Augmented reality is the future of surgery

Physicians have been performing surgery with the assistance of x-ray technology for almost half a century. While this technology has been progressing steadily, its limitations continue to be a major challenge. Thus, many professionals agree: it’s time for our method to be changed.

At MEDICA 2017, Taiwan Main Orthopaedics Biotechnology introduced the worldwide first smart surgical glasses. While this first generation featured augmented reality (AR) and a navigation system, this year the company will present a completely new model for spinal surgery.

Today, radiation exposure is inevitable as orthopaedic surgery requires a C-arm or another form of X-ray technology. The high level of toxic radiation associated with the equipment can affect patient, surgeon and medical team alike and cause side effects ranging from soft tissue and skin burns to cancer.
Taiwan Main Orthopaedics Biotechnology’s new smart surgical glasses are equipped with 3D X-ray vision and AR assistance. The glasses dramatically reduce the necessity to take x-ray images during operations. On average, approximately 150 x-ray scans are acquired in an OR session, with this new technology just about 20 x-ray scans need to be generated. The most important feature of the smart glasses is AR technology which helps the surgeon to see through the patient’s body and understand the skeleton structure where the surgery will be performed.

Features of smart surgical glasses “Foresee-X”:

- FDA approved at the end of 2017
- Equipped with AR technology
- Improves efficiency by allowing the surgeon to focus on the region of interest instead of computer screens and monitors
- Reduces radiation exposure by reducing the necessity to take x-ray scans during operations
- Enhances accuracy by monitoring every movement of surgical tools, such as puncture needle, trocar, etc.
- Allows doctors to screen surgical procedures through smart tablets and collects data for academic purposes
- Equipped with image enhancement procedure, able to zoom in and out.

New model

“Surgeons need this advanced technology, especially during complicated interventions such as spinal surgery”

Min-Liang Wang

In July 2018, Dr Min-Liang Wang, inventor and CEO of Taiwan Main Orthopaedics Co., Ltd., introduced the smart surgical glasses befittingly named Caduceus, using revolutionary technology which combines mixed reality with surgical navigation. Caduceus allows the surgeon to see through a patient's body and visualize a 3D model of the patient anatomy. The surgeon can see the exact position of the needle insertion without ever taking the eyes off the patient to look at any other instrumentation.
"These glasses can be thought of as X-ray glasses," said Dr Wang, who is Assistant Professor at the School of Electrical and Computing Engineering at Taiwan's National Chung Cheng University. Wearing the glasses during his presentation, he explained why the response to his invention has been so overwhelming: "This technology responds to a real clinical need. Surgeons need this advanced technology, especially during complicated interventions such as spinal surgery. Caduceus cuts surgery time as well as radiation exposure, which benefits the patients and the physicians." According to Dr Wang, Caduceus surgical smart glasses will be available as of January of 2019.

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