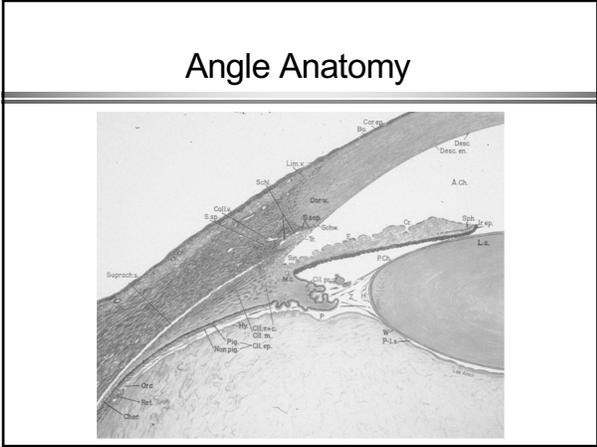


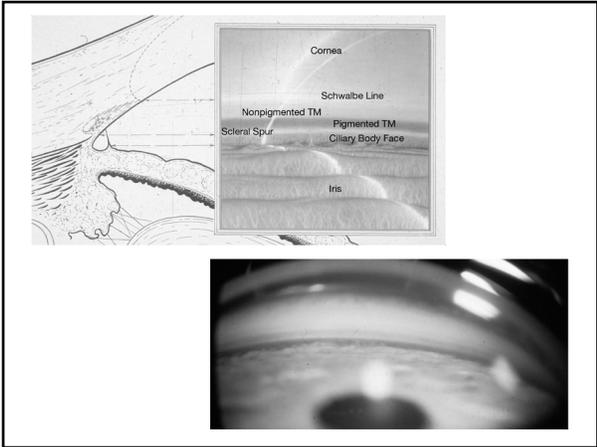
Glaucoma Surgeries

J. Kevin McKinney, MD, MPH

1



2



3

Mechanisms of Action

- Increase outflow of aqueous
 1. enhance existing outflow
 - dilate Schlemm's canal & collector channels
 - » canaloplasty, viscodilation
 - » iTrack, OMNI
 - open/remove TM
 - » goniotomy / trabeculotomy
 - » Trabectome, Kahook, OMNI, GATT
 - stent TM
 - » iStent, Hydrus

4

Mechanisms of Action

- Increase outflow of aqueous
 2. enhance alternate outflow
 - direct aqueous into suprachoroidal space
 3. bypass drain entirely
 - create new path into subconjunctival space
 - » trabeculectomy, tube, Xen gel stent, Preserflo

5

Mechanisms of Action

- Decrease production of aqueous
 - » Cyclophotocoagulation (CPC)
 - » Endocyclophotocoagulation (EPC)

6

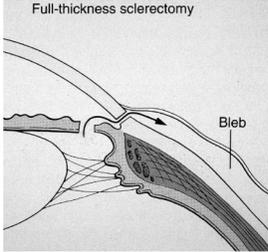
**“Traditional”
Glaucoma Surgeries**

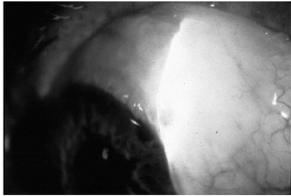
- Trabeculectomy
- Glaucoma Drainage Implants
– “tubes”
- Cyclodestructive procedures

7

Full Thickness Procedure

Full-thickness sclerectomy



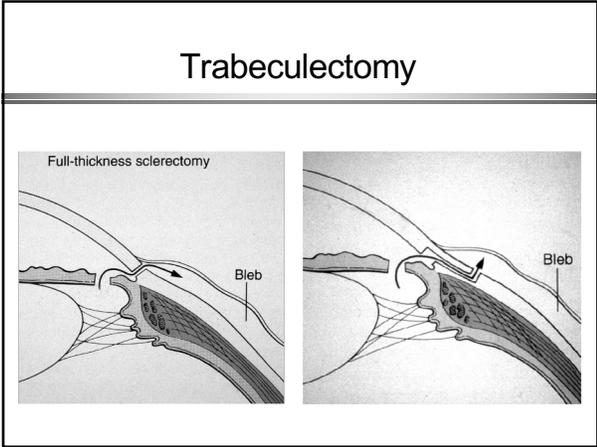


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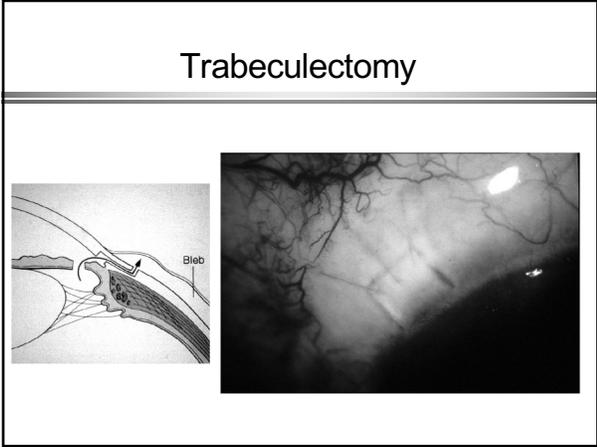
Trabeculectomy

- Reported by Cairns in 1968
- A “guarded” procedure
 - » Sutured scleral flap provides some back pressure to prevent degree of hypotony (very low IOP) seen with full thickness procedures

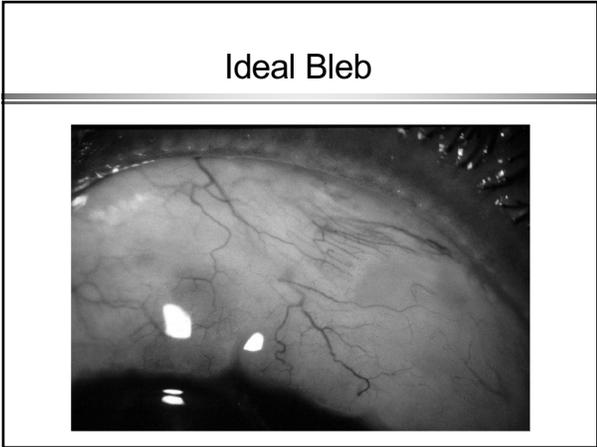
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10

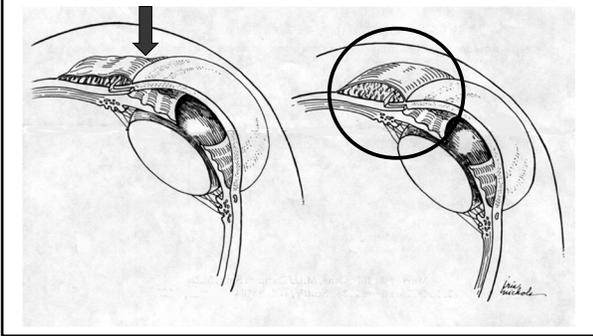


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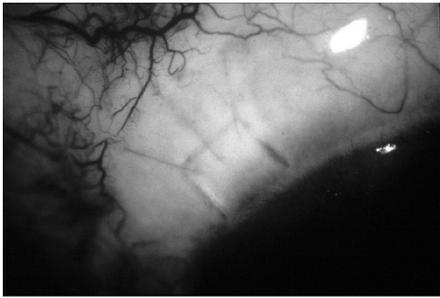
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Digital Massage



13

Suturelysis

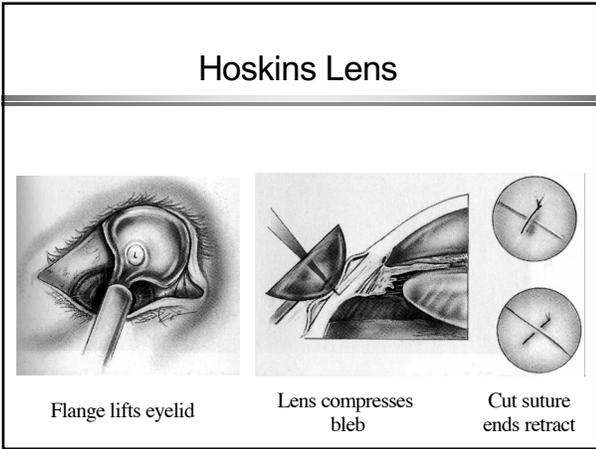


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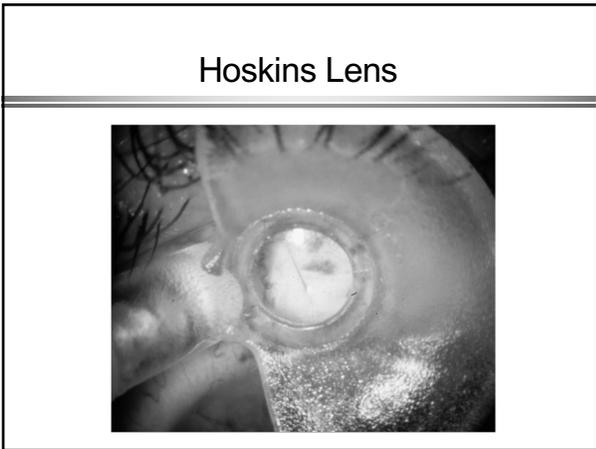
Hoskins Lens



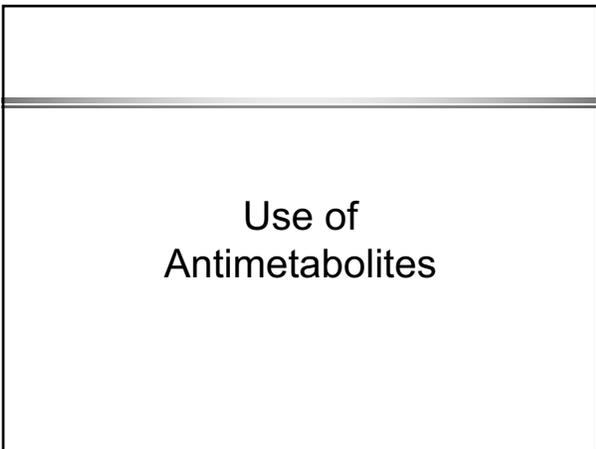
15



16



17



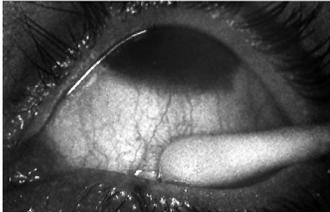
18

5-Fluorouracil

Inhibits fibroblasts
(scar cells)

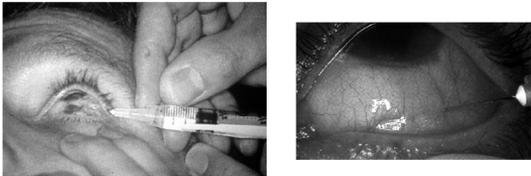
19

5-FU Anesthetic



20

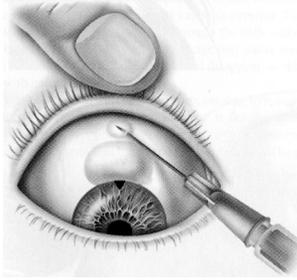
5-FU Injection



21

5-FU Injection

- Give beside or in bleb
- 50 mg/ml
 - » 0.1cc = 5mg dose
 - » 0.2cc = 10mg dose



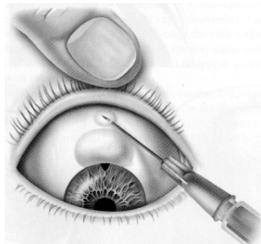
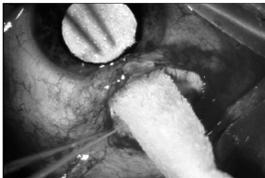
22

Mitomycin C

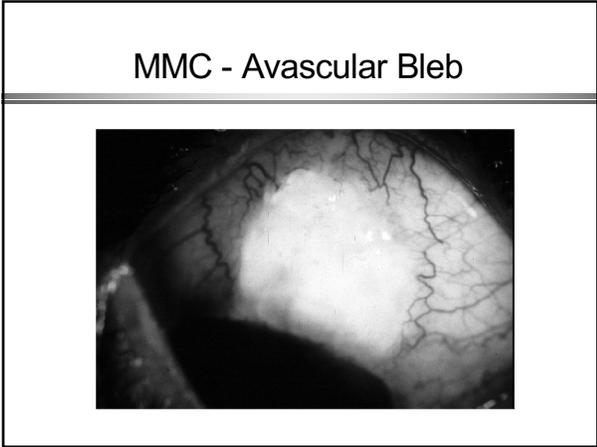
Kills fibroblasts (scar cells)

23

MMC application



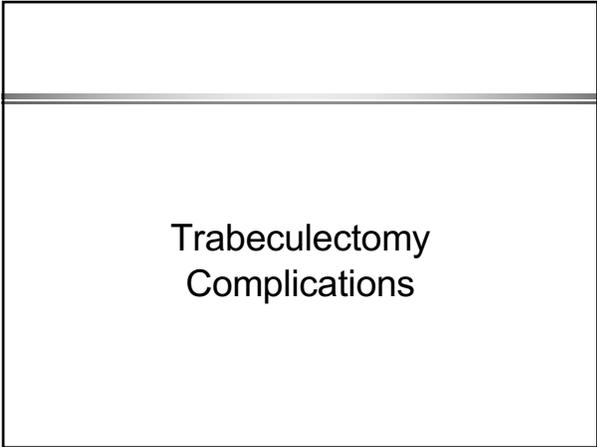
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25

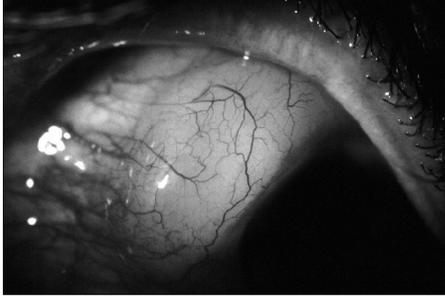


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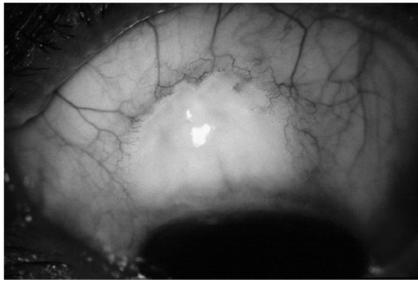
27

Tenon's Cyst



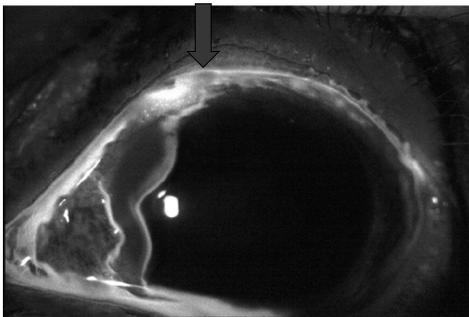
28

"Ring of Steel"



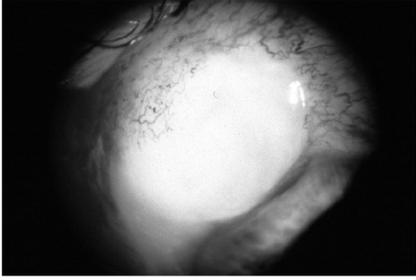
29

Bleb Leak



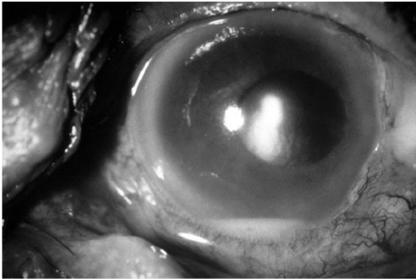
30

Bleb "Abscess"



31

Bleb-related Endophthalmitis



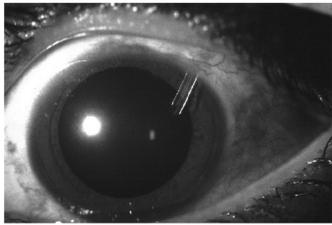
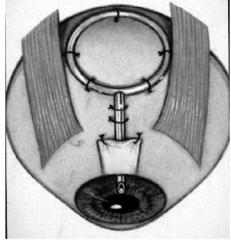
32

Glaucoma Drainage
Implants
(GDI)

J. Kevin McKinney, MD, MPH

33

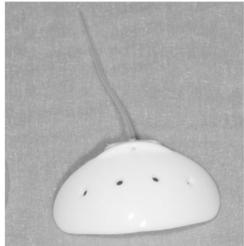
GDI – Tube - Seton



34

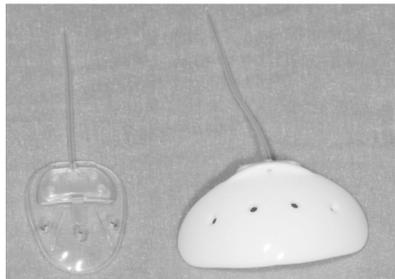
Baerveldt 350

- Flexible, polished white silicone plate
- Fenestrations limit bleb height
- Non-valved



35

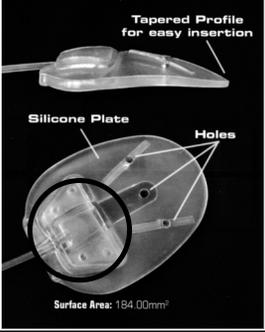
Ahmed vs Baerveldt



36

Ahmed Valve FP7

- Flexible silicone plate
- Fenestrations to limit bleb height
- “No Touch Zone”



The diagram illustrates the Ahmed Valve FP7. It features a tapered profile for easy insertion, a silicone plate with holes, and a surface area of 184.00mm². The valve is shown in a cross-section view, highlighting its internal structure and the placement of the silicone plate.

37

Ahmed ClearPath

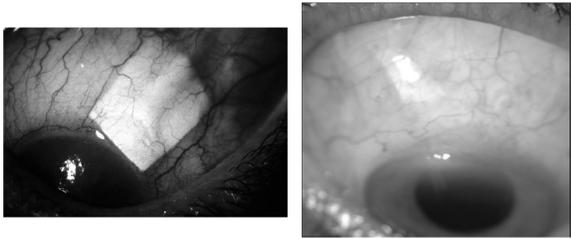
- Flexible white silicone plate
- Fenestrations to limit bleb height
- Non-valved



The image shows the Ahmed ClearPath device, which consists of a flexible white silicone plate with fenestrations. The device is shown in a cross-section view, highlighting its internal structure and the placement of the silicone plate.

38

Patch Graft



The two images show the application of a patch graft to the eye. The left image shows the graft being applied to the eye, and the right image shows the graft in place, covering the surgical site.

39

Cyclodestructive Procedures

Therapeutic destruction of the ciliary body for glaucoma

J. Kevin McKinney, MD, MPH

40

Cyclodestruction

- Permanent destruction of the ciliary body epithelium
- Lowers IOP by reducing aqueous production

41

Cyclocryotherapy (CCT)



42

Diode Cyclophotocoagulation

- Compared to cyclocryotherapy:
 - » Less pain
 - » Less inflammation
 - » Less risk of phthisis
 - » Equally effective

43

Iridex Infrared (810nm)

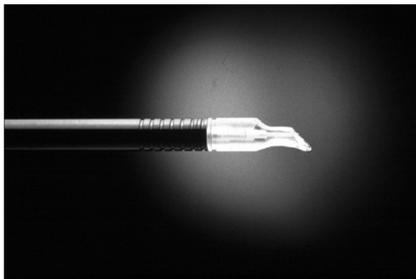
- Solid state laser
 - » durable
 - » low maintenance
- Fits in small suitcase
 - » Portable
- Continuous wave



Infrared Laser

44

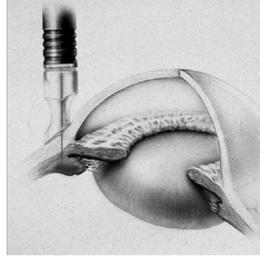
G-Probe



45

G-Probe Position

- Place heel against limbus
- Parallel to visual axis



46

Micropulse CPC

- Repetitive short energy pulses alternate with rest periods
 - » allows tissue cooling -> less collateral damage
- Theoretically safer than traditional CPC
 - » use in younger patients &/or baseline vision?
- Requires sweeping motion along limbus

47

P3 probe micropulse CPC



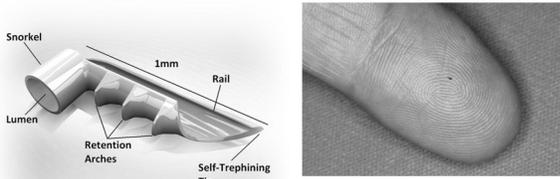
48

MIGS

- Minimally Invasive Glaucoma Surgery
 - » less risk
 - » less effective

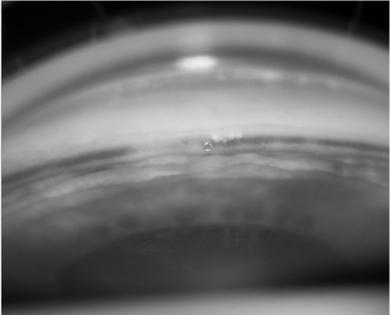
49

iStent
1st generation

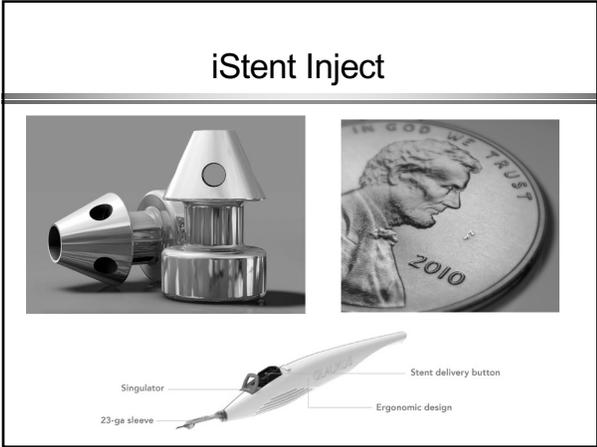


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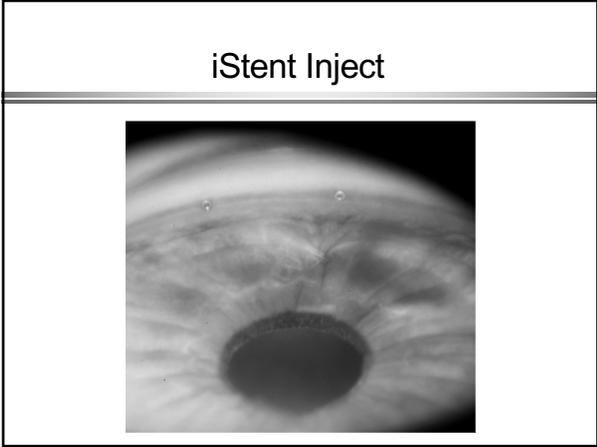
iStent
1st generation



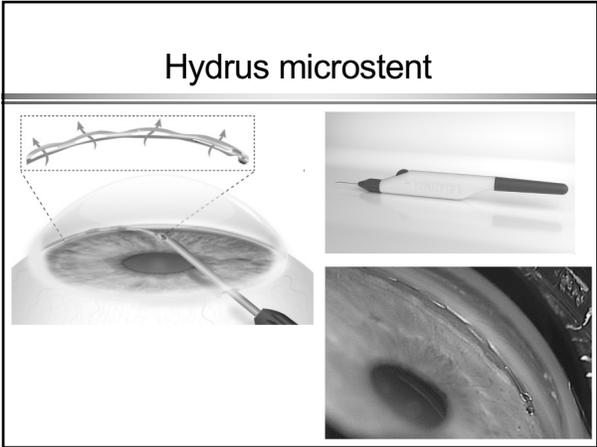
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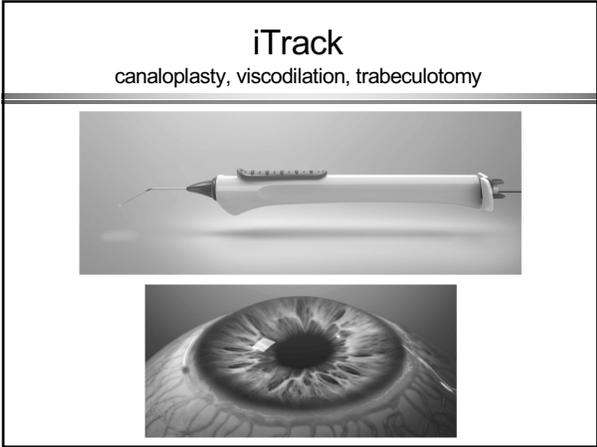
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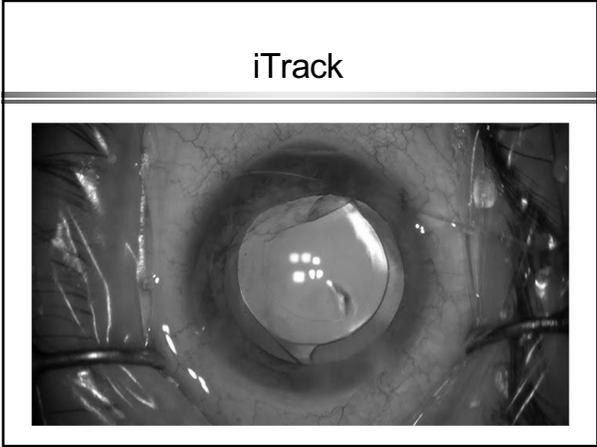
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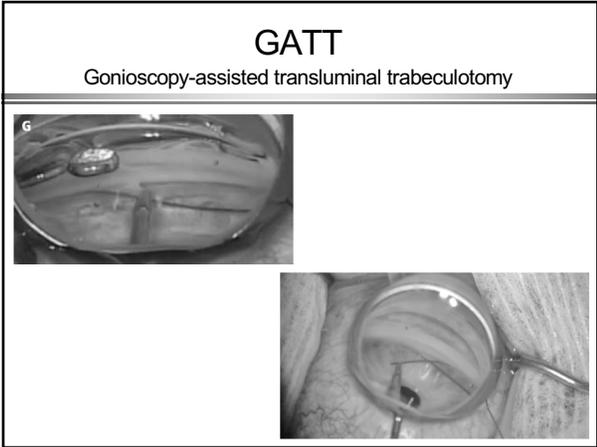
54



55



56



57

Stents

- **iStent**
 - » perforates / bypasses TM
 - » aqueous passes through stent into Schlemm's canal
- **Hydrus**
 - » dilates Schlemm's & stretches TM
 - » enhances aqueous flow across TM
 - » also perforates TM at entry point
 - can use YAG to open more TM windows

58

Canaloplasty

- **Catheterize Schlemm's Canal**
 - » Disrupt blockages
- **Viscodilation**
 - » Inject viscoelastic
 - » expands Schlemm's canal and collector channels
 - (which flow into episcleral veins)

59

Goniotomy

- **Cut or remove trabecular meshwork (TM) from inside eye**

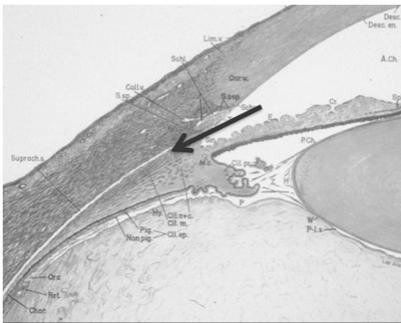
60

Trabeculotomy

- Open Schlemm’s Canal into AC
 - » breaks TM from inside Schlemm’s:
 - » Micro-catheterize Schlemm’s canal with fiber or suture
 - » Pull fiber/suture back into AC through trabecular meshwork

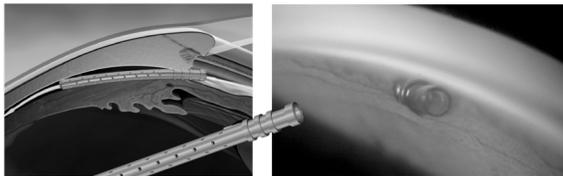
61

Suprachoroidal “Stents”

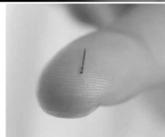


62

CyPass micro-stent



Withdrawn from market due to corneal complications



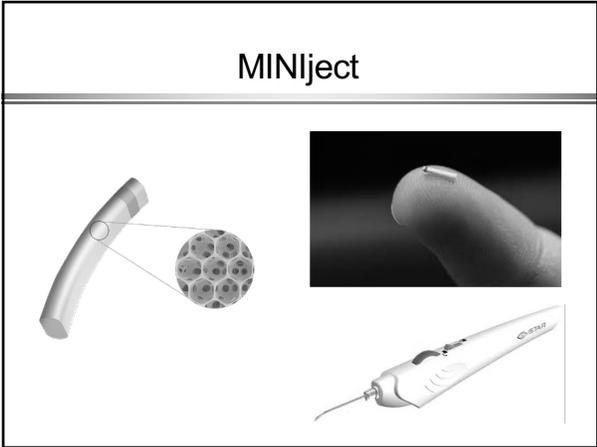
63



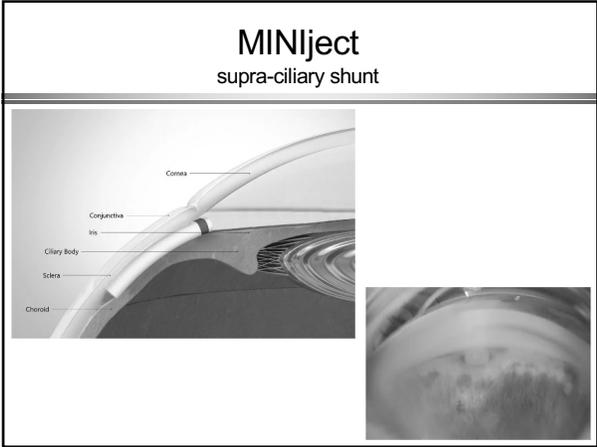
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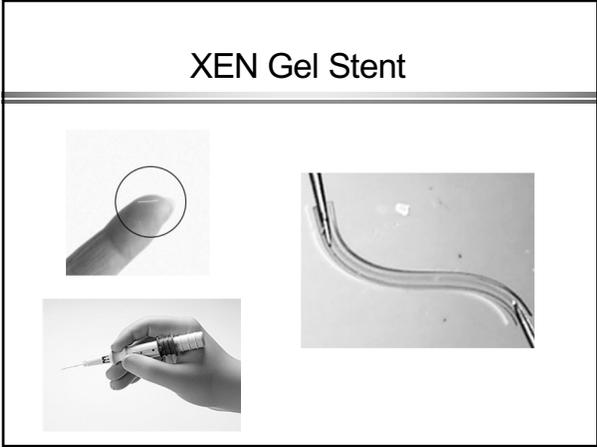
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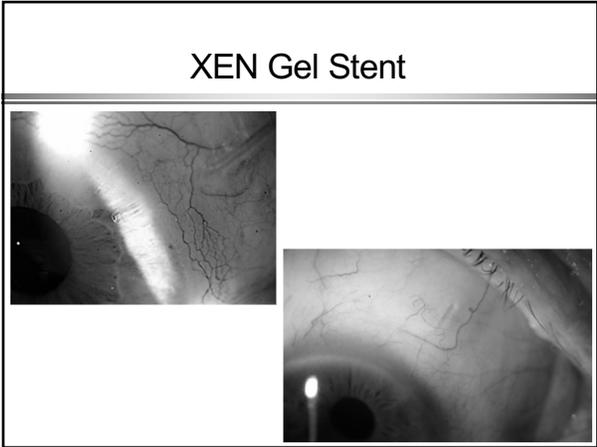
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67

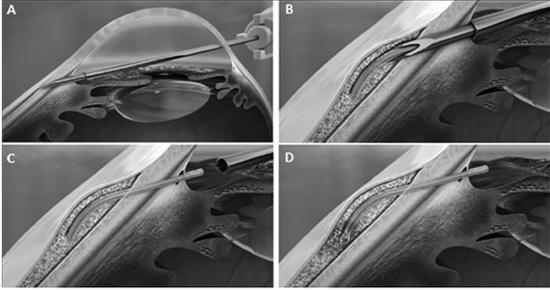


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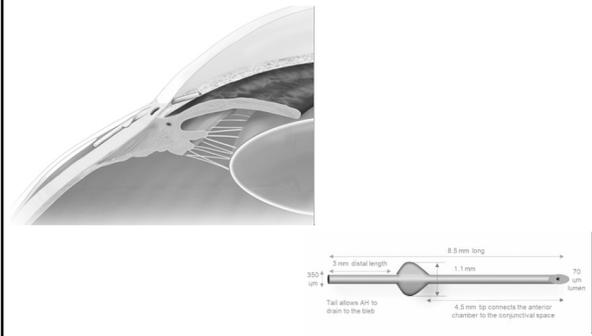
69

XEN Gel Stent



70

PRESERFLO microshunt

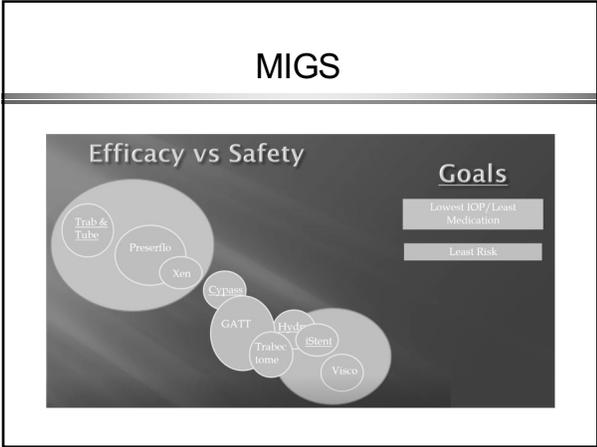


71

OMNI canaloplasty, viscodilation, trabeculotomy



72



73

Drug Delivery Systems

- Sustained release
 - » External
 - Rings
 - Punctal plugs
 - » Internal (intracameral)
 - Injectable dissolving pellets
 - Implanted reservoirs
- Prolonged duration of action (months)
- Reduces adherence issues

74

Ocusert pilocarpine

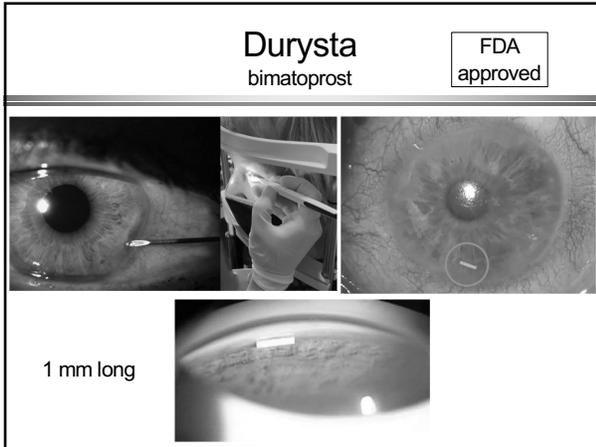
No longer available

OCUSERT NDDS: EXPLODED VIEW OF INTERNAL COMPONENTS

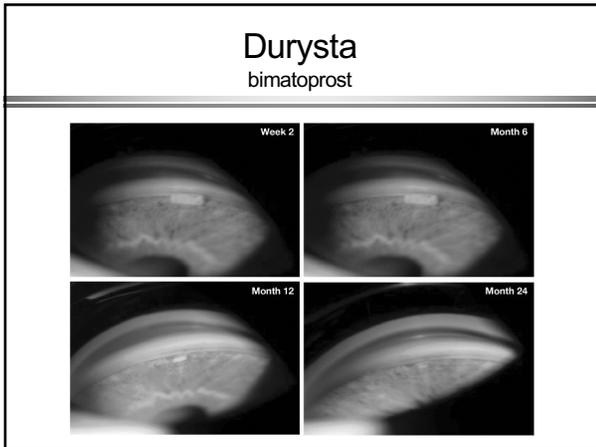
- OUTER RATE-LIMITING MEMBRANE
- DRUG-POLYMER RESERVOIR
- INNER RATE-LIMITING MEMBRANE
- SUSTAINS DRUG RELEASE

1975

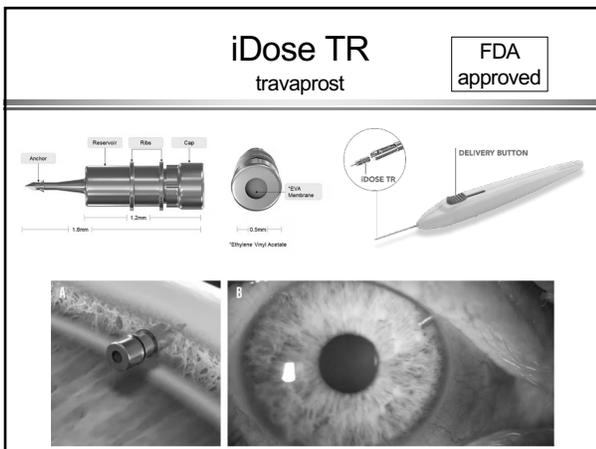
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76

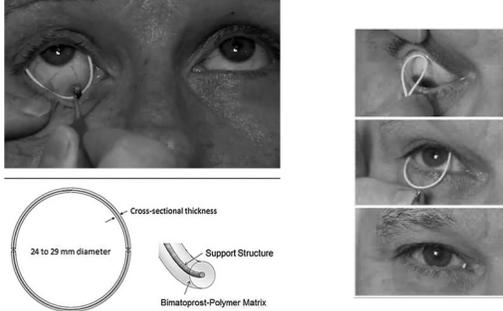


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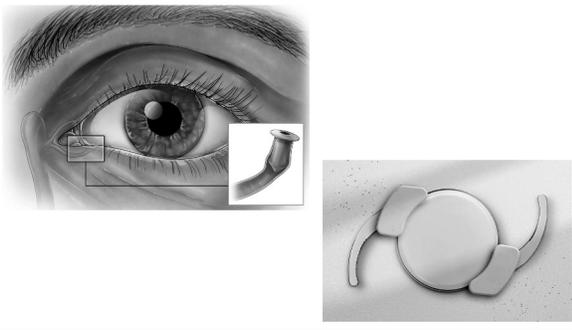
78

Bimatoprost Ring



79

Other Devices

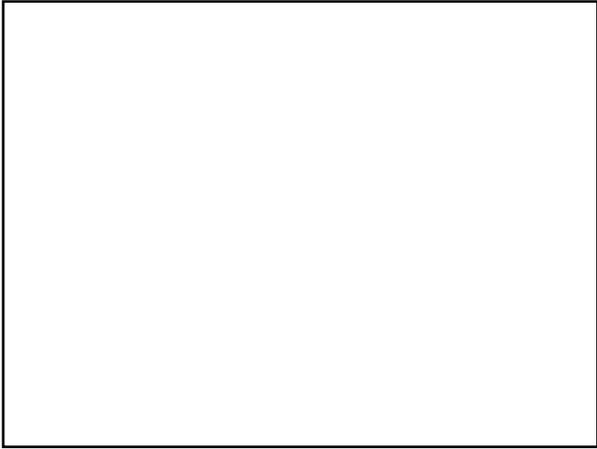


80

Thank You!



81



82