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# The Phakic IOL Debate

*Manus Kraff, MD, of the Kraff Eye Institute in Chicago, IL, moderated the Ciba Vision Breakfast Series in New Orleans, Louisiana, on November 12, 2001. The purpose of the meeting was to discuss new phakic refractive technologies and to debate the advantages and disadvantages of anterior versus posterior chamber lens placement. Dr. Kraff emphasized that the aim of the discussion was for the surgeons to learn from one another. The surgeons representing the posterior chamber panel were I. Howard Fine, MD, from Eugene, Oregon; Kenneth J. Hoffer, MD, from Santa Monica, California; and Stephen Lane, MD, from St. Paul, MN. The anterior chamber panel was composed of Antonio Marinho, MD, PhD, from Porto, Portugal; Matteo Piovella, MD, from Milan, Italy; and Georges Baikoff, MD, from Marseilles, France (via satellite link from France). The five lenses discussed were the Vivarte (manufactured by IOLTech; marketed by CIBA Vision Surgical); the PRL (manufactured by Medennium and marketed by CIBA Vision Surgical); the Artisan (Ophtec); NuVita (Bausch & Lomb); and the ICL (STAAR Surgical).*

**Advantages of Angle-Supported PIOLs**

Kraff: What are the advantages of using an angle-supported phakic IOL?
Lane: The primary advantages of an angle-supported phakic IOL are the ease of which they can be implanted, and their stability. I think that there is no learning curve in terms of the techniques that are necessary to implant such a lens. Also, over a period of time, we find that these lenses don't move around—if they are sized properly, they will remain in position without turning and twisting.
Hoffer: Another major consideration for this type of lens is that it is positioned away from the crystalline lens.
Baikoff: I feel that the Vivarte lens offers several advantages such as a very small incision, very stable results, and it is an easy lens to implant.
Fine: Dr. Baikoff, if that Vivarte lens is as wonderful as its early press releases say, do you use it for your cataract surgery patients?
Baikoff: No, not yet. The lens was designed for phakic patients, and not for aphakic or pseudophakic patients. But we can suggest using the Vivarte lens as a presbyopic piggyback lens for pseudophakic patients.

**Disadvantages of Angle-Supported PIOLs**

Piovella: For me, the most difficult aspect of angle-supported phakic IOLs is determining the correct lens size. With a properly sized lens, I feel the complications decrease.
Marinho: My experience is that pupil ovalization is still a problem with anterior chamber lenses. This is the main disadvantage of anterior chamber angle-supported lenses, as opposed to problems in the endothelium.
Kraff: The key point in achieving success with angle-supported lenses is that you must know the size of the internal part of the anterior segment before surgery.
Baikoff: We now have systems to measure the internal angle diameter of the anterior chamber, and very soon we will have OCT, which will give us the exact sizing with a precision of 10 or 20 µm. This will improve results considerably and decrease the risk of pupil ovalization.

**Advantages of Iris-Fixated PIOLs**

Marinho: The major advantage of iris-fixated phakic IOLs is that one size fits all. The surgical technique is more difficult, but future complications related to the size of the lens in the anterior chamber or fixated in the posterior chamber are eliminated.

Piovella: Another advantage is that there is more space available in the midperipheral anterior iris stroma, and like angle-supported lenses, the iris-fixated lens is positioned away from the lens and the cornea.

**Disadvantages of Iris-Fixated PIOLs**

Marinho: The biggest disadvantage of iris-fixated phakic IOLs is that they are difficult to implant.

Piovella: The problem is that the incision size is 5.2 mm to 6.2 mm, so implantation of the lens into an open eye is more difficult for surgeons accustomed to today's typical 3.2-mm incision. Another difficult aspect is the use of topical anesthesia due to the larger incision size.

**Advantages of Posterior Chamber PIOLs**

Hoffer: I feel that the small incision size is the primary advantage, followed by ease of insertion, assuming that all posterior chamber phakics can be inserted through a 3.2-mm incision.

**Disadvantages of Posterior Chamber PIOLs**

Hoffer: The most important disadvantages of the posterior phakics are their position in proximity to the crystalline lens, and possible loss of accommodation due to a developing cataract.

Marinho: Cataract formation is related to the incorrect sizing of the lens, similar to pupil ovalization with the incorrect sizing of angle-supported lenses.

Baikoff: Dr. Hoffer, would you consider cataract formation to be a more serious disadvantage than pupil ovalization?

Hoffer: I think pupil ovalization is a long-term chronic change of the iris, and does not occur after a cataract operation, so it is more of a disadvantage than the development of a cataract.

Hoffer: I feel that the appropriate power range of an IOL depends on the patient.

Kraff: I would go greater than -10 myself.

Marinho: I would do above -8, but I don't think it's fair to make such a comparison, because LASIK for low myopes is safer than phakic IOLs for low myopes. But LASIK above -8 or -10 is not very safe, phakics are safer. So we're losing the safest technique for each case.

Kraff: In terms of relative safety, the problems related to LASIK increase, but for phakic IOLs the safety levels remain constant?so at some point they cross.

Marinho: Yes, I feel they cross at around -6 to -7.

Piovella: I think that from -8 D up, because in my experience, it is possible to use topical anesthesia, and we don't need to perform an iridectomy if we use the Vivarte. Also, in the last few years, endothelial cell loss damage has decreased to only 1.5% after cataract surgery.

**What are the key factors in using phakic IOLs for hyperopes?**

Hoffer: The key factor in treating hyperopes with PIOLs is the anterior chamber depth, and not the lens power.

Kraff: In a normal eye, where do you set the limit at LASIK and where do you set the limit at phakic IOLs?

Lane: The amount of hyperopia is an interesting question, I think it is very different than myopia, especially if you're comparing an anterior-type lens versus a posterior chamber type lens.

Baikoff: I have experience with phakic IOLs in hyperopes, and I compared my own results for LASIK and phakic IOLs. If the anterior chamber is deep enough, I would not hesitate to implant refractive phakic IOLs in my patients. The problem with the very high hyperopes is that they often have very flat chambers.

Kraff: Do you have a number for an anterior chamber depth that you think is safe to put in hyperopes, 3.25, 3.0?

Baikoff: Over 3 mm or so, wide angle, measuring from the epithelium.

Kraff: What are the panel's thoughts on accommodative IOLs?

Fine: We've put in about 100 of the C&C Vision CrystaLens IOLs. There are now about

50 patients that have been binocularly implanted that are out between 3 and 6 months, and 96% of those patients have visual acuities uncorrected at a distance of 20/25 or better. About 90% of them have visual acuities in the range of 20/30 or better at near.

**Audience Questions**

Q: Has there ever been a case of endophthalmitis in a phakic IOL? Would you consider putting in a phakic IOL in -3; does it pay to take a risk for a low reward?
Fine: Yes, there has been a report in one of the first cases done outside of the US when the ICL ended up on the first postoperative day with endophthalmitis.
Marinho: There are two more reported cases, one with the ICL and one with an angle-supported PIOL. The risk is the same for a -3 D or -20 D. I think using phakic IOLs for every situation is not appropriate at this point.
Q: How does endothelial cell loss compare in the three types of IOLs discussed this morning?
Fine: I don't know whether there are any data that are meaningful, because science continues to improve the newer model anterior chamber IOLs, but, I would think that the amount of cell loss would be less for posterior chamber, slightly more for iris-fixated, and most for anterior chamber.
Kraff: Georges has some interesting observations on endothelial cell loss. I think you have changed the design from your original lens [in 1987] to decrease endothelial cell loss?
Baikoff: I have had to remove 80% of the phakic IOLs that I implanted between '87 and '89. Since 1990, I have not removed any IOLs because of cell loss.
Q: Please discuss postoperative glare with LASIK versus the various phakic IOLs.
Marinho: We are comparing aberrometry before and after implantation in different refractive procedures, but it is too early to discuss the results. We need to collect data, and we will probably have this within 2 to 3 months.
Kraff: Do you have a clinical impression of whether you're getting more glare in your postoperative corneal refractive surgery patients or in your phakic IOL patients?
Marinho: If we are comparing LASIK with -4 with a phakic IOL with -15, this is something that cannot be compared.
Kraff: So as the power of your refractive correction increases, the amount of glare is going to change?
Marinho: For LASIK, yes. Of course, all of the phakic IOLs have some amounts of glare.
Q: A question for our European colleagues: How long and how many Vivarte lenses have you implanted?
Piovella: Two months, 7 lenses.
Marinho: I implanted 11 lenses a year ago, had a 12-month follow-up for 6 lenses, then I waited 1 year to evaluate their performance. The result was good, so 2 months ago, I implanted five more of these lenses. I have six lenses with 1-year follow-up, and five with
2-month follow-up.
Kraff: We're hearing some wisdom here; there's a waiting period after the lenses are implanted before jumping on the bandwagon.

*Material extracted from the CIBA Vision Breakfast Series, presented at the AAO meeting in New Orleans, Louisiana on November 12, 2001.*