

Extended Depth of Focus versus Trifocal Intraocular Lens Implantation: A systematic Review and Meta-analysis

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INTRODUCTION

The implantation of trifocal or extended depth of focus (EDOF) intraocular lens (IOL) for patients undergoing phacoemulsification or lensectomy has been extensively studied. Trifocal IOLs diverge light into three point of focus to preserve near, intermediate and distance vision. An EDOF IOL splits light in an elongated and continuous area of focus enhancing quality of vision in all different distance. This is the latest meta-analysis which amalgamates the data of all clinical studies comparing the outcomes of the two types of IOLs to best guide clinical practice.

METHODS

Databases including MEDLINE, EMBASE, EMCARE, CINAHL and the Cochrane were searched to identify all studies comparing EDOF with trifocal lenses for patients undergoing IOL implantation. The EDOF was the intervention group and trifocal was the comparator. Conference literature, case reports and non-English articles were excluded.

Primary outcomes: Postoperative refraction (sphere, spherical equivalence, cylinder and astigmatism) and visual acuity.

Secondary outcomes: Postoperative defocus curves, intraocular aberrations, contrast sensitivity, quality of vision (QoV) questionnaire score, haloes and glares, spectacle independence and patient satisfaction.

Literature search results: A total of 28 studies enrolling 3065 eyes from 1766 patients were identified.

RESULTS

Trifocal IOL showed a significant improvement in terms of sphere (MD = -0.17; P = 0.01 - Figure 1) and spherical equivalence (MD = -0.11, P= 0.0001) compared to EDOF IOL. No statistically significant difference was observed in postoperative cylinder or astigmatism. Trifocal IOL reported significantly superior postoperative uncorrected and corrected near visual acuity (UNVA and DCNVA), P <0.00001 and P= 0.002, respectively. However, EDOF had statistically improved corrected distant VA (P= 0.002). Intermediate VA outcomes were not statistically significant.

RESULTS

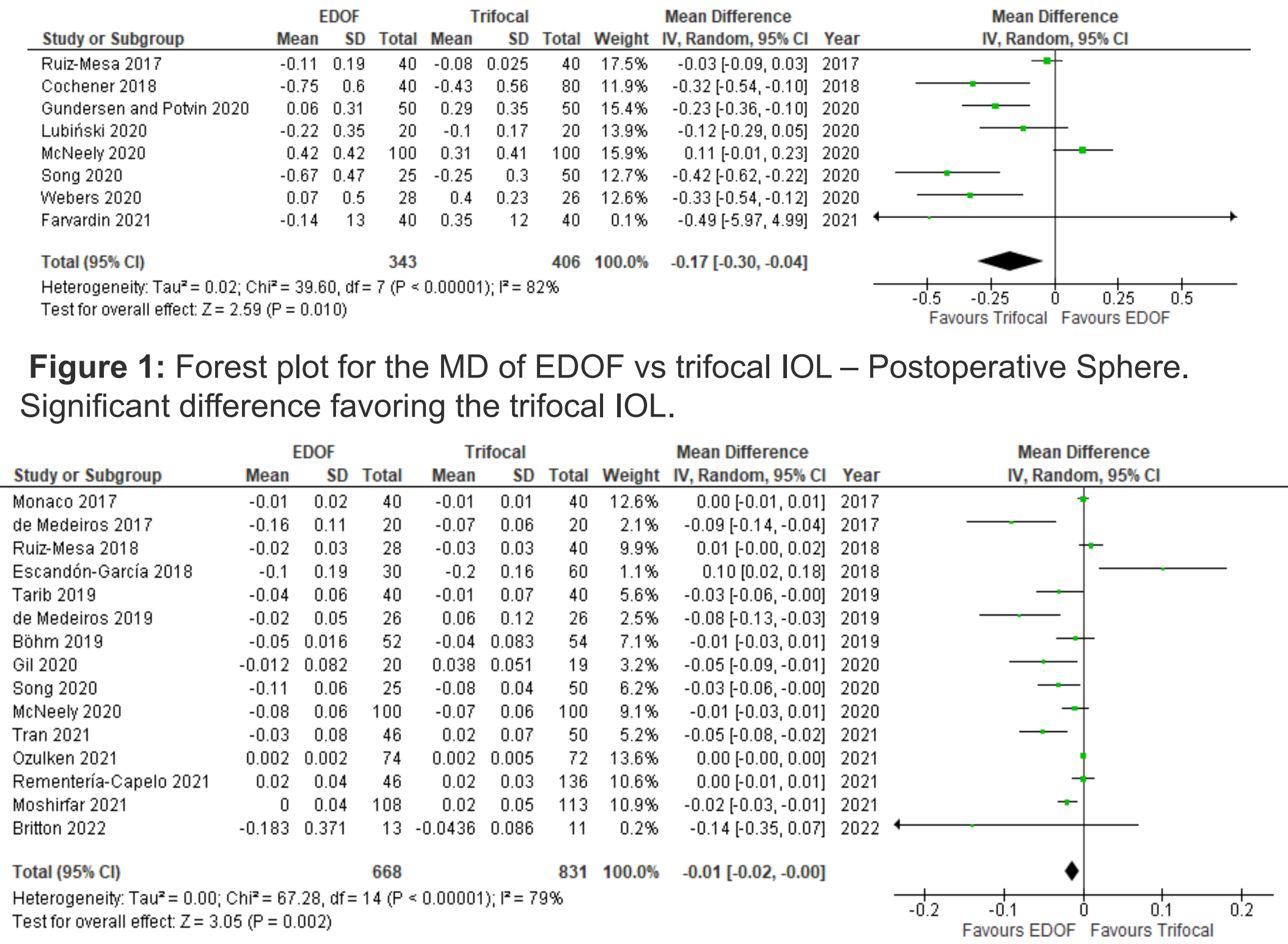


Figure 1: Forest plot for the MD of EDOF vs trifocal IOL – Postoperative Sphere. Significant difference favoring the trifocal IOL.

Secondary outcomes: Postoperative defocus curves were favourable for trifocal IOL at near vision and EDOF IOL at intermediate vision. Trifocal IOL also had statistically significant higher spectacle independence (P= 0.02) and QoV questionnaire score (P= 0.03). The two IOLs were comparable in terms of haloes, patient satisfaction, ocular aberrations and contrast sensitivity.

DISCUSSION AND CONCLUSION

The trifocal IOL has improved postoperative refraction and near visual acuity compared to EDOF IOL. However, latter group has improved outcomes at distance vision. These findings are in line with similar studies in the literature. The current study provides the latest extensive evidence of this topic, it is however limited due to limited number of randomised control trials. In conclusion, the use of trifocal versus EDOF IOLs should be based on individual basis and the clinician's judgement.

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