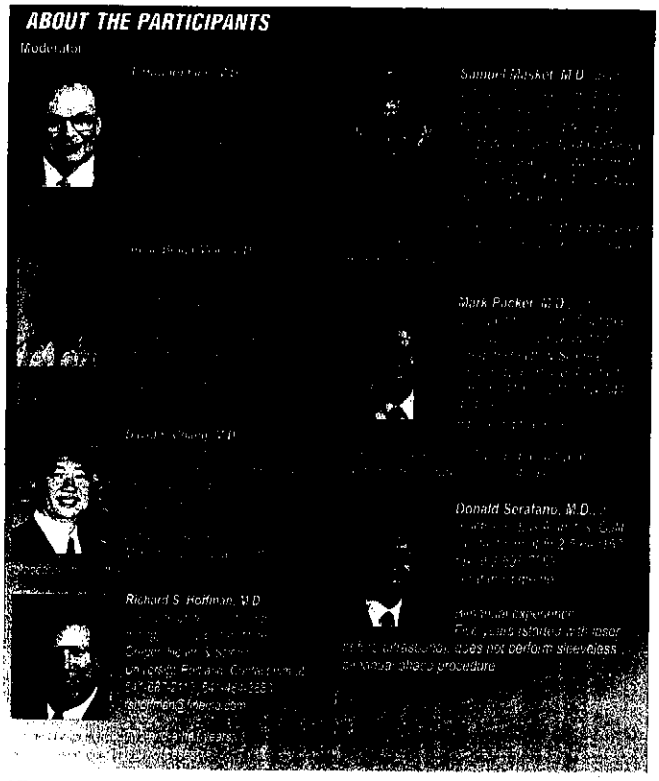
EW Dialogue

Is bimanual phaco a viable procedure?



Cataract surgeons discuss why bimanual phaco should — or should not — be a part of physicians' surgical arsenal.

Bimanual: Is it more difficult or more time-consuming?

I. Howard Fine, M.D.: Many bimanal microincision phaco critics discuss that bimanual procedures seem to take longer and are more difficult. When I first turned to bimanual, it took me a little longer to perform the procedure. But at that time, the instrumentation was very bad.

Since that time, the instrumentation has improved and now it takes me about the same amount of time as with coaxial phaco.

Do you find that there's a big diference in the time it takes for coaxal phaco compared to bimanual?

Rosa Braga-Mele, M.D.: I find that there's almost no difference in time once you're past your learning curve with bimanual phaco. I also agree that the instrumentation now is so much better than when we first started.

At this point, it takes me the same amount of time for coaxial as it does bimanual. So, for me, it makes no time difference at all.

Dr. Fine: Dr. Masket, you've said that you do bimanual on about 5% of your cases. Do you think the procedure takes longer?

Samuel Masket, M.D.: One must either raise the bottle or reduce the flow rates because in reality one cannot infuse through the irrigation chopper at the same rate as coaxially. I use two different programs, one for bimanual and one for coaxial.

What slows me down most is incision management. My sense is that the problem with incisions is they tend to leak at the close of surgery, and so we spend more time hydrating, etc.

The primary reason why I don't use bimanual surgery more often is related to incisional issues. We've got these round, rigid tubes that we place through slits, and if we want them to be as watertight as possible for chamber maintenance during the procedure, then we make them on the small side and we tend to stretch and distort

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Views From The Asia-Pacific

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Bimanual Experience : more than two years; performed procedure in about 50/10,000, less than 1% cases. I found no benefits for the patients and abandoned

"I have designed a special small sleeve named the Nano Sleeve. I can perform coaxial phaco through 1.7mm and implant 6.0mm AcrySof through the same incision. The wound can be easily sealed just by increasing the intraocular pressure without corneal hydration. I use this sleeve with a 1.1mm standard flared Akahoshi tip at 550mmHg vacuum and 40cc/min flow rate. The amount of irrigation in this system is 120cc/min. I can use conventional instruments and the same prechop techniques. By the new implantation technique called "Pull and Push", a 6.0mm single piece AcrySof can be implanted without extending the initial incision. As I can perform sub-2mm coaxial phaco surgery rapidly and comfortably, I cannot find any merit in bimanual phaco."

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Bimanual Experience : One-and-a-half-years; performs procedure in 10% of cases

I believe that future development in IOL technology will drive surgeons toward bimanual micro incision phaco. Though instrumentations and technique have been improved which allow us to perform bimanual phaco in almost any kind of case, there are still conditions that I prefer coaxial phaco. In extremely difficult cases such as a very hard nucleus, a very loose zonule, and a very small pupil, the 20 G irrigating chopper is too clumsy. In the situations that need a lot of fine manipulations, I always use a Sinsky hook as my chopper.
In developing countries, cost of instruments may also effect or delay the transition toward bimanual phaco. A micro capsulorhexis forceps is very expensive while an alternative capsulorhexis technique using a needle cystotome is not as effective or as safe in difficult cases. If future IOLs are also more expensive then the future of bimanual phaco is unclear.

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Bimanual Experience: two-and-half years, performs procedure in 20% cases

"Small is great. The many uses of micro-incision phaco" (Eurotimes Sept 2004). When phacoemulsification was introduced the incision was 3.2 mm. The new development of cold phaco technology has allowed the smallest coaxial phaco incision of 2.5 mm using a 20 G phaco needle. Without sleeve the incision can reduce from 2.5 mm to 1.4 mm and the irrigation through 1.4 mm side port incision using irrigating chopper. The irrigating chopper is bulky and imposes limitations on movement during chopping and also difficulty in doing horizontal phacochop. During my learning curve in bimanual phaco, I found the only difficulty is to adjust my movement during chopping and of course I have to slow down my fluidic machine setting and increase the bottle height. My limitations in doing bimanual phaco are the price of rolling IOL and in difficult, complicated cataract. My experience in bimanual is almost 3 years and in my recent study bimanual phaco was as safe and effective as coaxial phaco.

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them. Then, they don't hold the chamber when you remove the instrument. On the other hand, if you make them larger, they don't distort them and they leak during the procedure.

David Chang, M.D.: I don't really believe that the increased time is the main negative with bimanual microphaco.

Any time you transition to something new, it's going to add time. Also, if you routinely perform coaxial surgery, then there is added set-up time to do an occasional bimanual case.

Otherwise, I don't think the actual procedure time is significantly different. The focus should be on 'Does bimanual phaco enhance the safety and efficacy of the cataract procedure?'

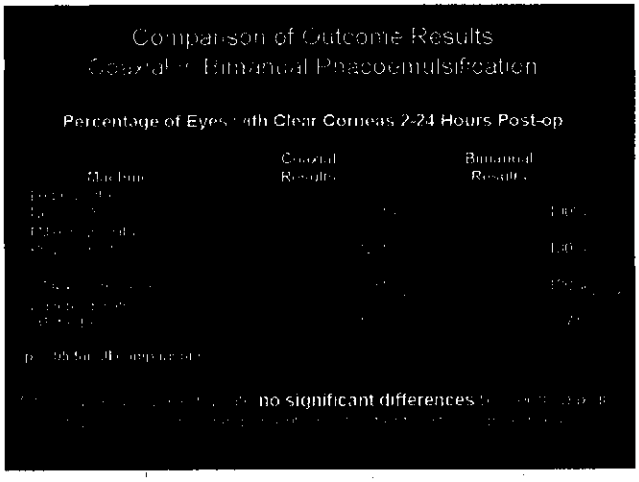
Fluidics in bimanual phaco

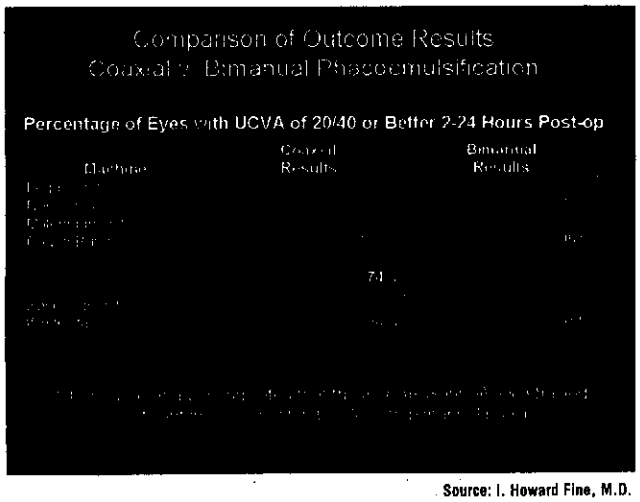
Dr. Fine: Getting back to Dr. Masket's comments on fluidics, I personally believe the fluidics in bimanual microincision phaco are better, with more stable chambers, than in coaxial phaco.

That's partially because we've been able to develop proper instrumentation in our irrigating handpieces that allow for that to be true. And also, because all of the fluid is basically coming from one position in the eye and existing from another position without much, although there is some incisional outflow.

Donald Serafano, M.D.: At the ASCRS•ASOA Symposium & Congress, I am scheduled to present a flow study that I completed. The study had to do with MICS — how much flow I get through an irrigating chopper, both with the end irrigation and side irrigation, versus what I can get with coaxial. Currently, I use 2.2-mm coaxial phaco.

I gave up some irrigation inflow when I went down to 2 mm using the ultra-sleeve, but the flow is still higher than I can get through the irrigating choppers. I have lower inflow with MICS, so I have to adjust the parameters of my aspiration flow rate and my vacuum in order to have a stable chamber.





Source: I. Howard Fine, M.D.

Dr S Istiantoro's Views

Bimanual: Is it more difficult or more time consuming?

Yes it was when I started to do bimanual phaco in early 2002. I have done coaxial phaco since 1988. Phacoemulsification surgery and technology have evolved and made for more efficient and safer phaco surgery. When I started to do bimanual technique everything had to be adjusted. I had to adjust my surgical instruments and also my fluidic settings. The irrigating chopper was bulky and imposed limitations on movements (oarlock and piston movement). Mastering this instrument was one of the most difficult during my learning curve. The irrigating choppers are able to supply BSS to the anterior chamber from 28 to 35 cc/minute and coaxial phaco, more than 100 cc/minute. The flow rate is therefore much reduced in bimanual phaco.

My recent prospective randomized study on comparison bimanual and coaxial phaco showed that the phaco time and effective phaco time was not significantly different but the energy used was significantly less in bimanual phaco than in coaxial phaco. I believe that the followability in bimanual phaco is better than coaxial phaco. In this study I used B&L Millennium venturi machine with custom control software. The machine setting was the same in both bimanual and coaxial phaco. My impression to date is that bimanual phaco is not any more time consuming compare to coaxial.

After I passed my learning curve, my bimanual phaco surgery time became the same as my coaxial phaco time. My limitation to do bimanual phaco is only on IOL technology. I believe that when the rolling (micro) IOL technology is improved the phaco surgeons will change their direction to bimanual phaco because bimanual phaco has more advantages.

Fluidics in bimanual phaco.

A deep and stable anterior chamber very important in phacoemulsification. During the procedure the irrigation and the aspiration of BSS from the anterior chamber at least must be equal and there should be no post-occlusion surge. In bimanual phaco the incision is critical. I use a 1.4 mm blade for 20 gauge phaco tip. My experience is that this incision is enough for maneuvering of the phaco tip and there is no BSS leakage from the anterior chamber. I use a 20 gauge 30 degree phaco because it is easier inserting through a very small incision. In coaxial phaco the incision is 2.5 mm when I use a 20 gauge phaco tip; the sleeve will seal the wound preventing BSS leakage.

I use a 19 gauge irrigating chopper inserting in 1.5 mm incision. The reason I use a 19 gauge irrigating chopper is that I have enough irrigation fluid compare to the 20 gauge irrigating chopper. I use a Fukasaku irrigating chopper which is able to irrigate BSS 33 cc/minute. I set the vacuum not more than 150 mmHg in B&L Millennium which is equal to aspiration flow rate of 30 cc of fluid/minute. The bottle height is 110 cm. When I am using this setting, the anterior chamber is deep and stable during the procedure. When I use AMO WhiteStar Sovereign, I set the aspiration flow-rate 30 and vacuum 300 during chopping and segment removal.

IOL technology and limitations of bimanual phaco.

I enlarge the main phaco incision to 2.6 mm with the same blade for inserting 6 mm optic foldable IOL. I do not have any leakage at the end of surgery. I do not make a new incision for inserting IOL. When I use a rolling (micro) IOL, I enlarge the incision to 1.6 mm.

By understanding the fluidic system as well as the US power software in every machine, the bimanual phaco is viable, safe and effective.

My limitation in doing bimanual phaco is based upon the availability, lens design and the spherical quality of the rolling (micro) IOL compared to the 6 mm optic foldable IOL. I do not do bimanual phaco in hard brown mature cataract.

CATARACT SURGERY INNOVATIONS

Iris prolapse in a Flomax (Boehringer Ingelheim GmbH, Germany) patient with IFIS occurs despite bimanual micro phaco with 1.2-mm incisions.

Source: David F. Chang, M.D.

Dr. Braga-Mele: Dr. Serafano, are you testing a 20-gauge or a 19-gauge chopper, with the irrigating instrument?

Dr. Serafano: I think in the study I used a 19-gauge. It's interesting you should bring this up. I am teaching this course with Dr. Chang and Matteo Piovella [M.D., Italy], and one of Dr. Piovella's slides is all the instruments that he has bought since he started trying MICS. We picked two of the more popular irrigating choppers to use in the study. Also, I did the study at two different bottle heights — 110 and 65 cm of water.

Dr. Braga-Mele: I do bimanual about 25% to 50% of the time, I don't change my parameters at all, other than raising the bottle height 5 cm to 10 cm higher than I would for coaxial. But my vacuum stays the same, my phaco stays the same. I use a venturi pump, so my flow is dependent on all of the above.

With my particular phaco machine, I can vary my vacuum throughout phaco so I have the ability to work at lower vacuum levels at certain parts of the procedure if needed. Basically, I don't find any chamber instability at all.

I agree that wound construction is important and that the trapezoidal blade is the best for construction. I use a 1.4 internal and 1.6 external trapezoidal blade. I use a 19-gauge system, and I find with the 19-gauge irrigating choppers — either open-ended or dual-irrigating choppers — that you get very good flow. It might not be comparable to coaxial, but it is still sufficient.

I haven't done the lab studies myself, but I still feel that the fluidics in the anterior chamber are superior because you can direct your irrigation where you need it to go rather than being forced to be at the site of the phaco needle tip.

Dr. Chang: I use a 20-gauge phaco tip, whether I do coaxial or bimanual phaco. I also use a 20-gauge irrigating chopper. There's certainly more inflow with the coaxial setup and that gives us a greater margin for error with chamber stability if the incisions aren't tight enough, or the pump parameters aren't adjusted exactly right.

I agree with Dr. Serafano that when you start out, you should use conservative vacuum parameters and raise the bottle to compensate for having less irrigation inflow than you're used to.

But then the question becomes 'Do we really need all that coaxial irrigation infusion?' I think that when we do bimanual phaco, we run less total irrigation fluid through the eye and have a more finely tuned fluidic balance.

Dr. Hoffman: I think if you adjust your parameters, the fluidics are basically the same.

As far as incision construction goes, I notice that when I have a smaller incision, with, for example, a 0.8-mm to 1-mm internal opening, that I had leakage problems after the case was over. Once I enlarged the incision to a 1.2-mm internal opening, the leakage problem disappeared. I think the problem with leakage is probably because we stretch these incisions too much.

Unique complications in bimanual

Dr. Fine: We know that we can distort these incisions and have some difficulty sealing them. Do you believe that more precision and care has to be taken in incision construction? What about more attention paid to detail and architecture? Is there any other unique complication of bimanual microincision compared to coaxial?

Dr. Chang: When I was starting out, I used a side-irrigating chopper. Because we tend to retract the chopper as we evacuate fragments with the phaco tip, the chamber can suddenly collapse if openings out of the eye.

In the beginning, I certainly had some close calls that way. Again, I think it comes down to issues of instrumentation and the learning curve — but they're surmountable problems.

Dr. Fine: They are very surmountable. I think we happen to prefer front-opening irrigators because as soon as you touch the incision, you blow the chamber up and you don't snag any intraocular tissue entering the eye. And again, your manipulation of that instrument within the incision is never in danger of closing the inflow.

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Views From The Asia-Pacific

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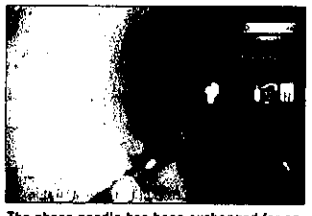
Since the introduction of phacoemulsification in 1967, clinicians have been refining the technique to achieve smaller incision size, decrease thermal damage to wound, decrease surgically induced astigmatism and shorten recovery time. Conventional phacoemulsification utilizes a titanium needle with a surrounding silicone sleeve as a single unit incorporating both the aspiration and phacoemulsification. This limits the minimum incision size to 2.6 to 3.5mm. Bimanual phacoemulsification technique separates the function of infusion and aspiration. It retains the advantage of phacoemulsification and at the same time achieves a smaller incision size of less than 1.5mm.

There are two controversial issues regarding bimanual phacoemusification technique. One is the lack of heat insulation of the naked phaco needle which may result in wound burns. The next is the question whether bimanual really confers significant advantage than the conventional technique. The solution to the former is the optimization of phaco energy settings to reduce the total amount of energy used in the surgery. This "cold" phacoemulsification has resulted in minimizing wound burns. The inventor of bimanual phacoemulsification technique, Amar Agarwal has reported no wound burns in 305 bimanual phacoemulsification cases.

As to the second issue, what is the real advantage of bimanual phacoemulsification technique over conventional phacoemulsification? The opponents of bimanual phacoemulsification argued that the technique is difficult, has a steeper learning curve and the anterior chamber depth may not be as stable. The proponents of bimanual phacoemulsification opined that the learning curve is comparable to conventional phacoemulsification. The anterior chamber depth stability can be addressed by the usage of a larger infusion needle with internal diameter of 0.75mm and a tip with 3 ports second hand instrument of 20 gauge or if needed, 18 gauge. This can be further enhanced by increasing the bottle height, complementary instrumentations and appropriate second hand instruments.

With the advent of any new techniques, there will be associated problems. To maximize the potential of new techniques, the associated problems need to be addressed systemically. Bimanual phacoemulsification is invented to reduce the incision size. Although it is a new development, it is a modification based on the conventional phacoemulsification. In promoting bimanual phacoemulsification, we should treat it just like a new technique for cataract surgery and the associated problems may not be as complex. In order to further our understanding on the principles of bimanual phacoemulsification and the development of the technique, we have invited experts on this field to express their views and share their experiences on bimanual phacoemulsification in this issue.

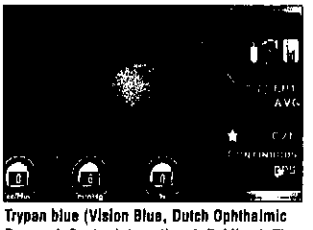
A vertical chopper separates a wedge-shaped piece of nucleus in preparation for mobilization and aspiration with the 20-gauge phaco needle, using high vacuum and very low levels of ultrasound energy.
Source: Mark Packer, M.D.



The phaco needle has been exchanged for an aspiration tip while the irrigating chopper has remained in the chamber so that no fluctuation or shallowing occurs during the change of instrumentation.
Source: Mark Packer, M.D.

The open-ended irrigator on the left complements a 0.3-mm aspiration tip on the right.
Source: Mark Packer, M.D.

A large wedge of moderately dense nucleus is mobilized and aspirated utilizing dual linearity with high vacuum and low ultrasound power in burst mode.
Source: Mark Packer, M.D.



Trypan blue (Vision Blue, Dutch Ophthalmic Research Center International, Zuidland, The Netherlands) constitutes an essential element of the surgical armamentarium when confronting an opaque cataract. Staining the anterior capsule increases its visibility dramatically and transforms the case from one fraught with anxiety to one that is routine. A significant advantage of micro incision phaco is enhanced chamber stability during the capsulorhexis.
Source: Mark Packer, M.D.

Advantages of bimanual

Dr. Fine: I know I'm still improving on my bimanual cases. What are the unique advantages of bimanual microincision phaco? Why should physicians learn how to do this?

Dr. Hoffman: I have found that there are certain cases in which a bimanual approach is superior to the coaxial approach. That's one of the main reasons why I'm still trying to get better at bimanual.

For refractive lens exchanges, when you use a Crystalens (eyeonics, Aliso Viejo, Calif.) you have to make a smaller capsulorhexis and it's very difficult to get the subincisional cortex out of those cases. With bimanual I&A, there's essentially no difficulty.

Dr. Masket: I think another way to answer that question would be to imagine the advantages gained with bimanual I&A.

It would be the same situation with bimanual phaco. There are many advantages to bimanual I&A, particularly when you look at the fluidics of not washing away the same material you are trying to absorb.

Again, I think the bimanual concept is very logical, and the fluidics are superior.

The only issue for me is that the incision maintenance is a big problem. When we have some type of a soft material that will allow the incisions to really stay sealed, I think it will be an absolute slam-dunk and I believe that the majority of surgery will be done by everyone in that fashion.

Dr. Fine: Dr. Masket, I think you're 100% right. I also think that bimanual microincision is much better in cases of post-RK patients, because you get between those radials and you have much less potential for opening a radial incision.

Dr. Chang: I agree with Dr. Masket as well. The operational analogy would be either bimanual I&A or bimanual vitrectomy.

In each case, what we're really doing is dissociating irrigation and aspiration. This can be helpful if you have a zonular defect, and can direct the irrigation away from this area to avoid a fluid misdirection syndrome.

The lower irrigation flow that we discussed can also be an advantage at times. With really lax zonules, too much hydrostatic force can be damaging. In these cases, bimanual microphaco may be less stressful to the zonules.

Dr. Packer: You mentioned vitrectomy. If you do have a break in the posterior capsule during bimanual, it's a tremendous advantage because you can keep the infusion in the anterior chamber, you can use the phaco needle, an I&A, or vitrector interchangeably with one hand while maintaining infusion and never allowing the chamber to collapse.

You can get through an entire case without anyone knowing you had a problem with the capsule because you're able to completely clean out all of the cataract material and cortex, put an IOL in the sulcus, and capture the optic in the capsulorhexis, or put it in the bag if it's a small, round tear. The vitreous never comes forward because you never lose the pressure in the anterior chamber.

In fact, before placing the IOL, you can start to inject your viscoelastic before you remove your irrigator so that you truly never allow the chamber to shallow at all. The vitreous never has a chance to come forward. That, to me, is the best management of a posterior capsule break.

Dr. Hoffman: If I can dovetail on that, posterior polar cataracts are another great indication because they have such a high percentage of posterior capsule ruptures. Also, with our technique, we can do a more controlled hydrodelineation and limited hydrodissection. It is not cortical cleaving hydrodissection, but it's hydrodissection without letting the fluid wave reach the area of potential capsule rupture. If you have a capsule rupture in a patient with a posterior polar cataract, it's more controlled for the reasons that Dr. Packer mentioned.

Dr. Fine: It has the potential, since we can maintain irrigation throughout the entire procedure, as Dr. Packer indicated, of stabilizing the vitreous face. If we do a refractive lens exchange, or even just a cataract in a high myope, we can leave the irrigating instrument in, and interchange all of the other instruments with our right hand, including adding viscoelastic while there's irrigation moving in. In turn, we can avoid trampolining of the vitreous face during the operation itself.

Does bimanual offer an advantage over coaxial in cases in which a patient has a floppy iris?

Dr. Chang: I have tried using bimanual microphaco in several Flomax (Boehringer Ingelheim GmbH, Germany) patients, thinking that the tighter 1.2-mm incisions would better prevent the iris from prolapsing. I think it helps, but I'd have to qualify it.

There does seem to be some advantage to keeping the irrigation flow more consistently anterior to the iris, instead of having it pass back and forth between the anterior and posterior chambers.

However, if you start out with a pupil that's small to begin with, then the iris still prolapses, billows, and constricts. So, I think bimanual phaco is helpful in Flomax patients if the pupil is reasonably large, but it doesn't help if you start with a smaller pupil.

Dr. Fine: Dr. Chang, in my experience, the iris does come to the microincisions but it doesn't extrude, where with a 2.5-mm phaco incision the iris comes out of the eye.

Dr. Chang: Well, that's true. I'm still just amazed at how a floppy iris can manage to prolapse to snug an incision.

Complications - from page 13

Now, in the early 1980s, we all had to open phaco incisions to about 6.5 mm or 7 mm to put in flat lenses.

People said, 'What's the point? Why do you bother to do that?' We all said that it was a better operation. Well, we have some data to show that bimanual microincision phaco is at least as good as coaxial phaco.

We repeated the study that we did with power modulations and new technology using bimanual instrumentation. But even though we can't at this time say that we can document that it's better, some of us feel it is better.

My belief is that we should encourage people to experiment with it at this time, because they will end up doing it later. They may as well take ideal cases and play with bimanual microincision phaco. It's easy to make the transition over a period of time when you're not under the gun because of the availability of micro-incision IOLs.

Dr. Chang: I agree. There are certainly no data that show that outcomes are superior with bimanual microincisional phaco.

However, I think that one reason to experiment with it is to learn an alternative way to phaco the lens. I also think that surgeons should learn bimanual I&A as an alternative to coaxial I&A.

There are different pros and cons to using coaxial versus bimanual instrumentation for either the nucleus or the cortex. If your armamentarium includes both methods, this can help you in special situations.

For routine cases, some surgeons will end up preferring bimanual phaco, while others will not, but they'll never know unless they try it.

Incision architecture and instrumentation

Dr. Fine: Regarding incision size, I have not found problems with leaky incisions — or difficulty in getting these to seal — but I use trapezoidal incisions, which give me more flexibility for manipulation of the instrument than straight incisions. I also use 100% diamond knives, which I have found really are advantageous, because they are so reproducible with respect to incision architecture.

Also, I don't enlarge those incisions in order to implant an IOL, but instead make a separate incision between the two microincisions for IOL implantation. If you enlarge them, you will find them to be slightly harder to seal.

Do you believe that the instrument manipulation through these incisions has resulted in more difficulty getting them to seal?

Dr. Serafano: I did a lot of laboratory testing with bimanual. The incision that we tested had a lot to do with manipulation. It wasn't the thermal damage as we initially thought was happening, but it was how much I had to manipulate within the incision. I then end up with a fish mouth instead of a nice closure.

While this was in a laboratory setting, we tried using a trapezoidal-shaped incision. We tried stainless steel and diamond and it still came down to manipulation in the wound.

So if I could be still, and not press against each side of the incision to try to get to areas of the eye, then the incision looked good. But, if it was more difficult and I switched back and forth between the right and left hand, then the incisions did not look as good.

Dr. Chang: After initially using metal blades, I finally went to a diamond trapezoid measuring 1.2 mm/ 1.4 mm. With the wider external dimension, you not only get a better seal, but there's more lateral maneuverability for the instruments. I agree that the trapezoidal incision is more self-sealing.

Dr. Masket: I have a small study, and I don't have enough data to present the numbers, but I'm going to continue it if I have the time.

I use a tonometer to set the pressure now at the close of surgery when I check my incisions for sealing. I have found that at the end of phaco or at the end of I&A [irrigation and aspiration], if you compare IOP as a group in those eyes that have had coaxial, it is higher than in those eyes that have had bimanual.

Dr. Fine: Dr. Masket, Dr. Packer did a major study with one of our fellows from Singapore and found data that were very interesting. Dr. Packer, can you discuss this study?

Dr. Packer: Yes. We did a study in cadaver eyes in which we performed standard coaxial phaco, and then we also performed bimanual microincision phaco with two different incision sizes.

We used the 20-gauge instrumentation, and we used a 1.3-mm internal opening for one set, and a 1.4-mm internal opening.

What was most interesting about the study was that the highest pressures that we obtained were during parts of the procedure that were not really unique to either procedure.

These were hydrodissections during which we got transiently very high pressures, higher than 100 mm Hg just prior to the burping out of viscoelastic, and that was true whether you had a 2.5-mm incision, or two 1.3-mm incisions.

The other time is during IOL insertion, because we've all had a patient wince once or twice when we've put in the IOL. We actually got very transient but very high pressures, even higher than 200 mm Hg. We did this using a pressure transducer in the vitreous cavity of the cadaver eye, which we obtained from a scientific company that makes Swan-Ganz catheters (Baxter Healthcare, Deerfield, Ill.) for cardiac research in rats.

So that's the kind of instrumentation we used.

Interestingly, the pressures during surgery were very similar for coaxial and bimanual, even though we had the bottle higher, as we do generally in bimanual. The stimulus for this whole study was that there had been criticism and concern about putting the bottle so high, 110 cm.

Was that creating dangerously high pressures? It turns out, in fact, that phaco is a high-pressure procedure whether you do it coaxially or bimanually, with pressures in the 50 mm Hg to 70 mm Hg range during either procedure.

The point is that you do have some egress of fluid, even through microincisions around your irrigator and around your phaco needle.

Dr. Masket: But did you measure the pressures immediately after removing the instrument?

Dr. Packer: Immediately after removing instruments, you generally have a little bit of a leak, so the pressures fall rapidly.

Dr. Masket: But not in a coaxial incision. That's the point that the numbers have taught me.

If you look at chamber depth when you come out of the eye, taking the instruments out with fluid running, and you check chamber depth, on average, the chamber will be deeper with bimanual than with coaxial surgery. To be frank, the reason that I have not moved toward 100% bimanual is only because of the incisions. I think that our instrumentation is a problem.

The one advantage of a coaxial phaco is that that silicone sleeve not only serves to somewhat fill the space, but it also serves to protect the tissue from all the distortion of moving it around, and what have you.

And so that when you come out with your instrument, you tend to allow the incision to seal. It's just the opposite in my own experience with the microincisions, and that, to me, is the whole crux of the issue.

The past and future

Dr. Chang: When you consider that we have only been doing bimanual microincisional phaco for a few years, we have come a long way in a very short time. I think it is quite an accomplishment that we can now remove a nucleus of any density through a 1.2-mm incision. Bimanual microphaco is indeed a viable, effective, and safe technique for cataract surgery.

Whether it's superior to coaxial phaco or not, I think that's going to be debated for a long time.

I don't think that one procedure is really safer than the other, so adoption is going to boil down to individual surgeon preference. We've had the option of bimanual I&A for years. Some surgeons love it, while others prefer coaxial I&A.

Certainly, bimanual microphaco would be more popular right now if we had IOLs that could go through smaller incisions.

However, in the future, we are going to choose IOLs based upon their optical and refractive benefits. Incision size won't be the primary determinant, because smaller incision size is at best a short-term benefit.

Dr. Braga-Mele: What I found from teaching residents bimanual phaco is that once they've done a bimanual phaco case, they'll tell me that they have become better surgeons from doing the bimanual cases, because, as Dr. Chang said, we are a little bit more aware when we're doing bimanual. We're continuously learning.

Also, there is the bimanual I&A. If people try nothing else, I think bimanual I&A is a true advantage over coaxial I&A. Physicians should use that as their first stepping stone.

Dr. Fine: Bimanual microincision phacoemulsification is the logical next step in phacoemulsification technology. In certain cases as indicated in this dialogue, it is superior to coaxial phaco. In routine cases, it is at least as good — and it is fun. I would encourage all physicians to start their transition sooner rather than later.

Editors' note: Dr. Fine has a financial interest in Advanced Medical Optics, Bausch & Lomb, eyeonics, and Pfizer. Dr. Braga-Mele is a consultant for Bausch & Lomb. Dr. Hoffman is a paid speaker for Advanced Medical Optics Inc. Dr. Masket has a financial interest in Advanced Medical Optics and Medennium. Dr. Packer has a financial interest in Advanced Medical Optics, Bausch & Lomb, STAAR Surgical, and Alcon. Dr. Serafano has a financial interest in Alcon. Dr. Chang is a consultant for Advanced Medical Optics. Drs Akahoshi, Pangputhipong and Istiantoro have no financial interests related to their comments.