

PRESBYOPIA SURGERY WITH VARIFOCAI LENSES AND FEMTOSECOND LASER

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Abstract

Aim: To evaluate visual performance, refractive stability, and subjective patient satisfaction after refractive lens exchange (RLE) performed with femtosecond laser assistance and bilateral implantation of Teleon Femtis MF15 varifocal intraocular lenses (IOLs) with a +1.50 D addition in presbyopic patients with mild hyperopic ametropia and minimal residual accommodation.

Materials and Methods: Prospective observational study of 12 patients (24 eyes), aged 55 to 65 years (mean age 59.3 years), with preoperative best-corrected visual acuity (BCVA) of 10/10, refractive error between +0.25 and +1.00 D, residual accommodation <1.0 D, and corneal astigmatism <1.25 D. All patients underwent RLE with femtosecond laser assistance and a 5.0 mm anterior capsulotomy, followed by implantation of the Teleon Femtis MF15 IOL. IOL power was calculated using the Barrett II formula. The refractive target was -0.25 D in the dominant eye and -0.50 D in the non-dominant eye. Follow-up was 12 months.

Results: At 12 months, mean binocular uncorrected distance visual acuity (UDVA) was 9.3/10 and mean binocular uncorrected near visual acuity (UNVA) was J1.9. The incidence of dysphotopsia was low. With a +1.00 D reading addition, 100% of patients achieved J1 or better. Refractive stability and centration remained favorable at 1 year, with high overall patient satisfaction.

Conclusions: Bilateral implantation of the Teleon Femtis MF15 after femtosecond laser-assisted RLE represents an effective solution for selected presbyopic patients, providing excellent distance vision and a good functional range while reducing the dysphotopsias typically associated with premium IOLs.

Introduction

The surgical treatment of presbyopia requires a balance between spectacle independence and preservation of visual quality. In patients between 55 and 65 years of age with mild hyperopia and excellent distance vision, refractive lens exchange (RLE) enables refractive correction while also preventing or addressing early cataract formation.

The use of low-addition varifocal lenses is intended to reduce aberrations and dysphotopsias compared with high-addition diffractive multifocal IOLs.

The Teleon Femtis MF15 is a varifocal IOL that uses a two-zone optical design: one zone for distance vision and one zone with a 1.5 D addition (Fig. 1). The central 1.4 mm button (Fig. 2) makes the lens more tolerant of large angle kappa values, which are particularly common in hyperopic patients. The fixation system with four flanges in the anterior capsulotomy, created

with extreme precision and centration by the femtosecond laser, contributes to lens stability and centration—features that are especially important in toric versions in order to reduce the risk of postoperative rotation (Fig. 3).

Materials and Methods

Prospective observational study in 12 patients (24 eyes). Age range: 55–65 years (mean 59.3 years). Inclusion criteria were preoperative BCVA of 10/10, refractive error between +0.25 and +1.00 D, residual accommodation <1.0 D, and corneal astigmatism <1.25 D.

Patients with corneal disease, maculopathy, advanced glaucoma, or severe dry eye were excluded.

Surgical technique: RLE with femtosecond laser, 5.0 mm anterior capsulorhexis (Fig. 4), lens fragmentation, and removal by standard phacoemulsification. Teleon Femtis MF15 IOL implantation in the capsular bag was followed by engagement of the four flanges onto the anterior capsulorhexis for stabilization (Fig. 5).

IOL power was calculated using the Barrett II formula. The refractive target was –0.25 D in the dominant eye and –0.50 D in the non-dominant eye. Clinical follow-up continued for 12 months and included assessment of binocular uncorrected distance and near visual acuity, refraction, dysphotopsias, and patient satisfaction.

Results

At 12 months, mean binocular uncorrected distance visual acuity was 9.3/10, while mean binocular uncorrected near visual acuity was J1.9.

Dysphotopsic symptoms (halos and glare) were infrequent and did not affect daily activities. For fine reading tasks, a +1.00 D addition was prescribed; with this correction, 100% of patients achieved J1 or better.

Refractive stability at 1 year was high, with maintenance of the target refraction and no clinically significant changes. Tolerance of corneal decentration associated with a high angle kappa and stable centration over time contributed to the high level of overall patient satisfaction.

Discussion

The findings from this case series support the effectiveness of the FLACS + Teleon Femtis MF15 approach for the management of presbyopia in selected patients. The low-addition segmented varifocal design promotes good distance-to-intermediate vision, with supplementary near addition for reading very small print, while simultaneously reducing the dysphotopsia trade-offs.

A distinctive feature of the Femtis lens is capsulotomy fixation by means of four flanges (Fig. 6), which stabilizes lens position over time. Reproducible, stable centration reduces the potential

for tilt, decentration, and loss of visual quality. This aspect may be particularly advantageous in toric IOLs (Fig. 3), in which postoperative rotation remains a relevant concern.

Preoperative counseling remains a key determinant of patient satisfaction. Patients must understand that the +1.50 D addition is not intended to allow the reading of microprint without glasses, but rather to provide a high level of independence in everyday life, with the option of light additional correction for prolonged reading.

Conclusions

Presbyopia surgery by means of femtosecond laser-assisted RLE and implantation of the Teleon Femtis MF15 varifocal IOL (+1.50 D) demonstrated (1) excellent binocular distance vision, (2) functional vision with only limited need for a light reading addition, (3) a low incidence of dysphotopsias, (4) refractive and centration stability at 12 months, and (5) high patient satisfaction.

This strategy appears suitable for presbyopic patients with mild ametropia who are seeking high visual quality and fewer of the trade-offs typical of high-addition multifocal IOLs.

Figure Captions

- Figure 1. Varifocal extended-depth-of-focus (EDOF) optic with two focal points.
- Figure 2. Teleon Femtis MF15 IOL. Characterized by a broad central distance-focus zone (1.4 mm), allowing excellent adaptability even in eyes with a large angle kappa.
- Figure 3. Teleon Femtis MF15 toric IOL. Fixation to the anterior capsulorhexis provides optimal stability of toric IOL orientation.
- Figure 4. FLACS. Use of the femtosecond laser enables highly precise and reproducible capsulotomy centration and diameter, while also providing accurate reference marks for toric IOL orientation (see Fig. 3).
- Figure 5. Design. The four anterior flanges are easily positioned in front of the capsulorhexis, creating the stabilizing effect.
- Figure 6. IOL at 6 months. The FLACS–FEMTIS combination enables long-term stability and centration after implantation.

References

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2. Auffarth GU, et al. Stability and visual outcomes of the capsulotomy-fixated intraocular lens. *J Cataract Refract Surg.* 2021.
3. Oshika T, et al. One-year clinical evaluation of rotationally asymmetric multifocal intraocular lenses with +1.5 D near addition. *Sci Rep.* 2019.

Quality-control changes incorporated from the Italian source

- Added the missing clinical inclusion criteria (BCVA, refractive range, residual accommodation, corneal astigmatism).
- Added the refractive target for dominant and non-dominant eyes.
- Added the exclusion criteria (corneal disease, maculopathy, advanced glaucoma, severe dry eye).
- Added the 5.0 mm capsulotomy detail and the Barrett II formula.
- Added the low rate of halos and glare and clarified that daily activities were not affected.
- Added the +1.00 D reading addition and the outcome that 100% of patients reached J1 or better with correction.
- Added the role of angle kappa tolerance, centration stability, and the value of preoperative counseling.