

ESCRS Munich 03

CORNEAL WAVEFRONT ANALYSIS AND TREATMENT OF HIGHER ORDER ABERRATIONS.

Purpose: To demonstrate a new method of diagnosis and treatment of irregular corneal surfaces and evaluate its predictability and safety. Primary irregular astigmatism as well as decentrations and other unsatisfactory ablation patterns of former refractive surgery were corrected in more than 50 cases .

Setting: Pre/postoperative clinical examinations took place in the offices of ophthalmic surgeons. Operations were performed in the Munich VisuMed Laser Center.

Methods: Curvature maps obtained by the Keratron Scout Topographic system were transformed into Zernike polynomials. On this basis, specific ablation patterns were calculated by the Optimized Refractive Keratectomy (ORK) Program for the Schwind Esiris 200Hz flying spot laser with 0.8mm true Gaussian profile. Treatments were performed by primary LASIK or flap relifts.

Change of Corneal Topography and consecutive reduction of Corneal Aberrations (RMS-total, RMS-higher order) were compared with patient satisfaction, manifest spectacle correction, uncorrected and best corrected visual acuity.

If results were unsatisfactory and corneal pachymetrie sufficient, a second ablation was performed after flap relift.

Results: Treatment of virgin eyes (Irregular Astigmatism) and reshapes of decentred or irregular ablations and small optical zones and regression resulted in significant

reduction of spherical and cylindrical refraction and increase in uncorrected as well as best corrected visual acuity. Patient satisfaction corresponded well with reduction of aberrations and improved topographic regularity. Especially results in hyperopic eyes were surprisingly good.

In cases where inflammatory processes as DLK or epitheliolysis had taken place in the flap, results after the first reshape were often unsatisfactory and only improved after a second retreatment.

Conclusion: Treatment of corneal irregularities based on Corneal Wavefront Analysis seems a promising approach for primary irregular astigmatism, if total ocular aberration is taken in account.

Decentrations and small optical zones were retreated with high efficiency and safety in myopic and hyperopic eyes.

Retreatments after precedent inflammatory processes were difficult (unpredictable flap-deformation?). A planned two step approach is proposed.