Ridley Intraocular Lens

Chua JC, Kaufman DV

Sir Harold Ridley

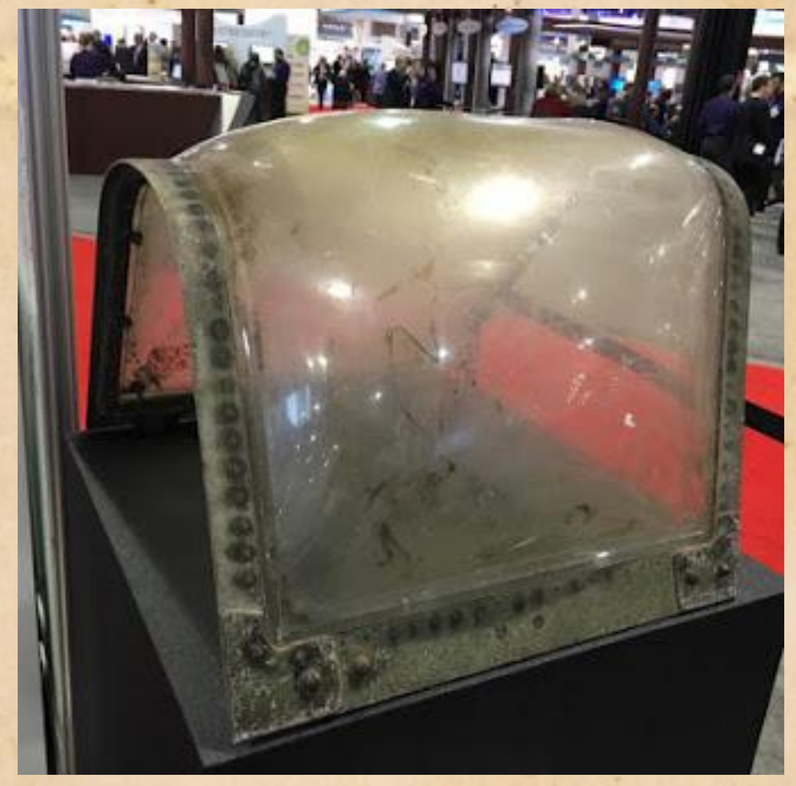
Born in Leicestershire 1906, Sir Nicholas Harold Lloyd Ridley (hereafter termed 'Ridley') was an English ophthalmologist who invented the intraocular lens and pioneered intraocular lens surgery for cataract patients.

He was the son of Nicholas Charles Ridley, a consultant ophthalmic surgeon at Leicester Royal Infirmary.

He completed his medical training in 1930 at St Thomas' Hospital and gained FRCS at the age of 25.

In 1938, Ridley was appointed full surgeon and consultant at Moorfields Hospital and later appointed consultant surgeon in 1946.

The first IOL: Ridley IOL



As a military surgeon during WWII, Ridley treated a Hurricaine fighter plane pilot who sustained penetrating eye injuries from particles from a severely damaged cockpit canopy. The canopy was composed of **PMMA** and when remained stationary in the eye, it did not stimulate a foreign-body reaction.

This led him to propose the use of artificial lenses made of **PMMA (Perspex)** to treat cataract. PMMA was light, with almost same specific gravity, 1.09, as aqueous humor.

Ridley's first IOL operation was performed on a 45-year-old woman at St. Thomas's Hospital in London on Nov 29, 1949.

Surgery was performed in two stages to ensure eye was quiet after ECCE, and then IOL implantation behind iris and anterior to posterior lens capsule three months later in February 1950.

Ridley IOL

Kayner

Dispensing Opticians
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AN ACRYLIC INTRA-OCULAR LENS

At the Oxford Ophthalmological Congress, July 6th, 1951, and in the March 1952 issue of the British Journal of Ophthalmology, Mr. Harold Ridley described the introduction into the eye, in the place of the crystalline lens removed for cataract, of a substitute crystalline lens made from Perspex.

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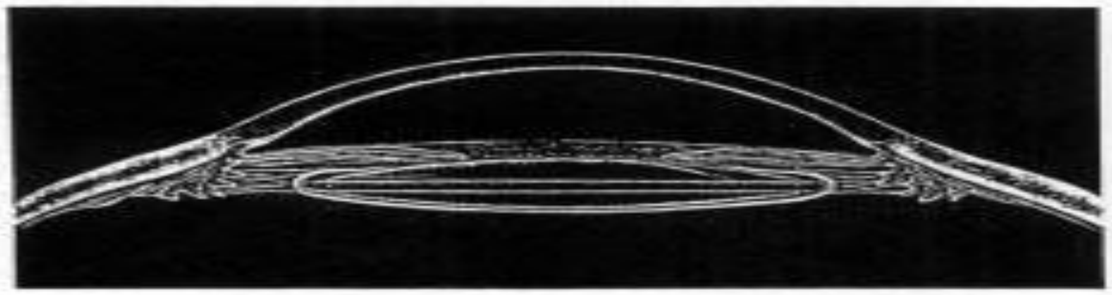

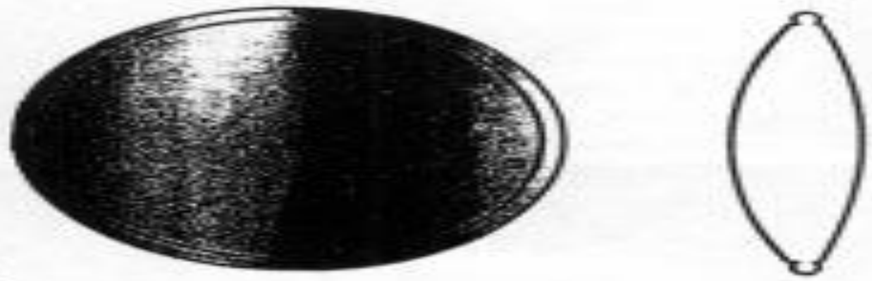

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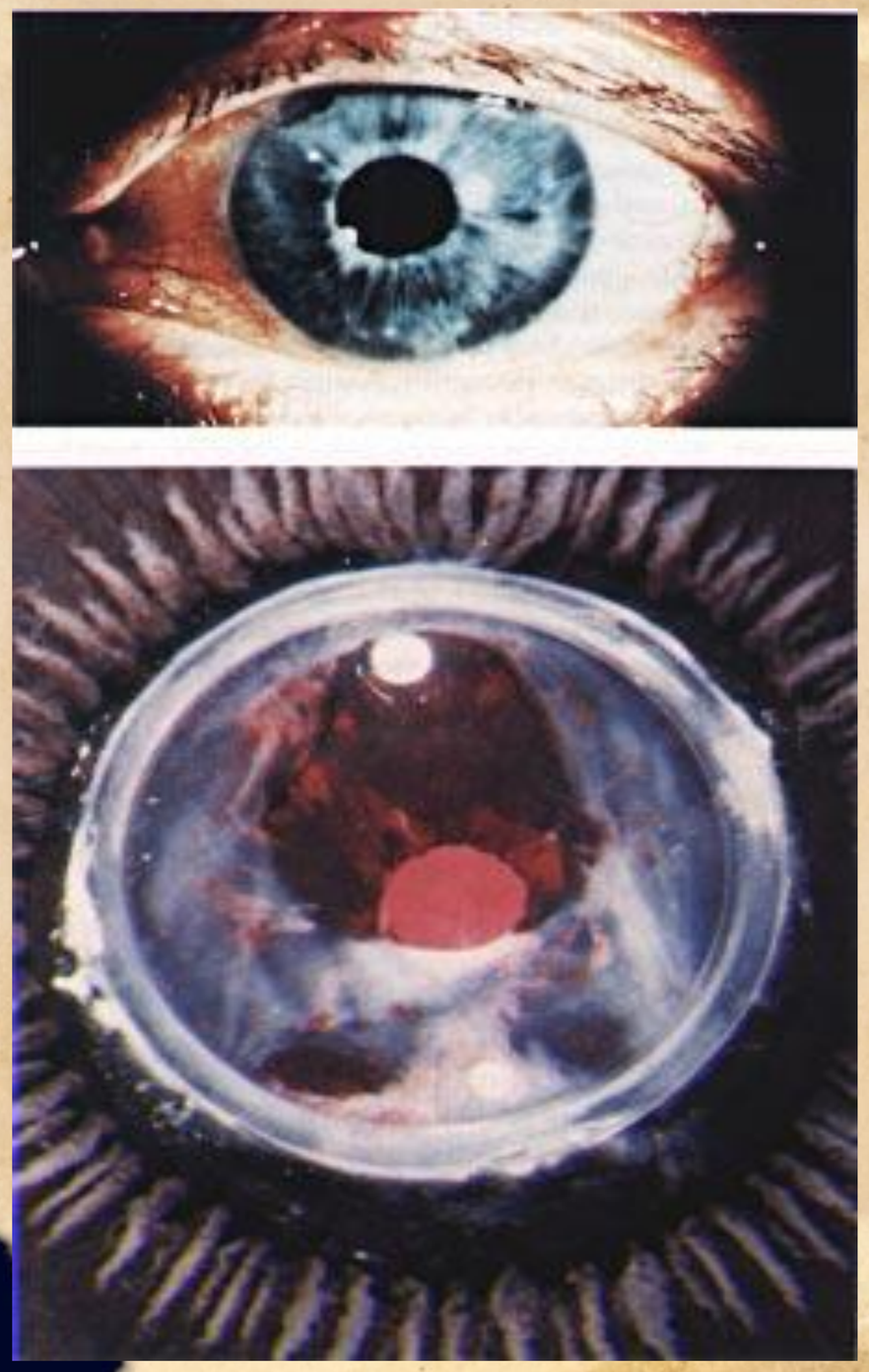
Portion of early brochure describing the Ridley lens. Schematic illustration of a sagittal section illustrating the ideal placement of Ridley biconvex disk IOL onto posterior capsule.

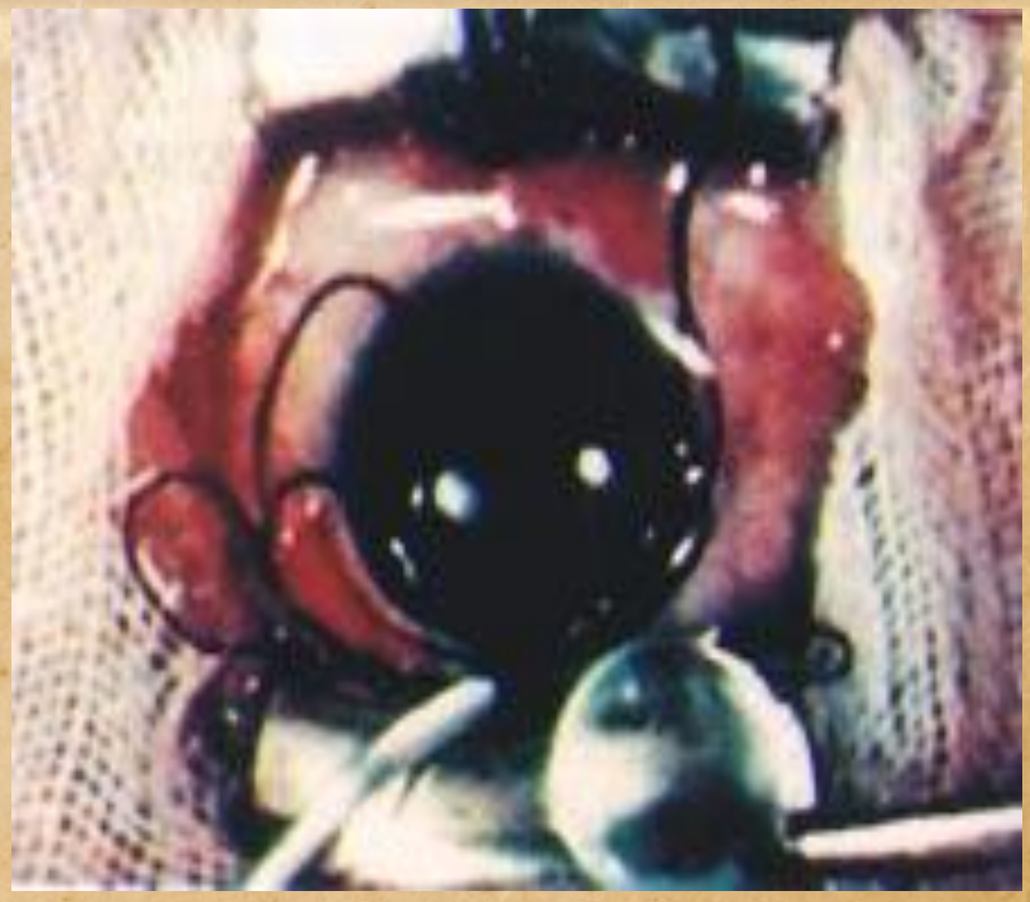
In reality, following the early can-opener type anterior capsulotomies performed at that time, there was probably very little equatororial capsule left; therefore, the lenses were more correctly placed “on-the-bag” rather than “in-the-bag”. Lack of equatorial support was a major reason for relatively high incidence of decentration of the early Ridley lens.

Ridley IOL



Top:
A Ridley IOL implanted in 1953, USA. 30 years later the patient's media were clear and vision was 20/25

Bottom:
Post mortem photograph from behind an eye with a well-centered Ridley IOL



Top: Ridley's 8th IOL implantation on May 8, 1951. Plastic Biconvex IOL disk held by forceps after cataract was removed by ECCE. Post operative patient had 20/20 vision.

Problems of initial Ridley IOL

High myopic overcorrection (due to inaccurate calculation)

Inferior IOL dislocation (20%) due to the then commision technique of ECCE-leaving little equatorial support by capsular bag in the absence of haptics

Glaucoma (10%)

Uveitis (from chemical sterilization then since gamma ray radiation was not discovered yet).

For over three decades (1949-1980s), Ridley was defamed by many surgeons for his controversial works on IOL, and some referred IOL as a "**time bomb**".

In 1969, prominent ophthalmologist Sir Stewart Duke-Elder wrote:

> *"It can be well argued while the results of a cataract extraction are usually so good and the use of contact lenses so safe and easy (in selected cases) it is perhaps unwise to gamble on further surgical procedures (IOL insertion) which require considerable specialized technical skill and a healthy eye on which to operate, the results of which in the absence (at present) of longterm observations are somewhat problematica*l."

Ridley IOL

Ridley worked hard to overcome complications, and had refined his technique by the late 1960s. In 1981, IOL was finally approved as "safe and effective" and approved for use in the US by the Food and Drug Administration in 1981.

The first US Food and Drug Administration (FDA) approved lenses, (Choyce Mark VIII and Choyce Mark IX Anterior Chamber lenses) were manufactured by Rayner.

IOL evolved through five generations:

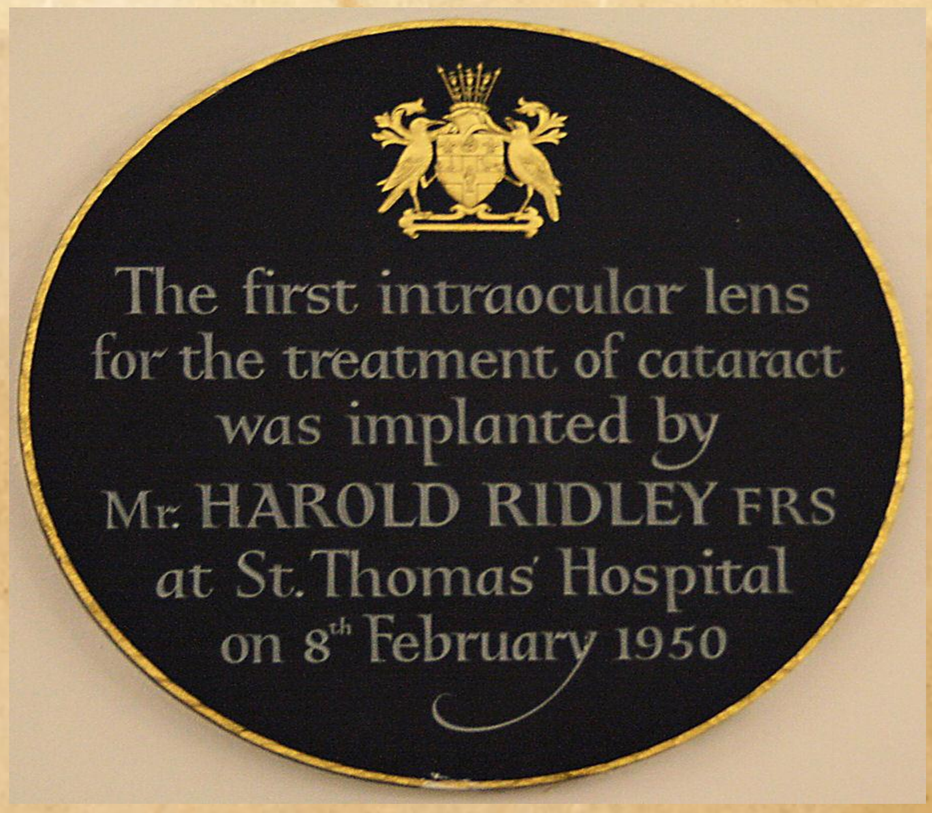
I. Ridley's lens, 1949
II. Early anterior chamber lenses, 1952-1962
III. Iris supported lenses, 1953-1973
IV. Modern anterior chamber lenses, 1963-present
V. Modern posterior chamber lenses, 1975- present
VI. Capsular IOL for implantation into lens capsular bag (PMMA and pliable soft IOL, 1980s- present.

Recognition of Ridley's contribution

In the thirty years after implanting the first IOL in 1949, Ridley received scant thanks and recognition from his peers.

That began to change in the last twenty years of his life when he finally received recognition as an inventor whose invention had restored the sight of millions of patients worldwide

Ridley was honoured with a knighthood in 1999.



In 2001 A plaque was installed at St Thomas's Hospital, London to commemorate the first IOL implantation.