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The Influence of Optic Edge Configuration on the Development of Posterior Capsule Opacification

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"Phacoemulsification & aspiration and intraocular lens (IOL) implantation" has become the most common procedure for cataract surgery especially in industrialized countries. The success rate of this surgery is estimated to be more than 95%. The posterior capsule opacification (PCO) development during the postoperative course, however, is still an unavoidable complication. The treatment of PCO by means of Nd:YAG-laser costs a lot and might cause serious complications such as retinal detachments, cystoid macular edema and glaucoma.

Therefore, prevention of PCO development is a very important issue. Advances have been made in IOL designs that have reduced the amount of PCO following surgery. The understanding of how the IOL design influences PCO has also advanced. It is now well-known that the sharp edge design of IOLs leads to better PCO prevention.

The Centerflex IOL is a one piece hydrophilic acrylic lens. It has a sharp optic edge and a special haptic design, which ensures a good centring and rotation stability of this IOL.

Apple and his co-operators showed in an animal model that the haptic-optic junction of the Centerflex IOL where there is no sharp edge is the critical structure of PCO development. In a model with a total 360 degrees sharp edge, the PCO prevention was clearly better. Then, the C-flex IOL was developed to have a 360 degrees sharp posterior optic edge.

Considering the fact described above, in this doctor's thesis, the C-flex IOL with the 360 degrees posterior sharp optic edge design or "enhanced edge" was compared with the Centerflex IOL without the sharp edge design at the optic/haptic junction regarding the expression of PCO.

In a prospective Food and Drug Administration (FDA) study, the Centerflex IOLs were implanted for 83 patients after uneventful cataract surgery and the expression of PCO was investigated 6months and 12 months after surgery. In another FDA study, the C-flex IOLs were implanted for 42 patients and regularly examined after surgery. After 6 and 12 months post-op, retro illumination photographs were done and evaluation of PCO (EPCO) analysis was performed in comparison with a matched group of Centerflex IOL patients, who had participated in the FDA study.

The analysis of the expression of PCO with the EPCO program showed that there was a significantly low EPCO value in the C-flex group compared with that of the Centerflex group (P value<0.01). EPCO-value in the improved IOL C-flex group versus that in the Centerflex control group after six months and twelve months was 0.054±0.13 (n=30) versus 0.19±0.03 (n=36) and 0.082±0.085 (n=26) versus 0.35±0.04 (n=31).

C-flex showed a very good functional result regarding visual acuity. The average preoperative corrected visual acuity was 0.44±0.18 and on the first postoperative day, the visual acuity increased to 0.65±0.215. In the end, the corrected visual acuity 12 months after surgery became 0.82±0.179.

In conclusion, the EPCO-value of C-flex was significantly lower than that of Centerflex. Therefore, it was clinically indicated that the "enhanced edge" of the C-flex IOL lead to better PCO prevention. Additionally, the EPCO program showed that the average overlapping area of the C-flex group was larger than that of the Centerflex group. It might be also an additional prevention factor of PCO.