

muscle plasticity of the tibial cavity. Features of the innervation and blood supply of the triceps surae, the number of muscle branches, the levels of their departure from the nerves and arteries, and the levels of entry into the heads of this muscle were determined by the method of macromicroscopic preparation of the nerves and arterial vessels of the posterior tibial region on the right and left preparations of the lower limbs of 15 fetuses of 4-10 months and 5 corpses of people of both sexes in the second period of maturity. Special attention is paid to the topographical-anatomical relationship of nerves and arteries when they enter the triceps surae and the peculiarities of the intramuscular branching in the heads of the gastrocnemius and the soleus. The research was carried out taking into account bioethical principles and methodological recommendations for conducting scientific research. Loose and trunk types of intramuscular branching of arteries and nerves in the heads of the gastrocnemium muscle have been established. It was established that the innervation of the soleus is carried out by the tibial nerve, and its branches have different levels of departure. To replace defects on the inner and back surfaces of the upper half of the tibia, the gastrocnemius and soleus muscles are suitable, since nerves and vessels enter mainly in the area of their upper third. Depending on the size of the defect (cavity) of the tibial bone, it is possible to move either a part of the longitudinally dissected gastrocnemius or soleus muscle or the entire abdomen, separated from the tendon.

Therefore, understanding the intramuscular distribution of nerves and arteries in the heads of the triceps surae can help in the development of rational methods for the production of flaps for myoplasty of tibial cavities.

**Key words:** myoplasty, triceps surae, intramuscular branching, tibia, human.

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## ANALYSIS OF AGE-RELATED DYNAMICS IN FACIAL STRUCTURE SYMMETRY IN WOMEN

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*The article is dedicated to studying the frequency of visualization of physiological asymmetry of various facial structures in women of different ages and clarifying the peculiarities of their age dynamics. It was found that in childhood, 30% of girls do not have visual signs of facial asymmetry, in adolescence - 10%, in youth and mature age, signs of asymmetry were found in all examined individuals. Asymmetry by one indicator was detected in 40% of children, 70% of adolescents, 50% of girls in youth age, and women of the first period of mature age, and in 30% of examined women of the second period of mature age; by several indicators - in 30% of children, 20% of adolescents, 50% of girls in youth age, and women of the first period of mature age, and in 70% of women of the second period of mature age. Asymmetry of the smile and the mismatch of the midline between the central incisors of the upper and lower jaw were found in all age groups of the examined. Asymmetry of the smile has the highest frequency of detection, and asymmetry of the ears - the lowest.*

**Key words:** symmetry, asymmetry, face, women, age dynamics.

### Connection of the publication with planned research works.

The study was carried out as part of the comprehensive research work of the Department of Normal Anatomy and the Department of Operative Surgery with Topographic Anatomy of Danylo Halytsky Lviv National Medical University "Morphofunctional features of organs in the pre – and postnatal periods of ontogenesis, under the influence of opioids, nutritional supplements, reconstructive surgery and obesity" (state registration number 0120U002129).

### Introduction.

Symmetry is an important criterion in the visual assessment of the face from both aesthetic and medical perspectives. Therefore, diagnosing manifestations of its asymmetry and searching for its causes, as well as methods of correction, are particularly relevant today [1-4]. As it is known, the shape and symmetry of the face are determined by anatomical factors – cranial bones, teeth, occlusion, and the temporomandibular joint, facial and masticatory muscles, fatty spaces and fat pads, vessels and nerves, as well as the level of their functional activity [2-4]. Facial asymmetry can be physiological or pathological, congenital or acquired, and can develop as a result of trauma, stroke, impaired trophic supply or innervation, surgical interventions, loss or pathological positioning of teeth, etc. [5-8]. In cases of pathological asymmetry, which, when accompanied by dysfunction of the affected structures, is also a serious aesthetic factor, the problem acquires social significance [7, 8]. Physiological asymmetry is not accompanied by functional disorders, but under certain factors, it can intensify and transform into pathological asymmetry.

### The aim of the study.

To investigate the frequency of visualization of physiological asymmetry in various facial structures and areas in females of different ages and to identify the features of their age-related dynamics.

### Object and research methods.

The working group was formed using the randomization method. It included 50 females (5 groups of 10 individuals each according to age periodization – girls in the second childhood period, aged 8-11 years; adolescents, aged 12-15 years; young women, aged 16-20 years; women in the first period of adulthood, aged 21-35 years; and women in the second period of adulthood, aged 36-55 years) who attended scheduled or screening dental or ophthalmological examinations.

In all subjects, the symmetry of facial width, the size and shape of the eyes, eyebrows, eyelids, nasolabial folds, corners of the mouth, smile, position of the nose, the size and shape of the nostrils, the size, shape, and position of the ears, as well as the alignment of the midline between the central incisors of the upper and lower jaws, were visually assessed.

The study was conducted in accordance with the principles of the Helsinki Declaration on the Protection of Human Rights, the Council of Europe Convention on Human Rights and Biomedicine, and the provisions of the relevant laws of Ukraine. The study protocol was approved by the Local Ethics Committee for all participants. Written informed consent was obtained from all people who participated in the study.

### Research results and their discussion.

The analysis of data obtained from the visual assessment of symmetry in specified parameters among females of different ages revealed that in the randomized sample of girls in the childhood age group, asymmetry was detected in only three parameters. One child (10% of the total number in this age group) had asymmetrical eyelids, 4 children (40%) had an asymmetrical smile, and 5 children (50%) had a misaligned midline between the central incisors of the upper and lower jaws (**fig. 1**).

In adolescent girls, asymmetry was found in six parameters: 10% of the total number in this age group had asymmetry in the size and shape of the eyes and eyebrows, 20% had asymmetry in the nasolabial folds and corners of the mouth, 30% had an asymmetrical smile, and 40% had a misaligned midline between the central incisors of the upper and lower jaws.

Among young women, 10% had asymmetry in the size and shape of the eyes and corners of the mouth, 20% had asymmetry in the eyebrows, eyelids, and nasolabial folds, and 50% had an asymmetrical smile and a misaligned midline between the central incisors of the upper and lower jaws.

In women in the first period of adulthood, asymmetry was detected in seven parameters: 20% of women had asymmetry in the size and shape of the eyes, eyebrows, eyelids, corners of the mouth, and smile; 30% had a misaligned midline between the central incisors of the upper and lower jaws; and 40% had asymmetry in the nasolabial folds.

The highest number of asymmetry parameters was found in women in the second period of adulthood. In this age group, 10% of the subjects had asymmetry in the shape and position of the ears and a misaligned midline between the central incisors of the upper and lower jaws; 20% had asymmetry in the size and shape of the eyes; 30% had asymmetry in the eyelids; 40% had asymmetry in the corners of the mouth; 50% had asymmetry in the eyebrows and nasolabial folds; and 70% had an asymmetrical smile (**fig. 1**).

Among all the examined girls in the childhood age group, 30% showed no signs of facial asymmetry during visual inspection, 40% had asymmetry in one parameter, and 30% had asymmetry in multiple parameters. Among adolescent girls, no signs of asymmetry were found in only one (10%), while 70% had asymmetry in one parameter, and 20% had asymmetry in multiple parameters.

In the next three age groups, signs of asymmetry were found in all subjects. Specifically, 50% of young women and women in the first period of adulthood exhibited asymmetry in one parameter, while the other 50% of both groups had asymmetry in multiple parameters. Among women in the second period of adulthood, 30% had asymmetry in one parameter, and 70% had asymmetry in multiple parameters.

Comparing the frequency of each type of asymmetry across different age groups showed that asymmetry in the size and shape of the eyes was equally common (10%) among adolescent and young women, twice as common (20%) among women in both periods of adulthood, and never detected in young girls (**fig. 2**).

Eyebrow asymmetry was found in only 10% of adolescents, 20% of young women and women in the first period of adulthood, and 50% of women in the

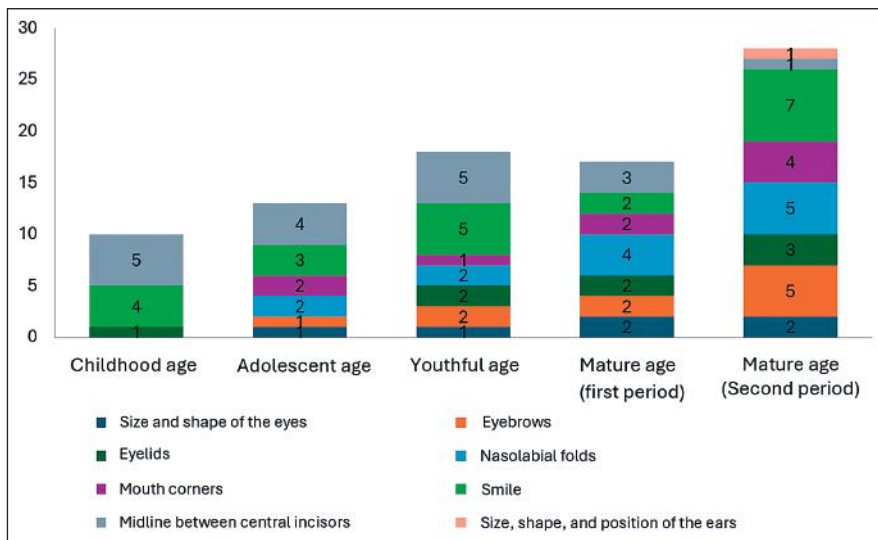


Figure 1 – Frequency of asymmetry detection in various facial areas among females of different age groups.

second period of adulthood. No eyebrow asymmetry was detected in children. Eyelid asymmetry was observed in 10% of children, 20% of young women and women in the first period of adulthood, and 30% of women in the second period of adulthood.

Nasolabial fold asymmetry was present in 20% of adolescent and young women, and twice as common in women of adulthood – 40% in the first period and 50% in the second period. Corner of the mouth asymmetry was found in 20% of adolescent girls and women in the first period of adulthood, 10% of young women, and 40% of women in the second period of adulthood.

Smile asymmetry and misalignment of the midline between the central incisors of the upper and lower jaws were detected in all examined groups. Smile asymmetry had the highest detection frequency—40% in children, 30% in adolescents, 50% in young women, 20% in women in the first period of adulthood, and 70% in women in the second period of adulthood. The frequency of detecting midline misalignment was slightly lower—50% in children and young women, 40% in adolescents, 30% in women in the first period of adulthood, and 10% in

corners of the mouth, and smile) in mature women are observed 1.5-3 times more frequently than in children, adolescents, and young women. It was also found that among the studied asymmetry parameters, the second most common was the misalignment of the midline between the central incisors of the upper and lower jaws. This can be explained by partial asymmetric tooth loss (physiological, related to tooth changes in children and adolescents, and pathological, related to tooth loss in young and mature adults) or bite pathologies.

Scientific literature offers various perspectives on the impact of dental conditions on facial asymmetry. Balikov V.V., Bidnyuk K.A., and Balikov R.V. [3] believe that facial asymmetry in patients with unilateral dentoalveolar anomalies is more pronounced than in adults with an orthognathic bite. According to Makarova O.M. [4], lip and smile asymmetry in patients with dental arch asymmetry is more pronounced than in individuals with a physiological bite, but it does not exceed physiological limits. The increase in lip asymmetry during a smile is

women in the second period of adulthood.

The rarest asymmetry, detected in only 10% of women in the second period of adulthood, was ear asymmetry (fig. 2).

The analysis of the obtained data showed that with age, the number of asymmetry parameters in women increases, as does their frequency. The results of the analysis of the identified age-related facial features suggest that facial expression load plays a significant role in the development of asymmetry. Manifestations of asymmetry in facial expressions (eyebrows, eyelids, nasolabial folds,

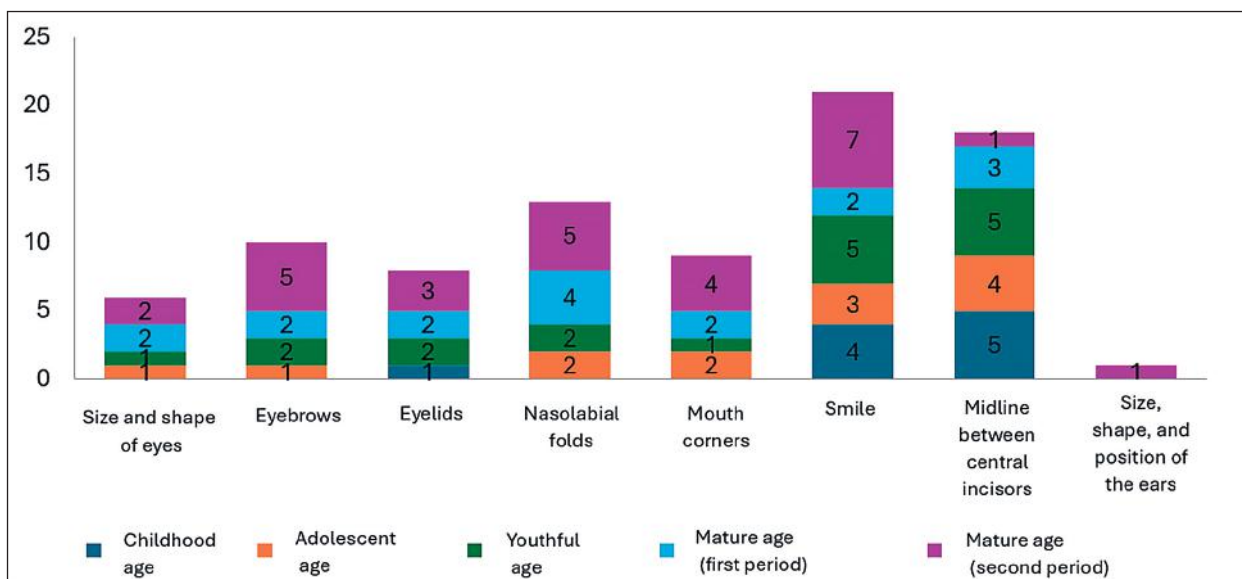


Figure 2 – Age dynamics of asymmetry in anatomical structures and landmarks among females.

explained by functional asymmetry of the facial muscles. The data obtained from our study and the processing of these indicators significantly supplement the known information on the physiological symmetry/asymmetry of the face and the patterns of its age dynamics. They have important practical significance as they highlight the impact of facial expression load and the condition of the dental apparatus on the development of asymmetry in various facial areas. This understanding not only helps in identifying the causes of asymmetry but also in preventing its progression.

## Conclusions.

1. In childhood, 30% of girls show no visual signs of facial asymmetry; in adolescence, this figure is 10%, while in youth and adulthood, all examined individuals exhibit signs of asymmetry.

2. Asymmetry in one parameter was found in 40% of children, 70% of adolescents, 50% of young women,

and women in the first period of adulthood, and in 30% of women in the second period of adulthood; multiple parameter asymmetry was found in 30% of children, 20% of adolescents, 50% of young women, and women in the first period of adulthood, and in 70% of women in the second period of adulthood.

3. In all age groups, smile asymmetry and misalignment of the midline between the central incisors of the upper and lower jaws were observed. Smile asymmetry had the highest detection frequency, while ear asymmetry had the lowest.

## Prospects for future research.

Studying the age and gender characteristics of physiological facial symmetry/asymmetry will help optimize measures to prevent their occurrence and progression and enhance the effectiveness of their correction.

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## АНАЛІЗ ВІКОВОЇ ДИНАМІКИ СИМЕТРИЧНОСТІ СТРУКТУР ЛИЦЯ У ЖІНОК

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**Резюме.** Симетрія є важливим критерієм візуальної оцінки лица як з естетичної, так і з медичної точок зору, тому діагностика проявів його асиметрії та пошук причин її виникнення, а також методів корекції є сьогодні особливо актуальними

**Метою нашого дослідження** стало вивчення частоти візуалізації фізіологічної асиметрії різних структур та ділянок лица у осіб жіночої статі різного віку та з'ясування особливостей їх вікової динаміки.

**Об'єкт і методи дослідження.** Дослідження проведено за результатами візуального огляду 50 осіб жіночої статі різного віку. У всіх обстежуваних визначали симетрію ширини обличчя, величини і форми очей, брів, носа, губних складок, кутів рота, усмішки, положення носа та величини і форми ніздрів, величини, форми та положення вух, а також співпадіння середньої лінії між центральними різцями верхньої та нижньої щелеп.

**Результати дослідження.** З'ясовано, що в рандомізованій вибірці дівчаток дитячого віку було виявлено асиметрію лише за трьома показниками (повіки, усмішка, середня лінія між центральними різцями верхньої та нижньої щелеп). У підлітків асиметрію виявлено за шістьма показниками (величина та форми очей, брови, носогубні складки, кути рота, усмішка, середня лінія між центральними різцями верхньої та нижньої щелеп). У дівчат юнацького віку за сімома показниками (величина та форма очей, кути рота, брови, повіки, носогубні складки, усмішка та середня лінія між центральними різцями верхньої та нижньої щелеп). У жінок першого періоду зрілого віку – за сімома показниками (величина і форма очей, брови, повіки, кути рота, усмішка носогубні складки, та неспівпадіння середньої лінії між центральними різцями верхньої та нижньої щелеп). У жінок другого періоду зрілого віку за вісьмома показниками. (форма та положення вух, неспівпадіння середньої лінії між центральними різцями верхньої та нижньої щелеп, величина та форма очей, повіки, кути рота, брови, носогубні складки та усмішка).

**Висновки.** В дитячому віці 30% дівчаток не мають візуальних ознак асиметрії лица, в підлітковому віці – 10%, в юнацькому та зрілому віці ознаки асиметрії було виявлено у всіх обстежуваних. У всіх вікових групах обстежуваних виявлено асиметрію усмішки та неспівпадіння середньої лінії між центральними різцями верхньої та нижньої щелеп.

**Ключові слова:** симетрія, асиметрія, лице, жінки, вікова динаміка.

ANALYSIS OF AGE-RELATED DYNAMICS IN FACIAL STRUCTURE SYMMETRY IN WOMEN

Krinytskyi R., Adamovych O., Rudnytska Kh., Chalyi I.-V., Kaminska M., Onutchak T., Masna Z.

**Abstract.** Symmetry is an important criterion for the visual assessment of the face both aesthetically and medically, so the diagnosis of its asymmetry manifestations, the search for the causes of its occurrence, as well as correction methods are particularly relevant today.

*The aim of our study* was to investigate the frequency of visualization of physiological asymmetry of various facial structures and areas in females of different ages and to clarify the features of their age dynamics.

*Object and research methods.* The study was conducted based on the results of visual examination of 50 females of different ages. In all examined individuals, symmetry of facial width, size and shape of eyes, eyebrows, eyelids, nasolabial folds, corners of the mouth, smile, position of the nose and the size and shape of nostrils, size, shape, and position of ears, as well as the coincidence of the midline between the central incisors of the upper and lower jaw were determined.

*Research results.* It was found that in a randomized sample of girls in childhood, asymmetry was detected only by three indicators (eyelids, smile, midline between central incisors of the upper and lower jaw). In adolescents, asymmetry was detected by six indicators (size and shape of eyes, eyebrows, nasolabial folds, corners of the mouth, smile, midline between central incisors of the upper and lower jaw). In girls of youth age, asymmetry was detected by seven indicators (size and shape of eyes, corners of the mouth, eyebrows, eyelids, nasolabial folds, smile, and midline between central incisors of the upper and lower jaw). In women of the first period of mature age, asymmetry was detected by seven indicators (size and shape of eyes, eyebrows, eyelids, corners of the mouth, smile, nasolabial folds, and the mismatch of the midline between central incisors of the upper and lower jaw). In women of the second period of mature age, asymmetry was detected by eight indicators (shape and position of ears, the mismatch of the midline between central incisors of the upper and lower jaw, size and shape of eyes, eyelids, corners of the mouth, eyebrows, nasolabial folds, and smile).

*Conclusions.* In childhood, 30% of girls did not have visual signs of facial asymmetry, in adolescence – 10%, and in youth and mature age, signs of asymmetry were found in all examined individuals. Asymmetry of the smile and the mismatch of the midline between the central incisors of the upper and lower jaw were found in all age groups of the examined.

**Key words:** symmetry, asymmetry, face, women, age dynamics.

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**Conflict of interest:**

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