

532 nm MicroPulse™ Laser Trabeculoplasty Successfully Lowers IOP as Primary Treatment



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History and examination

This case series includes 13 eyes in patients newly diagnosed with chronic open-angle glaucoma who elected to undergo MicroPulse laser trabeculoplasty (MLT) as primary treatment over medical therapy. Prior to treatment, their mean intraocular pressure (IOP) was 26 mm Hg (range, 21-38 mm Hg).

None of the eyes had been treated previously with medication, surgery, or laser trabeculoplasty, although five of the patients had previously undergone argon laser trabeculoplasty (ALT) in the fellow eye.

Treatment

In each case, MLT was performed with the IQ 532™ laser (IRIDEX, Mountain View, CA). One drop of brimonidine 0.15% and of prednisolone acetate 1% was instilled in the eyes before treatment.

I used a Ritch four-mirror lens, a 300- μ m spot diameter, 300 mW of power, and 300-ms duration with a 15% duty cycle. (Table 1). In each eye, subthreshold (non-visible) laser applications were placed contiguously to cover 360° of the trabecular meshwork (TM). No medications were administered after treatment.

Result

Four months after treatment, results have been comparable to those normally expected with ALT (Table 2). In fact, one patient had the same results with MLT as she previously had with ALT in the fellow eye.

Mean IOP reduction in this series of eyes was 18%, with some eyes achieving a 25% reduction (mean IOP, 21 mm Hg; range 17-30 mm Hg). One eye did not respond at all, but instead had an IOP elevation of 1 mm Hg. This patient underwent subsequent traditional ALT with no change in IOP either.

Follow-up is still limited, and I am eager to see how these results hold up over six months to one year.

Discussion

The IQ 532 laser with MicroPulse capabilities was appealing to me because of its potential to reduce IOP without causing

thermal damage to the angle. In MicroPulse mode, the laser delivers energy in a series of short-duration, low-power micropulses, with each pulse followed by a pause to allow the tissue to cool. From my perspective, this follows the mandate, "First, do no harm" oath we took in medical school.

There are some patients who benefit from initial laser treatment instead of medical therapy. And, given the tissue-sparing characteristics of subthreshold MicroPulse laser with no iatrogenic damage, I am comfortable offering it to patients as a first-line option. ALT can be used as primary therapy, too, but there are more risks. In addition, ALT typically demonstrates an 80% effect at two years and a 50% effect by five years. Although I don't yet know how long the MLT effects will persist, the great advantage of MLT over ALT is that it appears to be repeatable. This is a long-term advantage in those patients who experience a loss of effect over time, but it also offers much more flexibility for treatment of patients who have an inadequate response, or who have already had a previous ALT procedure.

This laser is fairly new in my practice, so I have not yet performed retreatments, but expect to be able to do so. Additionally, if MLT fails to achieve the desired result after retreatment, all other antiglaucomatous options can be performed later.

Compared to other lasers used for the treatment of glaucoma, the IQ 532 laser also offers greater versatility in treating a range of conditions including diabetic macular edema,

**TABLE 1: TREATMENT PARAMETERS
IRIDEX IQ 532 | Open-Angle Glaucoma**

Wavelength:	532 nm
Spot size on slit lamp adapter:	300 μ m
Trabeculoplasty lens:	Ritch 4-mirror lens
Power:	300 mW
Exposure duration:	300 ms
Duty Cycle:	15%
Treatment circumference:	360°
Treatment endpoint:	None

proliferative diabetic retinopathy, and retinal tears, among others. In treating patients with glaucoma, I can use it as I would a traditional argon laser (ALT) or switch to the MicroPulse mode (MLT).

When initially presenting treatment options to patients, I explain that the traditional argon laser is effective but creates some scarring damage to the TM and therefore cannot be repeated. I share with them that subthreshold MicroPulse laser creates some inflammation within the TM, but it increases outflow through the TM without causing thermal scarring. Furthermore, the procedure is repeatable.

Patients are more likely to choose a procedure they know will not cause thermal damage to their eye and one that can be repeated if necessary, potentially sparing them from needing medications later if their IOP rises again.

Treatment Pearls

To achieve optimum results, I use one drop of brimonidine 0.15% before the treatment. I also began using one drop of

prednisolone 1% before treatment, after a few patients complained of photophobia after treatment. Preoperative prednisolone seems to have eliminated these symptoms. Although I typically prescribe a four-day course of steroid drops after ALT, this is not necessary after MLT.

Ophthalmologists experienced with selective laser trabeculoplasty (SLT) will find MLT to be very similar, although the photothermal effects are very different: adiabatic bubble formation with SLT; sublethal thermal elevation with MLT. However, clinicians switching from ALT to MLT will experience a slight learning curve due to the lack of a visible endpoint. Because you do not observe a thermal reaction while treating, you need to simply place the spots contiguously to cover the desired area, knowing that the results will be seen in post-treatment IOP decreases, rather than a visible burn.

Lastly, to obtain the desired effect with MLT, I have found it best to treat the entire 360° right away, rather than initially treating 180°.

**Table 2:
Case Series: MicroPulse Laser Trabeculoplasty**

Patient	Pre-Treatment IOP (mm Hg)	4 Months Post-Treatment	
		IOP (mm Hg)	% IOP drop from baseline
1	23	19	17
2	25	23	8
3	27	21	12
4	21	16	14
5	21	17	19
6	27	23	15
7	21	17	19
8	38	30	21
9	30	23	23
10	28	21	25
11	21	22	-5
12	30	24	20
13	22	18	18
Mean	26	21	18

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