Short communication

Surgical technique for centering diffractive intraocular lenses with open-loop haptics

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ABSTRACT

Objective and method: To describe a surgical technique that enables diffractive lenses with open-loop haptics to be centered on the chosen optical axis. To perform this, the desired axis must initially be marked on the cornea, the rhexis must be aligned with this, and once the intraocular lens (IOL) is implanted in the capsular bag, it is aligned by intracapsular rotation to match the central ring of the IOL with the corneal mark. Centering by simple optical lateral mobilization is often ineffective.

Conclusion: The described technique is easy to perform, allowing more precise focusing than the classic lateral mobilization technique used.

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Técnica quirúrgica para el centrado de lentes difractivas con hápticos en open-loop

RESUMEN

Objetivo y método: Describir una técnica quirúrgica que permite centrar las lentes difractivas con hápticos en open-loop sobre el eje ocular elegido. Para ello se marca inicialmente sobre la córnea el eje deseado, se alinea la rexis con este y, una vez implantada la lente difractiva en el saco capsular, se alinea mediante rotación intracapsular hasta hacer coincidir el anillo central con la marca corneal. El centrado por simple movilización lateral de la óptica resulta frecuentemente ineficaz.

Conclusiones: La técnica de rotación descrita es una técnica fácil de realizar que permite un centrado más preciso que la clásicamente usada técnica de movilización lateral.

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Introduction

The visual quality obtained after implanting multifocal intraocular lenses (MFIOL) is directly related to the precise definitive centering on each lens.1,2 A technique is described to optimize the centering of diffractive MFIOL with haptics in open-loop (C-loop or J-loop designs).

Surgical technique

The surgeon must choose the point on the cornea on which the IOL will be centered. In our case this was the first Purkinje image. Just before initiating surgery under topical anesthesia and with the pupil dilated, we marked over the corneal reflex and asked the patient to look directly at the center of the coaxial light of the surgical microscope and make a mark in the corneal epithelium which was previously dried with a blunt instrument tip (Sinskey Hook) impregnated with Gentian Violet. After irrigating, we made certain that the mark persisted. When focusing on the lens surface the marked point will disappear from the field due to loss of focus and therefore does not interfere with the subsequent surgery.

When performing capsulorrhexis, it must be centered vis-à-vis the epithelial marking point, making the focus adjustments as required to see it while performing capsulotomy.

After implanting the diffractive IOL and extracting all the viscoelastic material from the capsular sac and anterior chamber (AC), if the central ring of the IOL and the corneal mark do not match, at the end of the surgery the IOL will not be centered with the target axis. If the aim is to center the IOL by means of lateral displacement utilizing an instrument to linearly displace the optic toward the corneal mark (Fig. 1A and B), frequently the IOL will return to its original position when the capsular sac is injected with balanced saline solution (BSS) in the closed AC (Fig. 1C). For this reason, instead of lateral displacement it is preferred to rotate the lens within the capsular sac with the aid of the irrigation-aspiration terminal in pedal position 1 (only irrigation) which, either by pushing a haptic or softly supporting ourselves on the optic, allow us to produce a progressive IOL rotation within the capsular sac injected with BSS (Fig. 2A). As the rotation takes place the center of the lens changes position vis-à-vis the corneal mark (Fig. 2B). We must continue the rotation until the center of the optic matches the epithelial mark or if not possible to bring it as close as possible. The position of the IOL will remain after injecting BSS in the sealed AC (Fig. 2C). If the AC is lost and the lens moves during the incisional hydration maneuvers, only at that moment we can re-center it with lateral instead of rotation movements with a service instrument because we are already at a point which is closer to the corneal mark than the one we can obtain through rotation.

Discussion

There is controversy about the corneal mark that is closest to the visual axis,3 but if the surgeon wishes to center the IOL on a different point, the described technique will also be useful.

As regards capsulorrhexis centering, the convenience of the anterior capsule slightly covering the edge of the implanted lens is well accepted. Greater rhexis predisposes to posterior capsular opacification while smaller rhexis could reduce the optic qualities of these lenses, particularly in scotopic situations, among other drawbacks.4 Accordingly, it is important to center the capsulorrhexis vis-à-vis the corneal mark because otherwise it is likely that the IOL will not be centered under the epithelial mark without losing correct anterior capsule coverage.

The operation of centering the lens in the capsular sac by means of lateral movements is frequently inefficient (Fig. 1). However, this is not the case when the centering is carried out with intra-sac rotation, where it can be seen that the center position of the IOL varies with respect to the corneal mark while rotating it in the sac (Fig. 2). A theory that could explain this behavior is that the in vivo capsular sac fundus perimeter anatomy is not circular or that local stress in the sac periphery is not symmetrical. This would not be surprising considering the well known asymmetry in the perimeters of anterior ocular segment structures.5 However, we have not found any bibliography on the exact in vivo size of the capsular perimeter. In the case of implanting a capsular expansion ring, centering by means of intracapsular rotation would be less efficient or not at all due to the smoothing-out effect of the ring on the sac perimeter.

Even though the above description refers to diffractive IOLs with open-loop haptics, it is likely that similar behavior will be observed in other IOL designs having clearly differentiated

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Fig. 1 – Classic technique for centering IOL by means of lateral displacement. (A and B) The IOL optic is laterally displaced with a service instrument to match the corneal X mark. (C) When refilling the chamber with BSS, the IOL with frequently return to its initial position.
centers. This finding leads us to think about the difficulties of centering thoric diffractive lenses in which the rotation maneuver goes against the required orientation of the astigmatism access to be corrected by means of the IOL.

**Conflict of interest**

No conflict of interests has been declared by the authors.

**REFERENCES**