THE LITERATURE

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INFLUENCE OF INTRAOCULAR LENS HAPTIC DESIGN ON REFRACTIVE ERROR

Savini G, Barboni P, Ducoli L, et al[1]

ABSTRACT SUMMARY

Savini et al evaluated the influence of IOLs' haptic design on the refractive prediction error for cataract patients. The investigators used the same devices to measure corneal power and axial length in 110 eyes implanted with a three-piece AcrySof IOL (MA60AC) and 84 eyes implanted with a single-piece AcrySof IOL (SA60AT; both from Alcon). They assessed the median absolute error and mean absolute error in refraction prediction (ie, the difference between expected and actual refraction) 1 month postoperatively using the Haigis, Hoffer Q, Holladay 1, and SRK/T formulas.

With all of the formulas, the median absolute error was lower with the three-piece IOL. The median absolute error ranged between 0.15 D (Haigis and Holladay 1) and 0.19 D (SRK/T) with the three-piece IOL and between 0.23 D (Haigis) and 0.30 D (SRK/T) with the single-piece IOL. With all of the formulas, a higher percentage of eyes with the three-piece IOL were within ±0.25 D and ±0.50 D of the target refraction.

DISCUSSION

The ophthalmic industry has endeavored to establish a gold-standard IOL platform. One-piece IOLs have become the platform of choice for multifocal/bifocal and toric lenses. Compared with three-piece IOLs, single-piece lenses can be inserted through smaller incisions (up to 1.8 mm vs 2.75 mm), and their placement inside the capsular bag is more predictable and less traumatic. It is important to note that most IOLs that fit through small incisions (1.8-2.2 mm) are made of a hydrophilic acrylic material, which is associated with a high percentage of posterior capsular opacification as well as opacification of the optical zone, leading to a severe decrease in visual acuity.[2,3]

Klamann et al reported that 1.8-mm incisions result in statistically significantly less surgically induced astigmatism than 2.2-mm ($P = .046$) and 2.75-mm ($P = .017$) incisions. There was no significant difference between the 2.2-mm group and the 2.75-mm group in the study.[4] According to Prinz and colleagues, both single- and three-piece IOLs have comparable rotational stability, suggesting the latter is a viable toric IOL option.[5]

The study by Savini et al is limited by its short follow-up period (1 month), but the higher percentage of eyes within the target refraction in the three-piece IOL group highlights the strength of the haptic design of these lenses. They resist capsular contraction, preventing further forward axial movement caused by haptic compression force decay in the first few postoperative days. In conclusion, a three-piece IOL is a very good option for cataract patients. It outperformed the refractive predictability of the single-piece IOL with minimal clinical differences between the two lenses.[1]

COMPARISON OF THE ANTERIOR CAPSULOTOMY EDGE CREATED BY MANUAL CAPSULORHEXIS AND TWO FEMTOSECOND LASER PLATFORMS: SCANNING ELECTRON MICROSCOPY STUDY

Al Harthi K, Al Shahwan S, Al Towerki A, et al[6]

ABSTRACT SUMMARY

The authors compared the anterior capsular edge of manual (n = 10) and laser capsulotomies created with the LenSx Laser (Alcon; n = 9) or the Victus Femtosecond Laser Platform (Bausch + Lomb Technolas; n = 10). They used scanning electron microscopy (SEM) to evaluate irregularities of the capsule's edge using angular moment and contrast.

On SEM, the surfaces of the edge created by both lasers showed marked irregularity compared with the smooth edge of the manual capsulotomy. The angular second moment and contrast measures for both lasers differed significantly from those obtained for the manual capsulorhexis ($P < .001$). There was no difference between the lasers in angular second moment and contrast measures. The angular second moment showed only a weak negative correlation with increasing laser power, whereas contrast showed a weak positive correlation with increasing power.

DISCUSSION

Although surgeons face oppressive marketing, they must balance the pros and cons of laser cataract surgery for patients. SEM suggests that the laser compromises the resistance of the capsular edge, increasing the risk of anterior capsular tears during intraocular maneuvers, especially in eyes with hard nuclei where excessive manipulation is mostly required. Abel et al reported that anterior capsular tears occurred in 1.84% of eyes in the laser group (n = 1,852) and 0.22% of eyes in the manual group (n = 2,228; $P < .0001$).[7]

Capsulotomies created with the laser result in superior centration and size, more predictable effective lens position, and a lower incidence of posterior capsular opacification.[8] Still, the clinical relevance of these differences when compared to that of a capsulorhexis performed manually by an experienced surgeon is questionable.[8,9] Harthi et al elucidate the morphological modifications associated with cutting the lens capsule, and the results of their study should be used to improve laser cataract surgery so that the edges are more smooth with minimal structural damage. ■

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