## NIDEK OPD-SCAN

**By Omid Kermani, MD**

The Nidek OPD-Scan (Nidek Co, Gamagori, Japan) is an aberrometer that can be used for routine clinical screenings, intraocular surgery screenings and can aid in the custom ablation of normal to extremely aberrated eyes (Figure 6). Incorporating approximately 7,000 data points, the OPD-Scan is a combination unit that measures wavefront, corneal topography, refraction, keratometry and pupillometry (Figure 7). Surgeons can examine virtually all patients. A corneal navigator screening software is integrated into the OPD station's add-on software package, facilitating automatic screening of patients for various corneal conditions (eg, pellucid marginal degeneration and keratoconus) (Figure 8). Furthermore, this software is useful in identifying keratoconic suspects, coupled with the surgeon's clinical impressions.

In addition to traditional wavefront maps, the OPD-Scan provides wavefront data in clinically relevant wavefront refractive formats including OPD, OPD higher order and internal OPD maps. The information provided is useful for immediately evaluating the refractive effect of aberrations. For example, spherical aberration is a common cause of night myopia. The magnitude of wavefront error (in µm) for spherical aberration alone may not provide the full clinical picture. Physicians must consider that various aberrations interact differently and may benefit or deleteriously affect visual quality. The OPD map addresses this issue by plotting a diagram in diopters to demonstrate how the various aberrations interact to cause a refractive error gradient across the mesopic pupil. It also plots the overall magnitude of refraction for different pupil diameters. In the case of spherical aberration, if the OPD map reveals a significant increase in myopia peripherally, then the patient may be more prone to night myopia and halos because the myopic periphery will come into play as the pupil expands at night.

Another useful feature of this instrument is the ability to provide information on corneal aberrations and internal aberrations. The effect of corneal or internal aberrations can be separated out, and the resulting effect on visual quality may be simulated. This aids the surgeon in determining whether corneal or intraocular surgery is warranted. The generation of corneal and internal wavefront-error values permits the surgeon to select the type of customized IOL that suits best. The use of wavefront error values coupled with the OPD higher order maps, which clarify the refractive effect of higher order aberrations, allows the opti-


**Figure 6. The OPD-Scan provides wavefront data in various maps.**

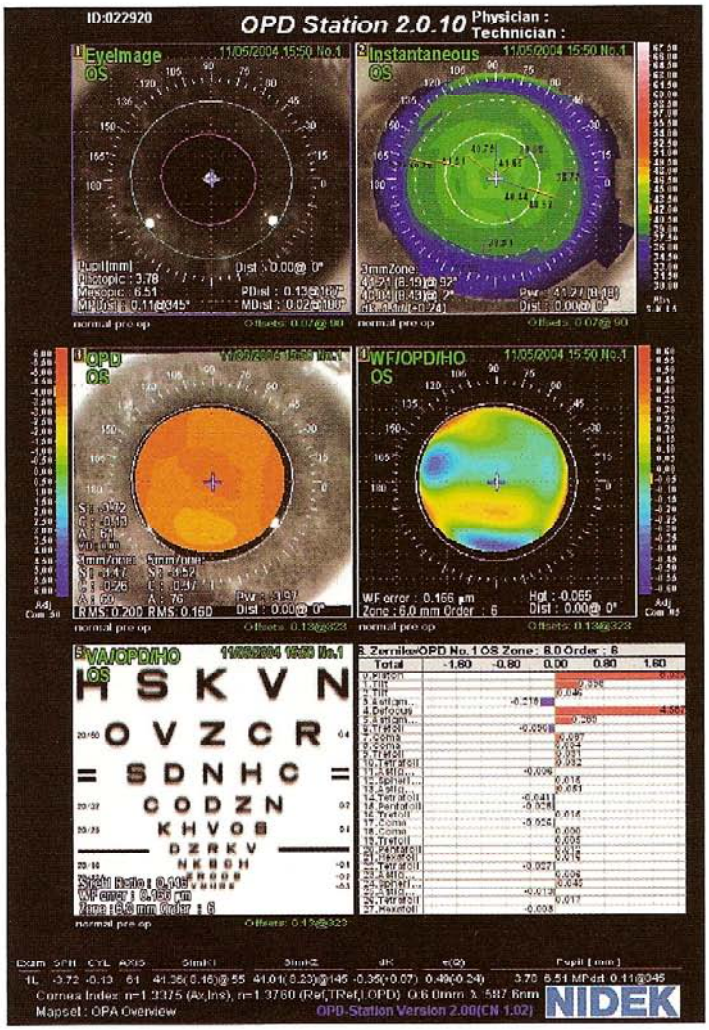


Figure 7. OPD-Scan printouts show pupillometry, instantaneous corneal topography, refractive wavefront maps (OPD and OPD higher order), visual quality and Zernike graphs.

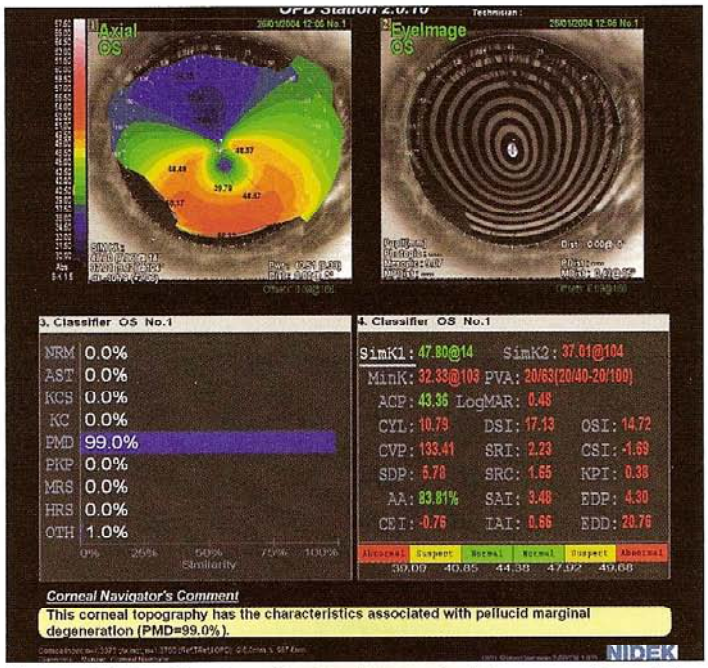


Figure 8. Identification of pellucid marginal degeneration with corneal screening software available with the OPD station.

mal selection of custom or conventional treatments. The ability to use the point spread function and letter charts that simulate visual quality is an excellent patient teaching tool. It helps in the explanation of why the surgeon is opting for one type of surgery over the other. The OPD's unique method of measurement also evaluates extremely aberrated eyes that have undergone previous surgery, whether intraocular or corneal. This enables the treatment of a subset of patients who cannot be measured with most other aberrometers.

Providing supplementary clinical information, the combination of features incorporated in the Nidek OPD-Scan provides valuable clinical information to aid in the diagnosis of corneal pathology and the identification of the appropriate treatment for a variety of patients.