

THE CURRENT STATUS OF INTRAOCULAR LENSES

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When Harold Ridley, in 1949, described an artificial lens and a technique for its introduction into the posterior chamber of the eye after an extracapsular cataract extraction, it captured the imagination of ophthalmologists throughout the world. However, the procedure has been and still remains one of the most controversial in all of ophthalmology. This comes as no surprise since this method makes an important modification in an operation which has proven one of the most successful in all of surgery. In every lively scientific encounter there are those who present facts and those who offer opinions. It is distressing that those who offer opinions are often unaware of important improvements in the design of these lenses and in the techniques of their implantation. This represents an injustice since it provides an unhealthy medicolegal arena for what appears to some of us to be a very useful procedure.

My remarks will be subdivided into the past, the present, and the future of intraocular lenses.

PAST

The original Ridley lens was abandoned because it often caused iridocyclitis by making contact with the ciliary body and often dislocated into the vitreous since the thin posterior capsule of the crystalline lens could not be consistently depended upon to hold it in place. SLIDE: This is a recent photograph of a Ridley lens placed in the eye of one of my patients by an ophthalmologist 17 years ago.

The problem of secure fixation of the implant was solved with the introduction of anterior chamber implants. At first, these were externally fixated to the sclera. SLIDES: Strampelli and Choyce lenses. Later they were supported by the anterior chamber angle structures. SLIDES: Strampelli and Dannheim lenses. Choy lens in eye of a child. However, they

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caused a high incidence of serious post-operative complications, the most frequent being late corneal edema. Much of the current negative feeling toward intraocular lenses has arisen from this unfavorable experience.

A revival of enthusiasm for intraocular lenses occurred when lenses were designed which depended upon the iris for support. It was reasoned that such an implant was sufficiently separated from the cornea and angle structures that corneal edema would not occur. Epstein of South Africa and Binkhorst of Holland independently pioneered this effort. Epstein inserted his first iris-supported lens, the "collarstud" lens in 1953 but did not report it until 1959. He later abandoned the collar stud principle and developed the "Maltese cross" lens, a pupillary plane lens. SLIDE: Epstein lens. Binkhorst developed his "iris-clip" lens in 1957. He later developed an "iridocapsular" lens in 1965 which was designed to be used in conjunction with an extracapsular lens extraction. There is no question that the major credit for the current interest in intraocular lenses rightly belongs to Binkhorst.

PRESENT

There are currently available a variety of iris-supported lenses currently in use in the United States and throughout the world.

Fyodorov lens consists of 3 posterior loops and 3 anterior sticks with a knob at the end of each stick. SLIDES: Because of the 3 loops it gives a hexagonal pupil.

Worst lens has 2 posterior loops behind the iris in the horizontal position. It is sutured to the iris. SLIDE.

Fyodorov-Binkhorst iris-clip lens consists of 2 posterior loops and 2 anterior loops, 90° apart. SLIDES.

Iris-plane (Copeland) lens is the only pupillary plane lens and is an outgrowth of the older Epstein lens. It is the only pseudophakos made entirely of one material. The supports are solid. SLIDES: The supports may be placed in any position which suits the surgeon.

Binkhorst iris-clip lens has 2 pairs of loops so that the iris is clipped between each pair. SLIDES: A transiridectomy suture is used as shown. The pupil may be dilated.

Binkhorst iridocapsular lens is used in conjunction with an extracapsular lens extraction. It has only 2 posterior loops which fixate to the posterior capsule of the crystalline lens. SLIDES: To test for fixation, the pupil is

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dilated on the 4th postoperative day. If fixation is secure, the implant remains centric, as shown. This implant is truly fixated by the capsule and is independent of the iris. There is the least danger of the iris-supported implant to come forward and make contact with the cornea.

Why an implant? SLIDE: The image size magnification most closely resembles the phakic eye than any other known method of optical correction of aphakia. The spectacle lens magnifies the image between 20 and 30%. The contact lens causes 5-10% magnification. The implant causes 1-2% magnification. Experience has shown that elderly patients generally do not manage contact lenses well.

Indications:

1. The elderly patient with a very advanced cataract in one eye and 20/40—60 vision in the better eye. He manages poorly in the sun and cannot drive his automobile. These are basically unilateral cataracts.

2. Unilateral cataracts in patients with infirmities such as rheumatoid arthritis, Parkinsonism, hemiplegia, etc.

3. Elderly patients with bilateral advanced cataracts which, for example, cause 20/200—400 vision in each eye. Usually surgery on only one eye will suffice.

4. Bilateral senile macular degeneration in patients with advanced bilateral cataracts. Spectacles cause decreased peripheral field vision which is the only vision these patients possess. These are some of the happiest patients.

The Miami Study: To assemble objective data and close some of the credibility gap which existed in this field, implant surgeons in the Miami community organized a Lens Registry in which every case was registered at the time of surgery. Annual examinations of these eyes were performed by ophthalmologists who were not the patients' personal surgeons. The results of the survey were reported each year at the annual Residents Day of the Bascom Palmer Eye Institute.

It was our conclusion that the implantation of a pseudophakos renders the patient most like those with phakic eyes. It avoids all the well known problems of aphakic perceptual handicaps. However, the procedure requires training and the rate of complications is higher than that of routine cataract surgery. For the very elderly patient, it is truly a blessing.

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Complications: The most frequent complications have been.

1. Cystoid macular edema SLIDE.
2. Recurrent iritis which responds well to steroids.
3. Intraocular lens membranes SLIDE: this is most common with the iris-plane lens.
4. Dislocation of the implant SLIDE.
5. Corneal edema SLIDE: this is an uncommon complication and does not represent the problem of the anterior chamber lenses of the early 1950's.

Penetrating keratoplasty in eyes with pseudophakia: An eye with a pseudophakos in situ represents a good prognosis case for penetrating keratoplasty in case of bullous keratopathy. SLIDES. A combined penetrating keratoplasty, lens extraction, and implant has also given good results. SLIDES.

Histopathology: It has been shown postmortem that eyes tolerate the presence of an implant quite well. These eyes resemble aphakic eyes without an implant. SLIDES.

FUTURE

There are 2 real dangers. The first is the eagerness of ophthalmologists to engage in this type of surgery because of economic pressures and other reasons without adequate preparation. The second is the already proliferation of manufacturers anxious to corner a piece of this market. Since there are 500,000 cataract operations performed annually in the United States alone, it is easy to understand this commercial aggressiveness. Safety standards will become mandatory. From a scientific point of view, one of the problems to be resolved is whether an extracapsular extraction is superior to an intracapsular extraction for implant surgery and if so, what kind of extracapsular surgery? How will these problems be resolved? They can only be resolved by the accumulation of objective data and the establishment of guidelines for governmental regulatory agencies. They will never be resolved by the irrational tirades of biased individuals. The failures of 20 years ago have formed the foundation of the successes of today.