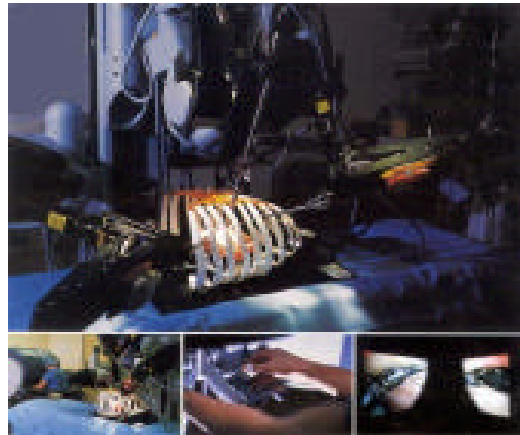


Surgical Robots
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In the past decade, robots have presented a new approach to surgery. They offer many advantages versus normal surgery. They allow for a less-invasive procedure with a minimal recovery time period. Robots, requiring only 3 pencil-sized incisions, have several advantages over human beings, this includes greater spatial accuracy, precision, and reliability. Unfortunately, this technology does not come without obstacles. Concerning telesurgery, even a time delay of more than 200 milliseconds could mean the difference between a patient's life and death. Of course, the most important factor in implementing robots in a surgery is the cost---each one costs approximately \$1 million dollars each. Another obstacle crucial to the survival of this new technology in the United States, is the Food and Drug Administration (FDA). The FDA has many reservations about the use of robot technology in surgery, particularly because these machines are dependent on their preprogrammed software.

Even with all of its drawbacks, surgical robots have made a significant contribution. *Computer Motion's* "Aesop endoscope positioner" has performed in more than 70,000 procedures since 1994. *Intuitive Surgical's* "da Vinci" surgical station has a slightly longer history, having been in use since 1996 for valve replacements as well as bypass procedures. In Ontario, Canada, the London Health Sciences Center (LHSC) predicts that its robot-assisted cardiac surgeries will increase from 5 percent in 1999 to 30 percent of a planned caseload

of 1,700 patients in 2005. LHSC has done much work in this field, including the first robotics-assisted, closed-chest bypass on a beating heart and the first closed-chest, beating-heart, cardiac hybrid revascularization procedure, in 1999.



Surgical robots has also inspired another medical breakthrough. Telesurgery, a long-distance operation with a doctor supervising a robot, has created another surgical option. On September 7, 2001, a 68-year-old woman in Strasbourg, France, had her gall bladder removed by surgeons operating via computer from New York, nearly 4,000 miles away. A high-speed fiber-optic service deployed by France Telecom made the connection between New York and Strasbourg with a time delay of less than 200 milliseconds. Two surgeons controlled the advanced robotic surgical system, designed by Computer Motion Inc. This enabled the procedure to be minimally invasive in which the patient was released from the hospital after about 48 hours and resumed normal activity the following week.