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SURGICAL SUTURE

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This invention relates to an improved surgical suture for use in cataract surgery and more particularly to a surgical suture comprising a length of silk suture attached to a length of catgut.

Heretofore, either silk sutures or catgut sutures have been used in cataract surgery. Silk sutures have been found to have a disadvantage in that frequently down-growth of epithelium along the suture track occurs and there is an increase in polymorphonuclear infiltration from relatively slight infiltration in the beginning until, at the end of the third week, the silk suture is usually surrounded by an area of necrosis and a consistent decrease in fibroblastic proliferation in the vicinity of the suture. When silk sutures are used in cataract operations, it is necessary to remove the silk after healing has taken place, and it has been found that in nervous and uncooperative patients loss of the anterior chamber, anterior chamber hemorrhages, and iris prolapse are common complications. Because of the above disadvantages inherent in the use of silk sutures in cataract surgery, the use of surgical gut has largely replaced the use of silk sutures. A number of surgeons have recommended the use of moderately chromicized surgical gut which has the advantages that there is no hazard of necrosis occurring around the catgut suture and fibroblastic repair continues unhindered. In addition, because catgut is absorbable in tissue, it is unnecessary to remove catgut sutures after healing, and thus all hazards connected with the removal of silk sutures are eliminated.

Frederick W. Stocker, M.D., in an article published in American Journal of Ophthalmology, vol. 42, No. 5, November 1956, entitled "The Use of Corneoscleral Gut Sutures," described a surgical procedure in which catgut sutures were used in cataract surgery. In the procedure of the article, which has been widely accepted by members of the surgical profession, the usual preparation and anaesthesia are followed and a conjunctival flap is dissected from above. A nonpenetrating incision is made in the sclera to provide a groove. Moderately chromicized absorbable catgut sutures are passed through the anterior and posterior lips of the groove at two places. A loop is formed by pulling each of the sutures out of the groove. Sectioning of the sclera is completed while care is taken that the sutures are not cut. After the cataract extraction is completed in the usual way, the two corneoscleral sutures are tied in a triple knot. The conjunctival flap is pulled back so that it covers the sutures completely and is sutured into place by superficial sutures, preferably of unchromicized catgut. The procedure is reported to result in perfect closure and approximation of the wound. The postoperative course is usually very smooth; the external conjunctival sutures become partly absorbed and the remnants slough out within a few days, especially if plain unchromicized gut has been used. There is no irritating or scratching sensation from the corneoscleral sutures since they are covered by a conjunctival flap.

One prominent disadvantage of the use of a catgut suture in corneoscleral suturing according to the above-described procedure is that a catgut suture is difficult to handle during the operation due to its lack of pliability and its tendency to twist upon itself. This disadvantage is most apparent when a loop is formed in the suture before sectioning of the sclera is completed. Because of the lack of pliability and the tendency of a catgut suture

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to twist on itself, some difficulties have been found in forming the loop. Because of its greater pliability, there is no difficulty in forming a loop in a silk suture when cataract surgery is performed according to the above-described procedure.

It has now been found that the difficulty in forming the loop when catgut is used in cataract surgery may be overcome, and the advantages of the ease of forming the loop when a silk suture is used may be retained by the use of a suture comprising a length of silk suture joined to a length of catgut. It is preferable that a surgical needle be attached to the end of the silk portion, and this may be done in a conventional manner by clamping the end of the silk portion in a channel or a hole drilled in the end of the needle. An eyed needle may also be used.

In using a suture comprising a length of silk joined to a length of catgut in cataract surgery, and particularly in cataract surgery performed according to the above-described procedure, a loop is formed in the silk portion after the silk portion is passed through the anterior and posterior lips of the groove in the sclera. After the section has been completed and extraction of the cataract has been completed, the silk portion is pulled so that the remaining part of the silk portion and the juncture of the silk and catgut are drawn through the sclera and only the catgut portion is in contact with the sclera. The catgut is then tied in a triple knot. The surgical procedure is completed in the usual manner in which the conjunctival flap is sutured back into its original place.

In the suture of my invention, the silk and gut portions are joined by the use of an adhesive. Any adhesive may be used which is able to securely cement silk and catgut together so that the bond is maintained during use in cataract surgery, is not irritating to eye tissue and may be sterilized by any of the usual procedures used to sterilize sutures which do not substantially weaken or destroy the bond between silk and catgut, including sterilization by ethylene oxide and by an electron beam. It is important that the portion at which silk and catgut are joined have a diameter only slightly greater than the diameter of either the silk or catgut portions in order that the portion of the bond may be readily drawn through the sclera with a minimum of enlargement of the hole made by the needle.

I prefer that about two-thirds of the length of the suture of my invention comprise the silk portion and about one-third the catgut portion. I also prefer that the portion at which the silk and catgut are joined be as short as possible and, preferably, not longer than about one inch.

In the preferred form, the silk and catgut portions of the suture of my invention are size 6-0, 0.002 to 0.004 inch in diameter, and the portion at which the silk and catgut are joined is not larger than size 4-0, 0.006 to 0.008 inch.

Adhesives in which the adhesive agent is a synthetic resin, such as polycyanoacrylate, polyurethane, polyacrylate, polymethacrylate, and epoxy resins, have been found to provide a satisfactory bond between silk and catgut sutures. However, the preferred synthetic resin is a thermo-setting solution of an epoxy resin. A solution of epoxy resin and hardener containing approximately fifty percent solids, which is sold by Rubber and Asbestos Corporation, Bloomfield, New Jersey, under the trademark Bondmaster M621, has been used to provide sutures in which the silk portion has a length of about ten inches, the gut portion a length of about five inches, and a portion at which the silk and gut are joined of about one inch in length. The diameter of the silk and gut portions was 6-0, 0.002 to 0.004 inch, and the diameter of the portion at which the silk and gut was joined was 4-0, 0.006 to 0.008 inch. These sutures were sterilized by

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ethylene oxide and I have used them successfully in cataract surgery performed according to the procedure of the above-identified publication.

While my invention has been described with some degree of particularity and reference to specific embodiments, it is nevertheless to be understood that the invention is not to be limited to any of the embodiments described but is to be restricted only by the scope of the appended claims.

What is claimed is:

1. A suture for cataract surgery comprising a portion of silk suture and a portion of catgut suture in which the portion of silk suture is secured to an end portion of said catgut suture by an adhesive in which the adhesive agent is an epoxy resin, the diameter of the silk and catgut portions are about 0.002 to 0.004 inch, the diameter of the portion at which the silk and catgut portions is joined is about 0.006 to 0.008 inch and about one inch in length, and a surgical needle attached to the end of the silk suture portion.

2. A suture for cataract surgery comprising in linear relationship a needle having a sharp end and a blunt end,

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a length of silk suture having two end portions and a length of catgut suture having two end portions; one end portion of said silk suture being attached to the blunt end of the needle and the other end portion of the silk suture being attached to one end portion of the catgut suture.

3. The suture of claim 2 wherein the silk suture is secured to the catgut suture by means of a synthetic resin adhesive.

4. The suture of claim 2 wherein the silk suture is secured to the catgut suture by means of an epoxy resin adhesive.

5. The suture of claim 2 wherein the end portion of the silk suture is adhesively secured to the end portion of the catgut suture.

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