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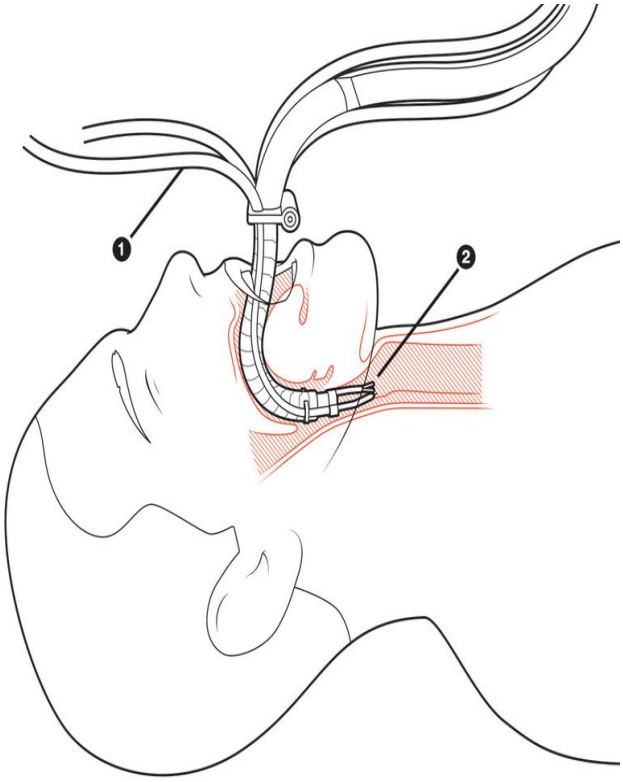
The Robot Surgeon of Your Nightmares Can Wiggle Its Way Inside You

The Flex Robotic System has a 3D high-definition camera and bends to conform to a patient's anatomy.

Michael Belfiore



1. A surgeon inserts the robot into a patient's mouth and maneuvers it into place using a joysticklike controller. 2. The surgeon uses hand controls to manipulate lasers, graspers, and other instruments attached

Form and function

The Flex Robotic System is equipped with a high-definition camera and can bend to conform to a patient's anatomy, allowing a surgeon to guide instruments through the patient's body.

Innovator: Howie Choset
Age: 47
Professor at Carnegie Mellon University's Robotics Institute and co-founder of Medrobotics in Raynham, Mass.

Setup

A surgeon inserts the robot into a patient's mouth and maneuvers it into place using a joystick-like controller.

Operation

The surgeon uses hand controls to manipulate lasers, graspers, and other instruments attached to the robot, guiding them through the tubing to where they're needed.

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Photograph: Courtesy Medrobotics

Origin

Choset conceived of Flex in 2004 and developed the first prototypes with Marco Zenati, then a surgery professor at the University of Pittsburgh, and CMU postdoc Alon Wolf. The three co-founded Medrobotics in 2005.

Funding

Medrobotics Chief Executive Officer Samuel Straface says the company has raised more than $130 million, mostly from anonymous private investors.

Market

The robot is intended to extend surgical options to a wider range of patients. It can, for example, remove otherwise inoperable tumors and reduce the need for radiation

Rival

Flex's chief competitor is Intuitive Surgical's da Vinci robot. That machine's inflexible instruments restrict surgeons to line-of-sight procedures. It costs $1.9 million to $2.3 million, vs. $980,000 for Flex.

Next Steps

Regulators in the U.S., Europe, and Australia have cleared Flex for procedures entering the mouth, and a Medrobotics spokesman says the company applied for clearance for colorectal procedures on Aug. 19. David Goldenberg, surgery professor at the Penn State Cancer Institute, says Flex overcomes the shortcomings of linear surgical robots. With Flex, he says, "we can now treat disease in a minimally invasive fashion more effectively."
