

Automated direct selective laser trabeculoplasty: First prospective clinical trial

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Purpose: Direct Selective Laser Trabeculoplasty (DSLTL) is a rapid, non-contact automated procedure performed directly through the limbus without gonioscopy. In this first non-randomized clinical trial to assess its safety and ability to reduce Intraocular Pressure (IOP).

Methods: Fifteen patients (15 eyes: 10 with open-angle glaucoma (OAG), 4 with ocular hypertension, and one with pseudoexfoliation glaucoma), naïve or after medication washout, with an IOP ≥ 22 mmHg, underwent DSLTL by irradiation with 100 or 120 sequential non-contact 532 nm, Q-switched laser shots (0.8–1.4 mJ) automatically applied during 1.5 or 2.3 seconds on the limbus, guided by image analysis and eye tracking. Results were assessed at 1 and 3 hours, 1 day, 1 week, and 1, 3, and 6 months.

Results: The mean \pm standard deviation baseline IOP (mmHg) in all eyes was 26.7 ± 2.3 . At 1, 3, and 6 months, this value was significantly reduced to 21.7 ± 4.2 (by 18.1%), to 20.8 ± 2.5 (by 21.4%), and to 21.5 ± 4.1 (by 18.8%) respectively. In 6 patients treated with 1.4 mJ/shot, the mean IOP at 6 months decreased from 26.7 ± 3.2 to 19.3 ± 2.0 (27.1%, $P=0.03$). There was a significant reduction in hypotensive medications (from 1.6 ± 1.0 to 0.4 ± 0.7 , $P=0.03$). No serious adverse events occurred.

Conclusions: Automated DSLTL appears to be an effective and safe non-contact, rapid modality for reducing IOP in patients with OAG. Higher energy usage led to better results.



Recent Publications

1. Mordechai Goldenfeld, Michael Belkin, Masha Dobkin-Bekman, Zachary Sacks, Sharon Blum Meirovitch, Noa Geffen, Ari Leshno, Alon Skaat. Automated Direct Selective Laser Trabeculoplasty: First Prospective Clinical Trial. *Translational Vision Science & Technology* March 2021, Vol.10,5.
2. Zachary S. Sacks, Masha Dobkin-Bekman, Noa Geffen, Mordechai Goldenfeld, and Michael Belkin. Non-contact direct selective laser trabeculoplasty: light propagation analysis. *Biomedical Optics Express* Vol. 11, Issue 6, pp. 2889-2904 (2020).
3. Noa Geffen, Shay Ofir, Avner Belkin, Fani Segev, Yaniv Barkana, Audrey Kaplan Messas, Ehud I Assia, Michael Belkin. Trasscleral selective laser trabeculoplasty without a gonioscopy lens. *Journal of Glaucoma*: March 2017 - Volume 26 - Issue 3 - p 201-207.
4. G.Gazzard et al. Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (Light): A multicentre randomised controlled trial. *The Lancet* VO 393, ISSUE 10180, P1505-1516, APRIL 13, 2019.
5. Yujia Zhou & Ahmad A. Aref. A Review of Selective Laser Trabeculoplasty: Recent Findings and Current Perspectives. *Ophthalmology and Therapy* volume 6, pages 19–32 (2017).

Biography

Mordechai Goldenfeld, MD, is a glaucoma specialist at the Sam Rothenberg Glaucoma Center, Goldschleger Eye Institute, Sheba Medical Center. He received his MD degree from Tel Aviv University and specialized in the treatment of glaucoma at North-western University, Chicago. Goldenfeld served as chairman of the Israeli Glaucoma Society from 2002-2004. He devotes his professional life to treat glaucoma patients, delay the progression of the disease and educate his patients how to cope with the demanding treatment. Awards or Testimonials: 1991 Fight for Sight, The National Society for the Prevention of Blindness - Postgraduate - Fellowship research award: Optic disc analysis using digitized photography and flicker analysis.

Received: September 31, 2021; **Accepted:** October 02, 2021; **Published:** March 07, 2022
