

Journal of Educational and Scientific Medicine

Issue 1 | 2022

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Supreme Attestation Commission of the Cabinet of Ministers of the Republic of Uzbekistan

ISSN: 2181-3175

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Erkin N. Bilalov, Okilkhon I. Oripov**OPHTHALMOLOGY: YESTERDAY, TODAY AND TOMORROW**

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Abstract.

The filling of the piggy bank of scientific knowledge concerning new aspects of etiopathogenesis, diagnostic methods, medical and surgical treatment of eye diseases is not interrupted for a single day. External circumstances, including the epidemiological situation in which we currently live, can only complicate, but in no way stop this process. One of the immutable postulates of ophthalmology, as, indeed, of the entire medical specialty, is the need for continuous improvement of a specialist doctor based on the exchange of accumulated information and the implementation of the experience gained in clinical practice.

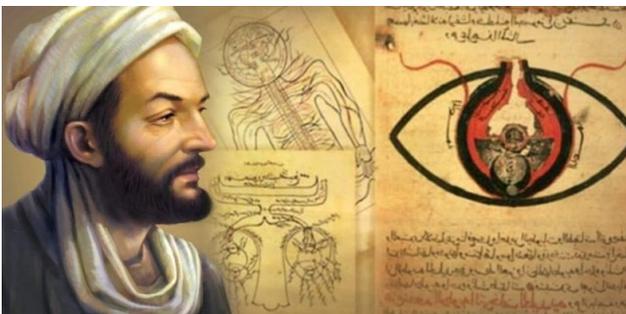
Key words: history of ophthalmology

«Of all the human sense organs, the eye has always been recognized as the best gift and most wonderful work of the creative power of nature. Poets have sung about it, orators have praised it, philosophers have glorified it as a measure of what organic forces are capable of, and physicists have tried to imitate it as an unattainable model of optical instruments».

G. Helmholtz

Brief outline of the history of ophthalmology.

The beginnings of the ancient science of eye diseases existed in Egypt, India, China for 5000 years BC. The Bible, medical papyri, and written records contain information about a number of eye diseases - strabismus, exophthalmos, thorns, cataracts, trachoma, etc. Pepi Ank Iri, who was born around 1600 BC, is considered the first oculist. The greatest physician of antiquity, Hippocrates, "the father of medicine:" (460-372 BC), pointed out in his writings such eye diseases as glaucoma, cataracts, nystagmus, mentioning a total of twenty eye diseases [1,2].



Avicenna and his doctrine of eye diseases.

From the middle of the 9th to the middle of the 14th century, the development of ophthalmology was associated with the development of culture in the Arab caliphates. The literature on ophthalmology in Arabic is extensive and includes over sixty authors.

These works outline the anatomy, physiology of the eye, the theory of vision, general pathology, and the treatment of eye diseases. Abulkasym (beginning of the second millennium) described twenty eye surgeries. In the most complete and systematized form, ophthalmology of this era is presented in the book of Abu Ali ibn Sina [2].

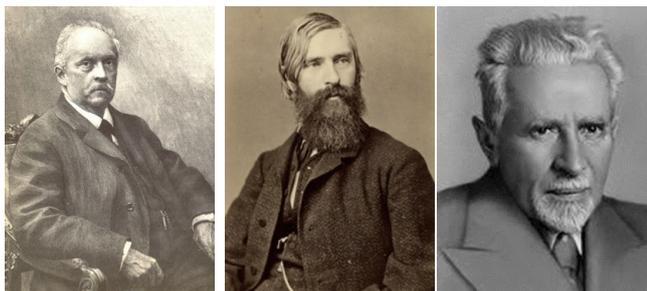
Ophthalmology as an independent clinical discipline arose in Paris and Vienna in 1796 with the opening of the first departments of eye diseases. Later, in 1805-1806, departments for patients with eye diseases and eye hospitals were opened in Moscow, St. Petersburg and London [3].

In 1756, the great Russian scientist M.V. Lomonosov, studying the physiology of color perception, put forward a three-component theory of color vision. In 1851, G. Helmholtz (1821-1894), based on conjugate foci, made the most important discovery - ophthalmoscopy, proposing an eye mirror. G. Helmholtz gave an explanation for the act of accommodation, revealed the essence of astigmatism. Thanks to the invention of the eye mirror, a new chapter in ophthalmology was opened - the recognition and treatment of diseases of the fundus, changes in the fundus in general diseases of the body.

One of the greatest ophthalmologists of our time, A. Grefe, played a huge role in clinical ophthalmology, enriching it with valuable observations thanks to ophthalmoscopy. He made a number of discoveries, of which the main ones are the method of surgical treatment of cataracts and glaucoma.

A special role in the development of ophthalmology was played by the school of Academician V.P. Filatov, who devoted a lot of energy to practical and theoretical ophthalmology. V.P. Filatov (1875-1956) redeveloped the problem of

corneal transplantation.



G. Helmholtz
(1821-1894)

A.F. Grefe
(1828-1870)

M.I. Averbakh
(1872-1944)

The original Filatov round stem marked an era in plastic surgery. It is impossible not to mention the outstanding ophthalmologist M.I. Averbakh (1872-1944). His contribution to science is exceptionally great, especially in the problem of refractive errors, injuries of the organ of vision, and prevention of injuries [1,2,3].

The second peak of the powerful development of world ophthalmology was the end of the 20th century. Soviet ophthalmology reached its peak in the 1970s and 1980s, taking a leading position in the world. At this time, Academician M.M. Krasnov is recognized as the best ophthalmic surgeon in the world and received the highest award of the World Academy of Ophthalmology - "Golden Eye". S.N. Fedorov made a huge contribution to the development of refractive surgery and headed the keratotomy section of the World Ophthalmological Society. On the basis of the MNTK, World Courses on the study of refractive surgery and the latest technologies in ophthalmology were organized, where ophthalmologists from all over the world gathered.



V.P. Filatov (1875-1956)

S.N. Fedorov (1927-2000)

The contribution of the Department of Ophthalmology of the Tashkent Medical Academy to the development of science in the Republic. In 2020, the Department of Ophthalmology of the Tashkent Medical Academy,

founded in 1920 as part of the Medical Faculty of the Turkestan State University in Tashkent, celebrated its 100th anniversary. The founder and first head of the department was Professor Alexander Georgievich Trubin. Over the long history, many brilliant ophthalmologists have worked as the head of the department, including Professor Alexander Nikolayevich Murzin (1885-1954), Honored Scientist of the Republic of Uzbekistan, Professor P.F. Arkhangelsky (1893-1959), Professor Sofia Alekseevna Popova (1889-1961), Associate Professor Turgun Yokubovich Kasymov (1912-1972), Professor Mukhtaram Khamidovna Khamidova (1921-2013), Honored Worker of Science of the Republic of Uzbekistan, Professor Tatyana Georgievna Ilyina (1920-2000), Associate Professor Alisher Rakhimovich Khudoiberdiev, Associate Professor Teshaboy Nazarovich Avazov, Professor Fazilat Arifovna Bakhritdinova, and Professor Erkin Nozimovich Bilalov, who heads the department today [5]. The listed people were outstanding representatives of their profession and each of them made a special contribution to the development of ophthalmology in the Republic.



P.F. Arkhangelsky
(1893-1959)

M.K. Khamidova
(1921-2013)

T.G. Ilyina
(1920-2000)

It should be noted that the applicants for the department at one time were many domestic ophthalmologists, who now occupy leading positions in the health care of the republic, namely, director of the Republican scientific and practical medical center of eye microsurgery and chief specialist of the Ministry of Health of the Republic of Uzbekistan, DSc A.F. Yusupov, Head of the Department of Ophthalmology and Pediatric Ophthalmology of TashPMI DSc B.T. Buzrukov, Head of the Clinic "DMC", Honored Health Worker of the Republic of Uzbekistan, cavalier of the "Mekhnat Shukhrati" PhD Z.R. Maksudova, the founder of the ophthalmological clinic "Crystal", PhD B. Kalankhodzhaev, head of the ophthalmological clinic "Vedanta", PhD Akshey

Khera and many others. Master's degree graduates of the TMA Department of Ophthalmology today work as leading specialists in the largest ophthalmological clinics of the republic and abroad.

At different times, professor E.V. Kremkova, associate professors H.K. Khadzhimukhamedov, E.P. Arkhangelskaya, A.A. Umarova, L.A. Muminova, Z.K. Boltaeva, B.T. Buzrukov, assistants, PhD V.Kh. Grigoryants, E.I. Gasparyan, F.N. Khakberdiyeva, Kh.S. Agzamova, T.U. Umarova, S.D. Achilova, Kh.Kh. Zhalilov, Z.S. Islamov, N.Kh. Abbaskhanova, assistants Kh.A. Zhalilov, F.K. Avazmatova and others worked at the Department of Ophthalmology of TMA [5].

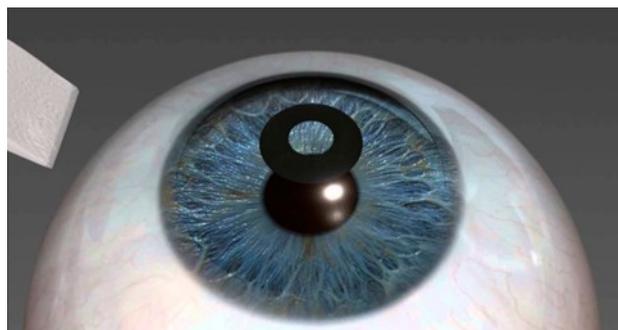
Present and future of ophthalmology

Until recently, it was difficult to even imagine that such areas as cell surgery, which includes the transplantation of cell-tissue complexes (endothelial keratoplasty) and tissue fragments containing stem cells (transplantation of limbal stem cells, pigment epithelial cells, etc.), editing technologies genome in the treatment of hereditary retinal pathology by injection of adenoviral carriers of genetic information, will not be a distant and illusory future, but will become a reality of clinical practice. New molecules help us cope with diseases of the eyes, from which there seemed to be no escape before.

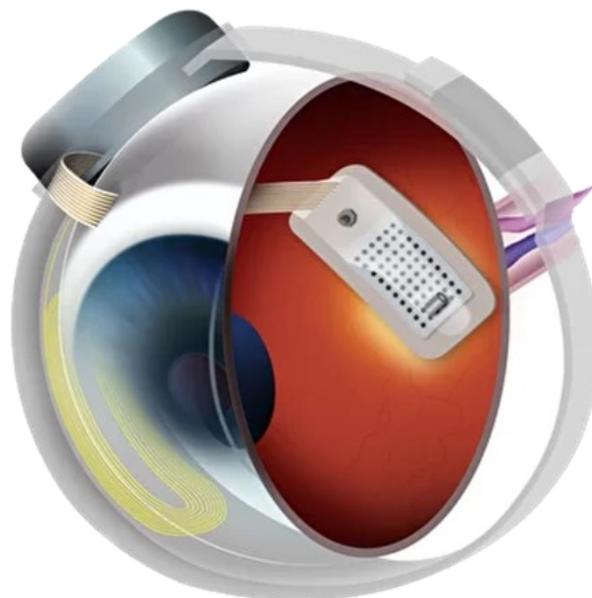
Vitreoretinal surgery based on new methods of pre- and intraoperative imaging, including the use of optical coherence tomographs, has made great strides. Laser energy of various wavelengths and intensities finds more and more applications in cataract surgery, glaucoma, diseases of the retina, optic nerve, and refractive errors. Biopolymers based on compounds highly compatible with ocular tissues also continue to be improved. They are already not only substitutes for the optical media of the eye (intraocular lenses) or intraocular fluid conductors (drainage devices), or substitutes for the vitreous body (silicone), but also serve as a delivery vehicle and at the same time a depot of various drugs (intravitreal and anterior chamber implants saturated with steroids and antiglaucoma drugs).

Many people around the world suffer from refractive errors, partial loss of vision or complete blindness. No matter how serious ophthalmopathologies are, they cause discomfort and difficult socialization of a person. The ability to have full vision allows people to feel independent and free. Therefore, scientists regularly introduce the

latest technical developments and other solutions into ophthalmology, which make it possible to successfully correct refractive errors, simplify the diagnosis of eye pathologies and improve methods of their treatment. In recent years, significant discoveries have taken place in ophthalmology related to the improvement of techniques that help people "see" the world around them in case of partial or complete blindness.



KAMRA corneal rings



«ARGUS» bionic eye

Among the latest achievements, we should highlight the KAMRA technology, which is already actively used in South America, Asia and Europe. It is based on the implantation of thin rings that replace corneal particles damaged due to age-related changes. This innovative technique has been approved by FDA experts. The technique has not yet found wide application due to the high cost of materials. Currently, it has been tested on a small group of people and has given a positive result: an improvement in visual clarity of up to 80% with a high

degree of myopia. It is believed that in the future this technology will eliminate the need for glasses and contact lenses [4].

There are other promising novelties that are in the active development stage. Researchers are gradually introducing concepts such as stem cell therapy and even the bionic eye into the field of ophthalmology. Most of the significant achievements in ophthalmology and discoveries have been made over the past 10 years, during which there were: created glasses with lenses that adjust automatically; biocompatible implants were invented; a gene for myopia was discovered, etc.

In addition, in recent years, new studies have been carried out on the cerebral cortex responsible for visual processes, as well as other work in the field of genetic engineering. The number of significant achievements in ophthalmology is constantly growing. Actively developing among the latest achievements is the direction associated with the prospects for the treatment of macular degeneration. To date, according to American statistics, about 2 million local residents suffer from this disease, which is characterized by damage to the retina and causes blindness. This became possible thanks to the technology of cold laser correction and the emergence of innovative drugs, some of which are still in the testing stage. Scientists are working hard to achieve positive changes at the gene level through the introduction of stem cells. According to the researchers, this will open up unlimited possibilities in the treatment of serious pathologies of the organs of vision. In the near future, scientists intend to create artificial conditions for trophism and the normal functioning of the eyes. This approach, according to leading Western scientists, has already begun to be partially tested for the treatment of pigment dispersion syndrome.

Modern ophthalmology has stepped forward so much that today a large number of tests are being carried out with artificial retinas - special eye sensors that are connected to a mini-computer that interprets light signals and transmits the information received to the brain. But still, the most interesting and unusual methods of treating ophthalmic pathologies fall on the use of stem cells. Bruce Xander, Ph.D., professor of ophthalmology at Harvard Medical School, who spent most of his life studying the eye, calls stem cells the future of humanity. On this issue, he is echoed by other leading experts in their field.

The surface of the human eye is covered with the thinnest shell - the cornea, without which the visual process is impossible. In one study, scientists are converting stem cells into a specific type of retinal cell in the hope that the process of incorporating them will have a positive effect on the recovery of vision in people with macular degeneration. Exciting is the fact that such clinical trials are actively practiced at the present time. In this regard, experts expect that in the next 10-20 years, new methods of stem cell treatment will help ophthalmologists learn how to stop or completely stop the process of blindness. At present, thanks to the activities of the specialized eye microsurgery center and its regional branches, as well as numerous private clinics, the level of domestic ophthalmology practically does not lag behind world standards. It can be stated that almost all high-tech microsurgical (phacoemulsification, vitreoretinal surgery) and laser operations (LASIK, Femto-Lasik, SMILE, laser coagulation of the retina, laser procedures for glaucoma, etc.) are currently widely practiced in our country.

Thus, filling the piggy bank of scientific knowledge regarding new aspects of etiopathogenesis, diagnostic methods, medical and surgical treatment of eye diseases is not interrupted for a single day. External circumstances, including the epidemiological situation in which we currently live, can only complicate, but in no way stop this process. One of the immutable postulates of ophthalmology, as, indeed, of the entire medical specialty, is the need for continuous improvement of a specialist doctor based on the exchange of accumulated information and the implementation of the experience gained in clinical practice.

REFERENCES

1. History of ophthalmology, 3. Documenta ophthalmologica. // *Advances in ophthalmology*. – 1990. - 74(1-2). – P. 1–150.
2. Santos-Bueso E., Fernández-Jacob M.C., Asorey-García A., Sánchez-Jacob E., Cerván-López I., Jiménez-Carmona S., Rodríguez-Bermejo C., Gutiérrez-Ortiz C., García-Medina J.J., Arteaga-Sánchez A., Vinuesa-Silva I., Vinuesa-Silva J.M., García-Sánchez J. *Oftalmología, historia y humanidades [Ophthalmology, history and humanities]*. // *Archivos de la Sociedad Española de Oftalmología*. – 2014. - 89(6). – P. 213–215. <https://doi.org/10.1016/j.oftal.2014.04.025>
3. Rohrbach J.M. *Augenheilkunde im Spiegel der (deutschen) Geschichte [1850-2017: Ophthalmology in the Mirror of (German) History]*. // *Klinische Monatsblätter für Augenheilkunde*. – 2017. - 234(10). – P. 1283–1293. <https://doi.org/10.1055/s-0043-114419>



4.Eandi C.M., Wolfensberger, T.J. Ce qui a marqué l'ophtalmologie en 2018 [Highlights in the field of ophthalmology]. // *Revue medicale Suisse*. – 2019. - 15(637). – P. 355–357.

5.Bakhriddinova F.A., Bilalov E.N., Oripov O.I. To the 100th anniversary of the Department of Ophthalmology of the Tashkent Medical Academy // *Vestnik Vestnik TMA*. – 2020. – 3. – P. 10-15.