Lowering the IOP, Laser Edition

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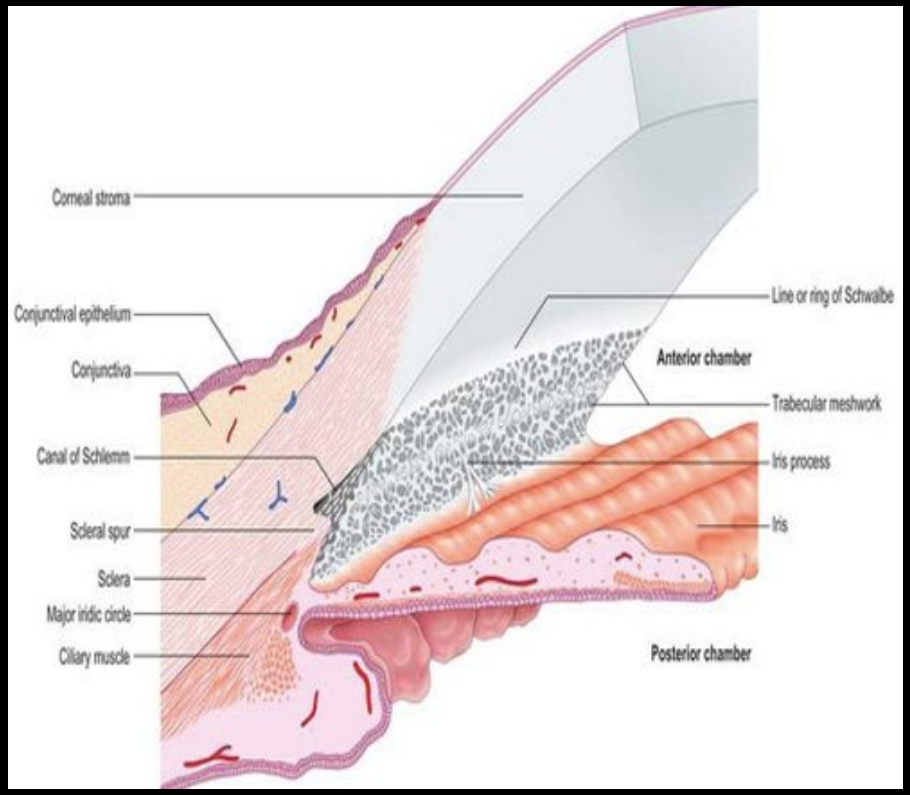
- No Financial Disclosures

Glaucoma Lasers

- Laser peripheral Iridotomy
  - Angle closure glaucoma
  - Prophylactic use in pigmentary dispersion syndrome
- Argon Laser Trabeculoplasty
  - Argon laser heats up trabecular meshwork
  - Not used frequently at this point
    - Secondary to scarring, inflammation, lack of repeatability and safer effective alternatives
- Selective Laser Trabeculoplasty
  - Limited invasiveness, easy procedure to perform, repeatability, low risk of complications and complimentary with other glaucoma treatment
  - *Like any other glaucoma treatment, success isn't guaranteed, and even if successful is not permanent*

Brief Anatomical review



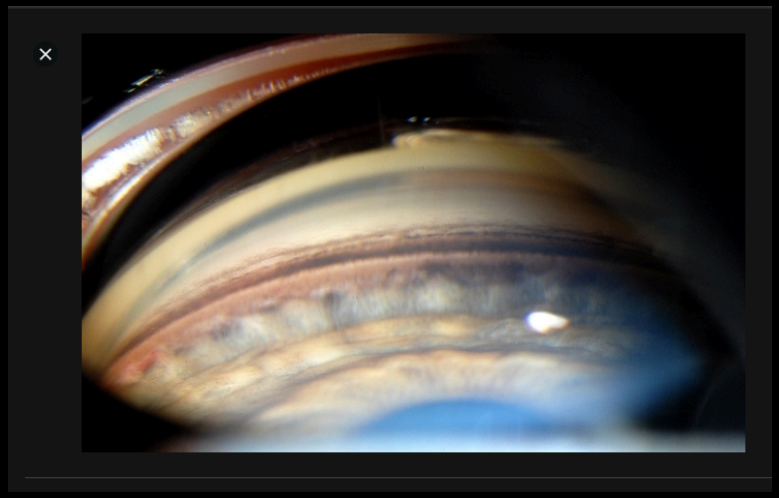
Schwalbe's Line

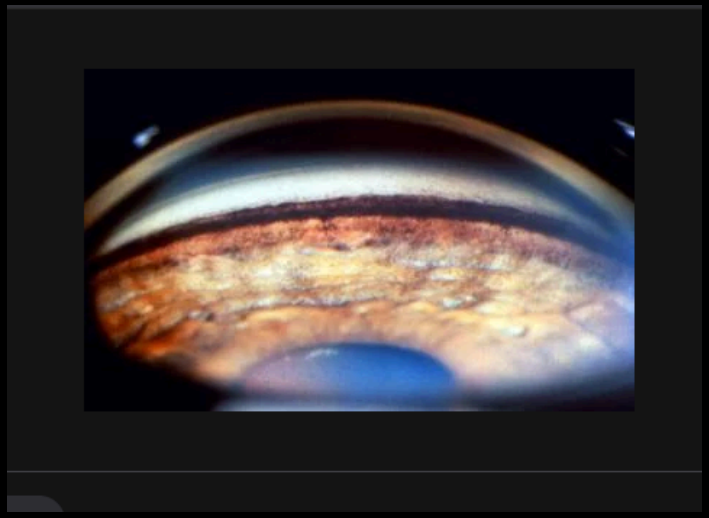
Trabecular Meshwork (Schlemm's Canal)

Scleral Spur

Ciliary

Pigment Grade



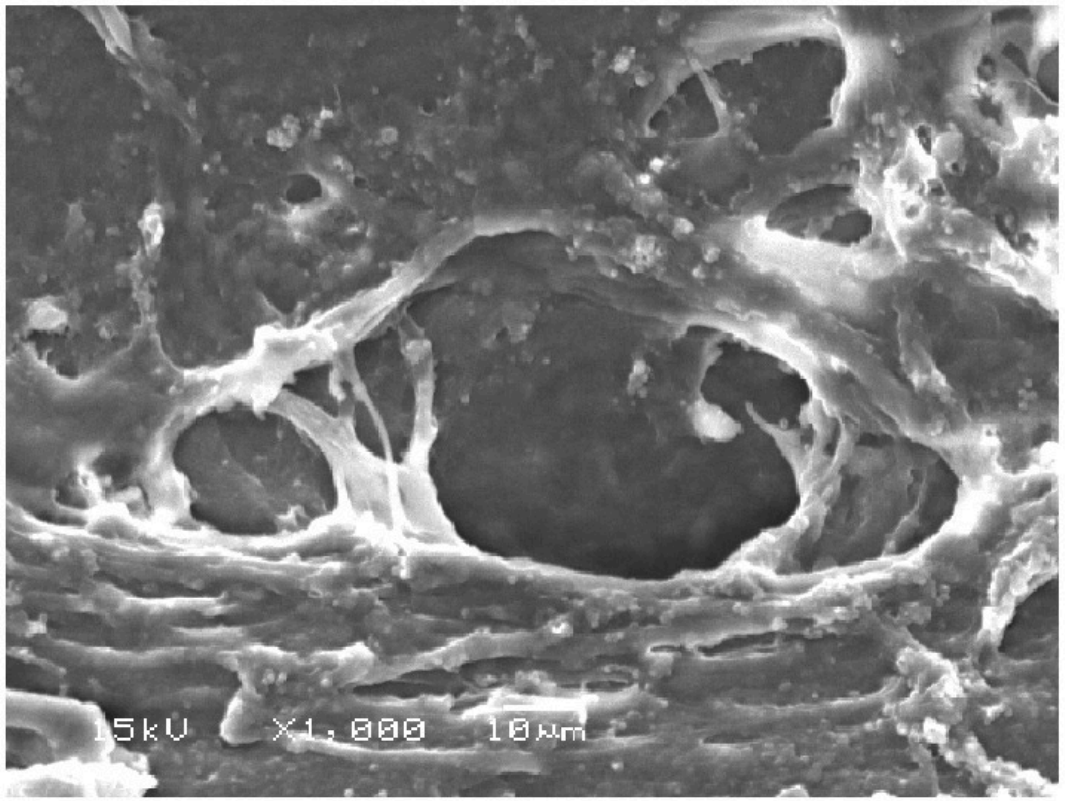


Angles to Avoid

- True pigmentary Glaucoma
- Neovascular Glaucoma
- Angle recession?
- Significant PAS

Trabecular Meshwork Physiology

- Remember the Trabecular Meshwork is pressure dependent
  - As little at 25% of patent functioning TM can maintain a homeostatic eye pressure
- What is happening to the TM during an SLT? How does this compare to an ALT laser
  - ALT laser creates a thermal burn and surrounding contraction


15kV X1,000 10μm

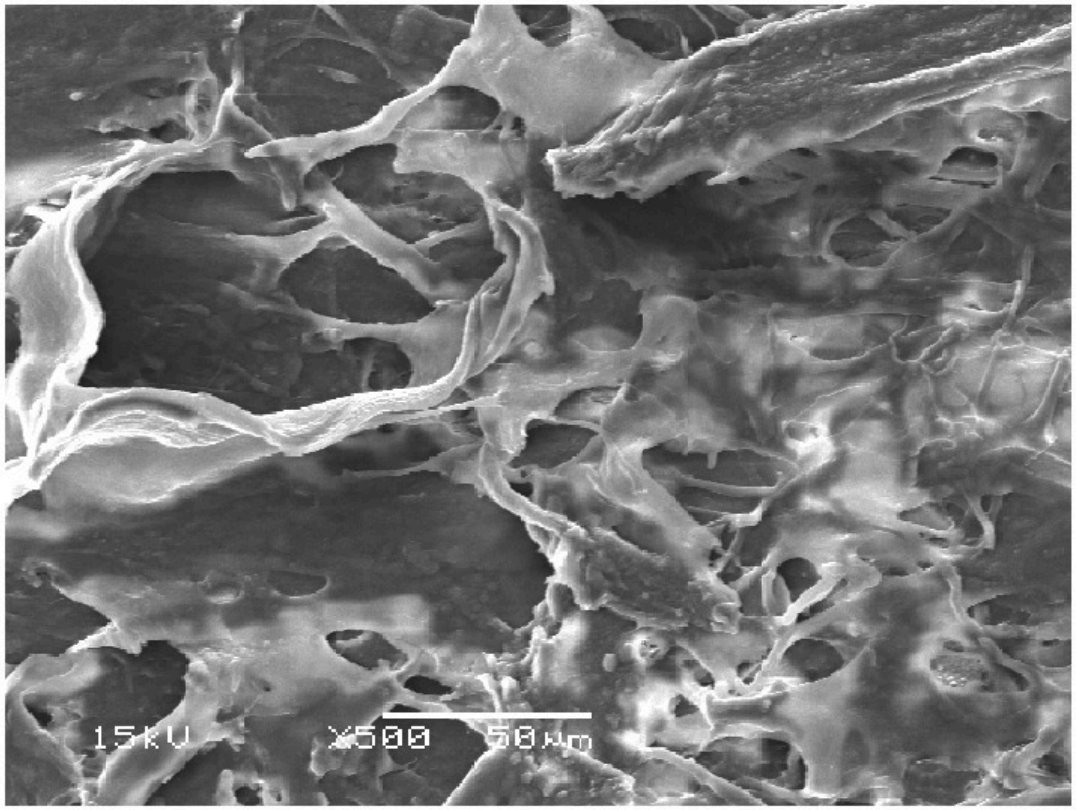
Trabecular Meshwork Physiology

- Remember the Trabecular Meshwork is pressure dependent
  - As little at 25% of patent functioning TM can maintain a homeostatic eye pressure
- What is happening to the TM during an SLT? How does this compare to an ALT laser
  - SLT's wavelength is specifically chosen to be absorbed only by the melanin. The duration of the burst is so short a thermal reaction is unlikely, the proposed mechanism is a stimulation of cytokines

Trabecular Meshwork Physiology

- Remember the Trabecular Meshwork is pressure dependent
  - As little at 25% of patent functioning TM can maintain a homeostatic eye pressure

- What is happening to the TM during an SLT? How does this compare to an ALT laser
  - These cytokines lead to migration of macrophages to phagocytize pigment within the meshwork thus increasing its permeability


15kV
×500
50μm

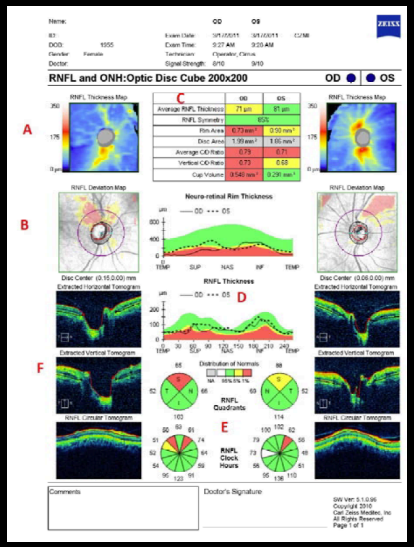
SLT Efficacy

- IOP lowering capabilities anywhere from 18 to 40%
  - Will slowly wear off
  - Similar to other treatment, the lower the starting IOP the harder it is to lower further
- IOP effect lasts anywhere from 12 month to 4 years

- Do prostaglandins effect the lowering capabilities?
  - Verdict is still out; the argument is that the prostaglandin rearranges the TM

Who is an SLT Candidate?

- COAG
- OHTN
- NTG (think more diurnal IOP fluctuations)
- What about Previous glaucoma surgery?
  - ALT
  - SLT
  - Filtering Devices



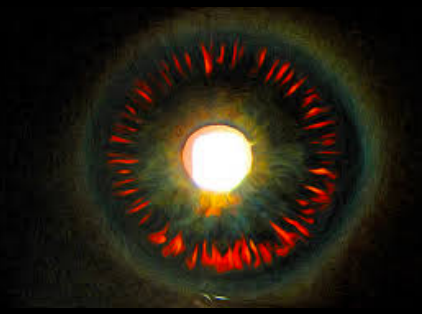
Who is an SLT Candidate?

- NAG with elevated IOP following successful LPI
- Anti-VegF induced glaucoma?
- Pseudoexfoliative Glaucoma
- Pigmentary Glaucoma?
- Uveitis related glaucoma

Who is an SLT Candidate?

- NAG with elevated IOP following successful LPI
- Anti-VegF induced glaucoma?
  - Inconclusive (personal experience)
  - maybe 25% success rate
- Pseudoexfoliative glaucoma
- Pigmentary Glaucoma?
- Uveitis related glaucoma

Who is an SLT Candidate?



- NAG with elevated IOP following successful LPI
- Anti-VegF induced glaucoma?
- Pseudoexfoliative glaucoma
- Pigmentary Glaucoma?
  - Generally not a good idea, significant concern over IOP spike following laser and when it goes bad, it goes bad quickly
  - Maybe 180^{o} or even less on initial treatment
- Uveitis related glaucoma

Who is an SLT Candidate?

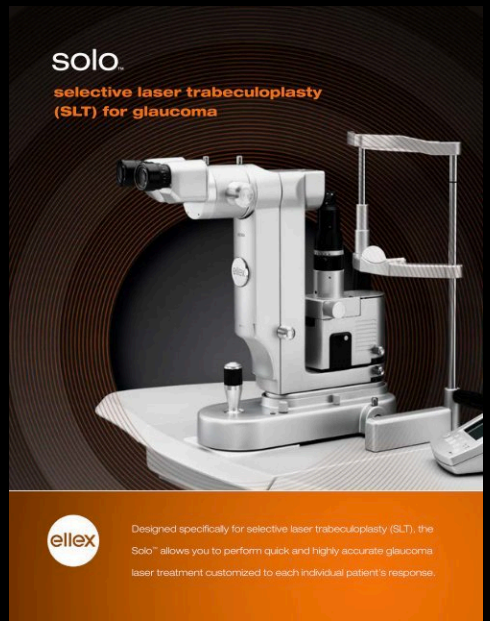
- NAG with elevated IOP following successful LPI
- Anti-VegF induced glaucoma?
- Pseudoexfoliative glaucoma
- Pigmentary Glaucoma?
- Uveitis related glaucoma
  - Typically contraindicated
  - Remember we are stimulating a small inflammatory response

When is a good time to Recommend an SLT?

- First line vs Second line in lowering IOP
- Repeat treatment?
- Young patients or patients intolerant to drops
- Ocular surface disease
- Unilateral disease
- Mission trips
  - Access to medications?

Equipment

- Stand-alone unit
  - 532 nm frequency doubled, Q –switched ND: Yag Laser with 3ns pulse duration and 400 nm spot size
- Combo Unit (typically 1064 nm and 532 nm)
  - Capable of Capsulotomies, Iridotomies, and SLT's
- Micropulse with Iridex laser
- Cost?



Equipment/Procedure

- Preoperative
  - Pilocarpine?
  - IOP lowering medicine?
  - Anesthetic
  - Latina Lens

Equipment/Procedure

- Intraoperative
  - Initial power of the lens generally starts at 0.8mJ
    - The power should then be titrated based on the visible response of the trabecular meshwork (Champagne bubble)
    - The more pigment, the less energy you will need and vice versa
    - When no bubbles are visible, slowly increase the power in 0.2mJ increments until the desired response is visible
  - 180^{o} vs 360^{o} treatment?
    - Clinical judgment
    - Generally 100 total spots for 360^{o} of treatment

Equipment/Procedure

- Post operative
  - Document energy per shot, total energy, and number of spots
  - IOP lowering medicine?
  - 30 minutes to 1 hour IOP check before discharging?
  - Post operative inflammatory medicine
    - Recent study indicated an NSAID (ketorolac) at QID for 4 days provided the lowest IOP reduction
  - Typical follow up appt 4-6 weeks
    - Obviously varies based on clinical judgement but remember the global period is 10 days

Equipment/Procedure

- Micropulse technology with Iridex laser
  - “Micropulse” refers to many short pulses of laser energy instead of prolonged build up of laser energy which can lead to increased thermal energy
  - MLT or Micropulse Laser Trabeculoplasty utilizes similar wavelength as SLT (532nm), with similar pathophysiology via increased cytokine activity and macrophage migration specifically targeting pigmented cells within the TM
  - Literature suggests IOP reduction of 20-30%
  - MLT vs SLT
    - Beam size is smaller, easier for narrow eyes?
    - Power is fixed at 1000mW with 300ms duration and 15% duty cycle
    - Number of recommended spots is 180-200
    - No visible tissue response within the eye

SLT complications

- Overall high safety profile
- Iritis
- IOP spike
- Hyphema
- CME
- Foveal Burn?

SLT complications

- Overall high safety profile
- Iritis
  - Uveitic glaucoma patients
  - History of iritis
  - Heavily pigmented TM
  - Less likely with NSAID treatment
- IOP spike
- Hyphema
- CME
- Foveal Burn?

SLT complications

- Overall high safety profile
- Iritis
- IOP spike
  - Increase in IOP between 5-10 was seen after 1 hour and generally responded to topical agent
  - Pigmentary glaucoma
  - Previous treatments
- Hyphema
- CME
- Foveal Burn?

SLT complications

- Overall high safety profile
- Iritis
- IOP spike
- Hyphema
  - Review which angles to avoid
  - Don’t aim at blood vessels….
- CME
- Foveal Burn?

SLT complications

- Overall high safety profile
- Iritis
- IOP spike
- Hyphema
- CME
  - Likely pre-existing macular disease (DME, RVO, Irving Gas, etc)
  - Extremely low concern in eyes without previous history of CME
- Foveal Burn?

SLT complications

- Overall high safety profile
- Iritis
- IOP spike
- Hyphema
- CME
- Foveal Burn?
  - User negligence
  - REVIEW THE SETTINGS ON THE LASER PRIOR TO EVERY SINGLE PROCEDURE

Billing and Coding

- CMS reimburses “trabeculoplasty by laser surgery” (CPT code 65855) without consideration of disease severity or number of medications but instead to other common indications
  - Adjunct therapy, intolerant to medicine, compliance, etc
  - Must document why
- Repeat treatment is well accepted and reimbursed well, however a poorly structured study from Oklahoma suggested optometrists repeat laser more than their ophthalmology counterparts

JAMA Ophthalmol. 2016 Oct 1;134(10):1095-1101. doi: 10.1001/jamaophthalmol.2016.2495.

Comparison of Outcomes of Laser Trabeculoplasty Performed by Optometrists vs Ophthalmologists in Oklahoma.

Stein JD[1], Zhao PY[2], Andrews C[3], Skuta GL[4].

Billing and Coding

- “The 2017 Medicare Physician Fee Schedule allowable for SLT performed in the surgeon’s office is $248. If SLT is performed in an ASC or HOPD, the surgeon’s reimbursement changes the Medicare allowable and is reduced to $212. These amounts are adjusted by local wage indices”.
- “If the procedure is performed in an ASC, the 2017 facility fee is $133. Remember that all procedures performed in an ASC are subject to Medicare’s Conditions for Coverage rules, which include a comprehensive H&P prior to surgery.”

Billing and Coding

- Same day procedure?
  - 25 modifier but be careful
  - Bilateral vs unilateral (50% less on second eye)
    - 50 modifier
  - Global period of 10 days

Thank You

- Questions?