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**Sykyrytska T.B.,
Kozariychuk N.Ya.**

B.L. Radzihovsky Department of Ophthalmology of the Higher State Educational Institution of Ukraine "Bukovinian State Medical University", Chernivtsi, Ukraine, naten_@mail.ru

Biryuk I.G.

Department of Disaster Medicine and Military Medicine of the Higher State Educational Institution of Ukraine "Bukovinian State Medical University", Chernivtsi, Ukraine

PECULIARITIES OF COGNITIVE MODULATION INFLUENCE ON IMPROVEMENT OF VISUAL ACUITY IN SPORTSMEN OF THE YOUNG AND MIDDLE AGE

Abstract. *A complex analysis of 85 children - sportsmen for the purpose of studying efficacy of the method of cognitive modulation in the treatment of amblyopia was carried out in this article. The method of cognitive modulation enables to stabilize visual functions on a high level in the majority of patients (67-75%). The method of video-computer autogenic training is characterized by the lack of contraindications and shows good results.*

Keywords: *amblyopia, cognitive modulation, visual analyzer.*

Introduction. Owing to the visual organ we receive information about the world around. Visual analyzer is bound with the whole organism by the significant quantity of anatomical and physiological mechanisms, therefore, functional or morphological changes of the visual organ are often caused by common diseases. The majority of pathological eye changes it is the manifestation of common or systemic diseases. The state of visual acuity and visual field provides visual perception of the objects, orientation in space and in case of their professional assessment enables to give functional characteristics of visual analyzer under pathologies, occupational selection, working examination and scientific investigations.

The problem of amblyopia in sportsmen of the young and middle age represents itself a serious medical and social problems. To solve these problems optic correction and various pleoptic programs are actively used in up- to - date ophthalmology [1;2;5-8].

Nowadays due to severe visual overexertion in young people the methods of treatment using the ways of external feedback started to be widely attracted in practical medicine Perspective in this direction is the method of cognitive modulation of the visual acuity which

is brought into effect by means of hardware complex "Amblyokor". In its base there is video-computer autogenic training which promotes the renewal by the nervous system of the control of the processes, taking place in visual analyzer, and intensifies brain capacity to restore accuracy of visual image.

The aim of the article is substantiated and evaluated by the efficacy of the method of cognitive modulation of visual acuity in the treatment of the students and sportsmen afflicted with amblyopia.

Pathological changes of the eye in the sportsmen of the children's and youthful age are observed not so often because of the severe medical selection when admitting to the trainings. According to the observations of ophthalmologists two diseases, in general, such as conjunctivitis and pathological changes of the retina are detected in the sportsmen of the given age group [3; 4]. If inflammation of the conjunctiva is associated with the conditions of physical trainings, then pathological changes of the retina (hemorrhages, exfoliations, etc.) - with the specific features of exercises and physical activities in either kind of sports. To the latter ones it is possible to refer frequent excessive exertions (barbell, wrestling), frequent position of the body head foremost

(gymnastics and others), cuffs to the head (boxing), which may lead to a significant visual deterioration or even its total loss.

Changes of the retina, associated with great myopia, hyperopia, astigmatism, strabismus, amblyopia, spasm of accommodation, hypertension and intense overstrain of a sportsman may be the contributing factors before the onset of such dangerous ocular diseases. One of the most effective, absolutely safe and painless way of treatment of ophthalmopathy in the sportsmen of the children's and adolescent age is timely use of physiotherapeutic methods of treatment.

Medication with medicinal preparations under certain conditions is undoubtedly justified but for all this there occurs reliability of undesirable and unforeseen side-effects. Surgical interference, as a rule, is an emergency measure in the process of treatment. Therefore, physiotherapy, being tested not by a hundred years, remains to be the safest and prevalent direction in the treatment and rehabilitation [6; 8; 10].

Objective: To ascertain the health condition of the students and sportsmen. To prove topicality of using health – supporting technologies in the process of teaching students.

Materials and methods. The authors have carried out complex analysis of the data of the 32 children (control group) with amblyopia of various genesis, who received traditional pleoptic treatment, and 53 children (group under study) who underwent multimodality therapy using hardware complex "Amblyokor" of ophthalmologic outpatient clinic "Luxor Optics". All children - sportsmen of the control and group under study were aged from 12 to 18 years. 19 children (59%) with refractive amblyopia, 11(34%) with dysbinocular and 2 children (7%) with amblyopia of obscure origin were revealed among 32 children of the control group (15 boys and 17 girls). When examining the given group amblyopia of a mild degree was observed in 17 (53%) children, medium degree - 12 (38%) and high degree - 3 (9%). Pleoptic medication included different kinds of photo-, colour- and laserstimulation. Acuity of vision

and field of view were determined in all patients before and after the treatment.

In ophthalmological outpatient clinic 53 children-sportsmen of the group under study with amblyopia of different genesis: refractive amblyopia -39 (75%), dysbinocular - 10(18%) amblyopia of obscure origin - 4 (7%) underwent hardware treatment using complex "Amblyokor".

The term of treatment according to the kind and degree of amblyopia constituted 10-15 procedures using the apparatus "Amblyokor".

Special attention was paid to the form of refraction when choosing the regimen of treatment. The regimen "relaxation" was used when detecting myopic refraction and mixed astigmatism, and the regimen "activation" was used in case of hypermetropic refraction and hypermetropic astigmatism.

Visual acuity was determined according to the Sivtsev- Golovin's, Orlova's tables and Landolt's rings with or without optic correction. Indices of visual acuity in children of the group under study were used as the control of the treatment efficacy. The analysis of the results of the treatment of 53 children (19 boys and 34 girls) using hardware complex "Amblyokor" in 3 and 6 months after therapy was carried out by us.

In the group under study amblyopia of a mild degree was observed in 27 (51%) children, medium- in 21 (40%) and high degree - in 5 (9%) children.

Results and discussion. Data of the retrospective analysis of the results of pleoptic treatment of children- sportsmen using traditional methods and therapy by means of hardware complex "Amblyokor" are shown in table 1. According to the data given in the table, in children receiving pleoptic therapy, the average visual acuity without correction increased by 0.05 and with correction by 0.15. Respectively, the structure of amblyopia has changed in degrees. Thus, amblyopia of a high degree decreased by 1.5 times (from 15% to 19%), medium- by 2 times (from 29 to 14%), and a portion of amblyopia of a mild degree increased by 1.5 times (from 50 till 75%).

Analyzing the data of the table, concerning

Table

| | Control group N=32 (Children- received pleoptic treatment) M ±m | | Group under study N=53 (Children – underwent the treatment using apparatus "Amblyokor") M ±m | | P |
|---------------------------------|--|--------------------|--|--------------------|-------|
| | Before treatment | After treatment | Before treatment | After treatment | |
| Medium visual acuity | | | | | |
| Without correction | 0,07±0,02 | 0,1±0,05 | 0,15±0,1 | 0,45±0,25 | >0,05 |
| With correction | 0,1±0,05 | 0,25±0,15 | 0,2±0,15 | 0,65±0,3 | >0,05 |

the children who underwent the treatment on complex apparatus "Amblyokor" it is possible to ascertain that due to the hardware treatment medium visual acuity without correction increased by 0.3, and with correction by 0.45.

As a result of multimodality treatment medium visual acuity increased from 0.2 +_0.15 (before medication) till 0.65+_0.3 (after medication).

Three months later after the hardware treatment visual acuity remained the same in 75% children, and in 6 months - in 67%.

In other cases, visual acuity reduction without correction and with the optic correction varied from 0.05 to 0.4. For the most part these were the children with obscure or dysbinocular amblyopia of a very high and high degree, what, in our opinion is explained by the availability of incorrect (not central) fixation, absence of the constant correction in case of one-sided lesion.

Conclusions. 1. This research corroborates the necessity of the search of new methods of amblyopia treatment using modern technologies.

2. Method of cognitive modulation of visual acuity enables to stabilize visual functions on a rather high level in the majority of patients (67%-75%).

3. The preference of video-computer-autogenic training method is the absence of side-effects, simplicity of the procedure and good effectiveness.

4. Despite of using up-to-date methods of pleoptics the treatment of amblyopia remains not completely solved.

Perspectives of further investigations. The obtained and cited results are the scientific

ground for further studying cognitive modulation influence in order to improve visual acuity in the students and sportsmen, who subject the visual organ to intensive overloading.

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