



***Laser Eye Surgery from LASIK MD – Topography-Based Screening for Previous Laser In Situ Keratomileusis to correct Myopia (Abstract)***

**Abstract Title:** Topography-Based Screening for Previous Laser in Situ Keratomileusis for Myopia and Hyperopia

**Purpose:** To develop a screening tool based on corneal topography to detect previous myopic and hyperopic laser in situ keratomileusis (LASIK).

**Settings:** Clinical data from three private clinics analyzed in a university setting.

**Methods:** 476 topographies (Orbscan II, Bausch & Lomb) were randomly selected (one topography per patient): 338 from unoperated corneas, 81 from corneas with previous LASIK to correct myopia, and 57 from corneas with previous LASIK to correct hyperopia. The LASIK procedures were performed using a Technolas 217C or 217Z excimer laser and a Hansatome microkeratome (Bausch & Lomb Surgical). Computerized image processing algorithms were developed. The first set of algorithms (VESm, VESh) calculated the volume summation between the anterior surface and the best fit sphere for two zones. The second set of algorithms (DCm, DCh), calculated the mean anterior tangential curvature difference between central and mid-peripheral zones. SVM classifier and cross-validation were used to optimize the radii of the studied zones.

**Results:** The features VESm and DCm for the screening of a myopic LASIK respectively gave 5.0% and 3.5% false positives, and 7.3% and 4.9% false negatives. The features VESh and DCh for the screening of a hyperopic LASIK, respectively yielded 5.2% and 2.9% false positives, and 6.9% and 6.9% false negatives. The performance of these attributes was generally superior to clinical assessment of the topography color maps. Our features values were strongly correlated with the amount of surgical correction expressed in spherical equivalent ( $0.691 < R^2 < 0.861$ ;  $p < 0.0001$  in all cases).

**Conclusions:** Criteria based on Orbscan II corneal topography are proposed for the detection of previous hyperopic and myopic LASIK performed with a Technolas 217C or 217Z excimer laser.