

An in-depth operation

3D: coming soon, to an operating theatre near you.

IN "AVATAR", a film that has enjoyed a certain modest success at the box office recently, 3D technology brought blue-skinned extraterrestrials to life. On June 10th, a similar innovation helped improve life on Earth when Iain Jourdan, a surgeon at the Royal Surrey County Hospital, in Guildford, England, donned polarising glasses to perform the first-ever laparoscopic surgery assisted by three-dimensional imaging.



Do Na'vi actually have gall bladders?

The procedure he performed, a routine gall-bladder removal, is typically done by incising a slit in the patient's navel, through which a tiny camera is inserted. Guided by the resulting video feed, the surgeon wields long-handled tools to excavate the gall bladder from its neighbouring organs before removing it through the slit. Until now, however, that video has been in two dimensions. Anyone who has tried threading a needle with one eye shut will understand that this is not ideal.

Past attempts to design a 3D display for use in the operating theatre have not worked. One prototype, a stereoscopic helmet worn by the surgeon, left users seasick after only a few minutes. The new system, manufactured by Solid-Look, a firm based in New York, abandons such missteps in favour of technology originally developed for the entertainment industry: 3D glasses and a specially modified television screen.

During the surgery, a camera sends back two live video feeds taken from slightly different angles, as it surveys the abdominal cavity from within. The signals are polarised in opposite directions, and the resulting images displayed as alternating rows of pixels on a high-definition television screen. The polarising lenses of the glasses filter these images, meaning each eye sees only one of them. The brain then adds them together as if they were natural, to create the impression of depth, as well as width and height.

The resulting vista of receding cavities and organic bulges allows for more accurate cutting and stitching. The first gall bladder removed by Mr Jourdan using the new system was extracted in 30 minutes, less than the normal average.

3D thus looks as though it could be poised for a dramatic future. And with the laparoscopic-device market valued at more than \$5 billion a year, the new technology could soon be a medical, as well as cinematic, blockbuster.

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