



## **Session 4-A: Refractive: Wavefront Technology**

### **Title: Refractive Values: Aberrometry-Derived Versus Conventional Methods Versus Manifest Refraction**

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**PURPOSE:** To compare results of aberrometry-derived refraction data with conventional refraction and the clinical standard of manifest refraction. We compare the refractive values obtained with a Tracey iTracetm, VISX WaveScantm, and Nidek ARK-900 autorefractor to manifest refraction.

**METHODS:** 20 eyes of 10 healthy volunteer subjects with no other ocular disease except refractive error underwent aberrometry-based analysis of their visual system using the VISX WaveScantm system (a Hartman-Shack-based wavefront aberrometer) and the Tracey iTracetm (a ray-tracing-based wavefront aberrometer). In addition, each patient had an acuity-based manifest refraction and autorefraction using the Nidek ARK-900 autorefractor. Refractive data were compared including sphere, cylinder, axis, and spherical equivalent. The axis was evaluated by quantifying the degrees over which the four sources of refractive data ranged for each eye. Additionally, the difference in the axis from the manifest was compared to that of the autorefraction, the WaveScantm, and the iTracetm.

**RESULTS:** Mean refractive sphere for manifest is -1.23D, for autorefraction is -1.23D, for WaveScantm is -1.28D, and for iTracetm is -1.17D. Mean refractive cylinder for manifest is -0.66D, for autorefraction is -0.71D, for WaveScantm is -0.78D, and for iTracetm is -0.79D. The mean range of axis from the four sources of refractive data is 19.25 degrees. The mean deviation of axis from the manifest refraction to autorefraction is 4.85 degrees, to WaveScantm is 6.38 degrees, and to iTracetm is 8.31 degrees. Mean refractive spherical equivalent for manifest is -1.56D, for autorefraction is -1.58D, for WaveScantm is -1.67D, and for iTracetm is -1.57D.

**CONCLUSIONS:** Manifest refraction data can be supplemented using contrast-based autorefraction and refractive analysis based on Zernicke analysis. The accuracy of this refractive data from these devices should be carefully analyzed when applied to clinical applications of refractive surgery.