New technologies in health color correction and disclosure of phenomena and patterns in the interaction of the retina of the eye and light

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Hermann Helmholtz in the middle of the 19th century for the first time expressed the idea that all those forces with the help of which our body lives and moves, have their source of sunlight.

Johann Goethe, back in 1748, first noticed that our eyes are sunny and in his poem he wrote: "If our eyes were not sunny, whoever admires the sun."

Sergei Ivanovich Vavilov at the beginning of the last century in his book "The Eye and the Sun" also expressed his concept of the sunshine of the eye. He wrote: "The eye cannot be understood without knowing the Sun, on the contrary, by the properties of the Sun one can theoretically determine the features of the eye." No wonder there is a proverb: "The sun created creatures of its own kind."

Until now, however, the essence of the sunshine of our eye has remained unrevealed. The mechanisms of interaction of the eye with the spectrum of sunlight were also unknown.

It is known that in nature, light has the property of converting into matter and vice versa and at the same time exerting electrical, chemical, thermal and mechanical effects on matter. This property of light reflects one of the fundamental laws of nature - the law of conservation of energy, which was first discovered by H. Helmholtz for non-mechanical phenomena. The manifestation of this property of light in the human body has not been essentially known until now.

We have created a new medical technology - a device that, according to the decision of the Committee on New Medical Technology of the Ministry of Health of the Russian Federation, bears the name: "Teterina's ophthalmic device for color therapy, programmable in seven modes, portable ATsT-02 (patents No. 31721, 2230534)". The device was recommended for production and use in medical practice, for registration and entry into the Register (Registration certificate No. FS 02262004 / 1420-05 dated 11.05.2005. Certificate of Conformity No. ROSS RU.IM02. In 13278 dated 26.10.2005.).

The advantage of this medical technology over the existing analogues previously developed by us (ASO-4 and ATsL-01 Strela) is that the following has been achieved:

1) improved color saturation;
2) higher stability of the glow of sources;
3) complete protection of the patient's eyes from possible ultraviolet components in the radiation spectrum of the optical unit;
4) efficiency of control over the characteristics of the emitted light;
5) providing therapeutic modes without interfering with the design of the apparatus;
6) reliability and durability of the emitters in the optical block;
7) the ability to assess the functional state of the retinal macula eyes and its correction;
8) visual observation: a) mirroring the spatial structure macula and the phenomena of photosynthesis in the macular region of the retina when stimulated by the short-wavelength part of the spectrum; b) mirroring biofeedback against the background of the color field of view, which manifests itself in the pulsating response of the neurons of the visual system and the brain to color stimulation of the retina.

Consequently, the technology allows one to observe firsthand the interaction of the retinal macula with the spectrum of visible light. In this case, the structure of the macula has the form of alternating concentric rings formed, firstly, due to its funnel-shaped deepening, and, secondly, in the process of absorption, emission and reflection of light by these rings when the eye is exposed to stimuli of blue, blue, purple and green light ... In a healthy body, these phenomena provide sparkle and radiance to the eyes. For chronic systemic psychosomatic diseases and syndrome

chronic fatigue, this phenomenon is not observed, the manifestation of which may be the syndrome of "tin eyes", i.e. there is neither shine nor their radiance. These diagnostic signs can serve as an indicator of a violation of the processes of photosynthesis in the retinal macula, as well as dysfunction of the mental sphere of the brain. Due to the close interconnection of the retinal macula and the hypothalamus, the new technology of color therapy through the visual analyzer provides an improvement in the activation of neurons in the visual cortex and subcortical structures of the brain. At the same time, the color signals of the retina are converted into complex neurodynamic impulses that play an important role in the regulation of the functional systems of the body by the structures of the brain. Thus, a systematic approach to correcting human health is provided through the visual analyzer by the spectrum of visible light, i.e. solar energy.

When comparing the absorption spectra of the macula of the retina and chlorophyll of plants, the general regularities of this phenomenon have been established, which consist in the fact that the maximum absorption of the macula and chlorophyll "b" is in the short-wave part of the spectrum with a wavelength of 400-480 nm, and light emission is in its middle-wave part (485-587 nm).

It is known that there are phenomena in nature, the spatial structure of which is also characterized by a funnel-shaped depression and concentric rings. These natural phenomena include Newton's color rings, the structure of snowflakes, cosmic planets, etc. Thus, we have established the commonality of the spatial structures of the macula of the retina and natural phenomena.

When comparing the phenomena of photosynthesis in plants and in the retina, we established general regularities in the mechanism of photosynthesis of chlorophyll, rhodopsin of rods and retinal pigment epithelium. A feature of the pigments of retinal rods and plant chlorophyll is the presence of weakly retained electrons in their non-protein system, which are selectively excited by light quanta using sensitizers. In plants, chlorophyll grains play the role of photodetectors, catchers of light photons and optical sensitizers, which absorb rays of solar energy and transfer them to carbon dioxide particles, which are insensitive to light rays. In this case, a photochemical reaction occurs, during which carbon dioxide in the air is decomposed into carbon and oxygen. In the retina of the eye, a similar role is played by the grains of the pigment epithelium,

We have also discovered a previously unknown regularity of photosynthesis and resynthesis of rhodopsin and retinal, the aldehyde form of vitamin A, on which twilight vision and visual orientation in space depend. Disruption of this mechanism of photosynthesis is the cause of such a disease as "night blindness", which is the main symptom of various forms of damage to the periphery of the retina, ie. her rod apparatus. The essence of the regularity of photosynthesis lies in the fact that in the light, as a result of the close contact of the outer segments of the rods with the villi of the retinal pigment epithelium, an interchange occurs between them. The grains of the villi by inductive resonance transfer the light quanta absorbed by them to rhodopsin, which leads to its decomposition and discoloration. In this case, vitamin A is formed, which, with the help of enzymes, passes into the pigment epithelium. In the dark, rhodopsin is resynthesized. In this case, vitamin A passes from the pigment epithelium back to the outer segment of the rods, where, being oxidized, it turns into 11-cis-retinal. The latter connects to the opsin, thanks to which it again turns into rhodopsin. The villi containing the grains are chlorophyll, contracted and move to the cells of the pigment epithelium.

Thus, it was theoretically established previously unknown, objectively existing regularity of photosynthesis of rhodopsin rods and retinal pigment epithelium.

This discovery makes it possible to reveal the etiopathogenesis of incurable retinal pathology, the main symptom of which is twilight-night blindness. In addition, on the basis of this discovery, the issues of prevention and treatment of this pathology can be resolved,

caused by impaired photosynthesis of rhodopsin and retinal pigment epithelium. The created devices and methods, protected by patents, make it possible to restore the function of photosynthesis of rhodopsin and retinal pigment epithelium and, accordingly, twilight vision.

There are no analogues in the world.

The device "ATsT-02" is recommended for widespread use in medical practice, namely:

1) In ophthalmology: for the prevention and treatment of diseases of the organ of vision and improvement of visual functions with refractive errors (myopia, hyperopia, astigmatism), amblyopia, presbyopia, initial cataract, glaucoma, retinal and optic nerve pathology, uveitis, keratitis, etc.

2) In neurology: to improve the general condition of the body in patients with encephalopathy, multiple sclerosis of the brain, parkinsonism, the consequences of ischemia and cerebral stroke, etc.

3) In endocrinology: with pathology of the thyroid gland (hypo- and hyperthyroidism, goiter), diabetes mellitus, etc.

4) In pediatrics: with systemic psychosomatic disorders, including enuresis,

5) In cardiology: with angina pectoris, coronary heart disease, consequences transferred myocardial infarction.

6) With dysfunctions of the digestive, immune (immunodeficiency), hematopoietic, genitourinary systems.

Consequently, the new technology of color therapy, acting on the regulatory structures of the brain through the visual analyzer, can be highly effective in the treatment of not only visual, but also systemic psychosomatic pathology. This is evidenced by the data obtained by us in the treatment of patients with cataracts, glaucoma and night blindness, in which a combination with systemic psychosomatic pathology was observed.

Cataract treatment results

A total of 126 patients with cataracts were treated (252 eyes), including 55 people with an initial stage of cataract (110 eyes) and a developed stage of 71 (142 eyes). The patients' age ranged from 42 to 75 years. In patients with the initial stage of cataract, the initial visual acuity averaged 0.65, in patients with the advanced stage - 0.29.

In all age groups of these patients, syndromes of systemic psychosomatic pathology were observed with involvement in the process of dysfunctions of the central nervous system, ANS, CVS, immune, and other systems.

After 1–2 courses of color therapy in patients with the initial stage of cataract, visual acuity improved in 100% of cases and averaged 0.95. In patients with advanced stage of cataract, improvement in visual acuity was noted in 70% of cases, and on average it was 0.55.

Along with the improvement of visual functions, an improvement was achieved in the general condition of the body, the functions of all body systems, including the immune and hematopoietic, as well as the normalization of blood pressure,

Thus, after color therapy in patients at the initial stage of cataract, the normalization of visual functions is achieved, and at the advanced stage, their improvement is twofold. Simultaneously with the improvement of visual functions, there was an improvement in the psychosomatic state of patients.

Color therapy in the rehabilitation of patients with glaucoma and the prevention of blindness

The aim of the work was to assess the effect of color therapy on visual function and intraocular pressure (IOP) in patients with stage I-III open-angle glaucoma (OAG). A total of 52 patients (82 eyes) were examined, including 19 men, 33 women. The average age for men is 62.5 years, for women - 68.6 years. Glaucoma stages: initial (I) - 20 eyes (after surgery - 1), advanced (II) - 36 eyes (after surgery - 5), advanced - 26 eyes (after

operations - 16). Uncompensated glaucoma in the operated eyes was 50%, in non-operated eyes - 76.1%. In 66 eyes (80.5%), cataracts were detected, including the initial - at 50 and immature - in 16 eyes, pseudophakia (with an artificial lens) - in 5 eyes, myopia - at 23, macular degeneration - at 6, central thrombosis retinal veins - in 3 eyes. The majority of patients showed symptoms of psychosomatic disorders, including cephalalgia, vegetative-vascular dystonia, hypertension, endocrine ophthalmopathy, dysfunction of the thyroid gland, cardiovascular, digestive and other systems. For the treatment of patients, TP apparatus was used. Teterina for color therapy ("ATsL-01-Strela" and ATsT-02), which are glasses that generate light pulses of a given color, duration, period and brightness.

results

After color therapy, improvement in visual acuity and expansion of the boundaries of the visual fields was noted in 100% of cases. With color campimetry, a positive dynamics of light and color sensitivity of the retina was observed. The average visual acuity in stage I patients before treatment was 0.65, after treatment - 0.9, stage II - 0.57 and 0.82, respectively, stage III - 0.22 and 0.42, respectively. Normalization of IOP was achieved in 82% of cases. In 50% of cases, according to the state of the visual fields, stage II passed into stage I, in one case the far-advanced stage passed into stage II, and in 6 cases the almost terminal stage passed into the far-advanced stage. Along with an improvement in visual acuity, patients noted a significant improvement in the general condition of the body, including the functions of the cardiovascular, endocrine, digestive and other systems.

Thus, the data obtained indicate that the use of color therapy by the method of TP Teterina is promising for the rehabilitation of patients with glaucoma and the prevention of blindness.

The effectiveness of color therapy for progressive twilight-night (night) blindness

The aim of our research was to study the effectiveness of color therapy in the prevention of blindness in twilight-night (night) blindness, since, according to the literature, no such studies have been carried out.

32 patients (64 eyes) with retinal pathology combined with progressive twilight-night blindness and myopia were treated. The observation period is from 1 to 7 years. Distribution of patients by age: 8–19 years - 18.52%; 20-29 years old - 7.1%; 30-39 years old - 7.1%; 40–49 years old - 18.0%; 60–69 years old - 42.8%. Men - 28, women - 12.

All patients repeatedly received conservative, and some of them, surgical treatment, but no improvement was observed.

Before and after color therapy, patients underwent clinical, psychophysiological and electrophysiological examinations. Color therapy was carried out according to the author's method (patents No. 31721, 2230534) for 10 days 2-3 times a year.

Results and discussion

The examination revealed that along with twilight-night blindness, myopia was also observed in patients, including mild (up to 3.0 D) in 40 eyes, moderate (3.5-6.0 D) in 12 eyes and high degrees (7.0–10.0 D) - in 12 eyes.

table

Visual acuity before and after color therapy

Myopia degree	Before treatment	After treatment
Myopia: up to 3.0 D: no correction	0.46	0.74
with correction	0.74	0.93
3.5-6.0 D corrected	0.45	0.7
7.0-10.0 D corrected	0,4	0.7
Total	0.5	0.77

The table shows that before treatment, visual acuity in low myopia (up to 3.0 D) without correction was 0.46, after treatment - 0.74, and with correction - respectively 0.74 and 0.93. In moderate myopia (3.5–6.0 D), the corrected visual acuity was 0.45 before treatment, and 0.7 after treatment, and in high myopia (7.0–10.0 D), respectively , 0.4 and 0.7

Refraction in mild myopia before treatment averaged 1.85 diopters, and after color therapy - 0.8 diopters; with moderate myopia - 6.5 and 4.5 diopters, respectively. The total field of view before treatment averaged 142º, and after treatment - 407.9º.

Simultaneously with the improvement in visual acuity, refraction and visual field boundaries, dark adaptation also improved significantly. This is evidenced by the fact that patients at dusk and at night before treatment without assistance did not orient themselves, and after color therapy they could freely navigate in space without assistance.

conclusions

1. For the first time installed:

- the spatial structure of the macula of the retina;
- previously unknown patterns of interaction of the retinal macula with the spectrum of visible light, obeying the Universal Law of the Spatial Structures of Nature;

- general patterns of interaction of the retina of the eye and chlorophyll of plants with the spectrum of visible light;
- the essence of the sunshine of the eye is revealed.

2. New technologies of color diagnostics allow to reveal the etiopathogenesis incurable retinal pathology, the main symptom of which is twilight-night blindness.

3. Based on the discoveries of the essence of the etiology and pathogenesis of twilight-night blindness the issues of prevention and treatment of this pathology caused by impaired photosynthesis of rhodopsin and retinal pigment epithelium have been resolved.

4. The created devices and methods, protected by patents, have a high efficiency in the correction of both visual and psychosomatic disorders, which indicates a systematic approach to correcting human health with the spectrum of visible (sunlight) light through the visual analyzer.

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