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Safer bone surgery thanks to a drill bit that protects soft tissue

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Surgical drills, commonly used in the surgery of the head, spine, extremities and in dental operations, may damage the soft tissue near the bone. It is estimated that complications associated with surgical drills cause costs amounting to more than EUR 4 billion every year and, in the worst cases, can lead to the patient's death.

Visa Sippola, who worked as a researcher at the Department of Neurosurgery at HUS, had an idea for a new type of drill bit. It would contain a mechanism to protect the soft tissue and could be installed in existing surgical drill systems.

The idea of safer bone surgery convinced the surgeons, the team and Tekes, the Finnish Funding Agency for Innovation, which granted funding aimed at the commercialisation of the idea. Now, a year and a half later, in September 2017, the respected technology publication MIT Technology Review has selected Sippola as one the 35 most promising young innovators in Europe. There were more than 1 100 candidates for the list.

The jury described the invention as an incredible innovation that will facilitate surgical procedures and reduce risks related to them. The tool is elegant in its simplicity, the judges said.

"This is a big recognition for the entire team! We want to make bone surgery safer to patients across the world. At the moment we are in the product development stage and our aim is to make the product available

to Finnish patients approximately in 2019. Our plan is to then expand to Europe and to the rest of the world," Visa Sippola says. He is the CEO of a start-up called Surgify, which develops the drill bit and has already received its first private investments.

Surgeons, and experts in machine design

However, without a successful phone call, the story of Surgify could have remained in a desk drawer. Having had the idea, Sippola called Petri Kuosmanen, Professor of Machine Design at Aalto University, who partnered him with Shahab Haer, an engineering student, and Juho Carpén, who was studying Industrial Engineering and Management. The team is supported by a steering group consisting of big names: Professor of Neurosurgery Juha Hernesniemi, HUS's Head of Neurosurgery Mika Niemelä, Chief Physician, Professor of Orthopaedics and Traumatology Jari Salo and other experts of the field. Thanks to the funding granted by Tekes in 2016, the development work started speedily and the method was patented at Aalto in the same year.

The Surgify team has an ambitious timetable for the commercialisation of their product as only 100 per cent reliability is good enough in the development of medical technology.

"Nevertheless, less invasive bone surgery is a major opportunity: it can reduce human suffering as well as generate considerable time and cost savings. According to Juha Hernesniemi, this is a real breakthrough," Sippola says.

Provided by Aalto University