New Approach For The Surgical Correction Of Myopia

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SURGICAL CORRECTION OF AMETROPIAS

When in 180 Fukala suggested for severe cases of myopia the extraction of the lens, he achieved, for the first time, the old wish of patients and surgeons, of correcting myopias by means of surgery.

In 1903 Muller performed the first scleral resections in order to shorten the myopic eyeball.

In 1949 J. I. Barraquer resected a corneal ring and sutured the wound in order to flatten the cornea and thus correct myopia.

He also included interlamellar lens of different kinds and used grafts of different sizes, to correct ametropia. He introduced the name of “Refractive Keratoplasty.”

Ridley, H. in 1951 inserted an acrylic lens between the iris and posterior capsule lens to correct aphakia.

In 1953 Sato does incisions on the cornea; these incisions retracted and modified the cornea’s shape. He used this method to correct myopia and astigmatism.

In 1953 Strampelli uses the first anterior chamber lens to correct high ametropias.

In 1954 Malbran, J. reinforced the myopic eyeball with a strap of fascia lata in order to shorten it.

In 1958 J. I. Barraquer obtains corneal tissue lens to achieve with them autokeratoplasties, lamellar anterior homokeratoplasties and interlamellar inclusions to correct myopia, hypermetropia and astigmatism.

Bases of the Refractive Keratoplasty

Corneal affections often determine a permanent change of eye refraction due to an alteration of the cornea’s curvature. Since the cornea is the organ with the greatest refractive power in the eye and since it is, at the same time the most accessible one, it seems logical that if we want to modify the ocular refraction by means of surgery, we should act upon it.

Our last 15 years of research have been specially directed towards finding a method that would enable us to modify at will the curve of the anterior face of the cornea without compromising its transparency.

After many experiments on animals with several techniques, we have chosen as the most adequate, the anterior lamellar keratoplasty with a dioptic powered graft (Fig. 1) and the inclusion of lamellar corneal tissue lenses into the cornea (Fig. 2).

Figure 1. Interlamellar inclusion of a corneal tissue lens. A—Positive. B—Negative.

We have named KERATOMILEUSIS the first technique, from the Greek roots θέρατος cornea, and συμπερασματικός chiseling. The second Keratophakia, from Greek θέρατος cornea, and φακός lens.

Figure 2. Lamellar Grafts. A—Without optical power. B—with positive power. C—with negative power.

SURGICAL CORRECTION OF MYOPIA

Being interested in correcting myopia, we shall speak only of Keratomileusis, that in the actual state seems to be the most adequate technique for this purpose.

In this case, as the cornea of the eye to be operated is healthy, it does not require a
graft or donor material, as it is enough with the change of the refractive power of the patient's own cornea.

**Technique of Keratomileusis**

Under local or general anesthesia, the Collybry Speculum is placed, the eyeball fixed with a pneumatic ring (Fig. 3) which is adapted to the anterior segment of the eye, by means of suction. The anterior face of the ring is flat to guide a small electrokeratome (new model (Fig. 4)) that when adapted and run over the flat surface of the ring, performs a 8 mm. diameter and 0.25 mm. thick circular keratectomy (Fig. 5).

The resected cornea has the shape of a parallel-faced meniscus; the posterior face is changed in radius by means of a turning radius machine and following the already established rules of turning contact lenses (Fig. 6). To make this procedure possible, the cornea must be hardened by freezing. Before freezing it, it is submerged and im-

pregnated with a 10% Glicerol solution, to protect it from freezing and thawing damages.

This solution also contains 0.5-1% Green Sulfo Solution which dyes the corneal tissue for a better visual control during processing.

The lathe (Fig. 7) has a device similar to the freezing microtome's plate. The turning does not present any difficulties for a Contact Lens Expert; it is performed with a diamond cutter at 1,800 revolutions.

Once chiseled, the negative corneal tissue lens is withdrawn from the lathe and quickly thawed in saline solution at 37° Centigrade. It is then washed, replaced and fixed in its bed with a contact lens sutured to the cornea.

The post operative course has no peculiarities and is similar to that of the lamellar keratoplasty with the advantage of being an autoplasty (Fig. 6).
We briefly sketch here the peculiar conditions of the cornea that have allowed corneal surgery to be several decades in advance of other types of surgery. Homoplasty (H. Power 1875), Heteroplasty (P. Payrau 1957) and now a change of a main function (the refraction) in a noble organ (the cornea) performed while this organ is separated from the human body.

The results obtained (Fig. 8) in the first operated cases are explained in the tables. The oldest case was operated in October 1963. These tables were made to be presented in Paris during the month of May and for this reason, actually the observation times are longer and the results are still the same or have improved.

From the study of these cases we arrived to the following conclusions:
1) Approximate correction can be obtained of myopic anisometropias.
2) The functional recuperation of ambliopic eyes can be achieved.
3) The possibility of correcting in the near future all kinds of refractive errors with accuracy and little risk.

Naturally, we must bear in mind that myopia is a degenerative illness and that the described technique, even if it can correct the refractive errors in a more or less complete way, cannot stop the degenerative process of the myopia.

In the actual state of the operation, its indication is Myopic Anisometropia associated or not to ambliopia and strabismus.

It is to hope that the increase of our experience, will enable us to enlarge progressively these indications and, in a near future, correct less serious refractive errors.

References