

Keratoconus: mechanisms of development*

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To date, the problem of surgical treatment for keratoconus has not been solved completely. After corneal transplantation, high refractive errors (myopic astigmatism, as a rule) occur in a graft. This reduces visual outcomes of keratoplasty.

Why is myopic refraction formed so persistently in the grafted cornea? Let us present our view of the problem.

Keratoconus is considered a polyetiologic disease (a cause is not clear). We have developed a concept of eye disease etiopathogenesis that explains that a cause of ophthalmic pathology, in most cases, is a weakness of accommodation [1, 2]. The weakness of accommodation is genetically conditioned and arises from the fact that in certain periods of life the distance between the lens equator and ciliary processes become shorter than the age norm. The ciliary zonules are slack and accommodation decreases.

Since accommodation (focusing) played a crucial role in the evolution for human survival as a species, an organism has provided a number of responses for recovery.

The first response is moderate dilation of the pupil (both the ciliary body and the lens-processes distance are synergistically enlarged);

The second response is an increase of intraocular pressure (in order to a little extend the capsule of the eye and to enlarge the lens-processes distance).

These responses are universal.

Based on the above, in case of initial keratoconus it would be reasonable to perform laser coagulation for mydriasis (moderate). If accommodation is not completely recovered, it is necessary to perform the second stage: a surgical or laser thinning of the sclera in the projection of the ciliary body.

Grades of artificial mydriasis and scleral thinning should be determined experimentally.

If on completion of these two stages, keratoplasty is still required then, in our opinion, postop graft's deformation (myopic astigmatism) will be much lesser and visual acuity will be notably higher.

Basically, myopic astigmatism, deepening the focal area of the eye, is aimed to unload the accommodative apparatus of the eye. If post-keratoplasty accommodation conditions become "unbearable", the organism just switches the accommodation off and paralytic mydriasis occur (paralysis of sphincters of the iris and ciliary body). Thus, keratoconus treatment requires new approaches related to accommodation recovery in the affected eye.

Parameters found in keratoconus studies can be kind of a seismograph enabling not only to define but to predict other eye diseases.

References

1. Rudkovskaia OD. [Glaucoma, cataract, myopia. What is common in their etiopathogenesis?]. *Okulist*. 2005;6:19. Russian.
2. Rudkovskaia OD, Pishak VP. Ocular hypertension and glaucoma: mechanisms of development. *Vestn Oftalmol*. 2010;123(3):40-43. Russian.
3. Rudkovskaya Oksana. Refraction and Accommodation in the Etiopathogenesis of Eye Diseases. Collection of scientific articles. Saarbrucken, Germany: LAP LAMBERT Academic Publishing; 2013: 75 p.

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