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PECULIARITIES OF AGE-RELATED VARIABILITY OF PHYSIOLOGICAL PARAMETERS IN YOUNG WOMEN OF REPRODUCTIVE AGE.

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Abstract. One of the approaches to the integrative assessment of the functional state of the body is the determination of biological age, which is a combination of metabolic, structural, functional, regulatory features and adaptive capabilities of the body and, in essence, is an indicator of the health status of the body [2]. An in-depth method for determining biological age exists, which is a typical linear regression model of biological age and includes the following set of 13 indicators: systolic, diastolic, and pulse arterial pressure, pulse wave velocity in elastic and muscular vessels, vital capacity, breath-holding time on inhalation and exhalation, lens accommodation, hearing threshold, static balancing on one leg, body weight, self-assessment of health, and the Wechsler symbolic-numeric test [1]. This method has found wide application in clinical gerontology, which makes it promising, but at the same time, the possibility of its application in young people remains poorly understood.

Keywords: biological age, calendar age, accommodation index, regression model.

Аннотация. Одним из подходов в интегративной оценке функционального состояния организма является определение биологического возраста, который представляет собой совокупность обменных, структурных, функциональных, регуляторных особенностей и приспособительных возможностей организма и, по своей сути является показателем состояния здоровья организма [2]. Имеется углубленная методика определения биологического возраста, которая представляет собой типичную линейную регрессионную модель биологического возраста и включает следующий набор 13-ти показателей: систолическое, диастолическое, пульсовое артериальное давление, скорость распространения пульсовой волны по сосудам эластического и мышечного типа, жизненная емкость легких, время задержки дыхания на вдохе и выдохе, аккомодация хрусталика, слуховой порог, статическая балансировка на одной ноге, масса тела, самооценка

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здоровья, символьно-цифровой тест Векслера [1]. Данная методика нашла широкое применение в клинической геронтологии, что делает ее перспективной, но вместе с тем, до настоящего времени остается малоизученной возможность ее применения в молодом возрасте.

Ключевые слова: биологический возраст, календарный возраст, показатель аккомодации, регрессионная модель.

Annotatsiya. Tananing funktsional holatini integrativ baholashga yondashuvlardan biri biologik yoshni aniqlashdir, bu organizmning metabolik, strukturaviy, funktsional, tartibga solish xususiyatlari va moslashuvchan qobiliyatlarining kombinatsiyasi bo‘lib, mohiyatan organizmning sog‘liq holatining ko‘rsatkichidir [2]. Biologik yoshni aniqlashning chuqur usuli mavjud bo‘lib, u biologik yoshning odatiy chiziqli regressiya modeli bo‘lib, quyidagi 13 ta ko‘rsatkichlar to‘plamini o‘z ichiga oladi: sistolik, diastolik va puls arterial bosimi, elastik va mushak tomirlarida puls to‘lqinining tezligi, hayotiy sig‘im, nafas olish va nafas chiqarishda nafasni ushlab turish vaqti, linzalarning joylashishi, eshitish chegarasi, bir oyoqda statik muvozanat, tana vazni, sog‘liqni o‘zini baholash va Wexler ramziy-sonli testi [1]. Bu usul klinik gerontologiyada keng qo‘llanilgan, bu uni istiqbolli qiladi, ammo shu bilan birga, uni yoshlarda qo‘llash imkoniyati hali ham kam tushunilgan.

Kalit so‘zlar: biologik yosh, taqvim yoshi, akkomodatsiya indeksi, regressiya modeli.

INTRODUCTION.

Objective: to assess the possibility of using the method for determining biological age in healthy women of active reproductive age and with impaired reproductive function.

MATERIALS AND METHODS. We analyzed age-related dynamics in women of young reproductive age: the study included 70 apparently healthy non-pregnant women. Patients were divided into two groups depending on their chronological age: Group 1 included women aged 20-24 years (n=50); Group 2 included women aged 30-34 years (n=20).

Statistical data processing was performed using nonparametric analysis. Results are presented as medians and 25th and 75th quartiles. Significance of differences was assessed using the Mann-Whitney U test at $p < 0.05$.

RESULTS AND DISCUSSION. When determining the biological age in women of young reproductive age, with an increase in calendar age, the main changes concerned the following parameters: there was a tendency for the pulse wave conduction time to increase both in elastic (PWVe) and muscular (PWVm) vessels: in the 20-24 year old group, these parameters were PWVe 5.8 m/s, PWVm - 6.71 m/s; in the 30-34 year old group - PWVe 6.27 m/s, PWVm - 6.85

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m/s, which is significantly higher ($p<0.05$). A decrease in respiratory function indicators was also noted. In the 20-24 year old group, the average vital capacity indicator was 3680 ml, in the 30-34 year old group - 3580 ml, which is lower than in the first group ($p < 0.05$). When analyzing the breath-holding indicators on inhalation and exhalation, it was revealed that there was a tendency towards their decrease with age, but to an insignificant extent: in the 20-24 year old age group, the average indicators on inhalation were 49 s, in the 30-34 year old group - 48.5 s; on exhalation - 35 s and 33 s, respectively, in the groups ($p > 0.05$). The indicators of accommodation, hearing threshold and body weight increase with increasing calendar age. The average accommodation indices in the 20-24 year old group were 110 mm, while in the 30-34 year old group they were 120 mm ($p<0.05$). The analysis of the static balancing indices revealed that in women aged 20-24 it was, on average, 44.5 sec; in the 30-34 year old group it was 30 sec, which was significantly lower than in the first group ($p<0.001$). The average biological age in the 20-24 year old group was 21.9 years; in the 30-34 year old group it was 31.3 years, which was statistically significant ($p<0.000$).

Thus, in women of young reproductive age, biological age is primarily determined by the functional state of the cardiovascular and respiratory systems; visual, auditory, and vestibular functions deteriorate. The results of our study showed a correspondence between biological and calendar age in the group of healthy women aged 30-34 and a significant discrepancy between these values in those aged 20-24 (table). Our findings support the development of a new regression model for women of young reproductive age.

Table-1

The ratio of calendar and biological age in women of young reproductive age

Age group	Calendar age	Estimated biological age
20-24 years	21,9±0,24	24,1±0,52
p		0,001
30-34 years	31,4±0,33	30,2±0,95
p		0,241

Table-1

Age-Related Variability of Physiological Indicators in Women of Reproductive Age.

Indicator	18–24 years	25–29 years	30–35 years	Age-related trend

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Body Mass Index (BMI)	Lower normal values	Moderate increase	Highest values within reproductive age	↑
Systolic Blood Pressure	105–115 mmHg	110–120 mmHg	115–125 mmHg	↑
Diastolic Blood Pressure	65–75 mmHg	70–80 mmHg	75–85 mmHg	↑
Heart Rate	72–78 bpm	70–76 bpm	68–74 bpm	↓
Vital Lung Capacity	High	High	Slight decrease	↓
Reproductive Potential	Maximum	High	Beginning decline of ovarian reserve	↓
Adaptive Capacity	Maximum	High	Moderate decline	↓

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