RESULTS OF NON-PENETRATING LAYER-BY-LAYER TRABECULECTOMY IN OSTIAS OF THE SCHLEMM'S CANAL

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Background:

In order to reach a more pronounced and sustained hypotensive effect of the non-penetrating glaucoma surgery, a ***novel surgical procedure*** is proposed, which provides an enlargement of the filtration membrane area under maximal maintenance of the natural aqueous outflow pathways.

Methods:

In 14 eyes (10 patients, IOP: 28,4±3,8 mmHg; age: 70,3±5,4 years) the following non-penetrating surgery was performed: dissection of the conjunctiva and the outer corneo-scleral flap; deep separation of the internal scleral flap; excision of the outer wall of Schlemm's canal (SC); removal of juxtacanalicular and corneoscleral trabecular layers with the **atraumatic trabecular spatula** in the site of SC open area; introduction of the **cannula-harpoon** In both SC-ostias between juxtacanalicular and corneoscleral trabecular layers above and the uveal layer below; backward movement of the cannula: due to its' harpoon orientation two superficial less penetrated trabecular layers are removed in SC-ostias.

Results:

As a result of the surgery the filtration zone becomes extended due to the natural outflow pathways in SC without disturbing principles of non-penetrating surgery. Post-operative IOP of 13,1 ± 2,3 mmHg after 1 year follow up was measured in the evaluated group of glaucoma patients. In all 14 eyes the hypotensive effect was absolute (without medications). In 5 (36%) cases during the surgery a hyphema appeared, which dissolved in all the cases 2-3 days postoperatively.

Conclusions:

Our results demonstrate a pronounced and sustained effect of the novel surgery technique and show that this surgery can be applied successfully in patients with therapy resistant open angle glaucoma.

BACKGROUND:

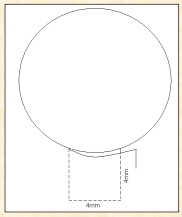
The creation of a semi-permeable membrane in the filtraton zone of the anterior chamber angle represents the main principle of the classical non-penetrating surgery.

Trabecular meshwork is ca. 75 μm thick and consists of 4 main layers:

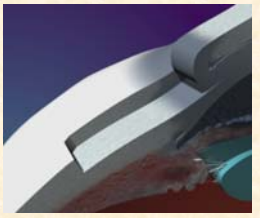
- well permeable uveal layer. Diameter of pores: 25-75 μm
- moderate permeable corneioscleral layer. Diameter of pores: 5-50 μm
- less permeable juxtacanalicular layer. Diameter of pores: 2-20 μm
- Non-porous endothelial layer of the inner wall of the Schlemm's canal (SC)

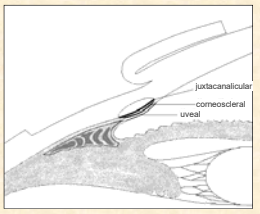
METHODS:

Surgical technique

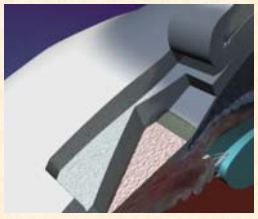


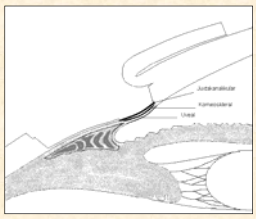
1. Dissection of the conjunctiva and preparation of fornix-based conjunctival flap, following by the dissection of outer corneo-scleral flap of 4 mm x 4 mm



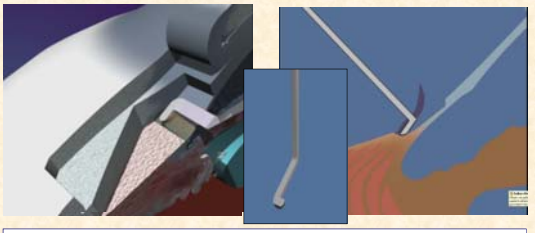


2. Scleral flap is dissected to 1/3 of scleral thickness (270-300 μm) 1 mm through the limb towards the cornea. The flap is parallel to scleral and corneal surface

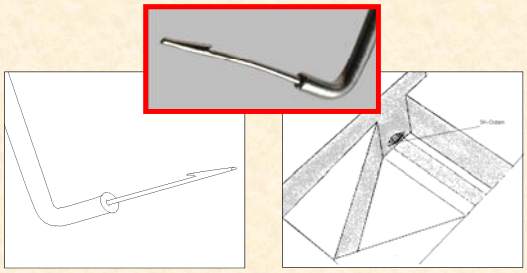




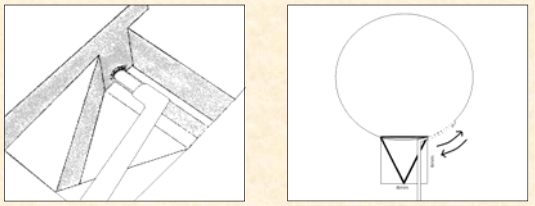
3. When dissecting the deep triangular scleral flap, sclera should be removed to the remained 2/3 of its' thickness. Excision of the outer wall of Schlemm's canal to sufficient depth and length.



4. Removal of juxtacanalicular and corneoscleral trabecular layers with the **atraumatic trabecular spatula** by Dashevsky (Fa. Geuder, G-16240) in the site of the scleral flap.

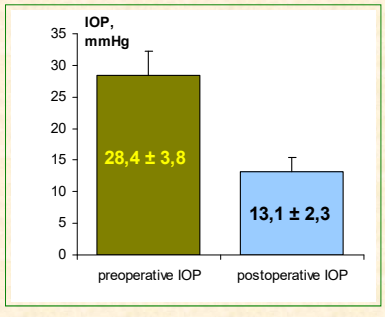


5. Introduction of the **cannula-harpoon** by Dashevsky (Fa. Geuder, G-S02199) in both ostias of the Schlemm's canal between juxtacanalicular and corneoscleral trabecular layers above and the well-permeable uveal trabecular layer below.



6. Viscoelastic is injected through the cannula-harpoon during its introduction. In such a way a permeable trabecular layer is separated from two other less permeable layers within SC ostias. Then the cannula is moved backwards. ***Due to its' harpoon orientation two superficial less penetrated trabecular layers within the ostias are removed.***

RESULTS (one-year follow-up):



complications:

Hyphema was dissolved
in all cases 2-3 days postoperatively

No other complications usual for glaucoma surgery like:

- hypotony
- choroidal detachment
- cystic filtering bleb
- flat anterior chamber, etc