

# Trial of Square and Round Edge Intraocular Lens on Preventing Posterior Capsule Opacification

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**Purpose :**

To clarify the effects of square and round edge Intraocular lens (IOL) on preventing posterior capsule opacification (PCO).

**Patients and Methods :**

In this study, square edge PMMA IOL was implanted in one eye and round edge PMMA IOL was implanted in fellow eye of 15 patients after Phacoemulsification. Those with Diabetes, Glaucoma, Exfoliation syndrome, Uveitis and Pupil size smaller than 6.0mm, past history of ocular surgery were excluded from study. All patients are between the age of 55 to 60 yrs and received same brand of IOL in the bag with well centered capsulorhexis covering the IOL optic by one surgeon applying same technique.

Post operatively, all patients received similar routine medications. At different follow-up interval PCO was assessed on morphological scoring systems that are independent of visual acuity testing or other exclusive subjective parameter, like glare, contrast sensitivity and optical aberration. In this morphological scoring system PCO was divided into two broad groups. One is central zone free (Peripheral) PCO and another is central zone involved (Central 5.0mm) PCO. Central Zone free PCO again divided into mild (1 quadrant), moderate (2 quadrant) and severe (> 2 quadrant) involvement of PCO.

**Results :**

Table shows changes of PCO values in each group at the end of 2 yr follow-up. Evaluating the picture of PCO at the end of two year, it appears that with sharp optic edge IOL, PCO was mostly inhibited, which is less marked in case of round optic edge IOL.

| PCO                              | Square edge IOL | Round edge IOL |
|----------------------------------|-----------------|----------------|
| <b>Central Zone Free PCO:</b>    |                 |                |
| Mild                             | 4               | 4              |
| Moderate                         | 2               | 3              |
| Severe                           | 0               | 1              |
| <b>Central Zone Involved PCO</b> |                 |                |
|                                  | 0               | 1              |



Severe



Central Zone Involved PCO

**Discussion :**

Posterior capsule opacification (PCO) is the most frustrating frequent late complication of modern cataract surgery with intraocular lens (IOL) implantation<sup>2</sup>. The rate of PCO is variable reportedly between 3 and 50% during the 1st 5 years after cataract surgery<sup>3</sup>. The reason for this variation is due to systemic and ocular disease, patients age, surgical methods, IOL materials and designs<sup>4</sup>.

The influence of IOL design on PCO has been extensively described based on experimental work by Nishi et. al.<sup>11</sup>

Schaumberg DA and coauthors report sharp optic edges seem the most significant factor in preventing PCO and currently receiving more attention than IOL material in PCO prevention.

Okihiro Nishi et. al<sup>9</sup> described the histologic section of an endocapsular IOL that had dislocated posteriorly into the vitreous and was removed showed that migrating lens epithelial cells (LECs) were inhibited at the distinct capsular

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bend created by the Plano-convex optic. They also observed that LECs were inhibited on rectangular shaped well bottoms in culture. All these findings suggest that a capsular bend or angle created by a capsule tensioning or on IOL can induce contact inhibition to LECs and, therefore, reduce PCO. (Fig-1 & Fig-2)



Fig-1



Fig-2

In this study, on the preventive effect of an IOL on PCO, the sharp bend optic IOL created a tight contact between the posterior lens capsule and IOL surface and thus inhibit the migration of LECs towards the centre and central PCO was mostly inhibited which is less marked in case of round optic edge IOL in this study.

Estimation of PCO on morphological system is not reliable though it is less expensive and less instrument dependent.

Further study is needed with long time follow-up of at least 5 years and large sample will be helpful to get the information about the role of optic geometry on preventing PCO.

#### Conclusion :

The sharp optic edge exerts greater compression on the posterior capsule and thus enhance the barrier effect provided by this optic geometry.

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