

On the scientific results of the 3rd Global Pediatric Ophthalmology Congress (London 2018) and on the effectiveness of publishing articles in high-ranked ophthalmology journals

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In this day and age of information technology and significantly accelerated scientific and technical progress in all fields of knowledge including ophthalmology, it is crucial for scientific results obtained to be published as quickly as possible. However, experience has shown that this is obviously not enough. It is required, for these results, to be available worldwide. Therefore, scientific papers in ophthalmology must be published in such a journal which is included in major world databases and which, in addition, has papers with an open access and with full texts, not only abstracts, properly translated into English.

Scientists using an automated translation service, for instance, Google translator, in their scientific work can have deplorable results, as a matter of practice, since the meaning of the said can become opposite or completely lost. This is associated with the difficulty of computer based translation and the inability of a computer to consider nuances of native speakers and a deep sense of special ophthalmic terminology. These embarrassing corruptions can significantly decrease the value of a scientific paper in the sight of other researchers.

There is the only way: high-quality translation of a paper into English as an international language with compulsory controlling the translation quality by authors. And here, the following should be noted. Qualitative translation of a paper into English is, so far, the only civilized way for post-Soviet countries to gain the priority, copyright, and intellectual property since what has been

published in the internet is included in bases of “eternal citation” worldwide including patent authorities. And this, nowadays, wonderfully defends the priority and author’s right of a scientist.

Any researcher is interested in acknowledgment and maintenance of his/her authorship worldwide. Copyright has not been cancelled yet. Although many authors make efforts to claim a world novelty of findings from their investigations and diagnostics and treatment developments by means of national patent appearance, the picture is still sad since the findings are still “borrowed” by unfair authors or entire corporations.

Suffice it to recall, for instance, a pneumotonometer, which was proposed by Prof. E.E. Somov [1] and first developed in the USSR and which, however, is imported to all former Soviet countries. Or, for example, a vibration tonometer by Prof. M.M. Krasnov [2] which is today imported as a Pascal dynamic contour tonometer manufactured by Ziemer Group and based on the same principle. Those and many other authors hardly could do anything to protect their author’s rights since, in the post-Soviet countries, there are still no consistent juridical mechanisms to bring legal actions for illegal patent granting to unfair supplying companies. Since what has already been published has no world novelty and, thus, cannot be granted a patent in any other country in the world.

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At bottom, a patent can “stake out” a market place, when no one is allowed in the country to produce and to sell the patent-protected goods without entering into contract with a patent holder. However, to obtain a worldwide patent with priority in all countries requires essential financial expenses not only at the initial stage but also for the annual maintenance of the patent in each country for 15 to 20 years. In the post-Soviet countries it can be realized not in every instance.

Therefore, as a rule, authors patent their intellectual property only in their own countries or via their originations and without annual payment maintaining the effect of a patent. So, we have a paradoxical situation: for instance, the government has provided funding for scientific investigations in ophthalmology for many years and this has resulted in development of novel treatments; however, the lack of funds for obtaining and maintaining a patent leads to loss of priority. And this new treatment can be freely used in all countries, including a patent holder country!

In this regard, of strange impression is an efficacy assessment for scientific activity of research or medical institution which is still accepted in some post-soviet countries and based on the annual quantity of national patents which, as a rule, are not maintained by annual payment to continue the patent validity in each patent-covered country. In some institutions, patents, annually filed for compliance with a plan, number in dozens. In actual fact, we give our scientific achievements, which required so many resources and efforts, free-of-charge to the whole world.

And much should be changed in the policy of protection of the intellectual property in ophthalmology. In particular, the government should be interested in protection of their investments and, hence, it is required not only to significantly broaden a financial package for filing and protecting the created intellectual ophthalmic property but also to implement a mechanism of gaining a profit. Worldwide, it is a super-profitable business, and we are just learning to get into it properly.

One thing is obvious – publishing the patents which are not supported by annual payments improves the backwardness of any country since we instantly get the whole world acquainted with our achievements and do it, in fact, for free. And many countries, as a matter of fact, do not go to the effort in multi-year research but take them ready from open access resources and go on before!

The said does not mean that ophthalmic research findings should not be patented. However, we want to emphasize that in order to get international and national grants for any research, grant recipients must have publications in prestigious scientific journals since this

determines largely, if not primarily, the possibility of research financing.

With this background, the importance of publishing papers in high-ranked ophthalmology journals with open access full texts in good English is obvious. But it is of a special importance to have a possibility to publish in such journals theoretical papers which contain fundamental hypotheses on development of various eye diseases and are written at the interdisciplinary level with the involvement of experts from different fields of knowledge. Surely, papers on unifying hypothesis can often be valuable not less than a field-specific clinical paper of high quality: hypotheses can simultaneously be tested in different research centers, which advances the progress significantly. Unfortunately, there are not many such fundamental ophthalmology journals, but they exist. And we are going to talk about one of them.

An important mission of such a fundamental journal in the post-soviet area is undertaken by “Oftalmologicheskii Zhurnal” and its editorial board. It is important to note that an excellent scientific review service, high-quality translation into English, and articles available in open access on the website have already brought this journal into a line of world significant journals. The journal is known, read, and cited. The journal is completely kept with the temper of the times. And it is worth much since a paper published in this journal will certainly be seen worldwide.

In particular, publishing a long form piece on the analysis of modern myopia theories with reasoned criticism of a defocus theory in “Oftalmologicheskii Zhurnal” in 2016 resulted in the authors being invited to make a plenary inducement report at 3rd Global Pediatric Ophthalmology Congress in London on 23-24 March 2018. The negotiations ended with an offer of Congress organizing committee to prepare and hold a separate interdisciplinary session on Physiology and Biomechanics of the Eye. And this, likely, happened for the first time in current history of ophthalmology.

The program of the Congress is given on the website; all reports of the cross-disciplinary session are also available there [4]. Representatives of North and South America, Europe, Asia, and Africa, a total of 150 specialists in different fields of knowledge, participated in the Congress. It should be emphasized that Ukraine’s representatives (Odessa, Ivano-Frankovsk) took part in the work of the Congress, and two of them were included by the organizing committee in a number of 6 moderators for the interdisciplinary session “Physiology and Biomechanics of the Eye”: they are V.I. Serdyuchenko (Dr. Med. Sc., Prof.) and I.N. Kuzhda (Cand. Med. Sc.). The session was headed by O.V. Svetlova (Dr Med Sc,

Prof.) from St. Petersburg headed the session together with other moderators.

The following sessions were presented at the Congress:

- Retina and Retinal Disorders. Corneal Diseases (6 presentations)
- Cross-disciplinary symposium "Physiology and Biomechanics of the Eye" (13 presentations):
- Physiology of the eye and modern theories of adaptation of myopia (5).
- The physiology of vision and safety of modern artificial light sources (2).
- The physiology of vision and binocular system functioning (3).
- The physiology of vision and executive mechanisms of accommodation (3).
- Pediatric Cataract and Glaucoma. Ophthalmology Surgery (7).
- Refractive Errors and Management. Pediatric Neuro-Ophthalmology (5).
- Video Presentations (2).
- Poster Presentations (4).

In our opinion, of a special interest at the Congress were the following presentations:

1. Yizhi Liu, Zhongshan Ophthalmic Center, China

Lens regeneration using endogenous stem cells for treatment of congenital cataract [5].

The author has designed a surgical method of cataract using phacoemulsification followed by "growing" a lens using endogenous stem cells providing lens regeneration in rabbits and macaques, as well as in human infants with cataract. Compared with a traditional procedure, the anterior capsulorhexis was moved from the center to the periphery, reducing the diameter to 1-1.5mm, preserving the capsule, sub-capsular cells, and the physiological barrier between the anterior and the posterior segment. For infants and young children, this procedure decreases the degree of post-operative inflammation and the incidence of postoperative complications such as iris adhesion and secondary ocular hypertension and protects the local medium, which is required for lens regeneration, for 6-8 month.

From our point of view, this is a really innovative and very prospective development.

2. Teuta Haveri, Mimoza Meco and Camelia Kojqiqi, American Hospital, Albania

Statistical study on cornea profile and parameters between generations in Albania; Is there a prediction for future keratoconus? [6].

They studied the corneal profiles and correlation between generations in Albany to predict the progression of acquired or inherited keratoconus in patients aged 14-40 years. Three-dimensional corneal topography was studied in 701 eyes using Oculus Pentacam HR. Keratoconus early signs are flat and thin cornea with asymmetric astigmatism

ranging from 2 to 6D. However, corneal astigmatism cannot significantly predict keratoconus in the future.

In our opinion, it is, likely, environmental toxicity that plays the greatest role in the frequent incidence of keratoconus in adolescents: smoke of fires with plastic bottles, plastic shavings, vehicle emission, etc. Using contact lens correction, dry eye syndrome in display civilization, and poor regenerative processes in the cornea also play an important role.

3. Serdiuchenko Vira and Viazovsky Igor, Filatov Institute of Eye Diseases and Tissue Therapy, Ukraine

Modified device for investigation of accommodation; irregular accommodation [7].

This outstanding fundamental work has a world priority [8] and was first published in RF in a collection of papers of interdisciplinary conference "Biomechanics of the Eye 2004" [9], initiated by co-head of the conference, I.N. Koshits. For the first time in one and half century, V.I. Serdiuchenko and I.A. Viazovsky could show by experiments the presence of uneven accommodation in different meridians in a human eye. And we are happy that the authors' work was noted in the final resolution of the Congress.

4. Olga Svetlova, Ivan Koshits, Department Ophthalmology of North-Western State Medical University named after I.I. Mechnikov; Petercom-Network / Management Systems Consulting Grope Cl. Corp; Saint-Petersburg, Russia.

Theory. Actuating mechanisms of accommodation and development of the theory of accommodation by Helmholtz [10].

For the first time, the most complete classification of accommodation mechanisms, including the Helmholtz lens accommodation mechanism and many other additional accommodation mechanisms, was presented internationally. The incorrectness of accommodation theories, incompatible with mechanical laws, which are spread in the USA and other developed countries, was clearly shown.

This presentation aroused much interest of the congress participants, especially of those from the USA. We recommend the readers to watch the full presentation on the Congress web-site.

5. Kaptsov V.A., Deynego V.N., All-Russian Scientific & Research Institute of Railway Hygiene, 2ELTAN, Cl.Corp.Soc., Russia.

Analytical review: Light-biological safety and risks of eye diseases among school child in classrooms with led light sources [11].

This presentation showed how dangerous for human health, for eyes in particular, is modern LED lighting with the intensive blue light in its spectrum, which 3-4 times exceeds a safe level of the blue light in the sun lighting. This leads to massive and earlier development of age-

related macular degeneration and other eye diseases. Ophthalmologists must clearly understand how dangerous today artificial LED lighting and spectra of displays and gadgets are. This has already resulted in the avalanche-like development of some eye diseases in a number of developing countries.

5. Marina Guseva, Oksana Makarovskaia and Janek Masian, *City diagnostic medical center "Vodokanal of St. Petersburg"; Russia; Ophthalmology Laser Clinic» Cl. Corporation, Russia; Department Ophthalmology of North-Western State Medical University named after I.I. Mechnikov.*

The art of choosing rational optical correction using the eyeglasses and contact lenses of modern design in the light of the metabolic theory of adaptive myopia [12].

Clinical trials were performed in 3,546 patients, aged 14-37 years, with all degrees of myopia. Duration of follow-up was 3, 5, and 7 years. Early rational correction (ERC) of adaptive myopia was proved to be reasonable and effective ($p < 0.01$). The higher individual visual acuity, the more the bracing effect ($p < 0.01$), which makes it possible to prescribe more comfort sparing ERC. Minimum incomplete correction for near (plus 0.5-0.75 D) and minimum optical correction for far (minus 0.12-0.25 D) were found to be effective as compared to traditional incomplete correction (plus 0.5-0.75D) for near and far sight ($p < 0.001$). The obtained clinical findings confirmed the reliability of the metabolic theory of adaptive myopia.

Some articles by the first author have already been published in *Oftalmologicheskii Zhurnal*.

6. Ivan Koshits, Olga Svetlova and Maksat Egemberdiev

Theory. Physiological and biomechanical features of the interconnected functioning of the systems of accommodation, and aqueous production and outflow. Hypotheses and actuating mechanisms of growth of the eye's optical axis in the metabolic theory of adaptive myopia and in the theory of retinal defocus. [13].

Actuating mechanisms of the metabolic theory of adaptive myopia (AM) and incremental retinal-defocus theory were analyzed. Mild and moderate acquired myopia without complications is shown in the metabolic theory not as a disease but a normal natural adaptive process which enables to reduce the energy consumption in long-term near work. Adaptive lengthening of the eye's anteroposterior axis (APA) is a general law of anatomic development of biological systems which is the energy saving for more effective living abilities.

Physiological mechanisms of AM development are common for animals and working-age humans and are realized through a regulatory mechanism of creating a temporary functional lack of uveoscleral pathway of

outflow (USPO). AM develops according to both loading and unloading types, when the ciliary muscle tone is close to maximum in near sight and maximal in far sight, respectively.

The most widespread worldwide incremental retinal-defocus theory (IRDT) has certain disadvantages and is based on a number of hypotheses which have not completely been confirmed by scientific investigations. According to IRDT, peripheral central defocus of a hyperopic type (over-correction) accelerates the development of myopia while peripheral myopic defocus (under-correction), contrary, brakes myopia development. Based on the IRDT theory, the length of the eye is adjusted to the visual environment not by the brain but its independent periphery, which is the retina. The result depends on the size, "blurring", and contrast of an imaginary "flash spot" on the retina: parameters of the spot supposedly regulate a level of production of neuromediators by retinal amacrine cells, which, theoretically, can penetrate through the pigment epithelium, Bruch's membrane, choroid to the sclera.

IRDT followers assign a major role in regulating the anteroposterior axis growth to the "noncoincidence of the visual focus and the retinal surface", considering that "defocus of an image directly regulates the growth of the eye" and accommodation stress is not a determined part in myopia refractogenesis and, therefore, accommodation is left out. In fact, the IRDT authors suggest considering that even if the optic nerve is cut, the external optical environment can regulate (several-fold accelerate!) the genetic program of the optic axis growth until the presbyopic period.

However, the TIRD authors' suggestion that the brain is not involved in refractogenesis is in conflict with a great number of clinical evidence; moreover, the hypothesis that the growth center exists in the retina separately from the brain is the most incorrect. To confirm the major IRDT hypotheses it is required to find in the retina rather strong "mechanisms for producing" specific inhibitors and catalyzers of the scleral growth, and, above all, to significantly find the pathways of their delivery to the sclera through the retinal pigment epithelium.

Conclusion

The development of adaptive myopia is likely to be related to manifestation of a common physiological mechanism, similar in animals and humans. The length of the optical axis, adequate to the visual load, is formed so as to provide an energy saving level as low as possible when performing loading and long visual work. The main task of AM prevention and retardation is to switch off the natural physiological mechanism of the adaptive growth of the axial length through early rational optical correction.

This key statement of the metabolic theory is reflected in the total resolution of 3rd Global Pediatric Congress [14]. The entire total resolution is given here and comment is needless

The final resolution of the 3rd Global Pediatric Congress, London 2018.

3rd Global Pediatric Congress notes the significant achievements of recent years in pediatric ophthalmology and considers it necessary to note the following.

1. Undoubtedly, one of the main urgent tasks in pediatric ophthalmology is the fight against the pandemic of adaptive myopia. By the year of 2050, up to 5 billion people will be affected by myopia, that's half of the world's population. This means that we do not yet have truly working and practically applicable theory of myopia. The most widespread theory of peripheral defocus is known for its shortcomings and is based on a number of hypotheses that are not fully supported by scientific research. In order to rely on the hypotheses proposed in this theory, it is necessary to carry out a number of fundamental physiological studies for their reliable confirmation. And we draw the attention of governments and private investors from all the countries to the necessity of funding such researches and trials.

2. Possibly, for the first time the metabolic theory of adaptive myopia, proposed by researchers from Russia, was announced in this congress. This metabolic theory is based on interrelated physiological hypotheses, which are well justified. In this theory, it has been shown that the physiological mechanisms of the emergence and development of adaptive myopia in animals and in human at working age are common. The acquired myopia is represented in this theory not as a disease, but as a normal natural adaptation process, which makes it possible to reduce the energy consumption of the eye during prolonged intensive work at near sight. These are manifestations of the general law of the anatomical development of biological systems - minimizing energy consumption for effective vital activity.

It is especially important to note that the metabolic theory of adaptive myopia has been reliably confirmed in clinical studies with observation periods of 3, 5 and 7 years. These studies are important for the theory and practice of optometry since the notion of "rational correction" is introduced. Rational correction allows to practically perform physiologically adequate optical correction, which not only effectively prevents the development of adaptive myopia, but also inhibits the development of other eye diseases. Owing to the fact that, these diseases are directly related to the deterioration of metabolic processes and/or accelerated by the aging of intraocular structures: first of all glaucoma, retinal and optic nerve degeneration, dry eye syndrome and others.

Practical recommendations on optical correction developed by Russian researchers, based on an understanding of the executive mechanisms of the metabolic theory of adaptive myopia, suggest the use of rational correction at the earliest stages of development of acquired myopia (if possible, it is necessary to inhibit the natural adaptation process at an early stage). In addition, rational correction should prevent the interrelated work of intraocular systems under the conditions of extreme phases of accommodation: the object is at the farthest distance and completely close. Such optical correction allows to exclude the work of the ciliary muscle in the maximal and minimal tone, ensuring an effective outflow of aqueous humor through the uveoscleral path, normalize the natural metabolic processes in the eye and ensure normal regeneration of the collagen in the sclera, including its posterior pole. In practice, this means physiological application of weak overcorrection when looking at distant objects (by 0.12-0.25 D) and a slight undercorrection when looking at objects located at near distance (0.25-0.5 D) with the correction for ortho- and exophoria.

3. An important achievement of the congress was a clear understanding of the need to develop and implement an effective control of video security in the visual environment in order to prevent not only the massive development of eye diseases, but also to exclude the negative influence of the modern visual environment on the functioning of many human life systems. Foremost, it is necessary to plan and accelerate interdisciplinary research to develop criteria for a comfortable visual environment when using artificial light sources, screens of modern TVs, displays and gadgets. It is necessary to pay attention to the increased emittance of blue lightwaves and the often insufficient component of red light. The general trend of safe illumination with semiconductor light sources and video-safe radiation from displays is the following: it is necessary to have a biologically adequate spectrum that will ensure balanced operation of the visual analyzer and the endocrine system. The Congress draws the attention of the heads of state and government to the need to fund government programs to develop national regulations on visual work, involving ophthalmologists and representatives of other scientific disciplines, specialists in the field of occupational health and safety.

4. The Congress notes the unquestionable importance and special prospects of scientific research in the field of "Physiology and Biomechanics of the

Eye". These studies have already led to the adequate development of Helmholtz's lens accommodation theory, and also revealed many new additional accommodation mechanisms, gave them a detailed classification and described the executive mechanisms. Also, these studies have allowed getting deeper ideas about the possible physiological mechanisms of the interconnected functioning of the retina and cerebral neuronal fields for the implementation of the binocular vision, as well as the accommodation control system. Today, Russia is the leader in these interdisciplinary studies.

5. The Organizing Committee of the Congress expresses sincere gratitude to all participants of the Congress, speakers and moderators of scientific sessions, wishes creative success in the scientific rationale of safety criteria for the visual analyzer in the conditions of the modern light environment and display civilization therefore to effectively prevent and treat children's eye pathologies.

Organizing Committee of the Congress

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