

# AbstractID: 11030 Title: A Novel Stereotactic Radiosurgical Device for the Treatment of Age-Related Macular Degeneration (AMD)

**Purpose:**

Age-related Macular Degeneration (AMD) is the leading cause of blindness in people over 65 in the U.S. It is caused by a proliferation of capillaries in the retina and can result in profound and rapid loss of central vision. As a neovascular disease, it has been shown to be susceptible to radiotherapy. Recently, a 100kVp tabletop stereotactic radiosurgical (SRS) device has been developed to deliver highly-collimated beams of X-rays to the fovea to treat AMD. This study is an evaluation of that system.

**Method and Materials:**

The device delivers a three-port, 16Gy single fraction dose to the macula. Using a suction-enabled contact lens assembly (“the I-Guide”) to stabilize the eye, three 4mm diameter beams of 100kVp x-rays are delivered to the fovea, directed by a positioning robot. The beams enter the eye through the sclera and avoid the radio-sensitive lens. The I-Guide includes reflective fiducials that are monitored by cameras, and the real-time position of the beam on the retina is calculated from the fiducial positions. Because of uniformity across adult eye populations, a class-solution treatment plan was implemented using a single parameter (eye length). Software manages treatment time and automatic gating of beam in case of excessive eye motion. A clinical trial is underway.

**Results:**

100kVp proves an optimal energy for ophthalmic radiotherapy. A therapeutic dose to the retina can be delivered with negligible impact to the brain and the scleral entry dose is well-tolerated. The scatter from the narrow beam is minimal to sensitive structures in the eye. Submillimeter targeting precision was demonstrated in the lab and in the clinic. Submillimeter motion-management was also demonstrated.

**Conclusion:**

The eye-specific SRS device shows great promise for providing a precise and non-invasive method of treating AMD.

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