

R1 R2 R3 PG0 PG1 Estagiário Tecnólogo
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Service (sector) Refractive Surgery N° CEP

The influence of dry eye on the wavefront measurements

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Purpose: The tear film plays an important role in the refraction of the eye, and its stability contributes heavily to the quality of retinal image. Purpose of this study is to show the influence of dry eye condition on the quality of wavefront measurements and discuss its possible influence on the surgical outcomes. **Methods:** Ten eyes of 5 healthy patients, joined voluntarily this study. The pupils were dilated with a drop of phenylephrene 10% and a drop of tropicamide 1 % to a size of more than 7 mm and then the aberrometry measurements were taken with a commercially available wavefront analyzer (ALLEGRETTO WAVE, WaveLight Laser Technologie AG), resulting in 5 good quality maps. Dry eye was provoked by instilling one drop of proximetacaine 0.5%, putting the eyelid speculum and leaving it dry out on still air. After a period of three minutes, the speculum was removed, patient blinked normally and additional wavefront measurement were carried out over the following 4 hours. The maps were analysed in the terms of lower and higher order aberrations in Zernike coefficients up to the 6th order (C3 – C27), root mean square (RMS) total and high. **Results:** Raw data photographs clearly showed the deterioration of the imaging quality of the eye with the dry eye condition, so that the measurements were not possible immediately after the three-minute drying period, as well as for the first 5 minutes. RMS total and high were very inconsistent in the first possible measurement, gaining more consistency throughout time, reaching its prior values after 4 hours. **Conclusion:** Dry eye condition alters the corneal epithelial regularity, and therefore tear film evenness. The quality of wavefront measurements with WaveLight ALLEGRETTO WAVE seems to correlate to the quality of the altered tear film and can be observed and analyzed.