The Continuous Edge-to-Edge Suture in Full-Thickness Corneal Grafts

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In full-thickness keratoplasty, with cylindrical graft, the majority of the mechanical postoperative complications are consequences of bad coaptation of the graft, due to some defect in the section or in the fixation. The use of instruments of first quality and the edge-to-edge suture have nearly eliminated them.¹

At first fixation was accomplished in 4 mm. grafts by using the sharp and very polished Vogt's suture needles, manufactured by Grieshaber and threaded with 000000 silk; placing two points at the extremes of the vertical meridian and progressively increasing its number until they are equal or even superior to the number of millimeters of the diameter of the graft.²

The "sharp side," on Vogt's needle, has been modified to place it in the convexity, in order to safeguard the bridge of the tissue at each side of the wound,³ which is attempted to be joined with the suture, making it easier to place the stitches nearer each other. The number of stitches was limited for fear of traumatizing the graft by the irritation which the knots and ends of silk would cause. The suture of pure silk of seven strands, 0.04 mm. thick, was well tolerated by the tissues and allowed us to increase the number of stitches to 16 in grafts of 6 mm. and to 32 in large grafts. The toleration of this material is due not only to its thinness but also to the absence of any chemical substances in it.

With this multiple suture displacements of the graft and ruptures of the wound disappeared. This allows the patient freer movements and a shorter time in bed and necessitates a binocular dressing only for a few hours after the operation, until the effect of the anesthesia and premedication disappears, allowing the patient a convalescence at home after the first change of dressings. This dressing is performed on the second or third day.* The main purpose of the first dressing is to check on the formation of the anterior chamber.

The advantages of this firm closure of the wound are offset somewhat by irritative disturbances produced by the sutures, which are far less with pure silk than with 000000 silk. But these disturbances are more evident in patients with a monocular bandage leading an ambulatory life than in patients with a binocular dressing who remain in bed.

The stitches placed in the cornea act as foreign bodies and produce pain and irritative reactions. The objective manifestations of such irritation are palpebral edema, blepharospasm, photophobia, perikeratic hyperemia, difficulty in dilating the pupil, and, posteriorly, formation of new corneal vessels. A retrobulbar anesthetic injection at the time of operation of sufficient alcohol to obtain a concentration of 10%-20% prevents such trouble in many cases. A higher concentration can not be recommended for fear of orbital edema.⁵

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⁴ Rycroft, p. 96.

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To remove the stitches is a delicate operation that must be performed by the surgeon himself under magnification. If this is done 15 days after operation, some opening of the wound, accompanied by flatness of the anterior chamber and partial ectasia of the graft, can frequently be observed. Leaving the total number of stitches for 20 or 25 days is annoying to the patient and did not avert the risk of opening the wound when all the stitches were removed simultaneously. For this reason, we decided to remove the stitches in a progressive way, doing it on three different days at eight-day intervals, beginning 8 or 10 days after surgery and removing every second stitch.

This technique proved satisfactory, especially in keratoconus, in which healing is slower and therefore the tendency toward opening of the wound and ectasia is greater.

To reduce the discomfort of the patient, we tried a continuous suture beginning at a point placed at the 12 o'clock position. Two previous discontinuous points, at the extremes of the vertical meridian, or four points, at the 12, 3, 6, and 9 o'clock positions, facilitate the location of this suture. The previous stitches are also useful for fixation when the continuous suture is removed (Figure).

The number of stitches can be equal to, and even greater than, that in the discontinuous suture, even reaching the number of 25 in a graft of 7 mm. and in this way increasing the firmness of the fixation and the coaptation of the graft. Also, a better apposition of the epithelial and endothelial planes is obtained, due to the oblique course of the silk between two points, acting as a bridge suture to the epithelial layers. We have used pure silk of seven strands, but 000000 silk can be used.

Sharp needles with the cutting edge at the convexity are used to avoid union between two adjacent points and the tearing of the bridge of the tissue to be joined with the suture. The dimension of the needle can be 4 to 5 to 7 mm., depending on the skill of the surgeon.
The suture forceps must be very fine to allow the location of stitches sufficiently near each other without difficulty and with a minimum of traumatism for the graft. The needle holder will depend on the dimension of the needles used.†

With this technique postoperative troubles diminished considerably and the patient's use of the eye not operated on becomes possible and more efficient. The continuous suture is removed at the 10th or 20th day. For this purpose it is enough to cut the thread every third loop and pull it up from the central one. The previous points must remain till the 30th day in keratoconus and other processes of slower healing, to avoid the rupture of the wound. The best instrument for this purpose is Schaal's forceps and a fragment of a razor blade held in a needle holder. Control with the surgical microscope is desirable and a magnifying glass at least indispensable.

Summary

In full-thickness keratoplasty, the multiple suture—edge to edge—with pure silk, with the progressive removal of the stitches under control of a magnifying glass, or the use of a continuous edge-to-edge suture is advised.

Retrobulbar injection of alcohol 10%-20% to reduce the irritative reactions produced by the corneal stitches is also recommended.

REFERENCES


† Rycroft, p. 231.