

# Effectiveness Of Surgical Treatment Of High Myopia By Implantation Of Phakic Intraocular Lenses

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**Annotation.** 40 implantation operations of the posterior chamber phakic IOL of the RSK-3 model were performed to correct high myopia (from 10 to 14 dioptres) in 20 patients (40 eyes) aged 18 to 28 years. On 3-4 days after surgery, a high visual acuity of 0,7-0,8 with correction was achieved. Refraction decreased to emmetropic. In the long term complaints from the patients were not noted. The method of implantation posterior chamber phakic IOL is characterized by the accuracy and stability of the refractive effect.

## 1. INTRODUCTION

Correction of high myopia in order to maintain full visual acuity is relevant, both socially and scientifically. For many years, the existing traditional methods of vision correction (glasses, contact lenses), as well as refractive operations (removal of the transparent lens, LASIK, PRK) remain the leading methods of correction of high myopia.

One of the directions in refractive surgery, which has been intensively developed and studied over the past decade, is the implantation of a negative corrective lens (IOL) inside the eye while preserving its own transparent lens [1,4]. Due to the continuous improvement of materials, manufacturing technology of phakic IOLs, improvement of the method of calculation and size of the artificial lens, methods of their implantation, the emergence of new tools and medicines that allow this technology to be safe for the correction of high-grade myopia, this method is the correct and often the only safe alternative to other methods. At the same time, it is possible to accurately predict the refractive effect and achieve high functional results while maintaining accommodation.

Thus, a comprehensive approach to the problem of optical correction of high-grade myopia is carried out according to the following scheme: eyeglass correction→contact lens correction→surgical correction.

In recent years, there has been increased interest in correcting high-grade myopia by implanting negative IOL into the phakic myopic eye (FME) through a small, self-sealing incision while preserving its own transparent lens [2,3,5].

Objective: to study the effectiveness of the phakic IOL implantation method for the correction of high-grade myopia, as well as the effect of this operation on the anatomical and optical parameters of the eyes.

## 2. RESEARCH METHODS

We examined 20 patients aged 18 to 28 years with high-grade myopia, who were on outpatient and inpatient treatment in the eye Department of the 1st clinic of the Samarkand State medical Institute and the ophthalmological center of Professor A. A. Yusupov.

The complaints of patients were difficult to tolerate, and sometimes absolute intolerance to glasses or contact lenses, rapid eye fatigue, discomfort of the visual analyzer, dizziness, a feeling of heaviness in the eye area, redness of the eyes after minor work at close range. Wearing thick glasses prevented patients from doing their job: they pressed the bridge of the nose, limited the field of vision. In addition, even with the short-term use of corrective agents, visual acuity did not meet their household and professional needs. Thanks to the operation, they would like to get rid of unsightly eyeglass lenses and thereby improve their appearance. Most patients preferred the operation for professional reasons, because of the pronounced asthenopic phenomena that occur with visual loads. Wearing contact lenses led to dry eye syndrome, redness of the eyes, conjunctivitis, keratitis. Laser correction was contraindicated due to the thin cornea.

All patients underwent a complete ophthalmological examination according to the traditional method. For the assessment of functions of the organ of vision and the refractive unit conducted the following research methods: visometry according to the standard table and Golovin Sivtsev, the after mydriasis skiascopy, refractometry and ophthalmometry on the device "Huvitus", biomicroscopy, ophthalmoscopy, ultrasound of the eye, ultrasound biomicroscopy (UBM) and optical coherence tomography (OCT) anterior and posterior eye, pachymetry and corneal topography, the amount of accommodation on proximate.

Before the operation, special attention was paid to the magnitude of visual acuity without and with full eyeglass correction, as well as with contact correction. Patients with visual acuity with correction of at least 0.2 were selected for the operation. When examining the anterior segment of the eye by biomicroscopy, the cornea was transparent, the relief and pattern of the iris were without features, the friendly and direct reaction of the pupil to light was preserved. According to the ultrabiomicroscopic examination, the depth of the anterior chamber varied from 3.2 to 3.6 mm (average 3.35 mm). Ophthalmoscopy revealed peripheral chorioretinal retinal dystrophy in 8 patients, which was previously subjected to preventive peripheral laser coagulation prior to surgery. Keratotopography showed the thickness of the cornea, which in the Central zone was less than normal (on average 4.81 microns). Refraction was in the range of -10.0 to -14.0 DPTR (average -12.5 DPTR). Of the total number of patients, 14 were diagnosed with anisometropia, of which 5 had a difference of more than 3 DPTR. The method of calculating FIOL was selected according to a specially proposed table and nomogram developed in the ISTC "eye Microsurgery", on an ultrasound diagnostic device.

- in myopia from 7 to 11 DPTR, 1 DPTR was added and 1 DPTR was subtracted from this value,
- for myopia from 11 to 15 DPTR, IOL of the same strength was used,
- in myopia from 16 to 20 DPTR, the strength of IOL decreased by 1 DPTR.

Intraocular pressure in all patients was within the normal range. All patients underwent laser iridectomy under local parabolbar anesthesia a week before the operation. All patients on both eyes underwent traditional implantation of soft, posterior-chamber phakic intraocular lenses of the RSK-3 model manufactured by NEP eye Microsurgery LLC. The optical power of the implanted IOLs ranged from to 8.0 diopters to – 14,0 d that, on average, made up of 9.75 diopters.

*Operation technique:* the operating field was treated with a Betadine solution 3 times. The operation was performed under local anesthesia. Epibulbarno in the eye was instilled 3 times a solution of 1% alkaine, retrobulbarno introduced 2% lidocaine solution 4 ml. The eye slit was widened with a blepharostat. At 12 o'clock, through a tunnel self – sealing incision with a width of up to 4-5 mm, the keratome performed paracentesis at 3 o'clock with a length of 2.4 mm, through which a viscoelastic was introduced into the anterior chamber. FIOI was injected through the incision using an injector and then implanted. Viscoelastic was removed by "push – push" technology using a Simcoe cannula. Depending on the nature of corneal astigmatism, either paracentesis expanded to 2.8 mm, or an additional tunnel incision was made in the strong Meridian with a knife of 2.8 mm. The anterior chamber and ophthalmotonus were restored with saline solution, and the edges of the incision were hydrated. No stitches were required.

### **3. THE RESULTS OF THE RESEARCH**

No serious complications were observed at the time of surgery. The follow-up period of the operation ranged from 1 to 6 years.

The surgical and postoperative periods were smooth. In the early postoperative period, all patients received maxitrol 2 drops 6 times a day for 20 days, with the exception of 2 patients who had transient ophthalmic hypertension as a result of pupillary block. The attack was stopped by medical myosis by instilling a 0.5 % solution of timolol 2 drops 2 times for 3 days and inside a tablet of 0.25 g of diacarb 2 times a day. After that, the patients underwent an additional laser iridectomy.

The visual acuity of patients on 3-4 days after surgery exceeded the value of visual acuity before surgery, that is, it increased to 0.5 – 0.6 without correction, and the correction of 0.7 – 0.8.

After a month, uncorrected visual acuity averaged  $0.65 \pm 0.11$ , which exceeded the result of preoperative correction of visual acuity by an average of 35%. Loss of corrected visual acuity was not detected in any case. Refraction in 18 patients decreased to emmetropic, in 2 patients-to weak myopic, in the range of the spherical component from -0.25 to -0.75 DPTR and the cylindrical component to -0.5 DPTR only in one case.

In the long term, there were no complaints from patients.

One of the special aspects of the observation of these patients was the study of the effectiveness of the operation on the subjective feelings of patients, since all patients were people of working age, working in various sectors of the national economy. After the operation, the performance of patients at close range significantly improved, the feeling of eye fatigue decreased, and the boundaries of peripheral vision subjectively expanded. Patients have gained confidence, purposefulness, the fear of low vision has disappeared forever, they have got rid of wearing thick glasses and painful contact lenses. They considered themselves full members of society, and the range of their professional activities increased.

#### 4. CONCLUSIONS

1. Correction of high-grade myopia by implantation of the FIOL model RSK-3 produced by NEP eye Microsurgery LLC is a very effective method.

2. Refraction of the eyes became within the limits of physiological emmetropy, visual acuity significantly improved, the volume and stock of accommodation were restored-increased, anatomical and physiological parameters of the eyes were stabilized.

3. The corrective lens Placed inside the eye significantly exceeds the image quality of extraocular correction tools.

#### 5. RECOMMENDATIONS.

Surgical correction of high-grade myopia by implantation of phakic intraocular lenses reduces the number of disabled patients with high myopia, which leads to savings in public funds (costs for disability benefits), allows for medical and social rehabilitation in most patients.

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