EUREKA NETWORK PROJECT

9181 EYEINJECT

DOCTOR WITH A VISION

A Czech eye surgeon is the man behind an invention to save patients pain from eye surgery. The product could be on the market soon thanks to his Czech and Slovak industrial partners on EUREKA project EYEINJECT.

The prospect of being able to see clearly without glasses or contact lenses is a magical one when you've been short sighted most of your life. Less magical is the discomfort some patients experience when recovering after a laser eye operation like LASEK where surgeons use a laser on the surface of the cornea to reshape it. Stinging eyes can stream in the hours after the surgery and patients can't overuse the anaesthetic drops developed because they slow down the healing process.

"'Why can't we get rid of that pain with the technology we have now?'" eye surgeon Pavel Stodulka asked himself. That simple question inspired research that could revolutionise the administration of painkillers in eye surgery. Stodulka's firm Gemini Eye Clinic, which has 10 clinics in the Czech Republic and one in Vienna, began EUREKA project EYEINJECT.

After 25 years as a surgeon, Stodulka had heard first-hand from countless patients who undergo laser surgery Lasek. Despite technological advances over the last two decades surgeons often recommend the newer Lasik operation for patients where healing is quicker and recovery less painful. But Lasek still has advantages and is often recommended to patients with thinner corneas that would be left too fragile by the Lasik operation.

Stodulka's idea was simple - to inject a painkilling solution straight into the cornea – but implementing it would be challenging. "The needle needed to be really thin and delicate and the injection needed to be precise because otherwise there was a high risk of penetrating the eye," explains Stodulka.

Tiny needles

He approached a director he knew at Tajmac ZPS, a machine manufacturer in his home city Zlin, who agreed to help, and the two companies decided they needed to bring on board a specialist in super-thin tubes. After an internet search they found Slovakia-based Precision Tubes Europe.

While the eye surgeons at Gemini defined the concept, the engineers at the industrial partners worked out how to implement it. The partners decided to develop a device that could inject 6 to 8 needles with a diameter of just 0.15mm diameter into the cornea, disposable needles to be used once only.

> ***'This is a real game changer for patients undergoing laser vision***

Not all the models they developed were successful. One injected the needles into the cornea but didn't retract the needles properly afterwards; another distributed the painkilling liquid unevenly. The successful prototype they picked not only did the job, but also uses a cube system for even injection that is suitable for mass production.

"This is a real game changer for patients undergoing laser vision correction", says Stodulka, saying the product has been successfully tested on pig eyes. The device could make Lasek much more popular and also has other applications. It could be used to administer antibiotics in the case of corneal infections and for corneal cross-linking – a procedure to treat a condition called keratoconus where the cornea thins out and weakens. In current cross-linking procedures, yellow vitamin drops called riboflavin are put into the cornea and surgeons have to wait 30 minutes for it to become effective. If injected into the cornea, there would be almost no need to wait.

Stodulka, who also works in the ophthalmology faculty at Prague University, says fellow eye surgeons are excited by the breakthrough. At a recent Chicago conference, the American Academy of Ophthalmology, some asked him when the product would be available.

He is optimistic that commercialisation could come soon. This isn't the first product Stodulka has helped invent. He won the 2016 first prize in the category of innovation at the European Society of Cataract and Refractive Surgeons congress after developing and carrying out clinical tests of the new laser for cataract surgery CAPSULaser with a Californian start-up. "We can get this one onto the market too," he smiles.

MAIN PARTNER

Gemini Eye Clinic, Czech Republic
Website: www.gemini.cz
Contact: Richard Pospisil
Email: pospisil@gemini.cz

OTHER PARTNERS

Tajmac ZPS, Czech Republic
Precision Tubes Europe, Slovakia
Augenlaser Praxis Dr. Pavel Stodulka, Austria

TOTAL R&D INVESTMENT

€ 0.4 million

DURATION

September 2015 to December 2017

COUNTRIES AND NATIONAL FUNDING BODIES INVOLVED

Ministry of Education, Youth and Sports
Ministry of Education, Science, Research and Sport (MINDEU)
FFG – Austrian Research Promotion Agency

EUREKA is a European network for market-oriented R&D.

www.eurekanetwork.org