

The Laser Quest for a Happy Medium

In glaucoma, medical management is plagued with noncompliance, and filtration surgery can be complex and risky. Could laser-based treatments offer a happy medium?

Few people under your care are “model patients.” Almost everyone misses a dose now and then, and it’s understandable. People have busy lives to lead, and some things get forgotten. The problem is, glaucoma is a progressive disease. Missed doses soon add up to progression, and unless the disease has been caught by screening measures (perhaps because of a family history), it’s likely that the disease is first diagnosed at a relatively

At a Glance

- *Topical glaucoma therapy is usually very effective at lowering IOP – so long as the patient follows the regimen, and self-administers the drops correctly.*
- *Even though eyedrop use can be associated with adverse events which reduce patients’ quality of life, filtration surgery is still viewed by some as risky, and an “option of last resort”*
- *Is there a happy medium? An approach that lowers IOP and reduces patients’ reliance on drops without requiring invasive surgery?*
- *Two glaucoma specialists review two laser-based techniques occupying the middle ground between drops and penetrating incisional techniques: SLT and CLASS*

advanced stage (and age) – as that’s when people start noticing vision loss. So this renders a predominantly elderly population, some of whom might be forgetful, with stiff fingers, and who need to take a considerable number of other medications to take each day (in addition to their eyedrops) just to get by – yet they are at a critical stage of their disease, where any progression equals vision loss.

Compared with only a decade ago, there are considerably more treatment options available today for glaucoma specialists to choose from. There’s no longer the simple

dichotomy of eyedrops and filtration surgery: there’s a number of laser and micro-incisional, minimally invasive approaches that can be taken today – the challenge is to determine which approach is most suited to your patient. We asked two glaucoma surgeons to discuss the laser-based treatments that they offer, in order to understand which patients are most suitable for their procedure of choice: Dan Lindfield discusses his use of selective laser trabeculoplasty (SLT) in the clinic, and Noa Geffen reviews 5 year results of using the CO₂-based CLASS laser.

A User’s Guide to SLT

What benefits can SLT offer, and which patients are eligible?

By Dan Lindfield

I don’t believe in waiting to offer surgical intervention. It’s clear that any intervention that achieves IOP control early in the disease process translates to better outcomes, so I routinely offer non-pharmacological interventions to my patients. I find that by treating early, less visual loss has occurred, and the target IOP is easier to reach – and I find that very often, this is achievable using SLT, rather than traditional filtration surgery. SLT use is not without risk (cases of transient anterior chamber inflammation, mild uveitis and cystoid macular edema have been reported), but the risks are infrequent, manageable, and are all front-loaded. This contrasts with the daily instillation of topical therapy – in fact, I think you could argue that overall, SLT has the superior risk profile.

When SLT was first introduced, there

were concerns about its duration of action and its repeatability, and this stopped many glaucoma specialists from adopting the technology. But research continued, the technology advanced, and most of the issues previously identified with SLT have now been addressed. Indeed, using SLT as a primary treatment for ocular hypertension (OHT) and glaucoma was previously controversial but recent data has questioned this (1), and results from the forthcoming LiGHT (Laser in Glaucoma and Ocular Hypertension) study that’s comparing SLT versus drops as first-line treatment for OHT/Glaucoma should help further clarify SLT’s role in glaucoma management (2).

My patient population

I mainly use SLT to improve IOP control for patients on medication(s) to prevent them needing further medication or surgery, and I also use SLT to reduce medication dependence for patients with controlled IOP. For patients using drops who have problems with compliance, memory, side effects (ocular or systemic) or allergies, SLT is a useful option to use in order to reduce the number of medications needed for IOP control. In this setting, SLT can prove a cost-effective



option, as the cost of an SLT procedure may be lower than the cost of monthly eyedrops. Indeed, patients are increasingly asking me about SLT as an alternative to using multiple eyedrops for precisely this reason.

SLT after cataract surgery?

The question of exactly how laser energy modulates trabecular function after trabeculoplasty is still debated. In my opinion, the effects of both cataract surgery and SLT can be attributed to a “trabecular meshwork modulation” process. In cataract surgery, the high volume of fluid flowing around the anterior chamber “washes out” trabecular debris, and a postoperative cytokine reaction is seen – this is similar to what happens in SLT. This means that performing SLT after cataract surgery is usually much less effective, as the outflow has already been improved. Anecdotally, three years or more post-phaco, I begin to see SLT become more effective again. I suspect that this is because, like SLT, the effect of the phaco-related trabecular modulation persists for two to three years before trabecular outflow resistance increases again. In practice, this means I usually reserve SLT for phakic patients, or those who have had cataract surgery over three years previously.

Champagne bubbles and pressure spikes
In my practice I use the OptoYag & SLT M (Optotek). Patients all receive written information about the procedure in advance. On arrival, they have their IOP checked for baseline, and pilocarpine 2% and apraclonidine 1% drops are instilled. I use a Latina gonio lens for this procedure and typically use an initial energy of 0.8 mJ, treating the inferior angle first, as it is usually the most open and the gonioscopic landmarks are clearest. I work up the power until I see what looks like fine champagne bubbles. If the bubbles are adherent or any changes on the trabecular meshwork

surface persist, then I reduce the power. The power can be adjusted to the visible bubble response (in contrast to some clinicians who use a constant power throughout) – higher power is needed nasally and temporally than inferiorly and superiorly because of the changes in angle pigmentation.

I apply approximately 110 shots to each eye and usually treat the full 360 degrees. Immediately post procedure, I apply another drop of apraclonidine 1% and prescribe a topical NSAID (four times daily for five days). A spike in IOP is seen in approximately 3 percent of patients, so IOP should be checked 60 minutes after the procedure. If an IOP spike does occur, then use acetazolamide to control it. In patients with advanced field loss or heavily pigmented angles, I also use acetazolamide prophylactically 30 minutes before the procedure, to reduce the risk of a transient pressure rise. I routinely review patients after 6 weeks to assess the effect of treatment, or after 48 hours if a spike has occurred. In patients who have had the procedure with the aim of reducing topical medication, I ask them to stop using their drops one week prior to the review appointment, in order to more accurately determine the outcome of the treatment.

It is also advisable to warn patients that the average duration of SLT is two to two-and-a-half years, but the effects have been known to persist for up to five. However, since the procedure can be repeated, a customized schedule can be developed for individual patients – this usually involves retreatment every couple of years.

Getting started

I have performed over 90 cases in my first six months with an SLT laser, which I believe to be a significant demand for the procedure. In this time, I have had three non-responders and two pressure spikes, both of which settled within 90 minutes

with acetazolamide and normalized by 48 hours. Indeed, in my patients, I have found that IOP reduction from SLT outperforms prostaglandin monotherapy. It is of course clear that this cohort are self-selected to be poor responders since they required SLT, as they are likely to have poor compliance or poor tolerance for topical therapy, but this biased data is a useful consideration for real life practice.

There is always some anxiety when first offering a new procedure to your patients. However, SLT is relatively easy to learn and combines two skills that glaucoma surgeons will be very familiar with – gonioscopy, and laser skills that are similar to Nd:YAG capsulotomy. Patient selection is key: always ensure that the angle is easily visible and there are no peripheral anterior synechiae. SLT requires gonio lens contact for approximately 5 minutes per eye so it is vital to select patients who will tolerate gonioscopy comfortably. Patients with tremor, or those who have difficulty with positioning make treatment more challenging, and hence are best avoided until the surgeon is very comfortable with the procedure.

These challenges aside, I have found SLT to be a useful and cost-effective alternative to medical therapy in my practice, helping me to control patient IOP, and in some cases reduce the need for eyedrops.

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References

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2. S Tsang et al., “Developments in laser trabeculoplasty”, *Br J Ophthalmol.*, 100, 94–97 (2016). PMID: 26377417.