Outcomes of mini-monovision with monofocal, enhanced monofocal and extended depth-of-focus intraocular lenses

Issac Levy, Rachana Prashant Shah1, Ritika Mukhija and Mayank A. Nanavaty ● Sussex Eye Hospital, University Hospitals Sussex NHS Foundation Trust, Brighton, United Kingdom

Purpose

Mini-monovision is a vision correction technique that allows for a broader spectrum of spectacle independence while minimizing anisometropia.
This systemic review aims to evaluate the clinical outcomes of pseudophakic mini-monovision with three types of intraocular lenses (IOLs): monofocal, enhanced monofocal, and extended depth of focus (EDOF).

Methods

A comprehensive literature search was conducted using PubMed and MEDLINE to identify studies reporting mini-monovision outcomes within the three categories of IOLs up to July 2024. Inclusion criteria were studies with more than 20 patients, target refraction to achieve mini-monovision difference in the fellow eye, and minimum follow-up of 3 months.

The primary outcome measure was uncorrected binocular intermediate visual acuity (UCIVA).
The secondary outcomes were binocular uncorrected distance visual acuity (UCDVA), binocular uncorrected near visual acuity (UCNVA), patient reported outcomes measures (PROMs), spectacle independence, contrast sensitivity, photic phenomenon, enhancement surgeries and IOL exchange.

Overall demographics

IOL Type	Number of studies	Follow-up period (months)	Number of patients	Age (years)	Gender (female %)
Monofocal	7	20.7 ±43.8	100.3 ±63.8	63.7 ±5	40.8 ±22.3
Enhanced Monofocal	4	2.5 ±1.2	120.5 ±203.3	68.8 ±7.3	47.3 ±2.3
EDOF	8	8.4 ±9.6	44 ±22.4	64.1 ±3.7	58.1 ±15.5

The secondary outcomes. *Pellie Robson contrast sensitivity test

Outcome	Monofocal	Enhanced monofocal	EDOF	P-value
Binocular UCDVA	0.08 ±0.05 (n=5)	0.04 ±0.07 (n=4)	0.04 ±0.04 (n=8)	0.34
Binocular UCNVA	0.13 ±0.11 (n=5)	0.26 ±0.16 (n=4)	0.20 ±0.11 (n=8)	0.36
Spectacle independence	51 ±22.12% (n=7)	55% ±35.4 (n=2)	63.4 ±24.6% (n=6)	0.79
Contrast sensitivity*	1.69 ±0.4 (n=2)		1.55 ±0.03 (n=3)	

Results

A total of 113 studies were screened, of which 19, with a total of 1,530 patients, were eligible for inclusion in this review.

Mean logMAR binocular UCIVA was 0.16 ±0.01, 0.11 ±0.06, 0.08 ±0.07 (p = 0.41), and mean logMAR UCDVA was 0.08 ±0.05, 0.04 ±07, 0.04 ±0.04 (p = 0.36), in the monofocal, enhanced monofocal, and EDOF groups, respectively.

The mean spectacle independence rate was 51% ±22.1, 55% ±35.4 and 63.4% ±24.6 (p = 0.05), respectively, in the monofocal, enhanced monofocal and EDOF groups.

A comparable low incidence of halos and glare was observed when enhanced monofocal lenses were evaluated against traditional monofocal lenses. EDOF lenses have, however, demonstrated mixed results. The complications, IOL exchange, and excimer laser enhancement rates were low across all groups.

Conclusions

While enhanced monofocal and EDOF IOLs may provide slightly better binocular intermediate visual outcomes and higher spectacle independence compared to monofocal lenses with regards to mini-monovision and intermediate vision performance, the differences are not statistically significant. All three IOL types exhibit high patient satisfaction rates when choosing a mini-monovision approach with decreased dependence on spectacles.

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