

## PURPOSE

To evaluate the effect of small-incision clear-cornea cataract surgery on optic nerve and macula blood flow studied with OCT Angiography. Based on split-spectrum SSADA technology, OCT Angiography allows for a non-contact, non-invasive method to image retinal and choroidal vascular circulation (using the intrinsic motion of blood cells) at multiple retinal and choroidal depths.

Without the need for an intravenous contrast agent, retinal and choroidal vascular imaging can be obtained avoiding the adverse effects of contrast agents. In addition, imaging vascular flow at different levels in and around the optic nerve head may also provide valuable information. Our current study compares images of macular and optic nerve blood flow, before and after uneventful phaco cataract surgery using SSADA OCT angiography.

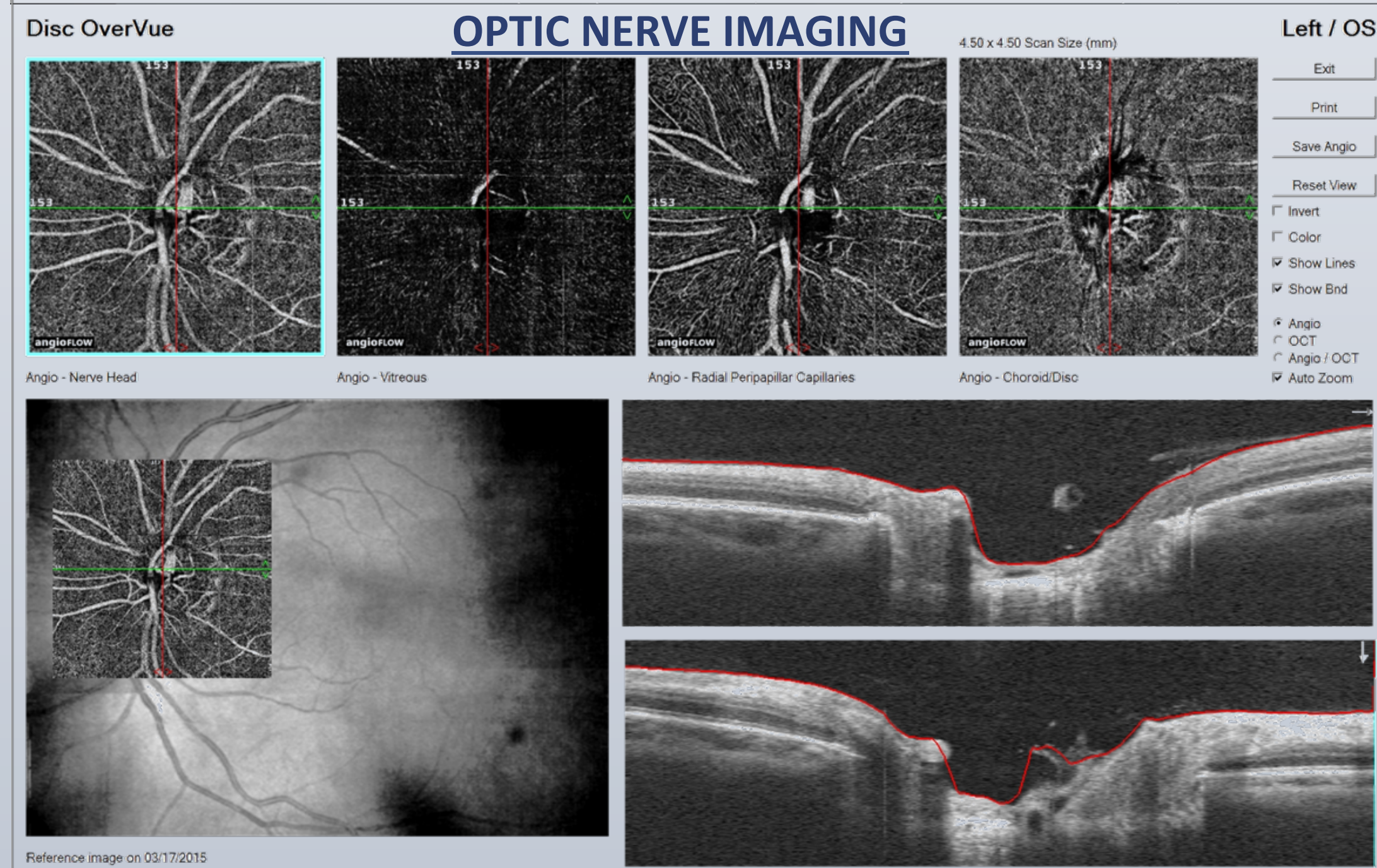
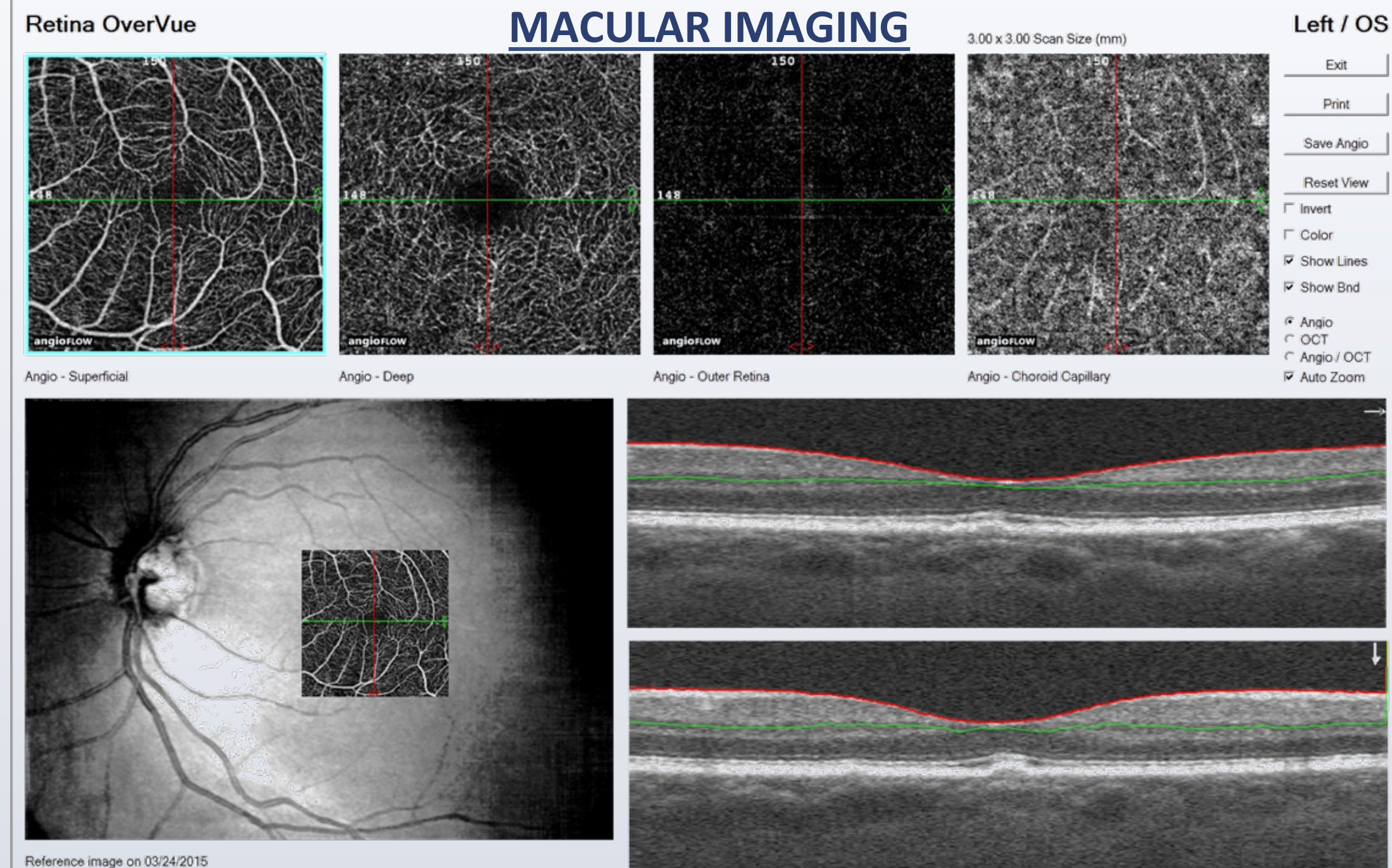
## METHODS

We evaluated 35 consecutive eyes undergoing clear-cornea cataract surgery (17 phacoemulsification, 18 femtosecond laser-assisted (LenSx, Alcon, Ft. Worth, TX) capsulotomy and lens fragmentation. We evaluated visual acuity, refraction, keratometry, tomography, pachymetry, endothelial cell counts, and intraocular pressure. AngioVue Imaging System (Optovue, Fremont, CA).

Images of the optic nerve and macula were obtained preoperatively, at day-1, week-1 and week-4. The Angioview images were obtained at 70 kHz A-scans-per-second using the SSADA algorithm, constructing angiography of the retinal and choroidal microvasculature, with the ability to isolate vasculature and circulation in individual layers of customized height in the retina and choroid.

As the current software does not allow direct comparisons of obtained images, we developed a relatively easy way to subjectively compare digital images, described as follows

1. Import Pre- and Post-op images in PhotoShop (version used PS5 12.04) - Adobe Inc., San Jose, CA.
2. Overlay and align ON cups and vasculature,
3. Use the 'linear burn' option.



## RESULTS

In 21/35 cases preoperative pictures were of adequate quality to be analyzed ( 14 unable to obtain due to cataract density) and compared to postoperative photos. Optic nerve OCT-angiography showed transient increase (both at radial peripapillary level and on optic disc blood flow) at day-1 in 5 cases (2 manual and 3 femto-assisted), not obvious thereafter possibly a transient episode of mild Irvine-Gass syndrome.

There was no macula OCT-angiography deviation from baseline at any follow-up interval. This applies for all four levels layers studied: superficial capillary, deep capillary, outer retina, and choriocapillaris. There was no statistical difference in the findings between the manual vs femto-assisted subgroups.

## CONCLUSION

This is a novel, non-invasive objective technique in evaluating optic nerve and or macula microvascular changes. Transient vascular flow pathology was evident in uneventful clear cornea cataract surgery with this non-invasive vascular flow study. This data may aid clinicians in the choice of post-operative anti-inflammatory regimen as well as its duration of administration.

In cataract cases is not always possible to acquire good quality preop AngioVue image. This makes comparison to postoperative images limited. Only transient vascular flow changes (peri-optic disc blood flow) were evident in a few cases of uneventful clear cornea cataract surgery with this non-invasive vascular flow study.

In the current series we did not experience any intraoperative complications such as capsular rupture and/or vitreous loss. This technique strongly suggests future studies of complicated cases (e.g. intraoperative posterior capsule break) may better elucidate the effect on optic nerve / macula blood flow i.e. Irvine-Gass occurrence.

Presenter Email- Spencer.Langevin@gmail.com