

MICROCRYOSURGERY OF CATARACT*

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The reason why of late we have adopted the microsurgical technique for cataract extraction is not the necessity to perform cryoextraction under the microscope; neither does it mean that the classic cryosurgery has failed. The reason is that the classic methods leave only little opportunity for the search of an even more atraumatic procedure in this operation.

It is not easy, for instance, to depart from the wide section, which is obligatory in the conventional techniques. There are, however, grounds for striving towards a narrower section, which is more sparing for the ocular tissues. The classic convention would be hardly appropriate for the endeavour to shift the whole process of healing from the sensitive region of the corneal limbus to the quickly and easily healing connective tissue of the sclera.

We may also succeed in demonstrating that what so far has been the unshakeable foundation of success in the classic operations, namely closing the corneo-scleral wound by tight suturing, can be replaced by another type of closure, for instance by plastic surgery of the sclera, which we should like to call microsurgical closure, and which is equally tight, but more atraumatic.

Numerous authors who use the microscope for the classic cataract extraction underline the ease and precision with which the lens is delivered and the sutures placed, especially the monofilament ones. Others prepare a semicircular, 1-2 mm. wide scleral flap above the upper part of the limbus and close it with a continuous suture ⁴, ⁷. There are also operators

* Trabajo presentado en el Secundum Forum Ophthalmologicum, pero no pudo ser leído por ausencia del autor.

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who sometimes combine trabeculectomy with simultaneous extraction of cataract through a widened section 1, 2, 5.

Our personal efforts in microsurgery of cataract were directed at making the section narrower, sometimes even down to about 130°, and at preparing an adequately broad lamellar scleral flap in order to close the operative wound either by glueing both surfaces of the sclera with frozen-dried plasma, by plastic operation of the sclera (microsurgical closure) or by placing monofilament buried sutures.

We perform cryoextraction of cataract under high magnification in the following way. Under local anaesthesia, semicircular peritomy is carried out; the conjunctiva is separated near the limbus and cut on 9 and 3 o'clock (the incisions being each 3 mm. long), after which it is freed and shifted upwards, so that the sclera is exposed in its upper quadrant.

After controlling the possible bleeding, sometimes by means of micro-cauterization, the sclera is incised to less than half its thickness and split longitudinally, so that an external lamellar scleral flap is formed. It has the form of a limbus-based trapezoid. In order to prepare the microsurgical closure of the wound, incisions are made penetrating into the deeper layers of the sclera, and a fastening band is formed in the midheight of the scleral bed before opening the anterior chamber. This is a horizontal band of the scleral tissue, more than 2 mm. wide; it is attached to the sclera near the two margins of the bed. The tunnel which is formed under the band is at least by 1/3 narrower than the corresponding part of the scleral flap. When preparing this scleral band, we always leave 1/3 of the thickness of the sclera intact.

The anterior chamber is usually opened with a razor-blade knife, and the section is widened to 120-130° with corneal scissors. After performing double basal iridotomy, the iris is grasped with a forceps in the typical way and lifted. The cataract is then removed with the cryoextractor. The operative wound is closed by introducing the external scleral flap under the previously formed scleral band. When the flap has found itself in its bed under the scleral band, it is incised on its both sides above the band along upward-sloping lines, so that a harpoon-like ending is formed, which locks the flap between its bed and the scleral band. In our material, this method of closing the operative wound was used most frequently.

When it is intended to close the operative wound by glueing it with frozen-dried plasma, both surfaces of the split sclera are carefully dried

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after the extraction of cataract; frozen-dried plasma, prepared as for glueing lamellar corneal grafts³, is then placed on the surface which constitutes the bed. Such plasma has proved completely neutral with regard to the ocular tissues and has good adhesive properties. Both parts of the split sclera usually stick well to one another. The result depends on the dryness of the tissue, concentration of plasma and lapse of time between the placing of the solution and bringing together both surfaces of the split tissue. The weak spot is the difficulty to obtain perfect dryness of the surfaces with the anterior chamber opened.

When suturing of the sclera is preferred, or when the result of glueing is uncertain, monofilament buried sutures can be used.

There follows the reposition of the conjunctiva; it is fastened with two pre-placed sutures, with which, immediately after freeing the conjunctiva, the sclera has been grasped superficially in the region of the limbus on 9 and 3 o'clock.

The principal stages of the whole operation are shown in Figs. 1-9 (the variant with the microsurgical closure).

Thirty microcryoextractions of cataract have been performed in this way.

An intra-operative complication occurred in one patient; it consisted in the scleral flap gliding out from under the band. The flap was immediately returned to its place.

Out of early post-operative complications, we twice observed hemorrhage into the anterior chamber due to self-inflicted trauma. In both cases the symptoms receded quickly. We are not yet able to discuss the possible late post-operative complications both because of the too small number of patients and of the short follow-up period. The subject of this paper was presented as a preliminary report to the XXXII Congress of the Polish Ophthalmological Society in september, 1974.

What we could ascertain so far is that the narrowing of the section which opens the eyeball to about 130°, whose merits have been underlined lately⁶, favours a speedy recovery of the eye, as does the shifting of the healing process of the operative wound to the sclera. The appearance of the eyeball is different from what we have been used to see after the traditional operation of cataract; it undoubtedly approaches what is known as the early white eye. Cycloplegic drugs are usually unnecessary. The dressing is removed on the second day, and on the third day the patient is allowed to move about. Hospitalization is limited to 10 or 11 days.

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The method of uniting by glueing relatively large areas of the connective tissue, which heal rapidly, is encouragingly easy. Even if frozen-dried plasma does not hold its promise as a biological glue, the idea itself will not be abandoned and search will be made for a better material and a better method of glueing.

Time, clinical experience and observation of distant results will determine the actual value of the microsurgical closure of the wound by plastic operation of the sclera. The merit of this closure consists in its location and in the fact that it is prepared before opening the eyeball.

Looking into the future, we cannot help thinking that the progress in the operative treatment of cataract will not consist in further improvement of the conventional elements of the technique, but in further perfecting of microcryosurgery, which creates conditions for a delicate and perhaps the most atraumatic operation.

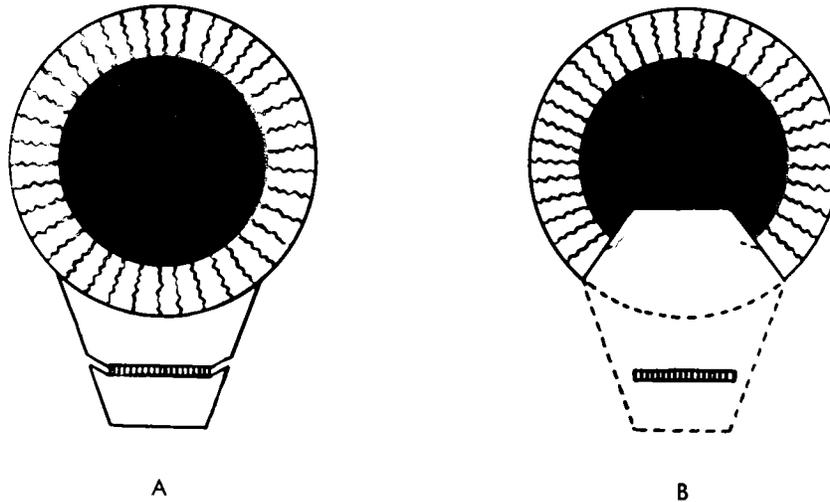


FIGURE 1

Scheme of the microsurgical closure of the wound.

a) Horizontal incisions of the deeper layers of the sclera, carried out in the midheight of the bed prior to opening the anterior chamber; a fastening band is formed of the freed portion of the sclera.

b) Closing the operative wound by introducing the external scleral flap under the fastening band; the flap is additionally held in place by two upwards-sloping incisions in its upper part, which thus performs a harpoon-like action.

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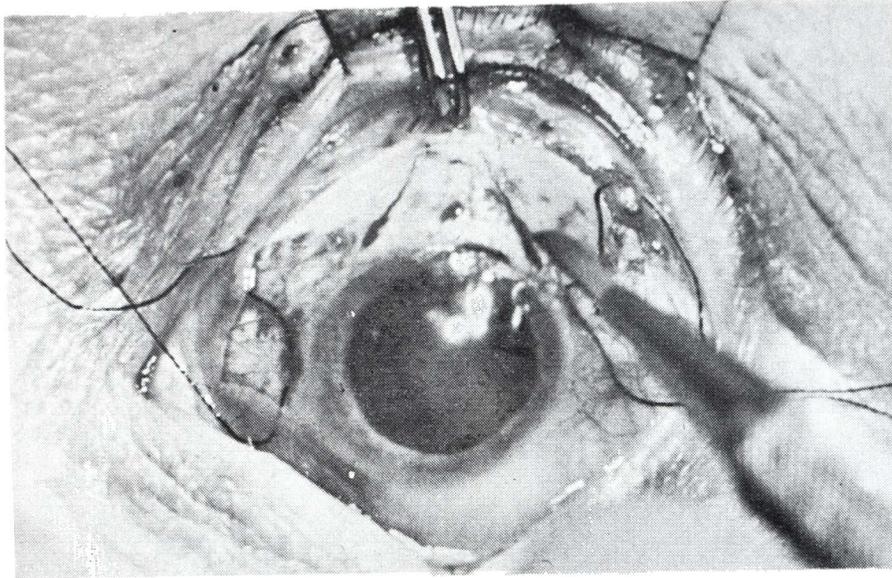


FIGURE 2

The exposed sclera is incised to less than half its thickness.

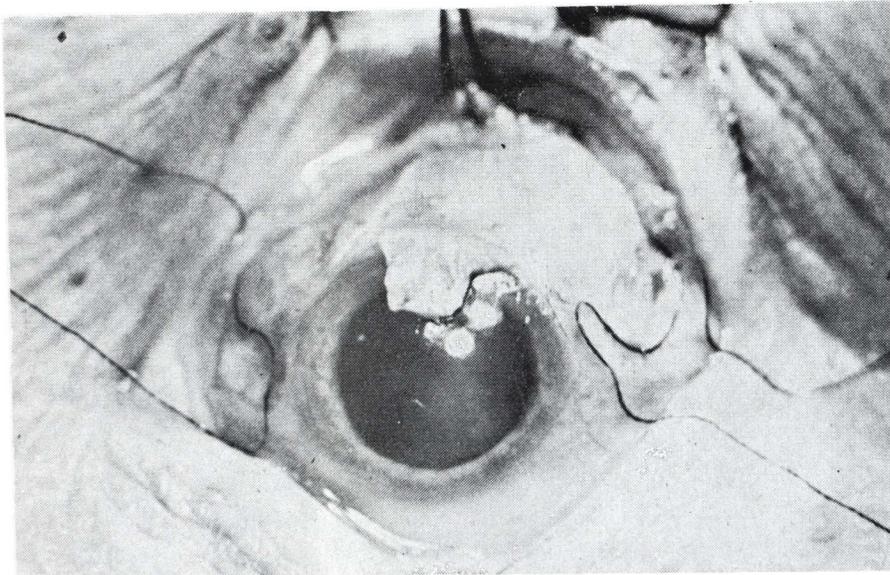


FIGURE 3

The limbus-based, external lamellar scleral flap has been formed.

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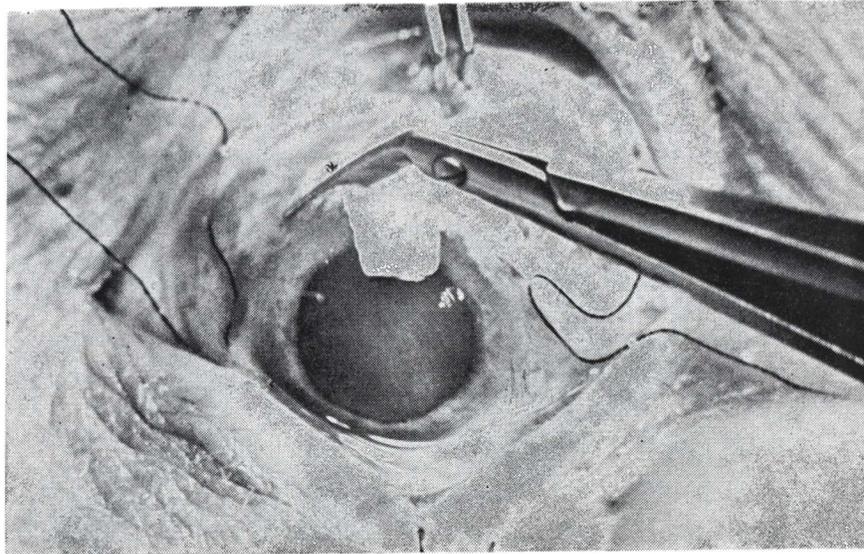


FIGURE 4

After the initial incision with a razor-blade knife, the anterior chamber is opened with corneal scissors to about 130°.

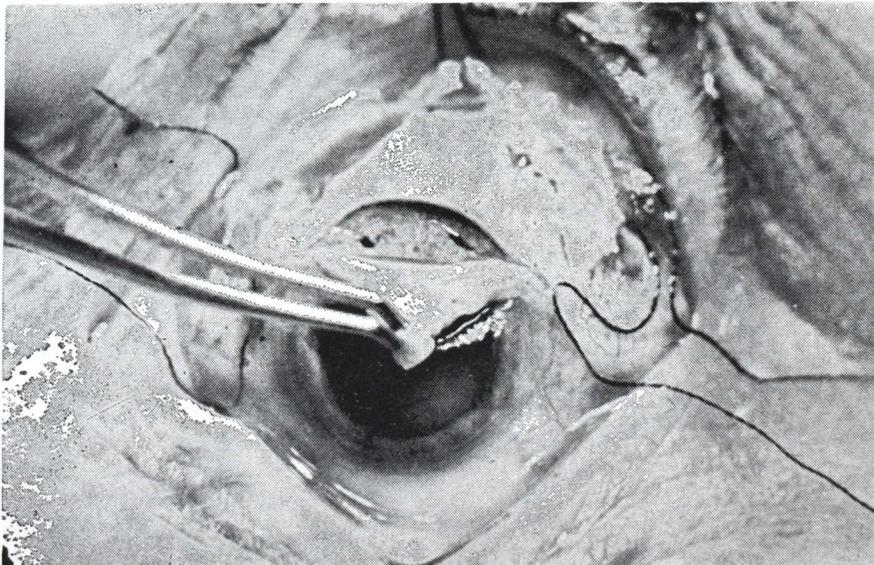


FIGURE 5

Double iridotomy has been carried out.

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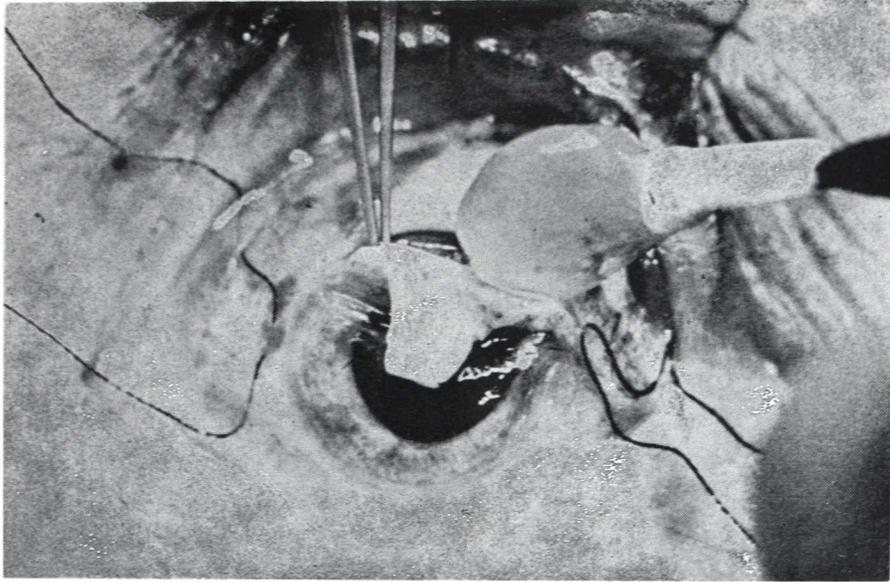


FIGURE 6
Cryoextraction of cataract (final stage).

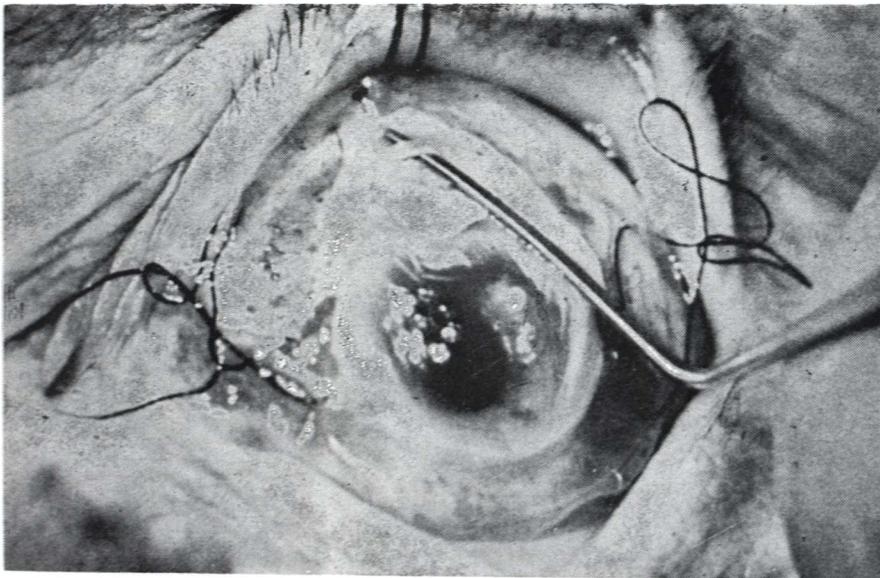


FIGURE 7
The fastening band of the scleral tissue has been formed.

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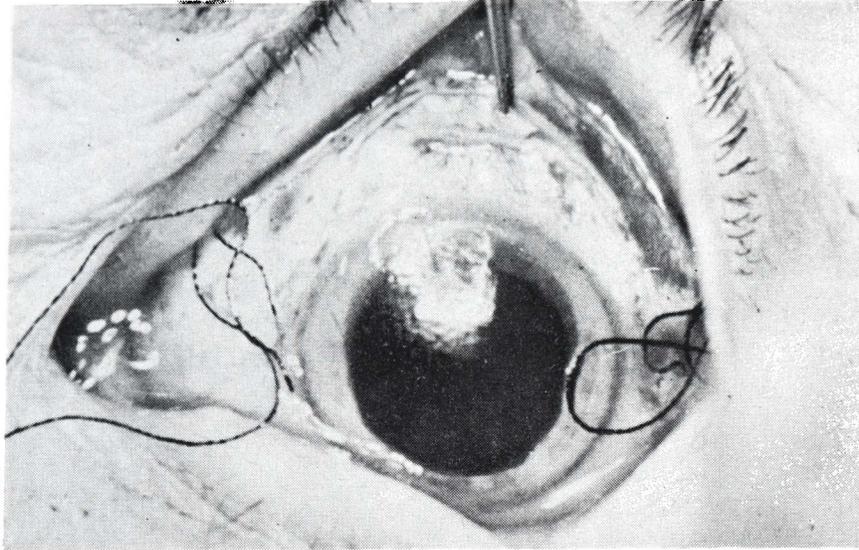


FIGURE 8

Microsurgical closure. The scleral flap has been introduced under the fastening band. The harpoon-like ending of the flap rests on the band.

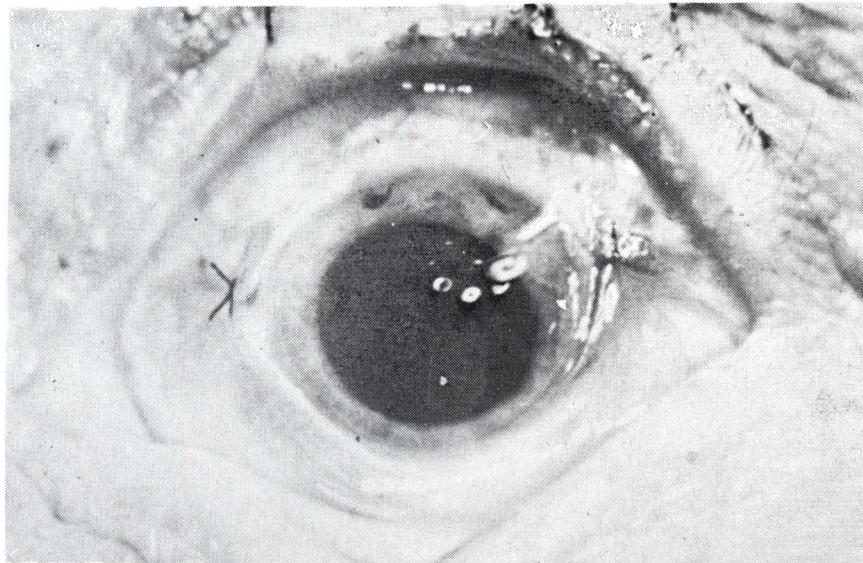


FIGURE 9

The repositioned conjunctiva is fastened with two sutures.

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SUMMARY

The author describes an operation of cataract extraction under high magnification, in which the main burden of the healing of the operative wound is shifted from the sensitive region of the limbus to the split sclera. By employing microcryoextraction of cataract it is attempted to reduce the extent of the section, sometimes even down to 130°, and to close the operative wound by means of a sufficiently broad external lamellar, limbus-based scleral flap, which is introduced under a fastening band of the scleral tissue and is additionally held in place by its harpoon-shaped ending (microsurgical closure).

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