

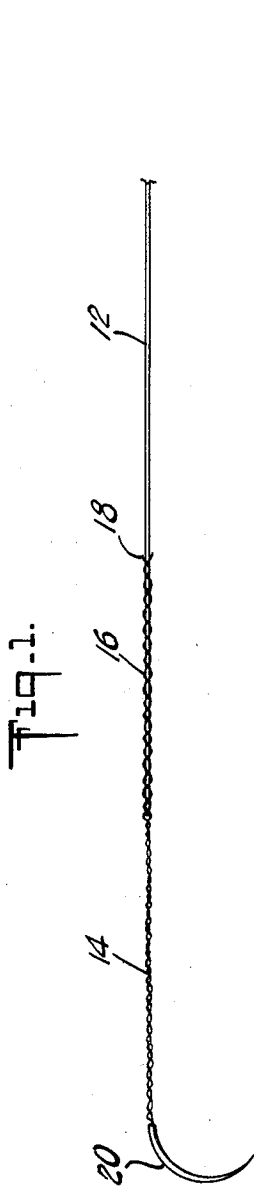
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SURGICAL SUTURE

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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 tract 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 nonperforating 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 grooves 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. This and other advantages of the invention will be apparent from the following description and accompanying drawings.

Referring to the drawings:

FIG. 1 shows a view of the suture of the invention with a surgical needle attached to the end of the silk portion.

FIG. 2 shows an enlarged fragmentary view of the suture of the invention, and particularly the manner in which the silk and catgut portions are joined.

Referring to the figures, the suture generally indicated at 10 consists of a gut portion 12, a silk portion 14, and a center portion 16, in which the silk and gut portions are joined by braiding means so that the silk fibers making up the braided silk portion are braided around the gut. At the point 18 where the silk ends, it is desirable to apply a small amount of adhesive such as an epoxy resin, in order that the silk fibers are prevented from brooming. It is preferred that a surgical needle 20 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.

The manner in which the silk fibers 22, which make up the silk portion 14, are braided around the gut portion 12, is illustrated in FIGURE 2. In the embodiment of the figures, the silk portion is composed of four braided silk fibers 22. The gut portion 12 forms a core about which the four silk fibers of the silk portion are braided to form the portion 16 at which the silk and gut portions are joined. The end 24 of the gut portion is covered by the four braided fibers of the silk portion. Although the embodiment of the drawing shows a silk portion having four braided fibers, more than four fibers may be used and satisfactory sutures have been made with six and eight fibers. The end 18 of the silk portion is, as pointed out above, treated with an adhesive so that the brooming tendency is substantially reduced. Any adhesive may be used to treat the end of the silk portion which 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 adhesive. The preferred adhesive to use is a thermosetting 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 designation of "Bondmaster M621," has been used successfully.

The silk and gut portions are joined by introducing the gut into the braid during the braiding operation at the point of braid formation. As the braiding progresses, the silk fibers are braided around the gut so that the gut becomes a core for the braided silk fibers, as illustrated in FIGURE 2. It is preferred that the portion at which the silk and gut portions are joined be about one to three inches in length. When braiding of the silk fibers around the gut core has progressed so that the braided portion is about one to three inches in length, the braiding machine is stopped and the gut is positioned so that it will not enter into the braid and form a core when the braiding operation is resumed. The braiding machine is then started and production of braided silk is continued until the silk portion is of the desired length. The machine is then stopped and a gut strand is again introduced into the

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machine to repeat the cycle described above. One combination silk-catgut suture is produced by each cycle. Individual combination silk-catgut sutures are obtained by cutting the silk portion of each cycle at the point where the gut has been positioned so that it does not enter into braided silk fibers and form a core. It is preferred that the silk portion of the suture be about six inches in length, the gut portion about five inches in length, and the portion at which the silk and gut is joined about one to three inches in length. In the preferred form, the silk and gut portions of the suture of the invention are size 6-0, 0.002 to 0.004 inch, and the portion at which the silk and gut are joined is not larger than size 4-0, 0.006 to 0.008 inch.

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 sectioning of the sclera has been completed and the cataract has been extracted, 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 by suturing the conjunctival flap back into its original place.

While the 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 braided silk suture, a portion of catgut, and a portion between the silk and catgut portions at which the fibers of the braided silk suture are braided around the catgut which forms a core.

2. A suture according to claim 1 in which the ends of the fibers of the braided silk suture are joined to the catgut core by an adhesive.

3. A suture according to claim 1 in which the ends of the fibers of the braided silk suture are joined to the catgut core by an epoxy resin.

4. A suture according to claim 1 in which the ends of the fibers of the braided silk suture are joined to the catgut core by an epoxy resin, the diameter of the silk and gut portions are about 0.002 to 0.004 inch, and the diameter of the portion at which the silk and gut portions are joined is about 0.006 to 0.008 inch and about one to three inches in length.

5. A suture according to claim 1 in which the ends of the fibers of the braided silk suture are joined to the catgut core by an epoxy resin, the diameter of the silk and gut portions are about 0.002 to 0.004 inch, and the diameter of the portion at which the silk and gut portions are joined is about 0.006 to 0.008 inch and about one to three inches in length, and a surgical needle is attached to the end of the silk suture portion.

References Cited in the file of this patent

UNITED STATES PATENTS

826,063	Reid	July 17, 1906
1,180,386	Essbach	Apr. 25, 1916
1,865,214	Saladino et al.	June 28, 1932
2,387,320	Foster	Oct. 23, 1945
2,591,063	Goldberg	Apr. 1, 1952