Summary

Aberrations are defined as optical defects, caused by imperfections of optical systems, which reduce the quality of images formed by such systems. It can be described quantitatively using Zernike polynomials; these mathematical models are adequate for describing the wavefront measurements of the eye, because they are defined based on a circular form.

Higher-order aberrations such as coma, spherical aberrations, and other higher-order terms are refractive distortions that limit the vision of healthy eyes to less than the retinal limits and cannot be corrected with a spherocylinder lens or standard refractive surgery.

Wavefront sensing is the mean of measuring these aberrations. In the clinical literature on ophthalmology and optometry, the first applications of wavefront sensing to refractive surgery and ocular disease appeared less than 10 years ago. The fundamental principle by which contemporary aberrometers measure ocular wavefront aberrations was discovered nearly 400 years ago.

The principle of operation of wavefront sensors used in ocular aberrometers is to measure the deviation of individual rays of light passing through various locations in the pupil of the eye.

There are various physiological and pathological factors that can alter one’s higher order aberrations and understanding them lead to a better understanding in managing HOAs.

Moreover with the availability of multiple corrective methods for such a problem, understanding the requirements and the benefits of each one helps individualizing refractive correction to suite the

versatility of HOAs among patients, while defining the future of this technology and the advancement in it helps bringing the pursue of supernormal vision more closer to come to an end.