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MORPHOMETRIC FEATURES OF THE EYEBALL WITH HIGH MYOPIA IN YOUNG PEOPLE FERGHANA VALLEY

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Annotation: This article was a comparative assessment of morphofunctional changes in the sclera of the eye, histological structure, results of morphological testing of galata and morphological characteristics of connective tissue, i.e. sclera reaction, in high-grade juvenile and adolescent myopia.

Key words: Myopia, emmetropia, optical density of macular pigment, posterior axis of the eye, morphometric parameters, carotenoids.

Аннотация: Данная статья представляла собой сравнительную оценку морфофункциональных изменений склеры глаза, гистологической структуры, результатов морфологического тестирования микроэлементов и морфологических характеристик соединительной ткани, т.е. реакции склеры, при ювенильной и подростковой миопии высокой степени.

Ключевые слова: Миопия, эмметропия, оптическая плотность макулярного пигмента, перезнезадняя ось глаза, морфометрические параметры, каротиноиды.

In the structure of the morbidity of the visual organ, the frequency of myopia in various regions in the Republic of Uzbekistan and the Fergana Valley ranges from 20 to 60.7%. It is known that among the visually impaired, 22% are young people whose main cause of disability is complicated myopia of a high degree. Both in our country and abroad, high-grade myopia is often combined with pathology of the retina and optic nerve in adolescents and "young adults", thereby complicating the prediction and course of the pathological process. The medico-social significance of the problem is compounded by the fact that complicated myopia affects people at the most working age. The progression of myopia can lead to serious irreversible changes in the eye and significant loss of vision. According to the results of the national medical examination, the incidence of myopia in children and adolescents has increased 1.5 times over the past 10 years. Among adults with visual disabilities due to myopia, 56% have congenital myopia, the rest – acquired, including during school years.

Objective: to evaluate the morphofunctional parameters of the visual analyzer in patients with myopia as the length of the anteroposterior axis (PZO) of the eye increases and the development of myopia with deficiencies of trace elements. Materials and methods: A total of 36 patients (72 eyes) were examined. All patients in the course of the study were divided into groups solely by the size of the eyeball (according to the classification of E.S. Avetisov) [1]. The 1st group consisted of patients with mild myopia and a PZO value from 23.81 to 25.0 mm; the 2nd - with moderate myopia and a PZO value from 25.01 to 26.5 mm; the 3rd – with high myopia and a PZO value above 26.51 mm; the 4th - patients with refraction, close to emmetropic, and with a PZO value from 22.2 to 23.8 mm.

Patients did not take drugs containing carotenoids, did not adhere to a special diet enriched with lutein and zeaxanthin. All subjects underwent a standard ophthalmological examination, which allowed them to exclude macular pathology, presumably affecting the results of the examination. Analyzing the results of the study of essential trace elements, we found that patients with myopia

(regardless of the degree of progression) have an increased content of chromium - 21.2%, nickel - 12.5%, calcium - 10.7%. No significant increase in trace elements was detected in patients with other visual pathology. The reduced content of trace elements is noted much more often and in large quantities. Thus, with myopia, the amount of potassium is reduced in 58.3% of patients; iodine is reduced in 49.5%; calcium and iron in 29.1%. In patients with amblyopia, iodine and calcium are reduced by 72.2%; The examination included the following diagnostic complex of measures: autorefractometry, visometry with determination of maximally corrected visual acuity (MCOZ), non-contact computer pneumotonometry, biomicroscopy of the anterior segment using a slit lamp, static automatic perimetry with correction of ametropia (MD, PSD, and sensitivity in the fovea were evaluated), indirect ophthalmoscopy of the macular region and the visual disc nerve with a lens 78 diopters. In addition, all patients underwent echobiometry on a Quantel Medical device (France), determination of OPMP on an Mpod MPS 1000 device, Tinsley Precision Instruments Ltd., Croydon, Essex (Great Britain), digital photographing of the fundus using a Carl Zeiss Medical Technology fundus camera (Germany); OCT of the anterior segment of the eyeball on the OCT-VISANTE Carl Zeiss Medical Technology device (Germany) (according to the OST-VISANTE study, the central thickness of the cornea was evaluated); OCT of the retina on the Cirrus HD 1000 Carl Zeiss Medical Technology device (Germany). According to the OCT data, the average thickness of the retina in the fovea region, calculated by the device in automatic mode using the Macular Cube 512x128 protocol, was estimated, as well as the average thickness of the choroid, which was calculated manually from the hyperreflective border corresponding to the RPE, to the border of the choroid-scleral interface, clearly visible on a horizontal 9 mm scan formed through the center fovea when using the "High Definition Images: HD Line Raster" protocol. The thickness of the choroid was measured in the center of the fovea, as well as 3 mm in the nasal and temporal directions from the center of the fovea, at the same time of day from 9:00 to 12:00.

Statistical processing of clinical trial data was performed using standard statistical algorithms using Statistica software, version 7.0. The difference in values at $p<0.05$ (95% significance level) was considered to be reliable. Average values, standard deviation were determined, and correlation analysis was performed, calculating the Spearman rank correlation coefficient. Hypothesis testing in determining the level of statistical significance when comparing 4 unrelated groups was carried out using the Kruskal-Wallis ANOVA test.
Results: According to E.J. Tron, the length of the axis of the emmetropic eye varies from 22.42 to 27.30 mm. With regard to the variability of the length of the PZO with myopia from 0.5 to 22.0D, E.J. Tron gives the following data: the axis length with myopia 0.5–6.0D – from 22.19 to 28.11 mm; with myopia 6.0–22.0D – from 28.11 to 38.18 mm. According to T.I. Eroshevsky and A.A. Bochkareva, biometric indicators of the sagittal axis of a normal eyeball are on average equal to 24.00 mm. According to E.S. Avetisov, with emmetropia, the length of the eye's PZO is 23.68 ± 0.910 mm, with myopia 0.5–3.0D – 24.77 ± 0.851 mm; with myopia 3.5–6.0D – 26.27± 0.725 mm; with myopia 6.5–10.0D – 28.55 ±0.854 mm. Fairly clear parameters of emmetropic eyes are given in the National Manual of Ophthalmology: the length of the PZO of the emmetropic eye is on average 23.92±1.62 mm. In 2007, I.A. Craftnikov created a new anatomical-optical and corresponding reduced optical scheme of the emmetropic eye with a clinical refraction of 0.0 D and a PZO of 23.1 mm. The average age of patients ranged from 14.0±45.0 years. The obtained results of the studied indicators show a decrease in some of them as the PZO increases:maximum -corrected visual acuity ($p=0.01$), sensitivity in the fovea ($p=0.008$), average retinal thickness in the fovea ($p=0.01$), average choroid thickness in the nasal and temporal sectors ($p=0.005$; $p=0.03$). In addition, in all groups of subjects, a significant

statistically significant inverse correlation was revealed, between PZO and (MCOZ) -0.4; as well as the thickness of the retina in the fovea -0.6; the thickness of the choroid in the fovea -0.5 and sensitivity in the fovea -0.6; ($p<0.05$). An increase in the length of the eye in myopia is currently considered as a consequence of metabolic disorders in the sclera, as well as changes in regional hemodynamics. Elastic-elastic properties of the sclera and changes in the length of the anterior-posterior axis have long been of interest to scientists. The evolution of the study of the anatomical parameters of the eyeball is reflected in the works of many authors. **Conclusion:** To approach the medical treatment of ophthalmopathology in a different way, to abandon the practice of prescribing trace elements without studying the actual elemental status of a person.A detailed analysis of the obtained average values of the studied parameters revealed a tendency to a general decrease in the morphofunctional parameters of the eyeball as the PZO increases in the groups. At the same time, the obtained correlation data of the conducted clinical trial indicate a close relationship between the morphometric and functional parameters of the visual analyzer. Analyzing the results of the study of essential trace elements, we found that patients with myopia (regardless of the degree of progression) have an increased content of chromium - 21.2%, nickel - 12.5%, calcium - 10.7%. No significant increase in trace elements was detected in patients with other visual pathology. The reduced content of trace elements is noted much more often and in large quantities. Thus, with myopia, the amount of potassium is reduced in 58.3% of patients; iodine is reduced in 49.5%; calcium and iron in 29.1%. In patients with amblyopia, iodine and calcium are reduced by 72.2%

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