

Ocular higher-order aberrations (HOAs) and mesopic pupil size in individuals screened for refractive surgery.

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PURPOSE: To explore the distribution of ocular higher-order aberrations (HOAs) and mesopic pupil size (MPS) in individuals screened for refractive surgery.

DESIGN: Observational case series.

SETTING: My private clinic, Tehran, IRAN.

METHODS: Ocular HOAs and MPS were examined in 2458 eyes of 1240 patients with myopia and myopic astigmatism and 215 eyes of 110 patients with hyperopia and hyperopic astigmatism using the Advanced Personalized Treatment (APT, Busch& Lomb) wavefront aberrometer. Root-mean-square (RMS) values of HOA, total spherical aberration (TSA), total coma (TC) and MPS were analyzed. All patients had correctable refractive error without history of refractive surgery or underlying diseases. Pupil size measurement was performed under mesopic condition and Ocular HOAs were examined across a ≥ 6.0 mm pupil.

RESULTS: The mean value of MPS in myopic group [MRSE of -3.76 D and ± 2.26 (SD), (Range -0.75 to -16.0 D) and mean Cylinder 1.24 D ± 1.25 , mean age 28.3 year ± 7.32 (SD)] was 6.17 mm ± 0.97 mm(SD) (range 2.8 mm to 8.9 mm).

The mean value of MPS in hyperopic group [MRSE of +3.36 D and ± 1.92 (SD), (Range +0.50 to +8.25 D) and mean Cylinder 1.56 D ± 1.56 , mean age 37.69 year ± 10.09 (SD)] was 5.60 mm ± 1.03 (SD) (range 2.8 mm to 8.0 mm).

The mean value of HOAs in myopic group was 0.369 μm , ± 0.146 (range 0.10 μm to 0.990 μm), TSA 0.133 μm and TC 0.330 μm . In hyperopic group the mean value of HOAs was 0.418 μm ± 0.15 (range 0.160 μm to 0.970 μm), TSA 0.202 μm and TC 0.343 μm .

Hyperopes had statistically significant greater levels of total ($P=0.00$) and TSA ($P=0.00$) aberrations compared with myopes. Also the mean value of MPS in myopic group had statistically significant greater levels ($P=0.00$).

CONCLUSIONS: Significant levels of higher-order aberrations were found in both groups. The mean value of MPS in myopic group was 6.17 mm.