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innovation for all to see
WAVEFORM

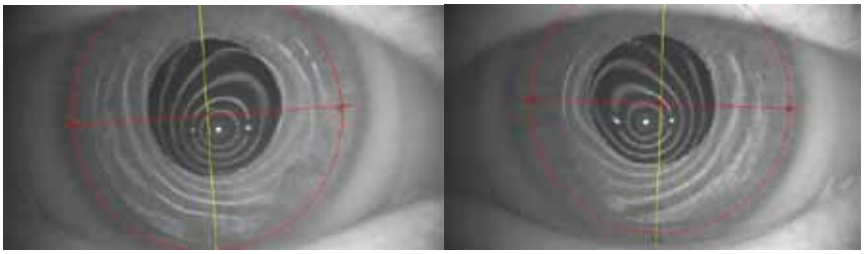
WaveForm Wavefront Guided Contact Lenses Case Study #1

RS – Keratoconus

Overview and History

RS, a 38 year old male presented with bilateral keratoconus. His best corrected VA was 20/200. Eyeglass lenses did not correct his vision and rigid gas permeable lenses could only be tolerated for 2 hours per day. RS tried many different options to correct his vision including large diameter rigid gas permeable lenses and hybrid lenses. Historically soft contact lenses are not an option for the correction of keratoconus due to the draping effect of a soft contact lens. As a result RS was evaluated and approved for disability.

Refraction fails to improve his vision. Upon anterior segment examination, both corneas demonstrate thinning inferior to the apex with scarring just inferior to central visual axis bilaterally. Positive Munson sign is present in each eye and lenses show trace NS OU. On dilated fundus exam the discs are pink, sharp and flat with cupping at 0.3 mm OD and 0.5 mm OS. All vessels and the macula appear unremarkable bilaterally. The peripheries are flat and attached bilaterally. Keratometry readings were attained which are consistent with keratoconus.



WaveForm Examination

During a routine follow up examination RS was evaluated for soft contact lenses using WaveForm's proprietary wavefront guided contact lens fitting system. A soft trial lens with fiduciary marks was manufactured by WaveForm. The parameters of the trial lens were tailored to the patient's axial measurements as measured by the OPD. After placing the trial lens on RS, the lenses were allowed to settle for 15 minutes at which time they were evaluated for overall fit and stability. Once stable, the patient was measured using the Marco OPD aberrometer for all low and high order aberrations including those generated by the trial lenses. WaveForm's software allows for the low and high order optical measurements of the eye as well as the position of the lens relative to the pupil including the X, Y and rotational co-ordinates. By using this information WaveForm manufactures a contact lens that accurately matches the visual needs of each of RS's eyes.

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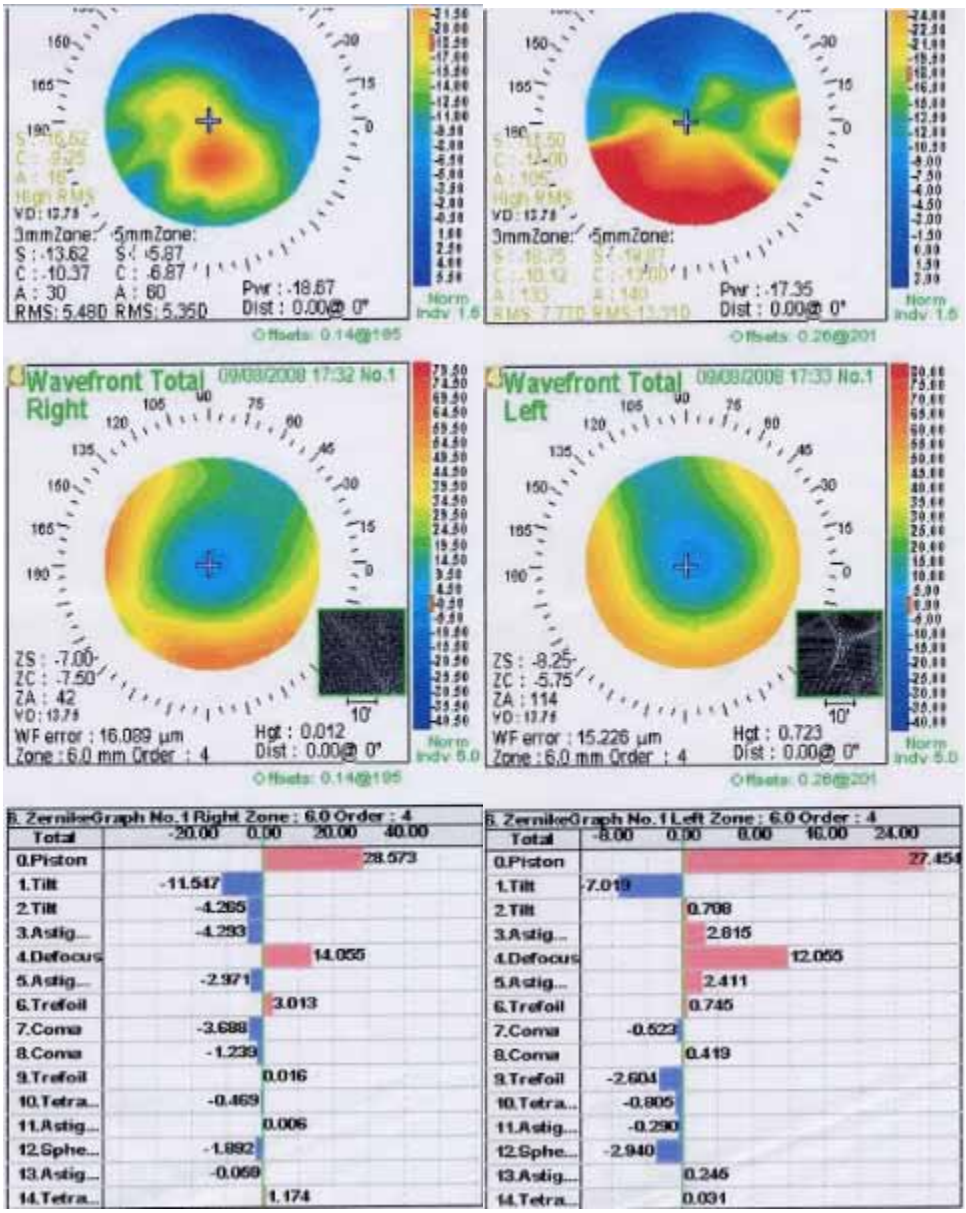
OD **OS**



WaveForm's Wavefront Guided Soft Lens Manufacturing Process

The Zernike data through 4th order polynomials was sent to WaveForm's manufacturing lab where it was optimized into cutting files for the Oscillating Tool Lathe. A lens with the same parameters as the original trial lens is used to re-create the final lens having identical fitting parameters. The cutting file generated through WaveForm's software algorithm precisely generates the Zernike coefficient data onto the front surface of the soft contact lens thereby correcting the patients low and high order aberrations.

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Results

RS was fitted with WaveForm's wavefront guided soft contact lenses. The resultant BVA is:

20/25-1 OU

20/30-1 OD

20/25-2 OS

Initial wearing time was 8 to 10 hours per day. For the first time in many years RS could function normally and was able to get off of disability and go back to work. He saw his children's faces for the first time. WaveForm's soft wavefront guided contact lenses precisely corrected RS's vision by correcting the eyes optical aberrations created by the kerato-conus where all other lenses had failed. This technology is revolutionary and may help millions of patients who have degenerative corneal disease, failed LASIK and people who have presbyopia. Research and development of this novel technology is ongoing.