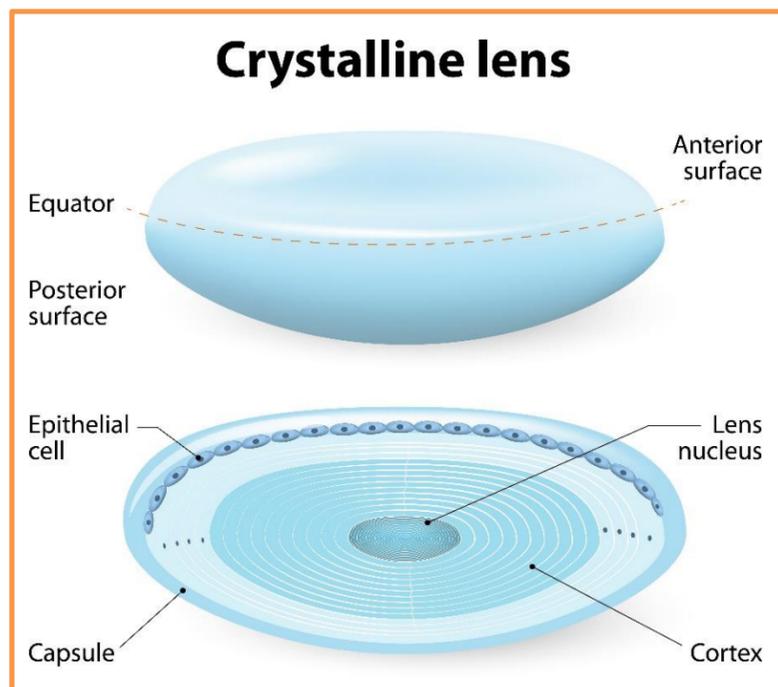


CATARACT & INTRAOCULAR LENSES

By AI Lens, COMT



The normal human eye comes equipped with a crystalline lens. This clear, flexible lens is located out of sight behind the iris (the coloured part of the eye). This lens makes up about one-third of the focusing power of the eye. It also allows the eye to adjust its focus from distance to near (and back again). It really is a marvellous structure.

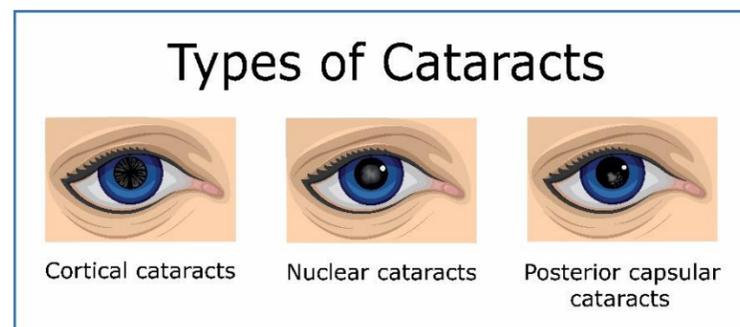
As it is with a lot of good things, there are some flaws to the crystalline lens. It is encased in a thin capsule, preventing any cells from leaving the lens for greener pastures. However, the lens continues to develop new cells throughout our life. Since the old cells have nowhere to go, the capsule has to make room for the new cells to join the old cells. This causes the lens to thicken with each passing year. And, just like a tree that gets thicker with each year, the lens becomes more rigid. This rigidity causes a decrease, and eventual total loss, of its ability to accommodate (change its focus)... also known as presbyopia.

While the need for reading glasses (or PALs, etc.) is frustrating to a lot of people, the lens remains clear for the most part. It just can't change its focus

well enough. That being said, if one would compare the transparency of the crystalline lens in a 10 year old's eyes to that of someone who is 50 years old, the change in clarity would be noticeable. This is similar to having the clarity of an old window in a house compared to a new window. This change in transparency means that older people will need a bit more light to see, and they may notice some glare from oncoming lights.

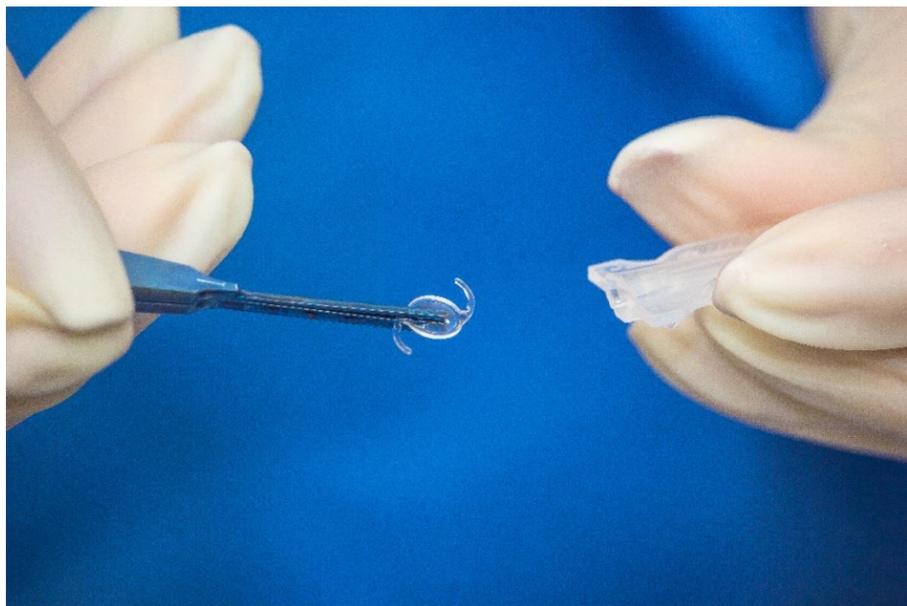
When the lens develops an opacification that affects vision, it is deemed to have a cataract. It is thought that everyone will develop cataracts if they live long enough. Like grey hairs and wrinkles, they can develop later in life in some folks than others. Most people will have a cataract by their eighties. Age-related cataracts typically develop in both eyes, but can be more dense in one eye compared to the other.

There are different types of cataracts. The most common is nuclear sclerosis. This is a clouding of the central 'nucleus' of the lens. These usually progress at a slow rate and can take years from the date of onset to the time surgery is recommended. Cortical cataracts develop in the part of the lens that envelopes the nucleus. They often appear in a spoke-like pattern. Subcapsular cataracts are just inside the wall of the capsule of the lens. These can progress quite rapidly. They are more common in younger eyes, or in individuals who have taken certain medications (e.g., corticosteroids).



While cataracts are associated with aging, they can develop at any time in life. In fact, some infants are born with cataracts (known as congenital cataracts). If the cataract is dense enough to impair the infants vision, it must be dealt with as soon as possible in hopes of establishing normal vision. Some congenital cataracts do not progress and do not require surgery. Drugs and trauma can also cause cataracts.

The remedy for cataracts is the removal of the crystalline lens. This is usually done through a small (less than 3 mm) incision at the periphery of the cornea. An opening is made in the anterior (front) capsule and the lens is broken up by ultrasound and aspirated (sucked out) of the eye. This procedure is known as phacoemulsification.



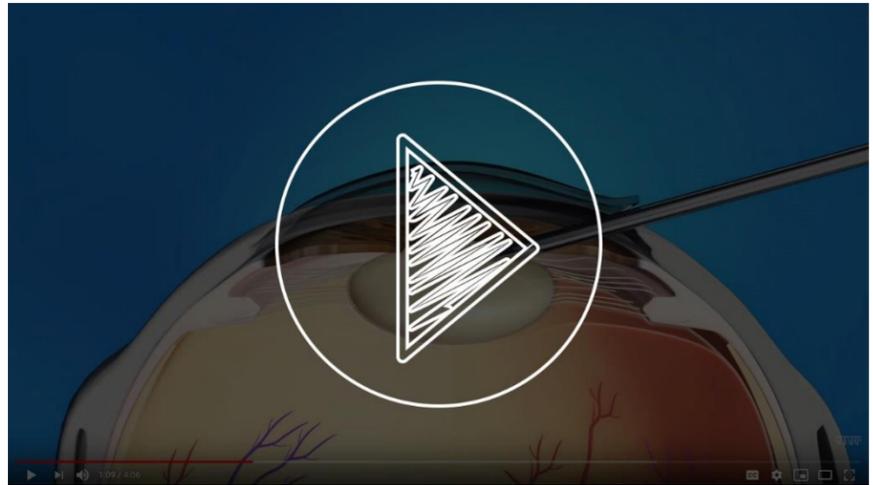
While that takes care of the cataract, it leaves the patient severely visually impaired without corrective lenses. In 1949, Dr. Harold Ridley implanted the first intraocular lens (IOL). This greatly improved the visual acuity without needing to wear corrective lenses. At first, the power of the intraocular lens was universal – everybody got the same power. Then the power of the lens was adjusted according to the pre-operative refractive error. Higher myopic (nearsighted) eyes required a lower powered intraocular lens, and hyperopic (farsighted) eyes required a higher powered IOL. Later, with the development of ultrasound to measure the length of the eye from front to back, formulas were developed to more accurately determine the desired IOL power.

The early IOLs were made from polymethylmethacrylate (PMMA) – the same material used for hard contact lenses. The main problem with this material was that it meant the incision in the eye had to be made large enough for the lens to pass through. Sutures were required to close the wound. Foldable lenses eventually became the standard and allowed for a much smaller incision. The incision is small enough that sutures are not typically required.

Early intraocular lenses did not have ultraviolet light protection and it was imperative that people wore protection post-operatively. While people are still encouraged to utilize UV protection (even in a normal eye), the modern day IOLs do provide some protection from harmful UV rays.

The next advancement in intraocular lenses was multifocal lenses to help with reading. The intraocular lens cannot change its shape in response to a near stimulus, but the multifocal lenses can produce clear near and distance vision simultaneously, similar to multifocal contact lenses. And just like multifocal contacts, these lenses are not meant for just anyone. There is a stringent selection criteria to make sure the patient will be compatible with the MF IOL.

Once cataracts are removed, they cannot develop again. However, the posterior capsule can develop an opacity that causes symptoms very similar to a cataract. A posterior capsule opacity (PCO) is easily treated with a YAG laser. The laser creates an opening in the capsule and is usually a one-time treatment.



<https://youtu.be/hcQahc4JCHQ>

ABOUT AL LENS



Al Lens is a Certified Ophthalmic Medical Technologist (COMT) who began his ophthalmic career in 1986. Al presents/instructs at numerous education events across North America, including conventions for Opticians, Optometric Assistants, Optometrists and Ophthalmic Medical Personnel. Al was also a keynote speaker at King Khaled Eye Specialist Hospital in Saudi Arabia.

Al Lens is an author/co-author of published optical books (SLACK, Inc.), including LASIK for Technicians, Optics, Retinoscopy and Refractometry (1st and 2nd editions), Ocular Anatomy & Physiology (1st and 2nd editions), and Cataracts and Glaucoma. Al is currently employed at three (3) ophthalmology clinics (general practice and Laser refractive surgery) and has developed training programs for large ophthalmology practices.

