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New procedure restores sight of acid burn victim

A revolutionary procedure performed for the first time in Singapore is giving patients with severe, complex cornea diseases the gift of sight. -AsiaOne

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Sophia (not her real name), a 41-year-old clerk, was returning to her home in Malaysia when a robbery attempt destroyed her eyesight in 2008.

The bespectacled mother of four was mere metres away from her house when she heard a sound behind her and instinctively turned around. She was splashed in the face with acid which ate through her glasses and entered her eyes, severely damaging her cornea and effectively blinding her. Her unknown assailant, who is still at large, grabbed her handbag and took off.

Despite the searing pain, Sophia managed to grope her way back to her house. Her horrified father carried her to a nearby clinic, where doctors tried their best to wash the acid off her. She was then transferred to Singapore's Mount Elizabeth Hospital, where doctors tried to fix the damage to her skin and her throat.

Sophia could barely see out of her right eye, while the cornea of her left eye was so scarred that she was blind in that eye. The extent of her eye injury meant that a conventional cornea transplant would have failed within a year, leaving her sightless once more.

After many consultations with different eye doctors, she was referred to eye surgeon Dr Leonard Ang, medical director of The Eye and Cornea Transplant Centre at Paragon Medical Centre.

Acid attack victims may suffer:

- Tissue death
- Permanent scarring of face and body
- Disfigurement
- Blindness
- Loss of speech (if acid burns through the throat)
- Psychological trauma
- In severe cases, death

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Restoring sight to the sightless

To restore Sophia's vision in her left eye, Dr Ang performed a new type of artificial cornea transplant operation called Boston keratoprosthesis, also known as Boston K-Pro. Dr Ang, who was trained by the inventor of the procedure Professor Claes Dohlman at Harvard Medical School, is the only eye surgeon in Singapore and the first in South East Asia to perform this highly complex procedure.

The Boston K-Pro operation takes at least two hours to complete. It removes the damaged cornea from a patient's eye and replaces it with an artificial cornea comprising a front plate, a back plate and a cornea graft held together by a titanium locking ring (see slideshow below). In Sophia's case, Dr Ang also had to reconstruct the entire eye surface due to the damage from the chemical burns, thus rendering the operation four hours long.

Unlike a conventional cornea transplant, the Boston K-Pro procedure eliminates the problem of graft rejection and failure. This means the patient can attain good vision without having to take immunosuppressant drugs, as would have been the case if he had received a conventional transplant. Immunosuppressants, which have to be taken for the rest of a patient's life, can cause many side effects such as extreme fatigue, headaches and damage to one's liver and kidneys.

Moreover, repeated conventional cornea transplants have an extremely high failure rate – over 90 per cent of third-time grafts fail within three years. In contrast, the Boston K-Pro has been shown to have a 100 per cent

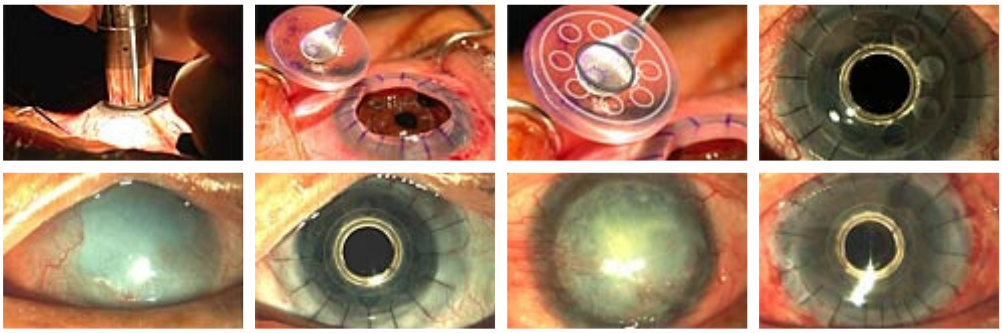
retention rate at three years. This means that patients who undergo the Boston K-Pro procedure can look forward to having good long-term vision. Visual recovery for this new procedure is also much faster than conventional corneal transplants, and vision is much clearer.

In Sophia's case, she was able to achieve almost perfect vision (6/7.5) in her damaged left eye within two months of the operation. Four months after the procedure, the 44-year-old mother of four is able to see clearly through her formerly sightless left eye. "I could only make out light in the past, but I could not see shapes or figures. Now I can see you," she told this reporter in Mandarin.

Her restored sight has allowed her to regain some measure of independence, as she is now able to move on her own without help. While she requires eye drops several times a day, she does not have to take oral medication for her eyes.

How the Boston K-Pro transplant is carried out

Warning: The following images may be disturbing to some readers. Reader discretion advised.
Click on thumbnail to view. Story continues after photos.
(Photos: Singapore Medical Group)



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Looking forward

Tears welled up in Sophia's eyes when she talked about her horrific experience. To this day, she does not know who attacked her, or why. Was it a petty robbery, or was it a personal attack? She may never know.

"I try not to talk about it, because it makes me cry," she said in Mandarin. "However, I want people to know that there is a cure for this type of blindness, so they can get help."

While Sophia has regained her sight, she still suffers from the injuries left behind by the acid attack. The skin on her face, throat and arms remain deeply scarred, and she needs further surgery to repair her nose which she keeps covered with a surgical mask.

Yet, she does not harbour any resentment against her assailant, having found solace in religion. Instead, she expresses gratitude to the doctors who took care of her, as well her supportive family.

Recalling how she broke down when she received the first hospital bill of over $100,000, Sophia described her husband's reaction: "He said, 'Do not worry about the bills. I will take care of them. Just concentrate on getting well.'"

'I want people to know that there is a cure for this type of blindness.'

Sophia hopes that the relevant authorities can take action to prevent further acid attack cases. No official statistics are available, but it is estimated that there are hundreds of such attacks every year in her country.

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Other cases

Grace (not her real name) had been severely injured in an acid attack in her native China when she was a teenager. Seven years after the attack, parts of her face still look as though they had been melted away, while one corner of her mouth droops slightly. Now in her early twenties, the petite young woman had also been blinded by the acid which completely destroyed her right eye and damaged her left.

After three failed cornea transplants in her left eye, Grace underwent the Boston K-Pro procedure by Dr Ang last month. Barely three weeks after the surgery, she has regained 6/12 vision in her left eye. "I'm very happy because I've not been able to see so clearly [since the attack]," she said in Mandarin. "I no longer need to take [immunosuppresant] medication anymore," she added, saying that the medication made her very tired and required changes to her diet.

54-year-old Mr Ko from Indonesia also benefitted from the Boston K-Pro procedure after he became blind from cornea damage. The grandfather of five had a failed cornea transplant in early 2008, and was unable to function independently. Last month, he underwent the Boston K-Pro procedure by Dr Ang on his left eye and attained near perfect vision (6/7.5). He is now keen to have the procedure performed on his right eye. "Previously, I needed people to help me cross the road. Now, I can help others cross the road," he said in Bahasa Indonesian.

To date, Dr Ang has performed the Boston K-Pro procedure on eight patients, all with excellent results. Most patients were able to achieve 6/12 or better eyesight within weeks of the procedure. More importantly, they were all able to resume normal daily activities and experienced significant improvements to their quality of life.

Dr Leonard Ang is one of the few surgeons in the world to be trained in the Boston K-Pro procedure.

Dr Ang said that there could be thousands of patients in Singapore who suffer from complex cornea diseases that can be treated by the Boston K-Pro procedure, which is still not very well-known, even among the medical community. To date, only about 100 Boston K-Pro procedures have been performed in Asia, and Dr Ang is the only surgeon in Singapore and one of the few surgeons in the world to be trained in this operation.

Although the procedure was first invented in 1992, there have been many improvements to it since then to make it safer. Dr Ang himself has made modifications to the procedure so that it works better for Asian eyes. In its new, improved form, the Boston K-Pro gives provides hope for patients suffering from complex cornea diseases which will not respond well to conventional treatments.

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