

GLAUCOMA SURGERY & IMPLANTS



Dept. of Ophthalmology,
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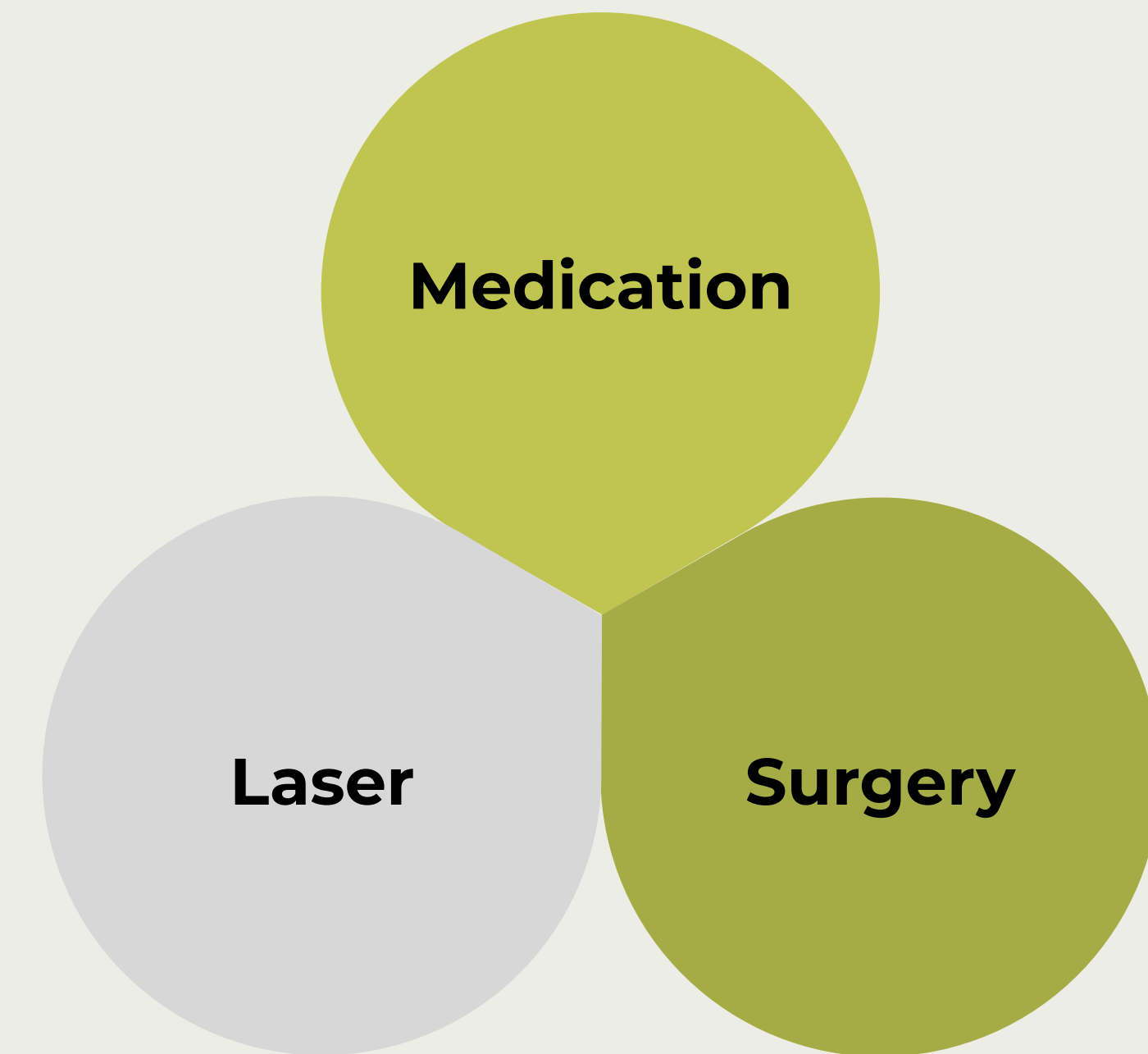
5th June 2026

Anuwat Jiravarnsirikul
MD, FICO

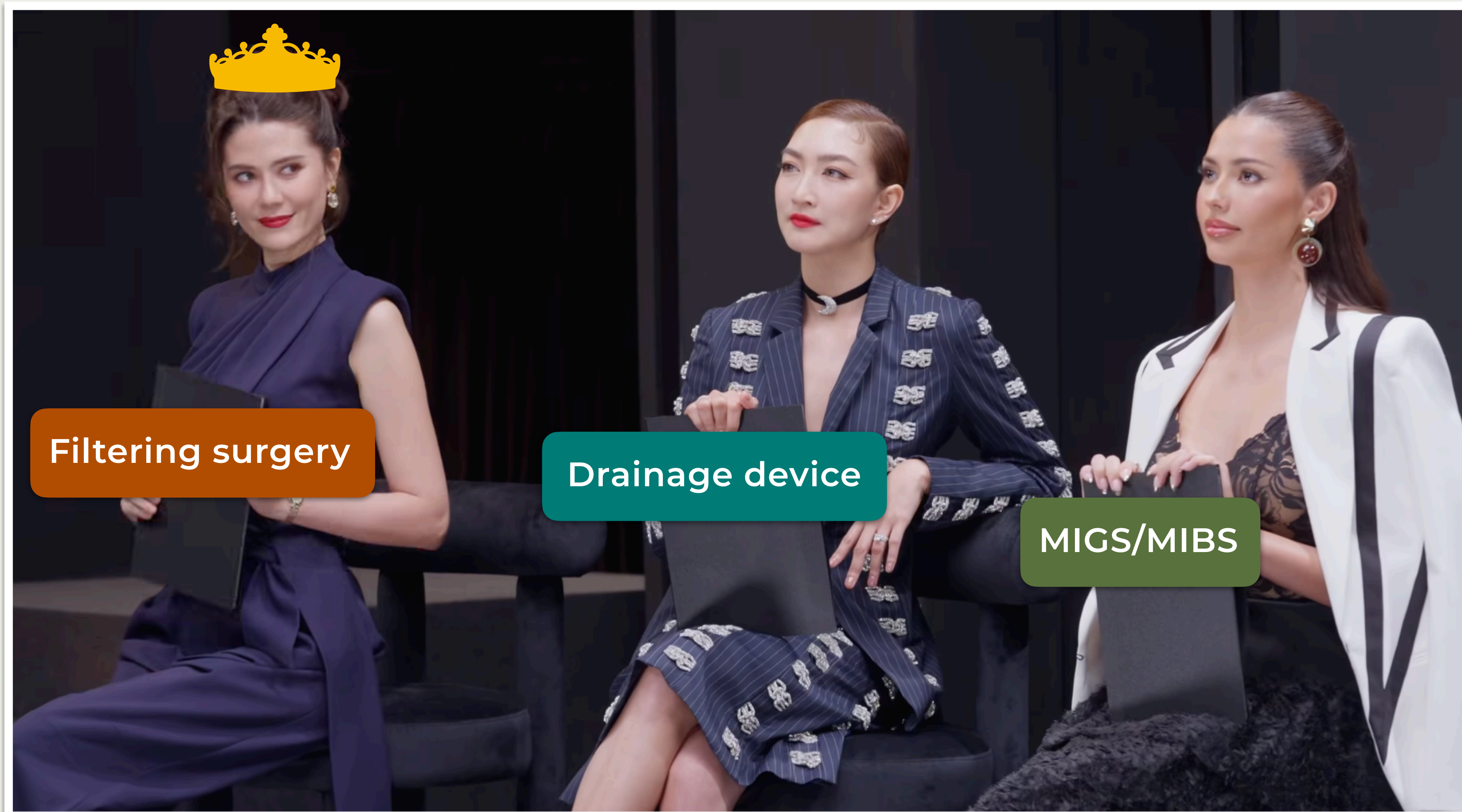
GLAUCOMA TREATMENT

*Glaucoma is the leading cause of **PERMANENT BLINDNESS** in many countries in the region¹*

- General principles of glaucoma treatment
 - Goal of care : *promote well-being and QoL within a sustainable health care system*
 - Minimal glaucoma induced visual disability
 - IOP lowering with medication/laser/surgery



GLAUCOMA SURGERY



Filtering surgery

Drainage device

MIGS/MIBS

FILTERING SURGERY

- **Basic mechanism** : creation of an opening (fistula) at the limbus, allows direct communication between the anterior chamber and subconjunctival space
- Aqueous absorbed by surrounding tissues, crosses the conjunctival epithelium and drains with tears through the nasolacrimal duct

Full thickness fistulas

- **Sclerectomy**
- **Trephination**
- **Thermal sclerostomy**
- **Iridencleisis**

Partial thickness fistulas

- **Guarded fistula : Trabeculectomy**

*First introduced in the 1960s, **gold standard** for many types of glaucoma and is still the **most commonly performed** glaucoma filtration surgery*

TRABECULECTOMY

INDICATIONS

- *Uncontrolled IOP* that is anticipated to **worsen the optic nerve, visual field or visual function** despite **MTMT** (Maximum tolerated medical therapy)
- Documented *progression* of glaucoma damaged at current level of IOP with treatment
- *Intolerance* to glaucoma medications due to **allergy or side effects**
- *Poor compliance* with medical therapy (cost, inconvenience)

TRABECULECTOMY

SURGICAL TECHNIQUE

LOCAL ANESTHESIA

- **Retrobulbar/Peribulbar injection** : Significant IOP elevations, retrobulbar hemorrhage, EOM injury, globe perforation and optic nerve injury
- **Sub-Tenon/Subconjunctival injection** :
May stimulate fibroblasts and cause scarring due to haemorrhage -> poorer outcome
- **Intracameral injection** : Corneal endothelium & retinal toxicity
- **Topical anesthesia** : Very short acting

Anesthesia

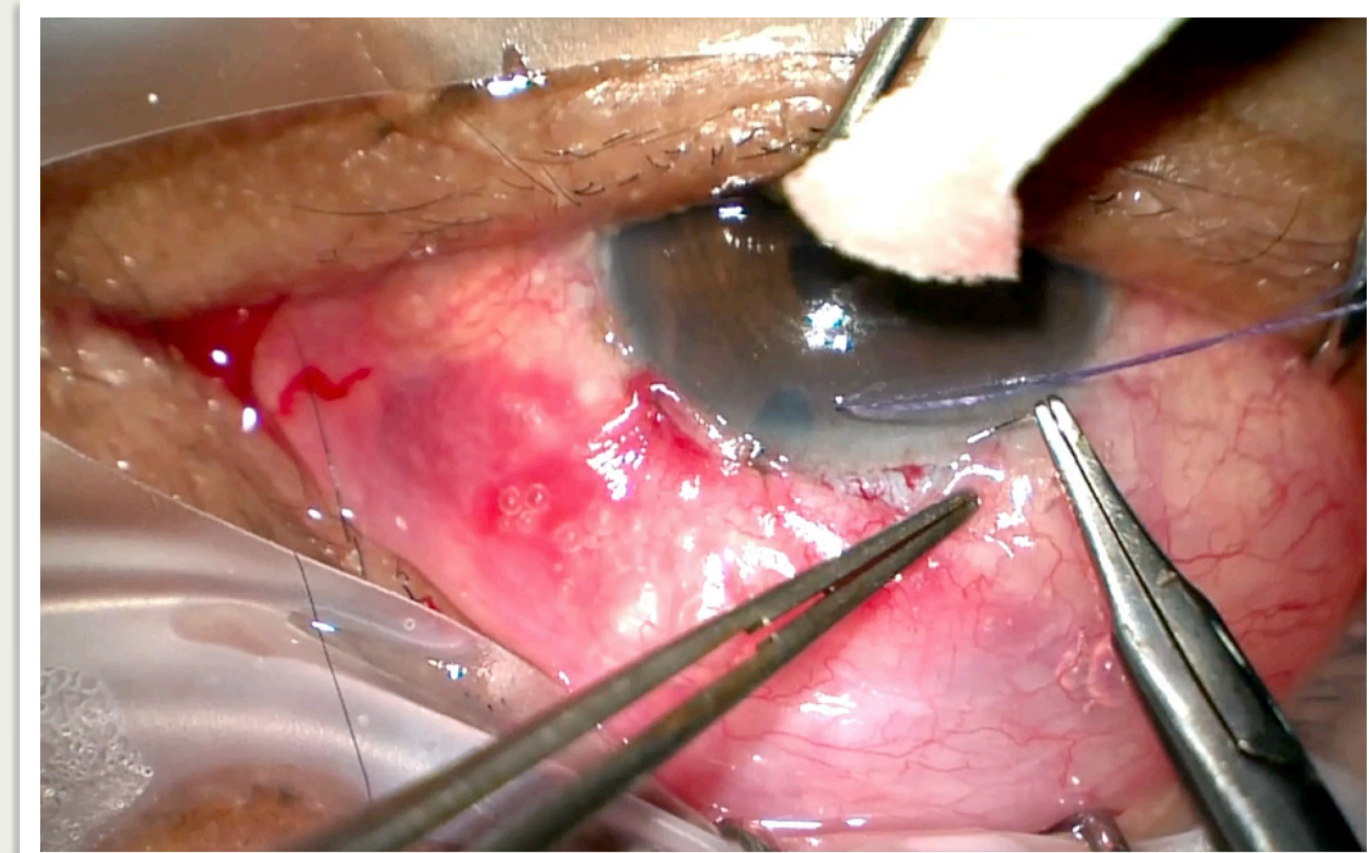
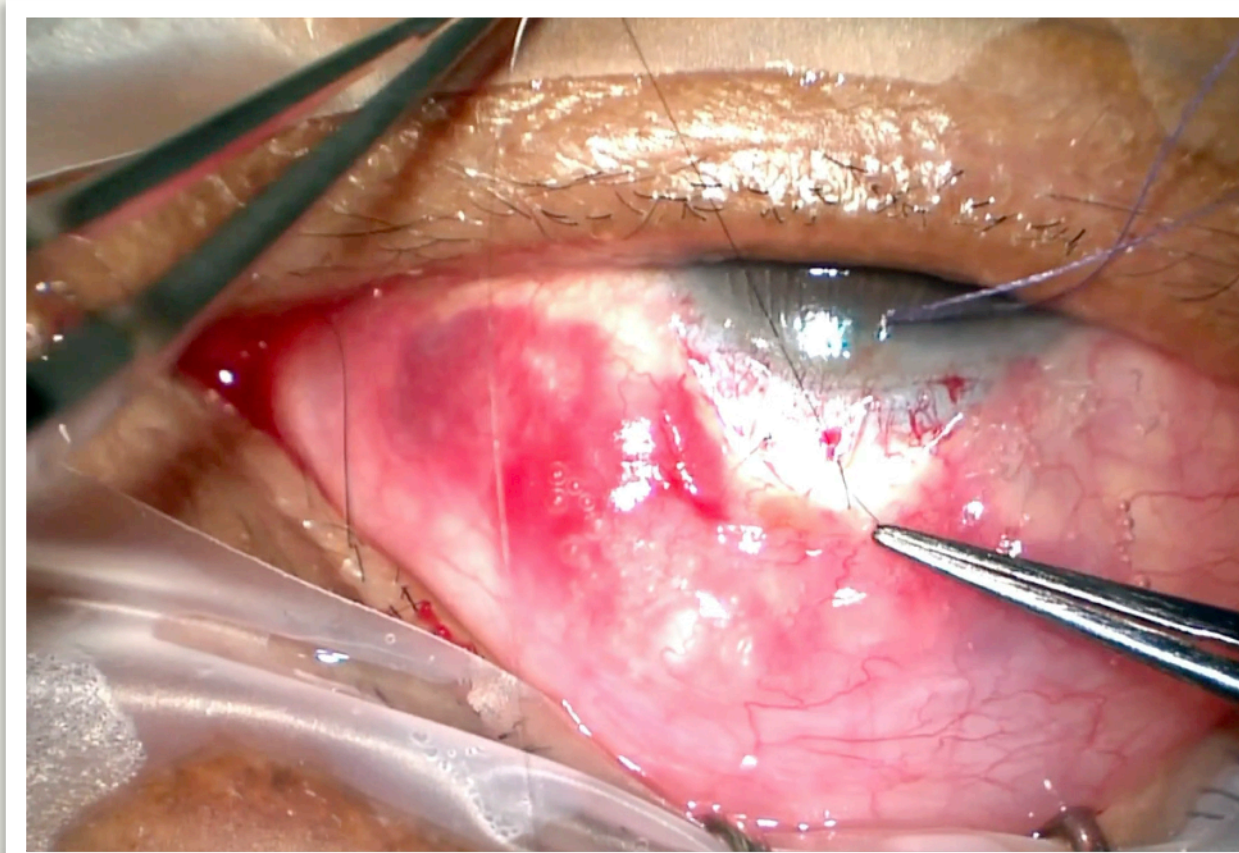
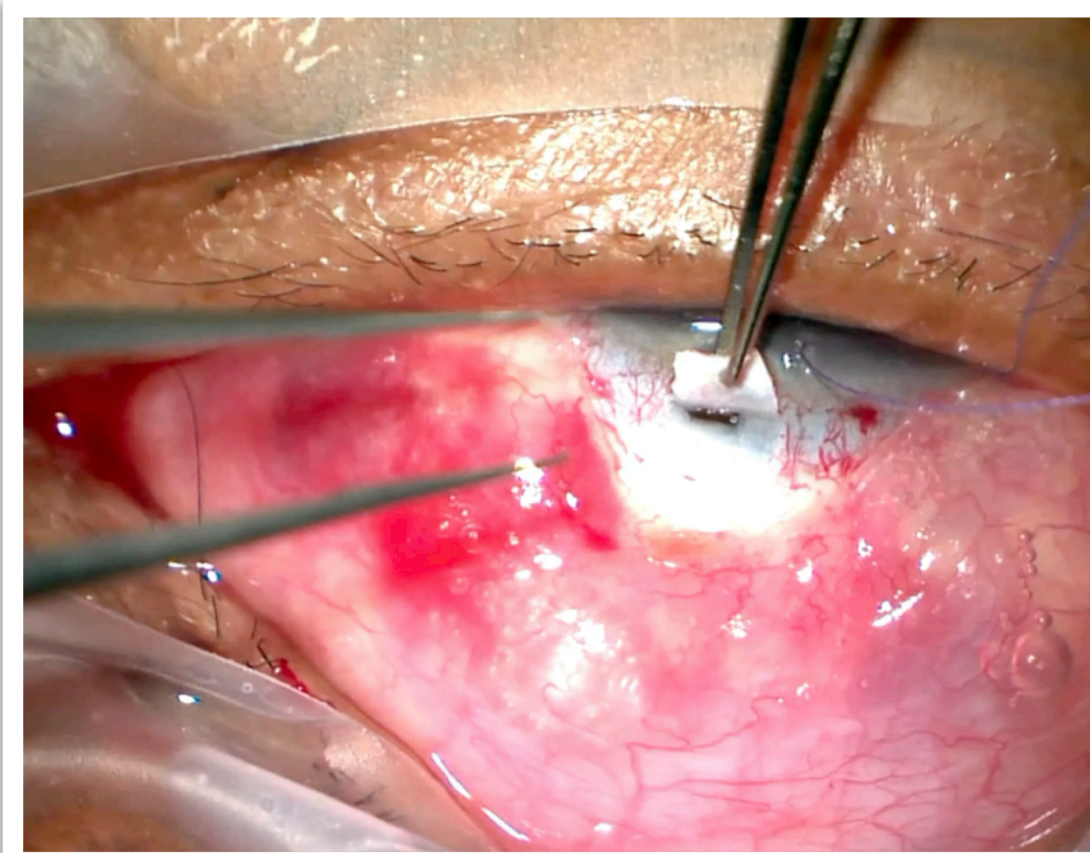
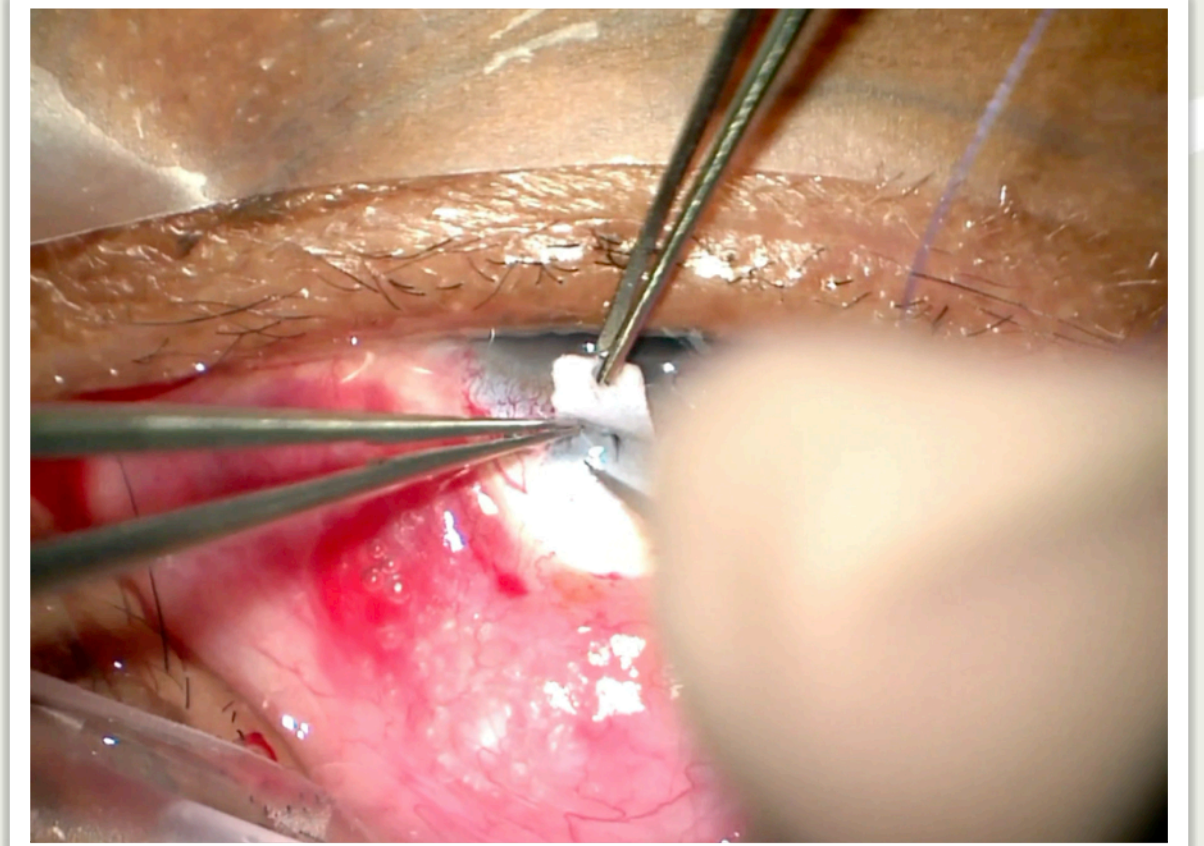
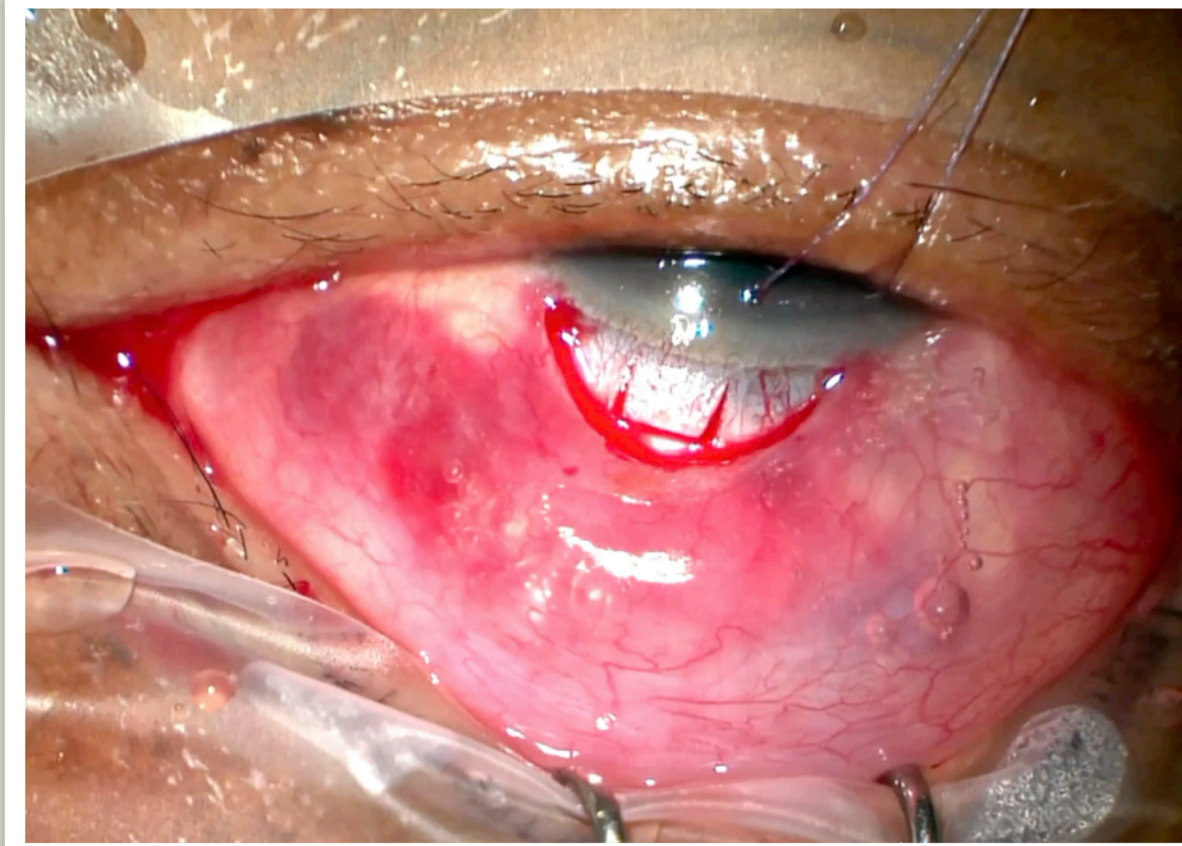
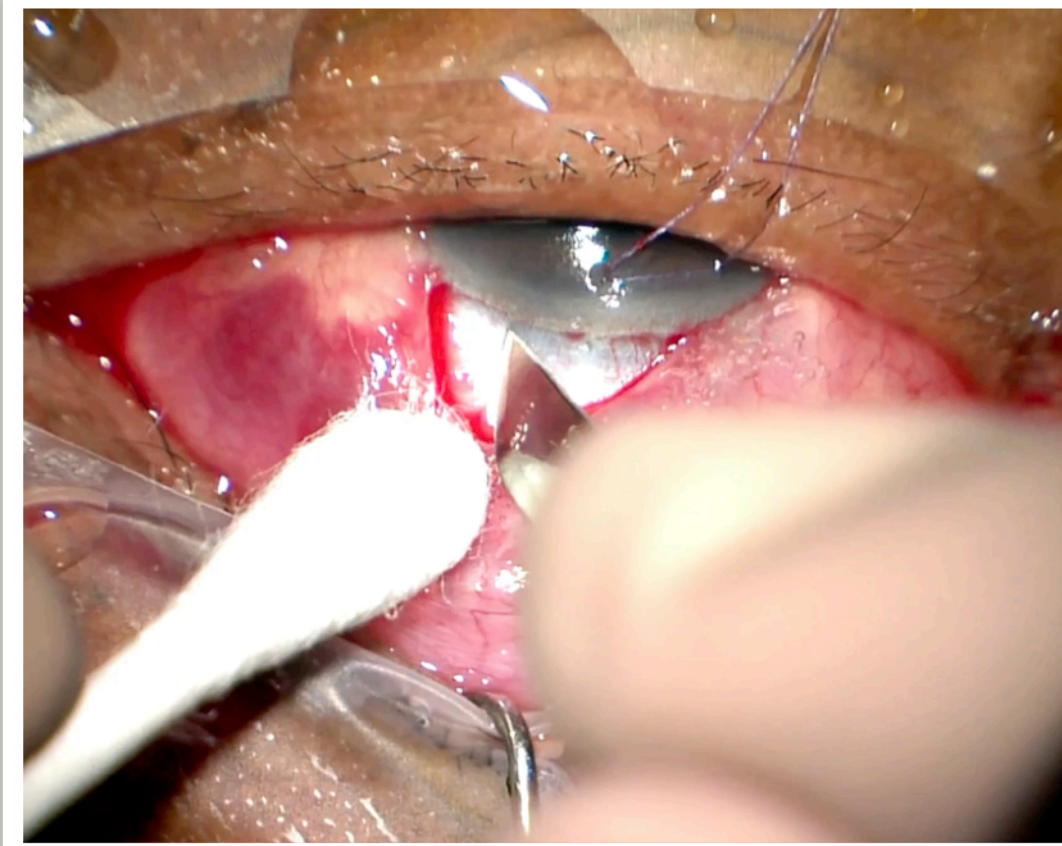
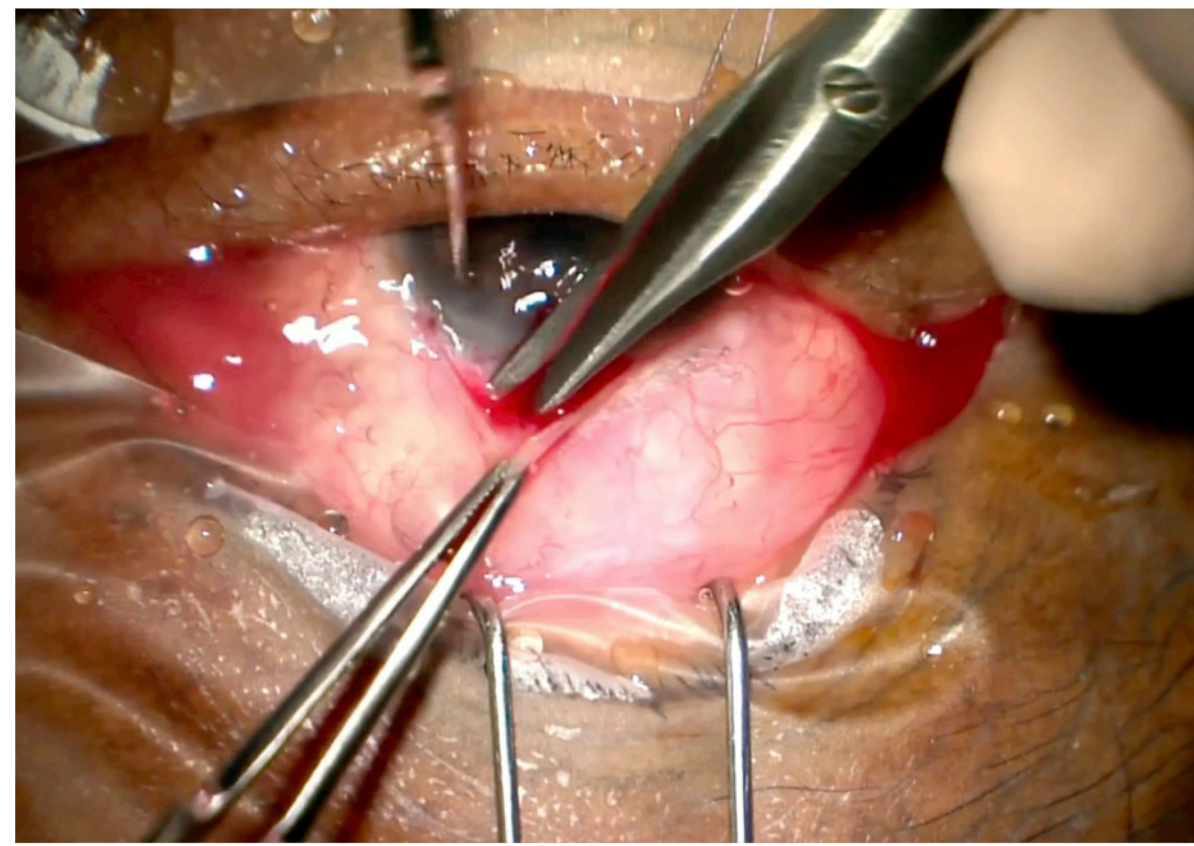
GENERAL ANESTHESIA

- Young patients
- Uncooperative patients
- Hearing or mentally impairment

Epinephrine : additional risk in glaucomatous eyes by reducing vascular perfusion to an already compromised optic nerve head

TRABECULECTOMY

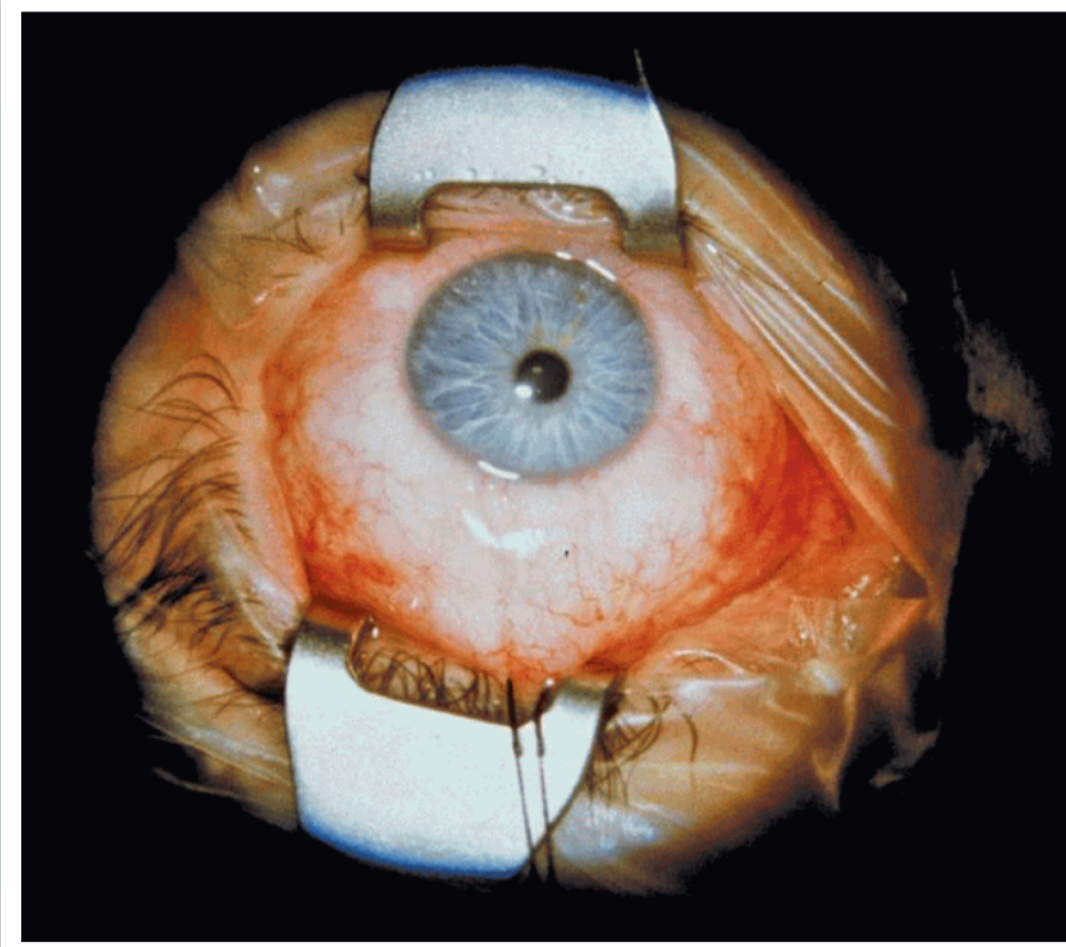
SURGICAL TECHNIQUE



TRABECULECTOMY

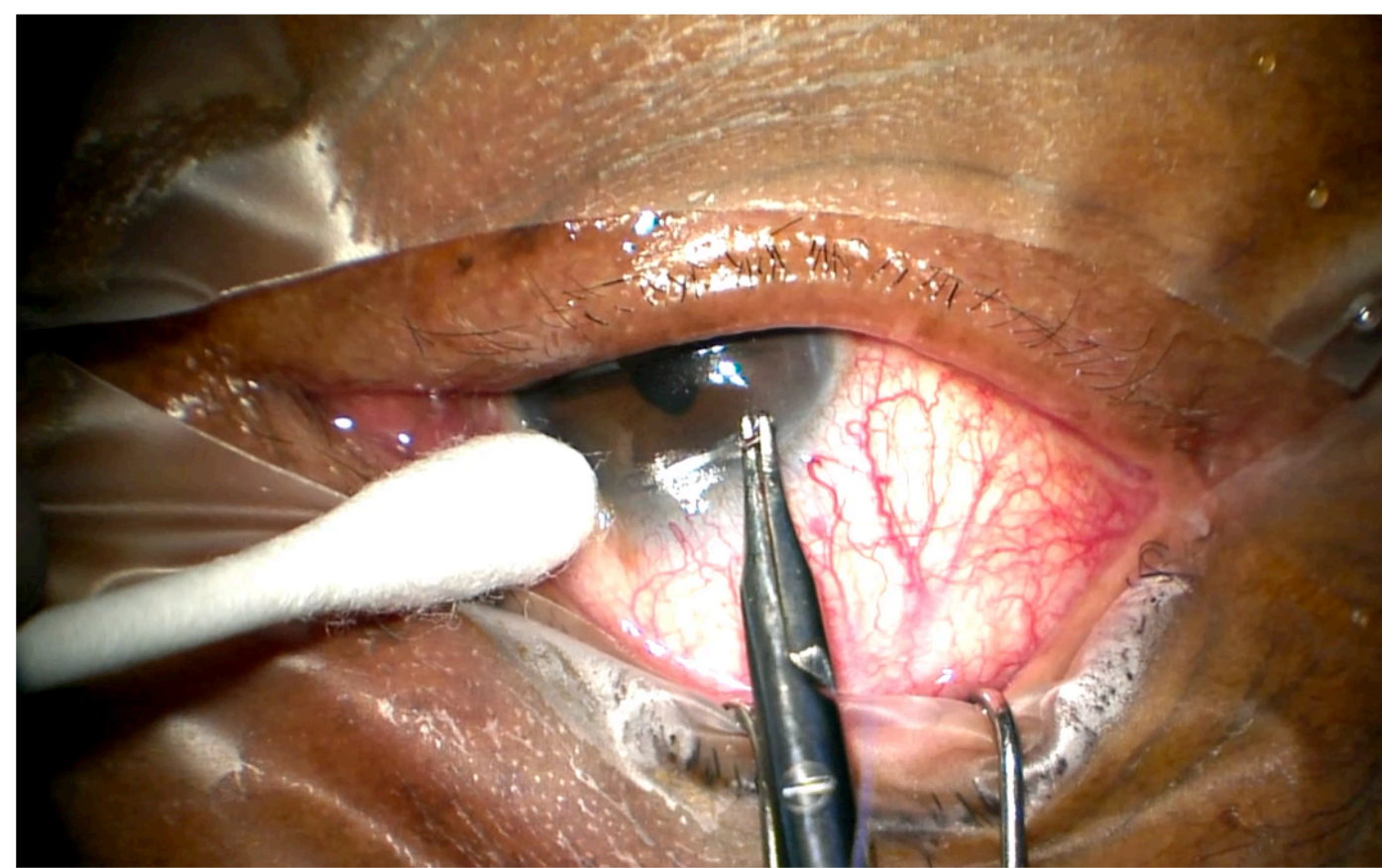
SURGICAL TECHNIQUE

Exposure



- ***Superior rectus traction suture***

- 4-0 silk suture
- Passed transconjunctivally beneath the muscles
- Complications : subconjunctival hemorrhage, conjunctival defects, scleral perforation, patient discomfort, and postoperative ptosis



- ***Corneal traction suture***

- 7-0 silk or polyglactin suture on a cutting needle
- Passed through ~3/4 thickness, superior, peripheral cornea
- Good exposure, less complications
- Can distort the cornea and A/C when the eye is soft



TRABECULECTOMY

SURGICAL TECHNIQUE

Operating site

- Usually in **superotemporal or superonasal** quadrant in area of **least inflamed or scarred** conjunctiva
- Superonasal placement...
 - Leaves room for subsequent GDD, cataract surgery
 - Achieve better intraocular pressure control in long term
 - Disadvantages : bleb leakage, corneal dellen and patient discomfort

TRABECULECTOMY: EFFECT OF VARYING SURGICAL SITE

ROSHINI SANDERS, CAROLINE J. MacEWEN and W. M. HAINING
Dundee

SUMMARY

Trabeculectomy reduces intraocular pressure by fistula formation into a subconjunctival bleb. The operation site traditionally has been at the superior corneo-scleral junction with a failure rate of 10–30%. The causes of trabeculectomy failure can be broadly classified into intraocular, scleral and extraocular. Extraocular factors account for the majority of failures, the main cause being increased subconjunctival fibrosis. Hitherto the effect of varying the site of filtration surgery on intraocular pressure control has not been studied. We therefore carried out a prospective study to evaluate the optimum site for trabeculectomy. Sixty patients were randomised to undergo a superior, nasal or temporal trabeculectomy. Patients who underwent a nasal trabeculectomy had significantly lower intraocular pressures 18 months after surgery ($p < 0.05$), with 30% having an intraocular pressure of ≤ 10 mmHg.

Trabeculectomy was first described by Cairns in 1968. He described the operation at the 12 o'clock position but added that it may be performed anywhere in the corneo-scleral circumference.¹ Since then the operation has traditionally been performed and described most frequently at the 12 o'clock position.² The reason for this is probably that surgical access is easiest superiorly. The peripheral iridectomy is unlikely to cause diplopia or a cosmetic defect at the 12 o'clock position and the resultant bleb is well covered by the upper eye lid.

Trabeculectomy lowers intraocular pressure by fistula formation into a subconjunctival bleb.^{3,4} The success rate of trabeculectomy in primary glaucoma is reported to be between 67% and 94%.⁵ Surgical failure is usually apparent in the first 6 post-operative months, and is generally due to increased subconjunctival fibrosis.⁶

Several studies have investigated the reasons for success and failure of trabeculectomy. The type of conjunctival flap (fornix-based versus limbus-based) has been

shown to influence bleb morphology and vascularity but to have no influence on control of intraocular pressure.⁷ Other studies have reported that an avascular area in the bleb correlates with better intraocular pressure control.⁸ Trabeculectomies have been performed with partial and total tenectomy. Total tenectomy was more likely to result in a cystic bleb. No difference in intraocular pressure control, however, was found between the two groups.⁹ More recently studies have shown that subconjunctival 5-fluorouracil decreases fibroblast proliferation and so reduces the risk of drainage failure.¹⁰ The success rate of trabeculectomy has been shown to be significantly higher when it is carried out as a primary procedure without prior topical antiglaucoma medication.¹¹ Topical medication is associated with increased numbers of inflammatory cells and fibroblasts in the conjunctival and episcleral tissue leading to a greater risk of filtration failure.^{12,13}

Hitherto, the effect of varying the site of filtration surgery on intraocular pressure control has never been investigated. We therefore carried out a prospective study to evaluate the effect of performing trabeculectomy surgery at different sites on the corneo-scleral limbus.

PATIENTS AND METHODS

A prospective study was conducted on 60 patients. The subjects were randomised using random tables to undergo a nasal, superior or temporal trabeculectomy, forming three groups of 20 patients each (Fig. 1). All patients had

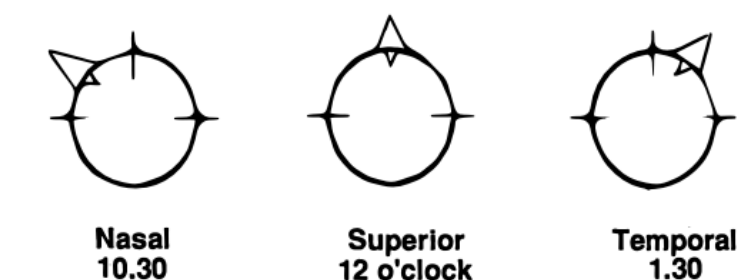


Fig. 1. The nasal, superior and temporal sites at the corneo-scleral limbus in the left eye, where trabeculectomy was performed.

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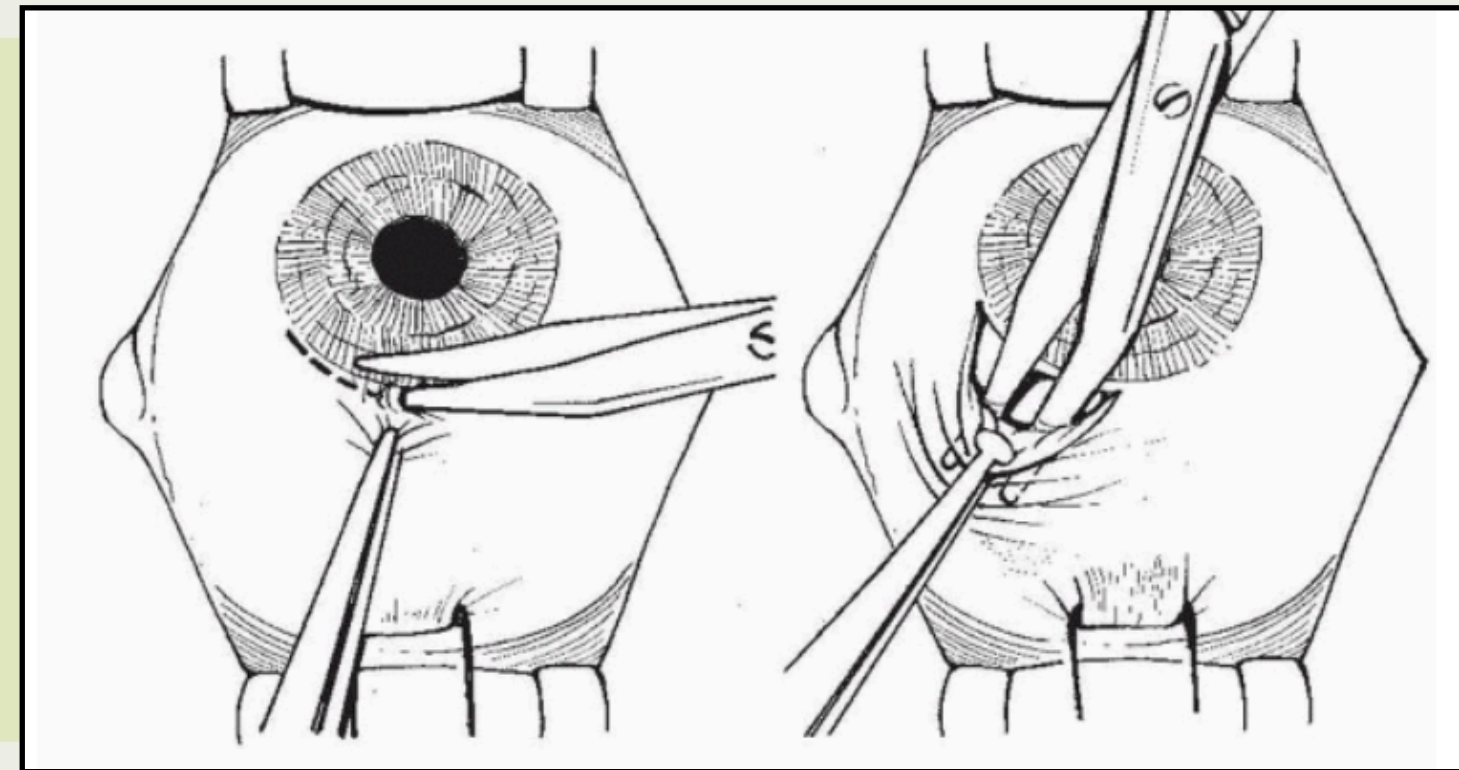
TRABECULECTOMY

SURGICAL TECHNIQUE

Conjunctival flap

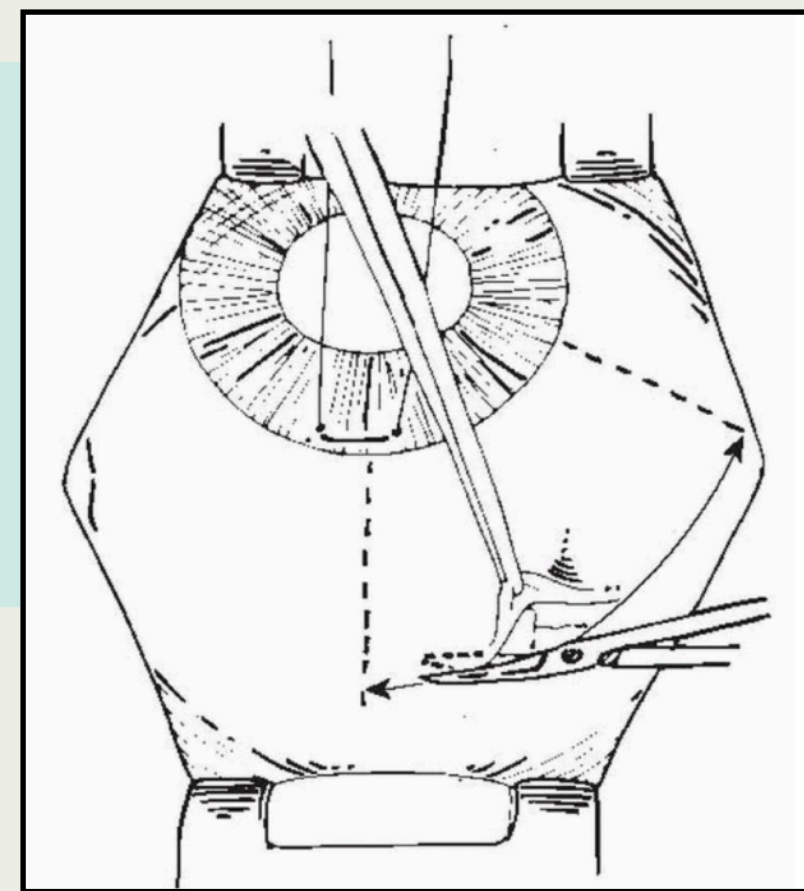
- Conjunctiva can be incised...

*At the limbus
(fornix-based
flap)*



- Incision of about 5-10 mm is necessary
- A relieving incision is commonly used but is not necessary (increases the trauma and risk of wound leakage)

*Deep in the fornix
(limbus-based flap)*



- Incision should be made far into the fornix
- Length of at least 10 mm is usually necessary to provide adequate exposure

*The conjunctiva should be **handled very gently** to avoid buttonholing, particularly if **antimetabolites** are used*

TRABECULECTOMY

SURGICAL TECHNIQUE

Conjunctival flap

Comparison of Limbus-Based and Fornix-Based Trabeculectomy: Success, Bleb-Related Complications, and Bleb Morphology

Jason F. Solus, MD, Henry D. Jampel, MD, MHS, Patricia A. Tracey, BLA, Donna L. Gilbert, BA, Tara L. Loyd, Joan L. Jefferys, ScM, Harry A. Quigley, MD

Purpose: To compare the success and complications of trabeculectomy performed with limbus-based and fornix-based conjunctival approaches.

Design: Retrospective case series with some prospective data collection.

Participants: Consecutive patients undergoing trabeculectomy by 2 surgeons between May 2000 and October 2008.

Intervention: We performed limbus-based operations during the first 4 years and fornix-based operations during the last 4 years. We collected data by chart review and by examination at the most recent visit. For each follow-up visit, we defined success as undergoing no further glaucoma procedure and achieving one of our intraocular pressure (IOP) criteria. We used Kaplan–Meier survival analysis, Cox proportional hazards models, and generalized estimating equation (GEE) analysis. During 2009, 439 trabeculectomy sites of 347 patients were quantitatively assessed by the Indiana bleb grading system.

Main Outcome Measures: (1) Success rate of trabeculectomy, as determined by the achievement of each of our different IOP goals, with or without IOP-lowering medications; and (2) incidence of surgical complications.

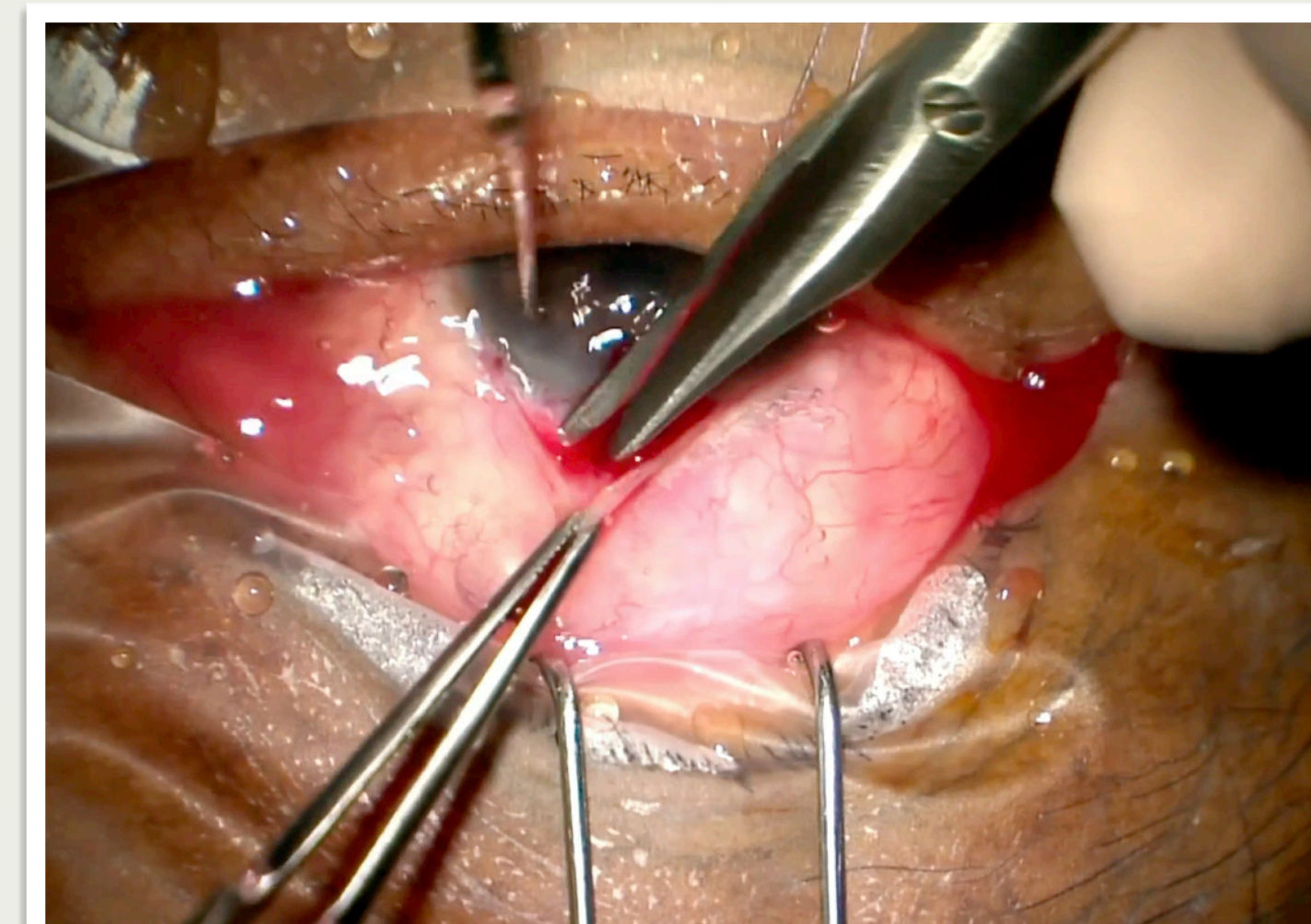
Results: During the 4 years after surgery, the success rates of limbus-based and fornix-based trabeculectomy were not statistically different for any of our IOP criteria. Blebs after limbus-based surgery were more likely to be graded as higher and to be avascular (GEE model, both $P < 0.0001$). Four percent of eyes experienced late-onset bleb leaks within 4 years after both limbus- and fornix-based operations; however, limbus-based cases developed bleb leaks significantly later than did fornix-based cases (2.1 vs. 1.0 years; $P=0.002$, GEE model). Late bleb-associated infection during the first 4 years after surgery occurred more often in limbus-based operations, although statistical significance was borderline ($P=0.054$, Cox model). Symptomatic hypotony during all available follow-up was more common with fornix-based operations ($P=0.01$, GEE model). Eyes undergoing the fornix-based operation had a greater risk of cataract surgery in the 4-year period after surgery ($P=0.02$, Cox model), and fornix-based cases requiring cataract surgery had the operation earlier than limbus-based cases ($P=0.002$, GEE model).

Conclusions: Success rates are similar between limbus-based and fornix-based trabeculectomy. Limbus-based procedures produce higher, more avascular blebs, with a greater risk of infection. Fornix-based procedures have more symptomatic hypotony and more and earlier cataract development.

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Limbus VS. Fornix based ?

- *No statistically significant difference* in IOP control between limbus and fornix-based
- Fornix-based : **hypotony** was more common
- Limbus-based : higher and more **avascular** and slightly more prone to **blebitis**

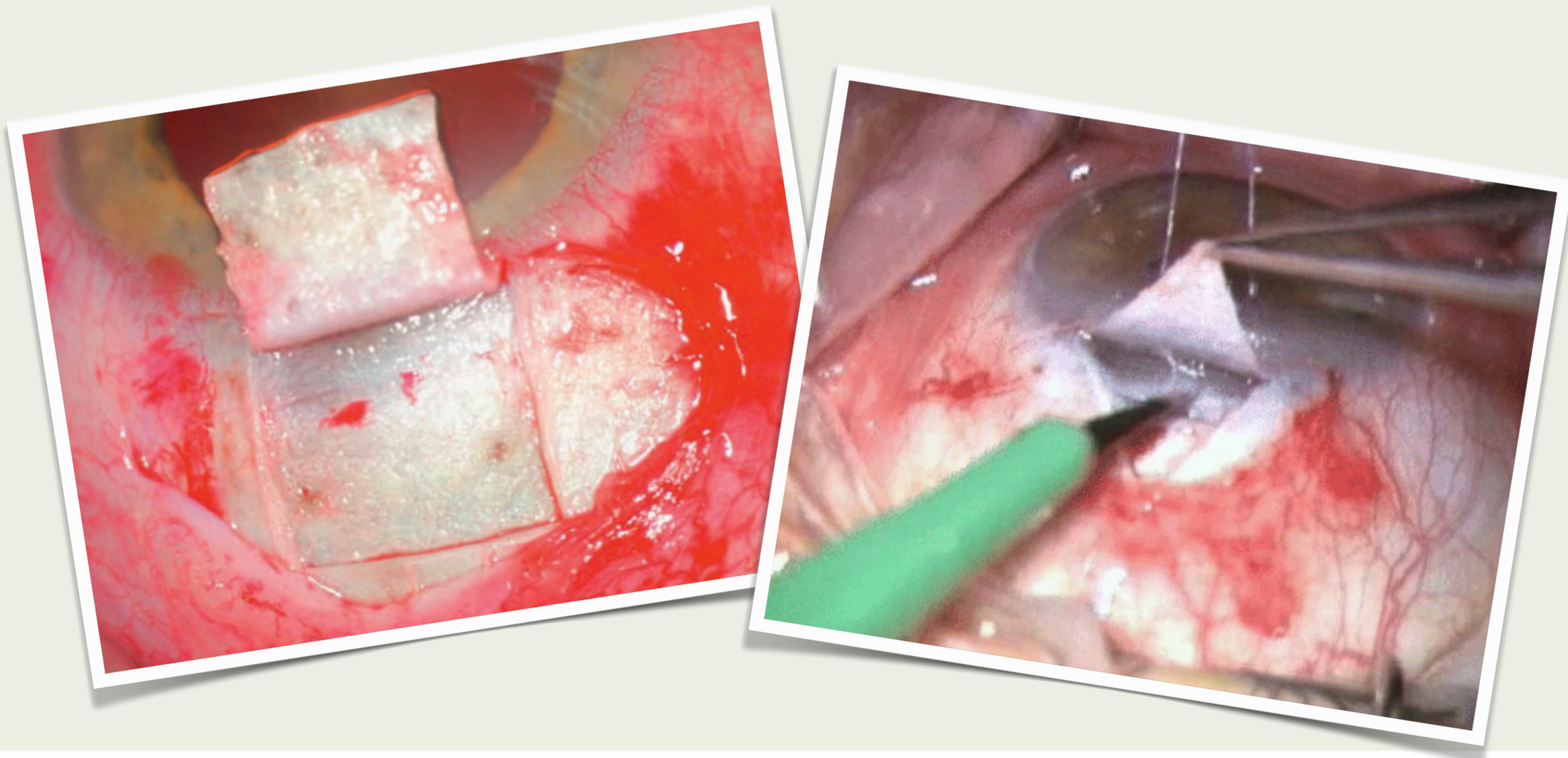


TRABECULECTOMY

SURGICAL TECHNIQUE

Scleral flap

- The scleral flap provides resistance to aqueous outflow and prevents hypotony
- Acts as a safety valve to minimise IOP fluctuations or spikes
- Several types of scleral flap – the **most common being rectangular or triangular** in shape



ORIGINAL ARTICLE

The Influence of Scleral Flap Position and Dimensions on Intraocular Pressure Control in Experimental Trabeculectomy

Wayne Birchall, FRCOphth,* Laura Wakely, MRCOphth,* and Anthony P. Wells, FRANZCO*†

Clinical science

Do shapes and dimensions of scleral flap and sclerostomy influence aqueous outflow in trabeculectomy? A finite element simulation approach

Kwong Ming Tse,¹ Heow Pueh Lee,¹ Noor Shabana,² Seng-Chee Loon,² Peter G Watson,^{3,4} See Yin Lennard Harold Thean²

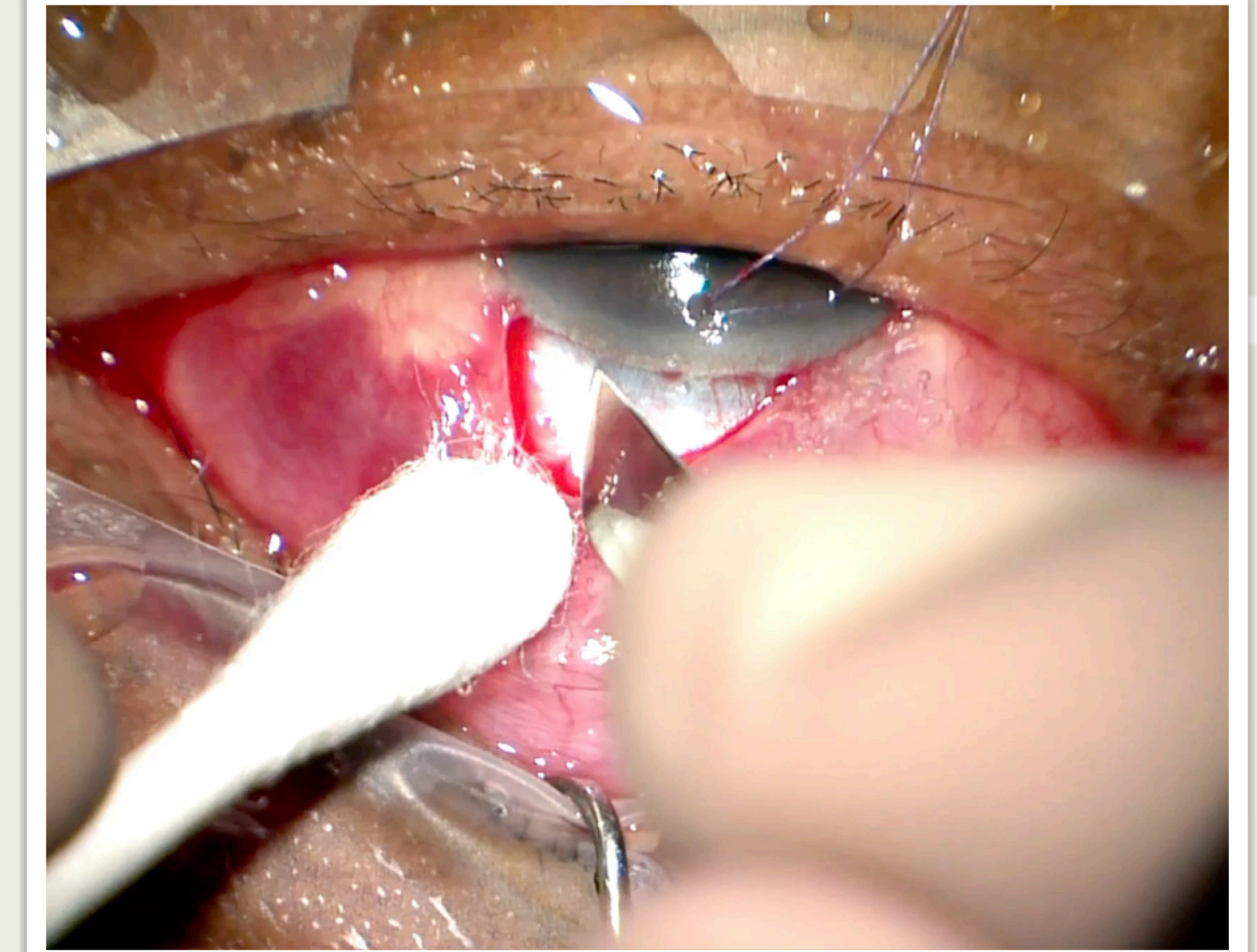
- *At present there is **no conclusive evidence** to suggest that the **flap shape** affects surgical results*
- *Studies have shown that **good IOP control** can be achieved with a **variety of scleral flap***

TRABECULECTOMY

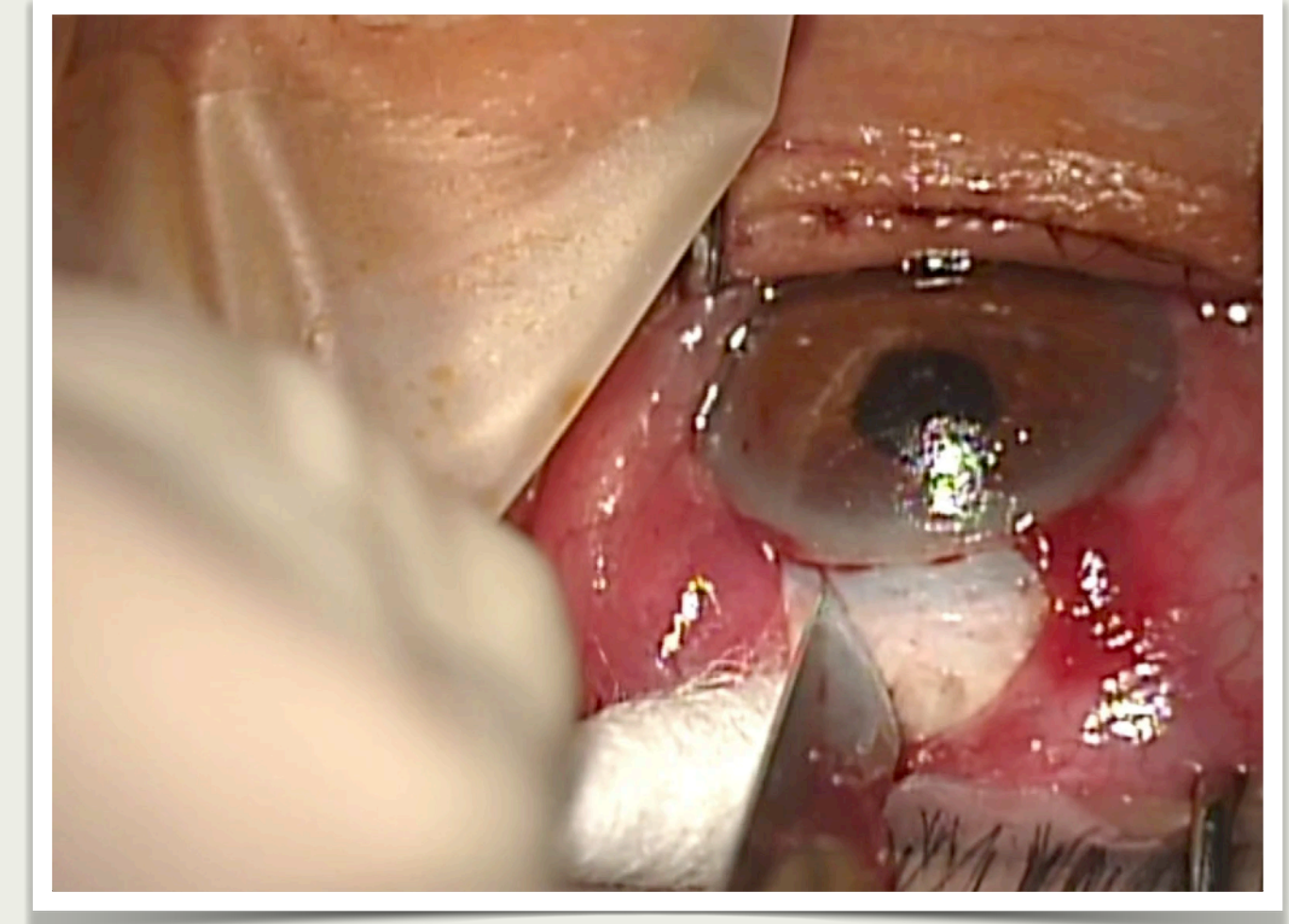
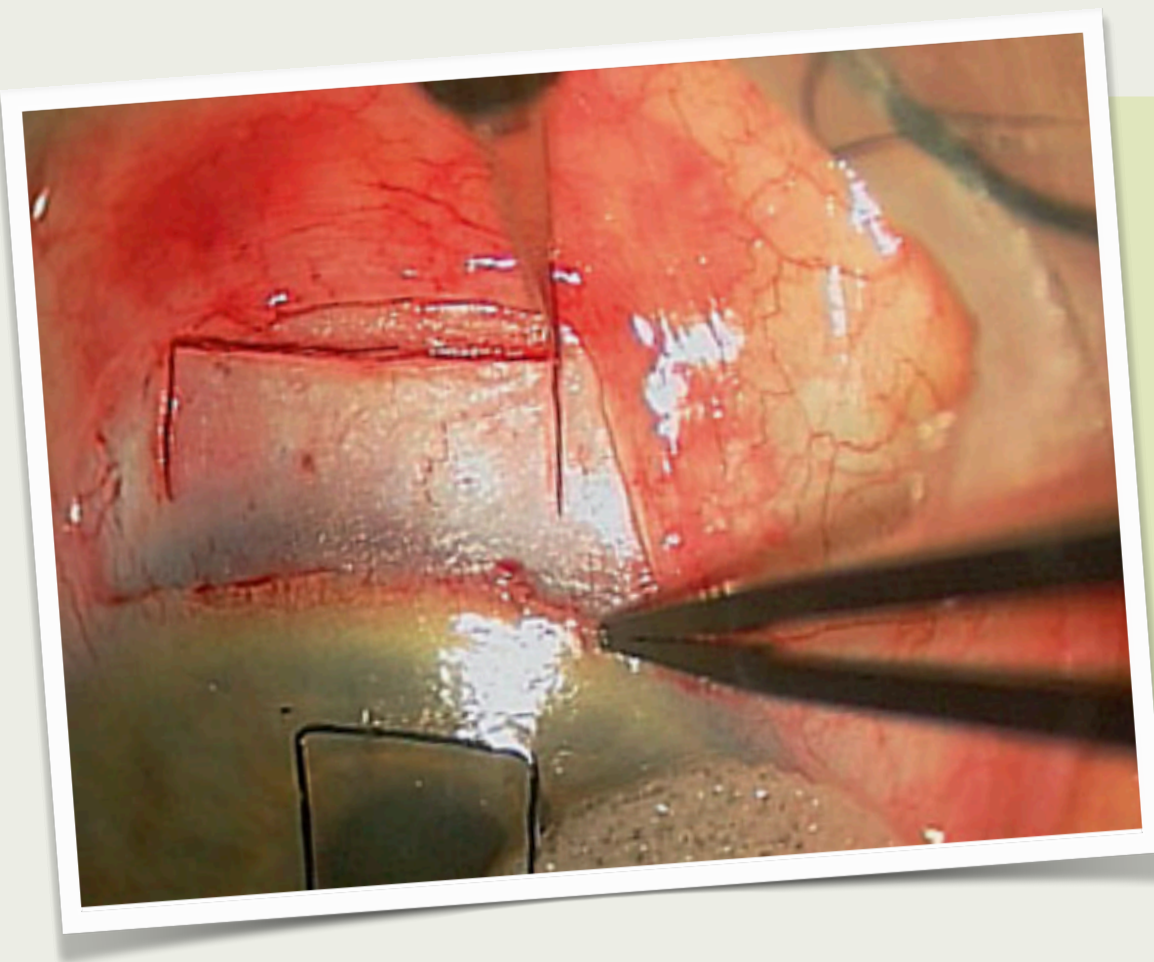
SURGICAL TECHNIQUE

Scleral flap

- Margins of flap are **outlined** with light cautery or blade, ~3.5 × 4.5 mm (The Moorfields Safer Surgery System)
- Followed by **partial-thickness scleral incisions** (1/2 to 2/3 scleral thickness), hinged at the limbus
- Dissected forward until **at least 1 mm of the bluish-gray zone** of the peripheral cornea is exposed



*Side incisions are cut ~85–90% to the limbus to **reduce anterior aqueous drainage and encourage posterior aqueous flow** (more diffuse non-cystic bleb)*



TRABECULECTOMY

SURGICAL TECHNIQUE

Antifibrotic agents

- Adjunctive antimetabolites **inhibit natural healing response** that may preclude successful filtration surgery
- Used with caution because of potential complications & stratified according to patient **risk factors**



5-Fluorouracil

- Pyrimidine analog antimetabolite
- Inhibit fibroblast proliferation by retarding DNA synthesis
- Less aggressive than MMC
- Concentration : Usually on a sponge soaked in 25-50 mg/mL for 5 minutes intraop.



Mitomycin-C

- Antineoplastic antibiotic isolated from *Streptomyces caespitosus*
- Inhibit proliferation of fibroblasts and suppress vascular ingrowth
- Much more potent than 5-FU
- Concentration : 0.2-0.5 mg/ml for 1-5 mins depending on risk factors

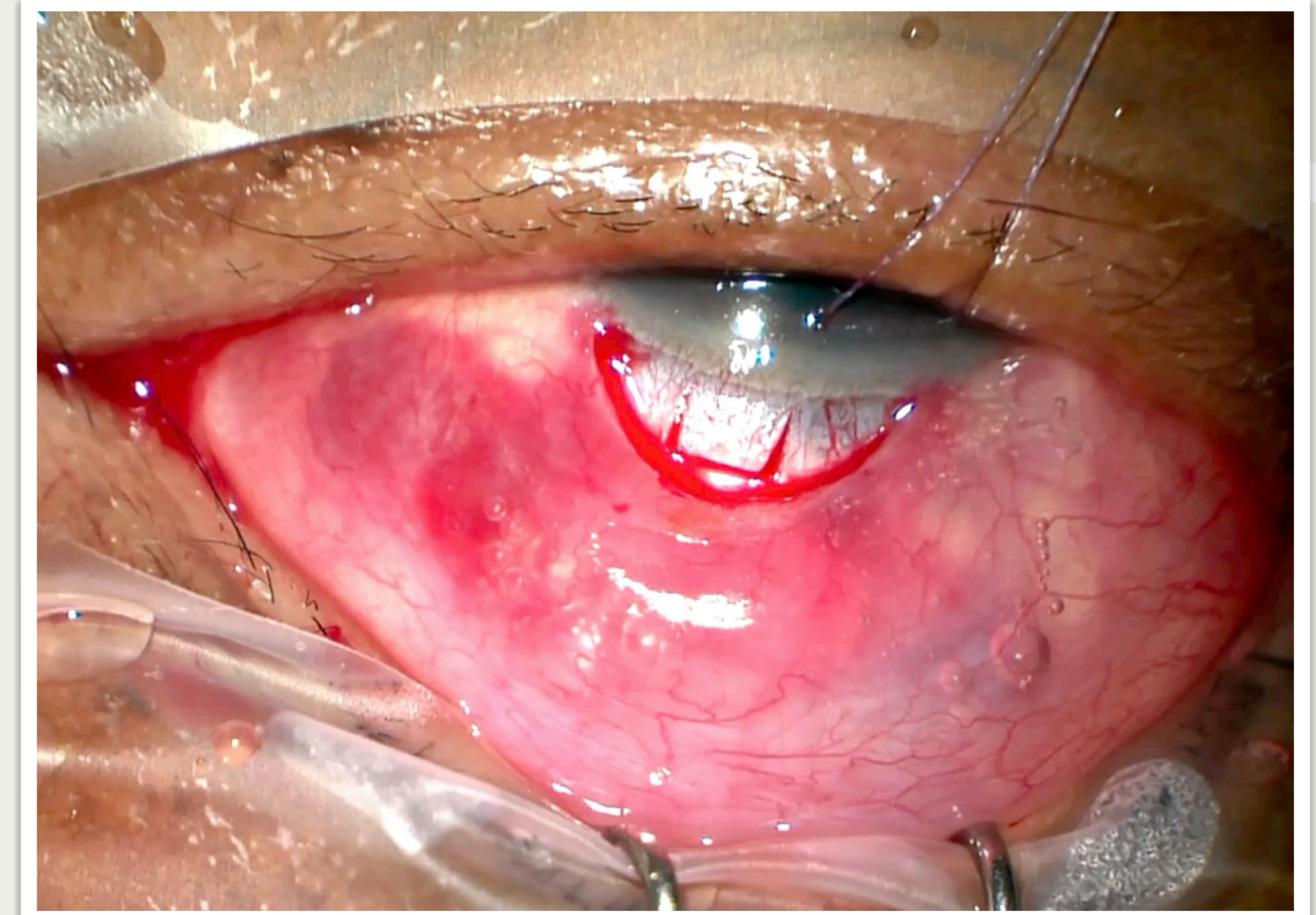
TRABECULECTOMY

SURGICAL TECHNIQUE

Antifibrotic agents

Techniques of Application of Antifibrotic Agents

- Applied soaked polyvinyl alcohol (PVA) or methylcellulose sponges onto the bare sclera alone, or in combination with under the scleral flap (before entry into the AC)
- Variation in concentration and timing
- Minimise antifibrotic agent contact with conjunctival edge to prevent post-op wound leaks and bleb-related problems
- Irrigation with 100 ml of BSS is performed immediately after sponge removal



- *Anti-fibrotic treatment should cover the **largest possible area** to create a **more diffuse non-cystic bleb** and prevent the development of a posterior limiting scar*

TRABECULECTOMY

SURGICAL TECHNIQUE

Paracentesis

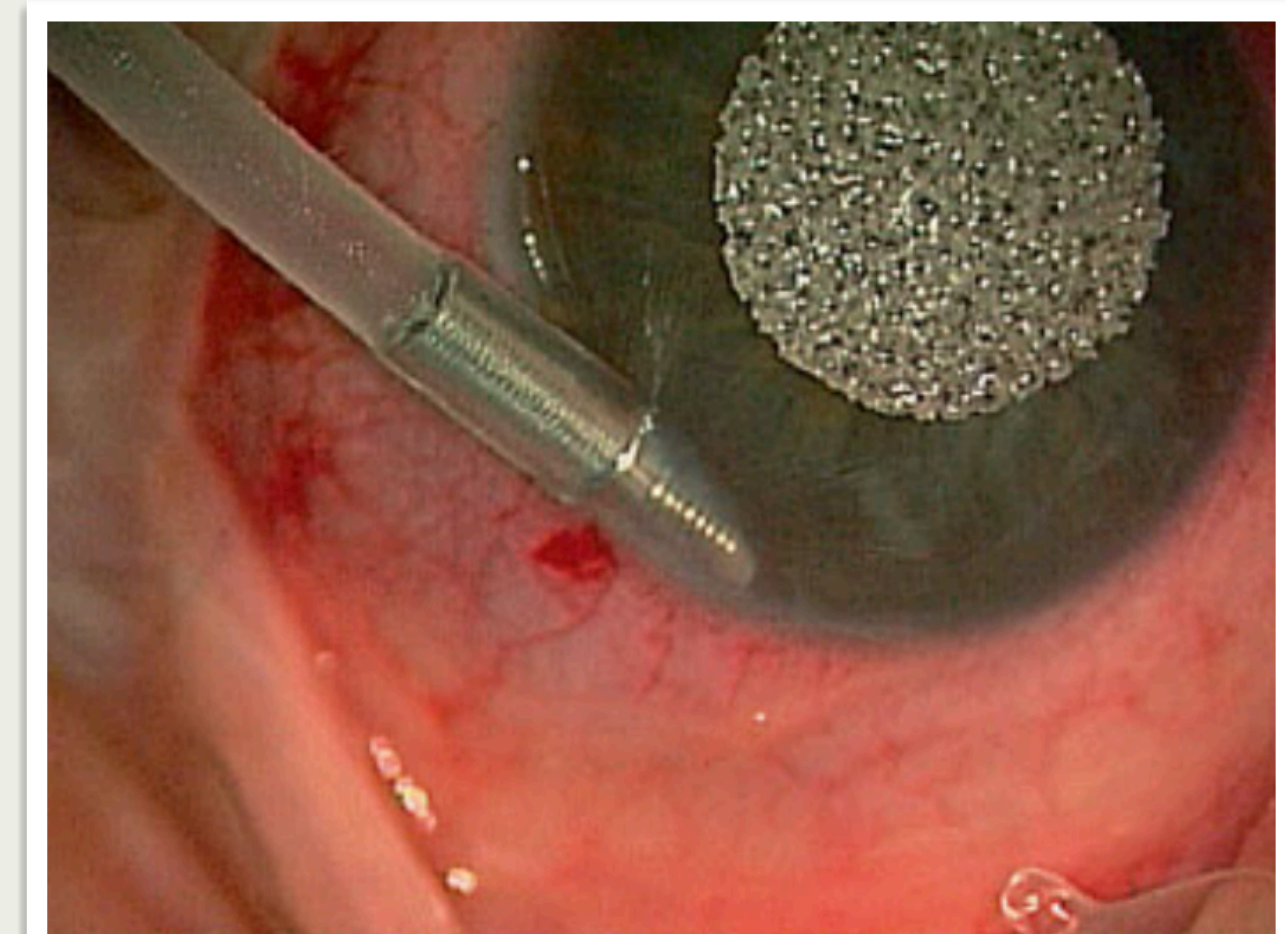
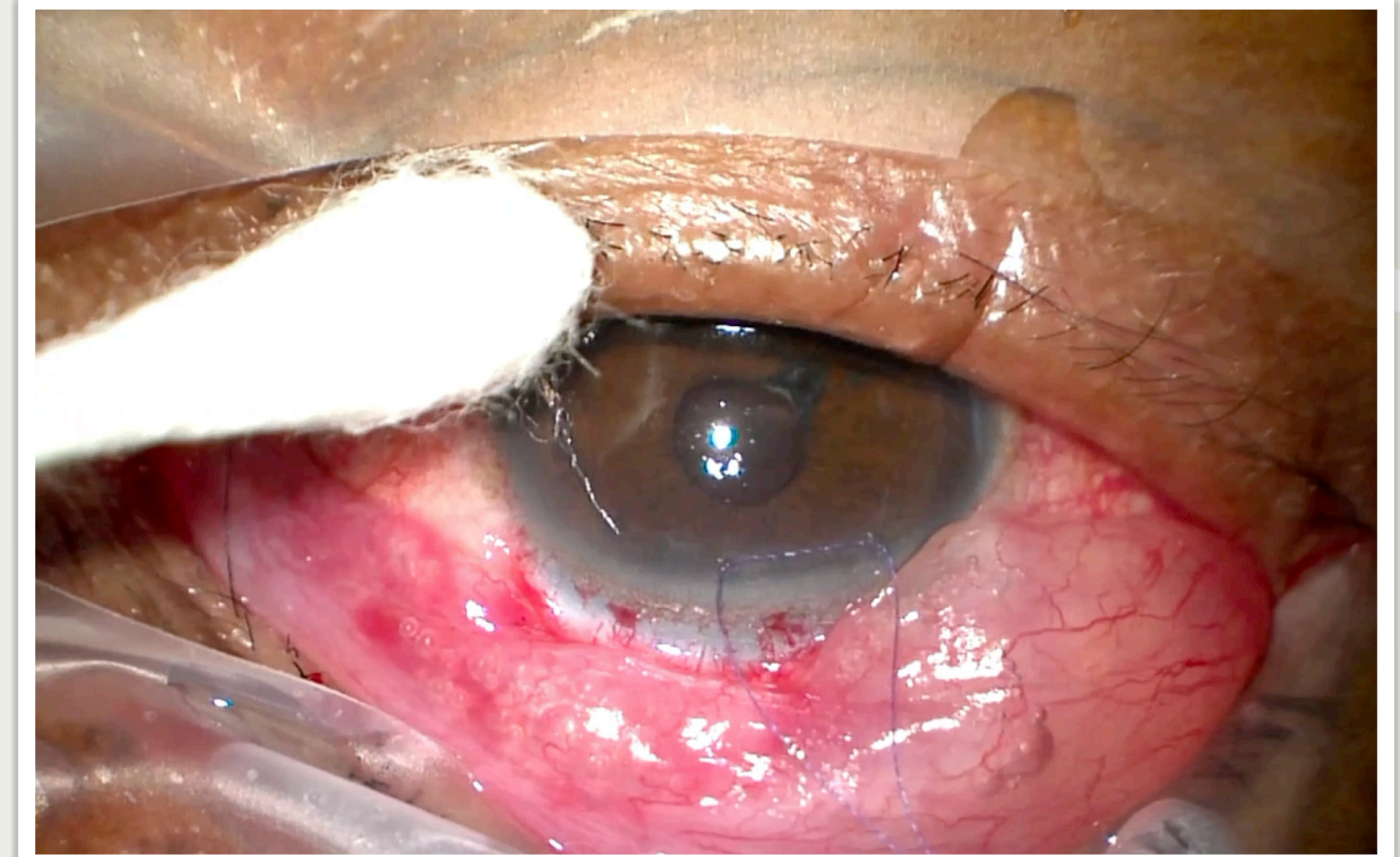
- A selfsealing, beveled incision into AC at limbus
- Usually temporally at the horizontal meridian, or in the inferior-temporal quadrant

1. IOP titration : Set opening pressure of the scleral flap with precision after tying the flap sutures

2. Reformation (or decompression) of AC, both intra- and postoperatively

3. Infusion can be placed to maintain a continuous IOP

4. Control and washout of AC haemorrhage



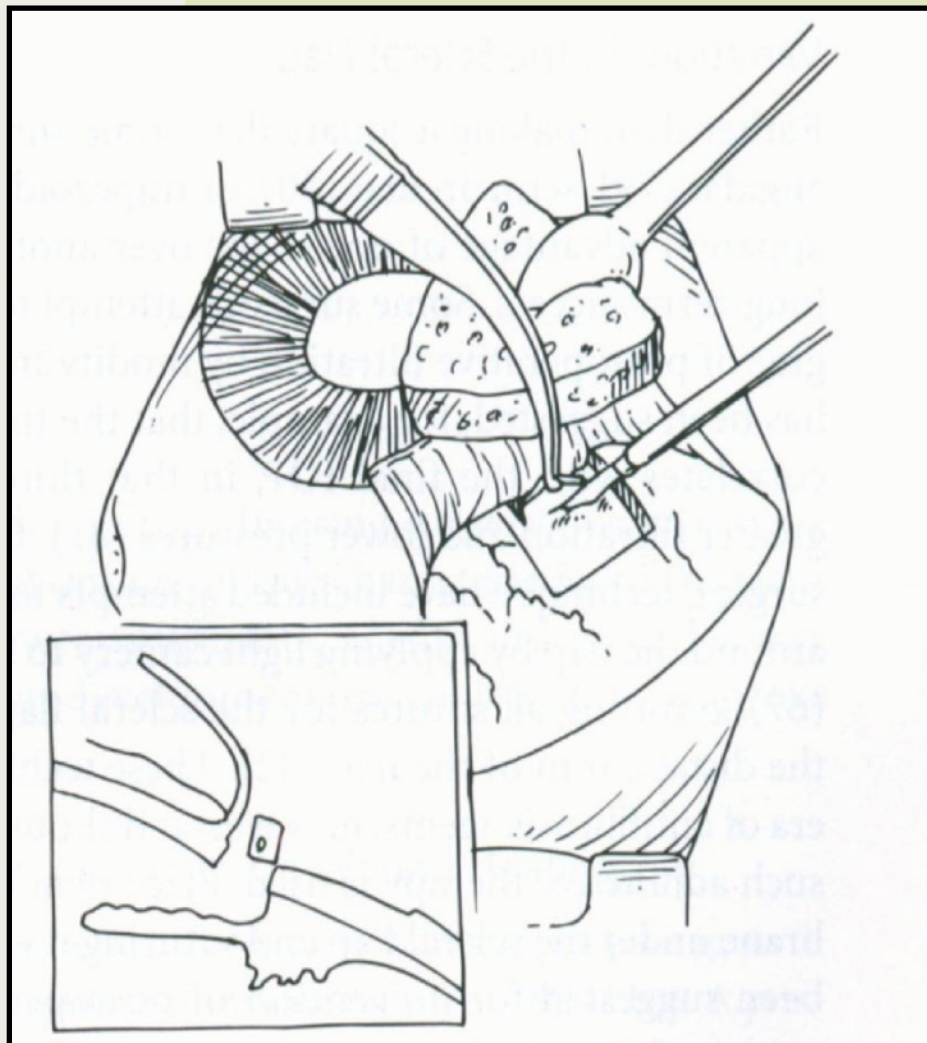
TRABECULECTOMY

SURGICAL TECHNIQUE

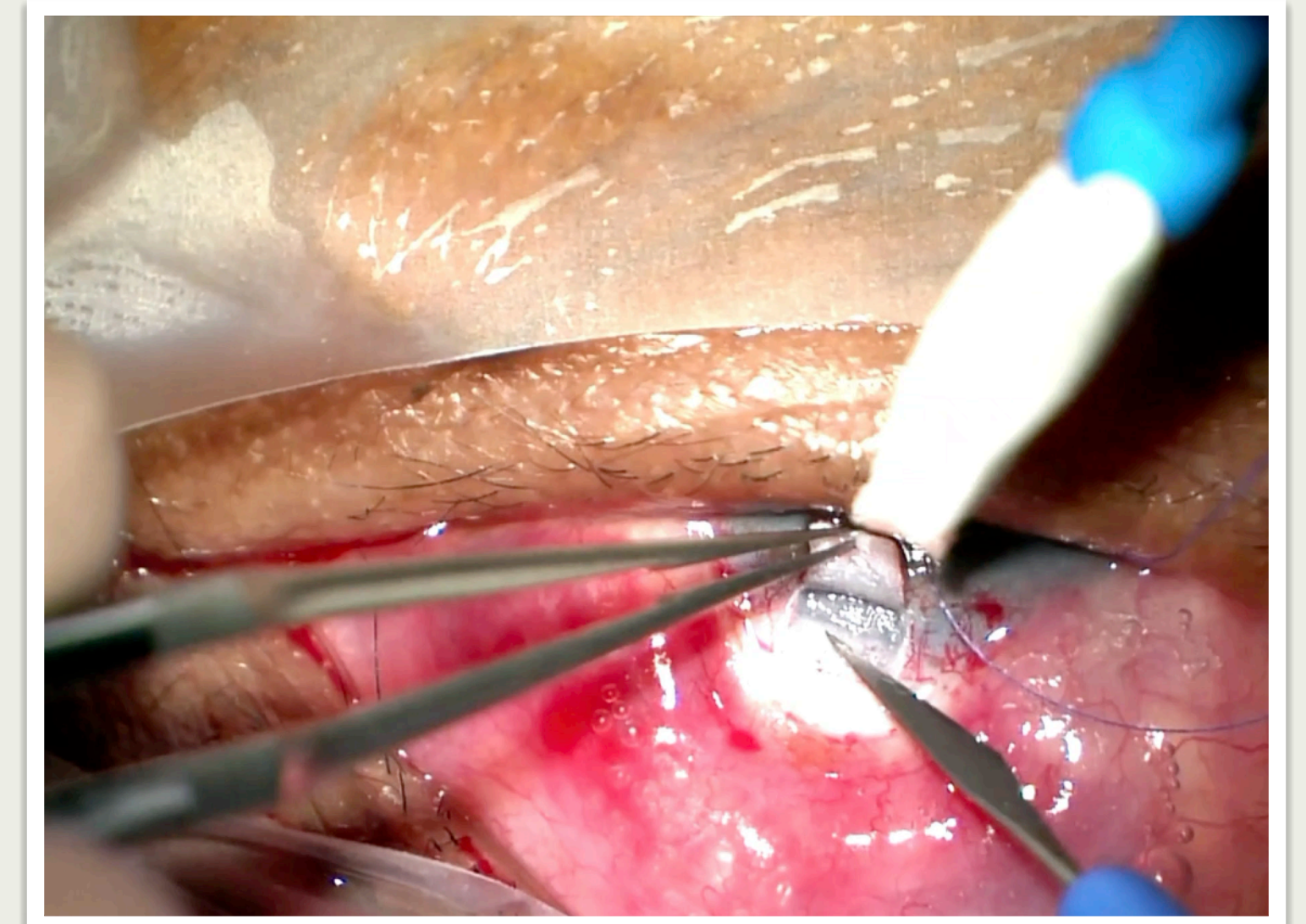
Sclerostomy

- Manually cut and removed, or a scleral punch can be used
- An anterior corneoscleral incision reduces the risk of iris incarceration and bleeding from the iris root or ciliary body

1 Manual Block Removal



- The block is outlined to at least 90% depth before AC entry through the anterior edge
- The rest of the block is dissected posteriorly to full- depth using a blade (difficult to smaller than 3 × 1.5 mm)
- Gentle traction to prevent damage to the iris and underlying structures



- *Problems : difficulty in dissecting anteriorly and the larger ostium causing shallow AC and hypotony*

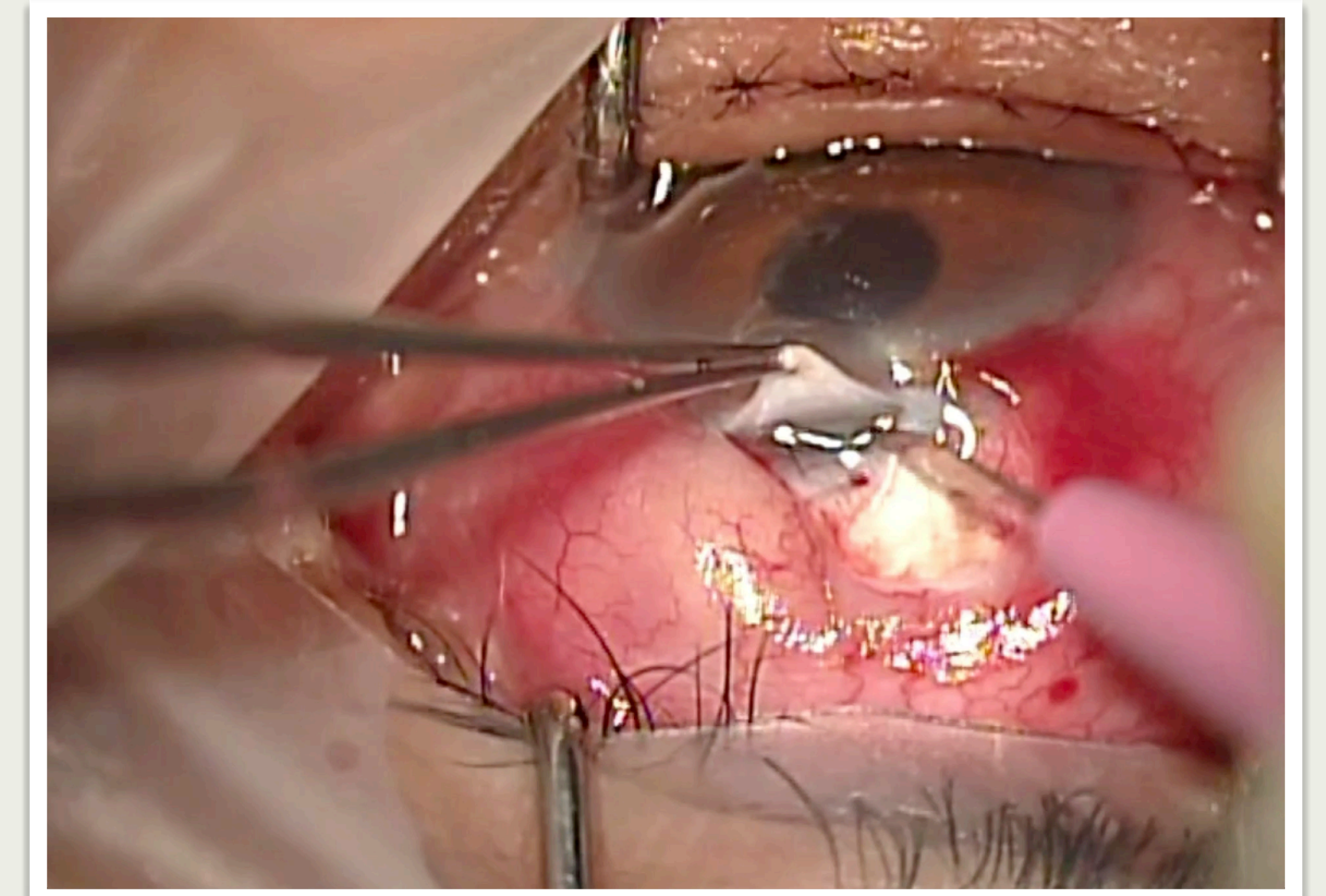
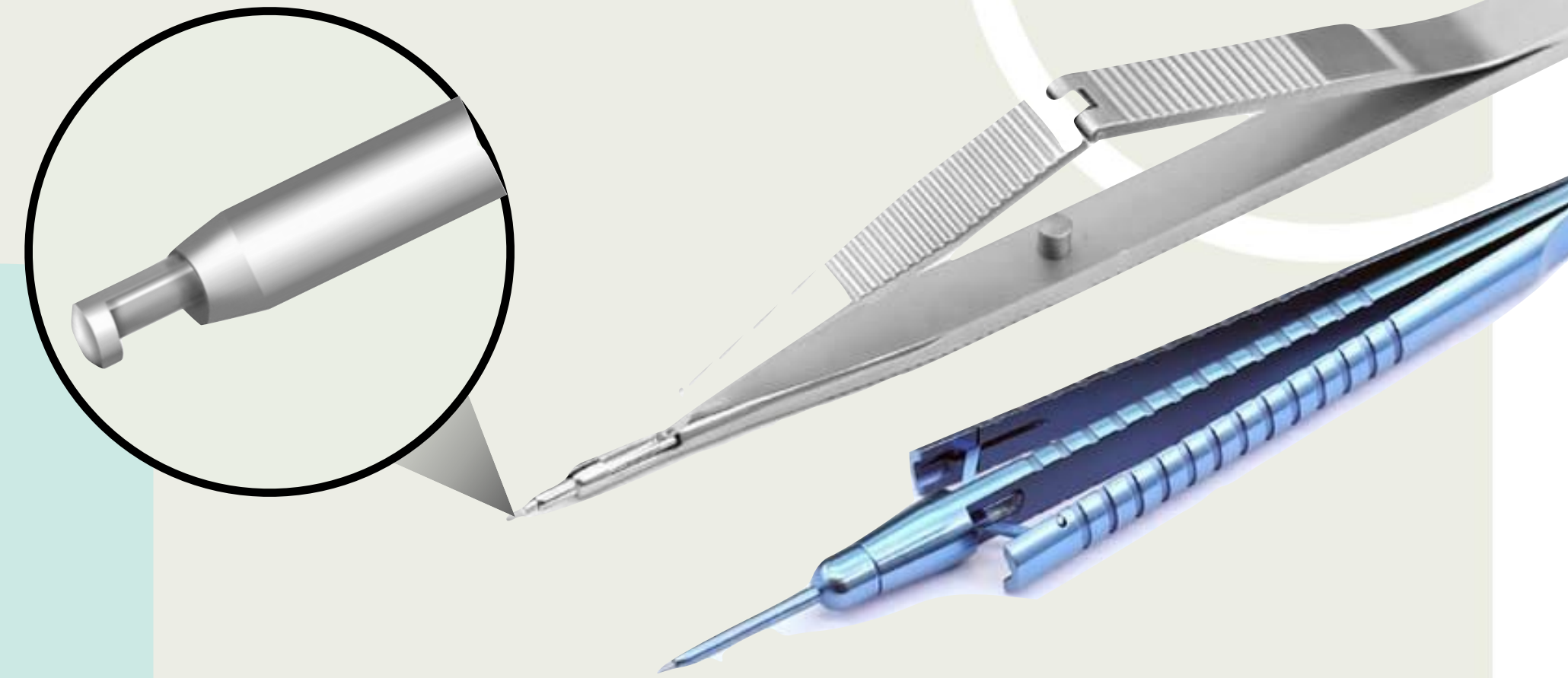
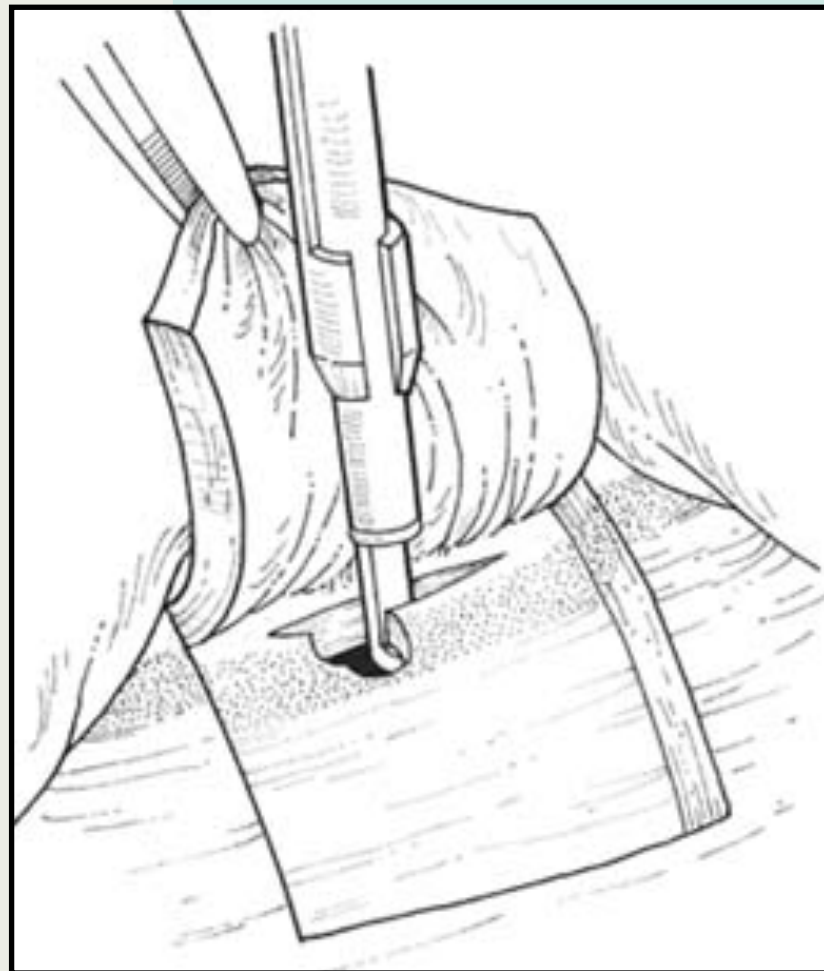
TRABECULECTOMY

SURGICAL TECHNIQUE

Sclerostomy

2 *Punch Sclerostomy*

- Blade entry into AC anteriorly through clear cornea beneath the scleral flap
- Punch is inserted to engage the full thickness of limbus and should be aligned perpendicularly
- Small 0.5 mm diameter punch and repeat punching as required (0.5–2 × 0.5–1.5 mm is adequate and provides optimum outflow)

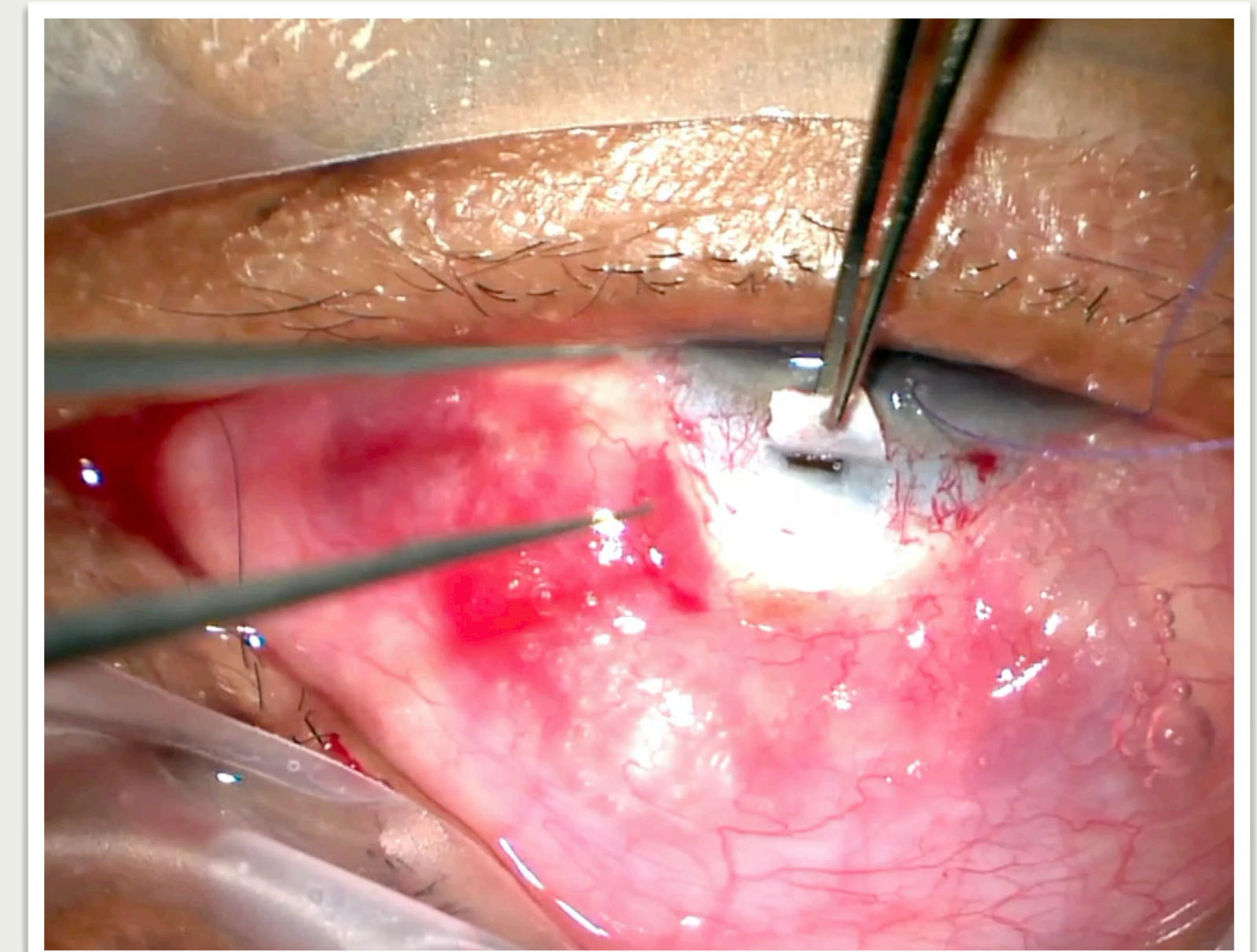
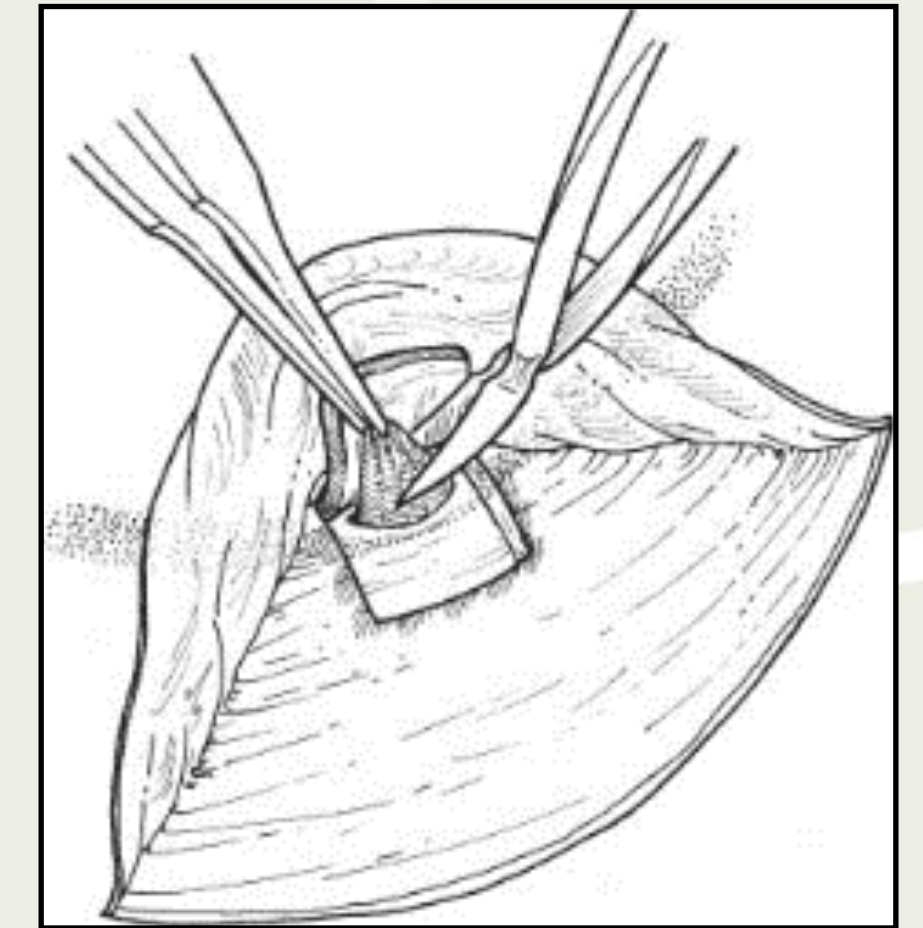


TRABECULECTOMY

SURGICAL TECHNIQUE

Iridectomy

- PI is performed through the sclerostomy
- Prevents **iris incarceration** and **relieves pupillary block** in some cases
- Broad at the base and short in length to reduce the size of iris defect, minimising **glare** and **monocular diplopia**
- Cutting the PI with scissors held parallel to the sclera



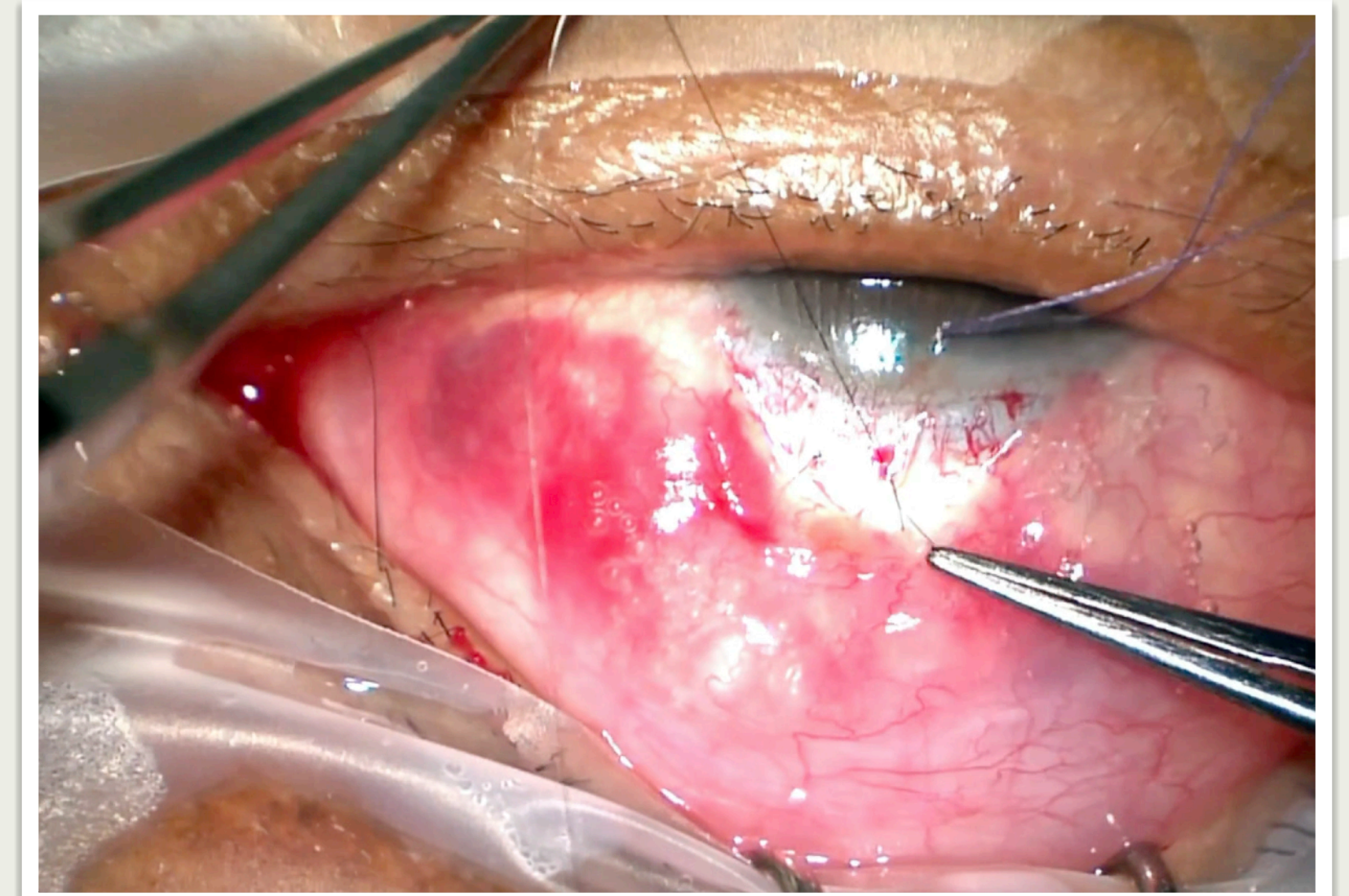
**Not to make the iris incision *too close to the iris root* :
incising the ciliary body and inducing significant *bleeding***

TRABECULECTOMY

SURGICAL TECHNIQUE

Scleral flap closure

- Secure the scleral flap and provide adequate tension
"aqueous flow restrictor"
- Fixed, releasable or adjustable sutures
- Scleral flap is approximated with 10-0 nylon sutures (two sutures at the posterior corners)



Loose suture?

- *Promote filtration around flap margins*

VS

Tight suture?

- *Avoid hypotonic, flat AC*
- *Laser suture lysis*

Tight versus loose scleral flap closure in trabeculectomy surgery

ETTALEAH C. BLUESTEIN & WILLIAM C. STEWART
The Glaucoma Service at the Department of Ophthalmology, The Medical University of South Carolina, Charleston, South Carolina, USA

Not differ significantly within early post-op & 3 months post-op (IOP, VA, AC depth)

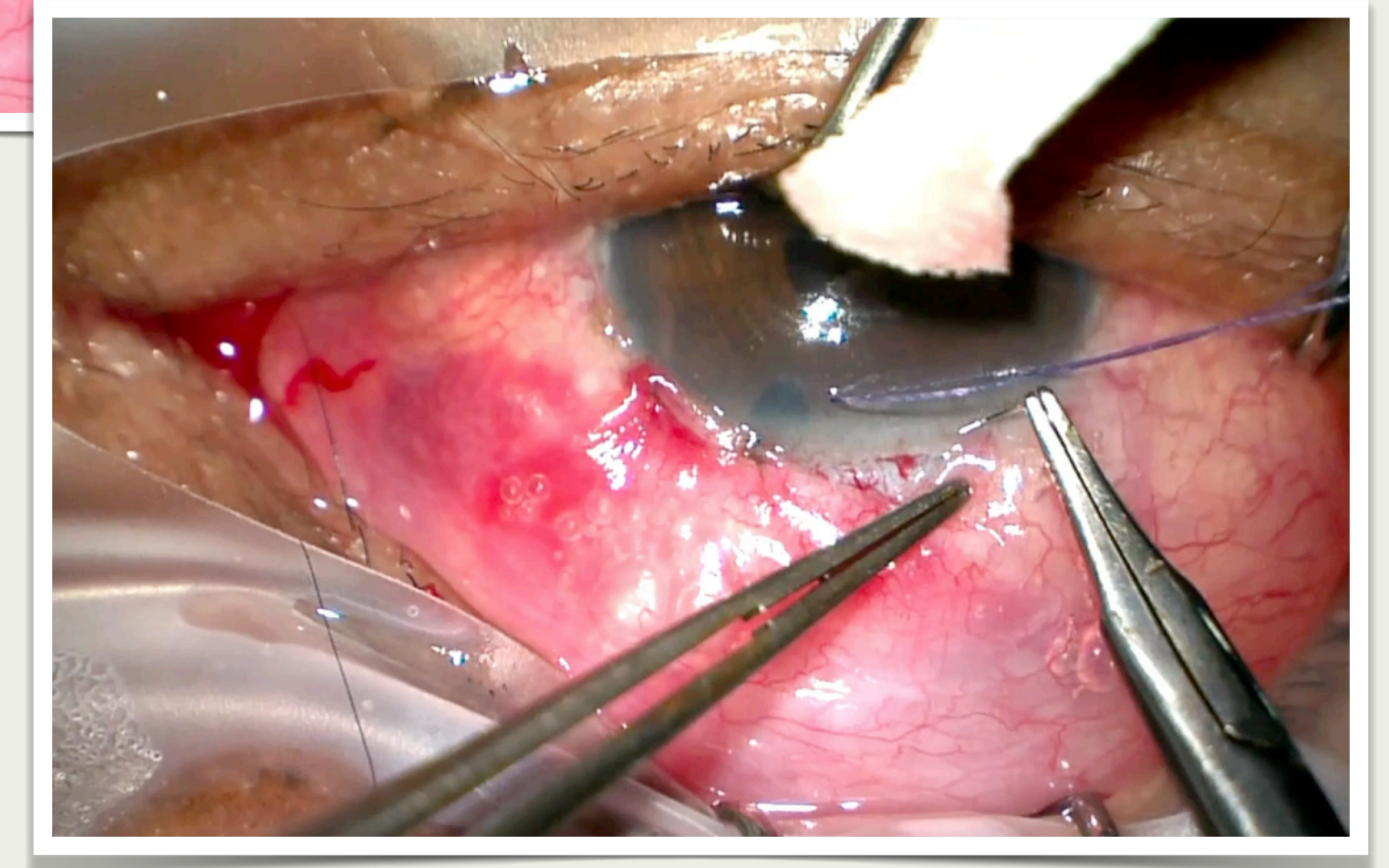
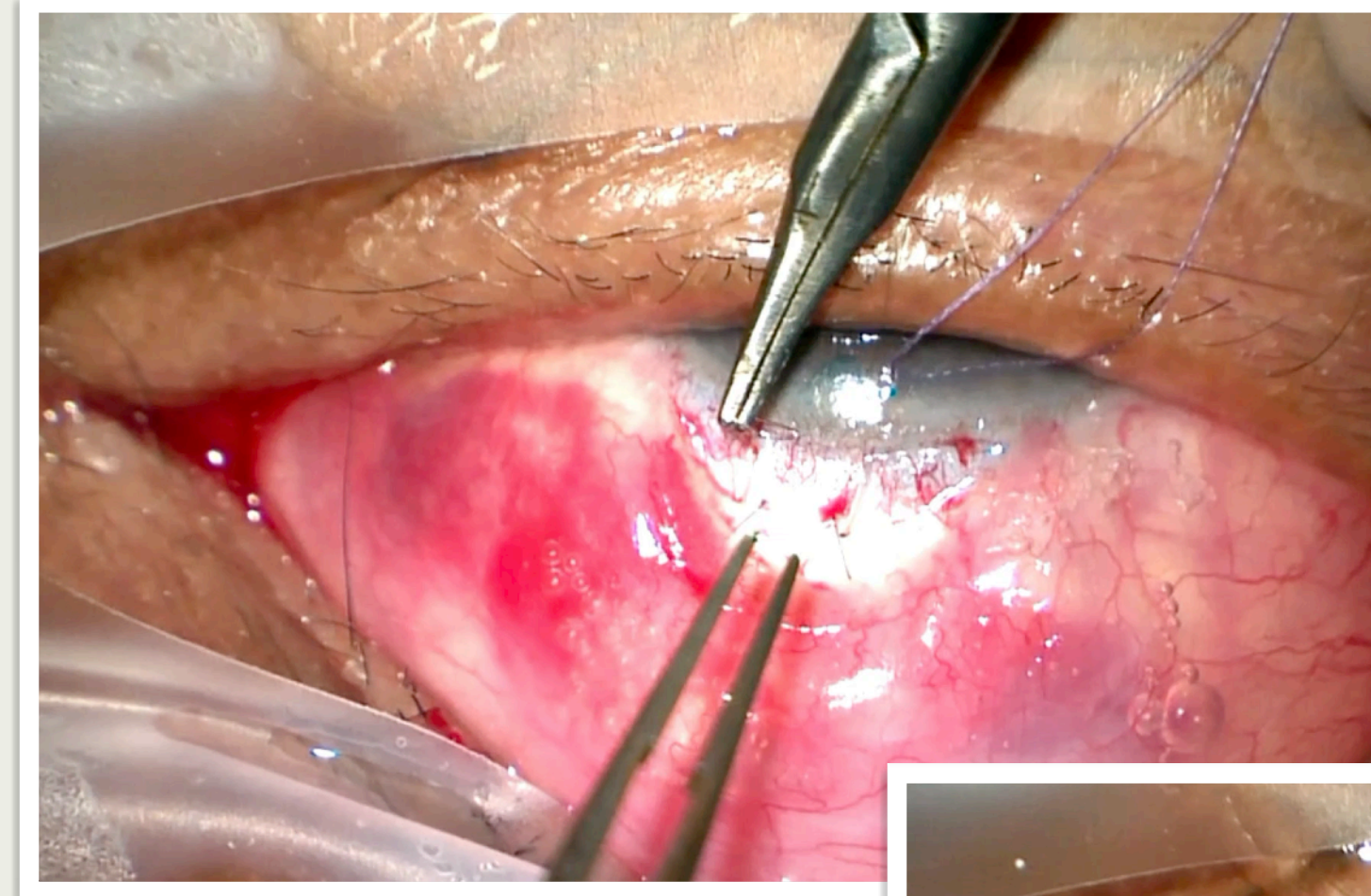
- *Closure that achieves **mild-moderate resistance** to aqueous flow, thus **maintaining AC depth**, is optimal*
- *Tested for **adequate flow resistance** via **paracentesis***

TRABECULECTOMY

SURGICAL TECHNIQUE

Conjunctival closure

- **Prevention of wound leaks** is of paramount importance in **fornix-based** surgery
- Reproducible **water-tight** closure techniques
 - Interrupted sutures at conjunctival incision
 - Edge purse-string sutures
 - Interrupted horizontal mattress sutures
 - Suture with corneal grooves
- **Round-bodied** rather than spatulated needle
 - minimise the risk of conjunctival tears, cheese-wiring and suture tract leaks



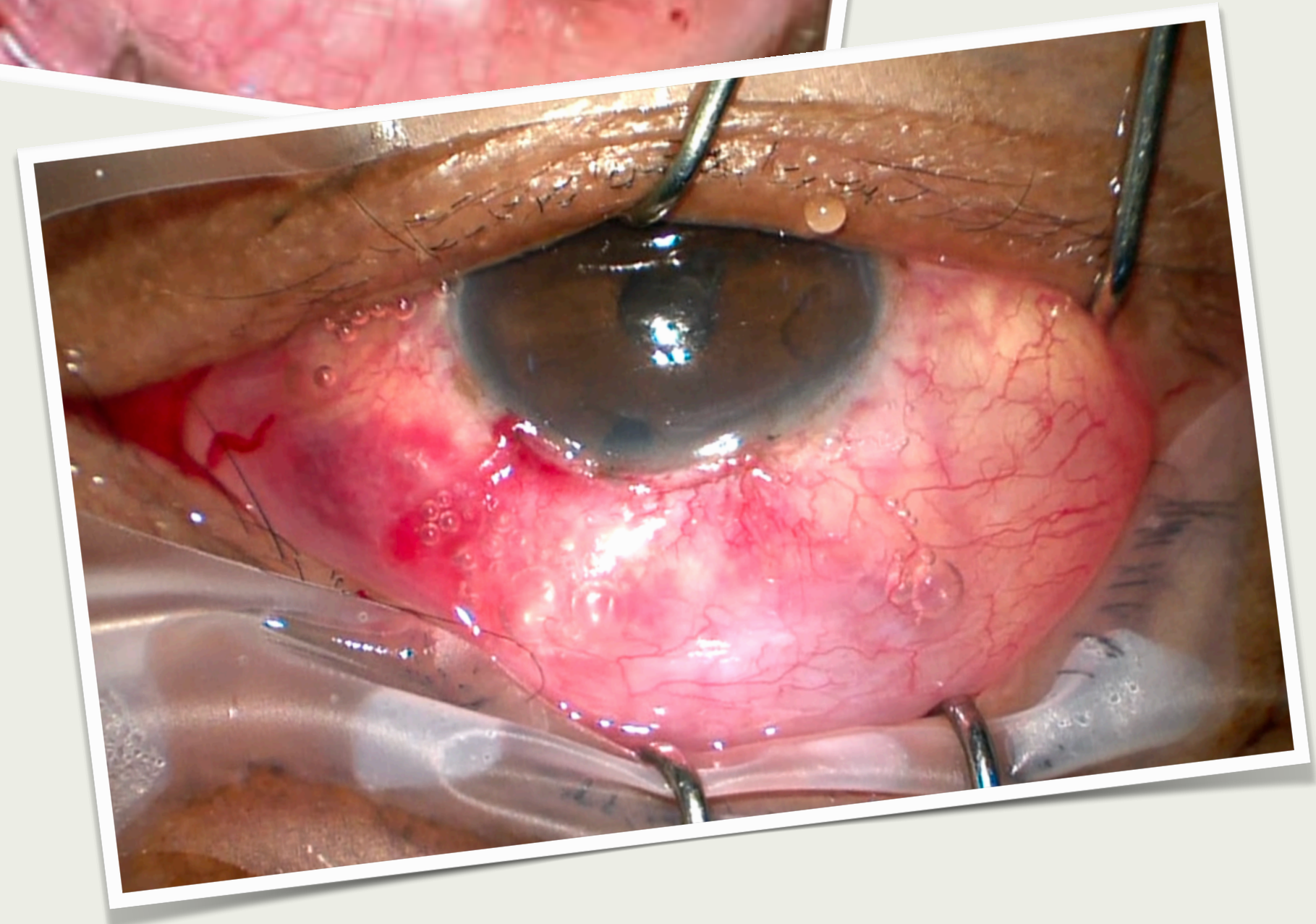
- *BSS is injected via paracentesis to ensure **patency of the scleral flap and water-tight closure***

TRABECULECTOMY

SURGICAL TECHNIQUE

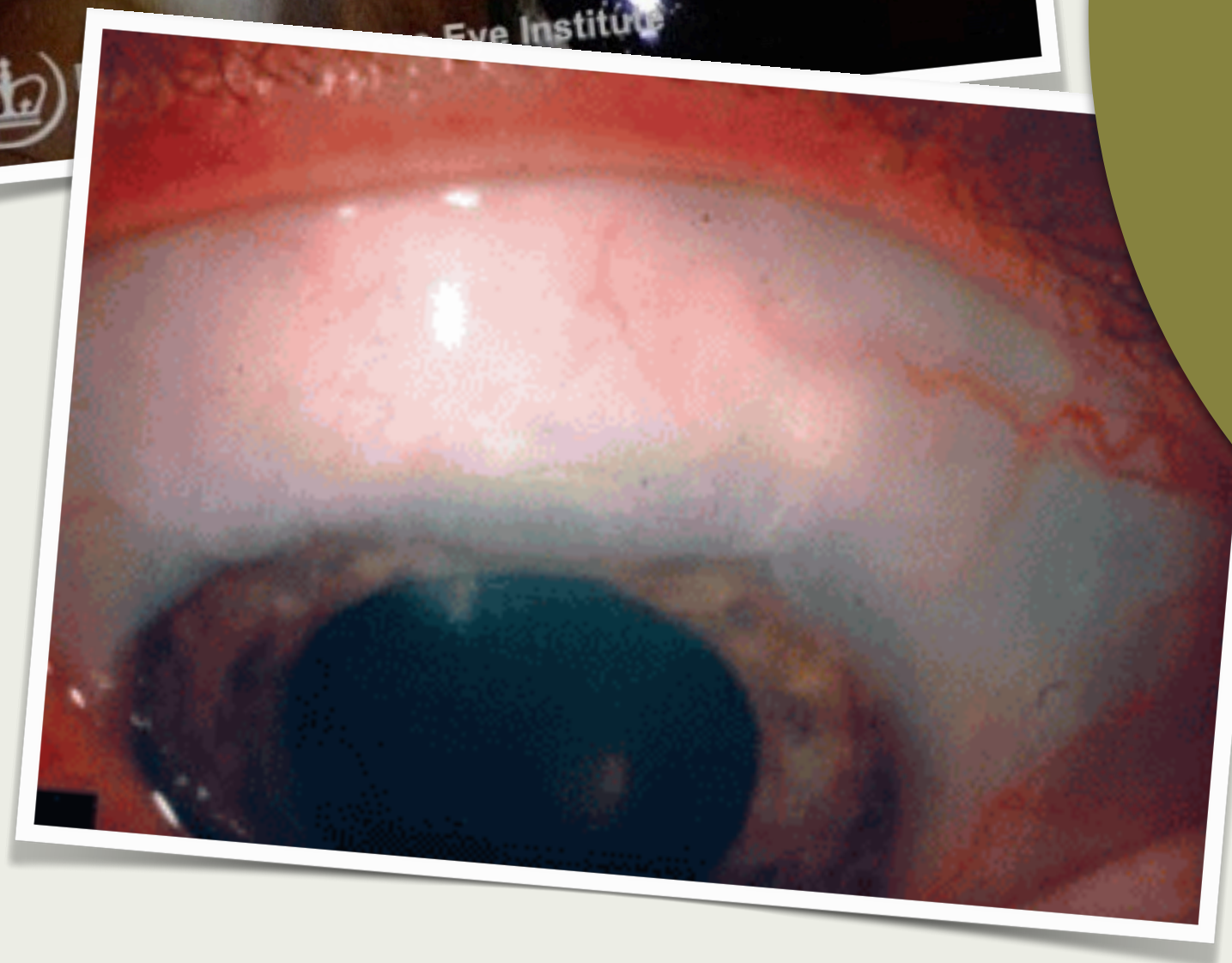
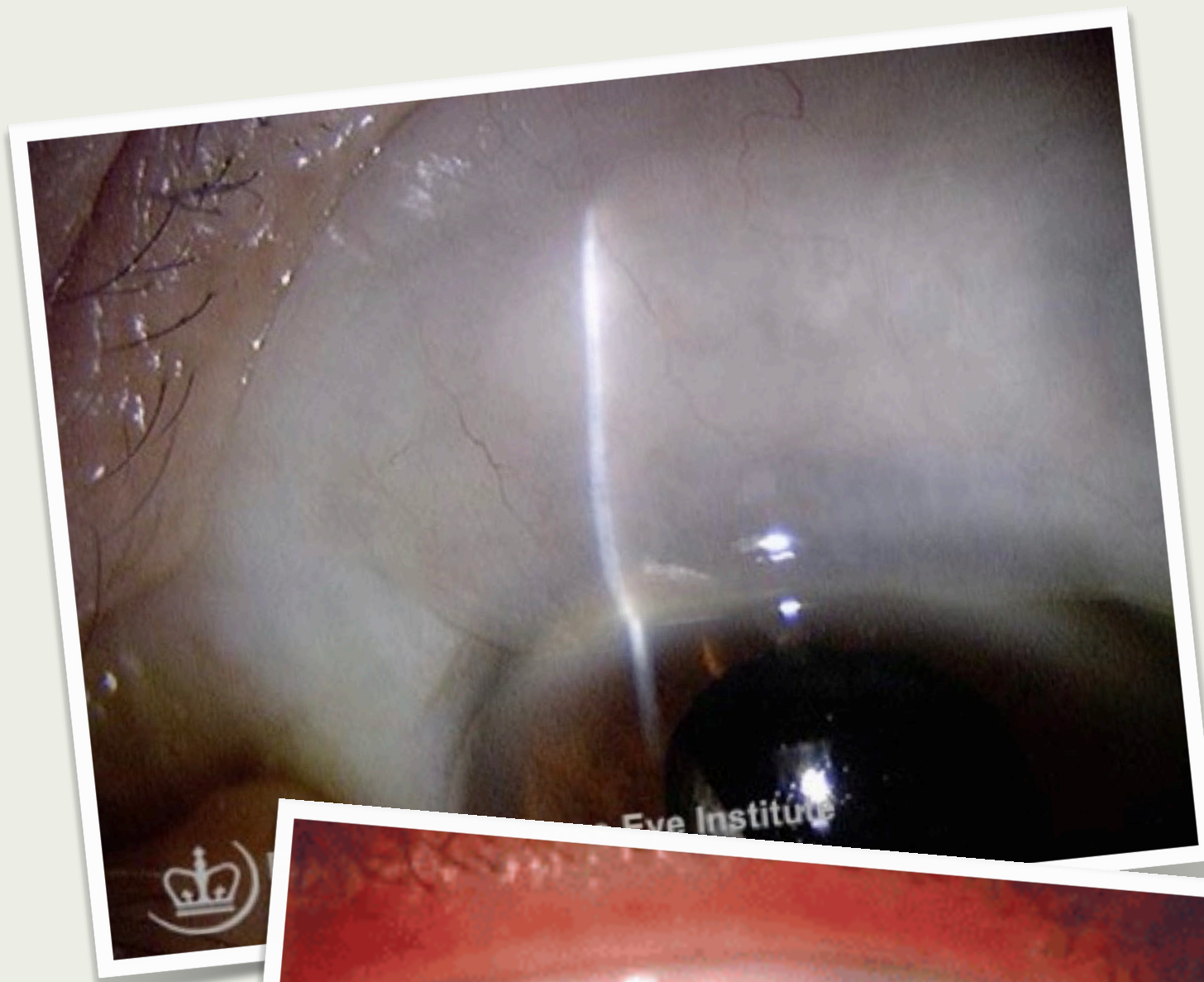
End of Procedure

- Subconjunctival injection of **steroid and antibiotic** is given **180° away** from the trabeculectomy site (prevent intraocular entry)
- Mydriatics/cycloplegics (topical atropine 1%)
 - Relaxation of the ciliary muscle and pain relief
 - Reduction of AC shallowing and malignant glaucoma (especially in short AXL eyes)
 - Stabilization of the blood aqueous barrier
 - Prevention of central posterior synechiae



TRABECULECTOMY

BLEB EVALUATION

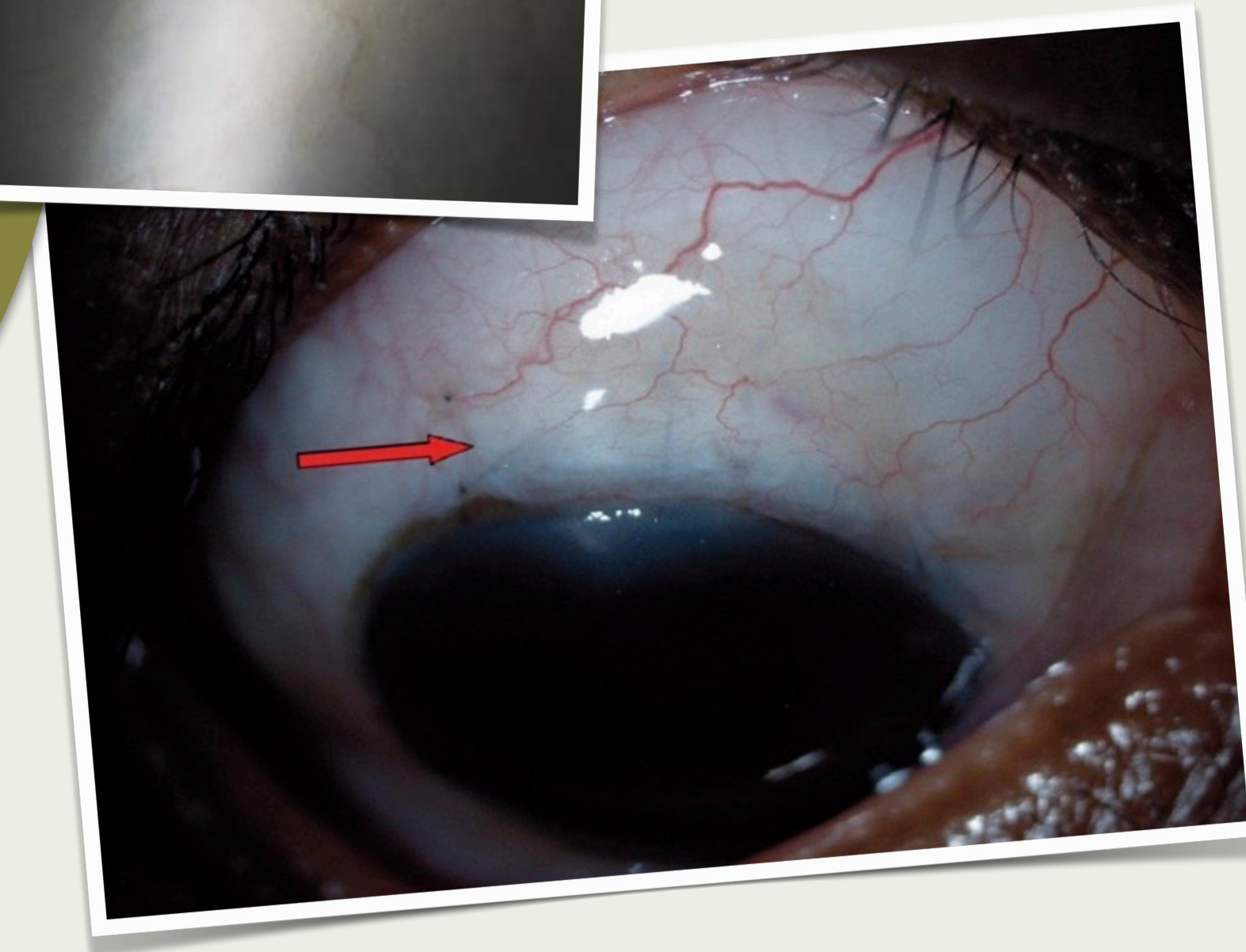
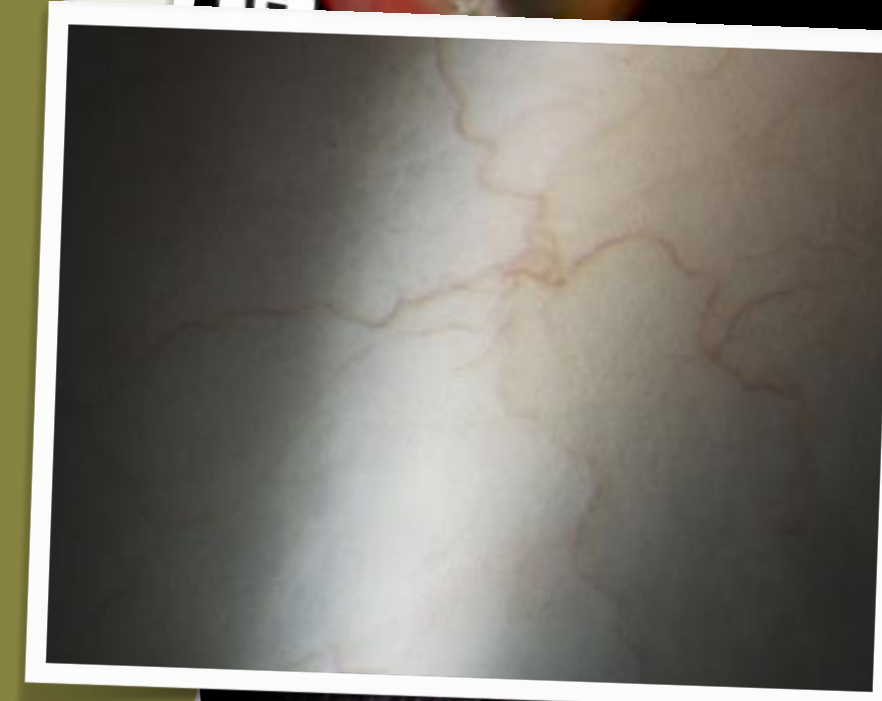
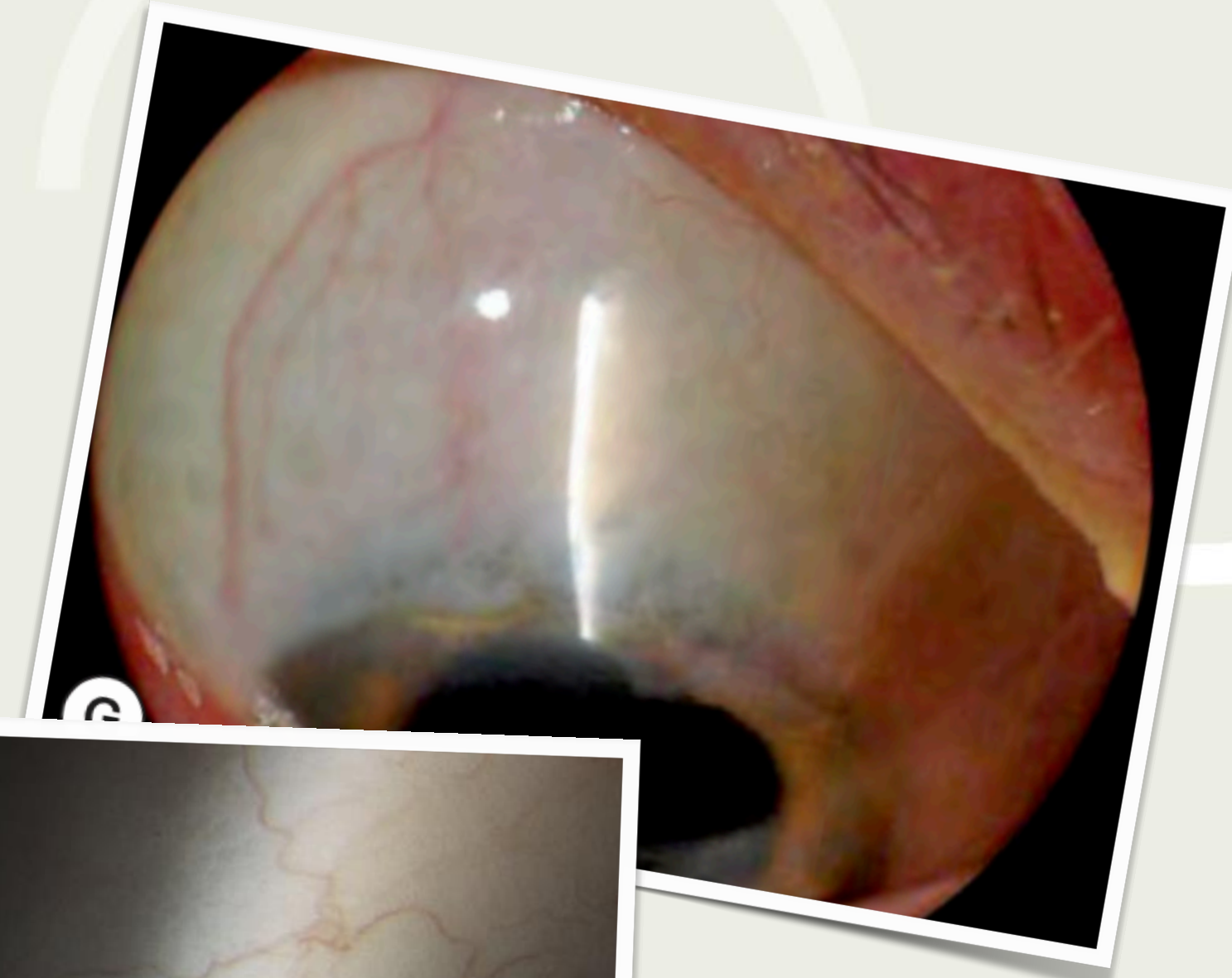


*Ideal bleb**

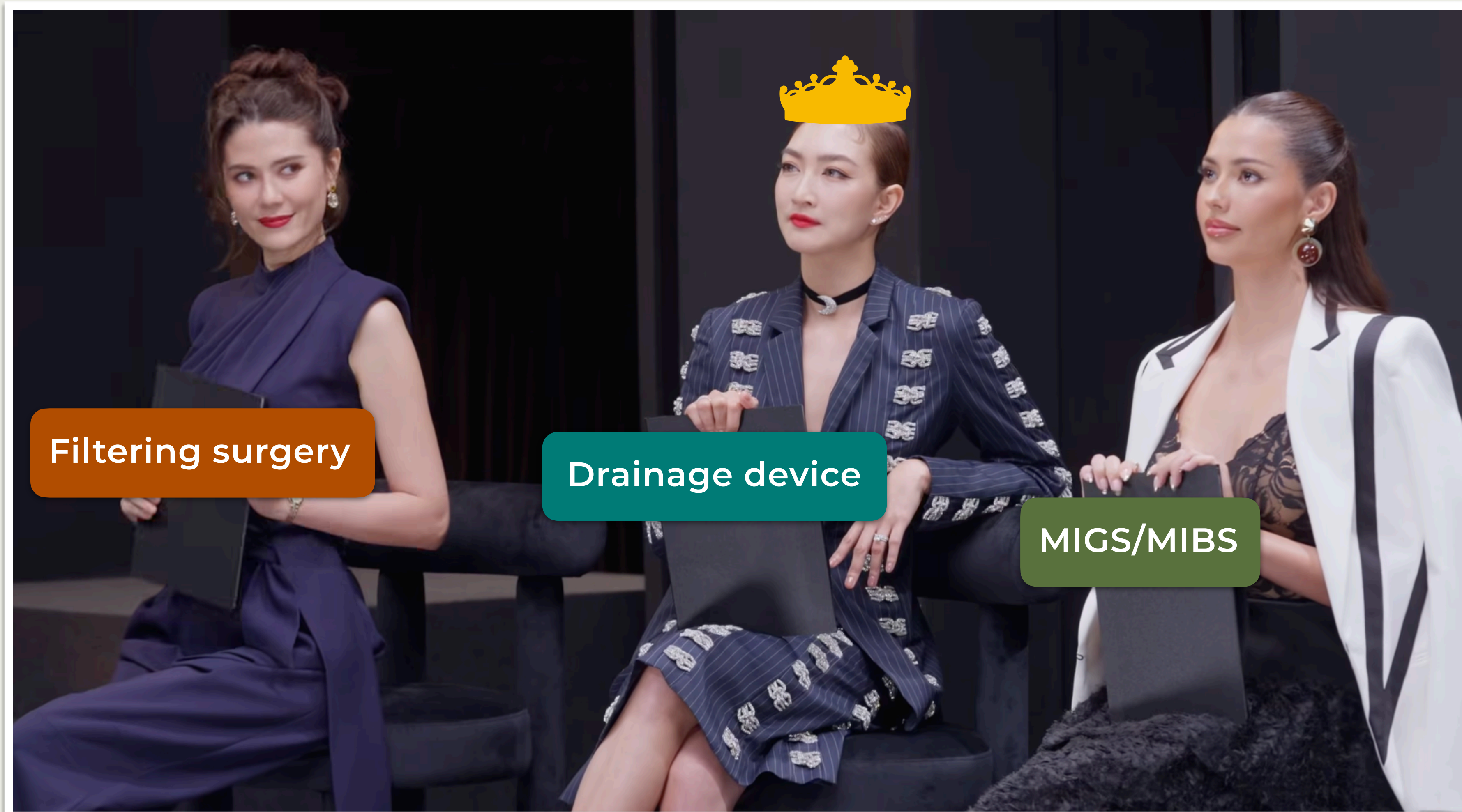
*Low & diffuse, or
more circumscribed
and elevated*

*decreased
vascularity*

*numerous
microcysts in
epithelium*



GLAUCOMA SURGERY

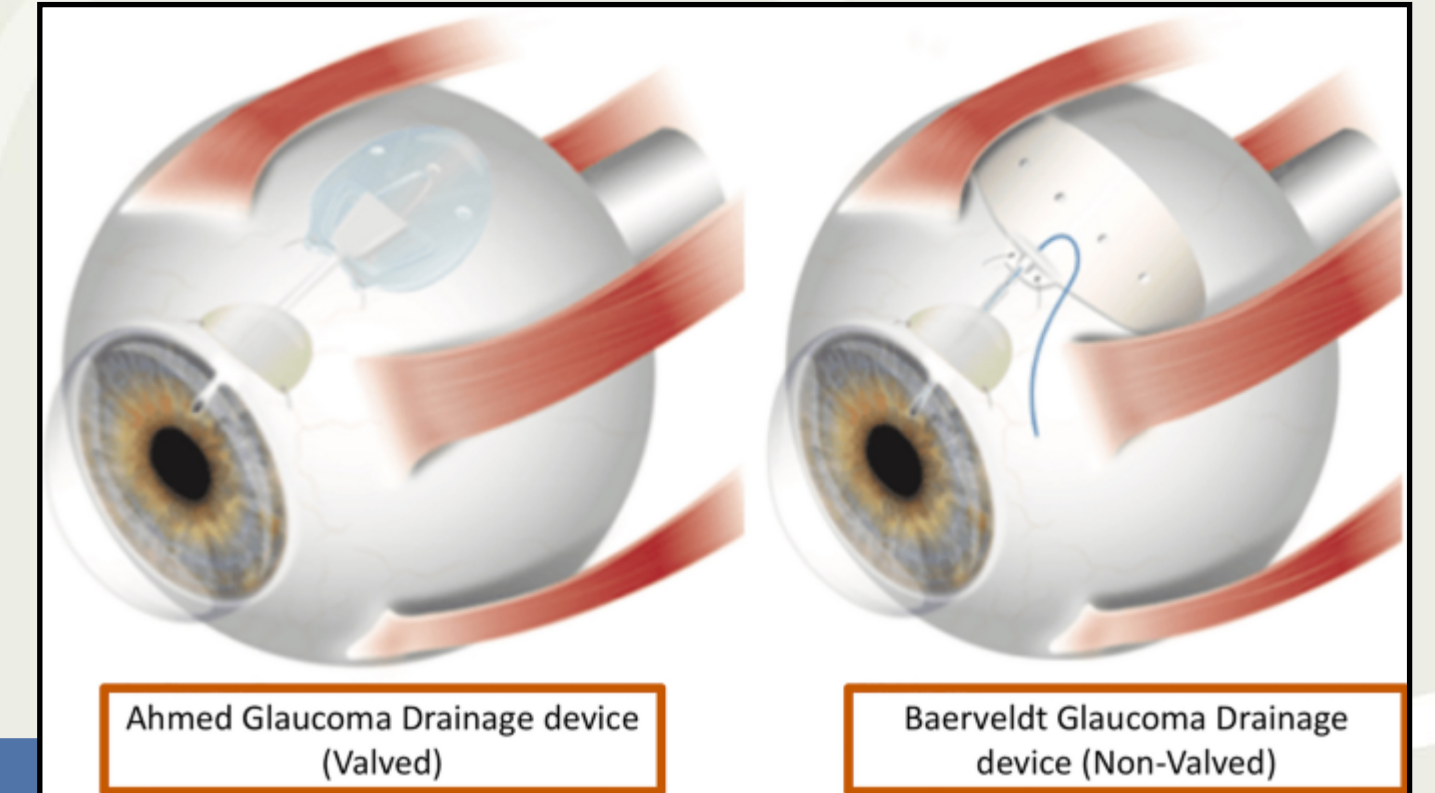


Filtering surgery

Drainage device

MIGS/MIBS

GLAUCOMA DRAINAGE DEVICES (GDDs)



- **GDDs** : Become the surgical **procedure of choice** for many types of glaucoma
- For **medically uncontrolled** glaucoma & **poor candidates** for standard trabeculectomy
- Successful way to control IOP & increasing rate of use over past 15 years

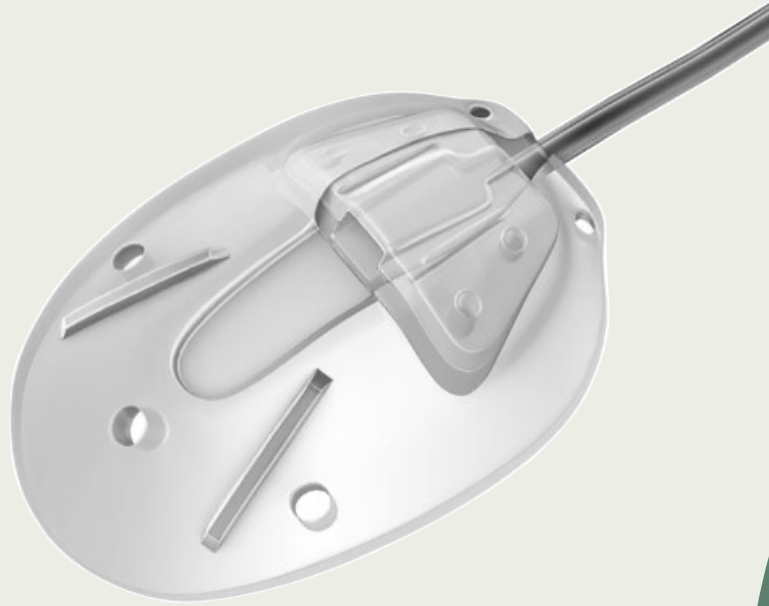
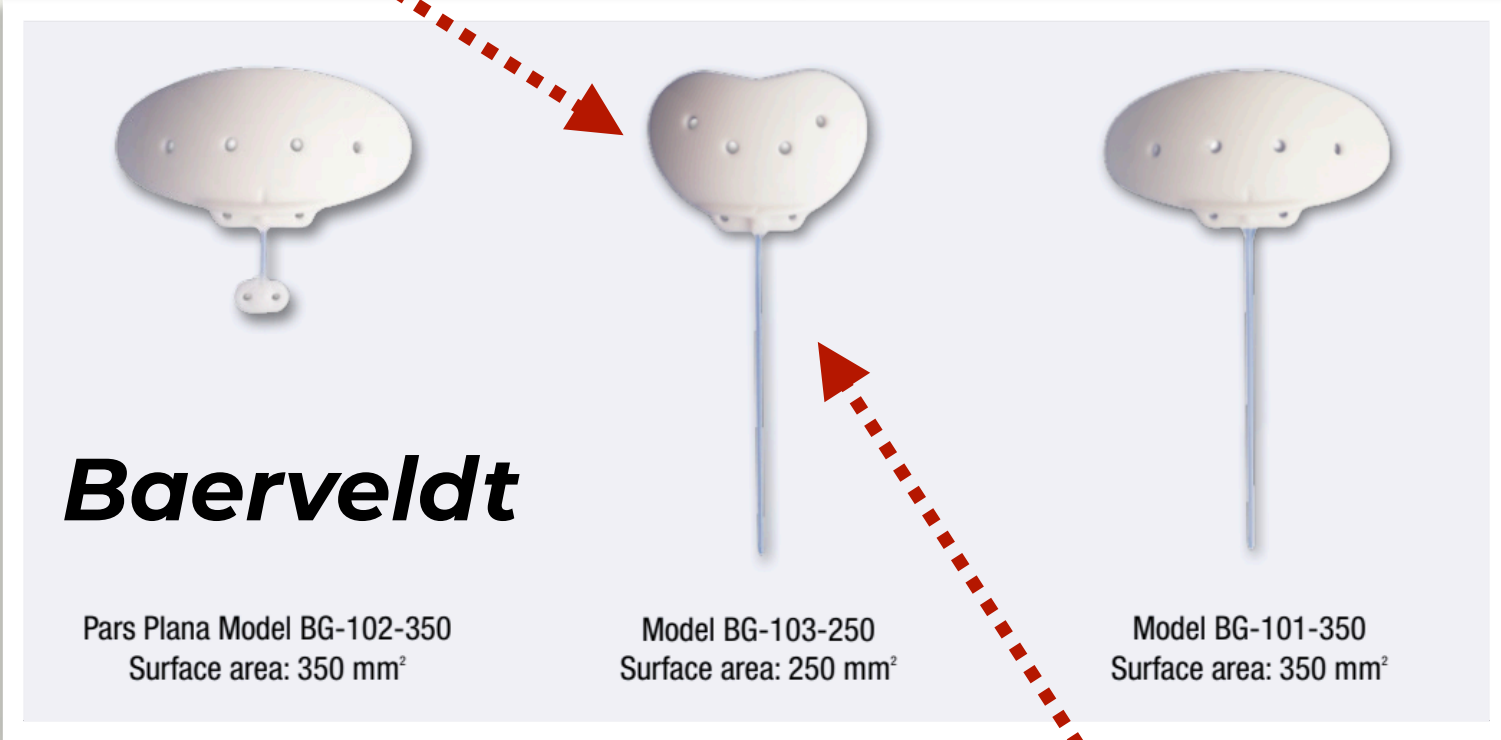
Indications

- Neovascular glaucoma
- Uveitic glaucoma
- Congenital or infantile with failed trabeculectomy
- ICE syndrome
- Epithelial downgrowth
- Glaucoma related to PKP, K-Pro, following RD repair

Threshold for implantation has lowered & **indications** broadened

GLAUCOMA DRAINAGE DEVICES (GDDs)

Soft barium-impregnated silicone plate



Ahmed valved

VALVED

- Ahmed implant
- Krupin implant

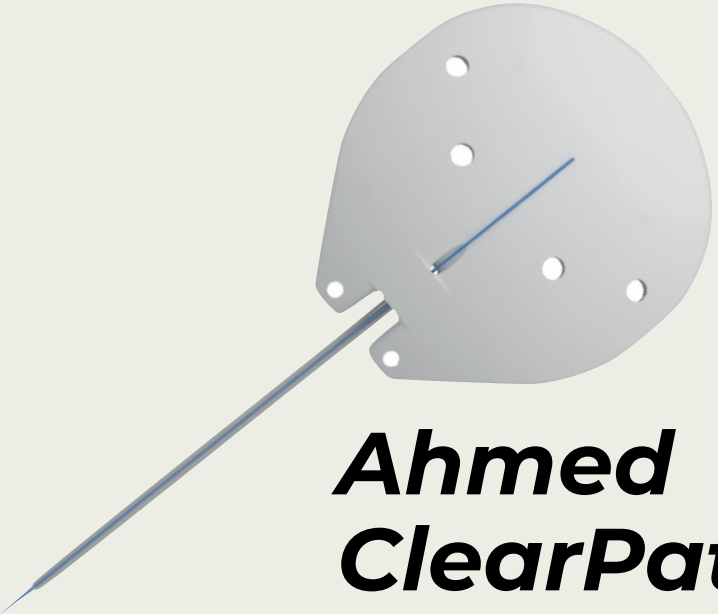
NON-VALVED

- Baerveldt implant
- Molteno implant
- AADI implant
- Ahmed ClearPath
- Paul implant
- Susanna implant

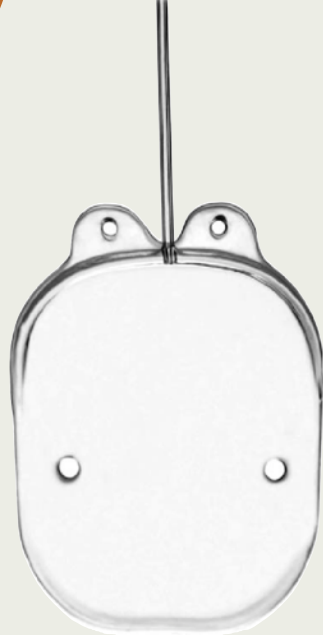
Silicone tube



AADI



Ahmed ClearPath



Susanna



Paul

GDDs

SELECTION

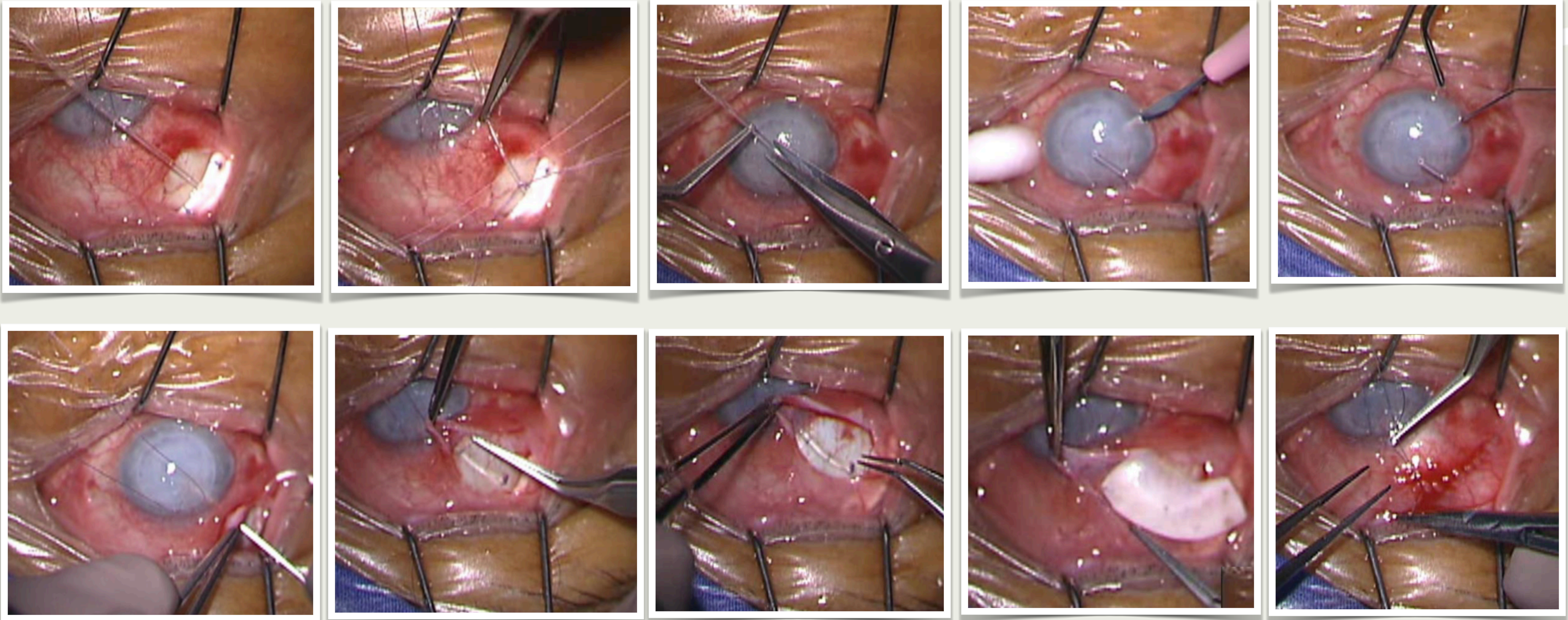
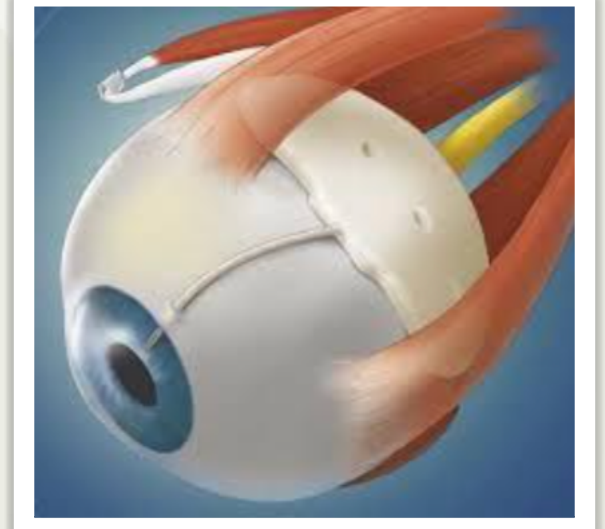
VALVED IMPLANTS

- IOP control in the early postoperative period is more predictable
- Patients with poor compliance with postoperative medication use
- Immediate IOP control
- Lower rate of hypotony
- For a beginning surgeon
- Moderate-long term IOP target

NONVALVED IMPLANTS

- The tube offers no resistance to aqueous flow
- Occluded with stent or ligature suture
- The postoperative IOP is unchanged
- Requires continuation of all preoperative medications until the fibrous capsules forms
- Low-long term IOP target

GDDs PROCEDURE



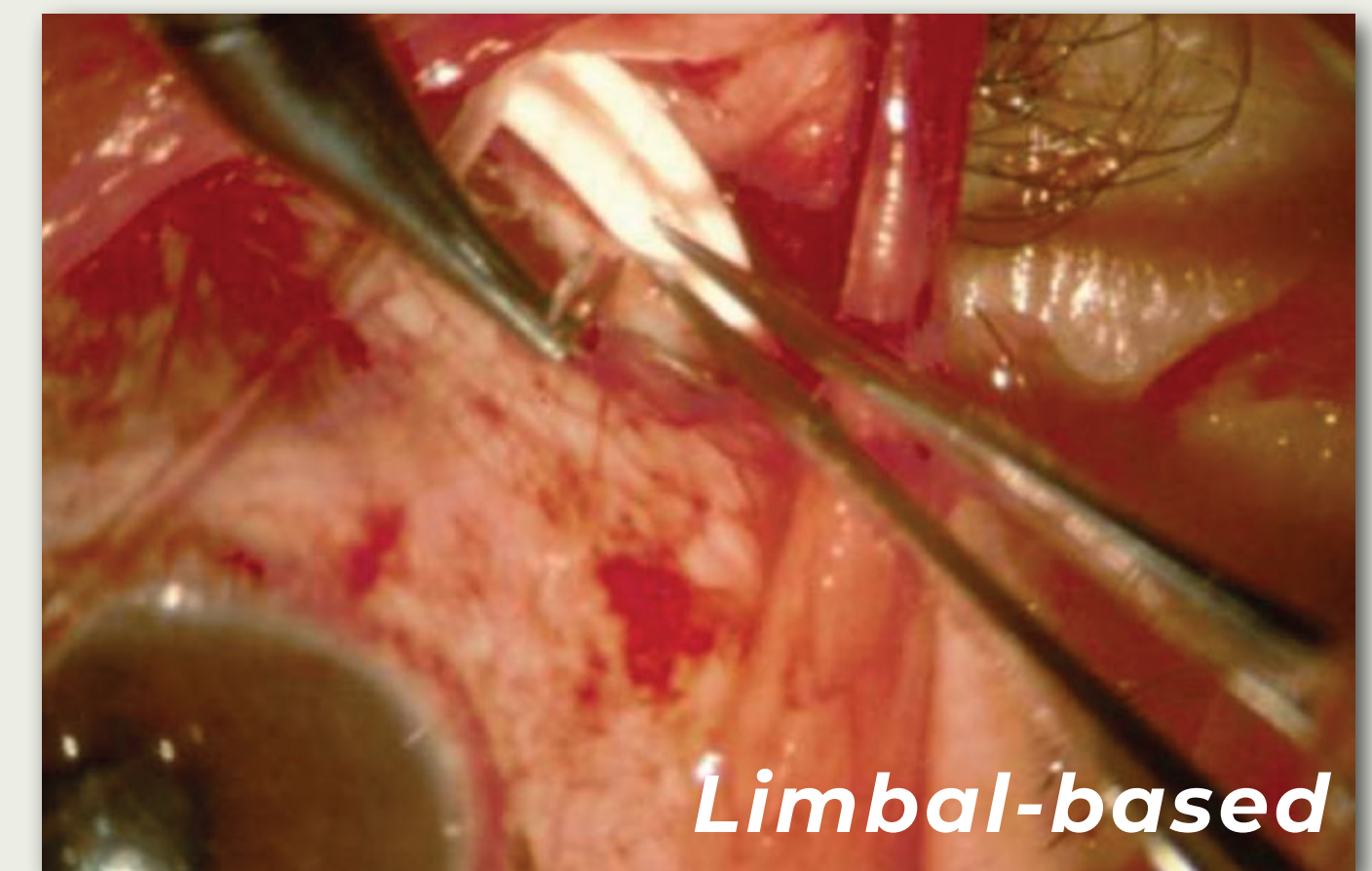
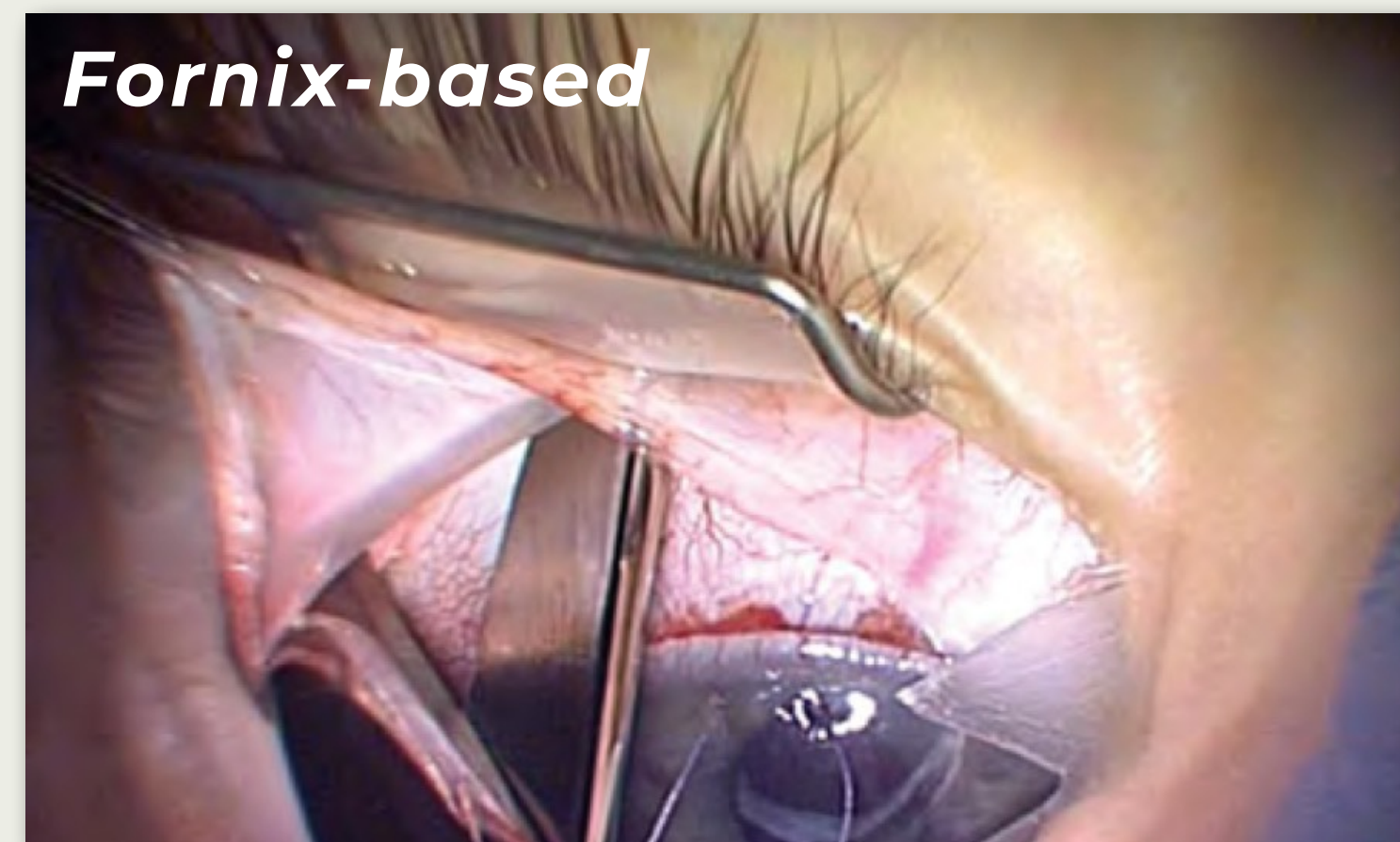
GDDs

SURGICAL TECHNIQUE

Conjunctival flap

- Most preferred site: Superotemporal quadrant
 - Better surgical exposure
 - Less ocular motility disturbances
 - Inferior quadrant placement: silicone oil in A/C, second GDD, other quadrants are not available

- Conjunctival flap
 - Fornix-based flap
 - Limbal-based flap

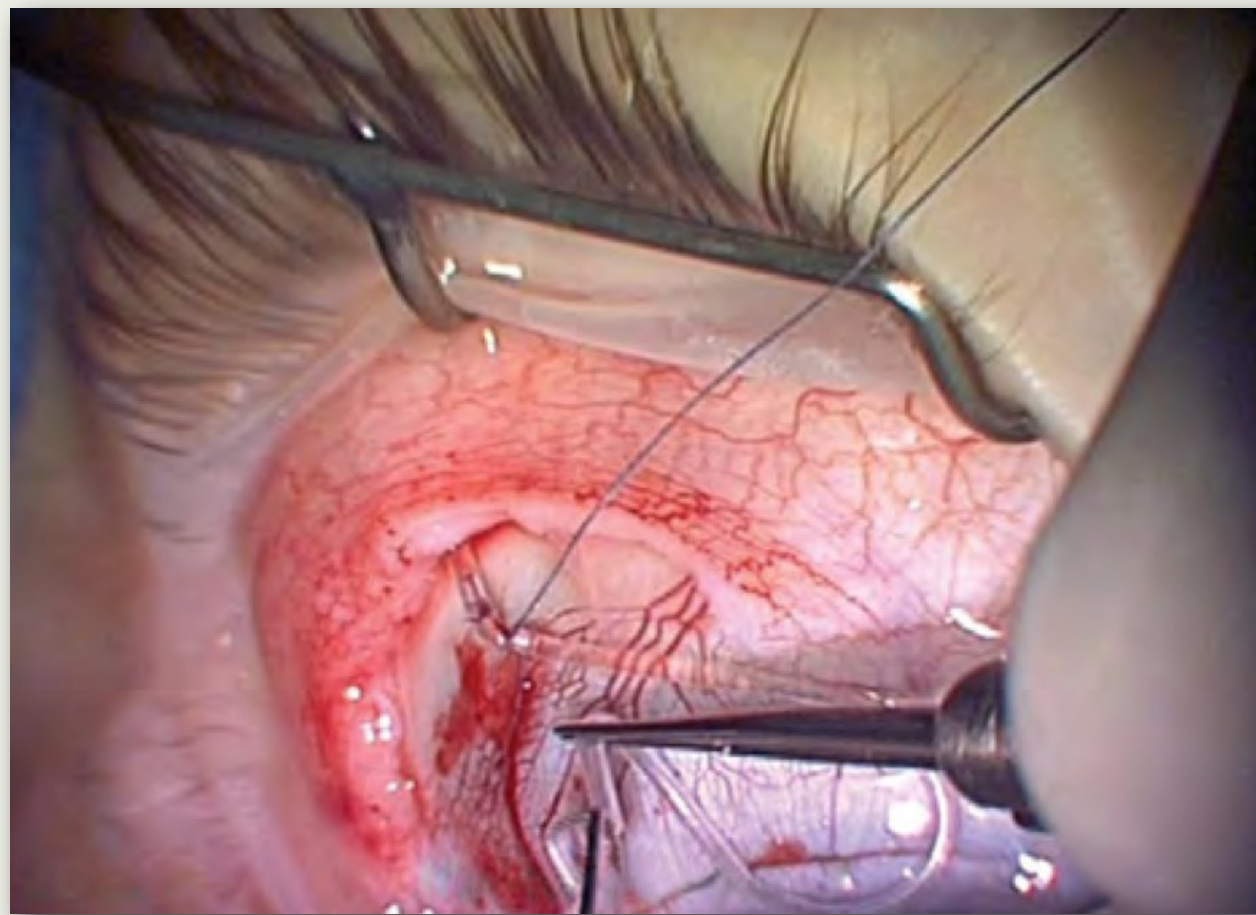


GDDs

SURGICAL TECHNIQUE

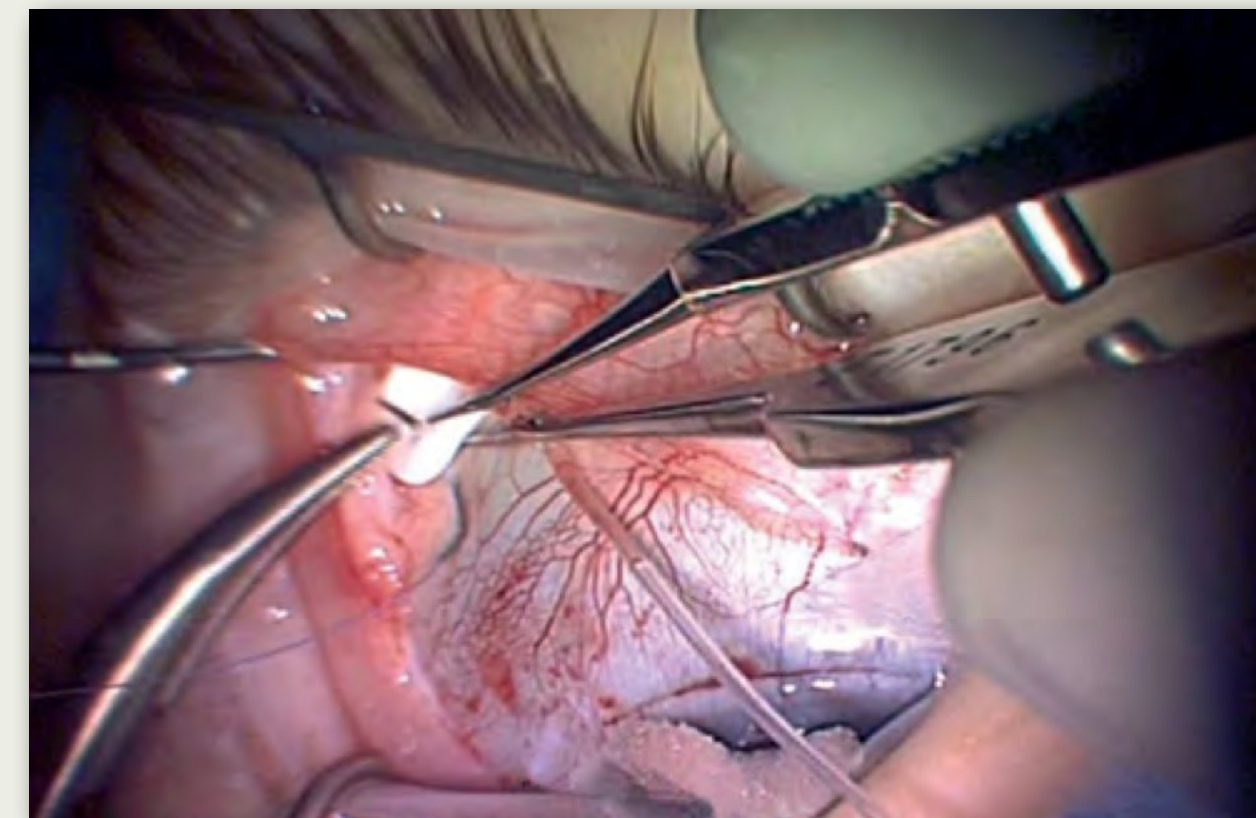
Implant preparation

- Priming tube
- Irrigate through tube using 27-30 gauge cannula



End plate attachment

- Place the plate in subtenon space, 8-10 mm from limbus
- Ahmed has a larger anteroposterior dimension: at least 5-6 posterior to limbus
- Suture to sclera with non-absorbable suture (9-0 prolene or nylon)
- Larger plate e.g. Baerveldt need to be tucked under rectus muscle



GDDs

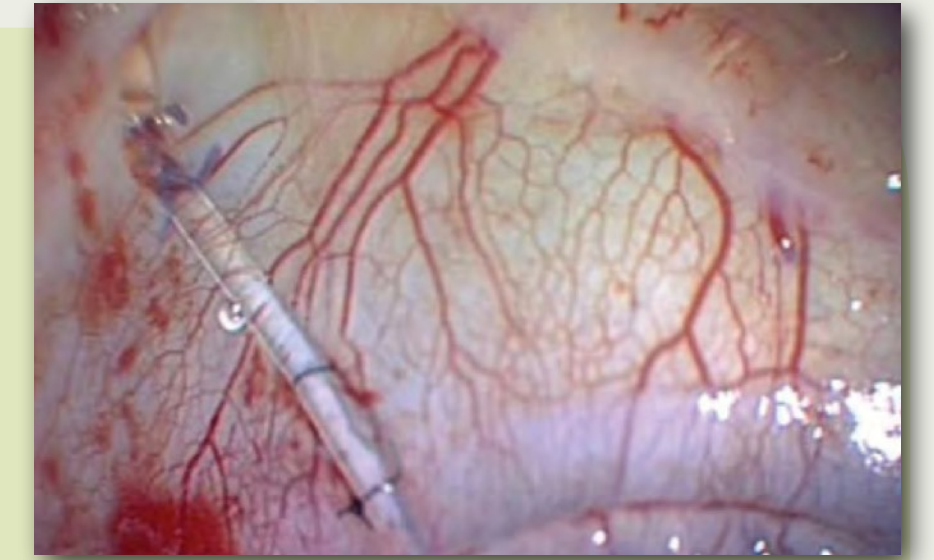
SURGICAL TECHNIQUE

Tube occlusion

- For non-valve design
- Prevention of early post-operative hypotony
- Single or two-stage technique

Single-stage technique

- More preferred technique
- Occluding tube before inserting into A/C
 - Internal occlusion (stent): passing 4-0 or 5-0 nylon or prolene through the lumen
 - External occlusion (ligation):
 - With absorbable (vicryl 6-0) suture (loss its strength 4-6 weeks)
 - With non-absorbable (9-0 or 10-0 nylon or polypropylene) suture (LSL with argon laser)



Two-stage technique

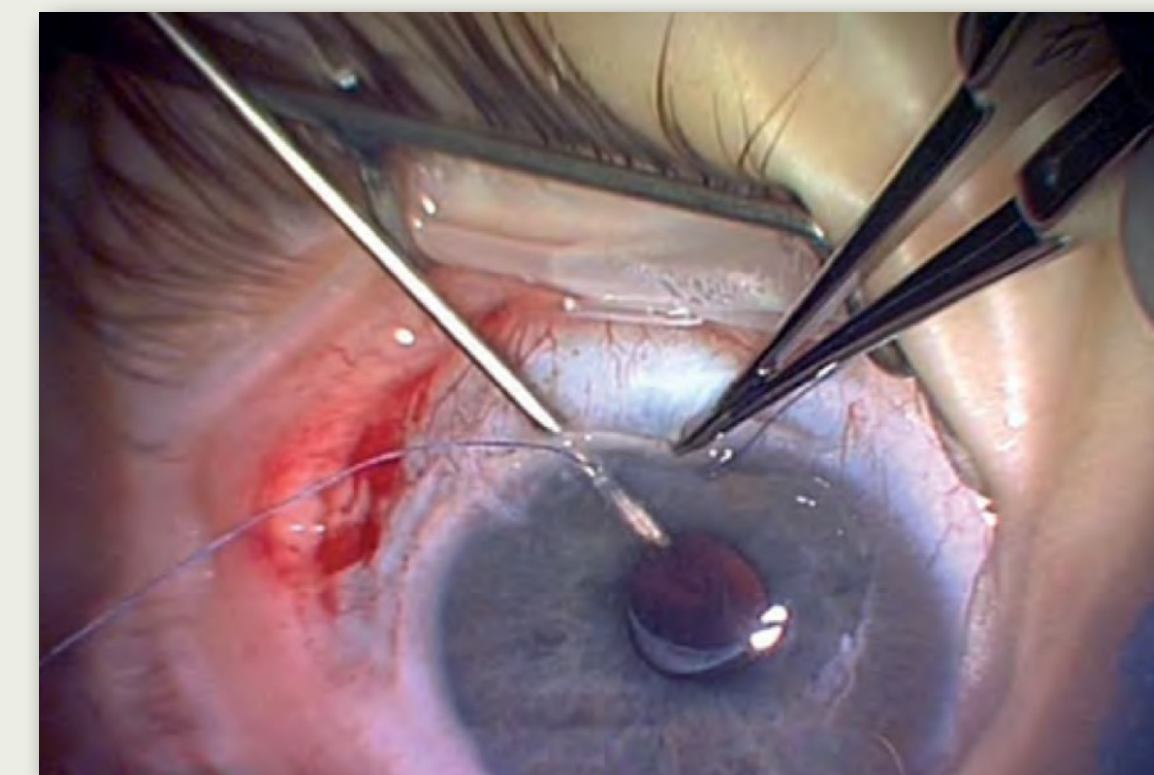
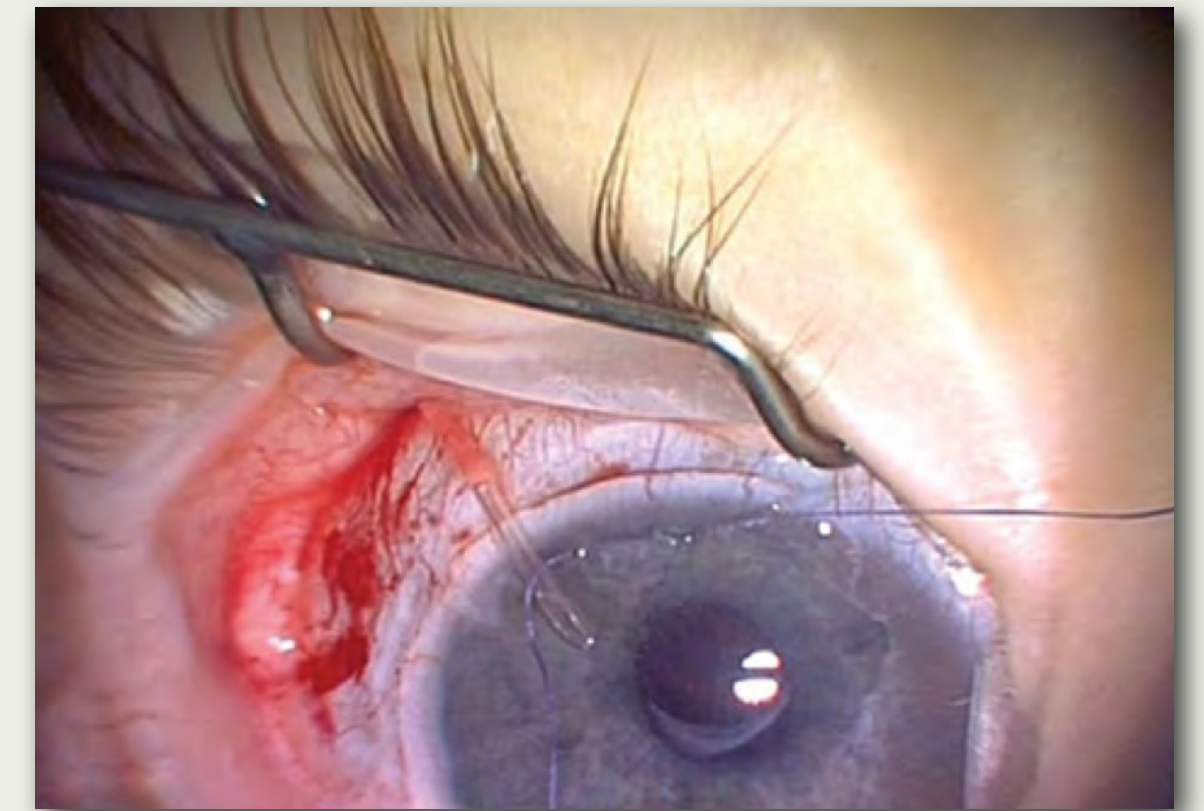
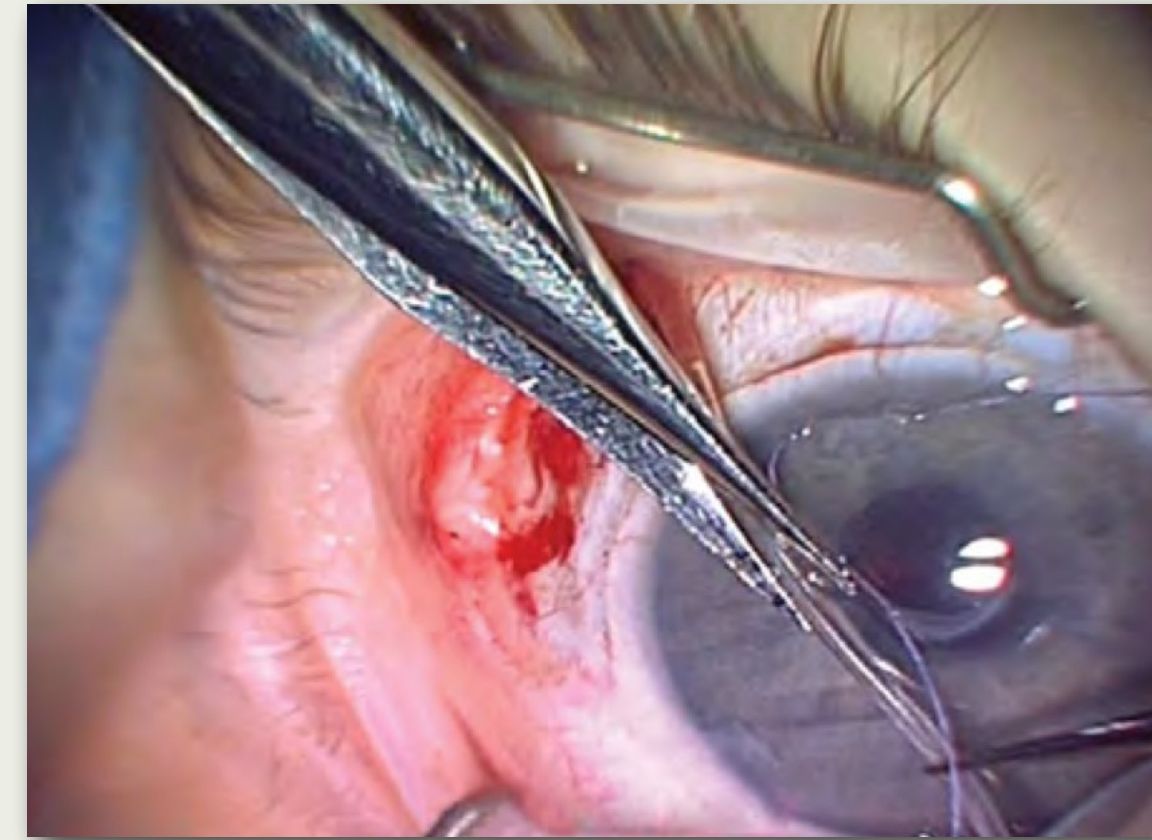
- Device is placed subconjunctivally without inserting tube into A/C
- Wait for 6-8 weeks until the capsule has formed, and the tube is inserted into A/C

GDDs

SURGICAL TECHNIQUE

Tube insertion

- Tube end is cut, bevel up, 2-3 mm extension into A/C
- Make tract with 23-gauge needle at 1-2 mm behind the limbus and parallel to iris plane
- Tube position in A/C: avoid touching cornea and iris
- Paracentesis for placement small amount of fluid to maintain A/C depth to assess the true position of tube

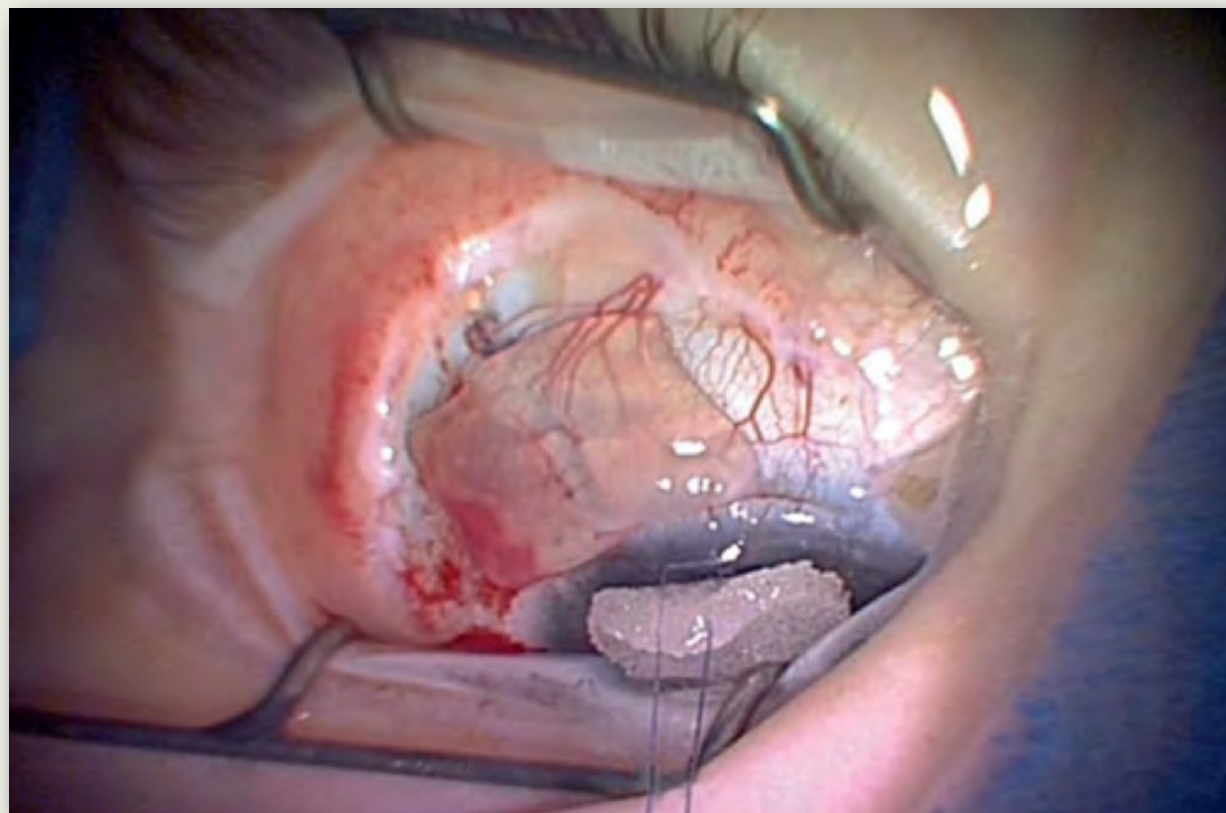


GDDs

SURGICAL TECHNIQUE

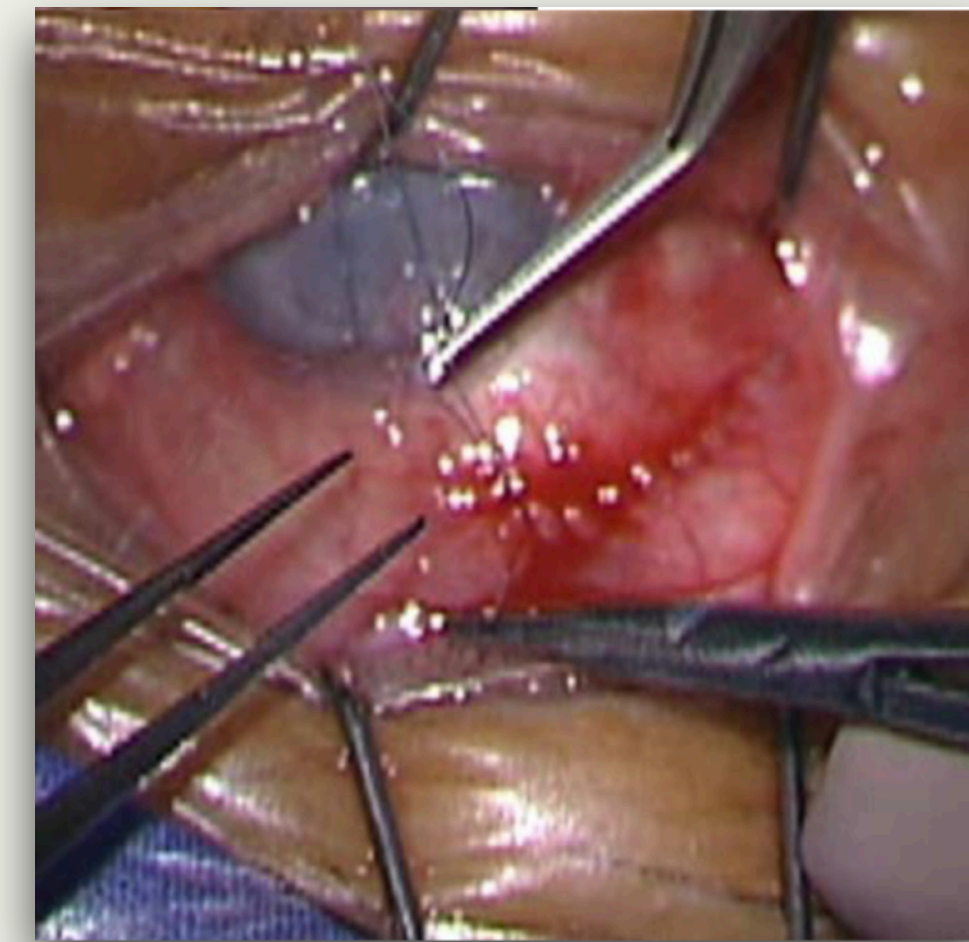
Patch graft

- Prevent conjunctival/ scleral erosion and tube exposure
- Rectangle of donor tissue 5*7 mm
- Materials: sclera, dura, fascia lata, pericardium, cornea



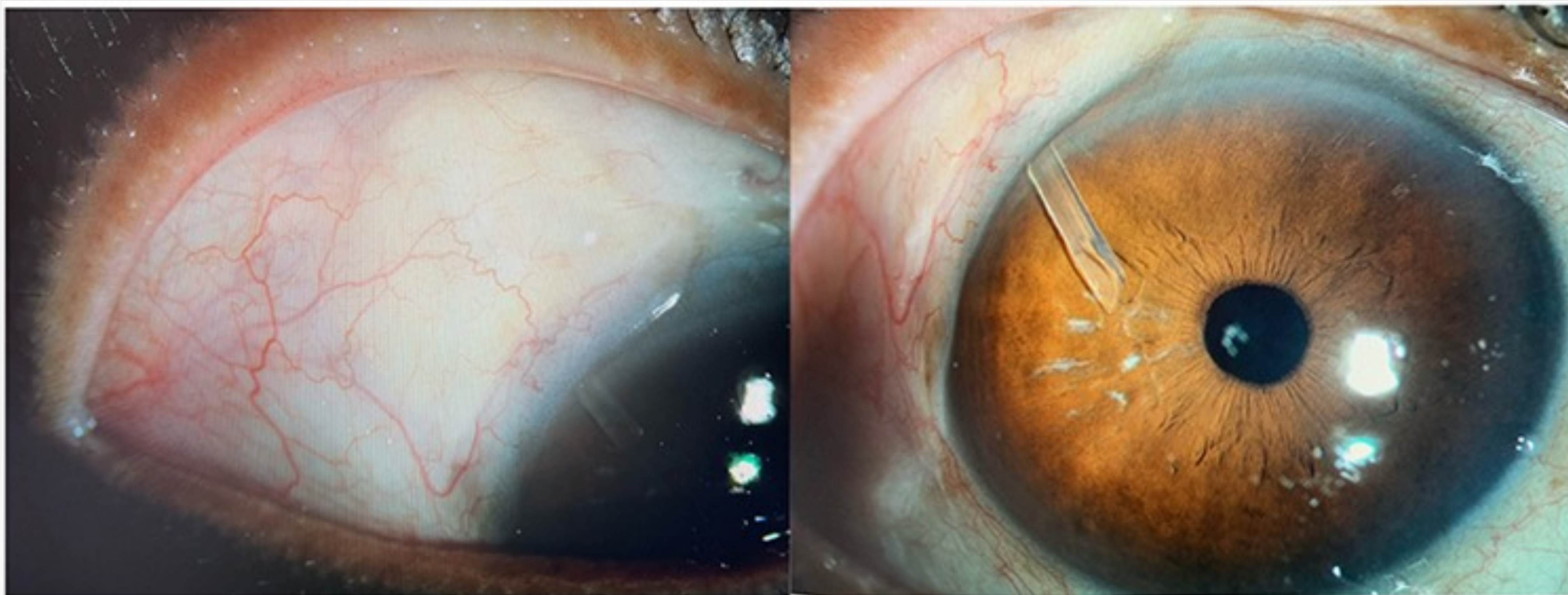
Conjunctival closure

- Cover the operative site with tenon's and conjunctiva
- Injected subconjunctival steroids and antibiotics in quadrant away from surgical site

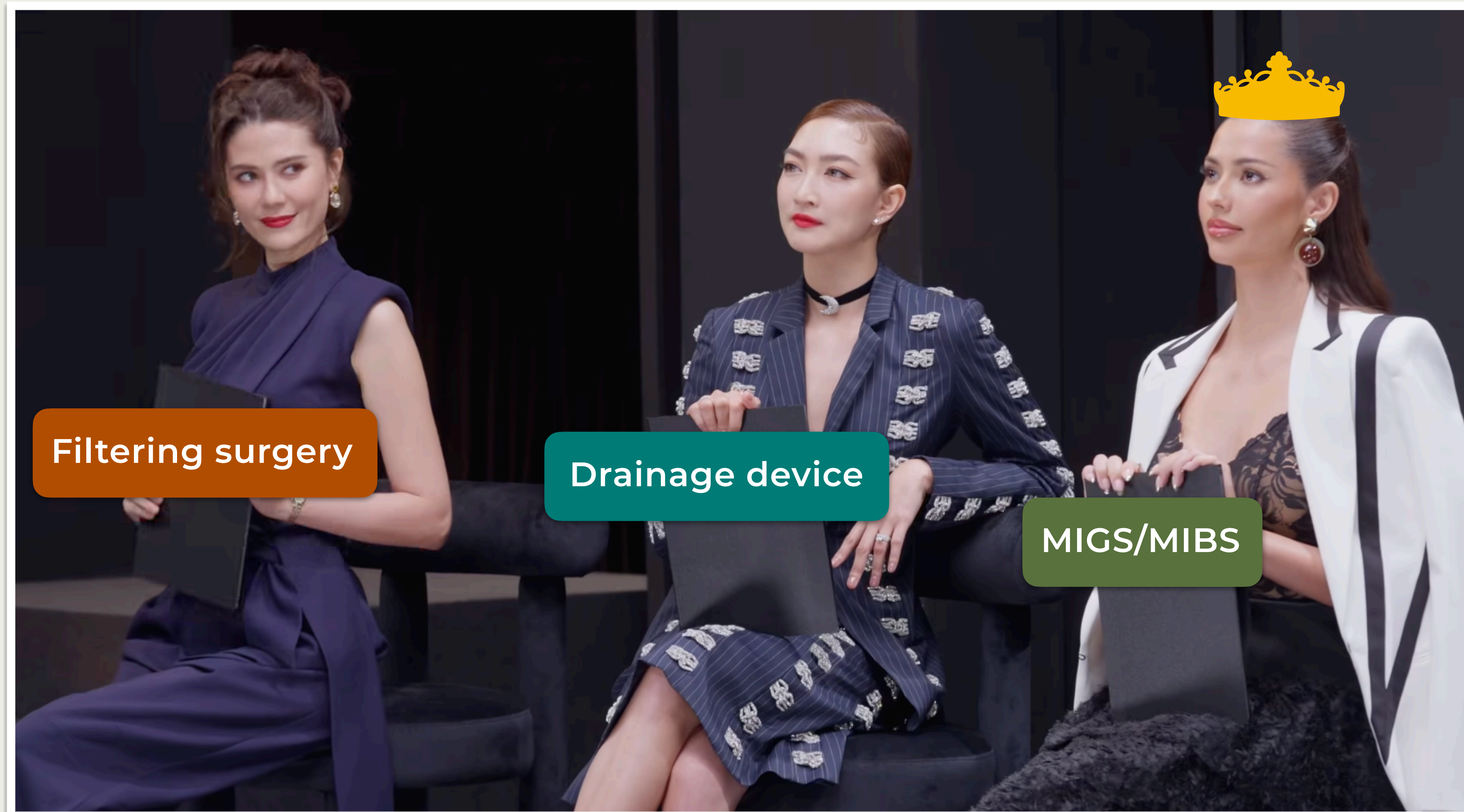


GDDs

POST-OPERATIVE OUTCOME



GLAUCOMA SURGERY



Filtering surgery

Drainage device

MIGS/MIBS



- 5th Ed EGS Guidelines
- Minimally Invasive Glaucoma Surgery (MIGS) = *“Ab-interno, non-bleb forming procedures”*
- *“Subconjunctival bleb-forming surgery”* = devices used either *ab-interno* or *ab-externo*

*Minimally Invasive
Bleb Surgery (MIBS)*

Indications

- Early to moderate glaucoma
- OAG
- Uncontrolled IOP by med/
laser/ poor compliance
- Coexisting cataract Sx

Contra I/C

- Angle closure glaucoma
- Advanced glaucoma
- Previous Sx with conj scar
- Active inflammation
- Increased EVP (SWS)



MIGS and the FDA: What's in a Name?

Iqbal Ike K. Ahmed, MD - Toronto, Canada

- IOP-lowering Sx that distinguish it from traditional glaucoma Sx
- Minimal trauma to tissue
- Ab-interno or Ab-externo surgical approach
- At least modest IOP-lowering efficacy
- Superior safety and a low complication profile
- Rapid recovery
- Frequently combined with cataract Sx

MIGS

Classification

- ABiC : Ab Interno Canaloplasty
- KDB : Kahook Dual Blade
- GATT : Gonioscopy Assisted Transluminal Trabeculotomy

Subconj. Bleb-forming Sx Ab-interno

- XEN Gel Stent

Ab-Externo

- XEN Gel Stent
- Preserflo Microshunt

MIBS

MIGS

Suprachoroidal devices

- iStent Supra
- CyPass*
- MINIject

Trabecular stenting devices

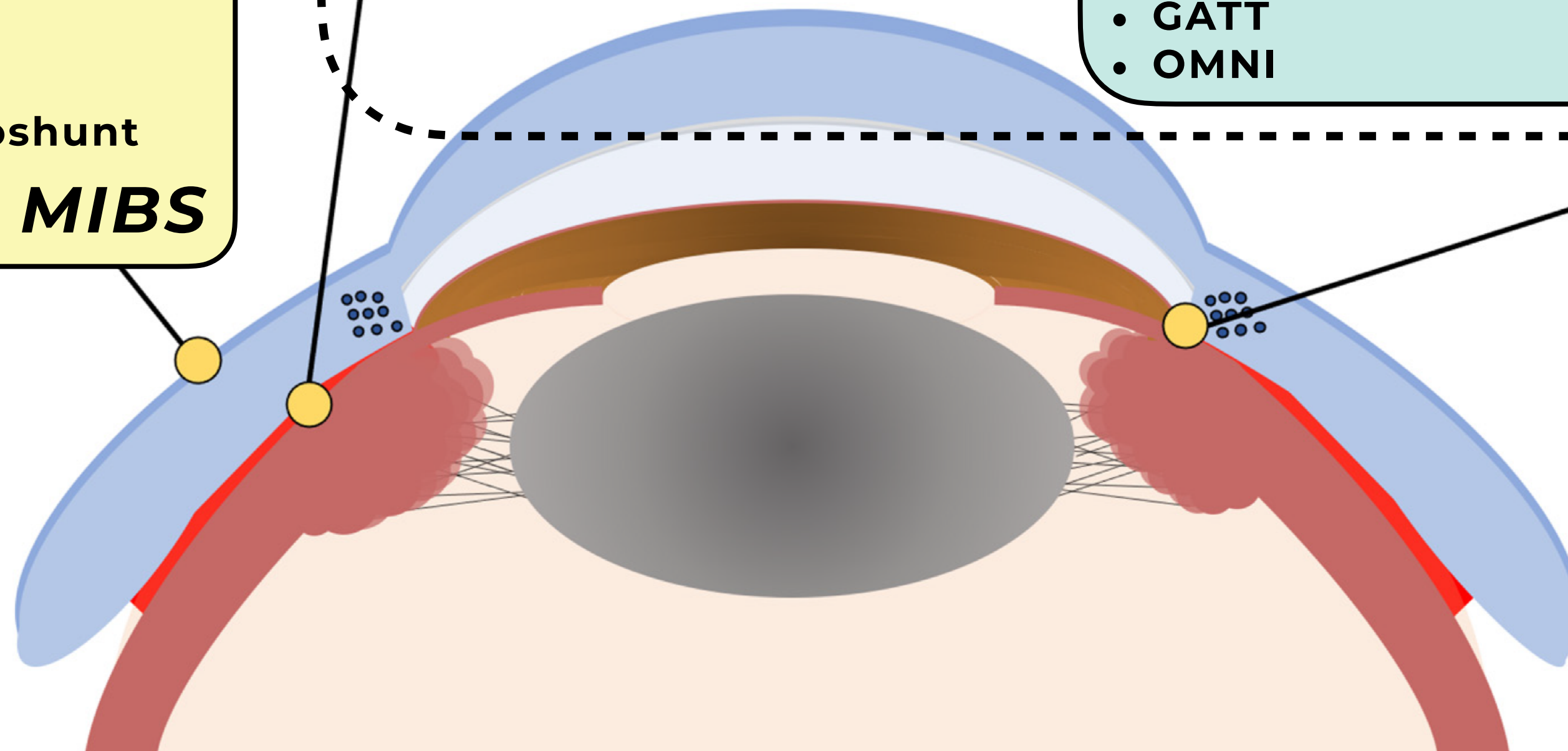
- iStent
- Hydrus

Trabecular/ Schlemm's canal dilation

- ABiC
- STREAMLINE surgical system
- VISCO360/OMNI

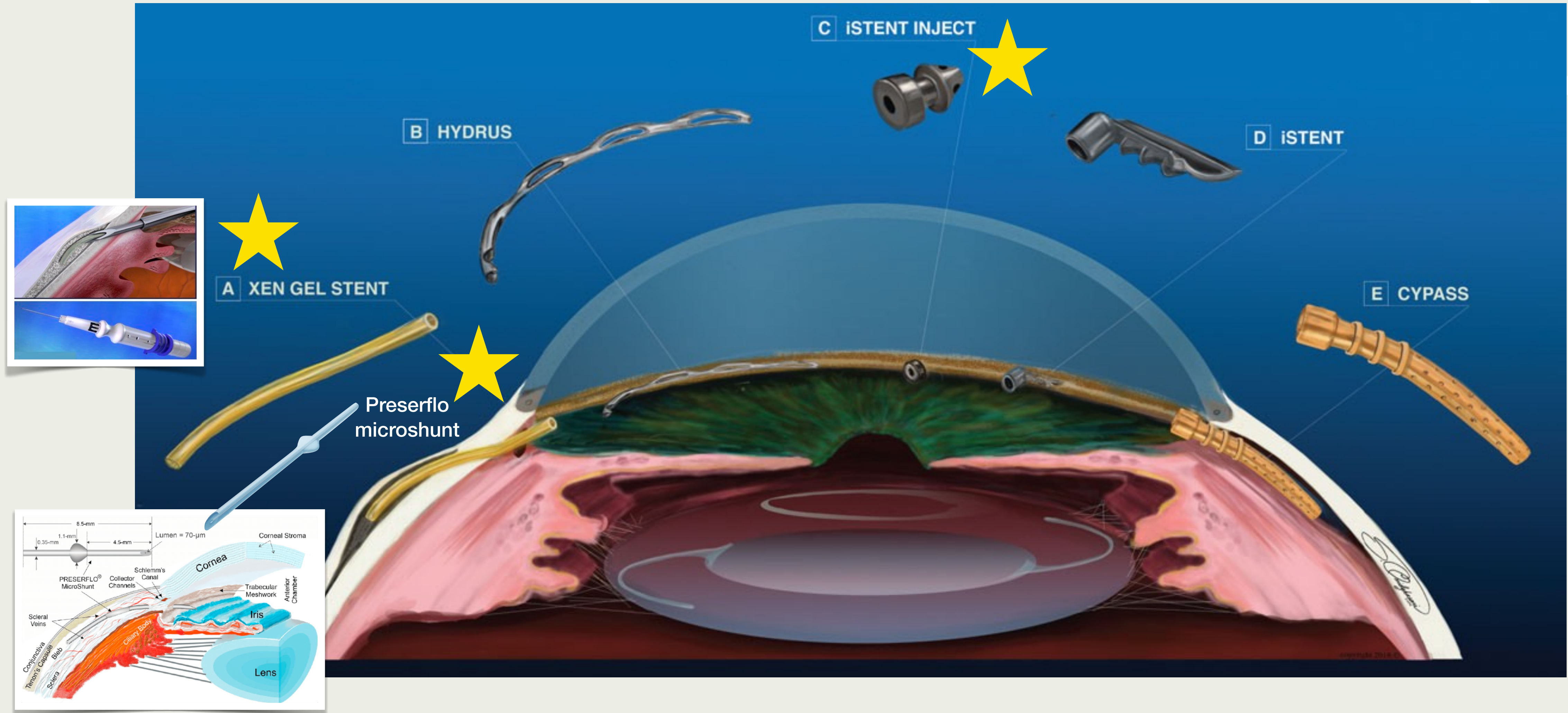
Trabecular disrupting Sx

- Trabectome
- KDB goniotomy / KDB Glide
- Tanito microhook
- GATT
- OMNI



MIGS

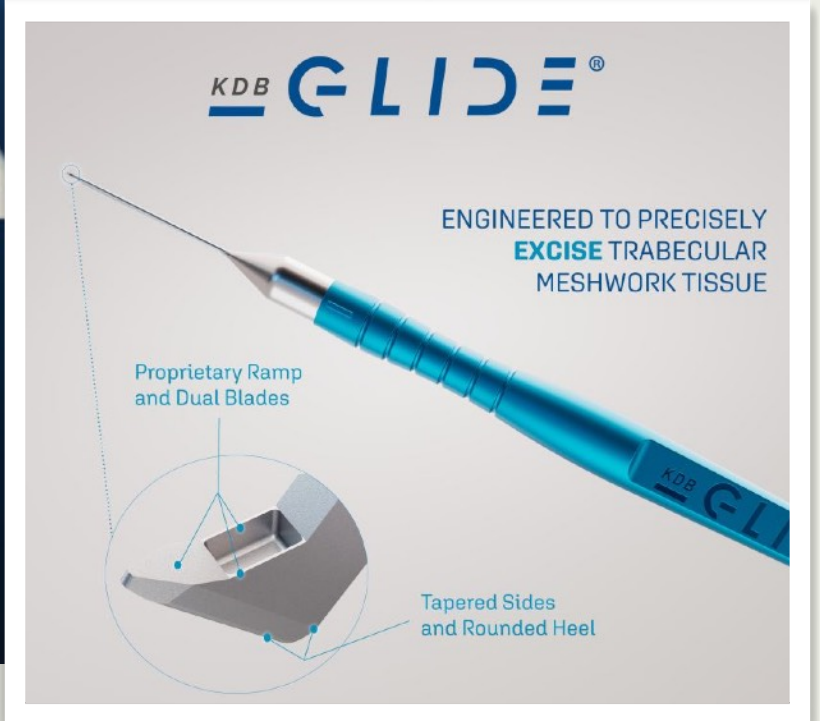
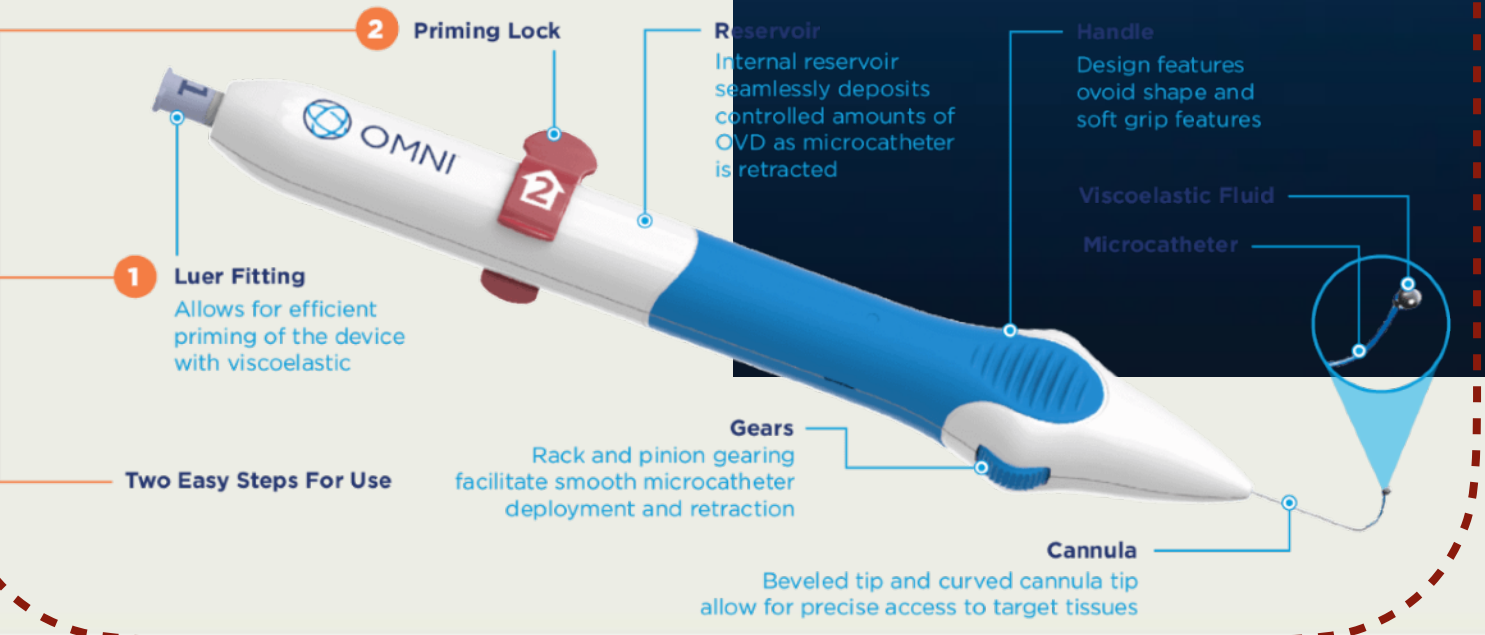
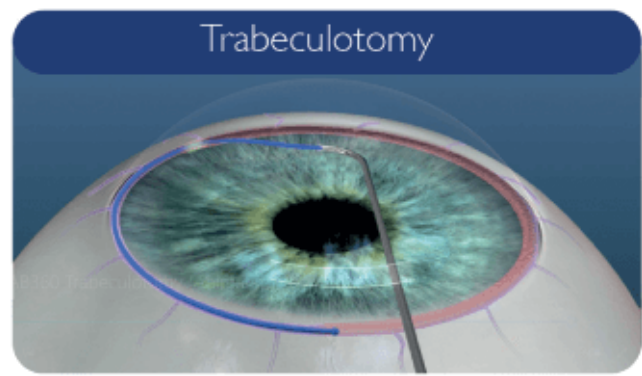
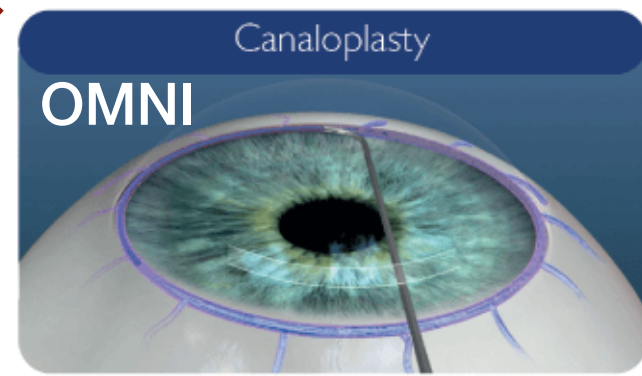
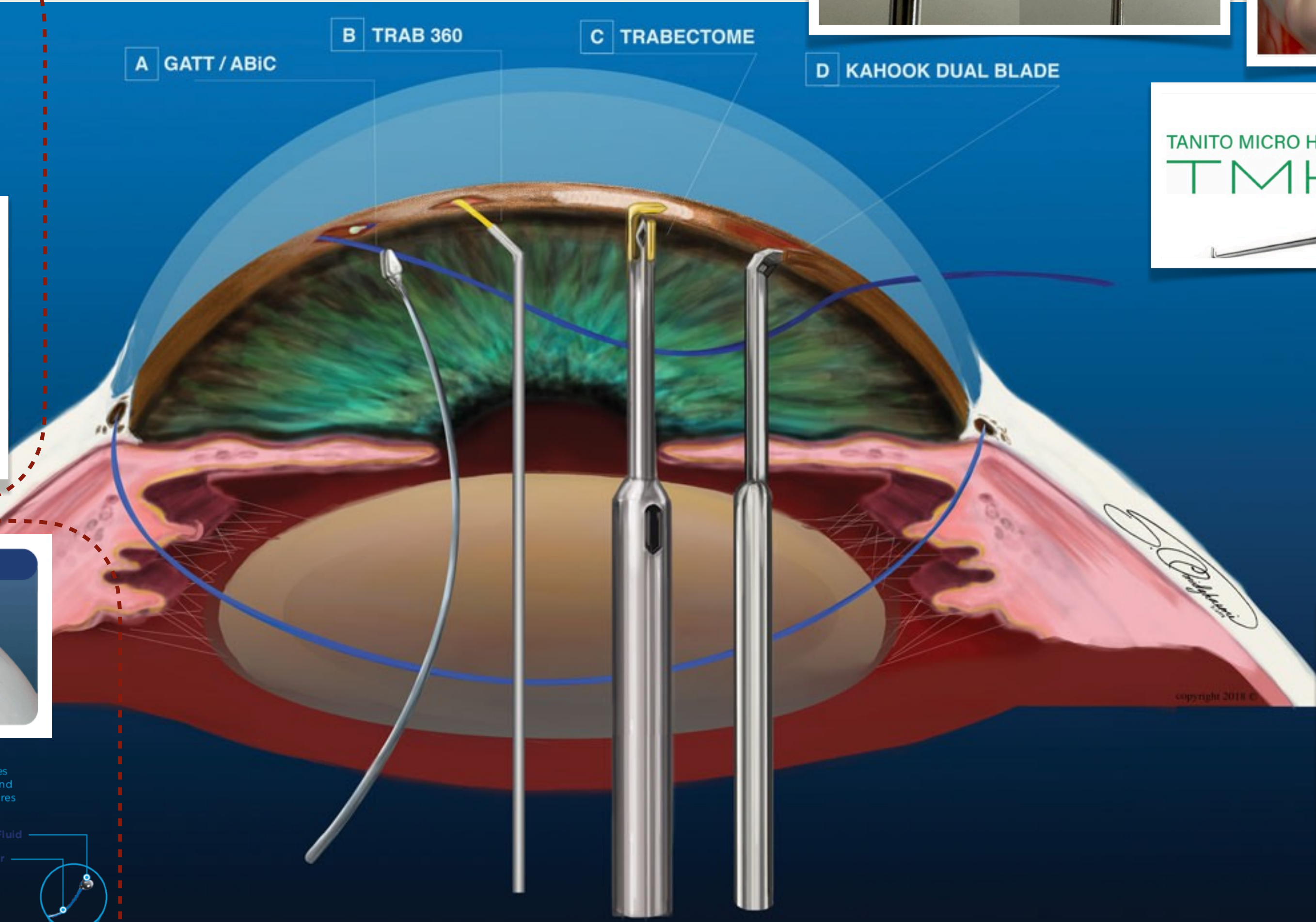
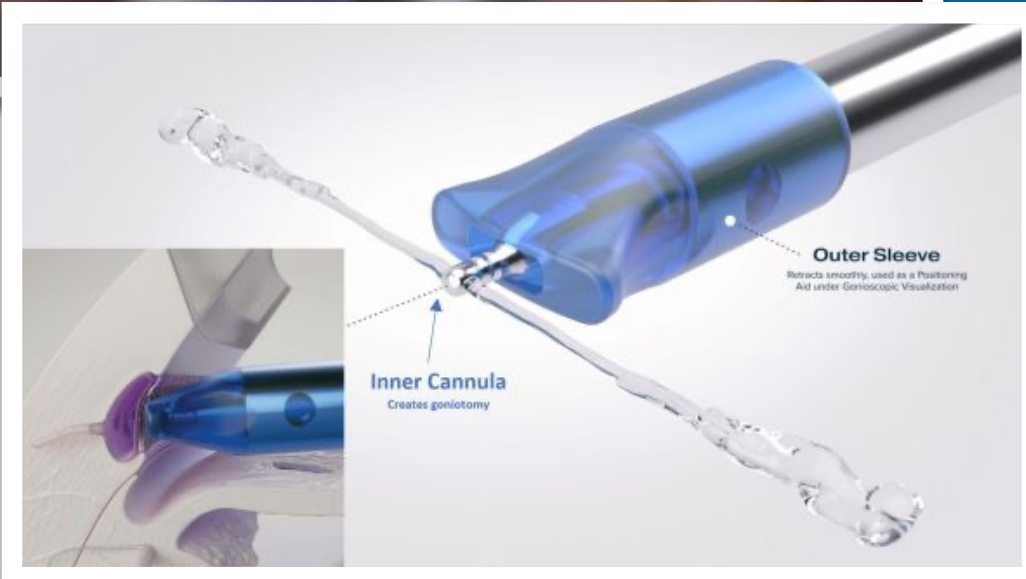
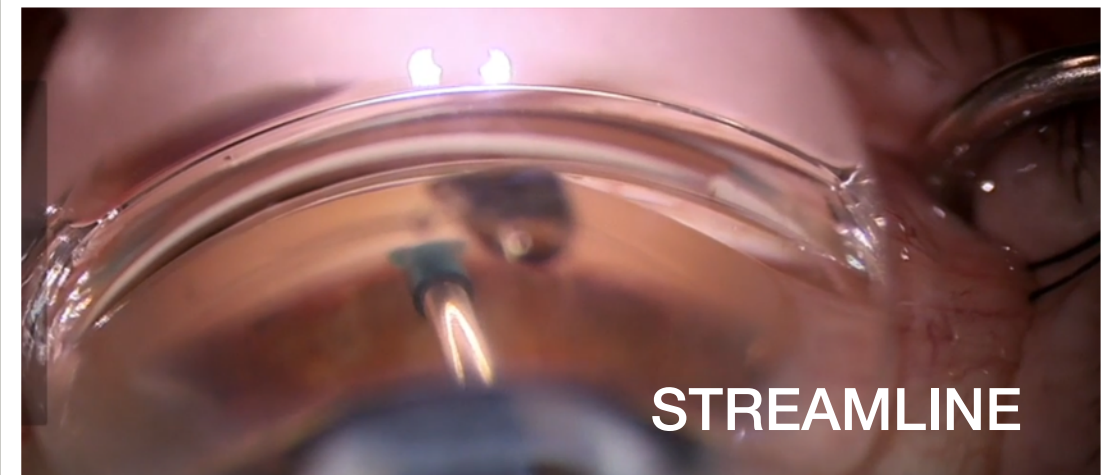
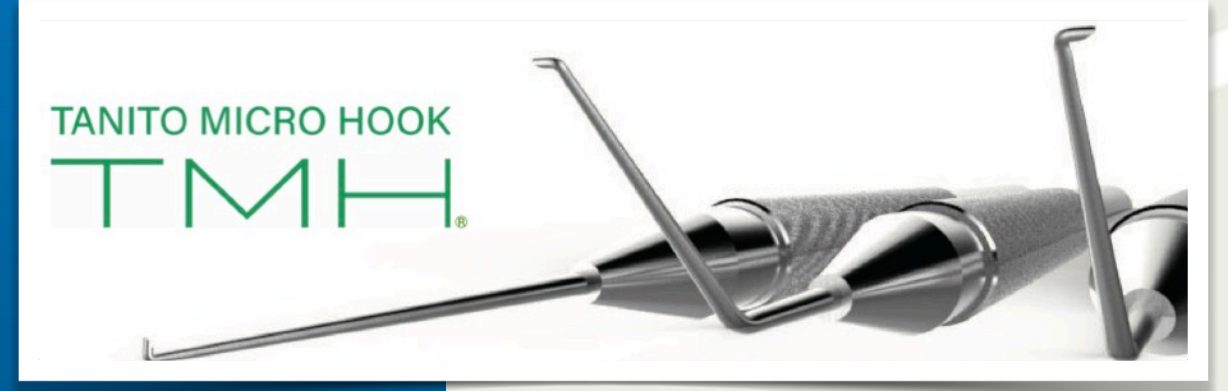
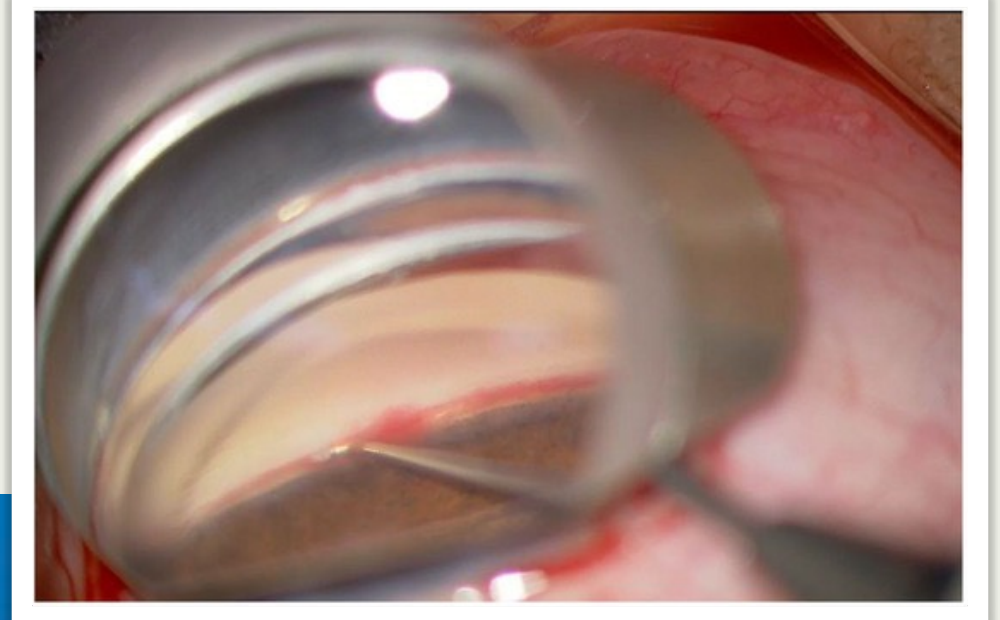
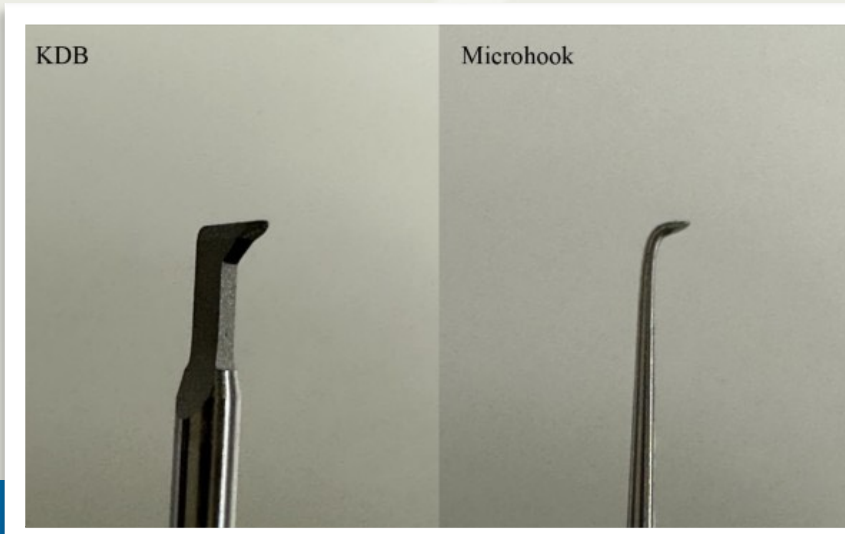
MIGS with Stents



MIGS

MIGS without Stents

- ABiC : Ab Interno Canaloplasty
- KDB : Kahook Dual Blade
- GATT : Gonioscopy Assisted Transluminal Trabeculotomy

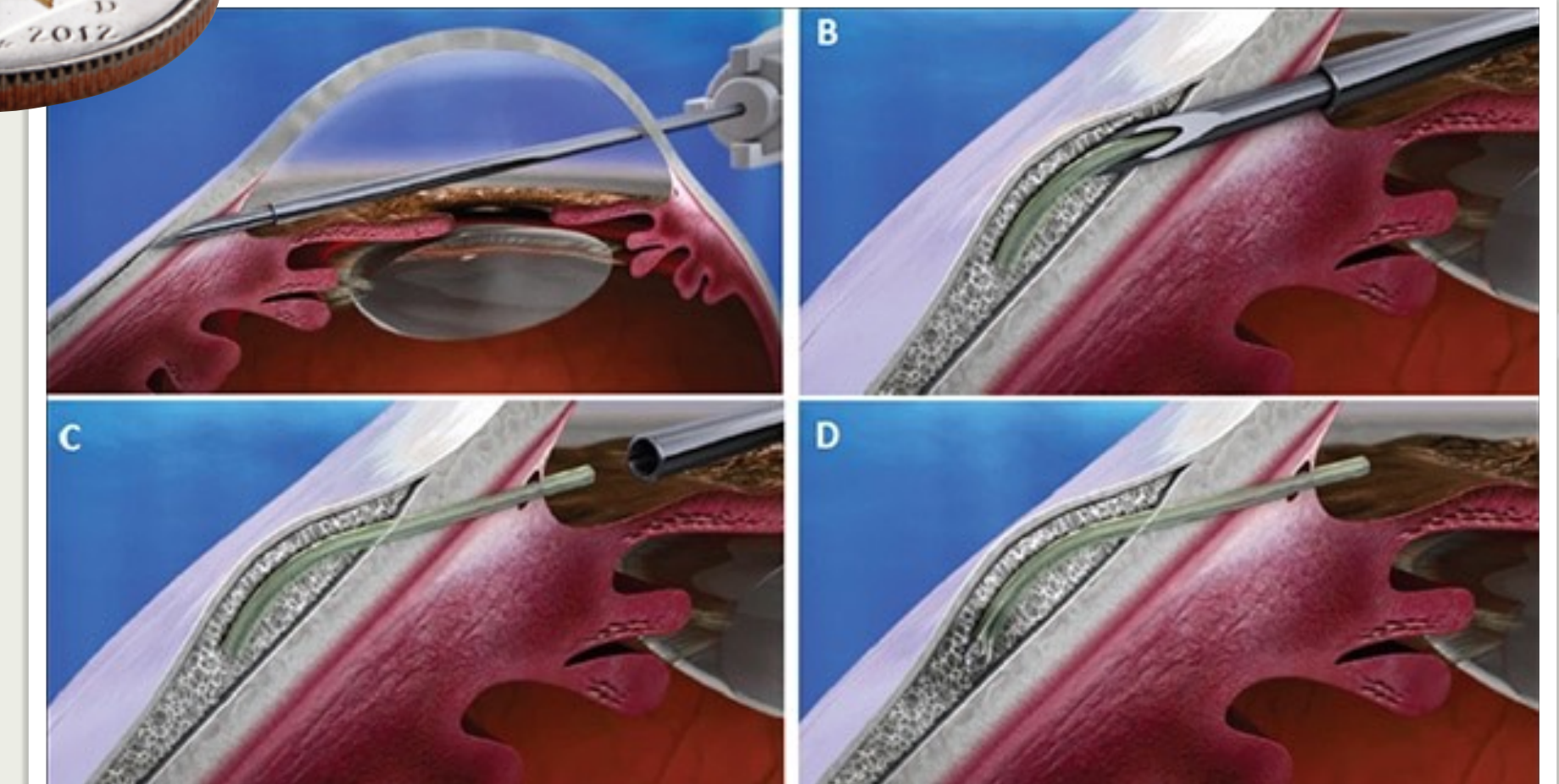
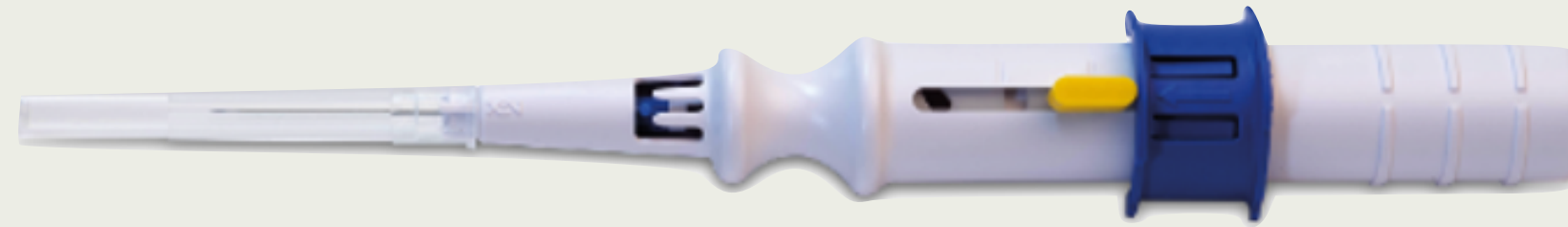


MIGS

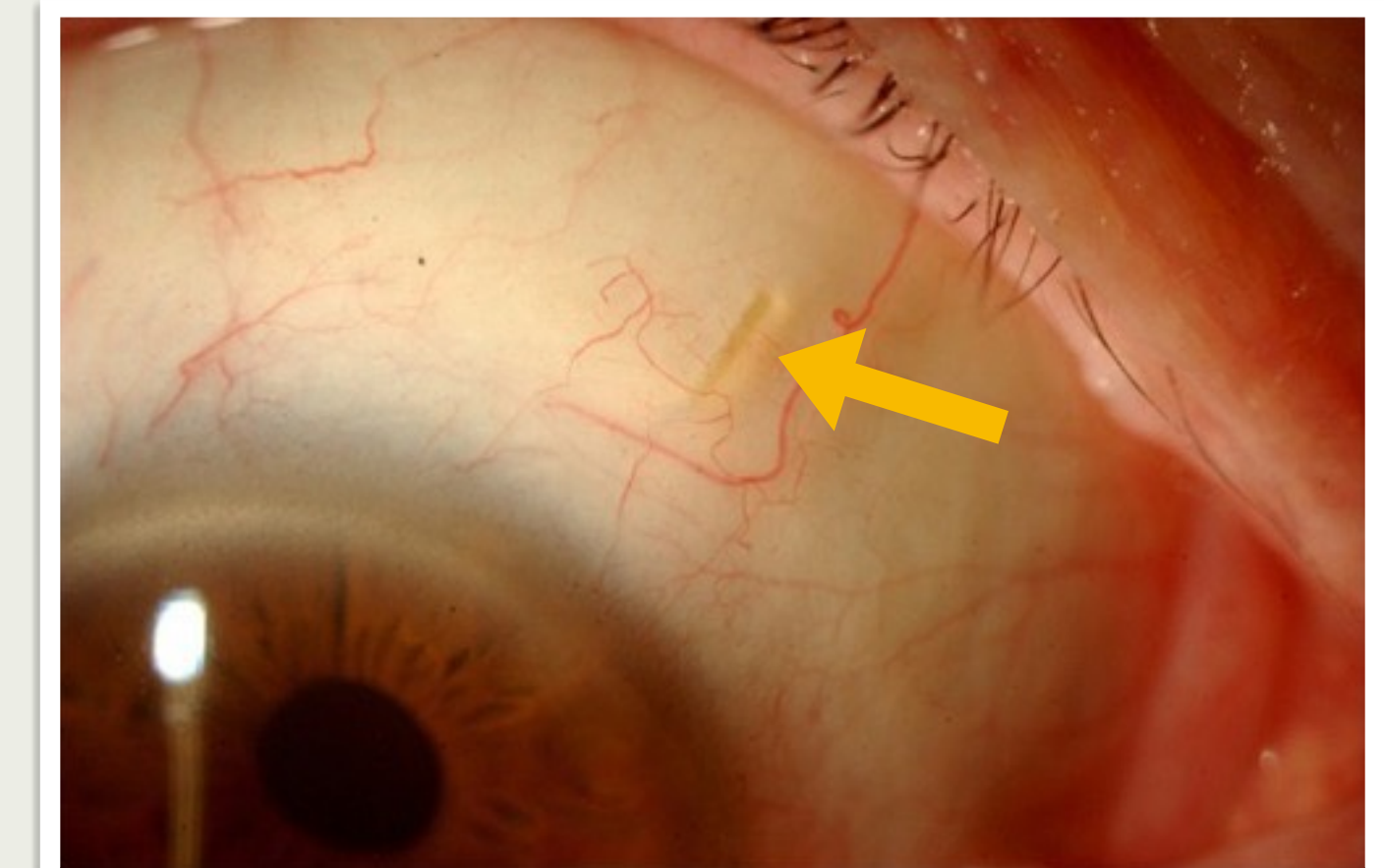
SUBCONJUNCTIVAL SPACE

MIGS with Stents

XEN gel stent



- 6 mm device
- Porcine-derived gelatin cross linked with glutaraldehyde
- Single-use, single-handed disposable injector with 27-G needle
- Ab interno or Ab externo
- Subconjunctival MMC typically before or after stent



Indications

- Refractory glaucoma
 - Pseudophakic
 - Uncontrolled on MTMT
 - Inadequately controlled by previous surgery
- Undergoing cataract Sx or a stand-alone procedure

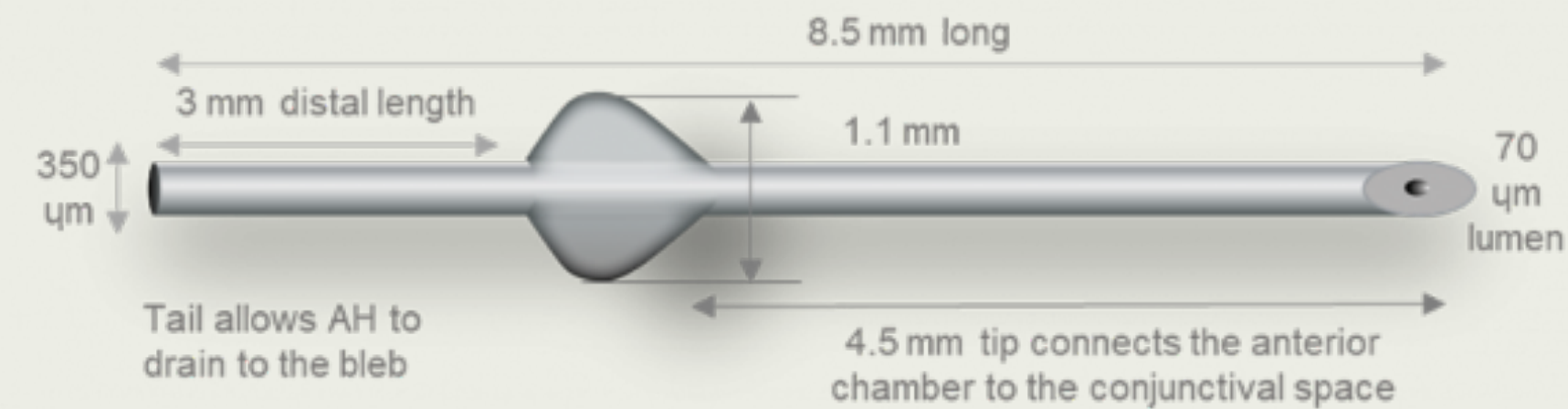
Contra I/C

- Angle closure glaucoma
- Previous glaucoma shunt
- Conjunctival scarring/pathologies in the target quadrant
- Active inflammation
- Active NVI, AC-IOL, intraocular silicone oil, vitreous in the AC

MIGS

SUBCONJUNCTIVAL SPACE

Preserflo microshunt



- Uniquely biologically inert (used in coronary stent)
= poly(styrene-block-isobutylene-block-styrene) or SIBS
- Length 8.5 mm, Internal lumen 70 µm

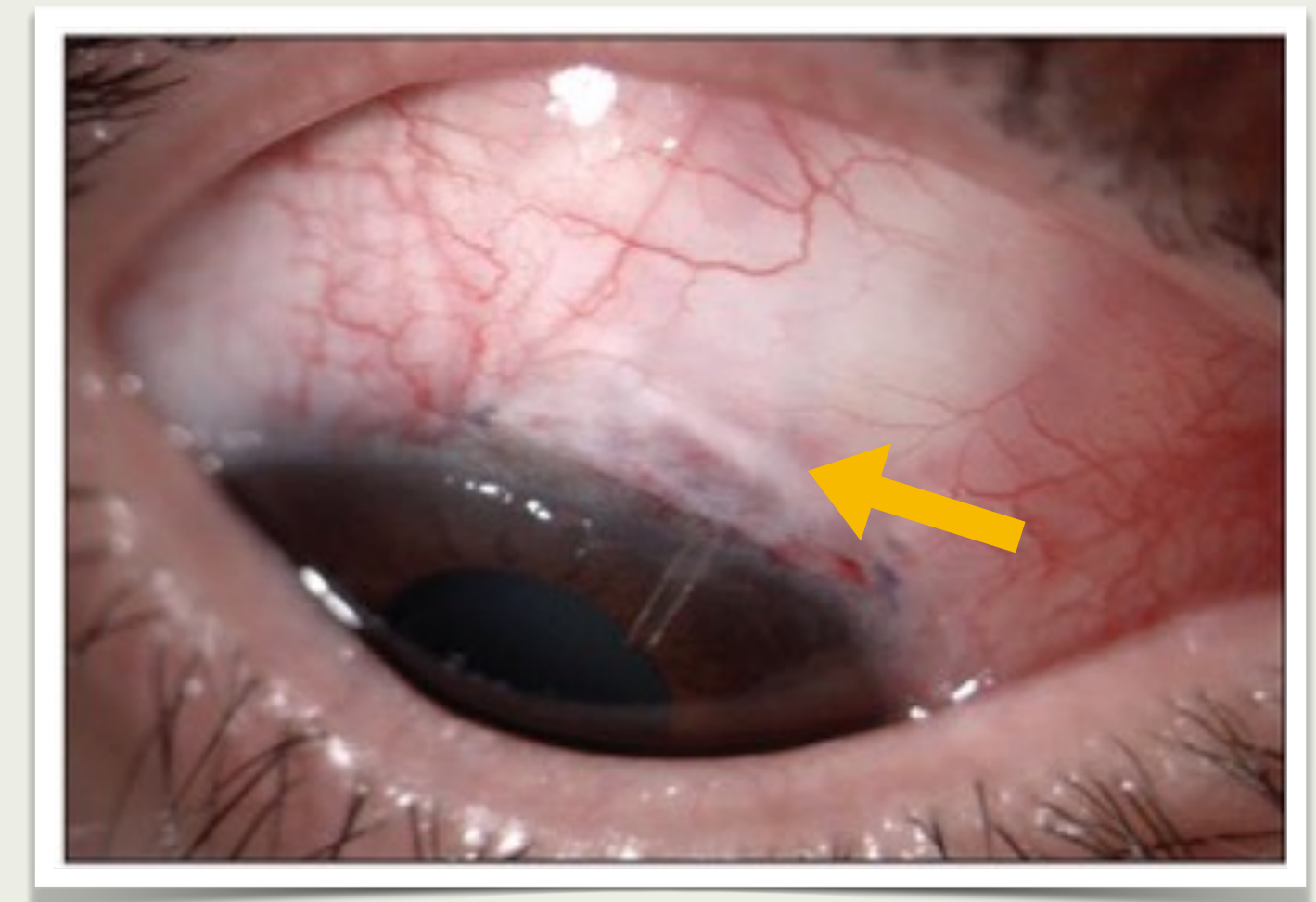
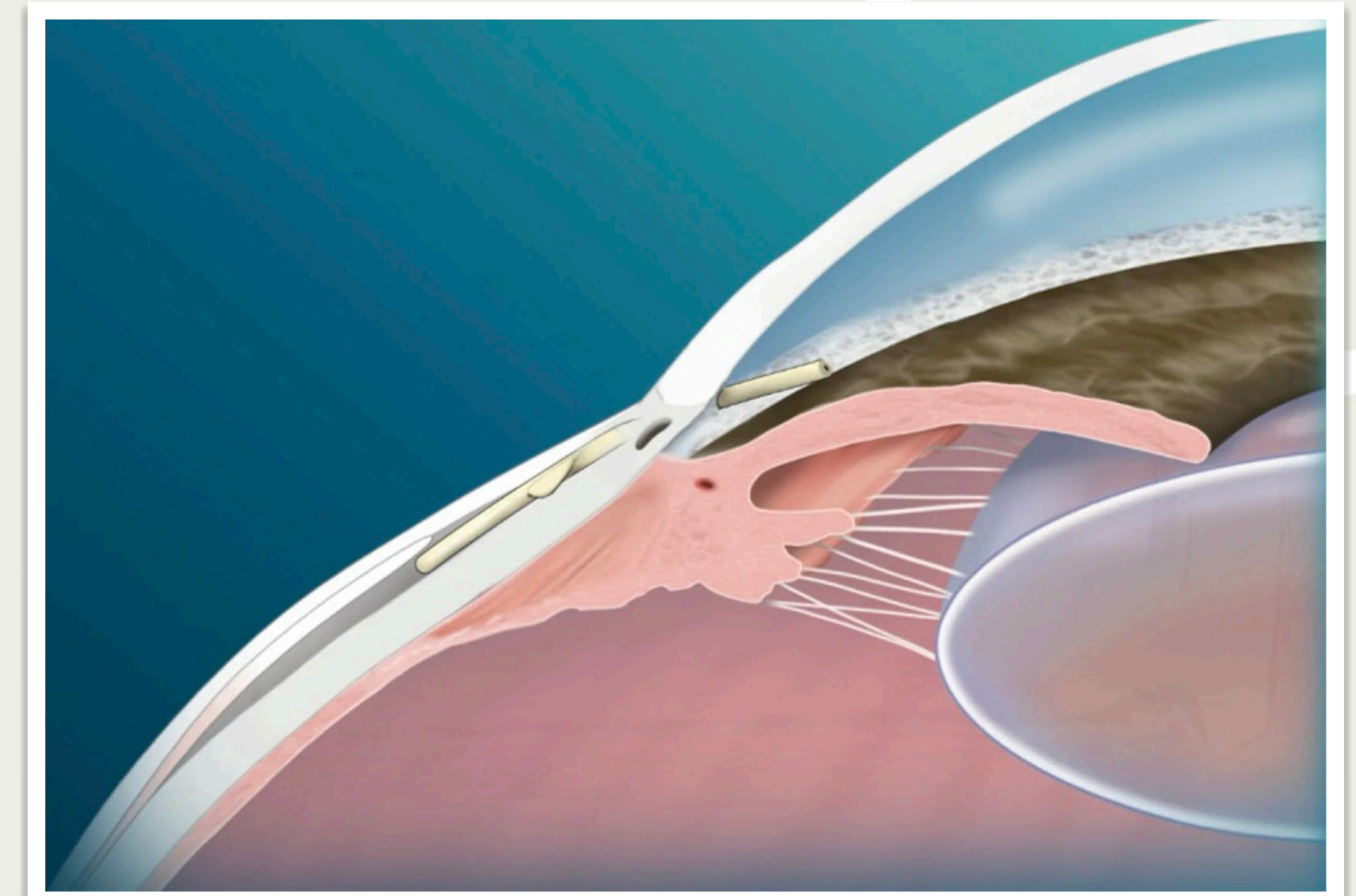
Indications

- POAG with MTMT and/or where glaucoma progression warrants surgery

Contra I/C

- Angle closure glaucoma
- Conjunctival scarring/pathologies in the target quadrant
- Active inflammation
- Active NVI, AC-IOL, intraocular silicone oil, vitreous in the AC

MIGS with Stents



MIGS

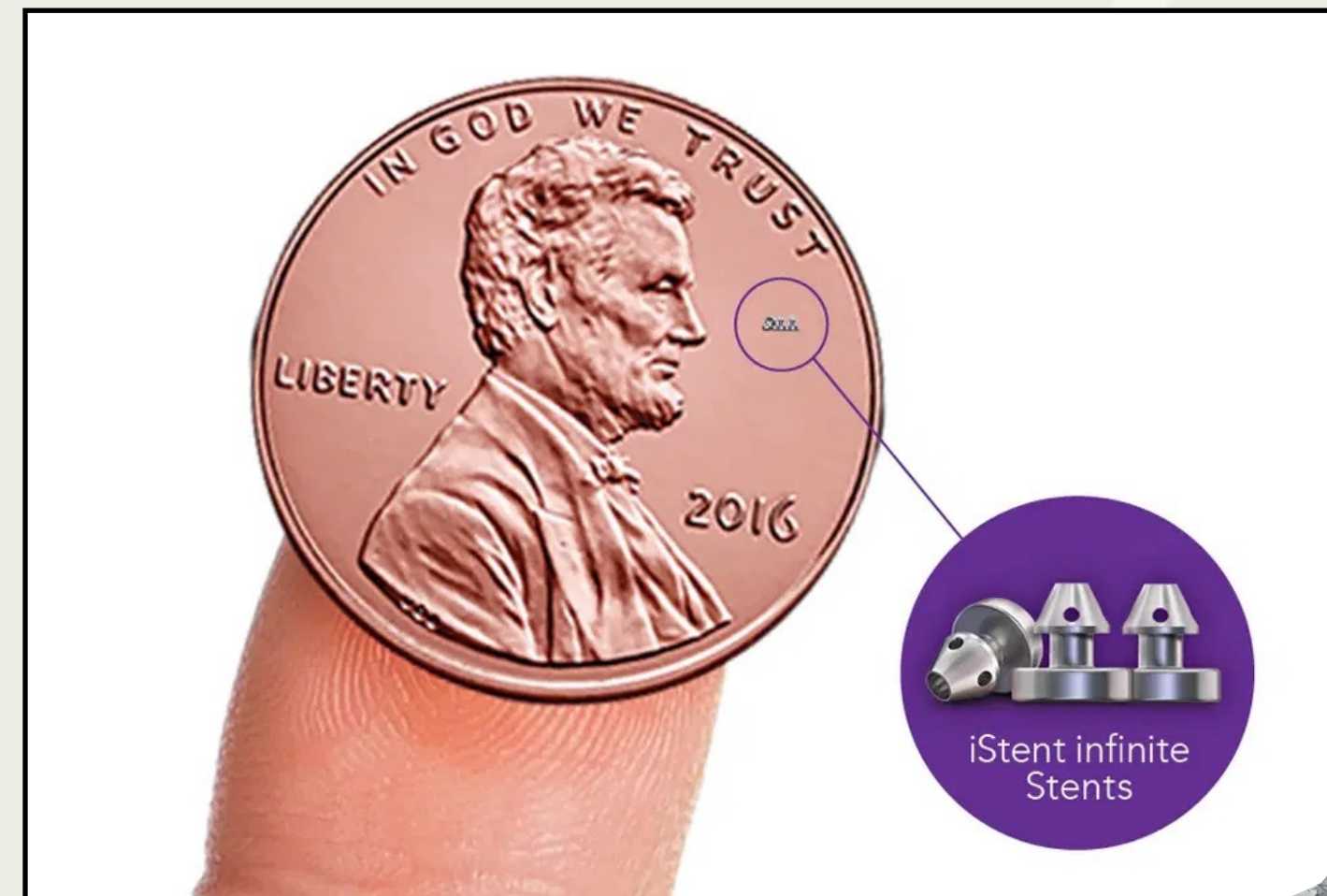
TRABECULAR STENTING

iStent inject

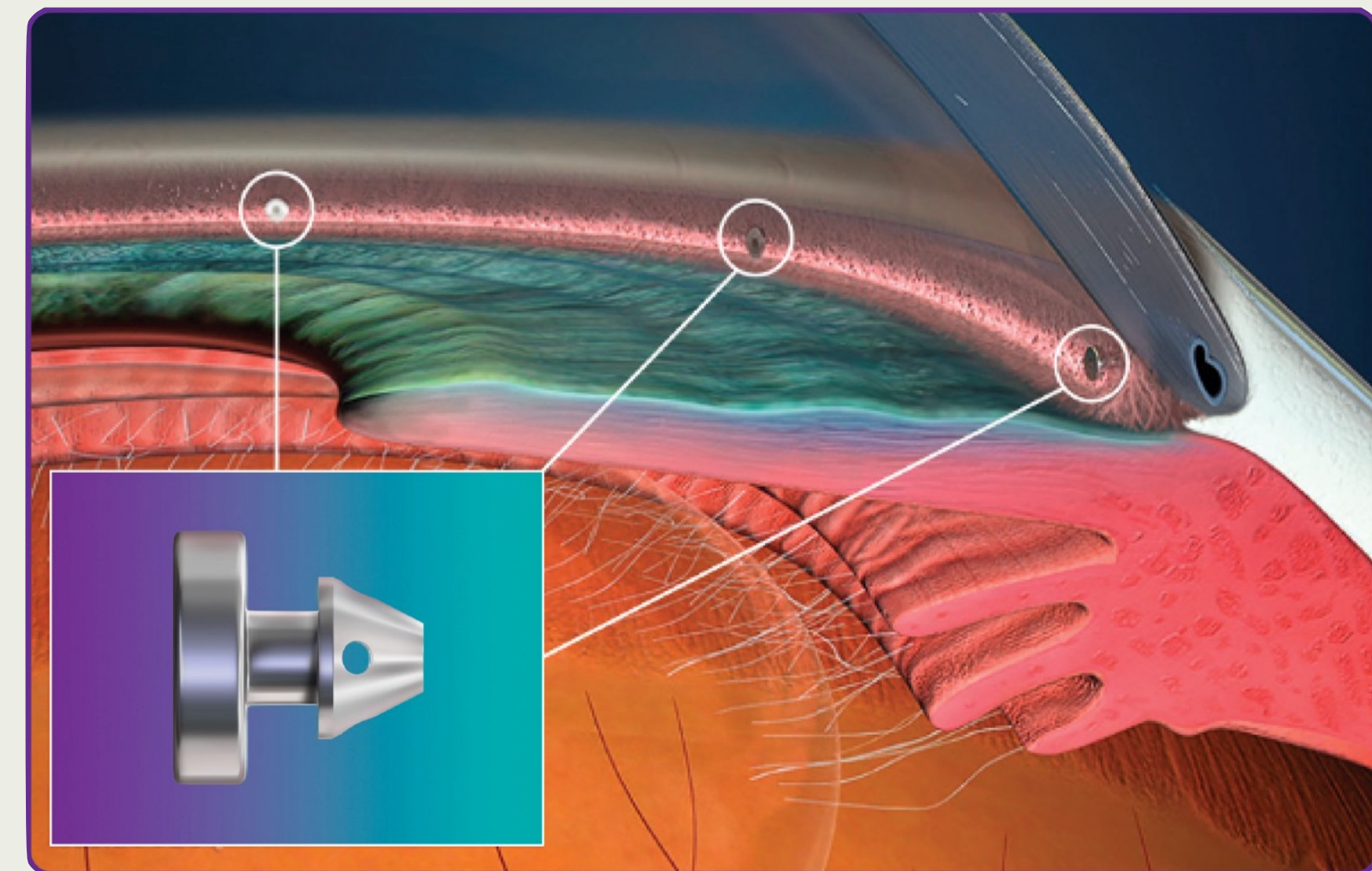
- Heparin coated titanium
 - Length 360 μm , Central lumen 80 μm
 - The smallest device to be implanted in the human body
 - In nasal angle \sim 2-3 clock hour apart

Indications

- Mild-moderate POAG
- With phaco or stand-alone



MIGS with Stents



THANK YOU

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5th June 2026

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