

Technology



Lose no sleep over vision thief

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GLAUCOMA, AN EYE disease that destroys the optic nerve, comes by stealth. There may be no early symptoms and the ones afflicted do not notice that their peripheral vision is diminishing.

The disease affects mainly the elderly but it can strike at any age, depending on an individual's risk factors such as nearsightedness, previous eye injuries, steroid use, cardiovascular disorders, diabetes and migraine headaches.

If untreated, glaucoma results in blindness.

Ophthalmologists examine our eyes for any elevated pressure but the vision thief is known to hide at daytime.

Studies have shown that eye pressure is markedly higher during the night as we sleep, rather than during the day.

To catch the disease early, it is advisable to have your eye pressure checked at night, but an overnight stay in the hospital could be expensive

and is not casually recommended during routine examination.

The personal cost of vision loss to the patient, the human cost to his family and the financial cost to the community to support patients with weakened vision is expected to increase dramatically as the global population ages.

Doctors need better tools to detect the increased eye pressure, the primary indicator of vision loss.

Advances in engineering can definitely help.

Ideally, a sensor measures the pressure continuously, but the instruments and methodologies available are suited when eyes are open. The eyelids cover the eyes during sleep – just when the vision theft can be most easily detected.

To measure eye pressure, one of the best approaches is to turn a thin and soft sensor into a contact lens so that the patient can wear it overnight.

The concept is simple, but difficult to apply



in reality since most sensors need power from a battery, and a brain made from hard silicon.

Advances in radio-frequency wireless technology have allowed the elimination of the battery from the sensor, but the hard silicon brain has remained until recently.

Using patented technology developed at the Hong Kong University of Science and Technology, a team of investigators was able to eliminate the hard silicon from the smart contact lens sensor and make it soft.

Together with a flesh-colored soft annular patch

around the eye, the pressure can be measured during sleep by having the patient wear the smart contact lens before going to bed.

Unlike today's method, which necessitates expensive hospital stay, and with the patient awakened to sit upright for a conventional eye pressure test, the patient can now sleep at home and data will be automatically collected by the smart soft contact lens.

The new method would allow the doctor to catch the thief in progress. With this new tool, the doctor can monitor treatment and reduce unwanted side effects by customizing drug dosage with precision.

Advances in engineering have indeed brought new diagnostic and monitoring tools to help doctors detect and manage glaucomatous vision theft.

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