

Sir Nicholas Harold Ridley : The Inventor of the Implant and a Pioneer in the Quest to Eradicate World Blindness

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Sir Harold Ridley (Fig. 1)

Sir Harold Ridley, the inventor of IOL, passed away at the age of 94, on 25 May 2001, and ophthalmology lost one of its greatest and most influential practitioners (Fig. 1). We are happy that he lived to enjoy the fruits of his labour to see the amazing improvements and the expansive growth that evolved in the cataract-IOL technique, from early and unsatisfactory operations in previous decades, to the superb results attainable today. This article presents a brief biographical sketch of Sir Harold Ridley and lists his major inventions and contributions to ophthalmology.

Sir Harold Ridley: Education & Academic Recognition

Nicholas Harold Lloyd Ridley, MA, MD, Cantab. (Cambridge); FRCS, England; D.H.L. Medical University of South Carolina, Charleston; D.S. City University of London; Fellow of the Royal Society (FRS), was born at Kibworth, Leicestershire, July 10, 1906. After completing studies at Cambridge in 1927, he proceeded with medical training at St. Thomas' Hospital, London, and in 1930, he completed his basic medical education. In 1938, he was appointed full surgeon and permanent consultant at Moorfields Eye Hospital. Ridley married Elisabeth Wetherill in Surrey on May 10, 1941, and soon thereafter he entered the Royal Army Medical Corps.

Sir Harold Ridley was elected a Fellow of the Royal Society of London in 1986. His first academic honor was an honorary doctorate degree, Doctor of Humane Letters (DHL), conferred in 1989 by the Medical University of South Carolina, Charleston. In 1992, he received the Gullstrand Medal (conferred by the Swedish Society of Medicine), and in 1994, he received the Gonin Medal (conferred by the Club Jules Gonin, Lusanne). The matter came full circle July of 1997, when Sir Harold Ridley was honored by the delegates of the Oxford Ophthalmological Congress—the venue of his first presentation of the IOL. In April 1999, at the annual meeting of the American Society of Cataract and Refractive Surgery in Seattle, Washington, Sir Ridley was honored in a special anniversary session as one of the most outstanding and influential ophthalmologists of the 20th century (Fig. 2). At that meeting, he also received a medal from Rayner,

Ltd., acknowledging their collaboration with Sir Ridley on his original lens, a most outstanding advance in the field of cataract surgery (Figure 3). He received similar accolades at the 1999 meetings of the European Society of Ophthalmology (Stockholm, July 1999) and the annual meeting of the European Society of Cataract and Refractive Surgery (Vienna, September 1999). In



Fig. 2: Sir Harold Ridley was awarded for being one of the most influential ophthalmologists of 20th century. This event commemorated the 50th Anniversary of the IOL.

- Sir Harold Ridley receiving award during the American Society of Cataract and Refractive Surgery in Seattle, Washington, April 1999.
- Sir Harold Ridley with authors of his biography during the American Society of Cataract and Refractive Surgery in Seattle, Washington, April 1999. (Left to right- Drs. Jim Sims, MD, Sir Harold Ridley, David Apple, & Mrs. Elisabeth Ridley).
- Sir Harold Ridley with some young ophthalmologists during the American Society of Cataract and Refractive Surgery in Seattle, Washington, April 1999. (Left to Right- Drs. Qun Peng, Elisabeth Ridley, Suresh K. Pandey, Sir Harold Ridley, Marcella Escobar Gomez, Nithi Visessook, Liliana Werner).

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February 2000, knighthood was conferred on him by Queen Elizabeth II (Figure 4). These honours finally helped erase what had indeed been a very difficult memories for him, for most of his professional life. Prior to these honours and recognitions, Ridley was indeed a “prophet -without-honour” in his own country.



At 1999 American Society of Cataract and Refractive Surgery meeting, Sir Harold Ridley also received a medal from Rayner, Ltd., acknowledging their collaboration with Ridley on his original lens, a most outstanding advance in the field of cataract surgery.



Fig. 4: Sir Harold Ridley was conferred the knighthood in his homeland by Queen Elizabeth II, in February 2000.

Sir Harold Ridley: Invention, Reaction and Recognition of the Implant

The story of Sir Ridley and his ground-breaking invention of the intraocular lens is well known and became one of the high points of our specialty in the 20th century. During the new millennium, we in ophthalmology and the visual sciences have recently celebrated the 50th anniversary of one the 20th century’s most important innovations in eye care—the invention of the intraocular lens (IOL) by Sir Harold Ridley. The 50th anniversary of this invention literally straddled the turn of the century. The first operation, done at St. Thomas’ Hospital, London on November 29, 1949. The pseudophakos was manufactured by Rayner, Ltd., United Kingdom.

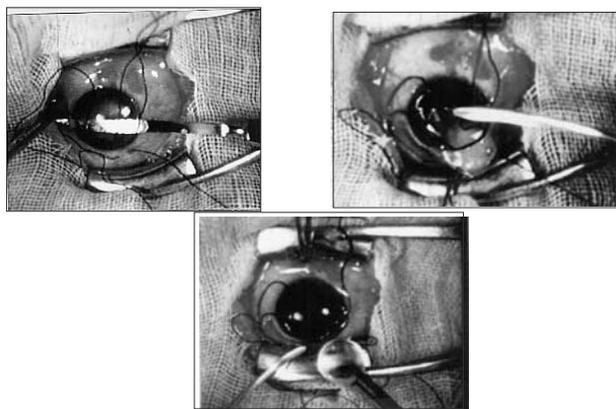


Fig. 5: Photographs of Sir Harold Ridley’s eighth implant operation, May 10, 1951. These cuts were taken from the original film.

- A. von Graefe incision.
- B. Crystalline lens removal.
- C. Intraocular lens insertion.

Sir Ridley’s first cataract extraction and IOL operation marked the beginning of a major change in the practice of ophthalmology. The idea of an artificial lens had been mentioned earlier (including mostly eponymal sources), but credit for the invention and implantation clearly goes to Sir Ridley. His collaboration with John Pike at Rayner, Ltd., the manufacturer of the first lenses, began a new era. He filmed some of his early cases, including case number 8, segments of which are shown here (Figure 5).

Sir Ridley’s first presentation of the new procedure was given at the Oxford Ophthalmological Congress on July 9, 1951. His presentation of two patients with successful implants evoked much interest, but also marked resistance. Although Sir Ridley had a handful of early supporters throughout the world, including David Peter Choyce (a participant in the early operations), he had numerous detractors. Some authorities in the 1950s and 60s had a conservative attitude toward this procedure, as there was little available experimental or animal data and little analysis of material in those early years. Some surgeons referred to the IOL as a “time bomb.” Governmental funding sources showed little interest in the device. Even as the success of the IOL became assured, doubts and questions still lingered—which, in retrospect, were probably healthy, as they helped stimulate more basic research into the procedure.

Young residents and practitioners today implant IOLs routinely and with ease, not realizing the extraordinary struggle that Ridley and many other contemporary surgeons, who implanted Ridley IOL had to undergo for many years to develop this

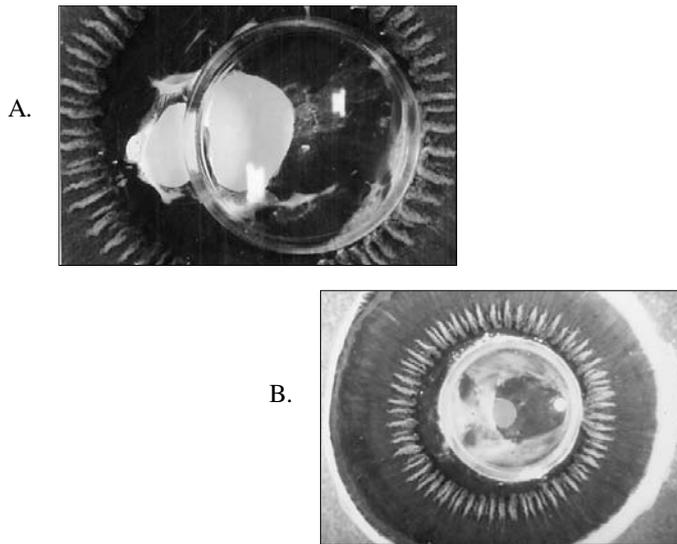


Fig. 6: Miyake-Apple view of a Ridley intraocular lens implant taken 30 years after surgery.

- A. IOL decentration.
- B. Capsular bag opacification.

technique. A prime example is the issue of lens fixation, which was one of Sir Ridley's biggest problems and has taken over 40 years to solve (Figure 6A). A solution was not achieved until the mid-late 1980s, when surgeons began to understand the advantages of in-the-bag (capsular) fixation of posterior chamber IOLs. Posterior capsule opacification (PCO, secondary cataract), another complication seen in Ridley's earliest procedures, is now being controlled, and its incidence has decreased to single digit percentages (Figure 6B).

Sir Harold Ridley: Other Inventions:

Sir Harold Ridley was sent to Ghana in the Gold Coast of West Africa, a challenging assignment that turned out to be a blessing in disguise. It was during this period that he performed his original work in the field of tropical eye disease, especially onchocerciasis. His monograph, *Ocular Onchocerciasis*, with his classic fundus painting, sometimes termed the *Ridley fundus*, was published in 1945. This work constitutes one of Ridley's major contributions.

In addition to his contributions to tropical medicine and enhancing eye care worldwide, and prior to his invention of the intraocular lens, Sir Ridley showed creativity and innovation in several other areas. He was the first to televise eye operations, and he devised a system of examining the inner eye by electronic methods. It has only recently been appreciated that Ridley developed many of the basic principles of what has evolved into modern confocal microscopy and scanning laser ophthalmoscopy (SLO).

Sir Harold Ridley & IOL Implantation in Developing World:

Forty million people in developing countries are functionally blind over half of them from cataract. Cataract removal and IOL implantation is by far the most common and most successful of all operations in medicine. We are pleased that Sir Harold Ridley lived to see the amazing improvements and the expansive growth that has evolved in the cataract-IOL technique, from early and unsatisfactory operations in previous decades, to the superb results attainable today. Our challenge is to "cure aphakia" on a global basis; and we are pleased that concerted efforts now are being made toward achieving widespread "pseudophakia" in the developing world. The advantages of an IOL implant over aphakic spectacles have also been confirmed in recent studies done in leading ophthalmic centers in developing countries.

Without exaggeration and there are very few doubters today Sir Ridley's IOL invention has both directly and indirectly led to visual restoration and cure for multi-millions of visually handicapped people worldwide, a huge step towards the eradication of cataract blindness. Because of Sir Harold's early work, implantation of IOLs on a broad scale in the rural areas of these countries is now a definite possibility. It would be a spectacular legacy to Sir Harold Ridley - *whose heart and intellect was strongly devoted to the problems of tropical medicine and blindness in the developing world* - to accelerate and expand efforts to provide the benefits of IOLs to needy individuals throughout the world.

In summary, as we say good-bye to Sir Harold Ridley, we hope that all of us who have shared the experiences of relatives or friends (even ourselves!) regarding IOL implants after cataract surgery, will reflect back in history on his *tiny piece of plastic* and be grateful for his sight-saving invention. The year 1949 began a new era, the formative years of the IOL. The intermediate years represented the period of growth of the cataract-IOL procedure. His death came at a time of near perfection of his invention, indeed during a period of maturation of not only IOLs, but also of other hi-tech implantable biodevices, many of which he pioneered. The second-half of the 20th century has truly benefited from Sir Ridley's contributions, and we are likely to continue deriving benefits from his work.

Suggested Reading

1. Ridley NHL. Intraocular acrylic lenses. *Trans Ophthalmol Soc UK & Oxford Ophthalmol Congress*. 1951;LXXI:617-21.
2. Ridley NHL. Intraocular acrylic lenses after cataract extraction. *Lancet*. 1952;1:118-19.
3. Apple DJ, Sims J. Harold Ridley and the invention of the intraocular lens. *Surv Ophthalmol*. 1996;40:279-92.