

## Measuring and Managing Corneal Biomechanics

Synopsis: Surgical correction of ametropias and the identification and management of corneal ectasias are separate but tightly intertwined issues of major significance. Corneal morphologic imaging (topography and tomography) is critical to identify corneal ectatic disorders such as keratoconus and to appropriately screen patients to determine suitability for corneal refractive surgery. A variety of devices and strategies have been used with varying degrees of success, but discrepancy exists in terms of the relative importance of various screening technologies and variables to identify the earliest manifestations of keratoconus. Placido-based corneal topography, Scheimpflug imaging, and anterior segment optical coherence tomography, especially epithelial thickness variations, all play a significant role in identifying keratoconic eyes in earlier stages. Despite multiple available technologies, there remains a gap in identifying ectatic corneal disease at its earliest manifestation, and there remains significant controversy and discrepancy in the literature about the relative value of different evaluations in distinguishing keratoconus suspect eyes from normal populations. The latest research shows that combining technologies provides better discriminating capability than using any device in isolation. Early identification of corneal ectasias using current technology is critical, but current tests in the clinic are morphological, not biomechanical, and therefore do not allow a definitive diagnosis at the earliest stages, resulting in some patients incorrectly receiving refractive surgery while others lose vision before cross-linking treatment is initiated. Thus, the need for accurate identification of subclinical ectasia has never been greater. The next step in corneal imaging will address direct biomechanical measurements in an accurate, reproducible way