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Comparative analysis of multifocal and monofocal intraocular lenses in treating cataract patients: Evaluation of postoperative visual quality

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Objective: This study aims to compare the effectiveness of multifocal and monofocal intraocular lenses in the treatment of cataract patients. Through postoperative visual quality assessments, the study provides an objective reference for surgical choices.

Methods and Materials: Cataract patients were randomly assigned to either the multifocal lens group or the monofocal lens group. Visual parameters such as acuity, refractive power, and corneal curvature were recorded before and after surgery. Postoperatively, regular follow-ups were conducted to assess the visual quality, including near and distance acuity and contrast sensitivity.

Results: Significant Improvement in Postoperative Vision:

Multifocal Lens Group: Showed a mean improvement in near-distance visual acuity of 0.2 logMAR (logarithm of the minimum angle of resolution), from a preoperative baseline of 0.5 logMAR to a postoperative 0.3 logMAR. Statistical analysis revealed this change to be significant ($p < 0.01$).

Monofocal Lens Group: Demonstrated a smaller improvement, with a mean change in near-distance visual acuity from 0.5 logMAR to 0.4 logMAR, which was statistically less significant ($p = 0.05$).

Flexible Visual Adaptation: Multifocal Lens Group: Patients exhibited a substantial increase in intermediate-distance visual acuity (at 60 cm), improving from a preoperative mean of 0.4 logMAR to a postoperative mean of 0.2 logMAR ($p < 0.01$).

Monofocal Lens Group: Showed minimal change in intermediate visual acuity, with a non-significant improvement ($p = 0.1$).

Enhanced Postoperative Contrast Sensitivity: Multifocal Lens Group: Recorded a notable increase in contrast sensitivity at spatial frequencies of 3, 6, and 12 cycles per degree, with statistical significance at all levels ($p < 0.05$). For instance, at 6 cycles per degree, contrast sensitivity improved from 1.5 to 2.1 log units.

Monofocal Lens Group: Contrast sensitivity improvements were less pronounced and did not reach statistical significance ($p > 0.05$).

Conclusion: Through the comparison of multifocal and monofocal intraocular lenses in the treatment of cataract patients and the assessment of postoperative visual quality, the following conclusions are drawn:

1. Multifocal lenses result in a more significant improvement in postoperative vision, especially in near-distance vision.
2. Patients with multifocal lenses demonstrate more flexible visual adaptation, meeting visual demands at various distances effectively.
3. Multifocal lenses enhance postoperative contrast sensitivity, providing patients with a clearer and more realistic visual experience. These findings suggest that multifocal lenses offer certain advantages in improving postoperative quality of life.

The study provides valuable clinical references for the choice of intraocular lenses in cataract surgery.

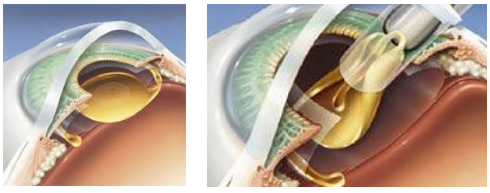

Figure 1: L Multifocal Intraocular Lenses

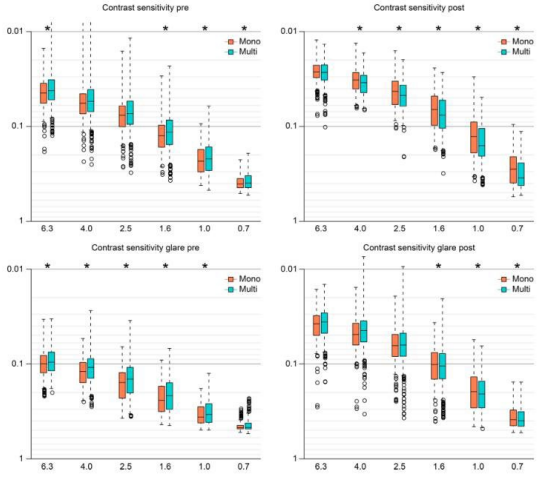

Figure 2: Contrast sensitivity with or without glare in the monofocal and multifocal groups before and 10 weeks after surgery on both eyes

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