

CLINICAL OUTCOMES AFTER MIX-AND-MATCH IMPLANTATION OF EXTENDED DEPTH OF FOCUS AND MONOFOCAL-PLUS INTRAOCULAR LENSES

Anagnostopoulou Sofia, Giannoulakos Georgios, Metaxiotis Antonios, Gerodimos Georgios,
Papathomas Thomas

Ophthalmology One - Day Clinic "ORASI", Trikala, Central Greece

No conflict of interest



Ultimate goal of presbyopic lens surgery → full range of vision of a normal young emmetrope.

By mixing different types of intraocular lenses (IOLs) - **the mix-and-max strategy** → aim to have full range of binocular vision

Mix-and-match of an extended depth of focus (EDOF) IOL and a monofocal plus IOL aims to : minimize the photic phenomena frequently observed in refractive and diffractive multifocal IOLs

- **EDOF (extended depth of focus) lenses :**

work by creating a single elongated focal point to enhance “range of vision” or “depth of focus”

- (+) reduce photic phenomena, glare, halos

Aim to: enhance intermediate+ near vision and minimally affect distance vision

- **Monofocal plus lenses :** Non diffractive/non multifocal IOLs

- Extend the depth of focus compared to classic monofocal IOLs.

- Aim to achieve excellent distance visual acuity and functional intermediate vision

Possible combinations : two monofocal IOLs with monovision
monofocal + accommodating IOL
monofocal + multifocal IOL
accommodating + multifocal IOL
two different multifocal IOLs

PURPOSE

To evaluate the clinical outcomes of mix-and-match implantation of an EDOF IOL and a monofocal plus IOL.

METHODS

- **6 patients**
- **mix-and-match implantation** of intraocular lenses-
the **monofocal-plus TECNIS Eyhance® IOL** (Johnson & Johnson Surgical Vision, Inc) in the dominant eye and
the **EDOF Bi-flex ELON® IOL** (Medicontur Medical Engineering Ltd) in the non-dominant eye.
- ✓ Binocular uncorrected distance visual acuity (**UCVA**) and
- ✓ binocular uncorrected near visual acuity (**UCNVA**) were evaluated before implantation and approximately 1 month after implantation.

UCVA : measured in Snellen Chart and

UCNVA : measured with a Jaeger Eye Chart at 35cm (normal reading distance)

Target of IOL implantation : plano in dominant eye , -0.25 to -0.75 D sphere in non dominant eye

Use of relaxing corneal incisions to reduce astigmatism when required

Bi-flex ELON® IOL (Medicontur Medical Engineering Ltd)

Single-piece, foldable, aspheric, hydrophobic IOL with an EDOF optic
Based on a series of central concentric refractive zones linked by specially designed linking zones

Light energy is distributed continuously along optical axis →
higher intermediate light sensitivity and wide range of functional vision

High quality for intermediate vision and functional near vision

TECNIS Eyhance® IOL (Johnson & Johnson Surgical Vision, Inc)

One-piece, posterior lens, biconvex, hydrophobic IOL
Incorporates a spherical posterior surface and a modified aspheric anterior surface

Distance vision and dysphotopsia profile comparable to a standard aspheric monofocal IOL

Extends the depth of focus → improved intermediate vision compared to a monofocal IOL

Better image contrast in low light

Low incidence of dysphotopsia

RESULTS

PATIENT	AGE	CLEAR LENS EXTRACTION (CLE)/ CATARACT	UCVA PRE-OP	UCVA POST-OP	UCNVA PRE-OP	UCNVA POST-OP	REFRACTION PRE-OP	REFRACTION POST-OP	DYSPHOTOPSIA/ PHOTIC PHENOMEMA
1	56	CLE	2/10	10/10	<J6	J2 +	OD + 4.0 -0.75 X150 OS +3.0 -1.25 X 20	OD -0.75 X 140 OS -1.0-1.25 X 80	NEGATIVE
2	73	CAT	2/10	10/10	J1	J5	OD -4.0-0.50 X75 OS -2.0-1.75X 130	OD -1.0 X 85 OS +0.75-1.25 X 110	NEGATIVE
3	51	CLE	5/10	9/10	<J6	J2 +	OD +2.25-0.50 X 10 OS +3.50-0.75 X 155	OD -0.25-0.50 X 170 OS -0.50 X 110	NEGATIVE
4	58	CAT	1/10	9/10	J1	J2	OD -3.75-0.75 X180 OS -1.75-1.0 X 180	OD -0.75-0.25 X 130 OS -0.50 X 5	NEGATIVE
5	51	CLE	10/10	10/10	J5	J1	OD +1.0 -0.75 X105 OS +1.25-0.50 X 95	OD+0.50-0.25 X 100 OS -0.25-0.75 X 115	NEGATIVE
6	75	CAT	6/10	9/10	J3	J1	OD -0.50 X70 OS -0.75 X90	OD -1.0-1.0 X 5 OS +0.25-0.25 X 115	NEGATIVE

OD :RIGHT EYE, OS : LEFT EYE

UCVA in Snellen Chart, UCNVA in Jaeger Eye Chart (J1 score the best, j6 score the worst)

Dominant eye marked with bold

RESULTS

- ✓ **All cases** had **binocular UCVA 9/10** or better in Snellen Chart (none monocular eye vision below 8/10)
- ✓ **5 out of 6 patients** had **binocular UNVA J2** or better in Jaeger Chart (J1 and J2).
- ✓ **1 patient** had **UNVA worse than J4**. It was noted that this patient had large diameter pupils in photopic conditions.
- ✓ **No cases** had **dysphotopsias/glare/halos (photic phenomena)**

CONCLUSIONS

- ✓ 5 out of 6 patients that underwent a mix-and-match approach of implantation of an EDOF and a monofocal-plus IOL were satisfied by the visual outcomes of uncorrected near and distance visual acuity.
- ✓ Further research is needed to evaluate visual and clinical outcomes of mix-match implantation of EDOF and monofocal IOLs.
- ✓ Preoperative evaluation of pupil size is mandatory for better postoperative outcomes.

Thank you

Bibliography

<https://www.elon-iol.com/wp-content/uploads/2022/10/Medicontur-Eurotimes-Supplement-2022.pdf>

https://crstoday.com/articles/2007-aug/crst0807_04-php

<https://www.reviewofophthalmology.com/article/tecnis-eyhance-intraocular-lenses-approved-by-the-fda>

<https://www.reviewofophthalmology.com/article/an-update-on-monofocal-plus-iols>

Kanclerz P, Toto F, Grzybowski A, Alio JL. Extended Depth-of-Field Intraocular Lenses: An Update. *Asia Pac J Ophthalmol (Phila)*. 2020 May-Jun;9(3):194-202. doi: 10.1097/APO.000000000000296. PMID: 32511121; PMCID: PMC7299221.