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SMALL INCISION SURGERY. PHACOEMULSIFICATION AND SOFT IOL INSERTION TIPS

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Small incision cataract surgery often leads to early rehabilitation and less postoperative astigmatism. This surgery implies the use of soft foldable IOLs and phacoemulsification, which is an excellent way of removing a cataract through a 3 mm incision.

Eighty to ninety percent of the patients in our part of the world seek ophthalmic care only when their vision is very reduced, many times down to light perception so the types of cataracts encountered are advanced, with very hard nuclei. Most phaco surgeons prefer to operate on soft nuclei, which means that only a small percentage (10 to 20%) of our patients would benefit from small incision surgery. In order to benefit the majority of these cases, the surgeon must develop proficiency in phacoemulsifying hard nuclei.

There are a few disadvantages to phacoemulsifying hard nuclei:

1) The procedure requires experiencie from the surgeon, so there is a learning curve involved.

2) The cost of the instrumentation and its maintenance.

3) Increased possibility of corneal endothelial damage due to the increased ultrasonic time required.

4) Increased possibility of posterior capsule rupture.

5) Good pupillary dilation is essential.

We have been investigating soft foldable IOLs for almost two years now. Our current protocol comparing Hydrogel, Silicone and PMMA IOLs calls for phacoemulsifying all cataracts in the study. As our study evolves, so does our ability to emulsify harder and harder nuclei. This paper will present what we have learned from our experience and offer some tips to help the phaco surgeon cope with harder nuclei.

TIPS FOR SUCCESSFUL EMULSIFICATION OF HARD NUCLEI

Use of YAG

We have recently begun using the YAG laser to fragment hard nuclei prior to emulsification. The technique described by Chamblis and others seems to decrease ultrasonic time and allows for the phacoemulsification of hard nuclei that would otherwise be very difficult. Though we have only used it in a few cases, results have been good.

Use of a two-hand technique

A two hand technique is a must in emulsifying hard nuclei. The lens manipulator eliminates unnecessary movement of the nucleus by keeping it against the phaco probe and prevents endothelial touch. It also helps in mechanical cutting of hard parts of the nucleus.

Incision

The incision must be located 2 mm behind the limbus, 3.5 mm in length. When the anterior chamber is shallow, the incision can be reduced to 3 mm.

Viscoelastic

Viscoelastic substance must be introduced before capsulotomy as many hard nuclei are surrounded by soft cortex when capsulotomy is started. Soft fluid cortex will obscure the view if there is no viscoelastic material to prevent it from filling the anterior chamber until the end of capsulotomy.

Capsulotomy

I do a pear-shaped capsulotomy with the apex pointing toward 12 o'clock. The first two cystitome incisions are made from the center towards the periphery

at 12 o'clock. The rest is continued in a can opener technique from the periphery to the center. The pear shape facilitates aspiration of the cortical matter at 12 o'clock and makes later insertion of the soft IOL in the capsular bag much easier.

Constant power setting

Many surgeons like to use ultrasonic powers ranging from a high of 9 to a low of 4. I use a constant ultrasonic power setting of 6 and change the time of burst according to the hardness of the nucleus. A constant power setting provides a constant parameter by which to evaluate each case. With experience, the surgeon will know how each tipe of lens will react to such power, preventing a lot of unnecessary surprises.

Nuclear sculpting

Start sculpting the central portion of the nucleus with very short ultrasonic bursts until 50% of the nucleus is sculpted. Then with the manipulator in your other hand, push the nucleus at 6 o'clock to expose the equator, at 12 o'clock. Start fragmenting the lens from the equator, pushing the nucleus toward the phaco tipo with the lens manipulator.

As you continue sculpting, the nucleus should be croissant shaped. At this point, there are two options: continue fragmenting the nucleus until it is cut into two halves then deal with each piece separately, or start fragmenting one limb of the croissant and then other. If some portions of the nucleus are hard to fragment, you may press the nucleus against the phaco tip with the manipulator to try to crush it mechanically without ultrasonic power. The manipulator is also useful for holding small nuclear fragments against the tip of the probe to prevent them from being ejected and hitting the corneal endothelium.

Posterior chamber emulsification

Phacoemulsification should be done in the posterior chamber or at pupillary level. Avoid as much as possible phacoemulsifying in the anterior chamber.

SOFT IOL INSERTION

For implanting the Silicone lens, I prefer to use the Bartell inserter or the Faulkner forceps. For the Iogel lens, I use the Barret forceps. Although it is possible to insert these lenses with any of these instruments, there are certain advantages and disadvantages to each.

Bartell inserter

The Bartell inserter can insert the Silicone IOL in the bag in one step. After the lens is folded into the Bartell inserter, inject healon and push all the way through

the small incision until the tip of the inserter is behind the anterior capsule at 6 o'clock. When the inserter is pulled out of the eye, the lens will be left behind the anterior capsule at 6 o'clock and the other end will be above the anterior capsule at 12 o'clock (Fig. 1). By a bent tip of a 19-gauge needle, one side of the lens is pushed to the right side above the anterior capsule, then pushed downwards and to the left to pass behind the anterior capsule, (Figs. 2 – 3), then the whole lens is rotated in the capsular bag to the 3 and 9 position. (Fig. 4). The space made by the pear-shaped capsulotomy that I use makes this manipulation easier.

The disadvantages of the Bartell inserter are that it is bulky and there is a high incidence of damaging the lens. Also, occasionally there is lens jittering inside the eye with possible endothelial touch. To avoid this possibility, push the tip of the instrument 45 degrees down into the bag and eject the lens slowy.

Faulkner forceps and Mazzoco holder

The Faulkner lens forceps folds the lens easier, but it is a little bit bulky. The Mazzoco lens holder easily holds and folds the lens and is easy to insert into the eye. There is also minimal risk of damage to the IOL. However, the IOL tends to stick to the holder after insertion. Many times it is necessary to insert a second instrument to push in the IOL while the holder is withdrawn.

Barrett forceps

The Barret lens forceps is small and fine and holds the IOL easily. However, the ends are too short, leaving the first portion of the IOL extended, thus making it difficult to insert the lens. The problem would be solved if the ends of the forceps were 1 to 2 mm longer.

THE FUTURE

The trend toward small incisions that has recently emerged in opthalmology has implications that go beyond the apparent advantages of the technique. Technological advances are rapidly applied to clinical settings in our specialty and the removal of a cataractous lens through a puncture incision with the subsequent injection of a soft polymer within the capsule is a concept that is already being investigated in animals. This technique will theoretically preserve accommodation and provide maximum rehabilitation to the patient. For the moment, we must objectively evaluate transitional techniques such as small incision surgery as to their safety and efficacy. The best way to accomplish this goal is to design randomized, controlled studies that will unbiasedly assess these techniques and materials before they are adopted for general use by the ophthalmic community.

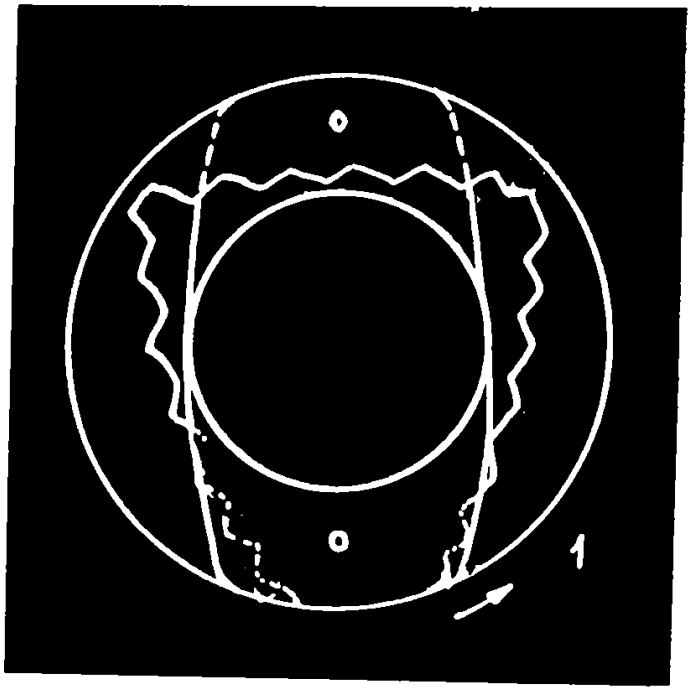
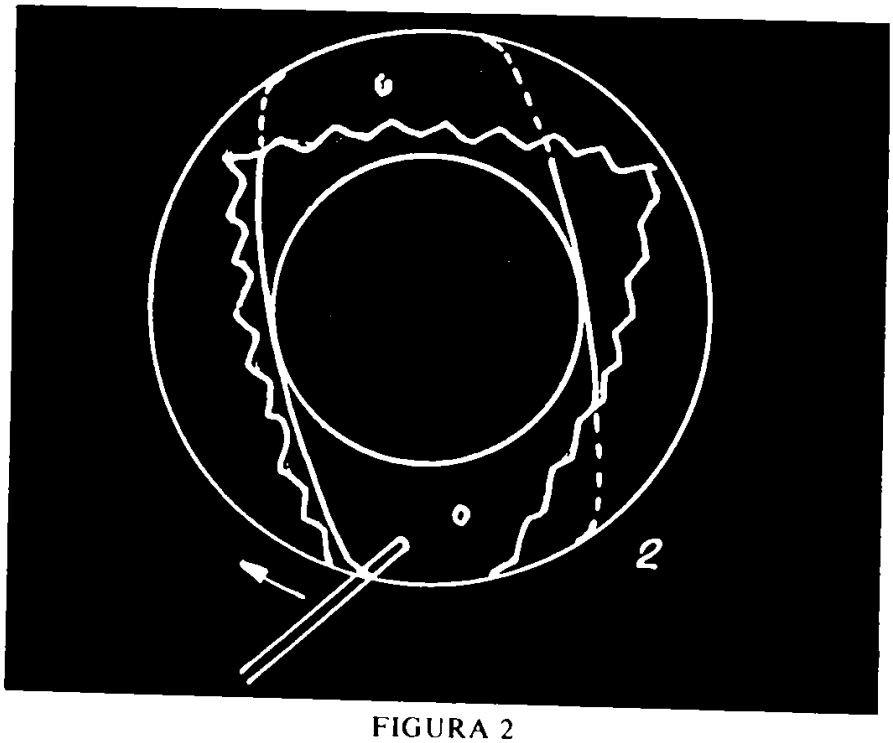


FIGURA 1



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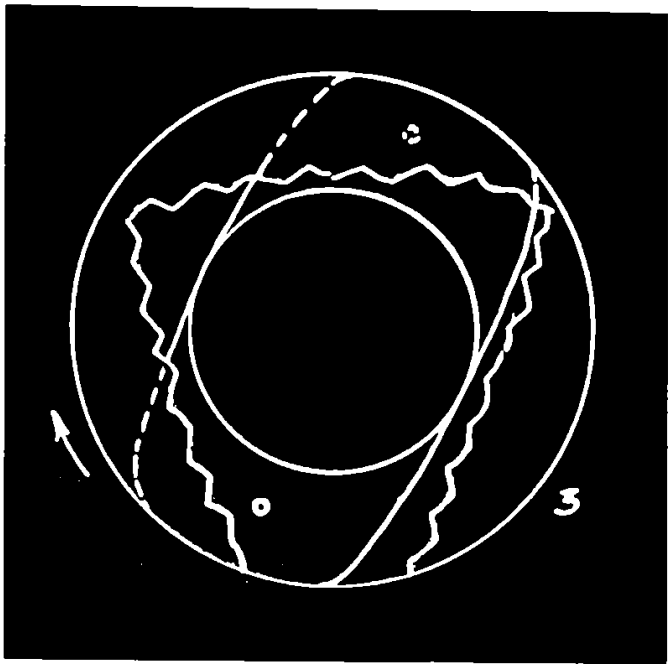

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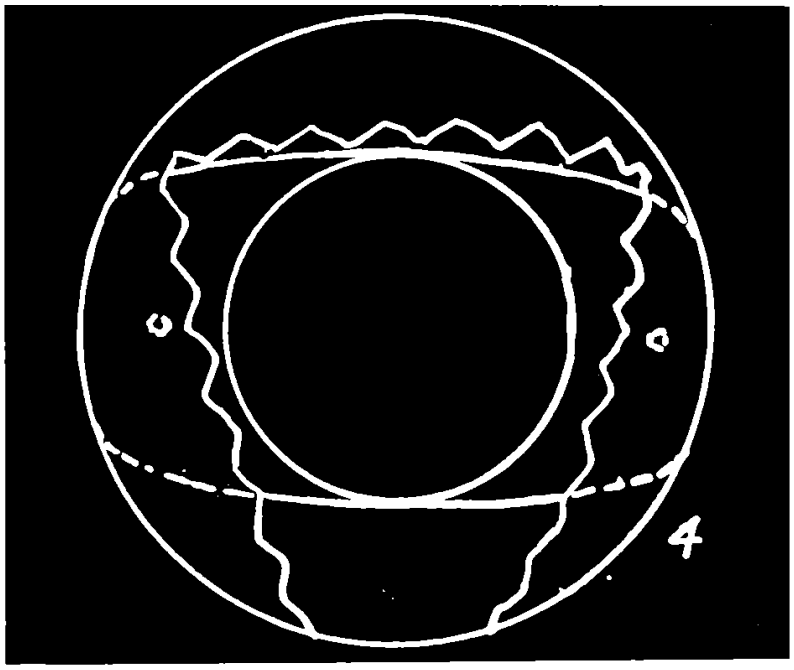

FIGURA 4