

shape of the haptics may vary widely without departing from the intent of the invention. Irrespective of the specific configuration, the frame section will be designed and arranged to establish a stable position in the anterior chamber at the lowest feasible point so as to minimize any possibility that the placement of the frame section prior to extraction of the cataract will interfere with the extraction procedure. The optic section, irrespective of its particular configuration, will be adapted to mate with the frame section in a manner which will limit its movement after it is finally positioned, and will be of an overall size sufficient to ensure that the haptics associated with the optic section extends upwardly a sufficient distance to ensure that at least a portion of the haptic is substantially co-extensive with the angle defining the outer periphery of the anterior chamber.

FIGS. 3 and 4 illustrate a further embodiment of the invention which comprises a lens assembly having integral frame and optic sections but including structure which permits the optic section to be movable so that it will not interfere with the physical space required for surgical removal of the cataract. The lens assembly 44 depicted in FIG. 3 is quite similar to that shown in FIGS. 1 and 2 except that the clip 26 appended to the optic section 20 has been replaced by an integral hinge 46 connected to optic section 48. The lens assembly also includes a frame section 50 composed of haptics 52 and 54 and intermediate member 56 around which hinge 46 is permitted to pivot. As illustrated, haptics 52 and 54 include loops 58 and 60 which provide these members with a degree of size adjustability. A similar loop could be included in haptic 62 associated with the optic section.

As with the other embodiments of the invention, the lens assembly of FIG. 3 is inserted into the eye after the incision is made in the limbal region between the cornea 30 and sclera 32. However, unlike the other embodiments the entire lens assembly including both the frame section 50 and integral optic section 48 is pre-positioned prior to extraction of the cataract. More particularly, the haptics 52 and 54 are pre-positioned in the lowermost portion of the anterior chamber of the eye as previously described in connection with the other embodiments. However, prior to extracting the cataract, the cornea 30 is folded back (as illustrated by the shadow line 34 in FIG. 4) to provide operating space for the surgical procedure, and the optic section 48 is rotated about hinge 46 so that it too is removed from the operating field to a position such as shown by outline lens 64. Upon completion of the cataract extraction, the optic section 48 is rotated back into a position where its lens can function as a replacement for the removed cataract lens, and the haptic 62 associated with the optic section 48 is manipulated into its final position as shown in FIG. 3.

It will be readily apparent that the hinge 46 is merely illustrative of one mechanical embodiment of an integral but movable optic section and that many other mechanical configurations could be used. FIG. 5 illustrates one such preferred embodiment which is based on the principle of a "live" hinge which exhibits elastic memory. More particularly, there is illustrated a lens assembly 66 comprising an optic section 68 and a frame section consisting of haptics 70 and 72. As illustrated, the haptics are permanently joined to the optic section at points 74 and 76. As in the other embodiments, the haptics are made of biologically inert materials which exhibit a degree of resiliency and are so constructed and

arranged so that the overall diameter of the lens assembly 66 closely approximates the diameter of the anterior chamber of the eye. The stability of lens assembly 66 is maintained by the fact that haptics 70 and 72 provide four contact points 78, 80, 82 and 84 at the outermost periphery of the anterior chamber which all preferably lie in substantially the same plane.

It will be readily apparent that the end 86 of optic section 68 opposite to the points 74 and 76 where the haptics are joined to the optic section is unrestrained. Accordingly, in use, the lens assembly 66 of FIG. 5 will be pre-placed in precisely the same fashion described with respect to the lens assembly 44 of FIGS. 3 and 4, except that all of the haptics will be pre-placed in their final positions before the cataract is removed. The unrestrained end 86 of optic section 68, the junction points 74 and 76, which preferably are located within less than 180° from each other and the periphery of the optic section, either alone or acting together with legs 88 and 90, respectively, of haptics 70 and 72, will function like a live hinge having elastic memory. Thus, during surgery, the optic section will readily move out of the surgical field, e.g., to a position similar to optic section 48 in FIG. 4, in response to any force applied on or near its free end 86 by the surgeon-surgical instruments or by contact with the natural lens as it is being extracted, but it will automatically return to its pre-positioned location as a replacement lens as a result of elastic memory when the force applied is released.

It will be understood by those skilled in the art that the mechanical arrangement for achieving a live hinge shown in FIG. 5 is illustrative only, and that a wide variety of arrangements which are functionally equivalent thereto will be readily apparent.

It will also be apparent that care must be taken to avoid damaging the inner surface of the cornea or endothelium 92 as a result of contact with the optic section of the lens during the surgery. Accordingly, the preferred embodiment of the invention contemplates the use of a coating on either the endothelium, the optic section or both to reduce friction and the possibility of injury. In one contemplated embodiment, a hydrophilic polymer coating, e.g., a hydroxethyl methacrylate coating, is grafted or otherwise applied to the lens and other optic section surfaces for that purpose. Other temporary or permanent liquid or solid coatings having the appropriate physical properties could also be employed.

What is claimed is:

1. A method of implanting an intraocular lens which comprises, making a surgical incision in the eye, inserting at least a portion of an intraocular lens assembly in the anterior chamber of the eye, pre-positioning at least one haptic associated with said lens assembly so that it is located at substantially the final position in said anterior chamber which it will occupy when the optic section of said lens assembly is in a position to function as a replacement for a surgically removed natural lens of the eye or portion thereof, and thereafter surgically removing at least a portion of said natural lens.

2. The method of claim 1, wherein the entire intraocular lens assembly is inserted in said anterior chamber prior to said surgical removal step.

3. The method of claim 1, wherein all of the haptics associated with said lens assembly are pre-positioned at substantially said final position in said anterior chamber.

4. The method of claim 1, wherein said lens assembly comprises a frame section and a separate optic section, said frame section and the haptics associated therewith