# VISUAL PERFORMANCE AFTER MONOFOCAL EXTENDED DEPTH OF FOCUS INTRAOCULAR LENS VERSUS MONOFOCAL INTRAOCULAR LENS

**Alaa El Zawawi, Ahmed Elsayed Shama, Hazem Wahid Kandil, Samuel Kipkoech Langat**

**Department of Ophthalmology, Faculty of Medicine, Alexandria University**

## INTRODUCTION

Cataract surgery has progressed from a basic operation to aiming at correcting all refractive problems in addition to removing the opacified crystalline lens. Since the introduction of intraocular lenses (IOLs) after cataract extraction, there has been a continual progression of IOL design, material, and function. Furthermore, rising expectations of our patients following cataract surgery intermediate vision to our patients is more important than ever. A new monofocal IOL, the Tecnis Eyhance - ICB00 IOL, claims to offer better intermediate vision along with full far vision correction. This IOL is based on a similar aspheric platform as the Tecnis- ZCB00 1 single-piece, but features a continuous change in power from periphery to center, forming a unique anterior surface which provides better depth of focus.

## AIM OF THE WORK

The aim of this study was to compare the visual performance of implanted monofocal extended depth of focus (Tecnis Eyhance) IOL versus implanted Tecnis One piece IOL in patients undergoing cataract surgery.

## SUBJECTS AND METHODS

In this single prospective randomised study, 54 adult subjects without ocular comorbidities and corneal astigmatism less than 0.75 diopters (D) were scheduled to undergo bilateral, primary phacoemulsification cataract extraction and posterior IOL implantation were randomized(30 Eyhance vs 24 Tecnis) to receive the enhanced monofocal ICB00 IOL or the monofocal ZCB00 IOL in both eyes.

Preoperative and postoperative (at one month) spherical equivalent (SE) values, monocular uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), uncorrected intermediate visual acuity (UCIVA), distance-corrected intermediate visual acuity (DCIVA), distance-corrected near visual acuity (DCNVA), monocular defocus curve, and residual refractive errors were recorded.
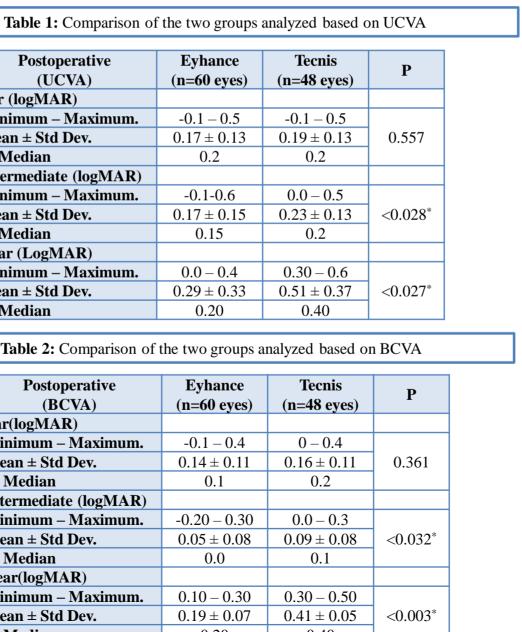
## RESULTS

Uncorrected intermediate visual acuity (UIVA) ,best corrected intermediate visual acuity (BCIVA), uncorrected near visual acuity (UNVA)and best corrected near visual acuity (BCNVA) was significantly better in Tecnis Eyhance (p=0.028, p=0.032, p=0.027, p=0.003, respectively) group compared to Tecnis 1 monofocal. Both the IOLs have similar performance for distance vision but visual acuity at intermediate and near is significantly better with Tecnis Eyhance compared to Tecnis 1 piece IOL.

**Table 1:** Comparison of the two groups analyzed based on UCVA

| Postoperative (UCVA) | Eyhance (n=60 eyes) | Tecnis (n=48 eyes) | P |
|---|---|---|---|
| **Far (logMAR)** | | | |
| Minimum – Maximum. | -0.1 – 0.5 | -0.1 – 0.5 | 0.557 |
| Mean ± Std Dev. | 0.17 ± 0.13 | 0.19 ± 0.13 | |
| Median | 0.2 | 0.2 | |
| **Intermediate (logMAR)** | | | |
| Minimum – Maximum. | -0.1-0.6 | 0.0 – 0.5 | <0.028* |
| Mean ± Std Dev. | 0.17 ± 0.15 | 0.23 ± 0.13 | |
| Median | 0.15 | 0.2 | |
| **Near (LogMAR)** | | | |
| Minimum – Maximum. | 0.0 – 0.4 | 0.30 – 0.6 | <0.027* |
| Mean ± Std Dev. | 0.29 ± 0.33 | 0.51 ± 0.37 | |
| Median | 0.20 | 0.40 | |

**Table 2:** Comparison of the two groups analyzed based on BCVA

| Postoperative (BCVA) | Eyhance (n=60 eyes) | Tecnis (n=48 eyes) | P |
|---|---|---|---|
| **Far(logMAR)** | | | |
| Minimum – Maximum. | -0.1 – 0.4 | 0 – 0.4 | 0.361 |
| Mean ± Std Dev. | 0.14 ± 0.11 | 0.16 ± 0.11 | |
| Median | 0.1 | 0.2 | |
| **Intermediate (logMAR)** | | | |
| Minimum – Maximum. | -0.20 – 0.30 | 0.0 – 0.3 | <0.032* |
| Mean ± Std Dev. | 0.05 ± 0.08 | 0.09 ± 0.08 | |
| Median | 0.0 | 0.1 | |
| **Near(logMAR)** | | | |
| Minimum – Maximum. | 0.10 – 0.30 | 0.30 – 0.50 | <0.003* |
| Mean ± Std Dev. | 0.19 ± 0.07 | 0.41 ± 0.05 | |
| Median | 0.20 | 0.40 | |

The defocus curve in our study showed superiority of the Eyhance group over the Tecnis group at vergence of -1.5 diopters, -1.25 diopters and -1 diopters (p=0.027, p=0.017, p=0.013, respectively). There was no statistical significance at vergence 0 to - 0.75. (p>0.05)

**Table 3:** Comparison of the two groups analyzed based on the defocus curve

| Postoperative (Defocus curve) | Eyhance (n=60 eyes) | Tecnis (n=48 eyes) | P |
|---|---|---|---|
| **-1.0 diopters** | | | |
| Minimum – Maximum. | 0.3 – 0.5 | 0.3– 0.5 | 0.013* |
| Mean ± Std Dev. | 0.39± 0.06 | 0.42± 0.05 | |
| Median | 0.4 | 0.4 | |
| **-1.25 diopters** | | | |
| Minimum – Maximum. | 0.4 – 0.6 | 0.5– 0.7 | 0.017* |
| Mean ± Std Dev. | 0.49± 0.06 | 0.51± 0.04 | |
| Median | 0.5 | 0.5 | |
| **-1.5 diopters** | | | |
| Minimum – Maximum. | 0.4 – 0.6 | 0.6– 0.8 | 0.027* |
| Mean ± Std Dev. | 0.53± 0.07 | 0.67± 0.08 | |
| Median | 0.5 | 0.6 | |

## CONCLUSION

Both the Eyhance and the Tecnis IOL are excellent monofocal IOLs. However, in our study the Eyhance group had better near and intermediate visual acuities.