



Ricardo Alarcon

Victor Bohorquez

Dual optic accommodating IOL affords high quality vision from distance to near

By Cheryl Guttman
in London

THE Synchrony dual optic accommodating IOL (Visiogen) offers excellent visual function at all distances with superior intermediate vision, image quality, and adequate reading performance, reported researchers at the XXIV Congress of the ESCRS.

Colombian researchers Ricardo Alarcon MD, and Victor Bohorquez MD, presented the findings from a comprehensive series of tests they undertook to investigate the performance and mechanism of action of the dual optic accommodating IOL. Their experience with that implant encompasses 106 eyes which were operated on in the department of ophthalmology at ServiOftalmos, Bogotá, Colombia.

They reported data from visual acuity measurements and functional reading tests obtained in 32 patients followed for a mean of 10.4 months after binocular implantation and from reading tests. In vivo observations of IOL movement using high frequency ultrasound biomicroscopy (UBM), and subjective and objective determinations of accommodative amplitude in a subset of that group were also presented.

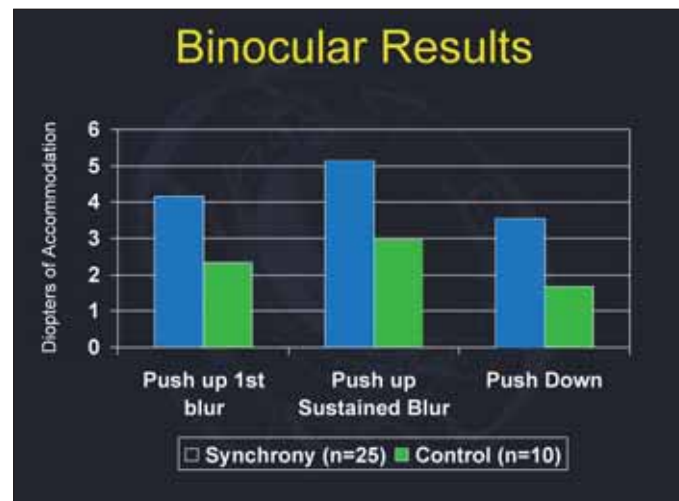
“Multifocal and bifocal IOLs that have been available for presbyopic correction can provide good near and distance vision, but do not provide functional intermediate vision. In contrast, based on its mechanism of action, this novel dual optic accommodating IOL has the potential to provide useful vision at all distances,” said Dr Alarcon.

The 32 patients included in the analyses of visual acuity ranged in age from 40 to 73 years (mean 62 years). Duration of follow-up was between three and 24 months.

Values for mean logMAR uncorrected visual acuity measured at distance, intermediate (80cm), and near (40cm) were 0.02, -0.1, and 0.1, respectively. When the testing was performed with best distance correction, the intermediate and near visual acuity values were unchanged.

The acuity results were further analysed with a line-by-line assessment determining proportions of patients achieving different levels of vision. Based on a decimal scale, more than 90 per cent of patients achieved distance and intermediate uncorrected visual acuity of 0.63 or better (20/30) and 81 per cent achieved near uncorrected visual acuity of 0.63 or better.

Reading performance was tested using a Spanish version of the MNRead chart held at 40cm with patients wearing distance correction and no near add. Results for 25 patients implanted binocularly with the dual optic accommodating IOL were



compared against those measured in 15 patients who were binocularly implanted with a standard monofocal IOL (AcrySof). The accommodating IOL group achieved significantly better reading acuity values as well as a significantly faster average reading speed. For newspaper print size, patients in the accommodating IOL group read an average of 160 words per minute compared with only 23 words per minute in the control group. Among the Synchrony patients, 88 per cent were able to read at least 80 words per minute whereas only 13 per cent of controls achieved that speed.

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“Our studies confirm that relative to a monofocal IOL, the Synchrony has advantages for providing better near and intermediate vision. Furthermore, our testing together with patient experience shows it also has benefits for avoiding dysphotopsias and enabling the performance of a whole range of daily activities, including reading, computer work, dashboard viewing, cell phone dialling, and grocery shopping,” Dr Alarcon said.

Dr Bohorquez reported findings from a pilot study performed to measure subjective and objective accommodative amplitude in 25 patients implanted binocularly with the dual optic accommodating IOL. They were compared

with an age-matched control group of 10 patients who had been implanted binocularly with a foldable acrylic IOL or PMMA monofocal IOL.

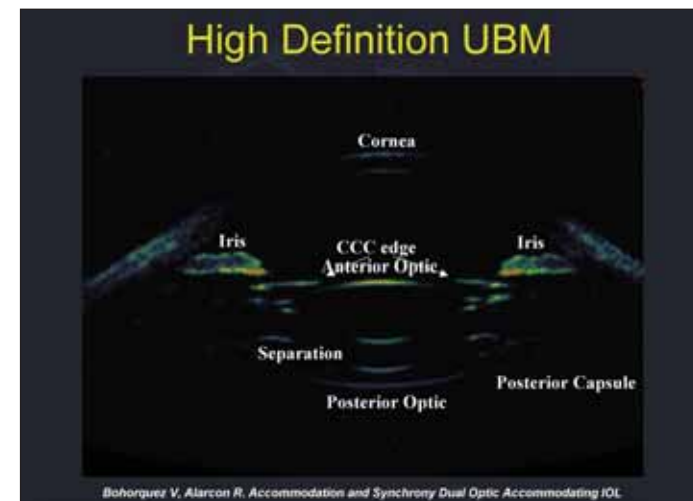
Push up/push down testing was used for the subjective evaluation. Measurements for push up to first blur, push up to sustained blur, and push down were obtained through the best-corrected distance visual acuity at 40cm and with use of minimum near add power.

For each of the three subjective tests, the average accommodative amplitudes achieved by patients implanted with the dual optic accommodating IOL exceeded those measured in the control group by approximately 2 D, and the differences in mean values between groups were all statistically significant.

In push up to first blur, the mean accommodative amplitude was 4.2 D in the accommodating IOL group compared with 2.3 D for the control group. For push up to sustained blur, average accommodative amplitudes in the accommodating IOL and control groups were 5.2 D and 3.0 D, respectively. In push down testing, average accommodative amplitudes were 3.6 D in the accommodating IOL group and 1.7 D in the controls.

“We also found that maximum binocular subjective accommodation achieved in the dual optic accommodating IOL group ranged to almost 6 D in push-up testing, and although the accommodative amplitude values tended to be higher with the push-up testing, the accommodative amplitudes achieved in push-down testing are adequate for functional near vision,” Dr Bohorquez said.

Additional analyses demonstrated that the results of the first blur and sustained blur tests in the accommodating IOL patients correlated significantly with the distance corrected near visual acuity outcomes.



“In other words, we found that patients with better near visual acuities achieved greater accommodation,” Dr Bohorquez said.

Objective evaluation of accommodation of the Synchrony IOL included UBM imaging to investigate movement of the anterior lens. Those evaluations were performed in patients who were at least one year post-implantation and showed that the two optics remained close together in the eye when the fellow eye was stimulated for distance vision. However, when near vision was stimulated in the fellow eye using a handheld ETDRS chart, the anterior optic moved forward.

In addition, ray-tracing aberrometry (Tracey Technologies) was used to capture changes occurring when focus was shifted from distance to near. Those measurements were obtained with best-corrected distance vision but no add power. Dr Bohorquez explained that this methodology uniquely allows measurement of the three-dimensional movement of the anterior optic in the dual optic IOL system.

“The high powered front optic of the Synchrony IOL facilitates three-dimensional movement – more extensively along the optical axis but also to some degree along a tangential axis. The axial movement is responsible for a total refractive power change, but the tangential movement of the anterior lens can result in a refraction gradient across the optic that may lead to an increase in depth of focus to further improve near vision. Unlike other methods used to measure accommodation, use of the Tracey aberrometer allows us to measure both change in refractive power and refraction gradient,” he said.

ralarconji@msn.com
vibo4@hotmail.com