

After the lens and the anterior capsule have been removed, with the posterior capsule remaining or not, the capsule 30 is inserted into the eye. This is accomplished by cutting the limbus and making a flap. The limbus is resealed after the operation is completed.

As shown in FIG. 4, the capsule 30 is sutured to the ciliary body 27. As many sutures can be used as is necessary. In general, the suturing is accomplished all around the periphery of the capsule 30 and it is preferred that at least about 12-16 such sutures can be used spaced more or less equally about the periphery of lip 33.

During the normal operation of the eye, the ciliary bodies act as muscles by a physiologic process to accommodate for different light conditions. In a normal eye the lens focuses light rays upon the retina. To focus light from a distant object, the ciliary muscle relaxes. This pulls on the zonules thereby reducing the antero-posterior diameter of the lens. When in its minimum diameter position, the refractive power of the lens is minimized and parallel rays of light are focused on the retina. To focus rays of light from a near object, the ciliary muscle contracts releasing the tension on the zonules. The elastic lens capsule then shapes the lens into a more spherical shape having greater refractive power.

Since the zonules are preferably removed, they have no control over the capsule 30. The sutures 35 now act effectively as zonules. When the need arises to focus on a distant object, the ciliary body relaxes and tightens the sutures, causing the upper and lower pieces 31, 32 on the material 34 to become flatter. Thus, the lens capsule 30 becomes less refractive. When the need arises to focus on a near object, the contraction of the ciliary body permits the sutures 34 to relax and the capsule to expand to a more nearly spherical shape. Thus, the capsule implant 30 has some of the features and effects of the original eye lens and lens capsule.

FIG. 5 is a cross-sectional view of another type of implant capsule 40 which can be used. The implant capsule 40 is also formed of two pieces of plastic 31, 32 material with the flap from each piece beyond the seal 33 being left loose. If desired, a spacer piece 37 can be inserted between the two pieces on the sealing area 33. This provides an arrangement wherein sutures 35 can be independently connected to each of the pieces 31, 32 forming the implant capsule. That is, there will now be a set of upper and lower sutures 35.

In using the implant capsule of FIG. 5, sutures 35 from the lower piece 32 of plastic are sewn to the lower portion of the ciliary muscle. The sutures attached to the upper piece 31 are sewn to the upper portion of ciliary body.

FIGS. 6 and 7 show a further type of implant 70 which does not use a liquid. Here the implant 70 is made of the deformable plastic material, such as of the so-called "soft" lens type. The center portion 72 is formed as a lens and has a diameter somewhat less than the distance between the ciliary body. The contour of portion 72 is made to have a selected optical focus for the light rays, preferably from near objects.

The implant 70 is formed with a surrounding main flap 74 on which is cut a number of sub-flaps 76. A suture 35 is attached to each, or a selected number, of the sub-flaps 76. The other end of each suture is attached to the ciliary body as previously described. The implant 70 is installed and functions in the same manner as the implant 30. The use of the sub-flaps provides a better controlled deformation of the implant by the

ciliary body since, effectively, there are a number of control points on the implant 70 which are more independent than if the flap 74 was continuous. Also, circumferential stresses are reduced.

The implant 70 of FIGS. 6-7 can use a continuous flap 74 if this is desired. Also, the implant capsules of FIGS. 2-4 can have their flaps cut to have the respective sub-flaps.

FIG. 8 shows a further embodiment of implant 80 which is made along the same lines as implant 70. Here, the flap 84 is continuous, although it could be made with sub-flaps. The major difference is that the central portion of the implant has been provided with a compound lens formed by the lower curved part 82 and the upper, more planar, part 83. Any suitable combination of optical lens characteristics can be used for the parts 82 and 83.

In each of the embodiments of implants, the elasticity of the implant material and/or the liquid filling the capsule, is selected to match the state of the eye. That is, for example, where on old patient is involved whose ciliary muscles are weaker, a material is used which requires less force to make it change its shape than in the case of a younger patient whose ciliary muscles are stronger.

What is claimed is:

1. A method of operating in the eye comprising the steps of:
  - removing the lens of the eye and at least the anterior capsule portion,
  - inserting a lens implant of a material which is deformable over a portion of its surface into the eye to replace the eye lens, and
  - connecting said implant to the ciliary body of the eye so that it can be deformed to change the focal length of the implant as the ciliary body moves.
2. A method as in claim 1 wherein the step of inserting comprises inserting into the removed portion as the lens implant a capsule having a deformable outer wall and a filling of a material which is substantially transparent.
3. A method as in claim 2 wherein the transparent material is at least partly liquid.
4. A method as in claim 1 wherein the step of connecting comprises suturing the implant around its periphery to the ciliary body.
5. A method as in claim 4 wherein the step of suturing comprises providing the implant with a continuous flap around the lens portion of the implant, and attaching the sutures to the implant.
6. A method as in claim 4 wherein the step of suturing comprises providing the implant with a flap around the lens portion of the implant, dividing the flap into a plurality of sub-flaps, and attaching the sutures to selected ones of the sub-flaps.
7. A method as in claim 1 wherein the step of inserting comprises inserting into the removed portion as the lens implant a single piece of deformable material at least a portion of which has optical properties of changing focal length upon deformation.
8. A lens implant for the eye comprising:
  - a lens portion of a material which is deformable over at least a portion of its surface to have a variable focal length,
  - means attached to said lens portion adapted to hold connecting means to connect the implant to the ciliary body of the eye, and to transmit the forces