

POSTERIOR CHAMBER IMPLANT LENS

BACKGROUND OF THE INVENTION

The invention relates to a posterior chamber implant lens of a homogeneous, clear synthetic material, acting as a replacement for the natural lens surgically removed, in particular extracapsularly, from the eye of a living being of a higher order, which

(a) has a central lens body and

(b) has holding means on the lens body extending radially outwards from its periphery and fixing it in its position, being of a homogeneous, clear, vulcanized silicone rubber.

Some time past (1949), Ridley in England, attempted to replace extracapsularly removed eye lenses with artificial acrylic glass lenses implanted in the posterior chamber of the eye. However, these attempts more or less failed due to various reasons, in particular due to reasons of insufficiently formed lenses and poor material, as well as due to insufficient sterilization, and for this reason a change was made to implant lenses of polymethyl methacrylate (PMMA) which consist of a planoconvex disk on which holding means or support elements of various types are attached, in the anterior chamber of the eye of living beings, in particular human beings, in front of the iris. However, this method also did not bring striking success, and for this reason, in recent years, the lenses of the type in question were attached to the iris with wire or plastic side pieces and possibly sewn onto the iris.

Apart from PMMA, polyamides were also used as material for such lenses. The disadvantage of these materials lies in particular in the fact that the lenses made out of them cannot be surgically perfectly sterilized. None of the hitherto conventionally used implant lenses can stand up to the heat sterilization by means of overheated steam or hot air, which must be used in order to reach a correct, germ-free sterilization (including bacteria spores).

Accordingly, surgery was forced to make do with subjecting the implant lenses to a chemical liquid degermination, i.e. virtually disinfecting them immediately after production, and then preserving them in more or less suitable liquids in ampouled form. The lenses are removed from these ampoules immediately before the operation. The limitations of such a chemical liquid degermination lie in the present case in their not being able to destroy bacteria spores, furthermore, these—not indifferent—chemicals easily accumulate in plastic bodies within the eye in an uncontrolled manner and over a longer length of time, due to an exponential function. This material behavior gives cause for concern, particularly for an eye implant.

Through the DE-AS No. 26 07 462 an implant lens became known based on the same inventor. This lens is to be attached to the iris and is to be made of a very particular silicone rubber. The suggestion of selecting this plastic material had the important advantage that the lenses could, for the first time, be sterilized using steam or hot air with the sufficiently high temperatures.

Implant lenses of the first generation, after Ridley placed his acrylic glass lens in the posterior chamber of the eye or in the lens capsule, were lenses of this aforementioned type. As a result of the then soon occurring, considerable complications, there was a change to implanting anterior chamber lenses which were formed with the most various of structures. However, also

these lenses which were described as those of the second generation, did not bring about a solution to the prevailing problems.

Lenses of the third generation was the name given to those lenses which were attached to the iris by means of their holding means arranged on them. The technology for implanting such lenses has been refined and improved. However they are still burdened with the disadvantage that they are made of PMMA or other materials which, seen in a physiological aspect, still encounter a certain amount of risk.

A further disadvantage of these lenses, as also is the case with the anterior chamber lenses, is that, seen from the optical system of the eye, the lens is not lying in a favorable position. The posterior chamber lenses, thus recommended for this reason have however not been able to prove themselves convincingly, on the one hand due to their form and on the other hand due to the material of which they are made.

SUMMARY OF THE INVENTION

The invention has as its object to provide a posterior chamber implant lens which avoids those negative complications which have occurred with the hitherto used lenses, on the one hand due to its form and structure, on the other hand due to the specifically used material. The lens to be made should have as great a mechanical stability as possible with low, optimum specific gravity of the material, corresponding approximately to that of the aqueous humor or marginally greater than this value. The lens, which becomes practically weightless as a result of the hydrostatic lift, gives rise to a very, very slight mechanical tissue strain on the surrounding tissue, if any at all.

Furthermore, the lens to be provided is to have a suitable elasticity which is not only of advantage for the implanting of the lens. As a result of its form, the anatomic lens position is assured. However where surface pressure can occur on sensitive tissue parts, this should be kept as low as possible.

It is a further object of the invention that the lens should be free from any inner mechanical stresses. Furthermore its material should be such that impairment of the lens surface during subsequent surgery, which will occasionally be necessary, does not have any detrimental influence on the dioptrical properties of the lens. Finally, the posterior chamber implant lens advantageously of one-piece design, should be physiologically compatible, chemically stable and physically clear and be able to be subjected to sterilization at temperatures in the range of 392° F.

A lens fulfilling these requirements is a posterior chamber lens formed according to the invention which has the features listed below in combination with each other:

1. The lens body is formed as a convex lens wherein the rear surface facing the lens capsule rear wall has a greater, preferably much greater curvature than the front surface facing the iris;

2. on the lens body is situated a thin-walled support element extending basically radially outwards, the outer edge of which encircles the center point of the lens body and has a diameter between approx. 9.0 and approx 12.0 mm, preferably about 10.0 to 11.0 mm;

3. in the support element are positioned several openings distributed over the element, preferably in the form of round holes;