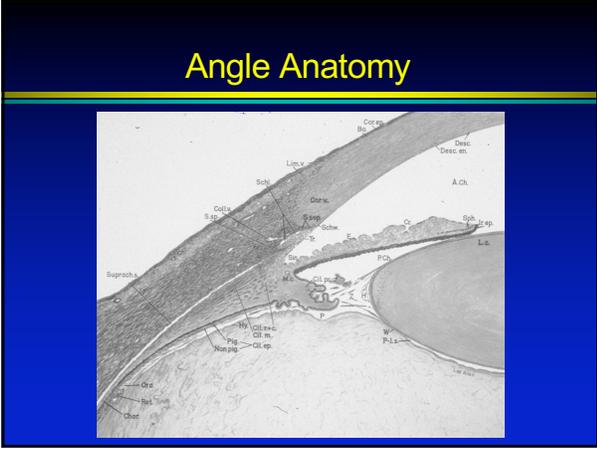


Glaucoma Surgeries

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

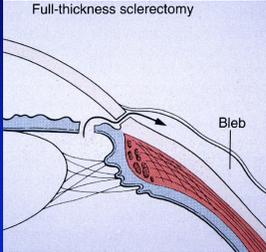
"Traditional" Glaucoma Surgeries

- Trabeculectomy
- Glaucoma Drainage Implants
– "tubes"
- Cyclodestructive procedures

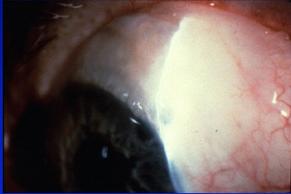
7

Full Thickness Procedure

Full-thickness sclerectomy



Bleb

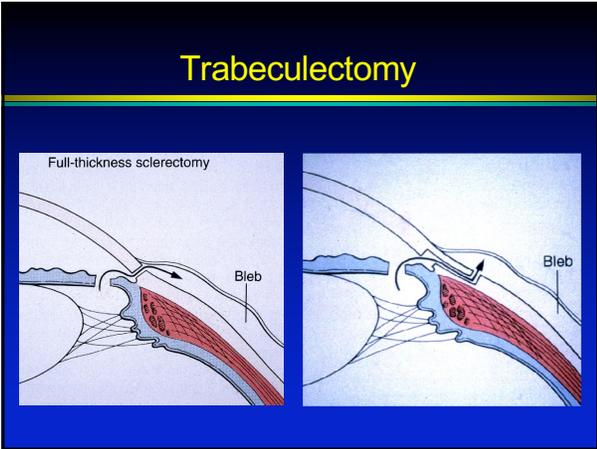


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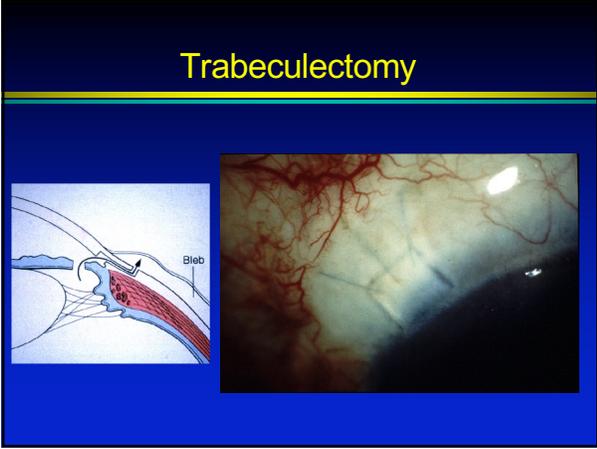
Trabeculectomy

- 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

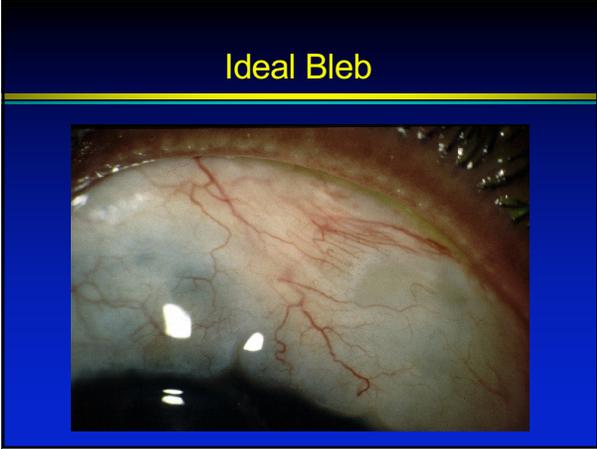
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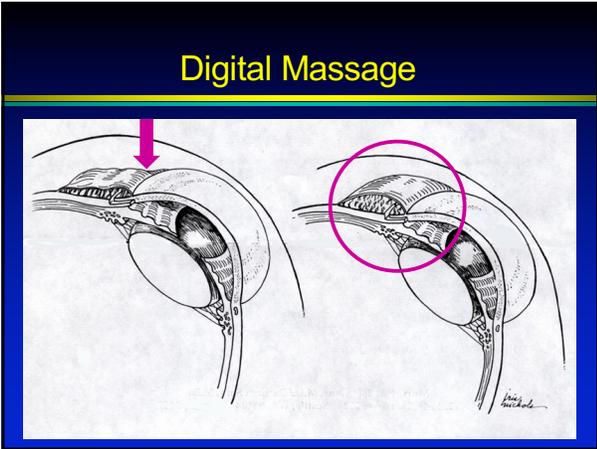
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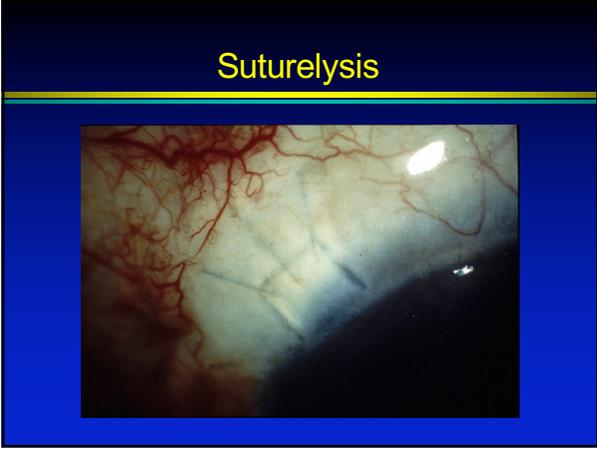
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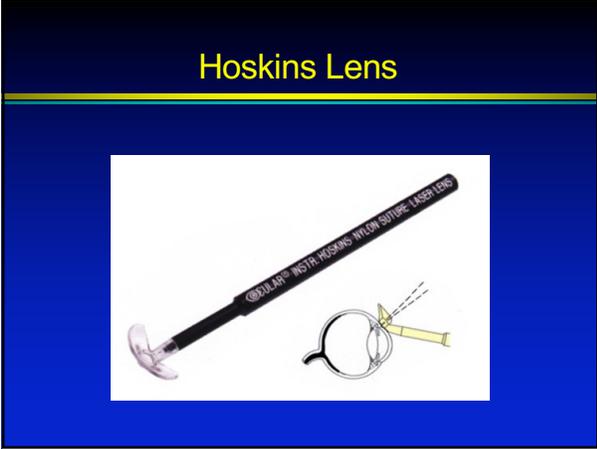
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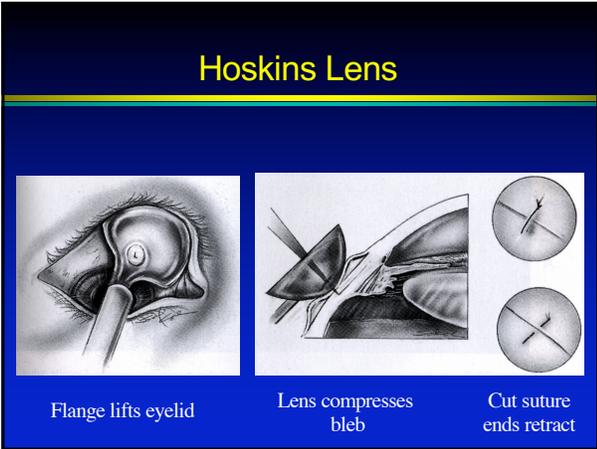
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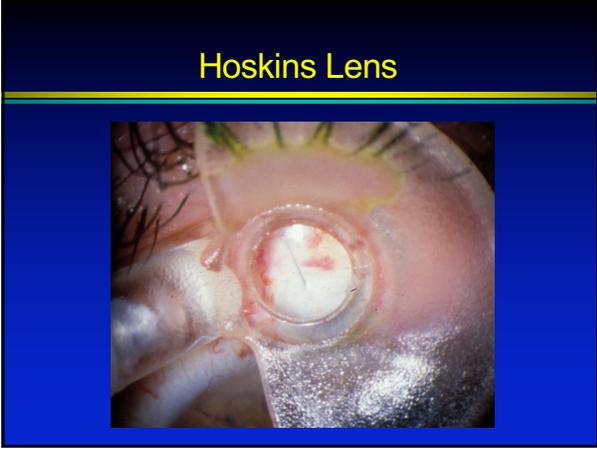
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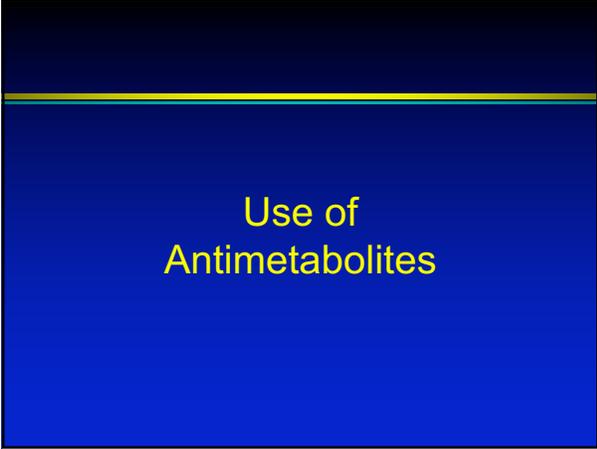
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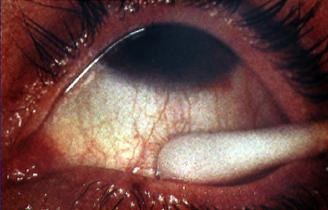
18

5-Fluorouracil

Inhibits fibroblasts
(scar cells)

19

5-FU Anesthetic



20

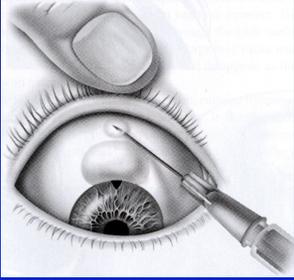
5-FU Injection



21

5-FU Injection

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



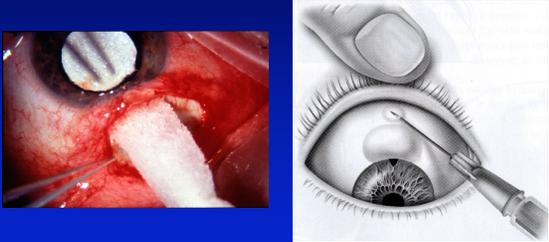
22

Mitomycin C

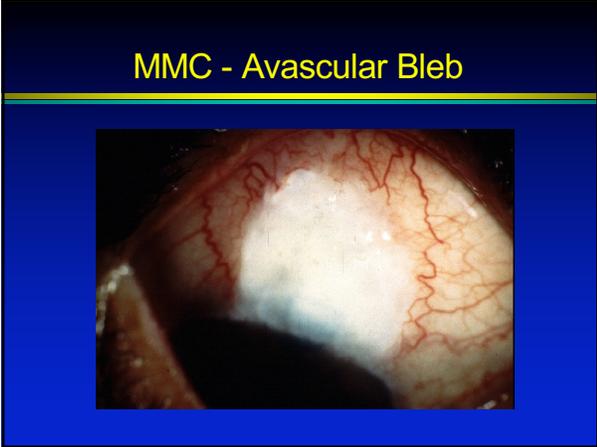
Kills fibroblasts (scar cells)

23

MMC application



24



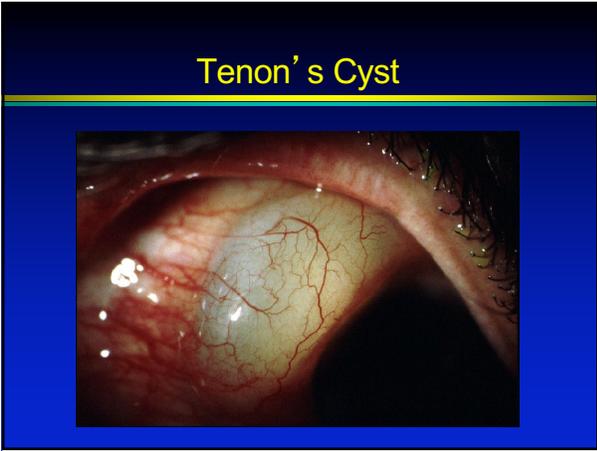
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26



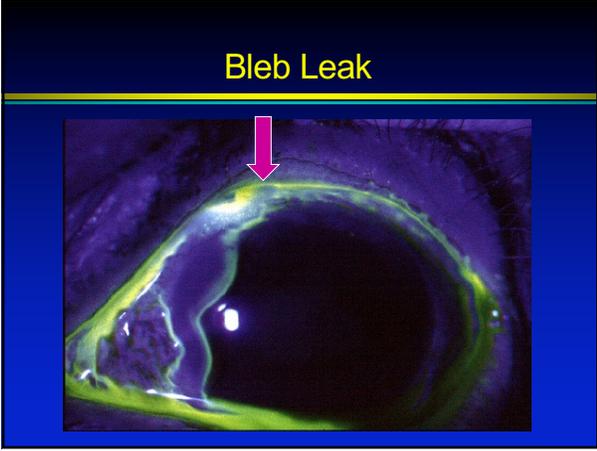
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28

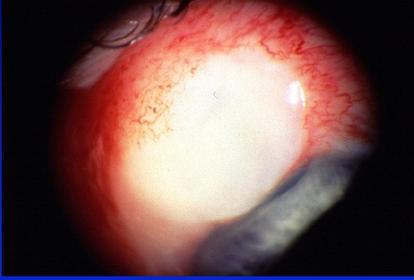


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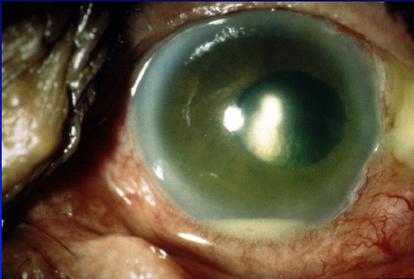
30

Bleb "Abscess"



31

Bleb-related Endophthalmitis

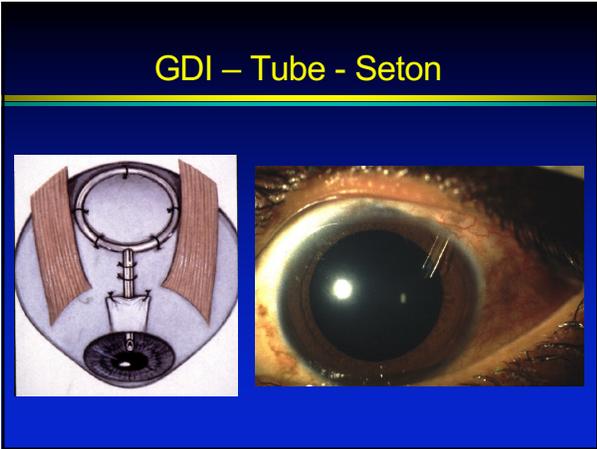


32

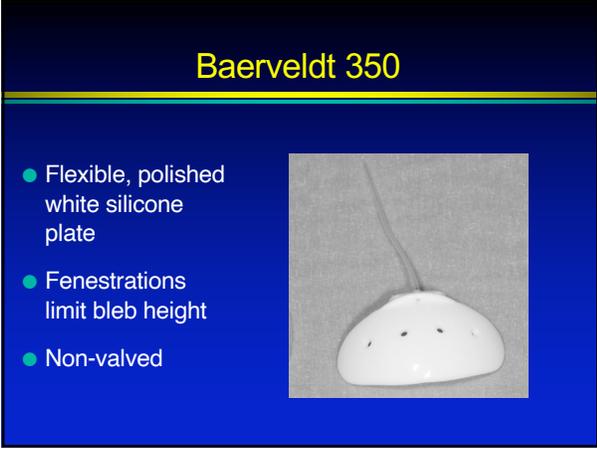
Glaucoma Drainage Implants (GDI)

J. Kevin McKinney, MD, MPH

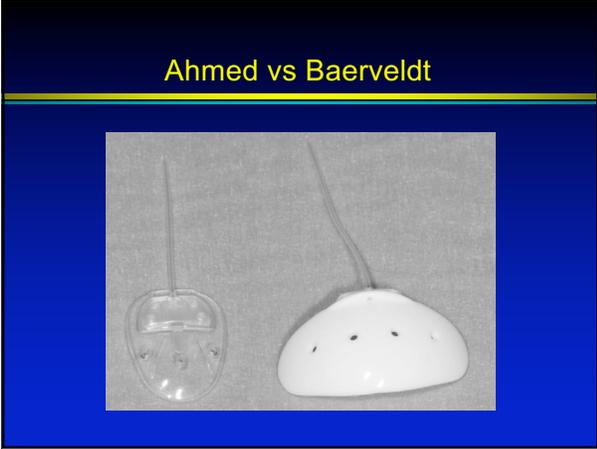
33



34



35



36

Ahmed Valve FP7

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



Tapered Profile for easy insertion
Silicone Plate
Holes
Surface Area: 184.00mm²

37

Ahmed ClearPath

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



Ahmed ClearPath®

38

Patch Graft



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)

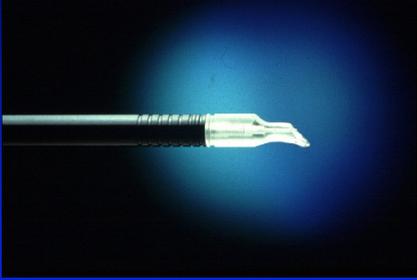
- Solid state laser
 - » durable
 - » low maintenance
- Fits in small suitcase
 - » Portable
- Continuous wave



Infrared Laser

44

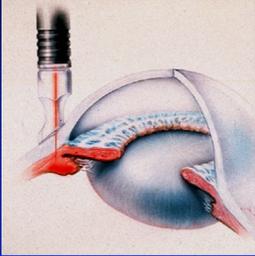
G-Probe



45

G-Probe Position

- Place heel against limbus
- Parallel to visual axis



The diagram shows a cross-section of an eye with a probe inserted into the anterior chamber. The probe's handle is positioned against the limbus, and the probe tip is directed parallel to the 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



The image displays the P3 probe, a purple handheld device with a yellow light at the tip, and its control unit, a small grey box with a digital display and buttons. Two circular diagrams above the probe illustrate the probe's application to the eye's anterior chamber.

48

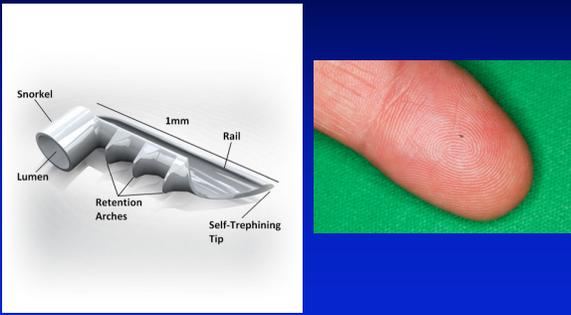
MIGS

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

49

iStent

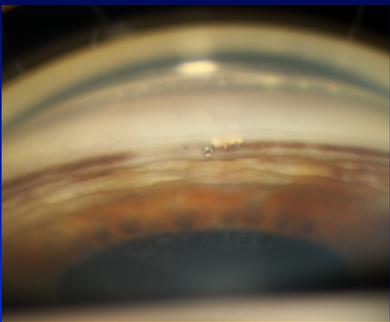
1st generation



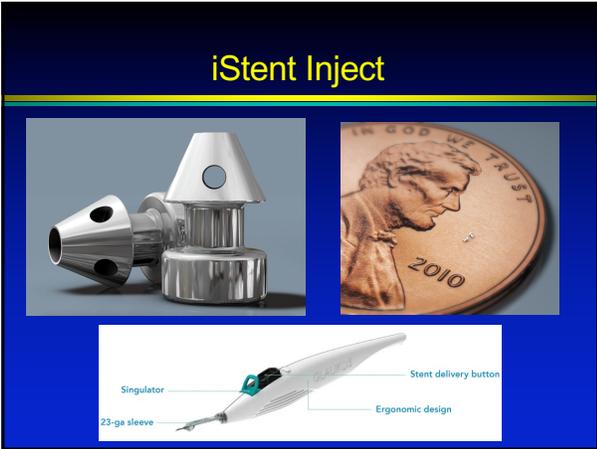
50

iStent

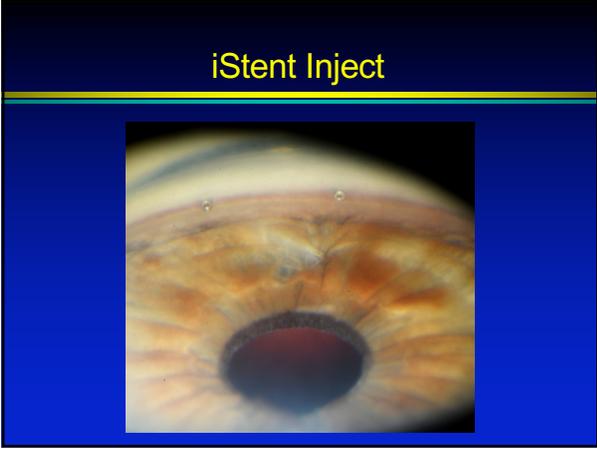
1st generation



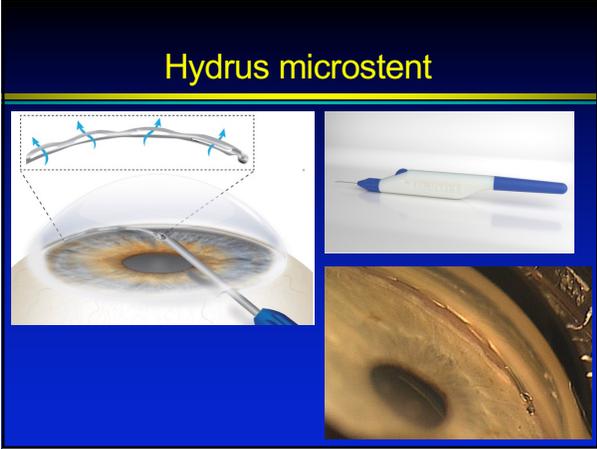
51



52



53



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



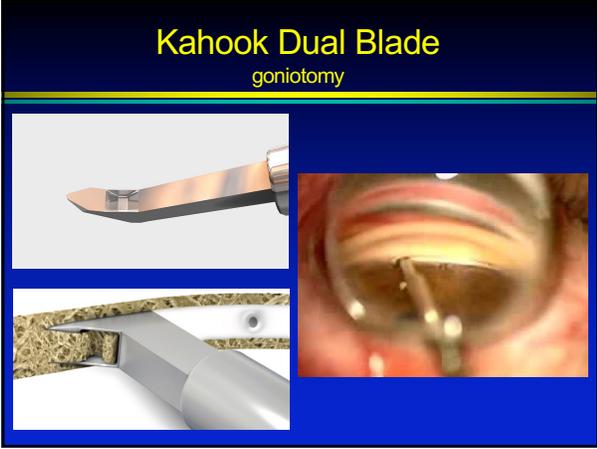
Withdrawn from market due to corneal complications



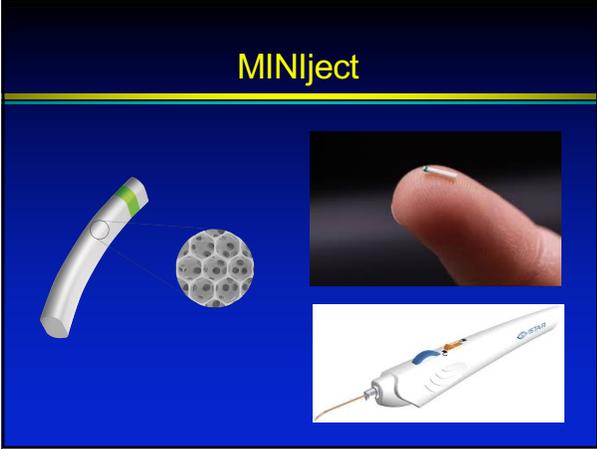
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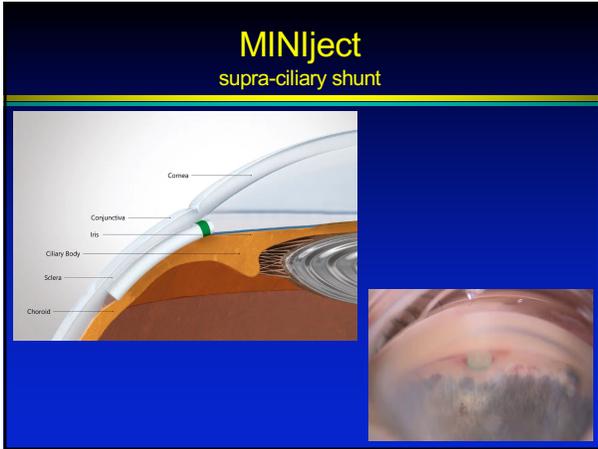
64



65



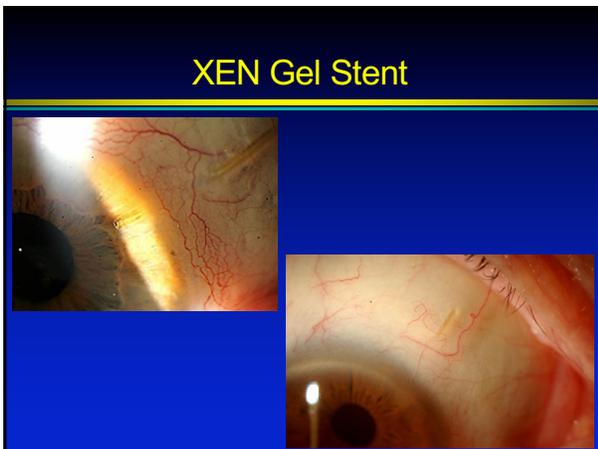
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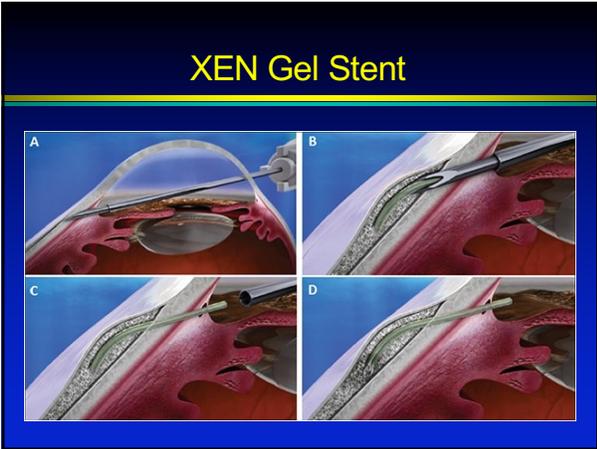
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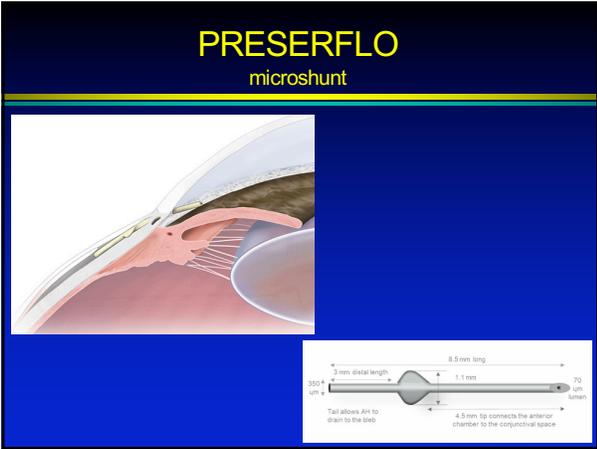
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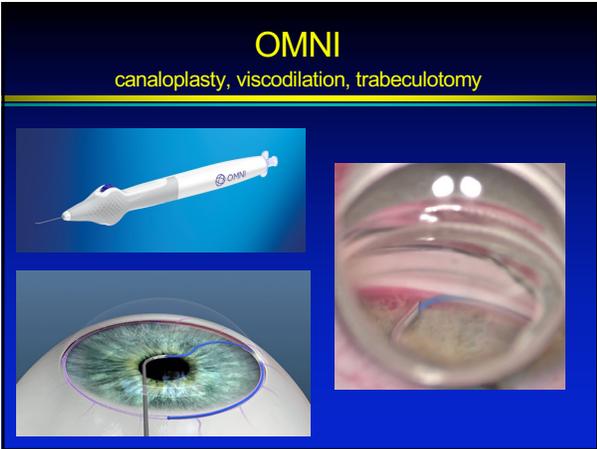
69



70



71



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

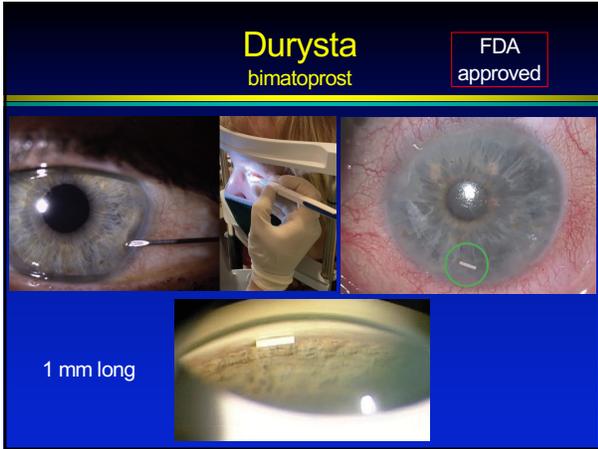
No longer available

OCUSERT NDDS: EXPLODED VIEW OF INTERNAL COMPONENTS

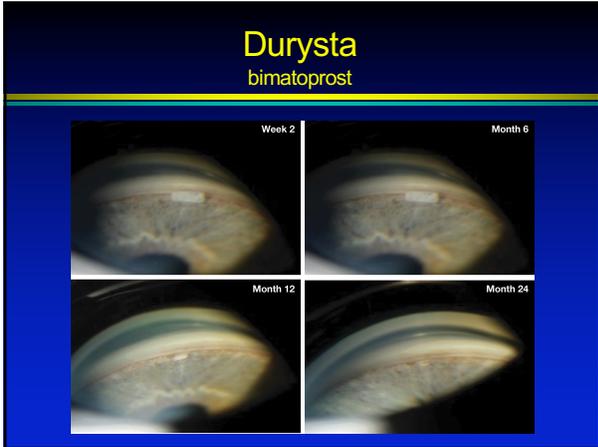
- OUTER RATE-LIMITING MEMBRANE
- DRUG-POLYMER RESERVOIR
- INNER RATE-LIMITING MEMBRANE
- SUSTAINS DRUG RELEASE

1975

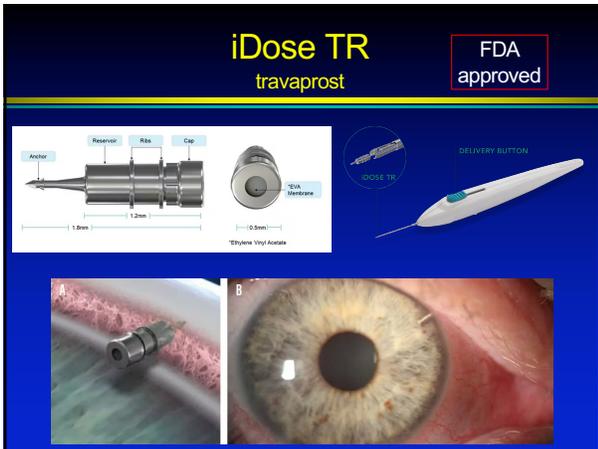
75



76



77



78

Bimatoprost Ring

Cross-sectional thickness
24 to 29 mm diameter
Support Structure
Bimatoprost-Polymer Matrix

79

Other Devices

Other Devices

80

Thank You!

Thank You!

81



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