



Nerve Fiber Layer Testing as a Predictive or Response Measure to Decrease in Intraocular Pressure from Selective Laser Trabeculoplasty as Primary or Secondary Treatment of Glaucoma

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Introduction

- **Selective Laser Trabeculoplasty (SLT) uses a Q-Switched frequency-doubled (532 nm), low energy Nd:YAG laser, which targets melanocytes in the trabecular meshwork^{1,2}.**
- **SLT treatment induces a biologic response in the trabecular meshwork, which involves the release of cytokines that trigger macrophage recruitment and other changes, leading to reduction in intraocular pressure (IOP).**
- **SLT treats the trabecular meshwork without causing thermal nor coagulative damage to surrounding structures.**

1. Latina MA, et al. Selective targeting of trabecular meshwork cells: in vitro studies of pulsed and CW laser interactions. *Exp Eye Res.* 1995;60:359-372.

2. Latina MA, et al. Q-switched 532-nm Nd:YAG laser trabeculoplasty (selective laser trabeculoplasty): a multicenter, pilot, clinical study. *Ophthalmology.* 1998;105:2082-2090.



Purpose



- To investigate the relationship of Nerve Fiber Layer (NFL) analysis, as a predictive or response measure, to decrease in IOP after treatment with SLT, as primary or secondary therapy, in patients with glaucoma.



Methods

- Retrospective chart review was performed on 58 eyes and 65 eyes respectively, of those treated as primary or secondary therapy, from a continuous case series of 3034 eyes treated with SLT over 7.5 years.
- NFL analysis, as measured by scanning laser polarimetry, was divided into three categories (< 25: normal, ≥ 25 but <40: suspect, ≥ 40 : glaucoma) for both primary and secondary groups.
- Two groups (primary and secondary) were established to examine the relationship between pre-op NFL value and post-op decrease in IOP and to examine the relationship between NFL value and time after treatment with SLT.



Results

- When analyzed as a function of IOP decrease, pre-op NFL values were not significant predictors for post-op IOP decrease after treatment with SLT in either primary or secondary groups ($p > 0.05$).
- When comparing the relationship between NFL values and time after treatment with SLT, these data indicate NO significant relationship between NFL values and IOP (primary: $R = 0.03$; secondary: $R = -0.05$).



Primary Patients

Pre-op NFL vs Post-op IOP

Primary	Normal (≤ 25)	Suspect (>25 & <40)	Glaucoma (≥ 40)
Number of eyes	39	10	12
Mean IOP Drop (mm Hg)	6.4	5.5	7.5
Standard Deviation (mm Hg)	3.2	2.7	3.3

Results are not significant with $p > 0.05$



Secondary Patients

Pre-op NFL vs Post-op IOP

Secondary	Normal (≤ 25)	Suspect (>25 & <40)	Glaucoma (≥ 40)
Number of eyes	29	13	24
Mean IOP Drop (mm Hg)	5.3	3.9	5.0
Standard Deviation (mm Hg)	3.5	2.2	9.0

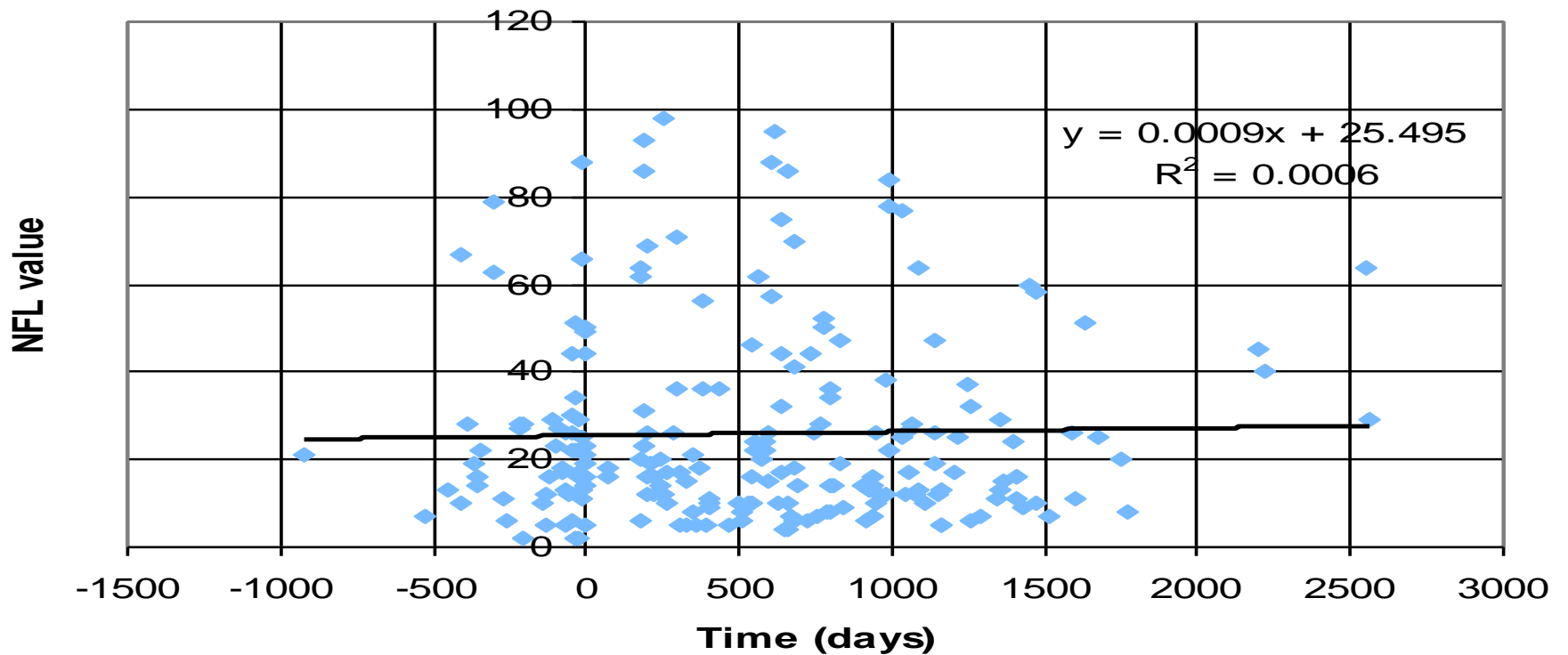
Results are not significant with $p > 0.05$



Primary Patients NFL vs Time Before and After SLT



**Primary Patients NFL vs. Time
Before and After SLT Treatment**

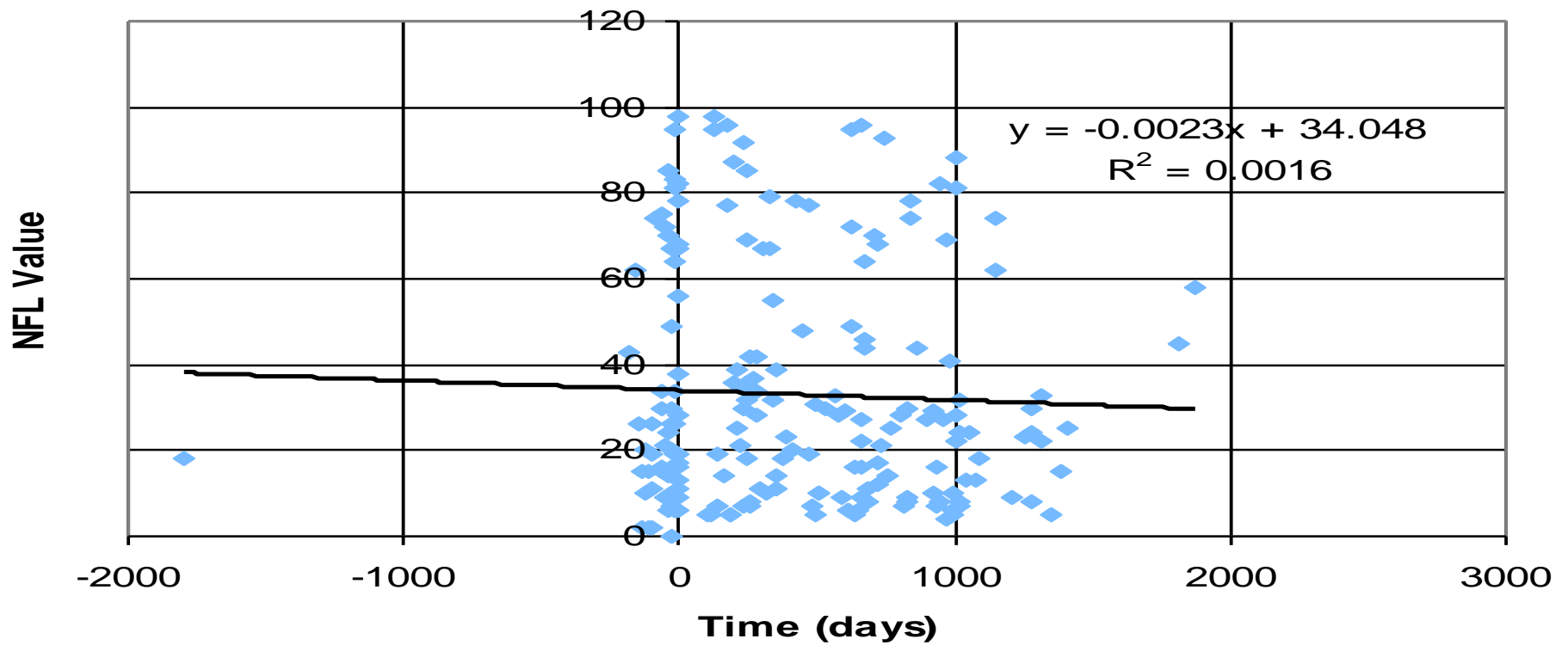


Results are not significant with $R^2=0.0006$ and $R = 0.03$



Secondary Patients NFL vs Time Before and After SLT

**Secondary Patients NFL vs. Time
Before and After SLT Treatment**



Results are not significant with $R^2=0.0016$ $R=-0.05$



Discussion

- **The Glaucoma Laser Trial**
 - Established efficacy of laser trabeculoplasty in lowering IOP in previously untreated glaucoma patients¹.
- **The Ocular Hypertensive Treatment Study and**
- **Early Manifest Glaucoma Trial**
 - Established efficacy of early and effective treatment to preserve long-term visual function in glaucoma patients^{2,3}.
- **Our findings build on these and suggest pre-op NFL value was not a significant predictor of post-op IOP decrease in patients treated with SLT for glaucoma ($p>0.05$).**
- **Our findings suggest, as primary or secondary therapy, SLT treatment did not significantly lower NFL in patients with glaucoma ($R\ll 0.90$).**
- **Further study with controlled clinical trials is indicated.**

1. The GLT Research Group. GLT. *Ophthalmology*. 1990;97:1403-1413.

2. Kass MA, et al. OHTS. *Arch Ophthalmol*. 2002;120:701-713.

3. Heijl A, et al. EMGT. *Arch Ophthalmol*. 2002;120:1268-1279.



Conclusion

- In this series of over 3,000 eyes followed for more than 7 years:
 - For Selective Laser Trabeculoplasty (SLT) as primary (initial) or secondary (adjunctive) therapy, pre-op Nerve Fiber Layer (NFL) value was NOT a significant predictor of post-op decrease in intraocular pressure (IOP).
 - For Selective Laser Trabeculoplasty (SLT) as primary (initial) or secondary (adjunctive) therapy, there was NO significant change in Nerve Fiber Layer (NFL) value as a response measure after treatment with SLT.