algorithm calculates the standard deviation of these values for the first zone and applies the formula for calculating irregularity. These calculations are repeated for each zone.

Optical surface irregularity is proportional to the standard deviation of surface curvature. Consequently, only axis-independent surface curvatures are used in the calculation, as only they are true surface properties. These include the mean curvature, which is a measure of local surface sphericity, and astigmatic curvature, which is a measure of local cylinder. As both curvature variations are important, the standard deviations of the mean and astigmatic curvature are statistically combined (their variances are added) to yield the irregularity in standard curvature units (reciprocal meters). Curvature in reciprocal meters can be converted to D by multiplying it by the surface refractive index difference, which is 0.3375 for the keratometric surface. Thus, the D equivalent of irregularity is about one-third the curvature measure in reciprocal meters.

Clinical Implications of Irregularity Calculations

Optical surface irregularity is important to the refractive surgeon because it often represents a loss in best-corrected visual acuity (BCVA). Regular astigmatism has a low irregularity, while irregular astigmatism has a high degree of irregularity. Higher-order aberrations (HOAs) may also have a high degree of irregularity. Measures of irregularity may also be useful as a supporting indicator (but not the sole indicator) in evaluating keratoconus. A 3-mm