

# Selective Laser Trabeculoplasty (SLT)

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# Treatment of Open Angle Glaucoma

- Pressure reduction
  - Medical
  - Laser Trabeculoplasty (ALT, SLT)
  - Surgical
  - Agreement with patient on treatment
- Neuroprotection
- Blood circulation

# Selective Laser Trabeculoplasty (SLT)

- **SLT: vs ALT**
- SLT: Possible mechanism
- SLT: Treatment
- SLT: Results from other centers
- SLT: Own result

# Selective Laser Trabeculoplasty (SLT)

- Is a new method for reduction of the intraocular pressure
- Is a milder alternative compared to Argon Laser Trabeculoplasty (ALT)

# SLT vs ALT: Wavelengths

- SLT: 532 nm
- ALT: 514 nm

# SLT vs ALT

	<u>SLT</u>	<u>ALT</u>	<u>Ratio</u>
<b>No. of spots</b>	<b>50</b>	<b>50</b>	
<b>Energy</b>	<b>0.8-1.4 mj</b>	<b>400-600mw</b>	<b>1:100</b>
<b>Fluence (mj/mm<sup>2</sup>)</b>	<b>6</b>	<b>40,000</b>	<b>1:6000</b>
<b>Exposure Time</b>	<b>3 nsec</b>	<b>0.1 sec</b>	

# SLT vs ALT

## Decrease in IOP (mm Hg) from Baseline

	Baseline n=118	1 mth n=109	6 mths n=96	12 mths n=75	18 mths n=57
SLT	24.1	-3.56	-5.47	-6.49	-6.04
ALT	23.8	-4.40	-5.45	-6.03	-7.13
P value	0.70	0.29	0.96	0.79	0.36

# SLT vs. ALT

## Previously Failed ALT Subgroup (mm Hg)

	6 months n=38	12 months n= 27
<b>SLT</b>	-6.50	-7.20
<b>ALT</b>	-4.50	-5.47
<b>P Value</b>	0.30	0.38

# ALT: disadvantage

- Coagulative damage in the trabecular meshwork
- Peripheral anterior synechiae → continuous elevation of IOP

# SLT

- No morphological change in trabecular meshwork
- Good effect of re-treatment

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# SLT: mechanism

- Selectively absorbed by pigmented cells in the trabecular meshwork (TM)  
→ melanin particle alteration in the cells → attract macrophage → clean the trabecular meshwork
- ???

**SLT targets the melanin  
containing cells in TM**

# SLT:

## Selective Photothermolysis

- Photon energy absorbed by intracellular melanin
- Short duration of light exposure confines the thermal effect to the target cell

**A cell with melanin:  
Pre SLT**

**A cell with melanin:  
Post SLT**

# SLT $\Rightarrow$ Clean up TM?

- Photothermal effect triggers cytokine response
- Cytokines recruit macrophages
- Macrophages clean up cellular debris

**SLT  $\Rightarrow$  Increase outflow**

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# SLT

- Indication:
  - Open angle > grade 2
  - High IOP despite maximum therapy
  - Intolerance of local treatment
  - Poor compliance
- Pressure lowering effect: 20-30 %

# Contra-indication

- Iritis
- Uveitis
- Narrow chamber angle

# Examination: Pre-SLT

- Visual acuity
- Intraocular pressure
- Gonioscopy

# SLT

- Frequency-doubled YAG laser (534 nm)
- Standard treatment: 50 laser spots, 180°

# Post SLT treatment

- IOP control: 2 hours, 1, 3, 7 months post SLT
- (Iopidine x 1)
- (Corticosteroid eye drops t.i.d. 5 days)
- Continue with same pressure lowering treatment until one month after SLT

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# SLT:

## Results from other centers

- Complementary treatment
- Primary treatment
- 360° vs 180° treatment

# SLT: U.S. Study

## Patient Demographics

- **120 patients treated**
  - **65 females (54.2%)**
  - **55 males (45.8%)**
  - **Mean Age 67.7 yrs (ages 29-90 yrs)**
    - **77 (64.2%) Caucasians**
    - **34 (28.3 %) African-Americans**
    - **9 (7.5%) Hispanics**
    - **0 Asians**

# SLT: U.S. Study

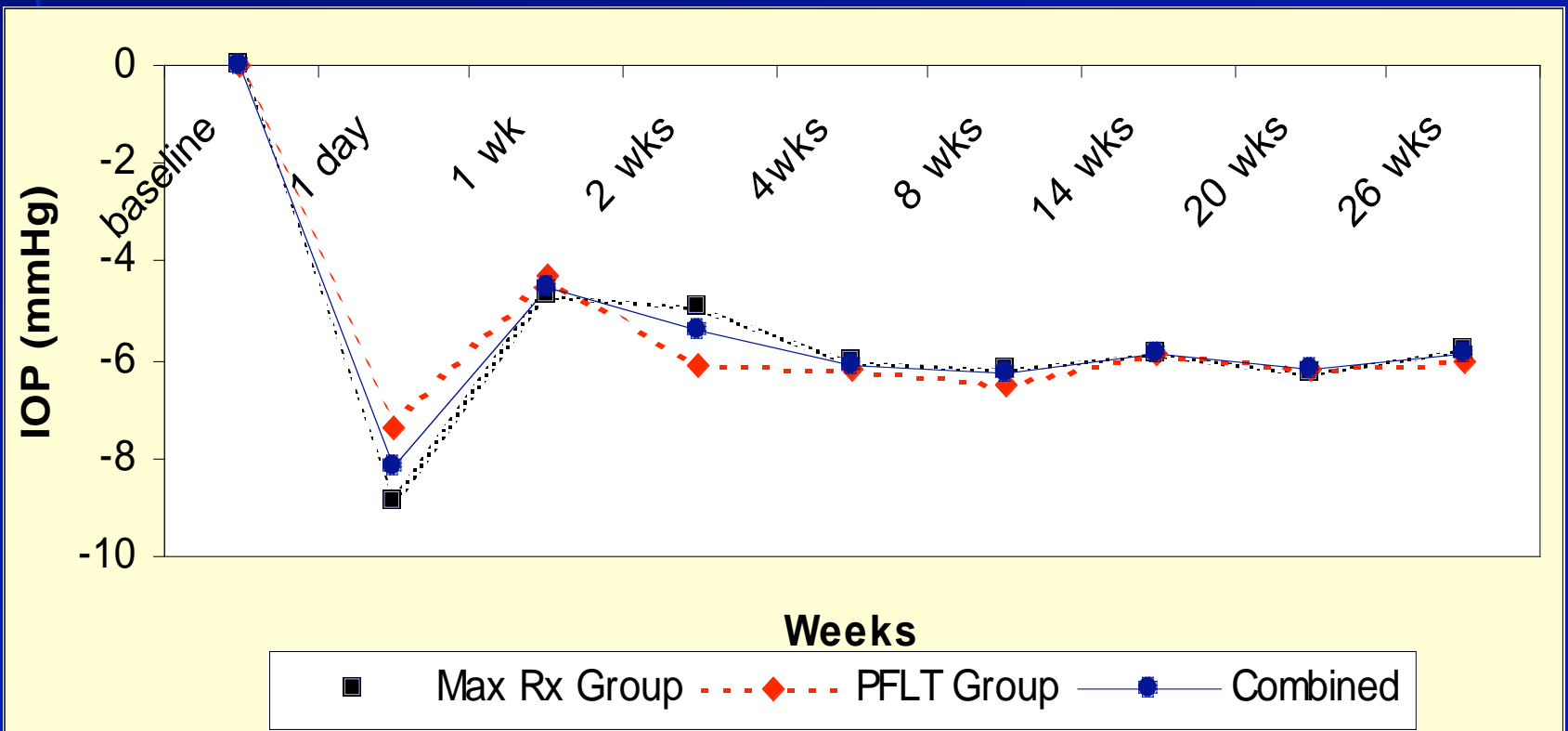
## Mean IOP Reductions at 26 weeks

Responders ( $\geq 3$  mm Hg IOP reduction) -  
**71/101 eyes**

	No. of Eyes	Pre-op IOP (mm Hg)	Mean $\Delta$ IOP (mm Hg)	% IOP Drop	P Value
All Responders	71	25.5	<b>-6.0</b>	23.6	<0.001
<b>MaxMeds</b>	34	25.3	<b>-6.5</b>	25.3	<0.001
<b>FailedALT</b>	37	25.6	<b>-5.7</b>	22.1	<0.001

# SLT

## U.S. Clinical Trial Results



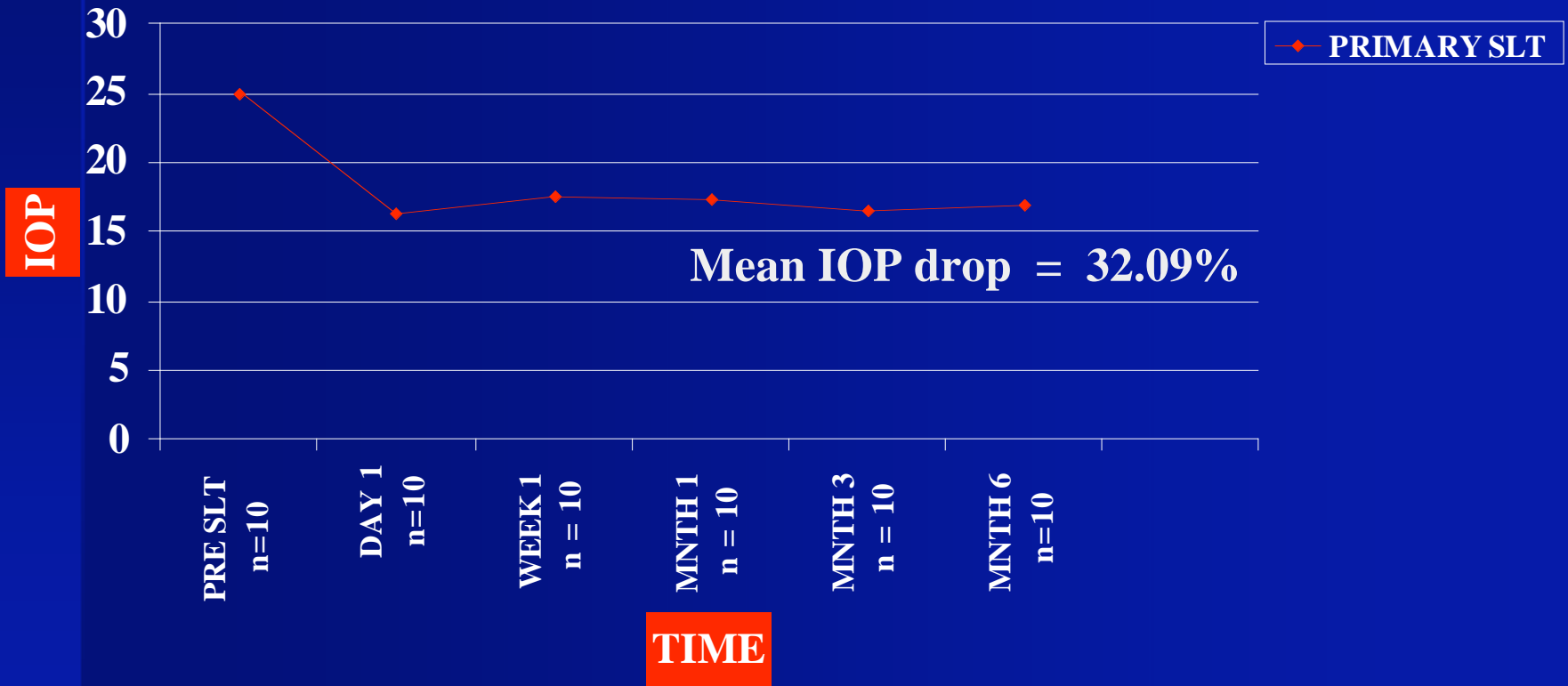
# SLT: U.S. Study

## Adverse Events - 120 eyes

	<b>MaxMeds group</b>	<b>FailedALT group</b>	<b>Combined</b>
<b>No. of Subjects</b>	<b>53</b>	<b>67</b>	<b>120</b>
<b>Event</b>			
<b>A/C Inflammation</b>	<b>47 (89%)</b>	<b>60 (90%)</b>	<b>107 (89%)</b>
<b>Pain/Discomfort</b>	<b>1 (2%)</b>	<b>5 (8%)</b>	<b>6 (5%)</b>
<b>Redness</b>	<b>2 (4%)</b>	<b>4 (6%)</b>	<b>6 (5%)</b>
<b>IOP Elevation (within 2 hrs post-op)     <b>≥ 10 mm Hg</b></b>	<b>3 (2.5%)</b>	<b>4 (3%)</b>	<b>7 (6%)</b>

SLT: primary treatment

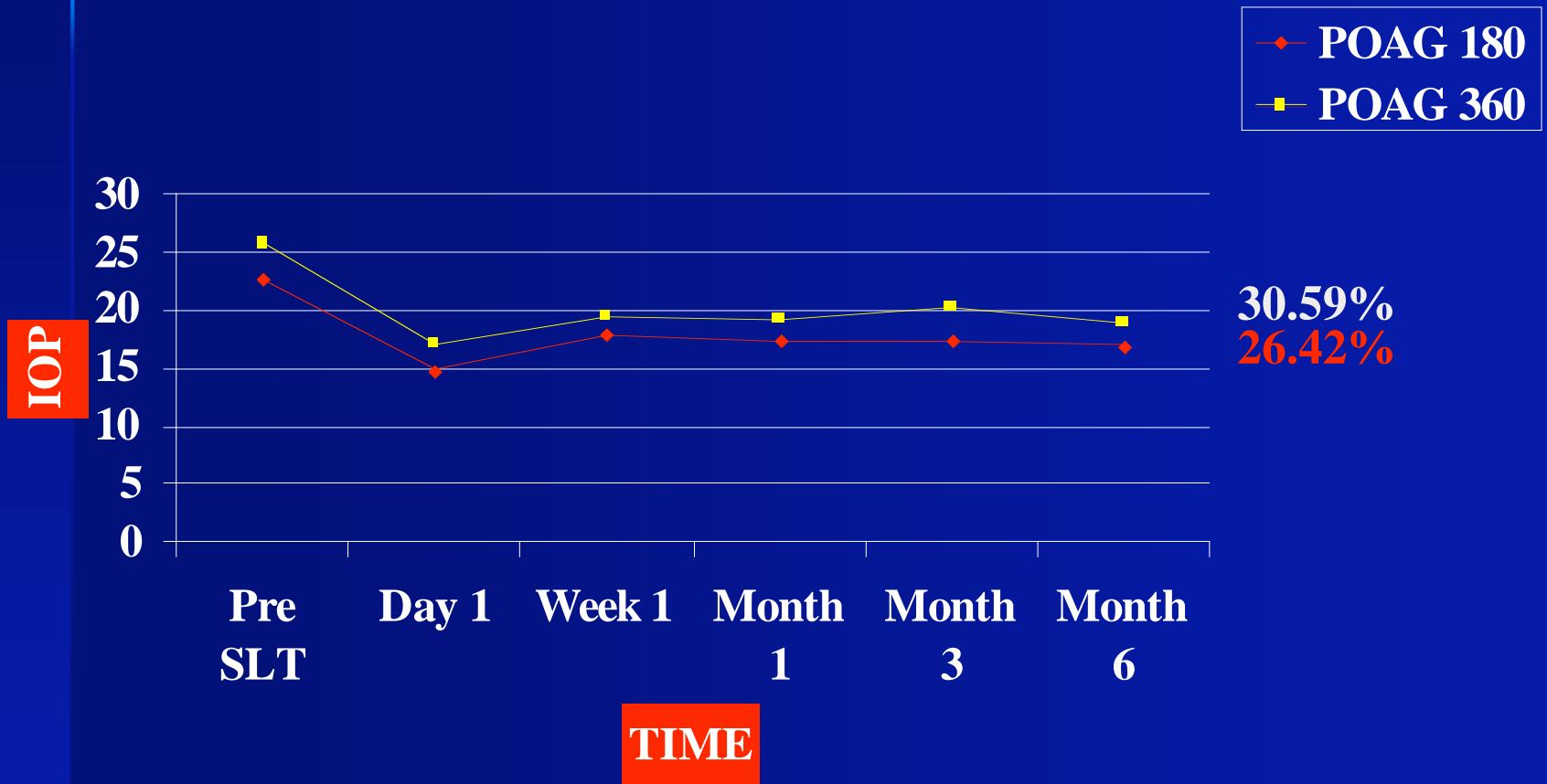
# SLT



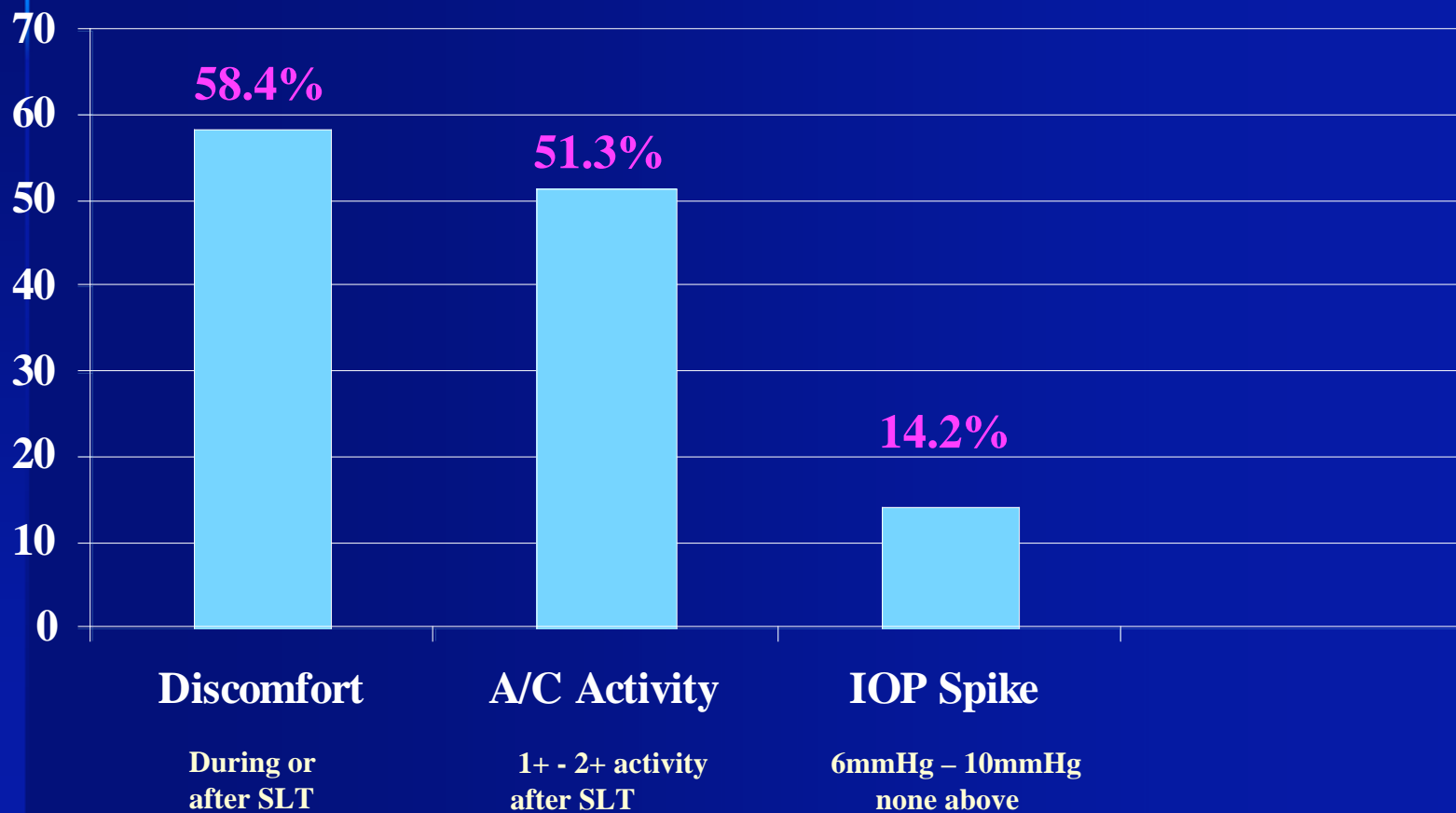
SLT:

360<sup>0</sup> vs 180<sup>0</sup> treatment

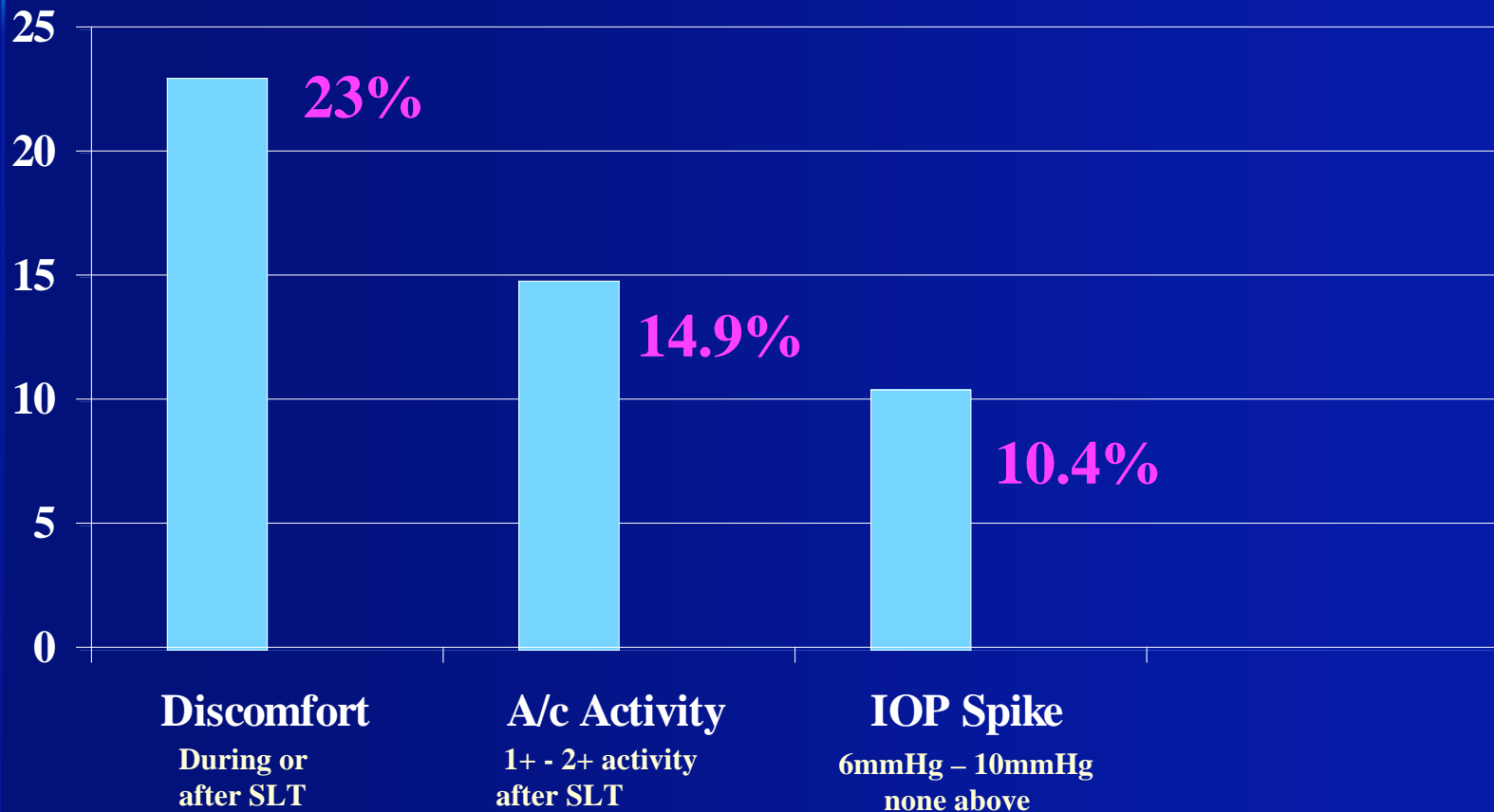
# SLT: 360° vs 180° treatment



# Adverse Effects (360°)



# Adverse Effects (180°)



# Own Result

# Selective Laser Trabeculoplasty: A comparison between 90° and 180° treatment

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# Aim of the study:

- Is 90° SLT treatment as effective as 180° SLT treatment?

# Patients & methods

## Glaucoma or OHT

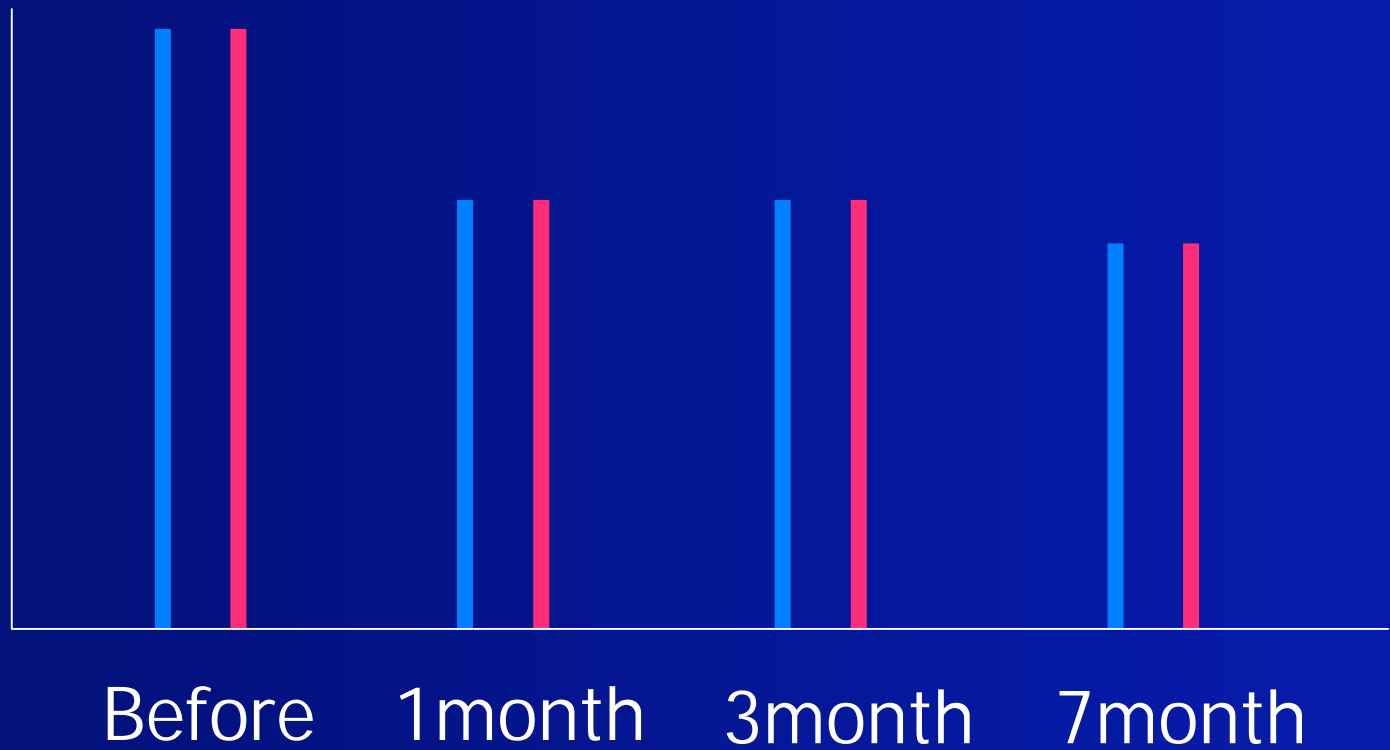
- Unsatisfactory pressure control in spite of the maximal medical treatment
- Intolerance to the medical treatment
- Poor compliance

# Patients & methods

- 32 patients 25 laser spots on 90° of trabecular meshwork (90° group)
- 32 patients 50 laser spots on 180° of trabecular meshwork (180° group)

# IOP

— 180° group  
— 90° group



# IOP

	Before	One month	Three months	Seven months
180° group	26.06 ± 1.73	21.03 ± 1.71	19.79 ± 1.44	19.90 ± 1.59
90° group	25.44 ± 1.41	21.28 ± 2.02	19.82 ± 2.04	18.43 ± 1.38
t-test	0.59	0.85	0.98	0.21

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# Conclusion

90° SLT treatment is as effective as  
180° SLT treatment

# Clinical significance

90° SLT treatment makes it possible to give repeated SLT treatments in the same eye

# Summary

- Pressure reduction: SLT = ALT
- SLT is a milder alternative to the ALT  
(Less post operative complications,  
better patient comfort)
- It is possible to perform repeated SLT  
in the same eye