

## THE BEALE CONTINUOUS CORNEAL CLOSURE FOR CATARACT EXTRACTION

Dr. JOHN P. BEALE, M. D.  
San Francisco, U.S.A.

### *BACKGROUND:*

Back in 1958 I developed a technique for corneal section for cataract surgery with which I was quite pleased. This corneal section was performed using a 10.5 millimeter trephine which was blunted on 180 degrees of its edge. The surgical assistants who worked with me were quite pleased and impressed with the simple nature of the procedure and with the immediate post-operative minimized reaction. However, as time passed, my trephine dulled and coincidentally so did my enthusiasm. I began to notice an increasing number of patients with anterior synechiae and for that reason I discontinued the procedure. In mid 1970, I again became interested in trying my old procedure or a type thereof because I now felt that better surgical closure using a microscope might eliminate the problem of anterior synechiae which I'd had previously. These synechia, incidentally, were visible under the slit lamp as strands at the site of the incision. Since I'd long given up using a limbus based flap, it was a simple matter to come slightly forward and eliminate the conjunctival fornix based flap which I had been making. I made my incision with a blade breaker knife and I was using 8.0 interrupted virgin silk sutures. These sutures however, did prove to be somewhat irritating and although I left many of them in, I had to remove some of them, which was a bit of a nuisance. Because my section was essentially clear cornea, I was reluctant to give my patients too much freedom post-operatively due to the reduced healing factor in corneal tissue.

I would like to report now on my current technique using a corneal section with continuous locked 10.0 sutures for closing the section in cataract surgery.

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*TECHNIQUE - CORNEAL SECTION:*

This section is performed by fixing the globe at 12 o'clock with Castroviejo forceps and using a blade breaker knife, starting in clear cornea at 2:30 and extending around to approximately 9:30.

This incision extends through approximately two-thirds of the depth of the cornea. A 7.0 black silk suture is then placed at 12 o'clock with the knot tied on the corneal side to provide both a traction suture for the cornea during the lens delivery and emergency closure for the cornea if that rare demand should appear. This suture is removed at the end of the procedure after the 10.0 suture has been completed. The anterior chamber is then entered using the blade breaker knife at 10:30 and the corneal section is completed using corneal scissors. The anterior blade is slid into the pre-placed groove and the scissors are closed by bringing the posterior blade anteriorly to cut the thin remaining cornea. A slight pressure with the scissors towards the center of the cornea gives the two-step incision, the first step having been created by the blade breaker knife. After iridotomies, alpha-chymotrypsin and lens delivery with the cryoprobe, the 7.0 suture is drawn up and tied.

*ADVANTAGES OF A CORNEAL SECTION AND CLOSURE:*

At this time in the description of this procedure, I think it would be a good time to discuss the relative advantages and disadvantages of the corneal section. First, advantages of the incision. This incision eliminates one step of the operation, namely conjunctival incision, whether it be for limbus based or fornix based flaps and it saves time for the operator. Secondly, there is less bleeding because the conjunctiva is not being cut thus giving better visualization for making the incision. Third, because of less cutting and because of less necessary cautery, there is less trauma to the eye at this time. During the intervening procedure with the eye open, there is no particular advantages of the corneal section. Since our incision is 150 degrees or slightly less and on a smaller arc, the cornea falls into position with good apposition simply with the tying of the pre-placed 7.0 suture. There is usually a large air bubble trapped in the anterior chamber at this time and if not, a small amount of air is placed to form the corneal dome. Because the opposing edges of the incision are of identical tissue it is easier to close the incision precisely. Post-operatively there is much less reaction and congestion than one would expect if a more extensive conjunctival incision were made. Furthermore, there are very few vessels at the line of incision and it is exceedingly unlikely that a hyphema could

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develop even if there were a slight shift of the corneal edges. Lastly, since the eye is less irritated, the patient is able to use the eye sooner.

#### *DISADVANTAGES OF THE CORNEAL SECTION:*

Now there are disadvantages with the corneal section. As far as the placing of the incision, there are none. But during the time that the globe is open, there are problems because there is a smaller working space. The iridotomies are more difficult to perform, the extraction of the lens occurs through a smaller space, and lastly, if one is using intraocular lenses, the lens has to be placed from a more vertical position rather than being slid in parallel to the iris. There are no problems with closure, or rather, no disadvantages of closure. Post-operatively there may be slightly more peripheral corneal edema seen than occurs with a more peripheral incision, healing is slower and theoretically there may be a greater risk of epithelial down growth. I've never had such a case and I believe with proper surgical management, epithelial down grow is as passe as the dodo bird and the passenger pigeon.

#### *TECHNIQUE - CLOSURE:*

After having completed the lens delivery, rather than using the gross 6.0 sutures that were being used 16 years ago or even the 8.0 virgin sutures which I'd been using 4 years ago, I now use 10.0 nylon (Ethilon or Perlon). This material is difficult to work with, but with practice, a satisfactory technique can be developed for handling this material. I place the first of approximately 12 corneal bites adjacent to the end of the incision at 2:30, the suture is tied with a triple knot with a square knot overlying and the free end is cut as close to the knot as possible. The knot is then swung toward the conjunctival side and buried, and then the succeeding corneal bites are placed and locked. The bites are placed under approximately 12 times magnification and the sutures are tied under six times magnification. The first and last knots are closely inspected and the loose ends cut with the blade breaker knife under 16 times power. When the last radial corneal bite has been placed, the needle is then placed intra-corneally at the apex of the incision. It is necessary to go back along the suture line with two finely tipped tying forceps and tighten each loop successively. The knot at the end of the suture is formed by tying the free end on which the needle is fastened, to the loop of the suture which is formed just superior to the end of the incision. The knot is exactly the same as described as the initial tying. Once again, an effort is made to bury this knot.

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*ADVANTAGES OF CLOSURE:*

The advantages of this continuous locked suture are that it gives continuing support along the line of the incision. This is particularly important since the cornea is slow to heal. The second advantage is the compensating tangential pull that is present. I have found that with interrupted 10-0 sutures, since the nylon material is not self-correcting, patients tend to develop little leaks between the sutures and to develop blebs if there was an overlying conjunctiva. The third advantage is that there is no suture reaction and fourthly, there is no necessity to remove the sutures. Lastly and very importantly, epithelialization occurs promptly from both the cornea and the conjunctiva and the patients can be given immediate activity and full rehabilitation.

*DISADVANTAGES OF CLOSURE:*

The disadvantages of continuous locked sutures is that they are time consuming to place. It takes approximately 12 minutes to do the entire procedure from start to lens extraction, including a wait of three minutes while the alpha-chymotrypsin acts. Approximately 11 minutes are required to close the incision. However, I feel the extra time is well worthwhile.

In over 1000 cases using my Continuous Corneal Closure technique of intracapsular cataract extraction I have had virtually no complications related to this incision and closure. I have had no flat anterior chambers, no iris prolapse and no hyphema despite immediate ambulation and return to full activity.

SUMMARY

After mentioning the advantages and disadvantages presented by the corneal incision in the cataract extraction, the author analyzes the technique in which the suture of the corneal flap is performed with 10-0 Nylon (Ethicon or Perlon) in a continuous way, all through the incision, as well as its advantages and disadvantages.

The main advantages are:

1. It provides a continuous support all through the incision.
2. It provides a tangent compensation of the tractions.
3. Lack of reaction to the suture.

The worst disadvantage is the time needed to practice this suture. Apart from this, no other disadvantage has been observed in 1,000 cases.

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