



Mark Packer

Devon Schuyler
in Las Vegas

PIGGYBACK intraoperative lens enhancement is an effective way to improve the results of refractive lens exchange with an accommodative IOL, according to a recent study.

The study also revealed that just under one quarter (18/74 = 24.3 per cent) of patients undergoing RLE needed a piggyback IOL in order to achieve emmetropia, and that having a short axial length was the best predictor of who would need the second procedure. A piggyback IOL was planned in eight patients because the total IOL power needed exceeded what was available in the accommodative IOL; however, in 10 patients the piggyback procedure had not been planned in advance and proved necessary to correct residual refractive error.

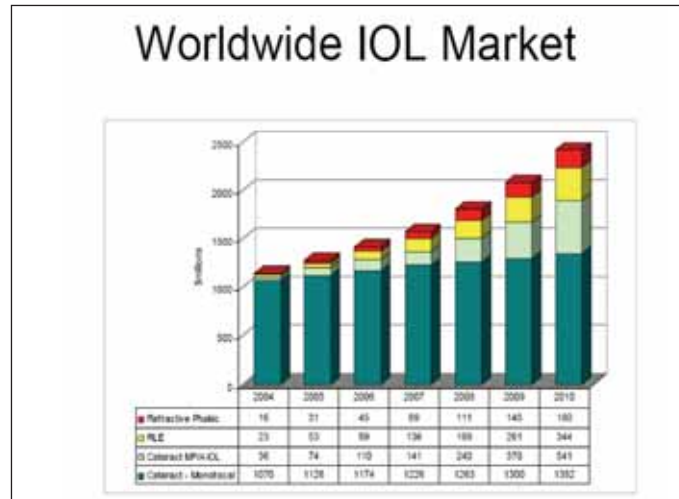
Speaking during refractive surgery specialty day at the annual AAO meeting, Mark Packer MD described his experience with piggyback IOL enhancement after RLE with an accommodative IOL. Dr Packer is an associate clinical professor, Casey Eye Institute, Oregon Health & Science University.

The retrospective chart review included 74 eyes in 41 consecutive patients undergoing RLE with the Crystalens AT -45 accommodative IOL (Eyeonics, Inc). The average patient age was 56, and 60.8 per cent of the patients were female. Before surgery, the average spherical equivalent was $+0.47 \pm 4.15$ (range $-9.50 - +8.50$) D and the average axial length was 23.35 ± 2.0 mm (range 18.47 - 27.45 mm).

Dr Packer said that he used the IOLMaster (Zeiss) to measure axial length and EyeSys videokeratography (EyeSys) to evaluate the corneal shape prior to refractive surgery. He calculated the optimal position for the IOL using the Holladay II formula, which he said "takes into account disparities in the size of the anterior and posterior segments."

After RLE, the average UCVA improved from 20/368 to 20/25. Twelve eyes of nine patients underwent unplanned piggyback IOL placement, but two of these had a plano multifocal lens implanted. The total number of piggyback IOLs placed to correct residual refractive error in the analysis was 18.

Planned piggyback implants were performed within three weeks of RLE; unplanned piggybacks were performed six to 14 weeks after RLE. After surgery, the average UCVA in the unplanned piggyback group improved from 20/59 to 20/22.5. The average uncorrected near VA in this group improved from J 9.7 to J 3.3. Some of the planned piggybacks were performed at the same time as RLE, so visual acuity prior to



piggyback implantation was never measured.

The average axial length was 20.43 in the eight patients with planned piggyback procedures and 21.46 in the 10 patients with unplanned piggyback procedures – significantly shorter than the average axial length of 23.35 in the patients who did not have a piggyback IOL.

A logistic regression analysis revealed that axial length was more effective than spherical equivalent, keratometry, white-to-white distance, phakic lens thickness, gender, or age in predicting who would need a piggyback IOL.

"Surgeons should use axial length alone as the best predictor of whether or not a patient will need a piggyback IOL," said Dr Packer.

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Dr Packer pointed out that RLE is a growing procedure, citing a study by Leaming and colleagues in the *Journal of Cataract and Refractive Surgery* (April 2004; 30:892-900) which found that 39 per cent of ASCRS members surveyed had performed at least one RLE in 2003, compared with just 14 per cent in 1999. But results are not always optimal, which is why some surgeons have begun fine-tuning them with LASIK or piggyback IOLs.

Dr Packer said that he prefers piggyback IOLs to LASIK for refractive enhancement because the IOLs offer rapid rehabilitation, excellent predictability, familiar techniques,

no need for additional incisions, no ocular surface issues, and no use of a microkeratome or laser.

As a result, he told *EuroTimes* in an interview that piggyback IOL implantation "has become a recognised enhancement procedure following RLE."

Disadvantages include the possibility of residual astigmatism; an inability to perform the procedure in people with inadequate anterior chamber depth or a prior YAG capsulotomy; limitations of the available powers; and the fact that it is an intraocular procedure, which increases the cost and risk. Dr Packer said that LASIK should be the enhancement procedure of choice in cases with residual astigmatism that has not responded to limbal relaxing incisions.

Manus C Kraff MD, one of the session's moderators, told *EuroTimes* in an interview after the presentation that he has some reservations about the procedure. He said that although it's an "interesting" approach, he questioned the wisdom of undertaking RLE while knowing full well that a second procedure will be required.

Dr Kraff, who is a professor of clinical ophthalmology at Northwestern University in Chicago, Illinois, also pointed out that the full sequence involves three procedures that are somewhat controversial individually: RLE, a first generation accommodative IOL, and a piggyback IOL. Instead of recommending all three procedures for a patient with hyperopia

Refractive Enhancement: Options & Choices

• LASIK



• Piggyback IOL



Regression Analysis

Axial Length is the best predictor of whether or not a patient will likely need a piggyback IOL ($B = -1.812$, Wald [1] = 14.625, $p < 0.001$).

Using Axial Length alone as the only predictor gives the best model fit ($\chi^2 [1] = 46.240$, $p = 0.001$).

that is beyond the available power of the IOL, he said that he "would probably recommend a correct-power monofocal IOL and have the patient wear reading glasses".

He did, however, concede that an argument could be made for the procedure when the patient has a difficult problem – such as very high hyperopia or very high myopia with minimal astigmatism – that is beyond the scope of currently proven refractive surgical procedures like LASIK or PRK.

An argument can be made for CLE in the presence of high myopia or high hyperopia. You are increasing the risks when doing the procedure for presbyopia. When you know that the IOL will not correct the pre-existing astigmatism or pre-existing myopia or hyperopia, this is an additional risk, with decreased predictability, Dr Kraff said.

manuskraff@mac.com
mpacker@finemd.com
sherrie@finemd.com