



Introduction to MIGS

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Financial Disclosures

- Glaukos (C,S)
- Allergan (C,S)
- Katena (C)
- Carl Zeiss Meditec (C)

WHAT IS MIGS?

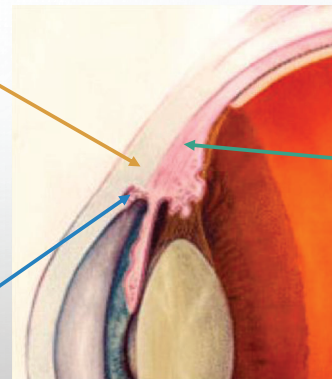
- AB-INTERNO APPROACH
- MINIMALLY TRAUMATIC
- MODEST EFFICACY
- EXTREMELY HIGH SAFETY PROFILE
- RAPID RECOVERY

Subconjunctival

- Xen
- Trabeculectomy
- GDD

Schlemm's Canal

- iStent
- Trabectome
- GATT
- KDB
- AbiC
- Omni



Suprachoroidal
- Cypass*

WHY MIGS?

Conventional Medical Management

- Medications
- Laser trabeculoplasty

Conventional Surgery

- Trabeculectomy
- GDD's

MIGS devices

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WHO SHOULD GET MIGS?

- ANYONE WITH GLAUCOMA ON MEDICATIONS UNDERGOING CATARACT SURGERY
- ANYONE WITH MEDICATION ADHERENCE CHALLENGES OR INTOLERANCE TO MEDS
- ANYONE WITH A MODEST IOP TARGET THAT HAS YET TO BE ACHIEVED MEDICALLY

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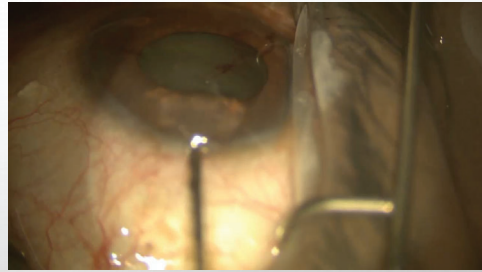
GLAUCOMA IS EVERYONE'S PROBLEM!

- GLAUCOMA PATIENTS LIVE IN ALL OF OUR PRACTICES, REGARDLESS OF SUBSPECIALTY!
 - AND IT IS OUR DUTY TO PROVIDE THE BEST POSSIBLE CARE FOR THEM
- THE SAFETY, EASE OF USE, AND PREDICTABILITY OF MIGS PROCEDURES ALLOWS EASY TRANSLATION INTO THE COMPREHENSIVE PRACTICE

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BARRIERS TO ENTRY

- LACK OF INTEREST
 - DO MIGS EVEN WORK?
- CONCERN THAT IT'S ONLY GLAUCOMA TURF
- FEAR OF LEARNING SOMETHING NEW
 - LOSS OF CLINICAL/SURGICAL EFFICIENCY



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THE PARADIGM SHIFT

- CONVENTIONAL MEDICAL AND SURGICAL GLAUCOMA CARE DO NOT PUT PATIENT QUALITY OF LIFE FIRST
 - FIRST GOAL IS IOP REDUCTION AND PREVENTION OF DISEASE PROGRESSION
 - LIMITED THERAPEUTIC OPTIONS, SO NOT MUCH OF A CHOICE
- WE ARE NOW ABLE TO PUT THE PATIENT FIRST, INDIVIDUALIZE CARE, AND OPTIMIZE QOL

What MIGS Should I Use?

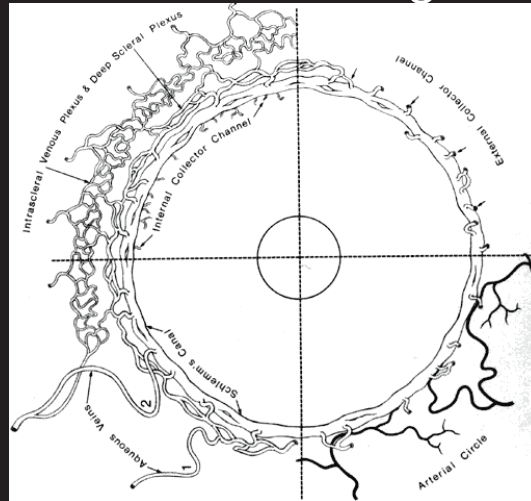
Schlemm's Canal

- Modest IOP target (mid-teens)
- Modest med reduction goals
- "Set it and forget it"

Subconj

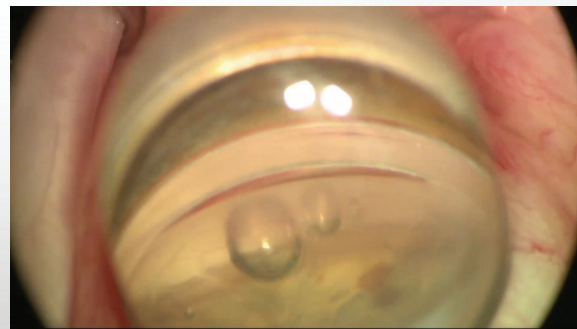
- More advanced disease
- More med reduction required
- Ability to tolerate slit lamp procedures

Optimizing Conventional Outflow Schlemm's Canal Surgical Targets



INTRAOPERATIVE GONIOSCOPY – THE FIRST (AND MOST IMPORTANT) CHALLENGE

- ENSURE EN-FACE VIEW
 - 30-40 DEGREE HEAD TURN, AND 30-40 DEGREE MICROSCOPE TILT
- AVOID STRIAE ON CORNEA
 - ADEQUATELY SIZED INCISION
 - INSTRUMENTATION REMAINS IN IRIS PLANE (NOT PLANE OF FLOOR)
 - LIGHT TOUCH WITH GONIOPRISM, USE OVD AS COUPLING AGENT
 - SURGEON, CORNEAL INCISION IN SAME AXIS AS ANGLE APPROACH
- CLEAR YOUR VIEW
 - REMOVE BUBBLES
 - AVOID TOO MANY OVD INTERFACES



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iStent 1.0



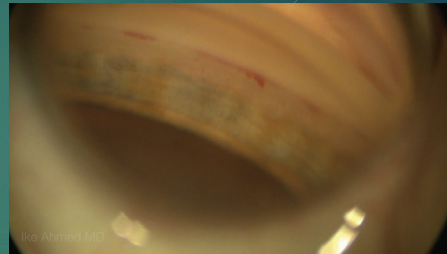
iStent 1.0

- ▶ Single stent
- ▶ Learning curve
- ▶ Safe
- ▶ Mildly effective compared to phaco alone

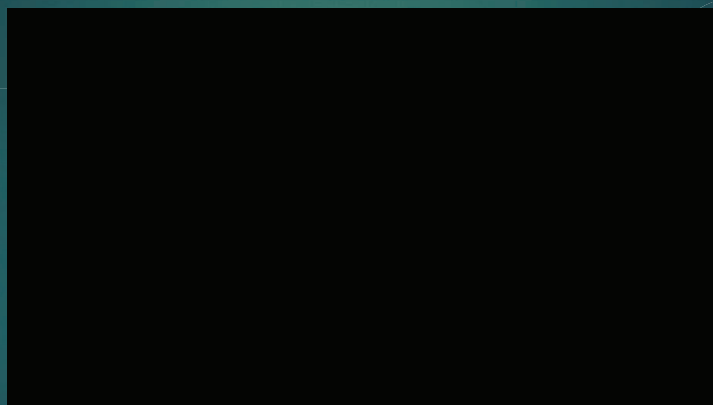


Targeted Placement

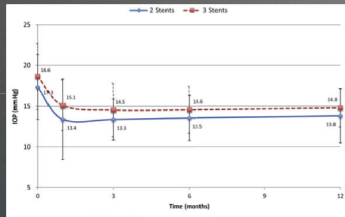
- ▶ Increased flow with more stents
- ▶ Targeting to blood reflux, pigment collection



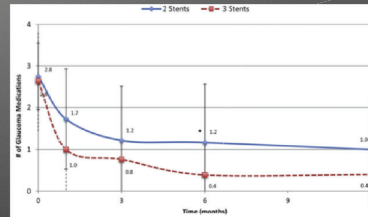
Targeted Placement



Multiple iStents



IOP

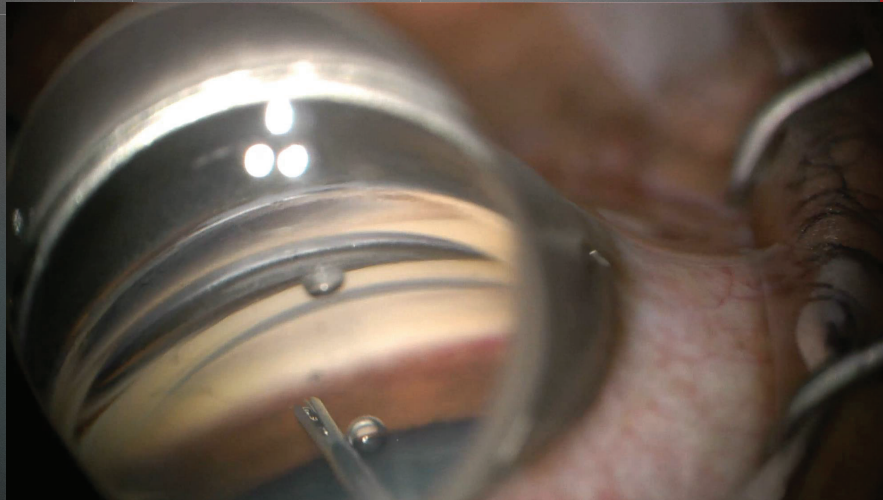


Medications

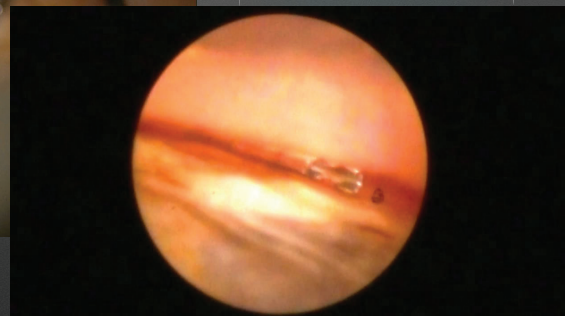
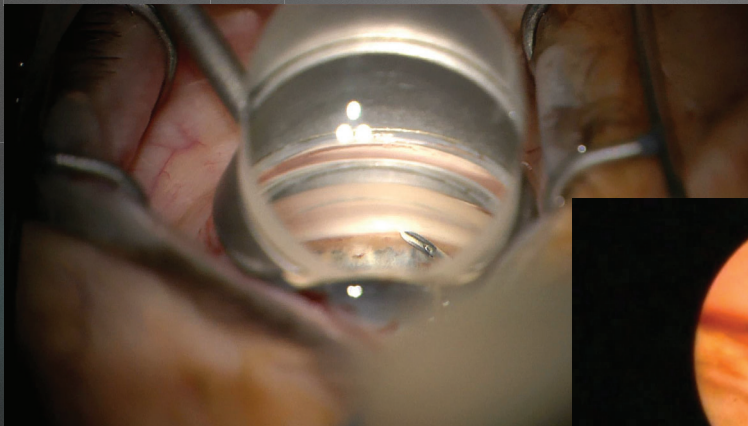
- ▶ Sustained IOP reduction with multiple stents
- ▶ 3 stents for eyes with greater need for IOP control

Belovay et al. JCRS 2012;38:1911-1917

iStent Inject (G2)

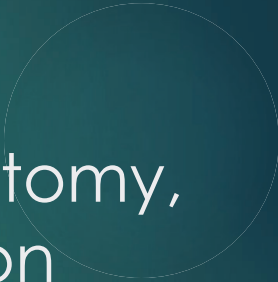



Hydrus Microstent





Ab-Interno Trabeculotomy and Goniotomy



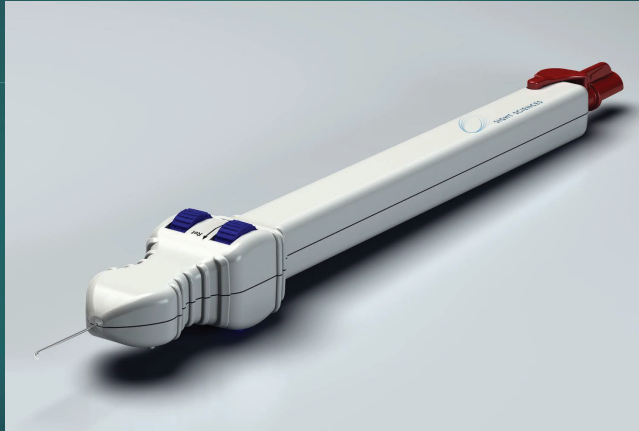
Ab-Interno Trabeculotomy/Goniotomy, Ab-Interno Viscodilation



Gonioscopy-Assisted Transluminal Trabeculotomy (GATT)

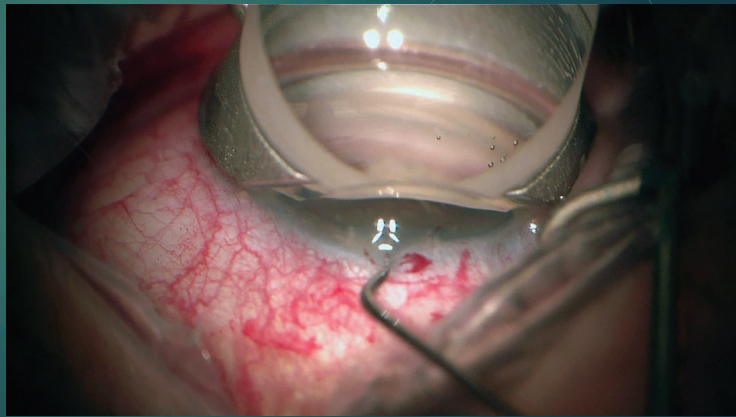
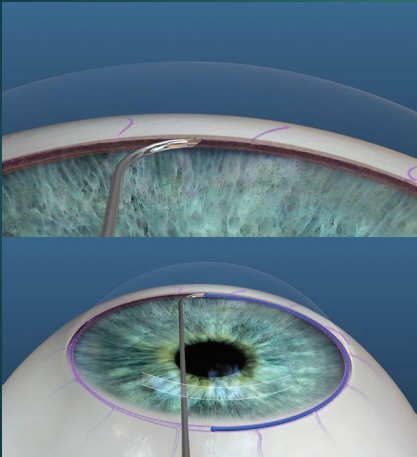


Trab360/Visco360/Omni

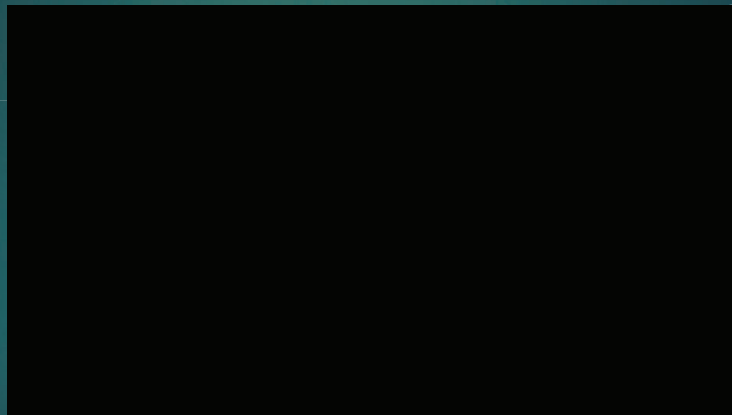


Trab360/Visco360/Omni

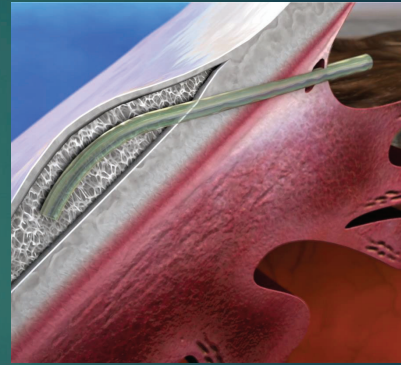
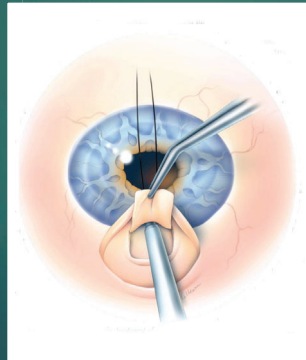
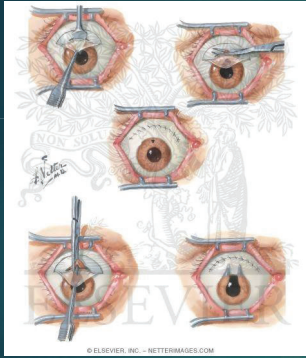
Single instrument that can be used to incise into SC, then viscodilate or unroof it 180 degrees at a time



Kahook Dual Blade

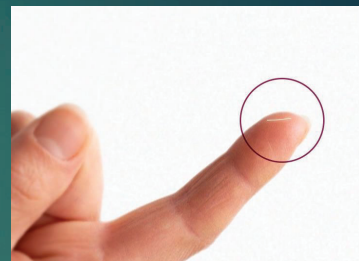


Subconjunctival Surgery Evolved



Anatomy of the Xen Gel Stent

- ▶ 6mm in length, 45 micron internal lumen diameter
- ▶ Cross-linked collagen that expands once hydrated
- ▶ Delivery through a 27g double-beveled needle on a single-handed injector
- ▶ Filtration guarded by physics

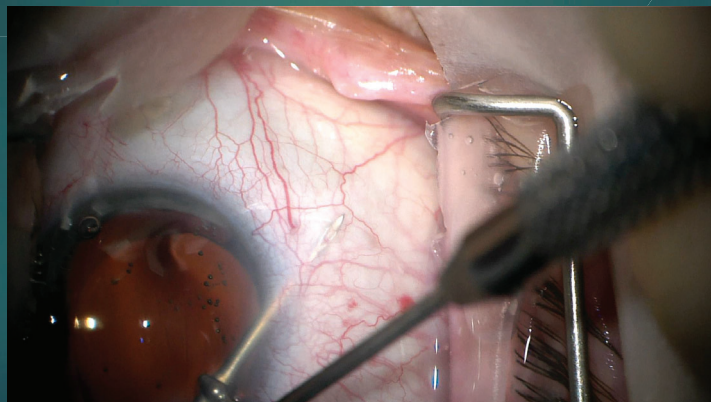


$$\Delta P = (8\mu LQ) / (\pi r^4)$$

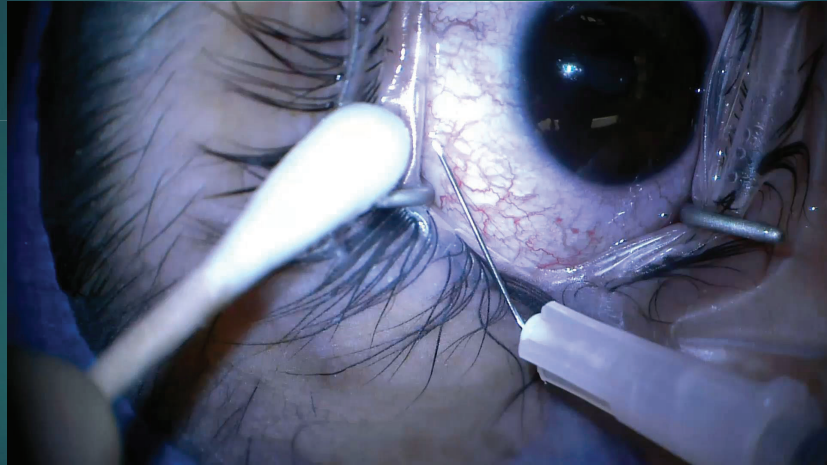
ΔP – Pressure loss along the lumen of the tube
 μ – dynamic viscosity
 L – Length of the tube
 Q – volumetric flow rate
 r – radius

Subconjunctival Delivery

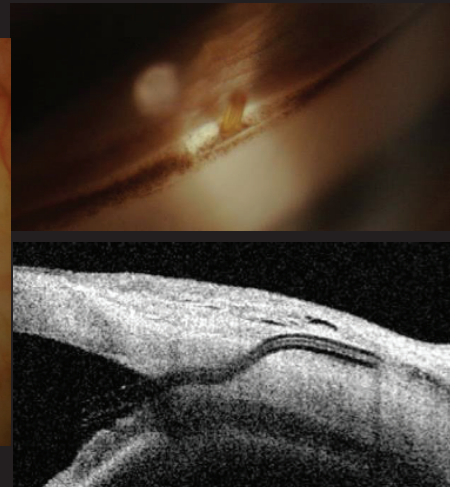
- ▶ Ideally position stent superficial to tenons and ensure it is free and mobile



Putting it Together



Not Your Grandfather's Bleb!



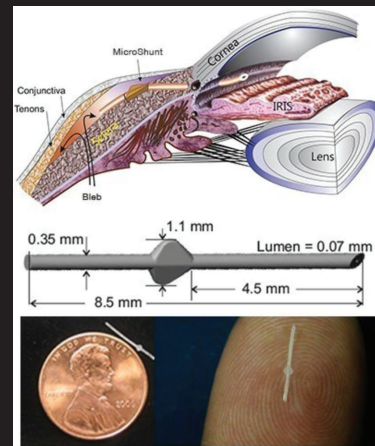
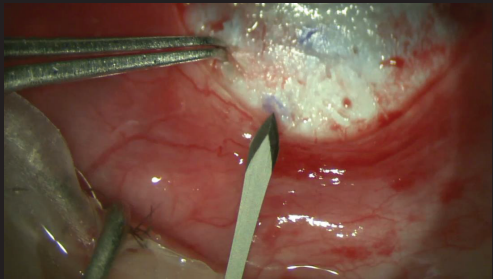
EXPECTED EARLY CHALLENGES

- POOR GONIOSCOPIC VIEW
 - STRIAE FROM WOUND EDGE, PUSHING ON POSTERIOR LIP OF INCISION, PUSHING WITH GONIOPRISM
- POOR VIEW OF ANGLE
 - ASSESS FOR ADEQUATE MICROSCOPE AND PATIENT HEAD TILT, CORRECT GONIOPRISM PLACEMENT
- POOR ANGLE LANDMARKS
 - CONSIDER TRYPAN BLUE TO HIGHLIGHT TM
- HEME REFLUX
 - USE COHESIVE OVD TO PUSH HEME TO THE SIDE

What's Next?...

SANTEN PRESERFLO

- 70 micron lumen diameter, 8.5mm length
- SIBS material - inert and biocompatible, less tissue reactive



ISTAR MINIJECT

- Targets the supraciliary space
- Porous silicone composed of hollow interconnected spheres to allow for flow regulation and avoid fibrosis

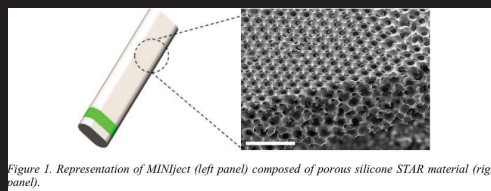
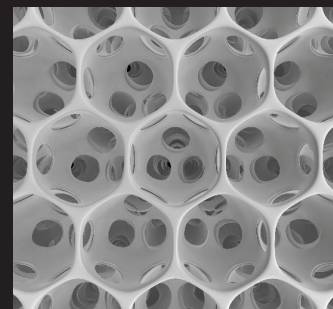
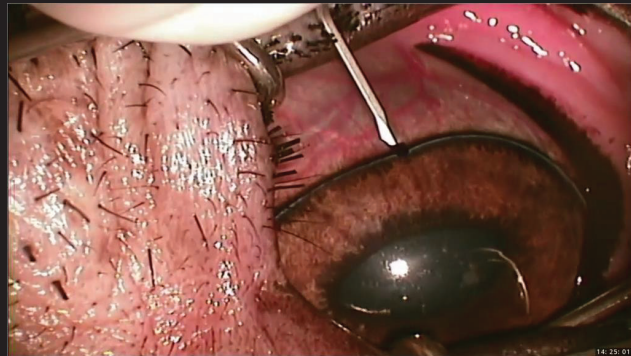


Figure 1. Representation of MINject (left panel) composed of porous silicone STAR material (right panel).



MICROOPTX BEACON

- Direct flow from the anterior chamber to the ocular surface
- Material properties and nanoscale fabrication to prevent protein deposition or bacterial entry



History Repeats Itself

"It may be that...the relatively crude procedures which we have inherited and which have been practised with only slight modifications for the last 50 years or so will have to give way to more sophisticated and exact techniques."

Nylon Filament Trabeculotomy.
Comparison with the results of conventional
drainage operations in glaucoma simplex

REDMOND SMITH (London)

Transactions of the Ophthalmological Society of New Zealand, 1969