

planted in the eye and showing the refractive, rupturable membrane means intact.

FIG. 6 is a cut-away view of a mammalian eye showing the intraocular lens of the present invention implanted in the eye and also showing a YAG laser disrupting the refractive, rupturable membrane means.

FIG. 7 is a perspective view of an embodiment of the intraocular lens of the present invention having one chamber means therein and showing a convex-convex central lenticular means.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

One embodiment of the intraocular lens 10 of this invention is illustrated in FIG. 1. Intraocular lens 10 has central lenticular means 12 and haptic means 14 and 16. Preferably, central lenticular means 12 is made from a solid, flexible, impermeable, physiologically compatible material conventionally available. Resilient haptic means 14, 16 preferably are made from polypropylene, other polyolefin, polymethylmethacrylate, or the like. Resilient haptic means 14, 16 are fixedly attached to central lenticular means 12 and act to stabilize implanted intraocular lens 10.

Central lenticular means 12 of intraocular lens 10 has chamber means 18 and 20 therein. Chamber means 18, 20 are separated by single, refractive rupturable membrane means 22. Flat, exterior surface 19 positioned anteriorly on central lenticular means 12 can function as refractive, rupturable membrane means. Similarly, exterior surface 21 positioned posteriorly on central lenticular means 12 can function as refractive, rupturable membrane means. Chamber means 18, 20 preferably are filled with a physiologically compatible fluid such as silicones, gelatins, polyvinyl alcohol and gases. Alternatively chamber means 18, 20 can be evacuated.

Intraocular lens 10 shown in FIG. 1 has a flat, exterior surface 19 positioned anteriorly on central lenticular means 12. FIG. 2 illustrates intraocular lens 10A having flat, exterior surface 23 positioned posteriorly on central lenticular means 12A. Flat, exterior surface 23 positioned posteriorly on central lenticular means 12A can function as refractive, rupturable membrane means. Similarly, exterior surface 25 positioned anteriorly on central lenticular means 12A can function as refractive, rupturable membrane means. Resilient haptic means 14A, 16A are fixedly attached to central lenticular means 12A. Chamber means 18A, 20A are separated by single refractive, rupturable membrane means 22A.

FIG. 3 illustrates intraocular lens 10B having convex-concave central lenticular means 12B. Resilient haptic means 14B, 16B are fixedly attached to central lenticular means 12B. Chamber means 18B, 20B are separated by single, refractive rupturable membrane means 22B. Anterior and posterior external surfaces 27, 29 on central lenticular means 12B can function as refractive, rupturable membrane means.

Similarly, FIG. 4 illustrates intraocular lens 10C having convex-convex central lenticular means 12C. Resilient haptic means 14C, 16C are fixedly attached to central lenticular means 12C. Chamber means 18C, 20C are separated by a single, refractive rupturable membrane means 22C. Anterior and posterior external surfaces 31, 33 on central lenticular means 12C can function as refractive, rupturable membrane means.

FIG. 7 illustrates intraocular lens 50 in another embodiment of this invention. Intraocular lens 50 has central lenticular means 52 and haptic means 54 and 56.

Preferably, central lenticular means 52 is made from a solid, flexible, impermeable, physiologically compatible material conventionally available. Resilient haptic means 54, 56 preferably are made from polypropylene, other polyolefin, polymethylmethacrylate, or the like. Resilient haptic means 54, 56 are fixedly attached to central lenticular means 52 and act to stabilize implanted intraocular lens 50 in the eye.

Central lenticular means 52 of intraocular lens 50 has chamber means 58. Chamber means 58 preferably is filled with a physiologically compatible fluid such as silicones, gelatins, polyvinyl alcohol and gases. Alternatively, chamber means 58 can be evacuated. Exterior surface 60 positioned anteriorly on central lenticular means 52 functions as refractive, rupturable membrane means. Refractive surface 62 has a curvature different from refractive surface 64. It should be appreciated that, depending on placement in the eye, exterior surface 60 can be positioned either anteriorly or posteriorly on central lenticular means 52.

FIGS. 5 and 6 show intraocular lens 30 implanted in the eye of a mammal. FIG. 5 illustrates intraocular lens 30 implanted in eye 28. Resilient haptic means 34, 36 are fixedly attached to central lenticular means 32. Chamber means 38, 40 are separated by refractive, rupturable membrane means 42. Preferably, solid central lenticular means 32 is made from silicone, but any material conventionally used is suitable.

Significantly, FIG. 6 illustrates that the refractive power of intraocular lens 30 can be changed subsequent to implantation. This is accomplished without removing intraocular lens 30 and without surgical incision. Using a YAG laser, refractive, rupturable membrane means 42 separating chamber means 38, 40 is ruptured or vaporized. Refractive, rupturable membrane means 42 acting as a refractive surface disappears. Intraocular lens 30 would have a resulting refractive power determined by the remaining refractive surfaces of central lenticular means 32 and the fluid, if any, in the newly combined chamber means 38, 40.

Single refractive, rupturable membrane means shown in the embodiments of the intraocular lenses of this invention illustrated in the figures can be ruptured subsequent to implantation in the eye, thus changing the refractive power of the lens. Similarly, in lenses having at least two chamber means therein and more than one refractive, rupturable membrane means, one or more of the refractive, rupturable membrane means can be ruptured subsequent to implantation in the eye. Consequently, the refractive power of the lens can be changed to greater extent in a single procedure or in successive procedures in calculated degrees.

A singular benefit of this invention resides in that refractive power of the implanted lens can be changed subsequent to implantation, without removing the intraocular lens, and with minimal or no trauma. This benefit is particularly important to patients who are very young. Eye size change in very young patients as they mature thus necessitates a reduction in intraocular lens refractive power.

The above has been offered for illustrative purposes and is not intended to limit the invention of this application which is defined in the claims below.

I claim:

1. Intraocular lens for implantation inside the eye of a mammal comprising:
 - solid central lenticular means having a free standing shape retaining configuration throughout its solid