



# **PLACE OF SLT IN THE MANAGEMENT OF GLAUCOMA**

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# LASERS IN GLAUCOMA

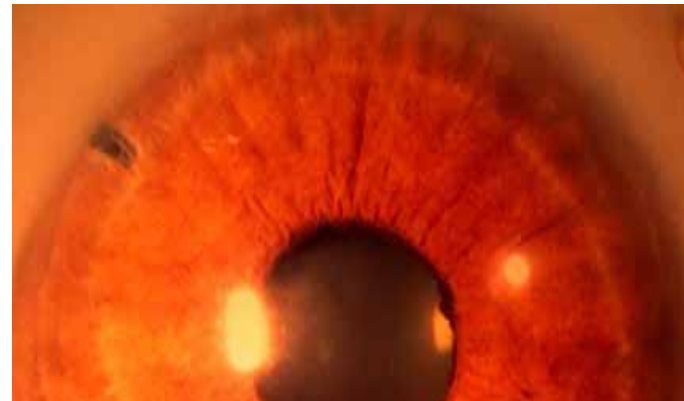
- LASER: The magic word for the patients:
  - For the REFRACTIVE SURGEON
  - For the CATARACT SURGEON
  - For the PLASTIC SURGEON
  - For the RETINA SURGEON
  - For the GLAUCOMA SURGEON:  
???

# LASERS IN GLAUCOMA

- POAG, OH, PG, XFG
  - **Argon or Selective laser trabeculoplasty**
- PACG, PACS, Acute PACG
  - **PI, Laser iridoplasty**
- 2ry pupillary block NVG, Uveitic
  - **Multiple laser iridotomies**
- Refractory glaucomas
  - **Trans-scleral CPC, Endoscopic CPC**
- Malignant glaucoma
  - **YAG capsulotomy-hyaloidotomy**
- Postop. pressure spikes
  - **Laser suture lysis, Goniopuncture, blocked sclerostomy, blocked tubes**

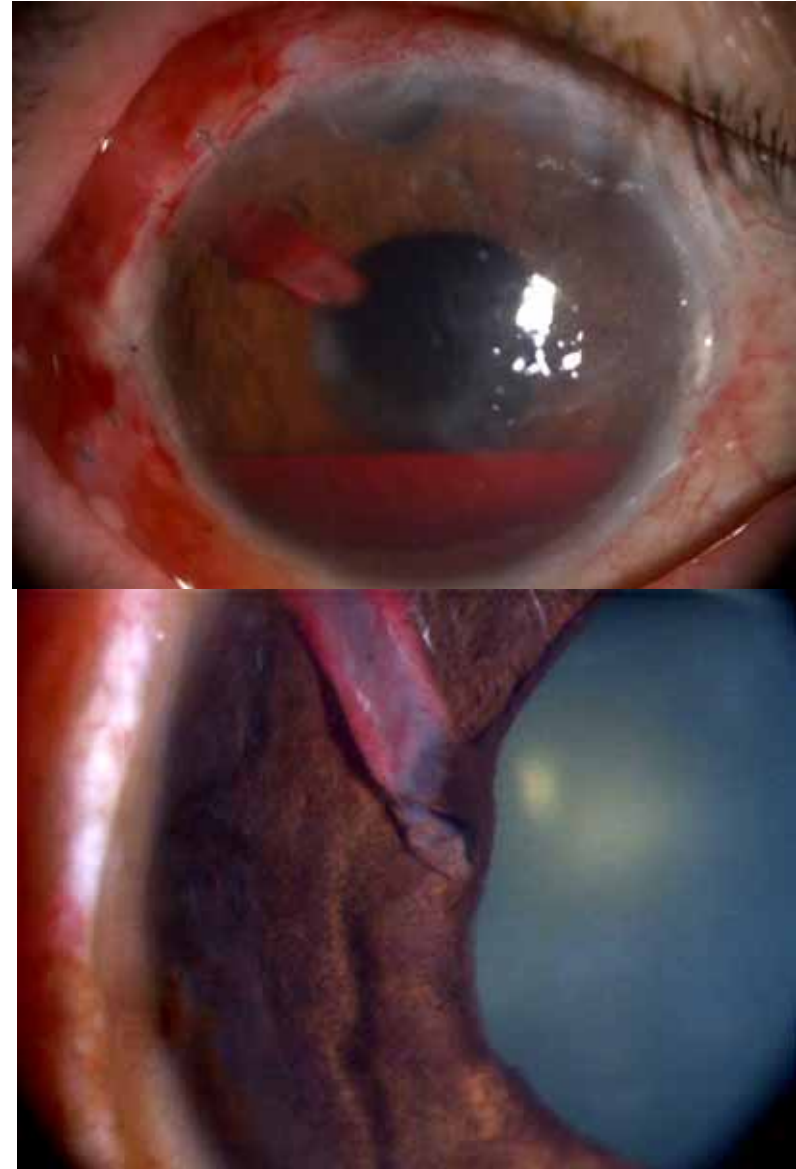
# PHYSICIANS & PATIENTS' ACCEPTANCE OF LASER TREATMENT

- Except for ALT & SLT, all other lasers are substitutes for other surgical interventions
- Preferred to surgery with regard to safety, efficacy, cost, and patient's acceptance of an office procedure



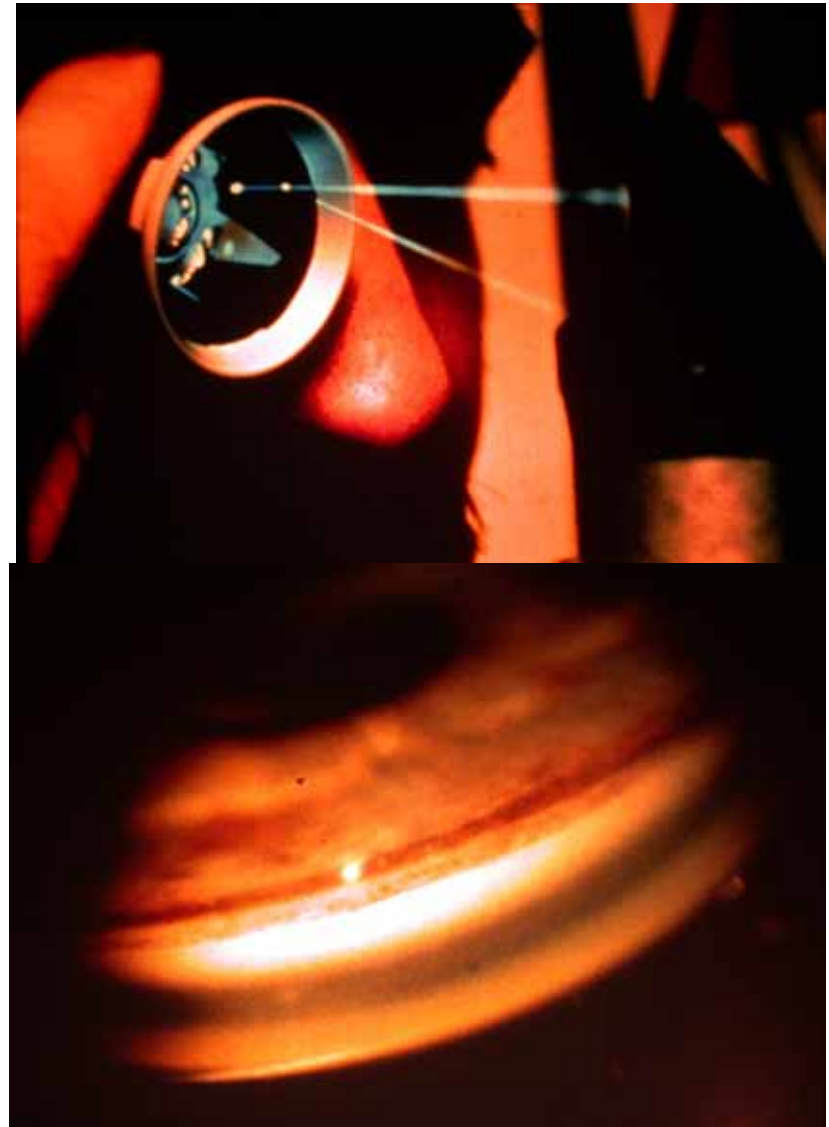
# PHYSICIANS & PATIENTS' ACCEPTANCE OF LASER TREATMENT

- Evaluation of Nd: YAG laser membranectomy in blocked tubes after glaucoma tube-shunt surgery. Kirti Singh, Tarek M. Eid, L. Jay Katz, George L. Spaeth, James J. Augsburger. *American Journal of Ophthalmology*, 1997;124:781-786
  - *Nd:YAG laser membranectomy is effective in reopening blocked glaucoma tube shunts but is associated with a relatively high rate of subsequent reblockage in the initially successful cases. four tubes (30.8%) remained patent through follow-up periods*



# LASERS IN GLAUCOMA

- ALT & SLT are indicated as a primary or adjunctive therapy for pressure control in early to moderate open-angle glaucoma
- What makes them better &
- What makes them worse



# LASER TRABECULOPLASTY

- Availability
- Simplicity of the technique
- Safety & tolerability
- Efficacy: short-term & long-term
- Repeatability
- Cost savings

# LASER TRABECULOPLASTY

## Availability

**ARGON LASER  
TRABECULOPLASTY**  
Use blue-green argon laser

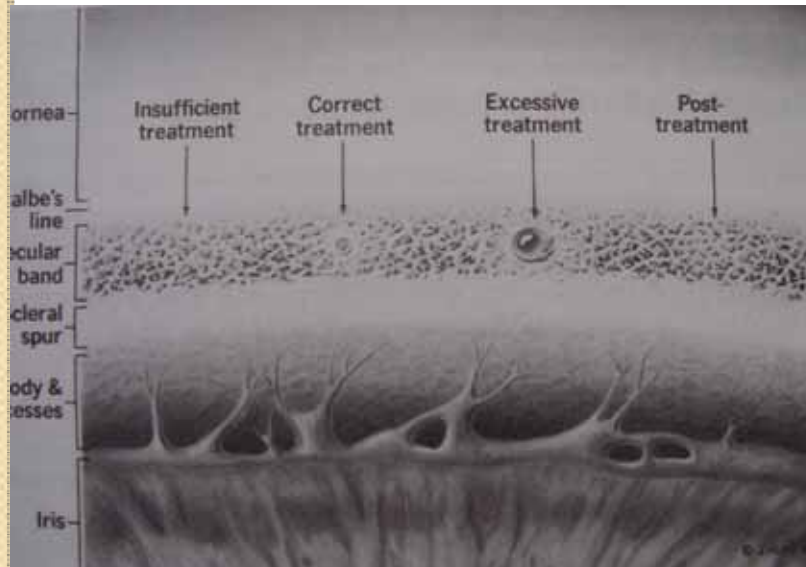
**SELECTIVE LASER  
TRABECULOPLASTY**

Use Q-switched, frequency-doubled  
Nd:YAG laser



# LASER TRABECULOPLASTY

- **Simplicity of the technique**
- Large spot size of SLT ►► no need to locate a particular zone in TM
- Pigment level is not critical for SLT
- End point is more obvious with ALT



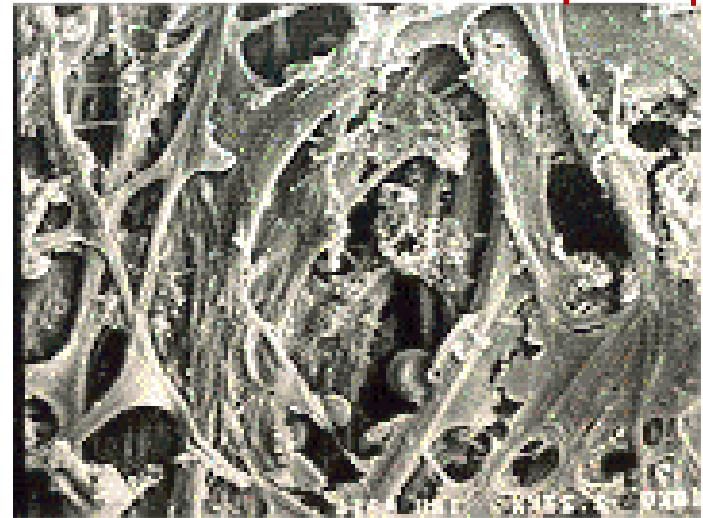
# LASER TRABECULOPLASTY

- **Safety:**
- SLT: safe, noninvasive, non thermal
- Targets melanin cells in TM without visible damage to adjacent tissue
- Produces intracellular microdisruption by ultrashort laser pulses (3 nanosec) without dissemination of created heat to surroundings

Human TM – ALT, 50 $\mu$ m spot



Human TM – SLT, 400 $\mu$ m spot



# LASER TRABECULOPLASTY

- **TOLERABILITY**

- Both SLT & ALT are tolerated by the patient with minimal or no pain during the procedure
- Postop. pain, anterior chamber reaction, and energy produced during treatment are much less with SLT than ALT
  - *Martiniez et al. SLT vs ALT, hypotensive efficacy, anterior chamber reaction and postoperative pain. EYE 2004;18:498*

# LASER TRABECULOPLASTY

- **EFFICACY**

- Both SLT & ALT produce equivalent reduction of IOP after their first treatment
  - *Juzych et al. Comparison of long-term outcomes of selective laser trabeculoplasty versus argon laser trabeculoplasty in open-angle glaucoma. Ophthalmology 2004;111:1853*
- SLT reduces IOP equivalent to prostaglandin monotherapy
  - *McIlraith et al. Selective laser trabeculoplasty as initial and adjunctive treatment for open-angle glaucoma. J Glaucoma 2006;15:124*

# LASER TRABECULOPLASTY

- **EFFICACY of SLT**

- **More effective**

- In eyes receiving 360 than 180 degrees treatment
- In eyes with high baseline IOP
- In eyes not receiving previous glaucoma medications

- *Katz et al. SLT/Meds Multicenter Study. AAO 2006*
- *Eid et al. SLT effect on nonmedically treated vs medically treated eyes. ESCRS 2007, Stockholm*

- **Similar efficacy in both phakic and pseudophakic eyes**

- *Werner, Smith, Doyle. SLT in phakic & pseudophakic eyes. Ophthalmic Surg Lasers Imaging 2007;38:182*

# LASER TRABECULOPLASTY

- **EFFICACY**

- **Long-term Success of SLT**

- After 6 months            69% - 92%
- After 1 year                52% - 98%
- After 2 years               58% - 88%
- After 3 years               52% - 76%

- *Gracner et al. Long-term follow-up of SLT in primary open-angle glaucoma. KLIN Monatsbl Augenheilkd 2006;223:743*
- *Juzych et al. Comparison of long-term outcomes of selective laser trabeculoplasty versus argon laser trabeculoplasty in open-angle glaucoma. Ophthalmology 2004;111:1853*

# LASER TRABECULOPLASTY

## REPEATABILITY

- Repeat ALT after 360-treatment is not preferred
  - Less efficacy
  - Postop intractable pressure rise
  - Increased risk of scarring & loss of outflow
- SLT can be repeated on previously treated areas of TM (no thermal damage of treated areas)
- Repeat SLT as effective as initial SLT
  - *Nagar M. SLT-effect of enhancement and repeatability. AAO 2006*
- SLT is effective after 360 degrees treatment with ALT
  - *Birt. SLT retreatment after prior ALT: 1-year results. Can J Ophthalmol 2007;42:715*

# LASER TRABECULOPLASTY

## COST SAVINGS

Cumulative 6-year cost difference per patient of SLT vs mono-, bi-, tri-drug therapy (Canadian \$)

SLT repeated 2 yrs vs	2 years	4 years	6 years
Mono-drug	68	137	206
Bi-drug	556	1112	1668
Tri-drug	997	1995	2992

*Lee, Hutnik. Projected cost comparison of SLT vs glaucoma medication in the Ontario Health Insurance Plan. Can J Ophthalmol 2006;41:449*

## COST SAVINGS

- SLT as primary therapy offers a modest potential cost savings over medicinal therapy in the management of OAG – However:
- SLT efficacy is equivalent to monotherapy & not bi-, or tri-drug therapy
- Economics should not drive the treatment paradigm, but it certainly needs to be considered

# SLT overcomes many of the adverse effects of medicinal therapy

- Local & systemic side effects to the drops & preservatives
- Continuous use of drops affects quality of life and psychological competence of the patients
- Most glaucoma medications are not targeting the tissue of concern (TM)
- Chronic therapy can compromise or interfere with the success of future glaucoma surgery
- Non availability or difficulty to access the medicine in patients in remote areas
- Cost of treatment to the patient & community over the long term

# Compliance and rule of laser treatment

- Nearly 45% of patients using electronic monitoring device who were taking one medication and knew they were being monitored and were provided free medication used their drops less than 75% of the time
  - Okeke et al. Adherence with topical glaucoma medication monitored electronically. The Travavatan Dosing Aide Study. Ophthalmology 2009;116:191-196
- Noncompliance is likely to have an important role in the progression to blindness from glaucoma. In this context, laser trabeculoplasty is an attractive option for initial treatment of open-angle glaucoma as compliant is not relevant.
  - EGS Terminology & Guidelines for Glaucoma. 3<sup>rd</sup> edition, 2008: 144

# SELECTIVE LASER TRABECULOPLASTY

## shortcomings

- Only glaucoma patients with open angles
- Effect not long lasting with degrading success over time
- Lower efficacy in patients on maximal treatment or on prostaglandins
- Conflicting reports on efficacy in pigmented angles (pigmentary & pseudoexfoliative glaucoma)
- Temporary paradoxical pressure rise after SLT in heavily pigmented eyes
- Treatment cost for non insured patients may not be accepted for asymptomatic disease in its early stages

# SELECTIVE LASER TRABECULOPLASTY

- Unrealistic expectations from SLT

## MDFD Comments

This lady visited ophthalmology clinic from in patient complaining of severe headache, lac, photophobia and nausea with history of left keratoplasty done at KKESH in Riyadh since 2 weeks and old glaucoma operation.

Examination reveals: V/A H.m. no P.L

Anterior Segment examination: Right opaque C graft  
Left keratoplasty with opaque graft  
Ciliary injection with watering  
Stoney hard tension digitally

Posterior Segment Exam : Not seen due to opaque corneas  
Diagnosis : Right ab glaucoma with opaque graft  
Left acute attack of glaucoma on top of chronic simple glaucoma  
with left keratoplasty and opaque graft.

This patient advised for Laser trabeculoplasty. Referred to Ophthalmology Consultation 2nd opinion at Al Maghrabi Hospital, Madhina Al Munavara. Please provide us plan of management of further action.

**Referred From:** Erfan & Saeedi **Specialty:** General Practice

**Referred to Case No.:** 2365551 **Type:** Outpatient **Validity:** 2 Month(s) **No. of Visits:** 00000001

# SELECTIVE LASER TRABECULOPLASTY

## • SLT as a primary treatment for newly diagnosed POAG

- SLT/MED Multicenter study (AAO 2006)
- As effective as medicinal treatment
- Both treatment modalities reached target IOP in most of the patients
- Provide the patient with some few years without glaucoma medications

# SELECTIVE LASER TRABECULOPLASTY

- **SLT as an adjunctive therapy for mild to moderate POAG**
  - An alternative to adding extra drops
  - As adjunctive to current medications to reach target pressure
  - To replace one drop discontinued because of adverse effects
  - As an adjunctive to patients not controlled on maximum therapy before shift to surgery

# ***ALWAYS REMEMBER TO SAVE THE FLOWER***



**TRAB F-16**



**SLT LASER  
GUN**



**B-Blocker  
Spray**

