

Keeping **Sight** Right

Cosmetically appealing eyes are good to have,
but optimum ocular function is really what's most important,
write **Mariel Chow**.



The eyes are one of the body's best qualities, with both men and women agreeing that they were an important factor when selecting a potential partner. While symmetry, eye colour and long lashes may be cosmetically appealing, what's the point of flawless beauty if ocular function is not at its best? Cataracts, glaucoma and poor eyesight are common, and at times, very serious conditions. Apart from causing unattractive outcomes such as cloudy eye colour or even the loss of an eyeball, cataracts and glaucoma will and can cause deficiencies such as blurred vision, blindness, bloodshot eyes and pain. Along with ocular diseases, shortsightedness could also be a nuisance as one has to constantly wear glasses or contact lenses which sometimes affect in visual aid maintenance, lost appliances and lens allergies.

Sight is one of the body's most important senses and treatment of ocular diseases is key to a healthy, happy and more functional lifestyle. In this article, we speak to Consultant Ophthalmologist and Oculoplastics Surgeon, Professor Dr. Chua Cheng Nen as he explains the many symptoms related to cataracts and glaucoma and their treatments. Later, Consultant Ophthalmologist, Dr. Jason Ngo Chek Tung chimes in to give us the down low on LASIK surgery and how everyone can have perfect vision for the rest of their lives with only one simple treatment.

CATARACTS

According to Prof Dr. Chua, a cataract is a condition which causes the clear lens to become opaque, preventing sufficient light rays from entering the eye, and thus causing blurred vision. This ocular condition mainly affects the elderly. Recent Malaysian studies have found that 80 percent of people over the age of 60 have some form of cataract. Although uncommon, cataracts can also be present among young patients. Risk factors for early cataracts include ocular injury, steroid use and diabetes. Congenital cataracts or cataracts among infants are also a rare possibility, affecting three or four out of 10,000 live births. Prof Dr. Chua explains, "Some of these congenital cataracts are inherited and some are caused by infections that occur during pregnancy."

Prof Dr. Chua says cataracts are the world's leading cause of blindness and he stresses that patients should visit an ophthalmologist as soon as they experience blurred vision. Other symptoms patients should look out for include frequent purchasing of spectacles due to increased shortsightedness, dull colours, poor vision in bright light, haloes around light, difficulty reading, watching TV or driving at night. "Once patients complain of these symptoms, the ophthalmologist will examine the eyes using a slit lamp to confirm the presence of cataracts," Prof Dr. Chua shares. He also adds that not all cataracts are visible to the naked eye, unless the condition is highly advanced. Furthermore, it's worth noting that ophthalmologists will additionally look for occurrences of other eye conditions such as glaucoma or macular degeneration as well.

Ophthalmologists will examine a patient's near and distant vision and look for any lens opacities with a slit lamp. Moreover, intraocular pressures will also be checked to exclude glaucoma. Lastly, pupils will be dilated using topical medications such as tropicamide so that retinas can be examined and abnormalities can be excluded. Prof Dr. Chua warns, "Patients may experience blurry vision for

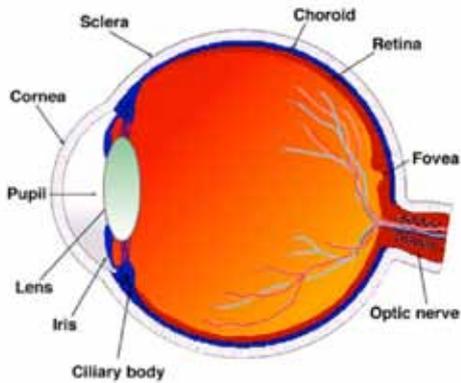


Diagram showing the location of the lens.

about two hours after pupil dilation and aren't advised to drive during this time.

He ascertains that symptoms related to age-related cataracts such as poor vision can be reduced through the use of spectacles, magnifying glasses or stronger lighting. He also suggests that studies are looking into eye drops that may even reverse the condition. Despite short-term measures and possible non-invasive methods, the only effective treatment is surgery. The eye specialist may use one of two methods for cataract removal. "The first method is called extracapsular cataract extraction and involves a longer surgical incision that's applicable when the cataract is too thick and cannot be broken into small pieces," Prof Dr. Chua explains. The second and more common surgical type is called phacoemulsification. It involves smaller incisions and fortunately effects in shorter recovery periods.



A man with a dense right cataract. Note the white pupil.



A newborn with dense cataracts in both eyes. Note the white pupils.

The extracapsular cataract extraction method involves a ten-millimetre incision made on the white of the eye, above the iris. The cataract is later removed in one piece through the surgical opening. Lastly, the anterior lens capsule is also removed in the process with the posterior lens left in place. The second and more common surgical type – phacoemulsification – is practiced in 90 percent of all cataract cases. Prof Dr. Chua says, "A small, narrow probe with an ultrasonic tip is inserted into the lens. The emitted waves will break the cataract into tiny pieces." Like the extracapsular cataract extraction method, the anterior lens is removed in the process and fragments are carefully extracted via a small suction device.



Pictures showing different types of cataracts.

Prof Dr. Chua points out that after the cataract is removed, the specialist will insert an artificial lens that will remain permanently in the eye. "The implant is inserted in the space between the iris and the posterior lens capsule and held in position by special loops that are part of the implant's design," he reveals.



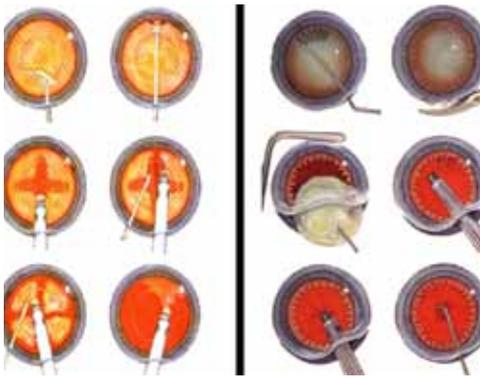
The top picture shows what a patient without cataract can see and the bottom picture shows how the same view appears to a patient with significant cataract. Things appear blurry, more yellowish and darker.



Consultant Ophthalmologist and Oculoplastics Surgeon, Professor Dr. Chua Cheng Nen.



Consultant Ophthalmologist, Dr. Jason Ngo Chek Tung.



The two different methods of cataract removal. The diagram on the left shows the steps of phacoemulsification and the diagram on the right the steps of extracapsular cataract.

Ocular operations require the use of tiny instruments and a microscope. Before surgery, eye drops will be applied to aid in pupil dilation and surgical facilitation. “If the patient is anxious, some sedatives may be given. Patients will experience zero discomfort as topical anaesthetic eye drops will be applied,” he declares. After the eye is cleansed and covered in linen, an instrument called the retractor is used to keep the eye open and prevent blinking. Additionally, pupil dilation leads to blurred vision and patients will not be able to see the instruments used to operate. Prof Dr. Chua cautions, “The treated region will remain covered until it is examined and patients are advised against wetting or having any type of foreign body in the eye.” Sensitivity to light is common so patients are encouraged to wear sunglasses over the next few days, especially if they go outside.

Cataract surgery is normally performed one eye at a time. Prof Dr. Chua asserts that this is due to risks of infection that although rare, can be very serious. Although this may be the norm, surgery on both eyes may be applicable for patients who have difficulty making two trips. These patients are commonly those with Down’s syndrome or who suffer psychiatric conditions. In cases like this, operations are normally performed under general anaesthesia.



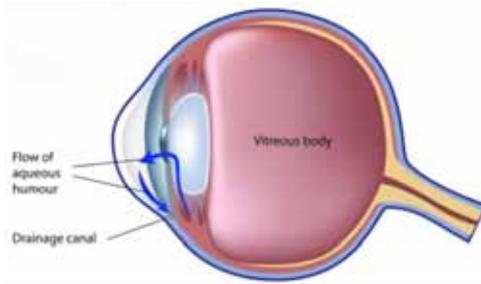
Showing a dense cataract before and after phacoemulsification. A lens has been implanted.



Steps of cataract surgery. a. The eye is anaesthetized with local anaesthetic; b. the eye is sterilized with iodine; c. the eye is draped with a plastic linen and the eye kept opened with a speculum; d. the cataract is removed using phacoemulsification; e. the drape is removed at the end of the operation and f. the eye is covered with shield.

GLAUCOMA

Glaucoma is a condition which affects the optic nerve. It is usually caused by build up of pressure within the eye. If left untreated, vision will progressively worsen. Visual loss is irreversible. The high intraocular pressure in glaucoma causes damage to the nerves that convey vision to the brain. When the nerves are damaged, they cannot regenerate and with time, vision will be lost when nerves are destroyed. Prof Dr. Chua states, “Glaucoma is usually caused by increased intraocular pressure. The eye produces a nourishing fluid called the aqueous humour and it circulates around the tissues of the inner eye and drains through an outflow channel called the trabecular meshwork.” Normal intraocular pressure is when there is balance between the amount of fluid present and the amount that’s drained away. If the meshwork within the eye is impaired, pressure begins to build up due to the collection of fluid.



In a normal eye, the fluid (in blue) produced by the eye leaves the eye through the drainage canal.

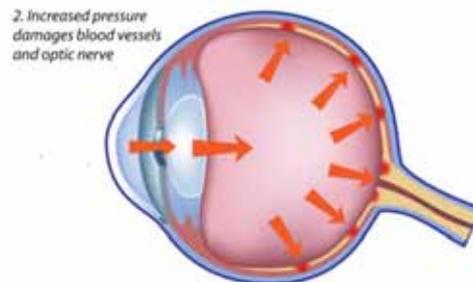
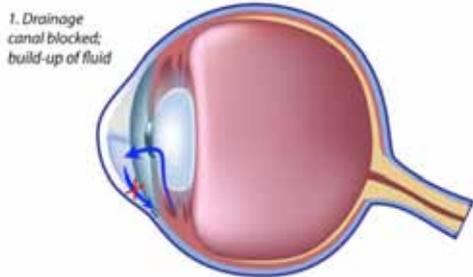


Diagram showing how glaucoma developed due to build up of eye pressure from poor fluid drainage.

Glaucoma can affect the eyes in two ways. Chronic glaucoma – which is more common – develops gradually and is often without signs or symptoms. According to Prof Dr. Chua, glaucoma is often called the thief of sight, as visual loss is unnoticeable during the condition's early stages. Acute glaucoma, on the other hand, is less common and occurs suddenly, with patients experiencing a sharp rise in eye pressure affecting in pain.

Prof Dr. Chua reports that although glaucoma commonly affects elderly patients, there are several risk factors that increase the chances of one suffering from the condition. He explains, "Family history can be a factor, if one's parents or siblings develop glaucoma, there are significant risks that one may develop it too. In such instances, it's essential that high risk patients undergo annual checkups as they may aid in early detection." Apart from family history and age, Prof Dr. Chua expounds that ethnic groups such as the Chinese may be more susceptible to glaucoma as well. Moreover, patients with diabetes or those who use certain medications such as steroids may also be at risk. Lastly, patients with long-sightedness may also have increased chances of acute glaucoma.



The upper picture shows what a patient with normal vision would see. The bottom shows how the same picture will appear to a patient with advanced glaucoma ie. constricted visual field.

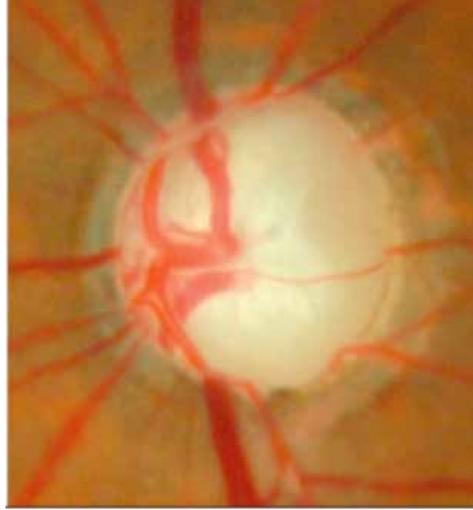
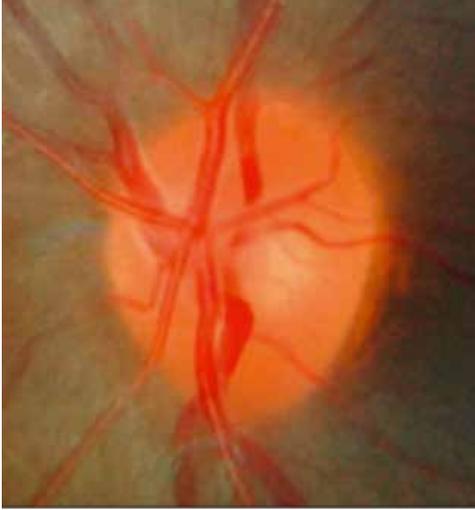
GLAUCOMA SYMPTOMS

As previously explained, it may take a long time before patients with chronic glaucoma experience any problems. "Effects are inconspicuous because glaucoma tends to damage the outer edge of the visual field and works slowly inward," Prof Dr. Chua shares. Patients may only notice problems after the disease begins to affect the central part of one's eye and vision. Treatment can prevent the impairment from becoming worse but unfortunately isn't able to reverse the damage. Conversely, acute glaucoma will usually bring patients straight to the clinic and to the attention of eye specialists early, as vision will become blurred and suddenly affect in painful, red eyes.

Chronic glaucoma is detected via three indications. First, there must be high intraocular pressure of more than 21mmHg. Next, loss of optic nerve can be examined in the back of the eye and finally, an abnormal visual field is done using a computer. On the other hand,



A painful and red eye in a patient with acute glaucoma.



The left picture shows a normal optic disc, the right an eye with advanced glaucoma showing loss of the nerve of the eye resulting in pale optic disc.

acute glaucoma can be detected via very high intraocular pressure of more than 40mmHg and closure of the angle at the front of the eye through which fluid drains.

Prof Dr. Chua confirms that treatment aims are to reduce pressure in the affected eye, either by fluid drainage or reduction of produced fluid. He clarifies, “The usual treatment for chronic open angle glaucoma is eye drops as it helps prevent damage to the optic nerve by controlling eye pressure.” The effectiveness of the drops will be monitored during regular glaucoma checkups, with some patients needing a combination of eye drops to help control the pressure. “It’s essential that patients do not stop the eye drops without instructions from the eye specialist. Patients are required to continue using the drops for life,” Prof Dr. Chua emphasises.

Although the majority of chronic glaucoma cases can be controlled non-invasively, patients whose pressure cannot be controlled may be recommended laser treatment to the angle of the eye in which fluid drains. Prof Dr. Chua further adds that should both eye drops and laser treatment fail, specialists will recommend glaucoma surgery or trabeculectomy. He says, “Trabeculectomy is a procedure where a hole is created at the top part of the eye to allow fluid to better drain, and thus reduce pressure.” Unlike patients with chronic glaucoma, those with acute glaucoma will undergo a special laser procedure to create a hole in the iris to aid in correct fluid drainage.



Checking the intraocular pressure using a tonometer.



A patient undergoes visual field test.

HOW TRABECULETOMY IS CARRIED OUT

Trabeculectomy involves the creation of a new channel in the white wall of the sclera through which fluid flows out into a space underneath the conjunctiva. “A successful trabeculectomy is the creation of something called a ‘bleb’ or a small elevation which is usually covered by the upper eyelid,” says Prof Dr. Chua. The surgery is usually done in an outpatient setting under local anaesthesia. The local anaesthetic is injected beside the eye, which makes the eye both numb and blurred. Later, a paper drape is placed over the patient’s face and a clip keeps the eye open. Prof Dr. Chua suggests that although



The picture on the left shows the glaucoma surgery in which a new channel is created for the fluid to flow out. The right picture shows an eye which has had a successful glaucoma surgery with a bleb on the top of the eye.

the patients may be able to grasp light and shadow, they won't be able to see the surgery carried out. During the procedure, additional medication may be used to prevent scarring as it may affect in poor drainage. The surgery takes about twenty minutes to half an hour to complete and upon completion; a patch is taped over the eye, which won't be removed until the next day. "Frequent follow-ups over the next few weeks is required and all surgical patients will need to be reviewed a day after surgery," Prof Dr. Chua maintains. He adds that if all is well a day after surgery, patients can return for a review a week later and once more a week to three weeks later. The amount of follow-ups will depend on how well the eye is settling. Frequent visits are most times required.

LASIK SURGERY WITH DR. JASON NGO

LASIK or Laser-Assisted In-situ Keratomileusis is a procedure, which corrects refractive errors by reshaping a patient's corneas. According to Dr. Jason, candidates who are eligible should be 18 or older, with healthy and stable eyes and sufficient cornea thickness. He explains, "LASIK removes the need for vision correction aids such as spectacles or contact lenses." Dr. Jason also adds that apart from improved facial aesthetics, eradication of contact lenses or glasses can remove the need for vision aid maintenance and lens intolerance.

First and foremost, the femtosecond laser is applied to the patient's cornea to create a flap. After the flap is created and gently lifted, the excimer laser is used to reshape the cornea. "After the cornea is reshaped, the flap will be placed in its original position and will naturally reattach on its own within a few days, without the need for suturing," he says.

Before the advent of LASIK surgery, ophthalmologists carried out the procedure manually with nothing more than the surgeon's skill and a blade. Dr. Jason shares, "The main difference between the manual and bladeless method is that flap creation is more consistent and precise in thickness". He goes on to state that choosing the appropriate surgical type is especially important among patients with flat and steep corneas. "Manual procedures aren't appropriate among patients with flat and deep corneas as it may respectively cause buttonhole or loose flaps," he warns. To provide better surgical outcomes, Dr. Jason reports that he sticks to bladeless procedures as chances of complications are drastically reduced.

WHAT CAN PATIENTS EXPECT?

LASIK surgery will take about 20 minutes for both eyes and patients will feel comfortable throughout the procedure, as processes are absolutely painless. Dr. Jason asserts, "There is no pain or itching immediately after surgery, but there may be chances of mild discomfort similar to onion chopping exposure." Although this may be, discomfort should last no more than a day. Along with that, some patients



may also experience mild sensitivity to light at night and experience halos or glares. Like the discomfort, light sensitivity will also diminish and patients can expect glare-free vision after the first postoperative week.

Patients will also be prescribed eye shields or patches that should be worn at night. This is to avoid eye rubbing during sleep. Furthermore, Dr. Jason also advises patients with young children to be cautious of accidental eye hitting as well. Other things to steer clear of are eye makeup and eye cream. He also advises, "Patients should avoid getting any water, sweat, dust or smoke in their eyes and hence circumvent activities such as swimming, saunas or facial treatments for at least a month."

Dr. Jason reveals that patients will see quite well immediately after the procedure but can expect perfect vision after a month. The results of LASIK surgery normally lasts a lifetime unless patients develop other ocular diseases such as cataracts later in life.

Although LASIK surgery may be the commonest form of correction, technological advancements have gone far and beyond to provide patients with additional options that are safer and more efficacious. In short, surgical intervention to correct shortsightedness can be viewed as First generation (the manual method that utilises a blade to create a corneal flap), Second generation (LASIK employs laser technology to create a flap. It's very precise and effects in fast recovery periods), and the Third generation. Called the SMILE procedure, it doesn't require a flap and is done via minimally invasive methods (keyhole surgery) and hence, is very safe. Dr. Jason reveals, "This technique utilises a femtosecond laser, which cuts a lenticule within the corneal stroma. The same laser is used to cut a small incision (about one fifth the size of a standard LASIK flap) along the periphery of the lenticule. Later, the surgeon uses a specially designed instrument to separate and remove the lenticule, leaving the anterior lamellae of the cornea intact. Unlike standard LASIK surgery, there is no need for the excimer laser.