A closer look at
Extended Depth Of Focus IOL
For Presbyopia Correction

Abdallah K. Hassouna, MD, PhD.
Professor of Ophthalmology, Ain Shams University
Consultant Ophthalmic Surgeon, Al Watany Eye Hospital (WEH)
President, Association of Research in Vision and Ophthalmology (ARVO-Egypt)

WEH
المستشفى الوطني للعيون
Al Watany Eye Hospital

Extended Depth Of Focus IOL (EDOF)

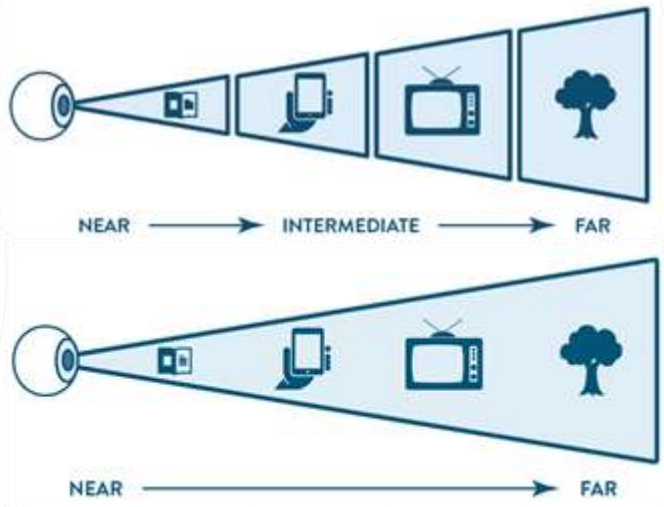
EDOF IOLs have become a focus of attention in IOL selection for near and intermediate vision.

Mechanism of EDOF

Creating a single elongated focal point to enhance depth of focus.

Multifocal IOL

EDOF IOL



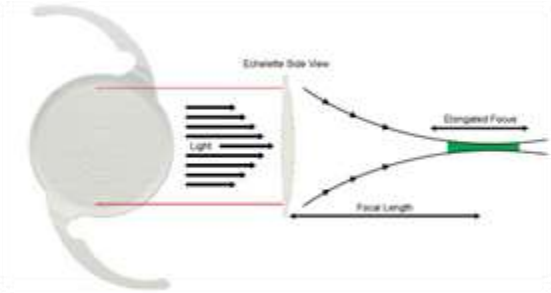
Design

Echelette Technology

Achromatic Technology

Diffractive Echelette

Nine tall and slightly angled echelettes.



- Elongation of the focus area rather than splitting the light
- Creating a second focal point
- Enhancing near and intermediate vision without compromising distance vision

Achromatic Technology

It uses **proprietary achromatic technology** to **counteract the chromatic aberration caused by the cornea**, resulting in sharper image quality and improved vision.

Outcomes of micro-monovision in RLE patients implanted with EDOF IOL

Purpose

To report distant visual acuity outcomes as well as patients' satisfaction for distant, intermediate and near vision based on spectacle independence in patients who underwent micro-monovision RLE with bilateral EDOF IOL implantation.

Patients and Methods

- **Study design:** Retrospective observational study
- **Study site:** Al Watany Eye Hospital, Watany Research and Development Center (WRDC), Cairo
- **Study duration:** Jan 2017 to Dec 2017
- The study was approved by the WRDC ethics committee under the regulations of the Helsinki guidelines.
- Statistical analysis was done using SPSS by IBM version 21 using paired samples t-test.

Patients and Methods

- **Study sample:** 40 eyes of 20 patients who underwent RLE with bilateral EDOF IOLs divided into 2 groups:

  Group A: The non-dominant eye was rendered slightly myopic, while the dominant eye was targeted to emmetropia (micro-monovision group)

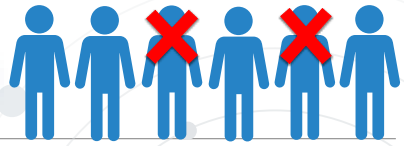
  Group B: both eyes were targeted to be emmetrope postoperatively (non-monovision group)

Patients and Methods

Outcomes:

1. UDVA
2. BDVA
3. Postoperative refraction
4. Patients' satisfaction:
   - Distant vision
   - Intermediate vision (70 cm)
   - Near vision (40 cm)

Patients and Methods



Inclusion Criteria

- Presbyopic patients seeking refractive surgery with complete spectacle independence.
- Fall within the available IOL power range
- Qualify for bilateral implantation.

Exclusion Criteria

- Have unrealistic expectations about their outcomes.
- Have a preexisting ocular pathology, such as severe dry eye, uncontrolled glaucoma, keratoconus or uveitis.
- Previous corneal surgery.

Patients and Methods

Surgical Technique:

- The EDOF IOL used in this study is ***Tecnis Symfony*** by Johnson & Johnson.
- All cataract surgeries were performed using a standard phacoemulsification technique or a femtosecond laser–assisted technique.
- Routine protocols for postoperative care were received.

Results

Group A (micro-monovision)

Preoperative vs postoperative data in the dominant eye

Age: 55 years ± 8.6 (44:70) **Gender:** 43% females **Follow up:** 5.6 months ± 2.3

Dominant eye (Emmetrope)						
	Mean		SD		Range Value	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
UDVA	0.48	0.97	± 0.25	± 0.25	0.2 : 0.9	0.9 : 1.0
BDVA	0.87	1.0	± 0.17	± 0.0	0.6 : 1.0	1.0
SE (D)	-1.05	- 0.51	± 2.65	± 0.15	- 4.87 : + 2.75	- 0.75 : - 0.37
Cylinder (D)	-0.82	- 0.57	± 0.20	± 0.15	- 1.00 : 0.00	-0.75 : 0.00

Results

Group A (micro-monovision)

Preoperative vs postoperative data in the non-dominant eye

Age: 55 years ± 8.6 (44:70) **Gender:** 43% females **Follow up:** 5.6 months ± 2.3

Non-dominant eye (Myope)						
	Mean		SD		Range Value	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
UDVA	0.54	0.97	± 0.25	± 0.04	0.1 : 0.9	0.9 : 1:0
BDVA	0.90	1.0	± 0.17	± 0.0	0.7 : 1.0	1.0
SE (D)	- 1.14	- 0.91	± 2.63	± 0.23	- 5.25 : + 2.50	-0.67 : -0.25
Cylinder (D)	- 0.85	- 0.46	± 0.33	± 0.30	- 1.00 : - 0.25	-0.75 : 0.0

Results

Group A (micro-monovision)

Statistically significant correlation between:

- Preoperative UDVA and postoperative UDVA in the **dominant** eye **(P= 0.04)**
- Preoperative UDVA and postoperative UDVA in the **non dominant** eye **(P= 0.04)**

Results

Group A (micro-monovision)

	Non-dominant eye (myope)	Dominant eye (emmetrope)
Efficacy Index (postoperative UDVA / preoperative BDVA)	1.07	1.11
Predictability Index (postoperative BDVA / postoperative UDVA)	1.03	1.03
Safety Index (postoperative BDVA /preoperative BDVA)	1.11	1.14

Results

Group B (non-monovision)

Preoperative vs postoperative data in the dominant eye

Age: 52 years ± 2.2 (44:64) **Gender:** 28% females **Follow up:** 6.2 months ± 1.8

Dominant eye (Emmetrope)						
	Mean		SD		Range Value	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
UDVA	0.67	1.0	± 0.23	± 0.0	0.3 : 0.9	1.0
BDVA	0.97	1.0	± 0.07	± 0.0	0.8 : 1.0	1.0
SE (D)	- 0.87	- 0.16	± 1.98	± 0.20	- 3.37 : + 2.37	-0.37 : -0.25
Cylinder (D)	- 0.75	- 0.36	± 0.34	± 0.24	- 1.00: 0.0	-0.75 : 0.0

Results

Group B (non-monovision)

Preoperative vs postoperative data in the non-dominant eye

Age: 52 years ± 2.2 (44:64) **Gender:** 28% females **Follow up:** 6.2 months ± 1.8

Non-dominant eye (Emmetrope)						
	Mean		SD		Range Value	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
UDVA	0.62	0.98	± 0.24	± 0.3	0.2 : 0.9	0.9 : 1:0
BDVA	0.94	1.0	± 0.11	± 0.0	0.7 : 1.0	1.0
SE (D)	-1.10	- 0.26	± 2.10	± 0.08	-3.25 : +2.87	-0.37 : -0.12
Cylinder (D)	-0.46	- 0.17	± 0.62	± 0.27	-1.00 : 0.0	-0.75 : 0.0

Results

Group B (non-monovision)

Statistically significant correlation between:

- Preoperative UDVA and postoperative UDVA in the **dominant** eye **(P= 0.01)**
- Preoperative UDVA and postoperative UDVA in the **non dominant** eye **(P < 0.01)**

Results

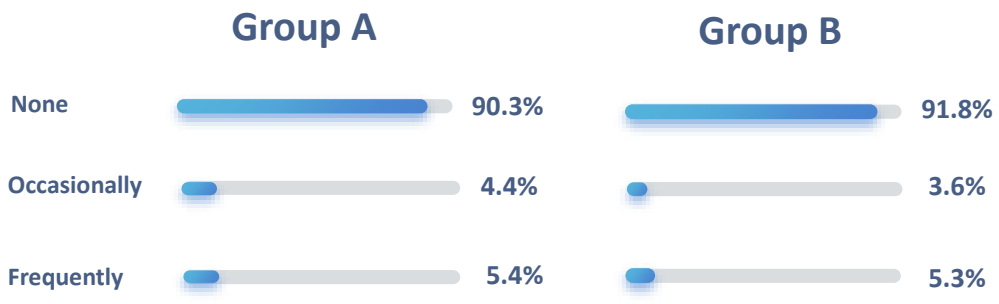
Group B (non-monovision)

	Non-dominant eye (myope)	Dominant eye (emmetrope)
Efficacy Index (postoperative UDVA / preoperative BDVA)	1.04	1.20
Predictability Index (postoperative BDVA / postoperative UDVA)	1.02	1.00
Safety Index (postoperative BDVA / preoperative BDVA)	1.06	1.03

Results

Group A vs Group B (Spectacle Independence)

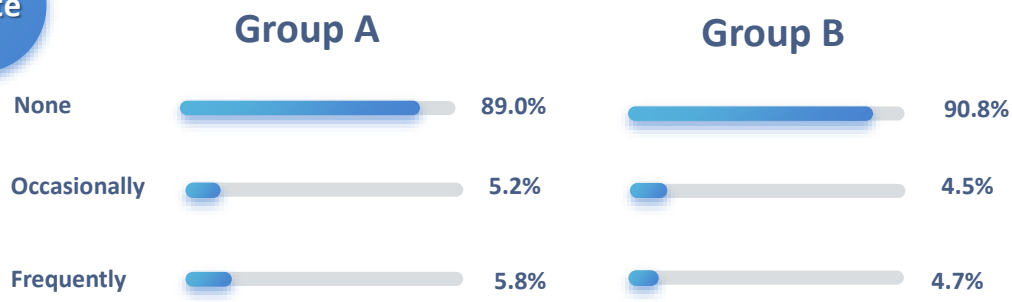
Distance



Results

Group A vs Group B (Spectacle Independence)

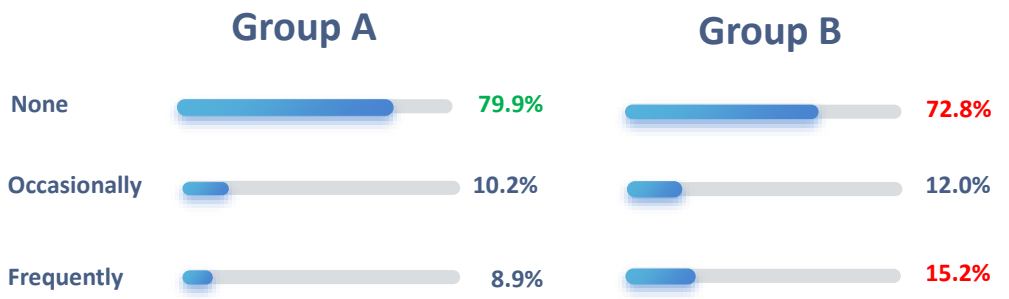
Intermediate



Results

Group A vs Group B (Spectacle Independence)

Near



Complications

- Laser enhancement to correct residual refractive errors was performed in 1 eye (2.5%) in Group A.
- Treatment for corneal dryness (cyclosporine for 1-2 months) was needed in 6 eyes (15%) in both groups.

27

Conclusion

- Micro-monovision did not affect the distant vision outcome with excellent efficacy, predictability and safety.
- Comparable satisfaction patterns were reported in both groups for both distant and intermediate vision, with slight superiority in the non-monovision group, yet micro-monovision showed significant improvement in the satisfaction of patients with their near vision.

28

Take Home Message

Micro-monovision can be an added value tool to improve the near vision satisfaction in patients undergoing RLE with EDOF IOL implantation without affecting the quality of vision.

THANK YOU
FOR YOUR ATTENTION