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## Subthreshold laser treatment following full thickness macular hole surgery

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**Posterboard#:** A0215

**Abstract Number:** 5770 - A0215

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**DisclosureBlock:** Boris V. Stanzel, Iridex Code R (Recipient), Centervue Code F (Financial Support), Iridex Code F (Financial Support), Lina Marcela Ramirez Paez, None; Sami Al-Nawaiseh, None; Peter Szurman, None;

### Purpose

Functional results after surgical macular hole repair are frequently disappointing due to incomplete restoration of foveal anatomy. We report a case series with remodeling of the subfoveal ellipsoid zone (EZ) and intrafoveal gliosis following subthreshold laser after anatomical macular hole closure.

### Methods

Retrospective uncontrolled case series after successful closure of macular hole with 23 gauge vitrectomy, internal limitans membrane peeling and gas or oil tamponade. Of 5 patients, two had an idiopathic macular hole (MH) and three had a MH after prior retinal detachment (RD) repair. Subthreshold laser using Endpoint Management (n=1; 577nm PASCAL, Topcon, Japan) and/or micropulse (n=4; 577nm IQ, Iridex, USA) technology was used. The patients underwent best corrected distance visual acuity (BCVA) using a Snellen chart, complete ophthalmic examination and spectral domain optical coherence tomography (SD-OCT; Spectralis, Heidelberg Engineering, Germany). Some patients (3 of 5) were also assessed by a mesopic microperimetry (S-MAIA, Centervue, Italy).

### Results

Five eyes of 5 patients with a mean age of 64.6 years (range, 51–71 years) after surgical MH closure were analysed. Although BCVA improved at a median of 6 weeks (range 2-10) after macular hole surgery from a median of 0.96 to 0.72 LogMAR, the patients presented with an altered subfoveal EZ and intrafoveal reflectance, albeit with discernible ELM and RPE bands on OCT. All then underwent between 1-3 subthreshold laser treatments of the posterior pole (at 4 to 12 weeks intervals between session) and were observed subsequently for 3 to 6 months. All patients showed recovery of the subfoveal EZ defect after laser (median defect size 738 µm before vs. 409 µm after treatment) and improved intrafoveal retinal layer reflectance. All patients had better final visual acuity after subthreshold laser (BCVA 0.72 LogMAR before vs. 0.3 after treatment). Microperimetry confirmed central fixation after subthreshold micropulse laser in 2 of 3 subjects; 1 patient with a repaired MH after RD surgery had a BCVA of 1.5LogMAR before laser. No patient had adverse effects as a result of the subthreshold laser treatments.

### Conclusions

Subthreshold laser treatment at the posterior pole may favorably stimulate foveal remodeling after

surgical MH closure beyond intrinsic retinal repair mechanisms. More work is required to validate our findings in a prospective controlled clinical trial.

**Layman Abstract (optional): Provide a 50-200 word description of your work that non-scientists can understand. Describe the big picture and the implications of your findings, not the study itself and the associated details.**

