



Less Invasive Cancer Surgery Techniques

When people think of surgery, they usually think of a surgeon making large incisions (cuts) through the skin, muscle, and other layers. Or, they picture a doctor using a surgical knife (scalpel) and other surgical instruments to cut into and remove, repair, or replace parts of the body affected by disease. This standard or traditional kind of surgery is called *conventional surgery*. You can learn more about it in [How Surgery Is Used for Cancer¹](#).

Newer surgical techniques are less invasive, meaning they use different types of surgical instruments, usually need smaller incisions, and lead to less pain and shorter recovery times. Some of these techniques are described here.

Laser surgery

A laser is a highly focused and powerful beam of light energy which can be used for very precise surgical work. It can be used instead of a blade or scalpel to cut through tissue. It can also be used to burn and destroy (vaporize) tumors or precancerous growths and treat cancers of the cervix, penis, vagina, vulva, lung, and skin.

Even though burning with a laser sounds very damaging, laser surgery involves less cutting and damage because it's less invasive than conventional surgery. For instance, with fiber optics and special scopes, the laser can be directed inside a natural body opening without having to make a large cut. The laser is then precisely aimed to destroy the tumor.

Lasers are also used in a type of surgery called *photoablation* or *photocoagulation* to destroy tissues or seal tissues or blood vessels. This type of surgery is often used to relieve symptoms, such as when large tumors block the windpipe (trachea) or

swallowing tube (esophagus), causing problems breathing or eating.

You can learn more details about lasers in [Lasers in Cancer Treatment](#)².

Cryosurgery

Cryosurgery uses a liquid nitrogen spray or a very cold probe to freeze and kill abnormal cells. This technique is sometimes used to treat pre-cancerous conditions, like those affecting the skin, cervix, and penis. Cryosurgery can also be used to treat some cancers, like those in the liver and prostate. A scan (like an [ultrasound](#)³ or [CT scan](#)⁴) might be used to guide the probe to where the cancer cells are. This limits damage to nearby healthy tissue.

Electrosurgery

A high-frequency electrical current can be used to destroy cells. This may be done for some cancers of the skin and mouth.

Radiofrequency ablation

Radiofrequency ablation, or RFA, is a type of [hyperthermia](#)⁵ - a treatment that uses heat to destroy cancer cells. In RFA, high-energy radio waves are sent through a needle to heat and destroy cancer cells. RFA may be used to treat cancer tumors in the liver, lungs, kidney, and other organs.

Mohs surgery

Mohs micrographic surgery is also called microscopically controlled surgery. It's used to remove certain skin cancers by shaving off one very thin layer at a time. After each layer is removed, the doctor looks at the tissue with a microscope to check for cancer cells. This procedure is repeated until all the cells in a layer look normal.

Mohs surgery is used when the extent of the cancer is not known or when as much healthy tissue as possible needs to be saved, such as when treating skin cancers on the face.

Laparoscopic surgery

A laparoscope is a long, thin, flexible tube that can be put through a small cut to look

inside the body. It's sometimes used for biopsy procedures (taking pieces of tissue to check for cancer). Research has found that by making small holes and using special long, thin instruments, the laparoscope can also be used to remove some tumors. This can help reduce blood loss during surgery and pain afterward. It can also shorten hospital stays and allow people to heal faster. Laparoscopic surgery is used commonly today for many operations.

Doctors can safely and effectively use laparoscopic surgeries for some cancers of the colon, rectum, liver, prostate, uterus, and kidney. Uses on other types of cancer are being studied.

Thoracoscopic surgery

A [thoracoscope](#)⁶ is a thin tube with a tiny video camera on the end that can be put through a small cut into the chest after the lung is collapsed. This allows the doctor to see inside the chest. Tissue samples of any areas of concern on the lining of the chest wall can be taken out, fluid can be drained, and small tumors on the surface of the lung can be removed.

This type of surgery leads to less cutting and has even been used to remove parts of the lung that contain cancer. Studies have shown that for early-stage lung cancer, results using this approach are much the same as removing part of the lung through a cut in the side of the chest.

Robotic surgery

Robotic surgery is a type of laparoscopic (or thoracoscopic) surgery where the doctor uses precise robotic arms to control some of the surgical instruments. The advantages of this type of surgery are largely the same as laparoscopic and thoracoscopic surgery: it can help reduce blood loss during surgery and pain afterward. It can also shorten hospital stays and let people to heal faster.

Robotic surgery is sometimes used to treat cancers of the colon, prostate, and uterus.

Stereotactic radiation therapy

As doctors have learned how to better control the energy waves used in radiation therapy, newer radiation techniques have been developed that blur the lines between traditional types of treatment. Stereotactic radiation therapy is a radiation technique that is so precise it's sometimes called *stereotactic radiosurgery*, even though no cut is

actually made. In fact, the machines used to deliver this treatment have names like Gamma Knife and CyberKnife, even though no knife is involved. By using radiation sources from different angles, stereotactic radiation therapy delivers a large precise radiation dose to a small tumor area. The brain is the most common site that can be treated using this technique, but it's also used on some head, neck, lung, spine, and other tumors. Researchers are looking for ways to use it to treat other types of cancer, too. You can learn more about this kind of treatment in [Radiation Therapy](#)⁷.

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery/how-surgery-is-used-for-cancer.html
2. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/lasers-in-cancer-treatment.html
3. www.cancer.org/treatment/understanding-your-diagnosis/tests/ultrasound-for-cancer.html
4. www.cancer.org/treatment/understanding-your-diagnosis/tests/ct-scan-for-cancer.html
5. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/hyperthermia.html
6. www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/thoracoscopy.html
7. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html

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