FLEXIBLE POSTERIOR CHAMBER LENS

This application is a continuation of application Ser. No. 624,232, filed 6-25-84, now abandoned.

BACKGROUND OF THE INVENTION

The human eye is a very complex organ comprising numerous interacting elements which gather, focus, and transmit light rays to nerve endings which eventually transmit the information to the brain for image perception. The eye includes a natural crystalline lens of avascular tissue, the transparency of which depends upon the critical regularity of its fibers and the balance of its chemical constituents. Obviously, there are enumerable factors which may interfere with lens makeup and thereby affect its transparent character. No matter what the reason, a condition of opacity in the lens, commonly called cataract, reduces the visual performance of the eye. When the visual performance is reduced to an unacceptable level, surgical cataract extraction becomes a necessity.

An eye without a lens, a condition called aphakia, is obviously defective from an optical point of view inasmuch as it cannot properly refract incident light rays. Aphakic correction may be accomplished in three ways:

(1) thick eye glasses worn in front of the eye;

(2) contact lenses worn on the eye; or

(3) artificial intraocular lens implant within the eye.

It is this latter procedure with which the instant invention is concerned.

The structure and procedure of installing an intraocular lens is very critical because the elements which make up the eye are extremely sensitive and subject to irreparable damage. Numerous experimental lens designs have been abandoned through the years because they caused corneal damage and other manifestations of intraocular irritation. For example, in the late 1940's and early 1950's, H. Ridley conducted clinical experiments with an artificial intraocular lens which included a lens portion having foot-like projections extending radially away therefrom. This device was placed in the posterior chamber with the feed extending between the ciliary processes and the base of the iris. The lens proved positionally unstable and resulted in unsatisfactory amounts of irritation.

U.S. Pat. No. 3,866,249 discloses a posteriorly positioned prosthetic lens which has a multiplicity of forwardly projecting prongs. During surgical implantation, the prongs are extended through the iris to anchor the lens in position. While this arrangement certainly maintains positional integrity, it, too, has distinct disadvantages. The great number of prongs extending through and over the iris promote undesirable irritational characteristics, and the number fixation points also have a tendency to distort the iris by pulling on it in numerous directions.

Finally, attention is directed to the lenses disclosed in U.S. Pat. Nos. 3,925,825; 3,913,148; and 3,922,728. Each of these patents teach a prosthetic lens structure which is, in one way or another, less than desirable in construction and use.

In an effort to remedy the problems associated with the prior art lens implants, applicant previously has been granted U.S. Pat. Nos. 4,143,427; 4,166,293 and 4,251,887. Other recent developments relating to implant lens may be found in U.S. Pat. Nos. 4,316,293 and 4,340,979.

A problem associated with the implantation of posterior chamber lenses is that opacification of the posterior capsule occurs through cellular migration onto the posterior capsule. A further problem associated with the prior art lenses is that the fixation elements do not engage substantially the entire capsular equator when the lens is implanted.

Therefore, it is a principal object of the invention to provide an improved flexible posterior chamber lens.

A further object of the invention is to provide a posterior chamber lens which is provided with a convex rear face which engages the posterior capsule to stretch the same rearwardly so that cellular migration onto, and the opacification of the posterior capsule is substantially reduced or eliminated.

A further object of the invention is to provide a posterior chamber lens including a flexible holding means which engages substantially the entire capsular equator when the lens is implanted.

Still another object of the invention is to provide a flexible posterior chamber lens which is of one-piece construction.

These and other objects will be apparent to those skilled in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of one form of the invention:

FIG. **2** is a side view of the lens of FIG. **1**:

FIG. **3** is a sectional view illustrating the lens of FIG. **1** implanted in the posterior chamber:

FIG. **4** is a plan view of a modified form of the invention;

FIG. **5** is a plan view of still another modified form of the invention:

FIG. **6** is a plan view of still another modified form of the invention:

FIG. **7** is a plan view of yet another modified form of the invention:

FIG. **8** is a side view of the lens of FIG. **7**; and

FIG. **9** is a plan view of still another modified form of the invention.

SUMMARY OF THE INVENTION

A flexible posterior chamber lens is provided which includes a disc-shaped lens body having a front face, a convex rear face, and an outer peripheral edge. The convex rear face of the lens body engages the posterior capsule to stretch the same rearwardly so that cellular migration onto, and the opacification of the posterior capsule is substantially reduced or eliminated. A flexible holding means is formed with the lens body and extends therefrom for engagement with substantially the entire capsular equator when the lens is implanted. In each of the embodiments, the flexible holding means has at least one support means which separates a fixation member from the lens body by a space. In one form of the invention, a pair of closed kidney-shaped loops are provided on the lens body. In another form of the invention, a support post extends radially outwardly from the lens body and has a pair of oppositely disposed arcuate fixation elements extending therefrom around substantially the entire peripheral edge of the lens body. In yet another form of the invention, a support post extends radially outwardly from the lens body and has a pair of fixation elements extending around substantially the entire peripheral edge of the lens body with the ends of