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MIOPIYA VIOLATION OF THE REFRACTION IS A ILLNESS

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ABSTRACT

Protection and improvement of health of the population are one of the main objectives of our state. The accommodation role as one of the main regulators was repeatedly emphasized with domestic ophthalmologists. Progressing short-sightedness remains to one of the most actual problems of ophthalmology as quite often leads to development of irreversible changes of an eye bottom and essential decrease in sight at able-bodied age. Thus, having considered a miopiya, refraction violation as an illness, algorithm of its diagnostics and treatment therapeutic and surgical we see that ophthalmologists under the direction of the government constantly in all the increasing volume carry out wide system of social and economic and medical measures for public health care of all age.

Modern ideas about the role of accommodation in refractogenesis

In recent decades, numerous data have been accumulated on the role of accommodation in the formation of refraction and, in particular, myopia. However, researchers differ in their interpretation of this role. Thus, according to T. Sato (1957), a persistent spasm of accommodation, thus, an increase in the refractive power of the lens, is the basis of acquired myopia. But later studies using ultrasound biometrics have shown that acquired myopia is always formed by lengthening the anteroposterior axis of the eye and even, more precisely, by increasing the vitreous cavity, that is, the distance from the back surface of the lens to the posterior pole of the eye. In other words, the nature of acquired myopia is always axial, not lens.

A.A. Sychev (1977) argues that active accommodation when looking into the distance is of great importance for explaining the initial mechanisms of refraction enhancement. The author admits that in connection with long-term work at close distance, there is an improvement in the activity of accommodation for near vision, and the activity for distance decreases.

E. Ong, K.J. Ciuffreda (1995) conducted studies proving that working at close range causes non-persistent myopia. It forms a

short-term myopic further point, which changes directly during subsequent continuous visual work at close range.

In another work, K.J. Ciuffreda, M. Rosenfield (1995) write that unstable myopia may appear after prolonged focusing on an approaching test object. This is due to the intensity of the accommodative response.

Noteworthy is the model of refractogenesis adopted in our country, developed by E.S. Avetisov (1986), in which accommodation acts as a regulator of this process.

As one of the etiological moments of the occurrence of myopia, the author considers visual work at close range in the presence of a weakened accommodative ability. The essence of the theory is as follows. The growth of the eye is not a simple increase in its size, but the directed formation of the eyeball as a complex optical system under the influence of environmental conditions and a hereditary factor. One of the main etiological moments in the development of the optical system of the eye is accommodation.

With a weak accommodative capacity of tension, visual work at close range becomes an unbearable burden for the eyes. In these cases, the signal from the ciliary muscle, which enters the eye growth control center for a long time, induces it to change the optical system in such a way as to adapt it to work at a close distance without accommodation tension. This is achieved mainly through a moderate lengthening of the anteroposterior axis of the eye during growth. Under the eye growth control center E.S. Avetisov meant "not an anatomical, but a functional concept - a system of neuro-humoral influences that ensure the growth of the eye and the directed formation of its refraction." Thus, myopia can be considered as a consequence of the adaptive reaction of the body, which consists in lengthening the eyeball, carried out according to the feedback principle. General diseases of the body, weakness of the supporting connective tissue and other factors only favor the cause (working at close range in conditions of weak accommodative ability) to turn into a consequence (myopic refraction).

In recent years, a method of lens-induced emmetropization has been developed abroad in animal experiments and a theory of retinal defocus as a mechanism for regulating eye growth has been proposed (Hung and Ciuffreda, 2003). According to this theory, one of the most important stimuli for regulating the axial growth of the eye is the defocusing of the image on the retina. Image defocusing directly regulates eye growth by changing the release rate of retinal neurotransmitters, which have a direct effect on proteoglycan synthesis and scleral matrix biology. The participation of the accommodation apparatus in these processes is completely rejected, since in the experiment the intersection of the optic nerves did not prevent the development of Lenz-induced myopia (Wallman, Wildsoe, Xu et all, 1995). At the same time, the experiment shows that “hypermetropic” defocusing induced by negative lenses (i.e., when the refraction is weak and the image is focused behind the retina) stimulates the elongation of the eye in order to combine the plane of the retina with the focus.

On the contrary, "myopic" defocusing with positive lenses, when the image is formed in front of the retina, inhibits the growth of the eyeball in experimental animals. These processes are presumably regulated by

neuromodulators secreted by the amacanthus cells of the retina itself.

In an animal experiment, data were obtained that it is possible to change the position of the retina by adjusting the thickness of the choroid, thereby changing the focus of the eye. Little is known about the mechanisms underlying the change and regulation of choroid thickness. The sclera acts as the outer shell of the eyeball and also helps to compensate for defocus, although it reacts more slowly than the choroid. Thus, these two processes are complementary.

However, without disputing these assumptions, we must not forget that the task of focusing rays on the surface of the retina is entrusted by nature to the accommodation apparatus. And the inability of this apparatus for long-term loads will lead to repeated episodes of defocus of the hypermetropic type, which includes the entire pathogenetic chain of uncontrolled eye growth. Accommodation is the ability of the eye to clearly see objects at different distances due to a change in refraction. According to many domestic ophthalmologists, accommodation is one of the main regulators of refractogenesis (Avetisov, 1999). Through the apparatus of accommodation, the influence of many unfavorable factors contributing to the development of myopia is mediated. These factors either hinder its activity (unfavorable hygienic conditions for visual work, anisometropia, astigmatism), or “affect” the accommodation apparatus itself (violation of regional hemodynamics, dysfunction of the ciliary muscle due to a disorder of sympathetic innervation, chronic infectious diseases, general physical inactivity). However, it is well known that almost all structures of the eyeball are involved to one degree or another in providing the biomechanism of accommodation, although the lens, the ligamentous apparatus of the lens, the ciliary muscle and the choroid are the main links of the actuating mechanism.

Thus, having considered refractogenesis (albeit superficially), the pathogenesis of acquired myopia can be traced. This knowledge can be used when choosing an algorithm for diagnosing and treating accommodation disorders in patients.

Tables of algorithms for the diagnosis and treatment of accommodation disorders in patients are provided in the work "Interregional Association of Ophthalmologists, 2012". In addition to the methods of treatment indicated in this work, if there are indications, myopia (refractive errors) is corrected with glasses, contact lenses (soft and / or hard).

At the same time, it is important to remember: in order to eliminate corneal distortions caused by wearing contact lenses, you should stop wearing soft lenses 2 weeks before keratotomy and hard lenses at the rate of 1 week for each year of wearing.

Myopia Correction:

1. Corneal surgery is aimed at flattening the cornea:

a) radial keratotomy consists in making radial incisions along the periphery of the cornea. The procedure gives good results in mild myopia. However, with the advent of laser interventions, it is used less often;

b) photorefractive keratectomy - performed using an excimer laser, which produces dosed removal of corneal tissue to a predetermined depth with minimal damage to surrounding tissues. When correcting myopia, the tissue of the

anterior surface of the cornea is in the center, which leads to its flattening; approximately every 10 μm of ablation corrects 1 diopter. PRK can correct myopia up to 6 diopters, astigmatism up to 3 diopters and mild hypermetropia. As LASIK progresses, PRK is performed less frequently and mostly in patients for whom LASIK is not an indication, such as those with very thin corneas; complications - delayed epithelialization, corneal hazes and halo (halo), reduced night vision and regression of the effect. Ablation site decentration, scarring, abnormal epithelial healing, aseptic infiltrates, infections, and acute corneal necrosis are rare.

c) laser in-situ keratomileusis is the most frequent refractive procedure recently. It has more capabilities than PRK and can correct hypermetropia of 4 diopters, astigmatism - up to 5 diopters, myopia - up to 12 diopters, depending on the thickness of the cornea. Complications: - Intraoperative include “perforated” holes, thin flap, incomplete flap cut, incomplete or uneven flap, and rarely corneal perforation; postoperative: - wrinkling, curvature or displacement of the flap; epithelial defects that predispose to epithelial ingrowth under the flap;

d) diffuse lamellar keratitis (linear granular infiltrates resembling quicksand of the Sahara), peripheral corneal infiltrates, late infectious keratitis, anterior segment ischemia and optic neuropathy, presumably due to increased ophthalmotonus;

e) implantation of intrastromal plastic rings causes flattening of the cornea in the center and can be used to correct mild myopia, does not affect the visual axis, is potentially reversible.

2. Lens surgery

a) extraction of a transparent lens gives a good visual effect, but there is a risk of developing retinal detachment;

b) a phakic posterior chamber lens is used for high myopia, possible complications are uveitis, loss of endothelial cells, cataracts, so this technique should be used strictly according to indications;

c) a phakic anterior chamber lens with a mount in the corner of the anterior chamber is applicable for high myopia. Its effect on the endothelium is minimal, other complications are not typical, with the exception of pupillary disorders.

Thus, having considered myopia, refractive error as a disease, the algorithm for its diagnosis and treatment, therapeutic and surgical, we see that ophthalmologists under the leadership of the government are constantly implementing a wide system of socio-economic and medical measures to protect the health of the population of all ages. In solving this problem, an important place belongs to the struggle for the preservation of full-fledged vision, the role of which in the cognitive and pond activity of a person is exceptionally great. Great attention is still paid to the protection of children's vision. The protection of children's vision should be understood as a set of general medical, hygienic and ophthalmological measures that ensure the creation of optimal conditions for the development of the visual system and contribute to the prevention, early detection and treatment of eye pathology in childhood. The struggle for the preservation of full-fledged vision in the younger generation is one of the most important tasks of modern health care, since full-fledged vision allows a person to maintain a quality standard of living and be useful in the labor field.

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