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“A New Titanium Sapphire (TiSa) Laser Activated Ultrathin Gold Glaucoma Drainage Device (LAGD) for the Treatment of Glaucoma”

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Purpose: This study was undertaken to evaluate the application of an innovative, new solid-state Titanium:Sapphire Laser (790nm, 7msec, 200um spot size, Solx-TiSa™) to activate a microscopic 24 karat gold drainage device for the surgical treatment of glaucoma (LAGD™). **Methods:** Clinical validation of the 790 nm laser device in glaucoma laser trabeculoplasty (GLT) has already been completed at 18 months comparing it with conventional ALT and SLT treatments. In this study, the infrared laser was used to activate an implanted ultrathin 30 micron gold glaucoma drainage device to allow the treating surgeon to titrate the target IOP. **Results:** Prior investigations demonstrated that when used alone, the Solx-TiSa laser induced significantly less trabecular thermal tissue damage than ALT or SLT. From baseline to 18 months, average IOP decreased from 29.0 to 17.4 mmHg and the average number of required medications decreased from 3.3 to 1.2. Sixth month data from the pressure lowering effect of the Solx TiSa™ laser in combination with the gold drainage device demonstrated a synergistic effect allowing for greater reduction in IOP than when either the laser or implant was used alone. Laser application to the implanted Gold Drainage Device resulted in 1-3 mm reduction for each 200 micron spot channel opening. **Conclusions:** The Solx TiSa™ long wavelength deep penetrating laser offers the potential to decrease intraocular pressure in glaucomatous eyes with less thermal damage and more selectivity than conventional treatments. When used in combination with the 30 micron gold drainage device, the pressure lowering effect of the LAGD treatments was further enhanced by 1-3 mm for each channel opened. The implantable device in combination with the laser, allows the treating surgeon to titrate the target treatment goal for better IOP management.