AZERBAIJAN REPUBLIC

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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

ASYMMETRY OF THE FACIAL PART OF THE SKULL AT DIFFERENT AGES OF THE POSTNATAL DEVELOPMENT

Specialty: 3241. 01 «Human Anatomy»

Field of science: «Medical sciences»

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GENERAL REVIEW OF THE WORK

The actuality of the subject. Asymmetry is characteristic of the modern human face and is one of the signs that reveal its individuality. Nowadays, information about facial asymmetry is using to create highly reliable protection systems. However, in modern times, the active study of facial asymmetry is only at an early stage.

Changes in both the soft tissues of the face and the skull cause asymmetry. Numerous studies devoted to the soft tissues of the face, little has been learned about the changes in the bone structures of the face in different shapes of the skull and at different ages.[1]

Although the diagnosis of facial asymmetry does not pose serious difficulties, scientists differ on its etiology.

Asymmetry of the facial part of the skull is mainly observed in people with injuries and developmental defects.

According to Bogatyr'kov D.V., Bogatyr'kov M.V., Volchek D.A. (2003)[2], facial asymmetry occurs in 1.3-2% of cases and accounts for 25% of pathologies of the maxillofacial region. Complications leading to facial asymmetry are observed in 15-25% of cases after such injuries.

Another factor that causes asymmetry is facial anomalies and deformities. According to the World Health Organization, the development of facial skulls is the third most common anomaly, with facial growth in 7% of live births.

Another factor that causes asymmetry is facial anomalies and deformities. According to the World Health Organization, the devel

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[1.] Шадлинский, В.Б., Мустафаева, Н.А., Караева, С.Д. (Shadlinskiy, V.B., Mustafaeva N.A., Karaeva S.D.) Индивидуальные особенности подглазничного канала, одноимённого отверстия и нижней глазничной щели // – Самара: Морфологические ведомости, –2016. №1, – с.91-96.

[2.] Богатырьков, Д.В., Богатырьков, М.В., Волчек, Д.А. (Bogatyr'kov, D.V., Bogatyr'kov, M.V., Volchek, D.A.) Асимметрии лица. Диагностика и лечение // – Москва: Клиническая стоматология,– 2003. № 2, – с.62-65.

[3.] Мировая статистика здравоохранения. 2010 год: (Всемирная органи-зация здравоохранения) – Женева: – 2010, – 177с.

opmental defects of the skull are the third most common anomalies and deformations causing deformation are observed.[3]

Causes of facial asymmetry include heredity, unilateral dyfution of the masticatory muscles, uneven development of the skull, premature loss of milk or permanent teeth, one-sided chewing, incorrect dentition, and bad habits.[4,5]

Some aspects of facial asymmetry have not been adequately studied. The facial area has been learned only at any age, taken separately from the postnatal development.[6]

In contrast to previous studies, the asymmetry of the facial part of the skull was studied sequentially at different ages of postnatal development (early childhood, childhood, adolescence, youth, I and II adulthood, old age).

Thus, all of the above provided a basis for defining the goals and objectives of the research.

The study aimed to study the degree of asymmetry in the different shapes of facial skulls related to specific age periods of extrauterine human development.

The objectives of the research include:

1. To clarify the shapes of the facial area in the studied skulls.
2. To study the effectiveness of the craniometric "Fan" method in detecting asymmetry in the skulls of different shapes.
3. To determine the degree of expression of the asymmetry of the facial skull at different ages of extrauterine development.
4. To clarify the sexual characteristics of asymmetry in different forms of the facial skull.
5. To determine the role of the eye sockets, outer nose, and maxilla in the formation of facial asymmetry.

[4.] Cassidy, K. Genetic influence on dental arch form in orthodontic patients / K.Cassidy, E.Harris, E.Tolley [et al.] // Angle Orthod., –1998. Oct;68(5), – p.445-454.

[5.] Rossi, M.., Ribeiro, E., Smith, R.. Craniofacial asymmetry in development: an anatomical study // Angle Orthod., – 2003. 73(4), – p.381-385.

[6.] Пономарева, Т.В. (Ponomareva, T.V.) Становление функциональных асимметрий в раннем онтогенезе: / дис. кандидата медицинских наук. / – Краснодар, 2010. – 163 с.

6. To evaluate the possibilities of modern examination methods of radiation diagnostics in detecting asymmetry of the facial part of the skull.

Research methods. The study used craniometric methods to study the brain and facial skull, determine asymmetry in the facial skull, determine facial asymmetry in the photograph (photometric analysis), X-ray, computer, and magnetic resonance imaging examinations. The study results were calculated using the MS EXCEL-2016 and SPSS-22 software packages using the variational statistical method.

The main provisions of the defense:

1. Based on complex morphological studies, the craniological dimensions on the right and left sides of the face were accurately compared in its "upper," "middle," and "lower" parts. The essential craniometric features in determining the asymmetry are the distances between the nasion and zygion in the “upper fan," the distance between the zygion and the lateral margin of apertura piriformis in the “lateral fan," and the distance between the prostion and the lateral margin of apertura piriformis in the “lower fan."

2. There are specific correlations between the asymmetry of the facial region of the skull and the shape of the facial skull. Thus, in the "Upper fan," left-sided asymmetry is observed in the skulls of broad-faced women and men, right-sided asymmetry in the skulls of middle-faced women, long-faced male skulls, and left-sided asymmetry in the skulls of long-faced women. In the "side fan," left-sided asymmetry was found in long-faced female skulls, long, medium, and wide-faced male skulls, and both left and right-sided asymmetry was found in broad and middle-faced female skulls. Both left-sided and right-sided asymmetries were observed in the facial skulls of all three shapes in the "lower fan."

3. Sex differences in the linear dimensions of the facial skull are noted on all three fans. Thus, the asymmetry in the craniometric dimensions of male skulls is better expressed than in women.

4. The degree of expression of the asymmetry of the facial skull varies at different ages of postnatal development. Thus, the

asymmetry is weak in the skulls of early childhood, relatively good in children aged 4-12 years, adolescents, youth, adolescence I and II, and more pronounced in the elderly than in other ages of postnatal development.

The scientific novelty of the work: For the first time, the study compared the morphometric dimensions on the right and left sides of human skulls of early childhood, childhood, adolescence, youth, I and II adulthood, old age, and both sexes, and at what age or acute observation was determined, the degree of expression of asymmetry in the skulls of different shapes was determined, the degree of effectiveness of the craniometric "Fan" method in detecting asymmetry in the skulls of different shapes was clarified, sex differences were found in the distances of the upper, lower and lateral fans.

The theoretical and practical significance of the research: The study's theoretical significance is determined by the fact that the obtained results will further enrich the knowledge of the anatomy of the facial skeleton, expand the existing ideas about the regularities of the formation of facial asymmetry.

The study's practical significance is that the evidence obtained on the asymmetry of the bony structures of the face can be used as a normative indicator in the violation of the integrity of the facial area at different ages of postnatal development. Data on the age characteristics of the morphometric dimensions of the facial part of the skull may allow early detection of asymmetry in this area. Information on the relationship between bone asymmetry and the shape of the facial part of the skull may be necessary to evaluate the final results of orthodontic treatments and determine the correct size of transplants during facial hypercorrection. The data obtained from the study of radiation diagnostic methods can be used to determine the degree of effectiveness of facial asymmetry at different ages of postnatal human development.

Approbation of dissertation materials. The main results of the dissertation work were presented at the XXII Republican Scientific

Conference of Doctoral Students. Young Researchers dedicated to the 100th anniversary of the Azerbaijan People's Republic (Baku, 2018), at the International Scientific-Practical Conference "Конституциональная анатомия, и приложения" (Moscow, 2019), at the International Scientific-Practical Conference dedicated to the 100th anniversary of the Department of Human Anatomy and Medical Terminology of the Azerbaijan Medical University (2019), at the joint meeting of the staff of the Departments of Human Anatomy and Medical Terminology, Department of Radiation Diagnostics and Radiation Therapy (Baku 2021), as discussed at the scientific seminar of the Dissertation Council FD 2.08 under the Azerbaijan Medical University of the Higher Attestation Commission under the President of the Republic of Azerbaijan (Baku, 2021).

Application of results. The results obtained in the study were applied in practice at the Departments of Human Anatomy and Medical Terminology, Forensic Medicine, Oral and Maxillofacial Surgery of the Azerbaijan Medical University.

Printed works. Eighteen scientific works (9 journal articles, eight conference materials, one thesis) were published on the topic of the dissertation. 2 journal articles in foreign press ("Журнал Анатомии и Гистопатологии " - Voronezh, " Морфологические ведомости" - Samara) was published. 2 (republics) were published in periodicals included in the international summary and indexing systems (SCOPUS, РИНЦ).

Volume and structure of the dissertation. The dissertation is interpreted in a 166-page (196209 characters) computer text and is based on “Introduction” (volume: 11273 characters), "The main content of the dissertation" (volume: 141645 characters), Conclusion” (volume: 39933 characters), “Results” (volume: 2039 characters), “Practical recommendations” (volume: 1319 characters) and list of used literature consists of.

The section "The main content of the dissertation" is divided into three chapters: Chapter I. "Literature review" (volume: 59468 characters), chapter II. "Materials and methods" (volume:

14267 characters), chapter III. "Results of the study" (volume: 67910 characters).

The bibliography includes 172 sources, including 15 in Azerbaijani, 84 in Russian, and 73 in other foreign languages.

MATERIALS AND METHODS OF RESEARCH

The study material consisted of 120 certified human skulls, specially selected from the craniological collection of the Museum of the Department of Human Anatomy and Medical Terminology of the Azerbaijan Medical University, belonging to different ages of both types of postnatal development and both sexes, no injuries or deformations (table).

Table
Distribution of research material by age and sex

Age periods	Sex		Total
	Men	Women	
Early childhood (1-3 years)	-	-	10
Childhood (4-12 years)	-	-	15
Adolescence (13-16 years)	11	7	18
Youth period (17-21 years)	10	10	20
I adult period (22-35 years)	9	10	19
II adult period (36-60 years)	17	15	32
Senile period (61-74 years)	3	3	6
Total	50	45	120

In addition to the above, 12 radiographs, 20 computer and eight magnetic resonance tomograms performed at the Teaching Surgery Clinic of the Azerbaijan Medical University were analyzed. In addition, photographs of 16 people were studied using the Golden Ratio Face computer program, which is designed to study facial asymmetry.

The study used brain and facial dimensions, a study of facial asymmetry, determination of facial asymmetry in photographs (photometric analysis), X-ray, computer, and magnetic resonance imaging methods.

All measurements in the skull are based on instruments widely used in modern craniology - sliding compass, goniometer, ruler, etc., was carried out through. The overall dimensions of the face and brain were determined using a sliding compass and a goniometer.

The central part of the study was generally accepted and proposed by Martin R. (1928)[7], and then carried out by craniometric method, improved by Alekseyev V.P. (1966)[8]. This method allows a comprehensive anthropological study of the skull as a whole or parts of it.

The study first determined the basic dimensions of the face and brain. Commonly accepted craniometric points were used during the measurements.

The length, width, and height of the skull were measured. Determine the shape of the brain, its width, and height indices were determined.

According to the width index, three types of skulls are distinguished: 1) Dolichocrane - long skull; 2) Mesocran - the middle skull; 3) Brachycran - a broad skull. The width index is less than 75.0 in dolichocran skulls, between 75-79.9 in mesocranal skulls, and more than 80 in brachycrane skulls. According to the height index, three types of skulls are distinguished: 1. Hameokran – low (flat)

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[7] Martin R. Kraniologie a kraniometrische technik / R.Martin. –,Jeneva: – 1928, – 214вd.

[8] Алексеев, В.П. (Alekseev, V.P.) Остеометрия. Методика антропологических исследова-ний / В.П.Алексеев. – Москва: Наука, – 1966. – 249 с

skull (height index of the skull up to 60.9). 2. Orthocrane - medium height skull (skull height index up to 70.9). 3. Hypsicran - high skull (skull height index more than 75.0).

Using the craniological points of the facial skull, its width (distance between the outermost points (zygion) of the cheekbones), morphological height (distance between nazion and gnation), and height (distance between nazion and prostion) were measured.

Determine the shape of the facial skull, its morphological and upper indices were determined. Morphological face index calculated the percentage of the distance between the nasion and gnation to the distance between the zygion points. However, it was impossible to calculate the morphological facial index in most cases because most of the skulls studied (97 skulls) did not have a jawbone.

The upper face index is calculated as the percentage of the distance from the middle of the fronto-nasal suture (nasion point) to the most protruding point (prostion point) on the anterior surface of the maxillary bone to the distance between the farthest points of the cheekbones (zygion points). According to R. Martin's (1928)[7] classification, there are three forms of the facial skull according to the upper face index: 1) wide-faced (euryen), upper face index less than 50, 2) medium-faced (mezen) upper face index 50 to 54, Up to 9, 3) long-faced (lepten) upper face index is more than 55.

Asymmetry in the facial skull was studied with the "Fan method." According to this method, three craniometric points on the facial part of the skull are taken as a basis: 1. Nasion (N) – the point is connecting the frontal suture with the nasal seam; 2. Prostion (Pr) - the protruding point of the broad alveolar ridge; 3. Zygion (Zyg) - the most protruding point of the cheekbone.[9]

The facial skull is divided into "upper," "lower," and "lateral fans," starting from these points and ending at the surrounding craniometric points.

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[9].Гайворонский, И.В., Дубовик, Е.И., Крайник, И.В. (Gayvoronskiy, I.V., Dubovik, E.I., Kraynik, I.V.) Морфометрические показатели асимметрии лицевого черепа у взрослого человека // – Санкт-Петербург: Морфология, – 2009, № 2, – с.74-79.

The “Upper Fan," consist of standard distance between the nasion and frontoparietal point (N-Ft), between nasion and lateral margin of apertura piriformis (N-Pl), between nasion, and infraorbital foramen (N-Fio), between nasion and zygion (N-Zyg), and non-standard distances starting from nasion.

The "Lower Fan," consist of stsndard distance the prostion and dacryon (a point on the medial wall of the eye socket where the upper end of the lacrimal bone comb touches the frontolacrimal suture) (Pr-D), prostion and lateral margin of apertura piriformis (Pr-Pl), prostion infraorbital foramen (Pr-Fio), between prostion and zygion (Pr-Zyg) and some non-standard distances starting from prostion.

The "Lateral fan" consists of standard distances between the zygon and the dacryon (Zyg-D), between the zygion and the lateral margin of apertura piriformis (Zyg-Pl), between the zygion and the infraorbital foramen (Zyg-Fio), and non-standard distances starting from zygion.

In addition to craniological measurements, computer, magnetic resonance tomograms, and radiographs were morphologically analyzed, and the asymmetry of the facial area in photographs was studied using the “Golden Ratio Face” computer program.

Following the general rules for medical and biological research, the quantitative indicators of the research work were statistically developed and analyzed.

The measurements obtained in the studies are specially compiled into a prepared statistical map and analyzed by biostatistical methods: variation and discriminant analysis.

The indicators on the card are divided into groups and subgroups according to the selection criteria (gender, age group, etc.) and in each row to evaluate the comparisons both average (M, $\sigma \pm$, $\pm$ m, 95% EI) and average structure (min, max, As, Ex, rank) indicators were assigned.

Given the fact that the distribution of rows does not follow the law of normal distribution, comparisons were made with the U-Mann-Whitney criterion. The $\chi 2$-Pearson criterion was used to compare the quality indicators in the study series.

Calculations were performed in MS EXCEL-2016 and SPSS-22 statistical package programs.[10]

The variations of the indicators were estimated by the magnitude of the coefficient of variation (VA). If AND does not exceed 10% - the variation is weak, if it is between 11 - 25% - medium, if it exceeds 25% - much, and when> 50% - is considered asymmetric.

To study the normal range of anatomical variability, when the value of the range of variation is in the range M ±o, this sign is the average of the magnitude, M ±a - M ±2a, the variation or signs - the average magnitude of the sign is less than the limit, M ±2o is considered a sharp deviation from the average size.

The final results obtained from craniometric measurements were recorded, and photographs of skulls were taken. Tables and diagrams were used to illustrate the evidence obtained in the dissertation.

The text of the dissertation contains 25 tables, 12 diagrams, 17 photos.

RESEARCH RESULTS AND THEIR DISCUSSION

The development of radiological diagnostics, cosmetology, plastic, and maxillofacial surgery in modern times requires research with new comprehensive morphological evidence.[11]

For this reason, extensive craniological research has been conducted, taking into account the shape of the cranial and facial skull.

The results of determining the shape of the facial section in the

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[10].Петри, А. (Petri, A.) Наглядная статистика в медицине. Перевод с английского языка / А.Петри, К.Сэбин (A.Petri, K.Sebin) – Москва: ГЭОТАР-МЕД., –2009. – 168с.

[11].Starbuck, J., Ghoneima, A., Kula, K. Facial soft-tissue asymmetry in three-dimensional cone-beam computed tomography images of children with surgically corrected unilateral clefts / // J Craniofac Surg. – 2014. 25(2), – p. 476-480

studied skulls showed that 34 out of 120 skulls (28.3%) have a long face, 63 (62.5%) have a medium face, and 23 (19.2%) have a wide face.

The 'Fan" craniological method was used to determine the asymmetry in the facial skull. According to this method, the indicators of the facial skull were divided into "Upper," "Lower," and "Lateral" fans and its linear dimensions starting from the points of Nasion (N), Prostion (Pr), and Zygion (Zyg) were estimated.

It was found that the distances between the nasion and zygion in the "Upper fan," the distance between the zygon and the lateral margin of apertura piriformis in the "Lateral fan," and the prostion and the lateral margin of apertura piriformis in the "Lower fan" are the essential craniometric measurements in estimating asymmetry.

According to Hwang H. (2012)[12], the zygion point is where the facial muscles are connected. Measurement differences in the distances starting from this point are related to the functional asymmetry of the facial muscles.

The study of asymmetry in the "Upper fan" on the skulls of different shapes showed that a woman with a wide face in the skulls right-sided asymmetry is observed in the distance between the nasion and the infraorbital foramen, Distance between the nasion and lateral margin of apertura piriformis, and zygion the left asymmetry is observed.

Right-sided asymmetry was observed in medium-faced female skulls other than the distances between the nasion and the frontoparietal point.

In long-faced female skulls, asymmetry is observed between the nasion and infraorbital foramen, between the nasion and lateral margin of apertura piriformis, and the zygion right-side asymmetry was observed.

At all distances studied in broad-faced male skulls, only left-sided asymmetry is detected.

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[12].Hwang., H. Three-dimensional soft tissue analysis for evaluating facial asymmetry in normal occlusion individuals / H.Hwang, D.Yuan, K.Jeong, [et al.] // Korean J Orthod., – 2012. 42(2), – p.56-63

In the skulls of middle-faced men, left asymmetry was noted at a distance between the nasion and the zygion and right asymmetry at other distances.

In long-faced male skulls, only right-sided asymmetry was observed at all distances.

A statistically significant sex difference in all sizes of the upper fan studied was observed on the left-side (-8 in females, -0.47 in males) in the distance between the nasion and the zygon in the broad-face skulls.

According to Baybakov S.E. (2008)[13], asymmetry in the "Upper fan" localization zone can be caused by two factors. The first factor is associated with functional asymmetry of the brain and facial skull and is a feature of its morphogenesis .

Study craniometric parameters of the "Lateral fan" showed a right-sided asymmetry in wide-faced female skulls in the distance between the zygion and the infraorbital foramen and the zygion and the dacryon the left-sided asymmetry in the distance between the zygion and the lateral margin of apertura piriformis and prostion.

In middle-faced female skulls, left-sided asymmetry was observed in the distances between the zygion and the lateral margin of apertura piriformis and the dacryon, and right-sided asymmetry in the distances between the zygion and infraorbital foramen and the zygion and prostion.

In long-faced female skulls, right-sided asymmetry was noted at the distances between the zygion and the lateral margin of apertura piriformis and left-sided asymmetry at the remaining distances on the ground.

In broad-faced male skulls, only left-sided asymmetry is observed at all distances. Skulls middle-faced men's left asymmetry was observed at distances other than the zygion and the lateral margin of apertura piriformis. In long-faced male skulls, as in broad-faced male skulls, only left-sided asymmetry is observed at all.

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[13].Байбаков, С.Е. (Baybakov, S.E.) Индивидуальная анатомическая изменчивость: Историко-методологические аспекты // – Москва: Вестник экспериментальной и клинической хирургии, –2012. №1, – с.65-7263

distances.

According to Dubovik E.I. (2009)[14], the most considerable left-handed asymmetry, the "Lateral Fan," is based on the distance from the lateral margin of apertura piriformis in the lepten-shaped skulls of women. Left-sided asymmetry is observed in leptorins at subspinal-anterior-molar, subspinal-infraorbital, subspinal-nasomaxillary distances. Distance point of inclination to the lateral margin of apertura piriformis, there is a significant ethically right-sided asymmetry in the distance between the incisor-nose-apple, which is found in the skulls of long-faced women.

Results measurements taken "Lower Fan" on the skulls of different shapes show that in broad-faced female skulls, there is a left asymmetry in the distances between the prostion and frontoparietal, point, the prostion and zygion point, the prostion and the dacryon point, and the prostion and infraorbital foramen point

In medium-faced female skulls, right-sided asymmetry observed distances prostion and the infraorbital foramen, the distance between the prostion frontoparietal and the zygion on the left, the distance between the prostion and the lateral margin of apertura piriformis, the prostion and the dacryon, the, and the frontoparietal.

In the skulls of long-faced women, there is a right-sided asymmetry in the distance between the prostion and the lateral margin of apertura piriformis and a left asymmetry at other distances.

In broad-faced male skulls, left-sided asymmetry was observed in the distances between the prostion and the frontoparietal point, the infraorbital foramen, the lateral margin of apertura piriformis, and the right asymmetry in the distances between the prostion and zygion and dacryon. In the skulls of middle-faced men, left-handed asymmetry was observed in the distances between the prostion and the frontoparietal, dacryon, infraorbital foramen, lateral margin of apertura piriformis, and right-sided asymmetry in the distances between the prostion and zygion.

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[14]. Дубовик, Е.И. (Dubovik, E.I.) Асимметрия лицевого черепа при различных его формах у взрослого человека: / дис. кандидата медицинских наук. / – Санкт-Петербург, 2009. – 156с.

However, there was no asymmetry in the distance between the prostion and the frontoparietal in long-faced male skulls. Instead, left-sided asymmetry found distances between the prostion and zygion and dacryon, and right-sided asymmetry in the distances between the prostion and the infraorbital foramen and the lateral margin of apertura piriformis.

According to An S.V. (1999)[15], right-sided asymmetry occurs in 95% of cases associated with excessive tone of the facial muscles on the right side of the face.

Baybakov has proved it, S.E. (2008),[13] and Gayvoronskiy I.V., Dubovik E.I., Kraynik I.V. (2009)[9] that the asymmetry in the "Lower fan" is due to the characteristics of the tone of the muscles of the nose, cheeks, cheekbones and the morphogenesis of the facial skull.

Significant sexual differences were observed in the "Upper fan" in the distance between the nasion and the lateral margin of apertura piriformis in the middle-faced skulls in the side fan and the distance between the prostion and the lateral margin of apertura piriformis in the long-faced skulls in the “Lower fan” was observed.

In the "Lateral fan," distance zygion and lateral margin apertura piriformis were observed in the middle-faced skulls, and in the "lower fan," the distance between the prostion and the lateral margin of apertura piriformis in the long-faced skulls was observed.

According to Mustafayeva N.A. (2016)[16], the transverse dimension of the infroorbital foramen was 1.09 times on the right, 1.11 times on the left, 1.02 times on the right, and 1.04 times on the left.

According to Qarayeva S.D. (2018), the length of the lower slit of the eye socket is 1.05-1.20 times longer in men than in women, the width is equal to men and women in the posterior-inner part of

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[15.] Ан С.В. (An S.V.) Межгрупповая изменчивость индексов асимметрии лицевого отдела черепа человека // – Сант-Петербург: Морфология. – 1999. №1 – 2, – с. 112-123

[16.] Mustafayeva, N.A. Bətnxarici ontogenezdə insanda göz yuvasi girəcəyinin, gözyuvasiüstü, gözyuvasialti dəliklərinin morfometrik, topoqrafo-anatomik və yaş xüsusiyyətləri: / tibb üzrə fəlsəfə doktoru dissertasiyasının avtoreferat) / – Bakı. 2016, – 22s.

this slit and 1.06-1.14 times in men in the middle less, and 1.12-1.24 times more in the outer part.[17]

Thus, it is possible to detect the difference between the morphometric parameters on the right and left sides of the upper, lower, and lateral parts of the facial skull with high accuracy by the method of craniological research "Fan."

One of the study tasks was to study the asymmetry of the facial skull at different ages of human postnatal development.

First of all, age features in the structure of skulls were analyzed. In early childhood, the shape of the skulls differs in external and internal relief. Frontal and parietal bumps are higher, the height of the outer nose is less. In addition, the occipital bone protrudes less, the walls of the eye socket become thinner.

Studies of asymmetry at different ages have shown that asymmetry was not observed in 5 of the 12 distances in early childhood skulls. Thus, asymmetry in the facial skull is generally poorly observed at this age (the average value of the degree of expression of asymmetry is 0.05 ±0.04).

Asymmetry in the facial skulls of children aged 4-12 years is better expressed than in early childhood (the average value of the degree of expression of asymmetry is 0.10 ±0.10).

The mean value of the degree of expression of asymmetry in the facial skull of adolescents was 0.21 ±0.01, which indicates that asymmetry was observed 4.2 times better at that age than in early childhood. The asymmetry studied in the facial skull of young people is weaker than in adolescents (the average value of the degree of expression of asymmetry is 0.15 ±0.04). The degree of expression of asymmetry in the facial skulls of adolescence differs little from that of young people (the average degree of expression is 0.18 ±0.04).

Asymmetry in facial skulls during puberty II is better expressed than in adolescence and adolescence I (average value of the degree of

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17. Qarayeva, S.D. İnsanin bətnxarici inkişafinda müxtəlif formali kəllələrin göz yuvasinin aşaği yariğinin morfoloji və ölçü göstəricilərinin xüsusiyyətləri: / tibb üzrə fəlsəfə doktoru dissertasiyasının avtoreferatı) / – Bakı. 2018, – 22s

expression of asymmetry is 0.21 ±0.12). The mean value of the degree of asymmetry in the facial skulls of the elderly was 0.41 ± 0.14. This indicates that the asymmetry of postnatal development in old age is more pronounced than in other studied periods.

According to Fokin V.F., Ponomareva N.V. (2009)[18], the specialization of the cerebral hemispheres is determined by individual features of the human nervous system, including functional asymmetry of the brain. Therefore, according to the researcher, specific activity cerebral hemispheres in children aged 2 to 5 years allows determining the dynamic change depending on the profile of individual asymmetry.

Thus, asymmetry is weak in skulls of early childhood, relatively good in children aged 4-12 years, adolescents, youth, adolescence I and II, and more pronounced in the elderly than in other ages of extrauterine development.

From a cosmetic and aesthetic point of view, the eye sockets, external nasal, maxillary bones occupy a central place in the facial skeleton. The shape and size of these bone structures have been studied. The average height is 28.3 ±0.5 mm, and 29.8 ±0.4 mm in the left eye socket. The width of the right eye socket is, on average, 32.3 ±0.4 mm, and the width of the left eye socket is 34.1 ±0.4 mm. In median skulls, the height of the right eye socket is on average 27.5 ±0.2 mm, and the height of the left eye socket is 28.9 ±0.2 mm. The average size of the right eye socket is 32.8 ±0.4 mm, and the width of the left eye socket is 34.3 ±0.4 mm. In skulls with a broad facial shape (euren), the average height of the right eye socket is 27.1 ±0.4 mm, and that of the left eye socket is 28.2 ±0.4 mm. In this type of skull, the average width of the right eye socket is 33.2 ±0.5 mm, and the width of the left eye socket is 35.5 ±0.3 mm.

Thus, in all forms of the facial skull, craniometric values eye

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[18].Фокин, В.Ф. (Fokin, V.F.) Функциональная межполушарная асимметрия: хрестома-тия / В.Ф. Фокин, Н.В. Пономарёва (V.F. Fokin, N.V. Ponomareva) – Москва: Научный мир, – 2004. – 257 с.

sockets are more significant than the left to the right.

Comparison of the sizes of the eye sockets on both sides showed that in children, the width of the right eye socket is slightly larger than that of the left eye socket.[19]

There is a significant difference in the linear dimensions of the slope on the right and left. Thus, the height of the mandible is on average 61.5±1.5 mm on the right side, 60.5±1.3 mm on the left side, 91.5±1.5 mm on average on the right side, and 89.5±1.5mm on average on the left side.

According to E.Y. Nikolayeva (2007)[20], asymmetry is observed mainly in the transverse dimensions of the facial skeleton. Because the jawbone is mobile, it is characterized by a more pronounced asymmetry than the immobile maxilla.

According to Tubbs R. et al. (2014)[21], knowing all the details of the location of the infraorbital foramen is critical to ensuring the safety of regional blockade and preventing iatrogenic nerve damage during surgery in the middle of the face.

For this reason, we studied asymmetry in the measurements of the distances from the infraorbital foramen to the nearest anatomical derivatives.

The results measurements showed the distance from the infraorbital hole to the most prominent point of the zygomatic process of maxillary bone was 18 mm to 30.0 mm on the right side, 19.0 mm to 31.0 mm on the left side, and the distance from that hole to the nasal cavity, from 14mm to 23.0mm on the right and 14.0mm to 23.5mm on the left. The distance infraorbital foramen and base of the alveolar ridge varies from 8.0 mm to 35.0 mm on the right and

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[19.] Kiryakov I. Morphometric characteristics of the orbital region of the skull of the newborn// Folia Med (Plovdiv), – 1983. 25(1), – p.31-38.

[20.] Николаева, Е.Ю. (Nikolaeva, E.Yu.)Влияние асимметрии лицевого скелета на степень тяжести аномалий зубочелюстнои системы и ее ортодонтическая коррекция: / автореферат дис. кандидата медицинских наук. / – Тверь, 2007. – 21с.

[21.] Tubbs, R. .A variation of the infraorbital nerve: its potential clinical consequence, especially in treating trigeminal neuralgia: case report / R.Tubbs, M.Loukas, W.May [et al.] // Neurosurgery – 2010. 67(3), – p.315-316

from 7.0 mm to 37.0 mm on the left. The distance from the infraorbital foramen to the infraorbital margin varies from 4.0 mm to 12.0 mm on the right. and from 3.5 mm to 12.0 mm on the left.

Aggarval A. et al. (2015)[22] studied the variations of the location of the infraorbital hole on 133 skulls in adults according to their relation to the bone landmarks. The study results showed that the infraorbital holes are 6.33±1.39 mm below the infraorbital margin, at 25.69 ±2.37 mm from the middle surface, 15.19±1.70 mm from the lateral margin of the pear-shaped incision maxillary bone.[22]

Fourteen of the skulls we studied had visible left-sided asymmetry of the outer nose and right-sided asymmetry in 26.

Asymmetry in the size of the outer nose was studied in all three fans.

The results study showed "Upper fan," left-handed asymmetry is noted in the distances between the nasion and the lateral margin of aperture piriformis in men, and right-sided in the distance between nasion and the medial margin of apertura piriformis in a woman.

Analysis of asymmetry in the “Lateral fan” shows that in men, at a distance between the zygion and the lateral margin of apertura piriformis, left-sided asymmetry is found in broad-nosed skulls and right-sided asymmetry in medium-width and narrow-nosed skulls. In women, right-sided asymmetry decreases from a broad nose to a long scull.

In the "Lower fan," a significant right-sided asymmetry is detected in the distance from the prostion point to the lateral margin of apertura piriformis point on female skulls with a medium-shaped nose.

Thus, the eye sockets, the outer nose, and the maxillary bone play an essential role in forming facial asymmetry.

In order to assess the possibility of determining the asymmetry of the facial skull by modern radiological research methods, morphological analysis of the data obtained as a result of X-ray,

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[22.] Aggarwal, A. Anatomical study of the infraorbital foramen: A basis for successful infraorbital nerve block / A.Aggarwal, H.Kaur, T.Gupta,[et al.] // Clin Anat. – 2015. 28(6), – p.753-760

computer and magnetic resonance imaging examinations were carried out.

According to Mercier J. et al. (2014)[23], the development of radiological diagnostic methods allows detecting asymmetry in the facial skull.

In the study, the facial region was studied in two projections (anterior-frontal and lateral-sagittal) of the skulls of different ages of extrauterine human development.

In the study, the facial area was studied in two projections (anterior-frontal and lateral-sagittal) radiographs of the skulls belonging to different ages of extrauterine development.

X-rays of the frontal surface of the head show a bulge towards the maxillary pocket cavity, which forms the contours of the submucosal canal and the lateral walls of the eye sockets. In addition, the swelling on the right side of the head is slightly different than on the left side. Thus, the right infraorbital canal is inclined forward, downward and inward relative to the left on the right side.

The results showed that radiographs taken from human skulls in early childhood showed only the general contour of the skull, the maxilla, jawbones, and tooth yeast located in them. It is impossible to distinguish other structures of the facial skull from each other.

Radiographs of the skulls of childhood can already determine the entrance to the eye socket, the general contours of the upper and lower walls, the degree of development of the front and maxillary pockets.

Anterior projection radiographs of human skulls from youth, maturity, and old age show the eye sockets separately. Each of them has a rectangular shape with rounded edges. The relief of the upper and outer walls of the eye socket is visible. Slightly above the eyelids is the shadow of the frontal pocket, and below it is the shadow of the nasal cavity with its partition and shells.

On the side of the nasal cavity, a relatively dark shade of the

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[23].Mercier, J.. Facial asymmetries and their skeletal component / J.Mercier, J.Perrin, J.Longis [et al.] // Rev Stomatol Chir Maxillofac Chir Orale., – 2014. vol. 115, No4, – p.219-228

maxillary sinus is identified.

However, it is challenging to study the anatomical and topographic features of the facial region of the head, which is characterized by the presence of vital organs, by traditional radiological methods. For this reason, only pathological asymmetries can be detected on X-rays of the head.

In order to study the possibilities of computed tomography in the detection of asymmetry in the facial skull, the facial skull was examined according to the "upper," "lower," and "lateral" fans, and then compared with the data of computer tomograms. It was found that in most cases, the data of craniometric and computed tomograms completely coincide. This is especially true of the size of the "Upper fan." Thus, it is a highly informative research method that accurately determines the size of computer tomograms. For this reason, according to computer tomograms, it is possible to estimate the size of the facial skull reliably.

In his research Badanin V.V., Vorob'ev Yu.I. (2012)[24] tried to study the information about the temporomandibular joint in people aged 18 to 87 years. In addition to the temporomandibular joints' parameters, the masticatory muscles' size was studied in 15 people without signs of joint dysfunction. The authors note that the combination of CT and MRT scans provides the most accurate information about the shape, structure, size, and changes in the masticatory muscles. Along with computer tomograms, magnetic resonance tomograms were also analyzed in the study. The analysis results showed that the contours of the frontal section of the head show the contours of the eyeball and surrounding soft tissues, frontal, and maxillary sinus, while the horizontal tomograms show the eyeball, optic nerve, internal and external smooth muscles of the eyeball.

However, unlike computed tomography, magnetic resonance

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[24]. Баданин, В.В., Воробьев, Ю.И. (Badanin, V.V., Vorob'ev, Yu.I.) Компьютерно-томографическое и магнитно-резонансное изображение височно-нижнечелюстного сустава в норме // – Москва: Стоматология для всех, – 2012. №1, – с. 30-32.

imaging does not provide a detailed assessment of the bone structures of the skull. Thus, research shows that only pathological asymmetries can be detected on radiographs. X-ray and magnetic resonance imaging methods are less informative to study facial skull asymmetry. In computed tomograms, it is possible to assess the morphology of the facial skull by determining the metric parameters of the skull bones and calculating the individual parameters.

In the study, the disproportion of the facial areas was checked anteriorly and laterally using the Golden Ratio Face computer program.

To detect asymmetry in the anterior view shows that the distances between the zygion points of the right and left halves of the face, the entocantion points and exocantion points, the outer points of the nasal wings, and the outer points of the oral cavity were examined.

The study results showed that in 5 of the 16 figures, the percentage of distances between the entocantion and the exocantion points ranged from 18.6 to 19.2 on the right and from 20.6 to 21.3 on the left. Thus, a weak left asymmetry was observed in this dimension. In other figures, the measurement was 22.7 to 24.5 on the right and 27.8 to 28.4 on the left, thus noting right-sided asymmetry.

Seven the 16 figures, the percentage of the distance zygion points on both sides was 20.4 to 21.5 right, and 18.7 to 19.3 on the left; weak right-sided asymmetry was noted in these figures. This indicator was 17.4 to 18.9 on the right in 5 figures, 21.2 to 22.7 on the left, left-handed asymmetry was observed, and no differences in the dimensions of the right and left sides were identified in 4 figures.

"Lateral view, percentages height outer nose, the distances between the entocantion and the exocantion points, and the angle between the exocantion point and the jaw are calculated.

Analysis of the results of the study showed that in 9 out of 16 images in the side view, the height of the nose ranged from 22.4% to 24.6%, and in 7 of them, from 19.3% to 21.2%. However, since this indicator is the same on both sides in the side images, it is impossible to estimate the face's asymmetry at that distance.

Thus, there are no differences in indicators of the right and left sides in the lateral view.

It was not possible to determine the asymmetry of the face in the photographs, i.e., the degree of expression of the asymmetry.

Trezubov V.N. Fadeev R.A., Dmitrieva O.V. (2012)[25] confirmed by a specially developed, unique method, it is possible to obtain a general and broad characteristic of facial features and determine the variant variability of its anthropometric features in photographs. The analysis is valuable evidence that complements the data obtained from clinical examinations, X-ray cephalometric method.

According to Ponomareva T.V. (2010)[26] people who want to take a picture of the left half of the face are considered more energetic, strong, active, and those who want to take a picture of the right side of the face are considered weaker and softer. The right hemisphere is mainly involved in regulating emotions, although the difference in perception can be determined by the differences in the expressions of the right and left sides of the face and the asymmetry of visual perception.

Based on the evidence obtained, it can be concluded that the asymmetry of the face is better determined in the front view than in the side view, using the computer program Golden Ratio Face of human photographs.

RESULTS

1. The results determination shape of the facial skull showed that in the 120 skulls studied, the majority of medium-face skulls [2,3,9,10,11,13].

2. With the method of "Fan" craniological research, it is

[25.] Трезубов, В.Н. Фадеев, Р.А., Дмитриева, О.В. (Trezubov, V.N. Fadeev, R.A., Dmitrieva, O.V.) Фотографический метод анализа лица // – Москва: Ортодонтия,– 2012. № 1, – с. 42-44

[26.] Пономарева, Т.В. (Ponomareva, T.V.) Становление функциональных асимметрий в раннем онтогенезе: / дис. кандидата медицинских наук. / – Краснодар, 2010. – 163 с.

possible to detect with high accuracy the differences between the right and left morphometric indicators in the upper, lower, and lateral parts of the skull of different shapes. The asymmetry in the distances of the "Lower fan" on the facial skull is better expressed than in "lateral" fans. [2,9,5,10,11,14,15].

3. Significant sexual differences studied size distance nazion zygion in the broad-headed skulls in the "Upper fan" (asymmetry in women -8, in men - 0.47), in the "Lateral-fan" in the middle-faced skulls in the distance between the zygion and the lateral margin of apertura piriformis (the degree of asymmetry was observed in men - 0.73, in women - 0.35), in the "Lower fan" in the long-faced skulls in the distance between the prostion and the lateral margin of apertura piriformis (asymmetry in women - 0.81, in men - 0.15) [6,7,13].

4. The study of the degree of expression of facial skull asymmetry at different ages of postnatal human development showed that asymmetry was not observed in 5 out of 12 distances in skulls belonging to early childhood. Asymmetry in the facial skull is better observed in children and adolescents aged 4-12 years in early childhood than maturity. In adolescence I it is better observed than youth and adolescence II. Asymmetry in the facial skull is more pronounced in the elderly than in other ages of postnatal development [1,2].

5. The shape and size of the eye sockets, outer nose, maxilla play an essential role in forming facial asymmetry. Thus, in all forms of the facial skull, the craniometric values of the left eye socket are higher than those of the right eye socket [3,8]. In all three “Fans”, both left and right asymmetry are noted in the dimensions of the outer nose [12]. There is a significant difference in the linear dimensions of the frontal bone on the right and left sides [4].

6. X-ray and magnetic resonance imaging methods are less informative for studying asymmetry in the facial skull. This research method does not allow the determination of the linear dimensions of the facial skull with high accuracy. Computed tomography can accurately determine craniometrics parameters at different levels [16,17].

PRACTICAL RECOMMENDATIONS

1. Evidence obtained on the asymmetry of craniometric indicators of facial bone structures can be used as normative indicators in cases of violation of the integrity of the facial area, deformities at different ages of postnatal development.

2. The information obtained on the age characteristics of the morphometric dimensions of the facial part of the skull will allow early detection of asymmetry in this area.

3. Information on the relationship between bone asymmetry and the shape of the facial part of the skull may be necessary to evaluate the final results of orthodontic treatments and incorrectly determine the size of transplants during facial hypercorrection.

4. Computed tomography, one of the methods of radiation diagnostics, can determine the effectiveness of facial asymmetry at different ages of postnatal development.

5. The information obtained on the age characteristics of facial asymmetry can be used in anthropological research, the creation of highly reliable defense systems, and forensic medical examination in the appointment of a person.

6. The study results can be used in lectures and workshops in the departments of human anatomy, forensic medicine, orthopedics, and the preparation of guidelines for physicians and residents on the clinical anatomy of the facial skeleton.

LIST OF SCIENTIFIC WORKS PUBLISHED ON THE SUBJECT OF THE DISSERTATION

1.Aliyeva, S.A. Features of craniological signs of asymmetry of the facial skull of mature people // XII International Congress “Euromedica Hannover. – Stuttgart: –19 - 25 may, – 2017, – p.5

2.Алиева, С.А., Гусейнов Б.М. (Alieva, S.A., Guseynov B.M.) Асимметрия размеров «верхнего веера» у взрослых людей с различной формой лицевого черепа // – Воронеж: Журнал анатомии и гистопатологии,– 2018. №1, – с.9-13.

3.Şadlinski, V.B., Əliyeva S.A. Müxtəlif formalı kəllələrdə göz yuvalarının kraniometrik ölçülərində asimmetriyanın təyini // Azərbaycan Xalq Cümhuriy-yətinin 100 illiyinə həsr olunmuş Azərbaycan Tibb Universitetində keçirilən Otorinoloringologiya üzrə Beynəlxalq Elmi- Praktiki Konqresin tezisləri. – Bakı: –27-28 aprel, – 2018, – s. 66-67.

4.Шадлинский, В.Б., Алиева, С.А. (Shadlinskiy, V.B., Alieva, S.A.) Возрастные Особенности формы и размеров верхней челюсти у детей // Материалы XIV конгресса Международной ассоциации морфологов. – Астрахань: – 19-23 сентябрь, – 2018, Морфология, №3, – с. 311.

5.Şadlinski, V.B., Əliyeva, S.A. Üz kəlləsinin aşağı üçdə bir hissəsində kraniometrik göstəricilərin asimmetriyası // ə.e.x., professor R.Ə.Əsgərovun anadan olmasının 85 illik yubileyinə həsr olunmuş beynəlxalq elmi konfrans materiallarının toplusu. – Bakı: – 2018, – s.125.

6.Шадлинский, В.Б., Алиева, С.А. (Shadlinskiy, V.B., Alieva, S.A.) Морфометрические характеристики лицевого черепа у взрослых мужчин и женщин // Материалы Всероссийской Всероссийская научно-практическая конференция с международным участием «Проблемы современной морфологии человека», посвященная 90-летию кафедры анатомии ГЦОЛИФК и 85-летию со дня рождения заслуженного деятелянауки РФ, члена-корреспондента РАМН, профессора Б.А. Никитюка.. – Москва: – 26-28 сентябрь, – 2018. – с. 147-148.

7.Şadlinski, V.B., Əliyeva, S.A. Kişi və qadınlarda üz kəlləsinin kraniometrik ölçü göstəricilərinin assimmetriyası // Doktorantların və gənc tədqiqatçıların XII Respublika Elmi Konfransının materialları – Bakı: – 2018, – s.125.

8.Əliyeva, S.A. Göz yuvasıaltı dəlik və onu əhatə edən anatomik törəmələr arasındakı məsafələrin asimmetriyası // – Bakı: Sağlamlıq, – 2019, №1, – s. 136-141.

9.Şadlinski, V.B., Əliyeva, S.A. Müxtəlif formali üz kəlləsinin aşaği hissəsində asimmet-riyanin öyrənilməsi // – Bakı: Azərbaycan

təbabətinin müasir nailiyyətləri,– 2019, №1, – s. 125-129.

10.Şadlinski, V.B., Əliyeva, S.A. Üz kəlləsinin asimmetriyasının aşkar olunmasında karniometrik "Yelpik" üsulunun effektivlik dərəcəsinin öyrənilməsi // – Bakı: Nəzəri, klinik və eksperimental morfologiya jurnalı,– 2019, №1, – s. 27-37.

11.Əliyeva, S.A. Üz kəlləsində asimmetriyanin təyininin nəticələri // Azərbaycan Tibb Universitetinin İnsan anatomiyasi və tibbi terminologiya kafedrasinin 100 illik yubileyinə həsr olunmuş Beynəlxalq Elmi-praktik Konfrans materiallarının toplusu. – Bakı: – 10-11 dekabr, – 2019, – s.43-44.

12.Shadlinski, V.B., Aliyeva, S.A. Comparative characteristics of the facial skull the size of an adult, depending on the shape of the nose // – Baku: Journal of life sciences and biomedicine – 2019, №1, p.77-82.

13.Алиева, С.А., Шадлинский, В.Б., Мовсумов, Н.Т. (Alieva, S.A., Shadlinskiy, V.B., Movsumov, N.T) Половые особенности асимметрии краниометрических показателей в различных формах лицевого черепа //– Самара: Морфологические ведомости,– 2019. №4, – с.9-15.

14.Əliyeva, S.A. Üz kəlləsinin müxtəlif formalarında yan görünüşdə asimmetriyanın təyininin nəticələri // – Bakı: Azərbaycan Tibb Jurnalı, – 2020, №1, – s. 172-176

15.Aliyeva, S.A. Investigation of asymmetry in different shaped face skulls // Materials of the 27th International Symposium on Morphological Sciences. Annals of Anatomy, – 2020, № 230S, – p.46-47.

16.Əliyeva, S.A. Müxtəlif yaşlı insanların üz kəlləsində asimmetriyanın öyrənilməsinin nəticələri Azərbaycan Tibb Universitetinin yaradılmasının 90 illik yubileyinə həsr olunmuş beynəlxalqa elmi konfransın materialları – Bakı: – 10-11 dekabr, – 2020, – s.46-47.

17.Əliyeva, S.A. Üz kəlləsinin asimmetriyasinin aşkarlanmasında müasiir radioloji müayinə metodlarının effektivliyinin təyini // – Bakı: Nəzəri, klinik və eksperimental morfologiya jurnalı,– 2020, №1-2, – s.68-75

18.Əliyeva, S.A. İnsanin bətnxarici inkişafinin müxtəlif yaş dövrlərində üz kəlləsinin asimmetriyasinin öyrənilməsinin nəticələri // – Bakı:Azərbaycan səhiyyəsinin nailiyyətləri, – 2020, №4, – s.93-101.

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