

Selective Laser Trabeculoplasty

**“An Evolutionary Advancement
in Glaucoma Therapy”**



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NO FINANCIAL INTERESTS

Historical Background

- SLT was first introduced by Dr Mark Latina and Carl Park in 1995.
- Multi-centre trials were started in USA in 1997.
- Now being practised in various countries namely USA, Canada, UK, Germany , Italy, France, Scandenavia, Netherlands, South Korea, Israel etc

Selective Laser Trabeculoplasty

- Selectively targets pigmented cells with minimal damage to neighboring tissue
- Non thermal
- Almost side effect free

Principles of SLT

Mechanisms are still not fully understood

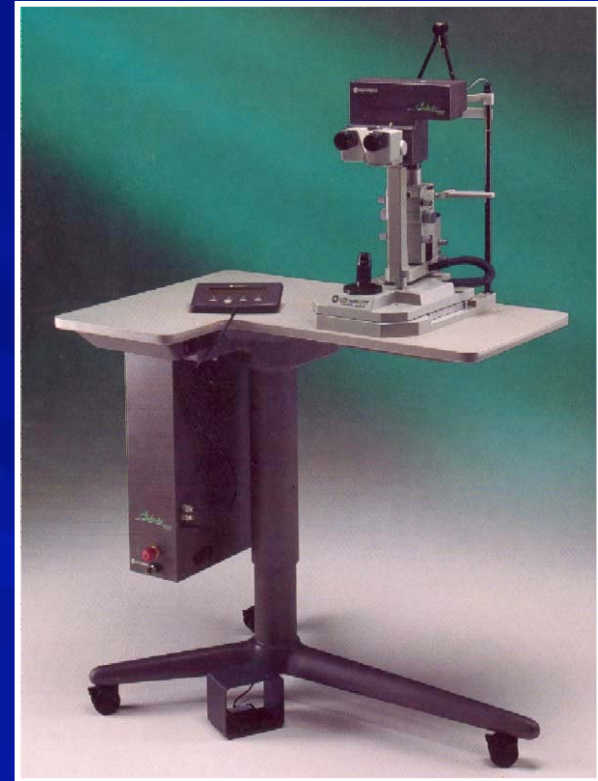
- Cell stimulation by bio-photoactivation triggers cytokine response and interleukins released
- Cytokines recruit macrophages
- Macrophages help clear cellular debris
- Interleukins act as growth factor for TM cells leads to trabecular cell hyperplasia

Biological Response to SLT

- Biological response improves outflow facility
- Fluid is allowed to flow freely through the TM

Equipment

- *Q-switched*
- *Frequency doubled Nd:YAG : 532nm*



Selecta 7000

Patient Selection

- Open Angle Glaucoma (POAG, OHT, Pigmentary Glaucoma, Pseudo-exfoliative glaucoma)
- Poorly compliant to medical therapy
- Intolerant or unresponsive to medical therapy
- Failed ALT (either 180° or 360°)

Clinical Protocol

- Method of Laser Placement

- Previous standard: 180° treatment
- 360° now being performed for increased response
 - **Watch-outs:** Pigmentary, PXF glaucoma
- Pigment may influence energy setting
 - More pigment = less energy needed
- Energy settings:
 - Desirable to see intermittent cavitation bubbles
 - Start with 0.8mJ, adjust to see bubbles every few pulses

Operative Technique

- *Local anaesthetic drops used.*
- *Patient positioned comfortably on the slit lamp.*
- *Goniolens, Goldmann lens or Latina lens placed on the eyeball.*
- *Laser delivered.*

Operative Technique

- Aiming beam seen over TM
- Rotate lens to cover TM
- 400 μ spot size
- Approximately 50 spots for 180° and 100 for 360° Rx



Overview of Clinical Studies

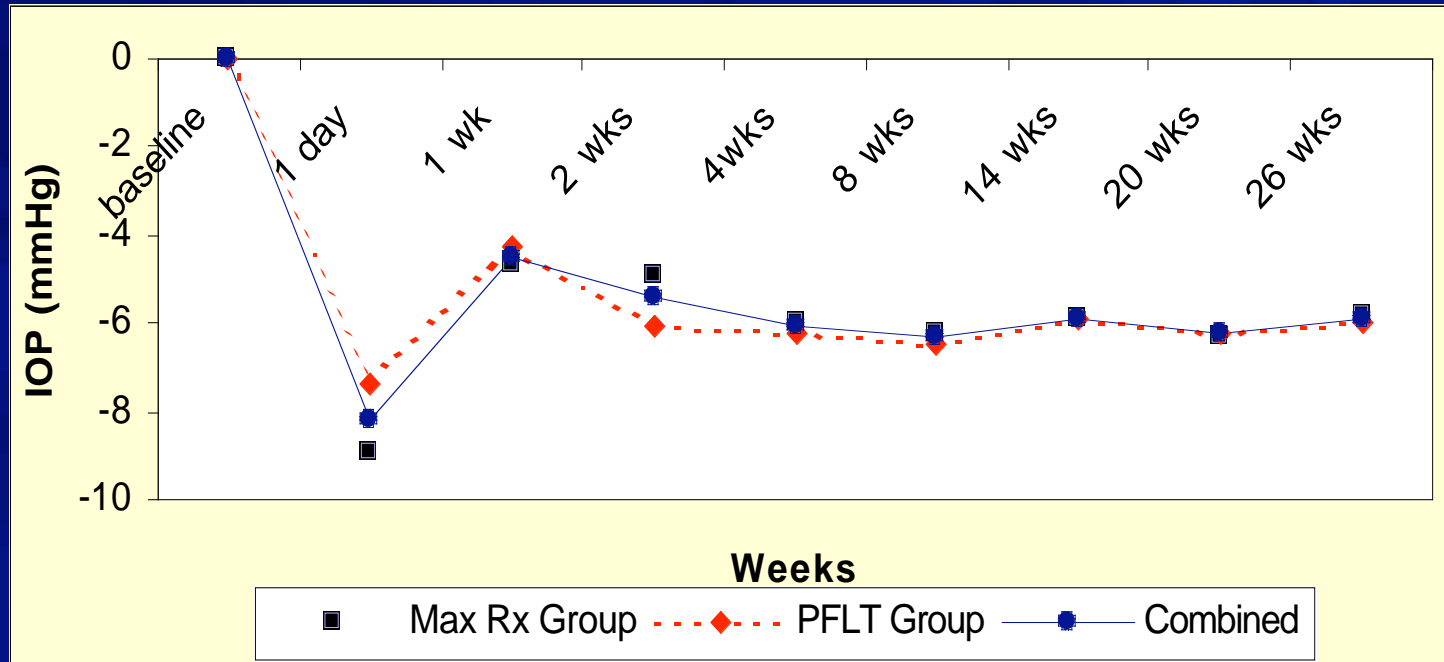
Initial Studies

- Initial studies focused on SLT as adjunctive therapy to medical treatment
 - Failed Maximum Tolerated Medical Therapy (MTMT)
 - Failed ALT
- Additional/Contemporary studies investigate the intervention point of SLT in glaucoma management
 - Primary therapy
 - Monotherapy
 - Replacement therapy

Clinical Studies

- US Clinical – Initial Study
- United Kingdom –
 - Prospective non-randomized case series.
 - RCT 90°, 180°, 360° & Xalatan
- Canadian – RCT SLT Vs ALT
- Norwegian -
- Israeli -
- New US Study – RCT SLT/Meds

Selective Laser Trabeculoplasty U.S. Clinical Trial Results



SLT-Treated Eyes Mean IOP Reductions at 26 weeks Responders (> 3mmHg IOP reduction) - 71/101 patients

Latina MA, Sibayan SA, Shin DH, et al. Q-switched 532 nm Nd: YAG laser trabeculoplasty (Selective laser trabeculoplasty). *Ophthalmology*. 1998; 105:2028-2088.

SLT: Conclusions

- **A safe and effective treatment to lower IOP in patients with open angle glaucoma**
- **IOP reduction has been maintained for up to 26 weeks in this U.S. clinical trial**
- **IOP reduction without coagulation damage**

Latina MA, Sibayan SA, Shin DH, et al. Q-switched 532 nm Nd: YAG laser trabeculoplasty (Selective laser trabeculoplasty). *Ophthalmology*. 1998; 105:2028-2088.

U.K Studies

STUDY 1

Prospective non-randomized case series.
(180° Rx to Inferior TM)

- Group 1 – SLT as an adjunctive or Replacement therapy (Uncontrolled POAG & OHT)
- Group 2 – SLT as Primary Rx (POAG & OHT)

U.K Studies

STUDY 2

Randomized Control Trial

- Group 1 – 90° SLT Rx
- Group 2 – 180° SLT Rx
- Group 3 – 360° SLT Rx
- Group 4 – Medical Rx Latanoprost drops

Prospective non-randomized case series

Aim:

To evaluate the safety and efficacy of SLT treatment as

- *Adjunctive Treatment*
- *Primary Treatment.*

Conclusion

-
- *SLT is a safe and effective treatment modality*
- *There were 4 % patients- responded well to SLT but Target IOP not achieved.*
- *There were 5 % of patients underwent 180° treatment but received just about 30-35 shots but still responded well to treatment.*
- *Hence decided to compare the response of 90°, 180° and 360° treatment (RCT).*

Randomized Clinical Trial

Aims:

- *To compare the effect of 90°, 180° and 360° SLT treatment*
- *To ascertain the degree of laser treatment required for satisfactory IOP reduction.*
- *To ascertain whether SLT will result in sustained pressure lowering compared to standard medical therapy.*

RCT - Study Design

Material and Methods:

- *Patient selection – Newly diagnosed OAG and OHT patients*
- *Pre SLT examination (VA, Slit lamp biomicroscopy, IOP, Gonioscopy, Fundus and VF)*
- *NSAID for 5 days*
- *Follow up visits 1/7, 1/52, 4/52, 12/52 & 26/52 & then every 6/12*

RCT - Study Design

Results recorded

- *Discomfort during and after laser delivery*
- *IOP 1 hour post SLT and then at every visit*
- *Visual Acuity at every visit*
- *A/C activity day one and week one*
- *Gonioscopy at month 3 and 6*
- *Visual Fields at month 6 and then acc to clinical condition*

Responders-

- *IOP reduction of 20% or more*

RCT - Study Design

Failure / Withdrawal Criteria

Failure -

- IOP returned to baseline or $< 20\%$ reduction
- Initiation of any anti-glaucoma medication
- Additional laser Rx
- Glaucoma surgical intervention

Withdrawn/excluded -

- Underwent cataract or non-glaucoma surgical intervention,
- Lost to follow-up

To Conclude

- *SLT is safe and effective in lowering IOP*
- *The response to 90°, 180° & 360° SLT Rx is clinically and statistically significant (p-value <0.001, CI 95%) - **DOSE RESPONSE***
- *Response to 360° Rx is comparable to medical Rx – Latanoprost drops*
- *Failure rate was same for both 360° Rx group and Xalatan group (10%)*

Why SLT?

If SLT is as good as Medical Treatment then why SLT

- New Rx
- Long term results ??
- Repeatability ??
- Initial Expense

Summary of SLT Benefits

- *Easy to perform*
- *No pain*
- *Cellular treatment*
- *No damage to TM*
- *No scarring*
- *Preserves filtering capacity of TM*
- *Excellent safety profile*
- *Repeatable*
- *Does not preclude any other form of treatment*

No Treatment Issues

Medications-

- *General Health*
- *Dosage*
- *Quality of life*
- *Chronic effect on tissues*
- *Cost expense*

No Compliance Issues

- Younger patient leading a busy, active life compliance and quality of life are major issues.
- Older age group dementia and physical disability are similarly important considerations.
- With SLT we do not depend on our patients

Selective Laser Trabeculoplasty

SLT has been proven both safe and effective

- Solo, Tango, Selecta, Selecta Duet - all have been FDA cleared to perform laser trabeculoplasty
- Indication for laser trabeculoplasty - patients with open angle glaucoma
- Non-specific to stage of disease

Case Scenario

- Young 43 yrs old pt diagnosed as POAG, Positive FH, Asthmatic, IOP- 28 & 27mm Hg, C:D Ratio- 0.65:1 (inf notch VF- Superior arcuate scotoma. Rx- Xalatan drops
- Reviewed 1/12, 3/12 & then every 6/12 for 2 years, IOP 16 & 14 on all visits but VF were gradually deteriorating, defect becoming denser
- Phasing (Diurnal curve) done IOP fluctuation no more than 3mm, No nocturnal dips in BP.

Case Scenario

Patient

- *Compliance was good.*
- *On once a day dosage – Xalatan.*
- *Does not work shifts.*
- *Intelligent & educated patient.*

Doctor

- *Puzzled & Frustrated.*
- *Could see him registered Blind/ partially sighted in 10 years time.*

Case Scenario

- *Treatment Options- Trabeculectomy*
- *Review visit was following Bank holiday- IOP- 30 & 28mm Hg.*
- *CAUSE- Pub crawling.*

- ***SLT done** on the very same day.*
- *2 years post SLT IOP & VF stable.*

In Clinic

Glaucoma patient on Rx with raised IOP. Possibilities-

- Non/Poor compliance
- Tachyphylaxis
- Forgot drops
- Present Rx not enough
- Drops missed the eyes

In Clinic

Glaucoma patient with previous SLT with raised IOP

Only ONE possibility-

- Non Responder or Effect is failing with time

Why SLT?

■ Safe

SLT is not associated with systemic side effects or the compliance and cost issues of medications

■ Selective

SLT utilizes Selective Photothermolysis to specifically target pigmented cells, leaving the trabecular meshwork intact

■ Smart

Cellular Photoactivation stimulates the body's natural mechanisms to enhance aqueous outflow

Selective Laser Trabeculoplasty

SLT will change the way we think about our glaucoma patients!!

- *Pressure lowering with no medication compliance issues.*
- *Repeatable procedure with reproducible IOP lowering effects.*

Thankyou

Acknowledgements

- Mr Frank Howes
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