Wavefront technology : Past, current status, and developing future

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Wavefront technology is very much in its infancy, but it promises to produce an aberration-free optical system which would be better than the natural optical system. But at this stage it is impossible to state exactly how far we would be able to carry this technology, given that we are dealing with a biological system such as the cornea. Many unknowns are still to be discovered and controlled, in that the cornea is a living structure which is altered considerably by removal of tissue. The biochemical effect on the cornea will need to be addressed in order for refractive surgery to reach its optimal correction. We have not completely elucidated the optical effect of removing tissues from the central or peripheral part of the cornea and what effect that has on the rest of the cornea. Unexpected effects that we are only now trying to understand and elucidate will have a significant impact in improving our results. (Siganos DS et al 2000).The theoretical limits are somewhere between the 20/8 or 20/10 vision. But in order to reach this limit we have to overcome a number of technological challenges. The optical aberrations that induce the most visual defects would have to be identified and understood prior to proceeding with treatment with the wavefront technology. We know that this technology will work as the early visual results are promising. However, we are facing technological limits that must be addressed within the next few years before -we are able to achieve the ”Holly Grail” of vision, which would be the aberration free optical system. (Phusitphoykai N et al 2003).