

# Surgical Procedures Performed by Robotic Systems

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## Description

Robotic surgery refers to surgical procedures performed with the assistance of robotic systems. Robotic-assisted surgery was created in an attempt to overcome the limitations of existing minimally invasive surgical procedures and to improve the capabilities of surgeons performing open surgery.

Instead of moving the instruments directly, the surgeon uses one of two methods to administer the instruments in robotically-assisted minimally invasive surgery. These methods include using a direct telemanipulator or computer control.

A telemanipulator is a remote manipulator that enables the surgeon to perform normal surgical movements. End-effectors and manipulators are used by the robotic arms to carry out the actual surgery. The surgeon controls the robotic arms and end-effectors with a computer in computer-controlled systems, though these systems can still use telemanipulators for input. One advantage of using the computerized method is that the surgeon does not need to be present, allowing for remote surgery.

Memory devices are critical in preventing complications during robot-assisted surgery. Based on the patient's physical record, memory storage solutions can perform a variety of functions. They can also indicate specific information to measure calibration offsets indicating storage drive system misalignment, data life, and so on. Robotic surgery has been chastised for its high costs, with average costs ranging from \$5,607 to \$45,914 per patient in 2007. As of 2019, this technique had not been approved for cancer surgery due to concerns about its safety and usefulness.

Remote surgery, minimally invasive surgery, and unmanned surgery have all made significant advances thanks to surgical robots. Because of the use of robotics, the surgery is performed with greater precision, miniaturization, and smaller incisions, resulting in less blood loss, less pain, and faster healing time. Articulation beyond normal manipulation, as well as three-dimensional magnification, contributes to improved ergonomics. These techniques reduce the length of hospital stays, blood loss, transfusions, and the use of pain medication. The current open surgery technique has numerous flaws, including limited access to the surgical area, a lengthy recovery time, long hours of operation, blood loss, surgical scars, and marks.

There is a wide range of viewpoints. Surgeons report that, while the manufacturers of such systems provide training, the learning phase is intensive, with surgeons needing to perform 150 to 250 procedures to become proficient in their use. During the training phase, minimally invasive operations can take up to twice as long as traditional surgery, resulting in operating room overcrowding and surgical staffs keeping patients sedated.

Complications from robotic surgeries include conversion to open surgery, re-operation, permanent injury, visceral damage, and nerve damage. Between 2000 and 2011, 34 of 75 hysterectomies performed with robotic surgery resulted in permanent injury, and 49 resulted in visceral damage. Prostatectomies were associated with a higher risk of permanent injury, nerve damage, and visceral damage.

Very few surgeries in a variety of specialties had to be converted to open or re-operated on, but the majority did sustain some kind of damage and/or injury. For example, one patient had to undergo re-operation after seven coronary artery bypass grafting procedures. Complications must be captured, reported, and evaluated in order for the medical community to be better educated on the safety of this new technology. If something goes wrong during a robot-assisted surgery, it is difficult to determine who is to blame, and the practice's safety will influence how quickly and widely these practices are used.

Current robotic surgery methods are also being marketed and advertised online. The removal of a cancerous prostate has become a popular treatment through internet marketing. Internet marketing for medical devices is less regulated than pharmaceutical advertising. Many websites claiming the benefits of this type of procedure omitted to mention the risks and provided unsubstantiated evidence. There is a problem with the government and medical societies promoting the creation of balanced educational materials. Many websites promoting robotic surgery in the United States fail to mention any risks associated with these procedures, and hospitals providing materials largely ignore risks, exaggerate benefits, and are heavily influenced by the manufacturer.

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