

INTRAOCULAR LENS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an intraocular lens which is an artificial optical implant device, used as a replacement for the naturally occurring human lens, when the naturally occurring human lens has been removed. The intraocular lens device after implantation, then serves as a means for optical correction of the eye in replacement of the naturally occurring lens.

2. Description of the Prior Art

Surgical implantation of an intraocular lens after the removal of the natural human lens is a method of visual correction now well established as successful in the field of Ophthalmology. The prior art of intraocular lenses involves many different lens designs which rely on various methods of fixation and stabilization of the implant within the eye such that the central or medial lens body is held in a stable position in relation to the pupil and visual axis of the eye. The type of intraocular lens is classified by location of its implantation within the eye, basically: anterior chamber, iris plane and posterior chamber.

The types of intraocular lens designs, classified according to method of fixation within the eye are:

1. Anterior chamber—Scleral spur fixation
2. Iris plane—Iris fixation
3. Iris plane—Iridocapsular fixation
4. Posterior chamber—Iris fixation
5. Posterior chamber—Capsular fixation
6. Posterior chamber—Ciliary sulcus fixation.

Fixation of the intraocular lens may be accomplished by:

1. Three points of touch of the lens device with the tissue providing three point fixation.
2. Four points of tissue touch with the lens device giving four points fixation.
3. Tissue touch in broad arcs with generally curving loops.
4. "Clipping" of the lens to the iris.
5. Suturing of the lens to the iris.
6. Placement of the fixation portions of the lens device within the posterior capsular envelope or bag which then develops adhesions around the portions of the lens device.

The first three methods of fixation, that is, three point, four point or broad arcs of fixation rely upon pressure against the tissue at those points for immobilization of the lens device. This point contact-pressure method of fixation can be used in the anterior chamber in the scleral spur region and the posterior chamber in the ciliary sulcus region.

Intraocular lenses may be used for both primary implantation, that is implantation at the time of initial removal of the natural human lens, or in secondary implantation, that is as a second, separate surgical procedure after the natural human lens has been previously removed in an earlier different surgical procedure. Some of the currently available intraocular lenses may be used in either primary implantation or secondary implantation.

Currently available intraocular lens designs provide a variable degree of symmetry and flexibility in the overall design and in the fixation parts which serve to hold the central optical body in position with respect to the pupil and visual axis. As is known to those practiced in

the art, a certain degree of flexibility is desirable since it reduces many problems, such as postoperative tenderness, allows for decreased tissue irritation within the eye when the eye undergoes various flexions during natural movement and reduces possibly injury. It is also well known, however, that excessive flexibility in the lens fixation can be a detriment, causing in its excessive flexibility, movement of the lens with resultant tissue irritation, chronic inflammation and damage to the eye with resultant eventual failure of the implant to be tolerated by the eye, causing possible visual loss and possibly requiring removal of the implant.

Currently available models and styles of intraocular lenses are such that they may be generally of solid one piece construction of one material or generally two or three types of material, the central optical body being of one material, such as polymethylmethacrylate, the peripheral fixation parts being of a different material, such as prolene, with the materials being joined to the central optical body mechanically.

There are various surgical techniques to those practiced in the art which can be used to safely remove the naturally occurring human lens. These surgical techniques are one of two general types:

1. Intracapsular lens removal, that is, removal of the human lens in its entirety in one piece with the lens capsule remaining whole and intact and removed completely from the eye.
2. Extracapsular lens removal, that is, removal of the lens in which the integrity of the capsule is intentionally and deliberately broken with the lens being removed in piecemeal fashion by one of several techniques using to a variable degree expression and/or fragmentation of the lens material and aspiration of the lens material with the intention of leaving the capsular "bag" or more particularly, the posterior capsule, intact and in the eye.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an intraocular lens suitable for use both in the anterior and posterior chamber of the eye.

It is a further object of the present invention to provide an intraocular lens with peripheral fixation members which provide sufficient flexibility to avoid the problem of tenderness and to allow safe implantation into the posterior chamber of the eye and also to have sufficient rigidity to allow adequate fixation of the intraocular lens within the anterior chamber of the eye.

The intraocular lens comprises a circular lens body having first and second position fixation members extending from opposite sides of the periphery of said lens body. Each of said first and second position fixation members comprises an arm portion having a base joined to the periphery of said circular lens body with said arm portion extending from said lens body, an elbow, and an elongated outward-convex seating portion having a first end joined to said arm portion by said elbow and an opposite free end extending in a direction such that said elongated outward-convex seating portion is outward of said arm portion relative to said lens body. The two bases of said arm portions of said first and second position fixation members are located to allow a straight line passing through the center of said circular lens body to pass through said two bases.

The arm portions of said first and second position fixation members extend from said lens body in opposite