p<0.05$), in females it decreases to 88.4±1.06 mm (significant difference compared to leptoprosopes at $p<0.05$). The projection length from the corners, at the same time, in men is at the level of 80.4±1.04 mm ($p>0.05$), in women it does not exceed 79.1±1.05 mm ($p>0.05$). The angular width of the jaw, in this group, is increased in men to 97.4±0.97 mm (significant difference compared to euryprosopes at $p<0.05$), while in women this parameter is equal to 95.6±0.98 mm (significant difference compared to euryprosopes at $p<0.05$). The height of the body of the jaw almost did not differ by gender and was determined within the range of 31.3±0.96 mm ($p>0.05$) for men and 30.7±0.97 mm ($p>0.05$) for women. In turn, the values of the average height of the branch of the lower jaw for the mesoprosopic craniotype in men were equal to 62.9±1.06 mm ($p>0.05$), in women – 61.7±1.07 mm (a significant difference compared to leptoprosopes at $p<0.05$). The length of the arch of the lower jaw in men increased to 147.4±1.05 mm (significant difference in comparison with euryprosopes at $p<0.05$), at the same time, in women, the indicator of this size was significantly smaller 143.0±0.99 mm ($p>0.05$). The conducted analysis of a group of mature people with a mesoprosopic type of structure shows a characteristic dominance of the averaged indices of each range of sizes of the lower jaw in comparison with other craniotypes. In addition, the dependence of the average values on gender was observed, which consisted in the predominance of these parameters in men by 0.6–4.4 mm, with statistical confirmation of a separate number of variations.

A demonstration of the most characteristic shape and structure of the lower jaw and lower dentition in both sexes of mature people with a mesoprosopic skull craniotype is shown in Fig. 4.

Fig. 4. Gender features of the shape and structure of the lower jaw of a person with a mesoprosopic type of skull structure: A – male (CT #623919); B – female (CT No. 603922)

In the observation group of people with the euriprosopic type of structure of the facial part of the skull, the accumulated digital material on the dimensions of the lower jaw was statistically analyzed.

It has been confirmed that the euriprozopic craniotype is characterized by a decrease in longitudinal parameters, for example, the straight length of the jaw in men is 85.3±0.68 mm (significant difference compared to leptoprozopics at $p<0.05$), in women it is 83.9±0.82 mm (significant difference compared to leptoprosopes at $p<0.05$); while, the projection length to the corners, in the former does not exceed 76.1±0.78 mm (significant difference compared to leptoprosopes at $p<0.05$), in the latter 73.7±0.75 mm ($p>0.05$), while both parameters showed minimum mean values among all groups. On the contrary, the angular width of the jaw in euryprosopes tended to the maximum and reached 103.4±0.82 mm in men (significant difference compared to mesoprosopes at $p<0.05$), and in women – 101.9±0.89 mm ($p>0.05$), which significantly outweighs the indicators of other craniotypes. The height of the body of the jaw showed small numbers and almost did not differ by gender, in men it was 28.7±0.74 mm ($p>0.05$), in women – 27.6±0.82 mm ($p>0.05$), similar features were observed for the height of the branch of the lower jaw, in men the average was at the level of 58.9±0.71 mm (significant difference compared to mesoprosopes at $p<0.05$), in women – 57.6±0.74 mm ($p>0.05$). Another maximum peak value, in people with a euriprosopic type of skull structure, was observed for the arch of the lower jaw, in men it increased to 150.8± ±0.71 mm ($p>0.05$), and in women to – 149.1±0.74 mm ($p>0.05$). Thus, it can be stated that the euriprosopic craniotype is characterized by a significant decrease in longitudinal and height dimensions to the absolute minimum values among all types of skull structure with a simultaneous increase in the angular width and length of the arch of the lower jaw. In addition, the average values in men were 1.1–2.4 mm larger than in women, which in some cases became a statistically significant feature.

Specific properties of the structure and shape of the lower jaw and lower dentition in euryprosopes are shown in Fig. 5.

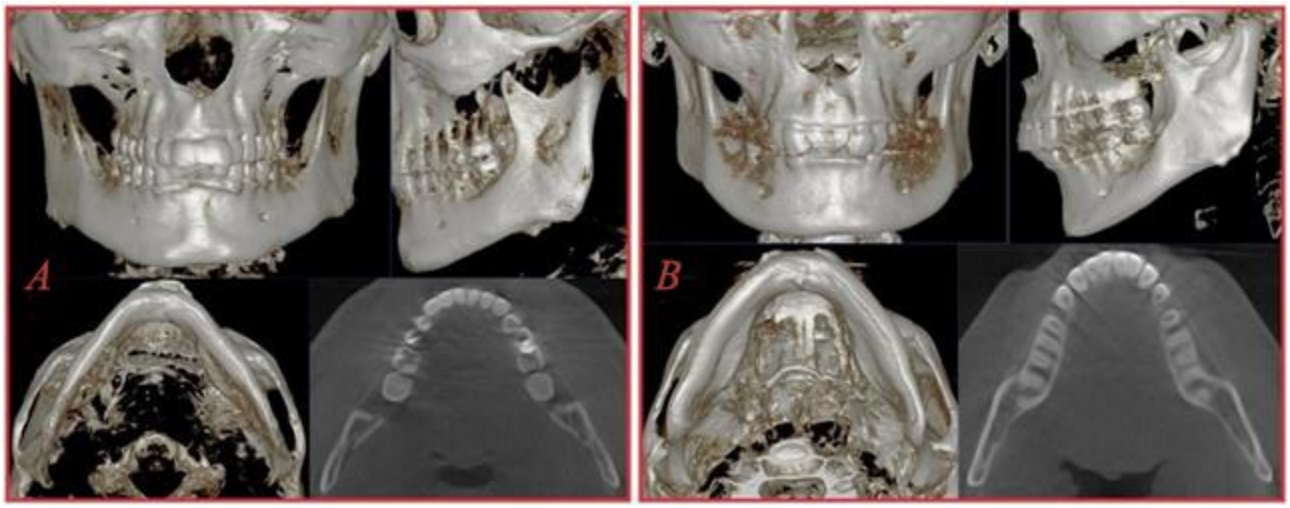

Fig. 5. Gender features of the shape and structure of the lower jaw of a person with a euryprosopic type of skull structure: A – male (CT #092817); B – female (CT #653530 and 515938)

4. Discussion of research results

During the study, a number of data were obtained regarding the craniometric structure of the lower jaw. In confirmation of the works [10, 11], all established parameters showed a strong dependence on the type of structure of the skull, especially, this applied to the general linear dimensions (Fig. 6).

The maximum values of the projection length of the lower jaw, in the range from 82.1 mm to 83.7 mm, were recorded in people with a leptoprosopic type of skull structure, regardless of gender. In mesoprosopes, this parameter was at the level of intermediate indicators – 79.1–80.4 mm, and in euryprosopes it significantly decreased to 73.7–76.1 mm. At the same time, the angular width, with the leptoprosopic type of skull structure, did not exceed – 89.3–90.9 mm, while in mesoprosopic people, the size reached – 95.6–97.4 mm, and in euryprosopes people, a variation of peak values was observed values in the range from 101.9 mm to 103.4 mm. Such values of linear dimensions confirm the form-forming role of the craniotype in the construction of the lower jaw, and, as a result, in the structure of the lower part of the dentition apparatus and the lower dentition. In parallel with this, an advantage of the average distance values in men by 1.3–2.4 mm was found, which allows us to confirm the difference by gender.

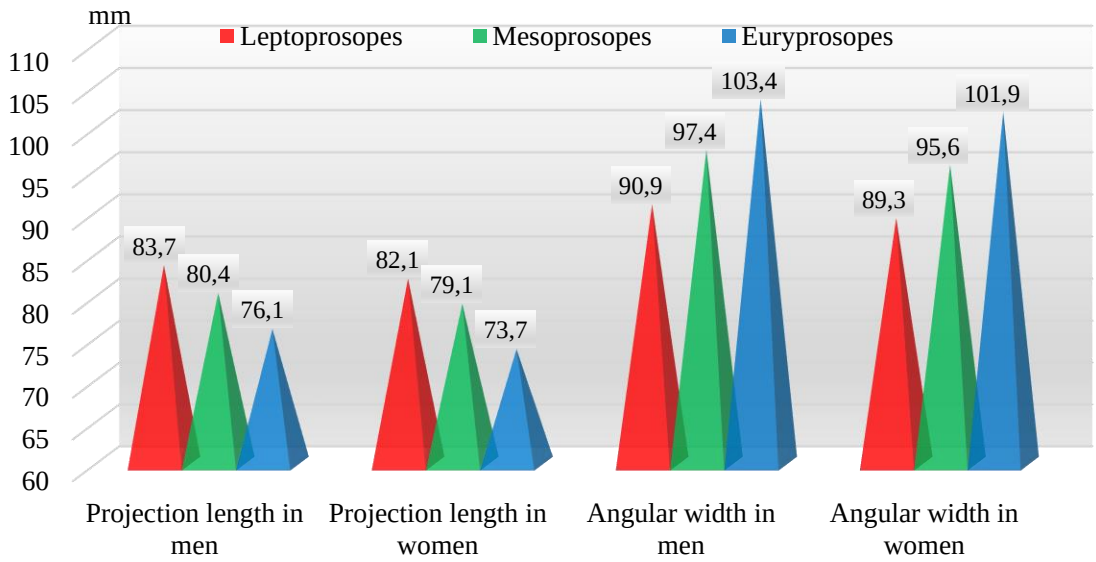

Fig. 6. Average values of the general linear dimensions of the lower jaw of mature people depending on gender and craniotype

Study limitations. First, the person's age, the study did not include men younger than 22 years old, women – 21 years old, and men older than 60 years old, women – 55 years old; secondly, skulls with bone tissue pathology were not included in the study.

Prospects for further research. The obtained intravital craniometric characteristics of the lower jaw and the lower dentition made it possible to establish three types of skull structure and trace the existing patterns of changes in linear dimensions in each group. This will allow, in our further work, to investigate the existing changes in the shape, size and position of individual, smaller, structures related to the searched area of the skull, and to develop general models of the properties of the organization of the

facial part of the skull for people with different craniotypes.

5. Conclusions

The main craniometric parameters of the lower jaw are significantly dependent on the type of structure of the facial part of the skull. Thus, the leptoprosopic craniotype is characterized by the maximum values of longitudinal (straight length in men – 96.4±1.45 mm, in women – 94.8±1.60 mm) and height dimensions (body height in men – 34.2±1.35 mm, in women – 32.8±1.61 mm) with minimum indicators of width (angular width in men – 90.9±1.32 mm, in women – 89.3±1.49 mm) and arc length (in men – 141.3±1.45 mm, in women – 140.5±1.58 mm). Mesoprosopes are characterized by the definition of intermediate, averaged values equidistant from marginal, terminal forms. In representatives with the euriprosopic type of skull structure, a significant decrease in length was observed (in men – 85.3±0.68 mm, in women – 83.9±0.82 mm) and height of the jaw (in men – 28.7±0.74 mm, in women – 27.6± ±0.82 mm) with a significant increase, up to the maximum values, in the width of the jaw (in men – 103.4±0.82 mm, in women – 101.9±0.89 mm) and arch length (in men – 150.8±0.71 mm, in women – 149.1±0.74 mm). At the same time, unlike leptoprosopes, which had a shortened and pointed arch, in euryprosopes, the arch tended to be smoothed and lengthened.

The assessment by sex leads to the fact that all sizes of the lower jaw predominate in men, but, nevertheless, a certain number of differences in indicators were within the limits of statistical error, which does not allow making absolute conclusions in this matter.

Conflict of interests

The authors declare that they have no conflict of interest in relation to this study, including financial, personal, authorship, or any other, that could affect the study and its results presented in this article.

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Data availability

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Use of artificial intelligence technologies

The authors confirm that they did not use artificial intelligence technologies when creating the presented work.

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