



# Augmented reality is no game

Head/neck surgery becomes ultra-precise.

**IMAGINE BEING ABLE TO SEE A PATIENT'S ANATOMY BEFORE MAKING THE FIRST SURGICAL CUT.**

Such previews already are possible for head and neck surgeons thanks to the union of Brainlab's Mixed Reality Viewer software and Magic Leap's headset hardware.

Originating in the gaming industry, this mixed reality

(MR) technology takes medical images from CT and MRI scans and combines them, says Linda Westernhagen, Ph.D., Brainlab's MR product and marketing manager. That creates hyper-realistic

3-D images and models of the inner and

outer anatomy of a patient's head and neck.

Craniofacial surgeons then can visualize and rehearse their moves in advance of surgery, which aids them before they perform complex choreography deep within the cramped quarters of the skull and neck.

With such practice comes the likelihood of less harm to surrounding nerves, blood vessels and soft tissue—vital to head and neck surgery.

"If a person's face becomes disfigured, their psychological health also can be impaired," says Anthony Morlandt, M.D., DDS, endowed professor of oral and maxillofacial surgery and head and neck oncology fellowship program director at The University of Alabama at Birmingham. He also directs UAB's head and neck oncology fellowship program.

"We also want to minimize treatment-related impact on patients' ability to speak, chew and swallow, which

are key quality-of-life concerns in patients with head and neck cancers," he says.

Morlandt says he's found using the viewer in advance has shortened the length of anesthesia in many cases. "We put that time in before surgery, which is better for reducing anesthesia-related medical complications," he says.

Medical professionals also use MR to teach and train up to six new clinicians at a time and to provide patients with a closer look at their diagnosis and treatment.

"Mixed Reality Viewers are not new in medicine; however, this application in craniomaxillofacial surgery, which is a nuanced field, stands to improve patient care globally for the future," Morlandt says. "It's an exciting time."

## The origins

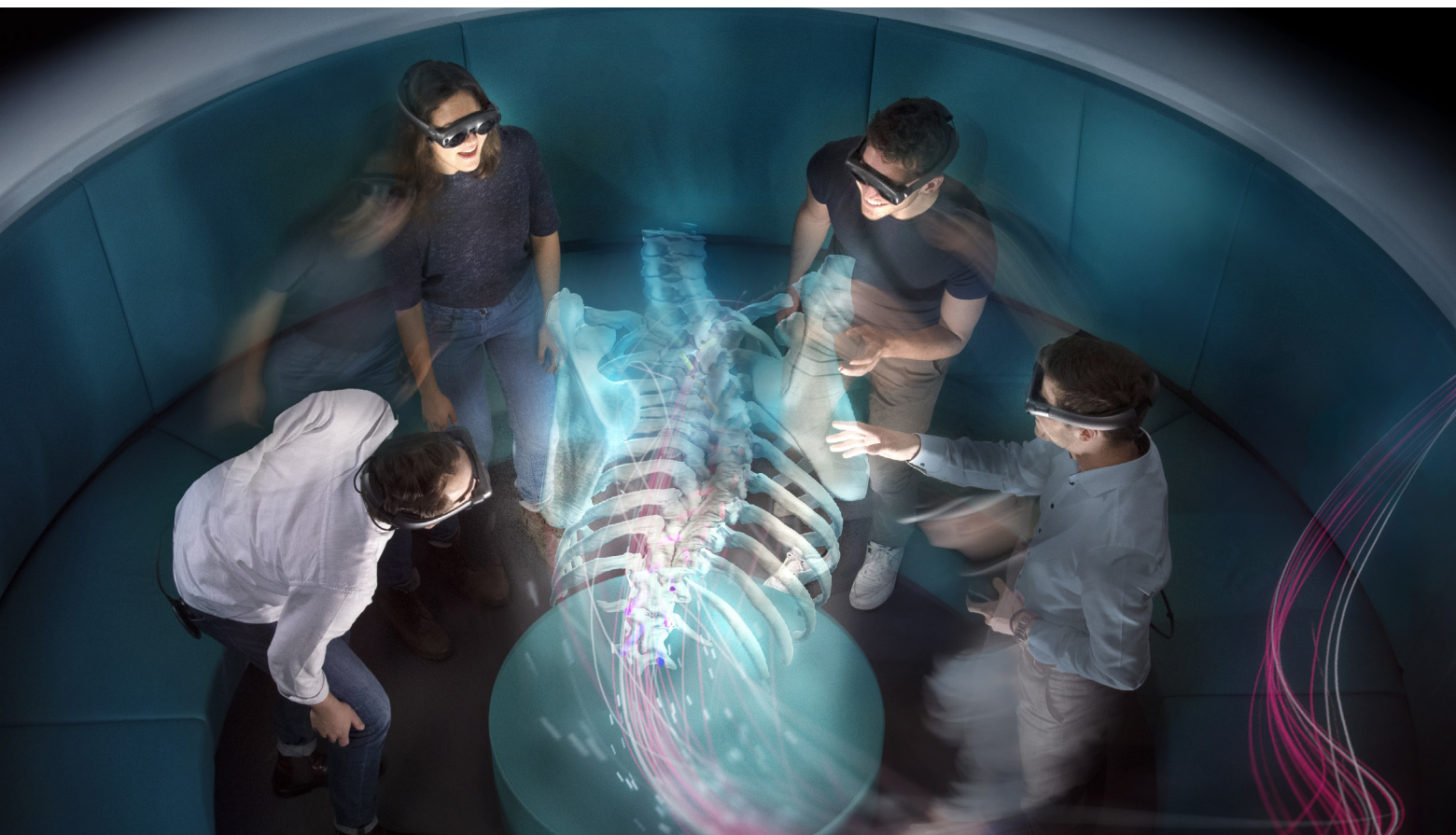
If the head-mounted displays look like those used by virtual reality gamers, that's because their origins began in that world—long before health tech firm Brainlab partnered with Magic Leap in 2018. Brainlab also envisioned a greater purpose when it acquired Level Ex, a Chicago-based firm, about a year later.

"Level Ex is unrivaled in its level of ergonomic user interaction and gaming-industry quality 3-D graphics," says Stefan Vilsmeier, president, CEO and founder of Brainlab, headquartered in Munich, Germany.

The heads of Brainlab and Magic Leap were on the



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same track decades earlier—and on different continents.

Vilsmeier launched his firm in 1989 out of his parents' home in Germany, using his earnings from a book he wrote at age 16 on 3-D gaming graphics. Meanwhile, Magic Leap's Florida-based comic book maker and inventor, Rony Abovitz, had patented a concept akin to the MR viewer in 2005, even before he made his first fortune as president, CEO and founder of robotic arms-maker MAKO Surgical Corp.

The medical field was slower to adopt the concept. "Since the Brainlab/Magic Leap MR viewer came from the gaming industry, health care was suspicious at first," Westernhagen says. "But once doctors try the device, they become converts."

Adopters have grown to include 80 sites in Europe and Japan and 18 in the U.S., Westernhagen says.

Though the U.S. Food and Drug Administration approved MR Viewer with Magic Leap in 2020, it already is being updated. The MR Viewer with Magic Leap 2 is expected to gain FDA approval by the end of 2023.

Magic Leap 2 will have lighter-weight goggles with a much larger field of view better suited for all uses. In the future, each physician's goggles also will be programmed with their optical prescription, proving that the foresight of Vilsmeier and Abovitz is 20/20.

## The future

Other companies have versions of augmented reality for neurosurgeons

and orthopedic surgeons. Brainlab and Magic Leap are collaborating on a version tailored to spine surgery.

Westernhagen says today's future doctors already are accustomed to visualizing in 3-D and memorize much better in 3-D versus a flat screen.

"The next step will be to take MR Viewers into the operating room," Westernhagen says. "That's the future." •

**MICHELE MEYER** is a Texas-based health and profile writer for 12 hospitals, five medical journals, five universities and Engineering Inc.

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