



# SURGICAL NEUROPROTECTION BY CHANGING THE BIOMECHANICAL PROPERTIES OF SCLERA IN THE PERINEURAL AREA IN GLAUCOMA

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## BACKGROUNDS

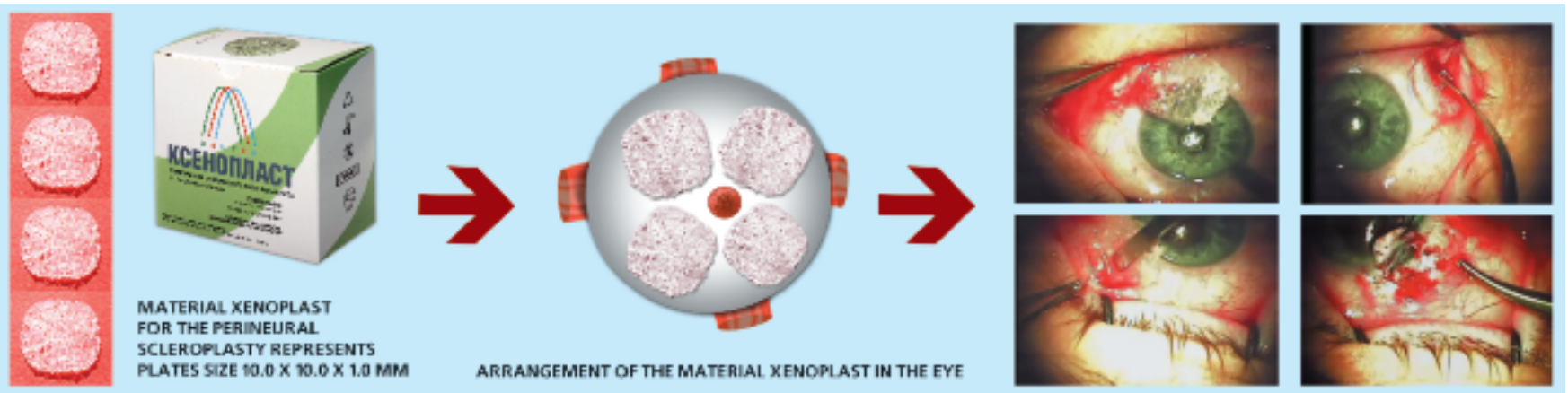
The method of surgical neuroprotection – perineural scleroplastic with xenoplast material in cases of far advanced glaucoma was developed in our clinic. This method is based on the mathematical model calculation of mechanical stretches in the optic disk area, which leads to significant decreasing of mechanical forces excess directly on optic disk.

## METHODS

Material Xenoplast for perineural scleroplastic consists of insoluble pore xenocollagen, extracted from bone tissue of agricultural animals. It has high biocompatibility with eye tissues, good integration with sclera and deformation stability.

The clinical material was tested on 189 patients with far advanced glaucoma (204 eyes). The observation period was 1-3 years after operation. The first group consisted of patients after antiglaucoma operation (AGO) – 20 patients (24 eyes), the second – after perineural scleroplastic (PS) – 45 patients (47 eyes),

the third – after combined antiglaucoma operation with perineural scleroplastic (AGO+PS) – 124 patients (132 eyes). Beside standard examination all the patients underwent optical coherent tomography (OCT) of the optic nerve and analysis of biomechanical properties of corneoscleral shell on ORA.



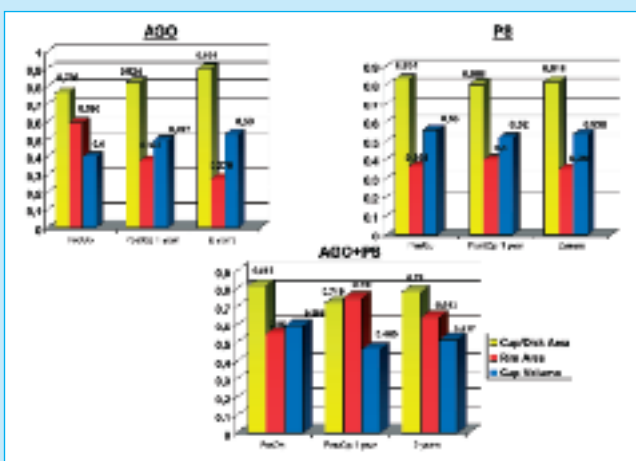
## RESULTS

Evaluating the morphometric dynamics of optic nerve disk parameters according to OCT results during 2 years, we received stable results in patients after perineural scleroplastic. Comparative enhancement of morphometric parameters were noted in patients after combined surgery.

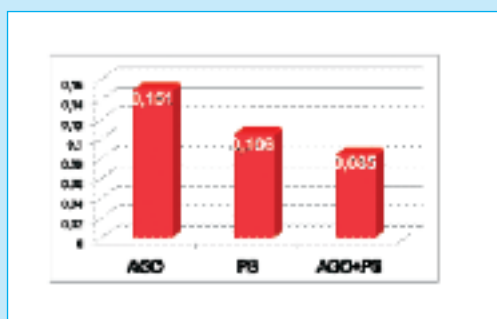
Parameters of retinal nerve layer thickness were stable during all period of observation in second and third groups. After antiglaucoma operation in the first and the third groups the corneal hysteresis increased

which can be explained by IOP decreasing after operation. In the second group corneal hysteresis decreased compared with the initial data, thus the result we got was caused by redistribution of mechanical forces in the eye after the surgery.

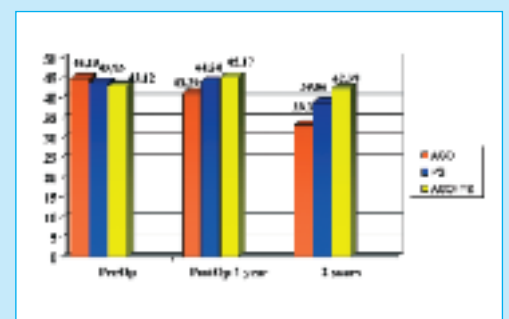
### DYNAMICS OF OPTIC NERVE DISK MORPHOMETRIC PARAMETERS (OCT RESULTS)



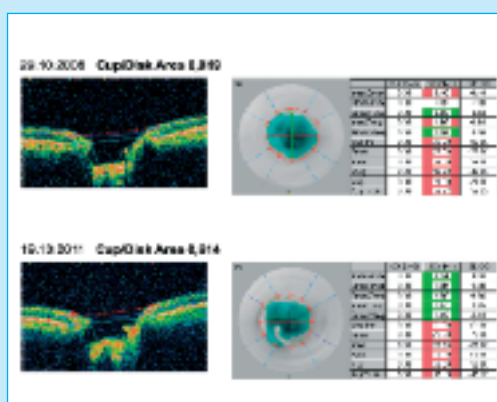
### INCREASED EXCAVATION OPTIC DISK TWO YEARS AFTER SURGERY



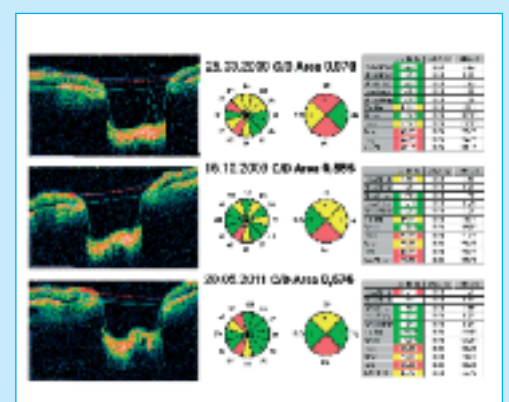
### DYNAMICS OF NERVE FIBER LAYER THICKNESS (OCT PARAMETERS)



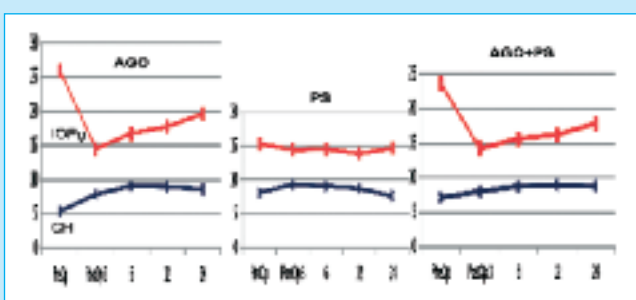
### THE CLINICAL EXAMPLE OF OCT PARAMETERS



### THE CLINICAL EXAMPLE OF OCT PARAMETERS



### DYNAMICS OF ORA PARAMETERS



## CONCLUSIONS

Perineural scleroplastic as a method of surgical neuroprotection provides visual function stability in cases of far advanced glaucoma. Optimal stable results during all observation period were received in patients after combined antiglaucoma operation with perineural scleroplastic.



# Biological Drainage – Xenoplast in Glaucoma Surgery (experimental and 10-years of clinical follow-up)

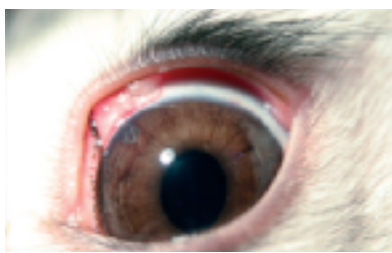
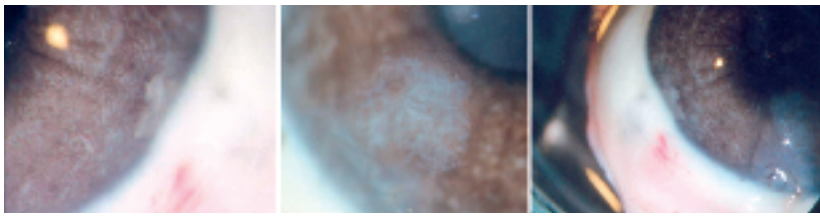
Anisimova S.Y., Anisimov S.I., Larionov E.V.

Drainage collagen non-absorbable antiglaucomatous (DCA Xenoplast).  
Material Xenoplast on the basis of bone collagen  
Patent RF №2161473 2001  
Registration from 31.05.2005 r.  
Ukrain Registration №5737/2006 21.11.2006

Drainage production  
in the clean room GMP  
with 200x air circulation

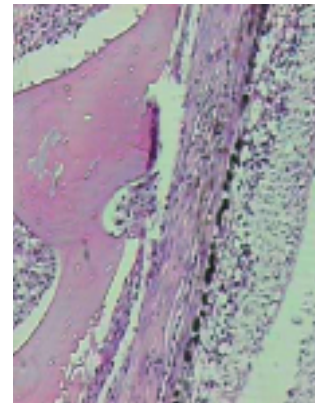


## Experimental investigations (4 months of follow-up)



• Type I collagen is non-toxic material and is well stand by animals either in applications or when it is inserted under the skin, in sclera, corneal stroma or anterior chamber.

## The investigation of Xenoplast material effectiveness on tissue reparation in rabbit eye filter zone



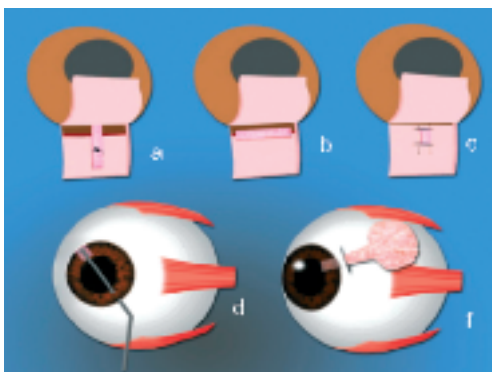
- Drainage histological view in 4 months after implantation in scleral layers near filter zone.
- No inflammation
- No capsular formation
- Kreiberg Colouring X 100.

The purpose of the work was to evaluate the effectiveness of Drainage – Xenoplast (ACD Xenoplast) usage according to the data received during international research study performed in different clinics of Russia, Ukraine and Syria.



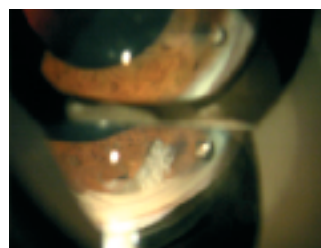
- The results of 3379 antiglaucomatous operations with Drainage Xenoplast in different stages and clinical types of glaucoma performed in 12 clinics of Russia, Ukraine and ophthalmological clinic in Khaleb (Syria) were analyzed
- 542 penetrating procedures with Xenoplast
- 2837 NPDS with Xenoplast into the scleral space

## Variants of Drainage location in surgical treatment zone



a), c), f) – S.J. Anisimova – 2001-2010;  
d) – N.G. Zavgorodnyaya – 2009 ( Zaporozhje)  
b) – L.K. Druzhkova, S.V. Kovalyova – 2009 (Barnaul)

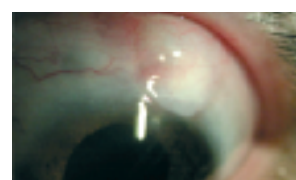
## Gonioscopic picture 6 month after surgery – Implantation of Xenoplast into the anterior chamber – close angle glaucoma



ACD Xenoplast in congenital glaucoma



OS – 12 m. post-op.  
Po = 11 mm Hg  
w/out medications



OD – 22 m. post-op.  
Po = 20 mm Hg  
w/out medications

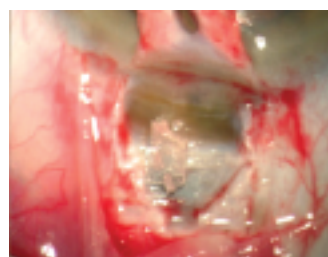
## Xenoplast in anterior chamber of the eye with advanced refractory 2-times operated glaucoma (first day after surgery)



Photo by prof. Alekseev I.B., 2010, 1-st day after surgery

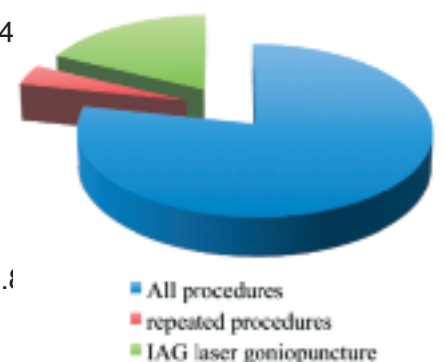
## Early and far post-op after antiglaucomatous procedures +Xenoplast Moscow Eye Center "East Sight Recover" (1815 procedures, 2-10 years of follow-up)

- NPDS+Xenoplast – 1185
- 477 eyes-26% IAG-laser goniopuncture)
- Angular-uveal drainage with Xenoplast– 45 eye (Hyphema 4,5%, Choroid detachment -11%)
- Combined NPDS+Xenoplast + phako– 456 eyes
- Repeated procedures 59 (failure) – 3,5%



## The results of 3379 antiglaucomatous operations with ACD Xenoplast in different stages and clinical types of glaucoma performed in 12 clinics (2-10 years of follow-up)

- Pre-op baseline IOP 31.0±11.4 mm Hg
- No of AG med 3.35±0.70
- IOP post-op 17.6±5.6 mm Hg
- % IOP Reduction 36.0±15.0,
- No of AG med post op 1.44±0.1
- IAG-laser goniopuncture after NPDS



## Ophthalmological department of Medical Academy of postgraduate education. Ukraine, Zaporozhje

- 250 procedures of suprauveal space drainage were performed ab interno (2-3 years of follow-up) (non-bleb surgery) .
- There were no cases of the reaction on the material and ACD Xenoplast removal.
- Pre-op baseline IOP 28.0±9.4, No of AG med 3.35±0.70
- IOP 17.6±5.6
- Reduction 26.0±11.0, No of AG Drops 1.0±0.8
- Qualified success 95%



■ Qualified Success  
■ Repeated Procedure

## Morozov's pediatric city clinical hospital, Moscow 2007-2010

- 18 eyes of 12 children aged from 3 to 8 y.o. with congenital glaucoma were operated.
- All cases far-advanced glaucoma. Po 48.0±11.4 mm Hg
- In all cases trabeculectomy with Xenoplast was performed
- No cases inflammation, no cases Xenoplast removal
- Qualified success 72%



■ Qualified success  
■ repeated procedures

## CONCLUSIONS

1. ACD Xenoplast is a drainage with exceptional high qualities of biocompatibility
2. The data received during international investigation, performed in different clinics of Russia, Ukraine and Syria has shown that ACD

Xenoplast usage effectively decreases IOP to tolerant level and maintains new developed paths of intraocular fluid flow after antiglaucomatous surgery of penetrating and non-penetrating types of glaucoma surgery.