

HOW IT WORKS

TRUE ROBOTIC DELIVERY PRECISION

The CyberKnife System is the only radiation delivery system which features a linear accelerator (linac) directly mounted on a robot to deliver the high-energy X-rays or photons used in radiation therapy. It uses real-time image guidance and a robot to deliver dose from thousands of beam angles, setting a new standard for delivery precision anywhere in the body and enabling Stereotactic Radiosurgery (SRS) and Stereotactic Body Radiation Therapy (SBRT) treatments for the full range of indications. The robot moves and bends around the patient, approaching the tumor from thousands of unique angles, significantly expanding the possible positions to concentrate radiation to the tumor while minimizing dose to surrounding healthy tissue.

TREATMENT TYPES

The CyberKnife System was designed to deliver external-beam radiation therapy:

- **Stereostatic Radiosurgery (SRS):** A non-surgical radiation therapy approach used to treat functional abnormalities and small tumors in the brain. High-dose, precisely-targeted radiation is delivered in fewer treatment sessions than conventional radiotherapy, typically just one to five sessions, which can help preserve healthy tissue.



- **Stereotactic Body Radiation Therapy (SBRT):** A radiation therapy approach which delivers high-dose radiation to a target within the body, in either a single treatment session or up to no more than five treatment sessions. Each session is typically referred to as a "fraction."

REAL-TIME MOTION SYNCHRONIZATION

Why does motion management matter? As the patient, you breathe. You could change your position. You could cough. Muscles tense and relax. Fluids and gasses displace internal organs. The CyberKnife System is the only device designed to accommodate all forms of body and tumor motion, even while the treatment is being delivered. With its motion adaptive delivery technology, the CyberKnife System enables smaller treatment margins around the tumor, minimizing the amount of healthy tissue exposed to high-dose radiation.

The CyberKnife System uses advanced technologies to track tumors anywhere in the body, while its unique robotic design keeps the radiation on target even while the tumor moves. Before delivering the radiation beam, the CyberKnife System is the only device that verifies the exact tumor position and adjusts the robot to precisely target the tumor. This ensures radiation is delivered to where the tumor is, not to where it was moments before. Additionally, the CyberKnife System features Synchrony, the world's only real-time adaptive delivery technology. Synchrony expands on the CyberKnife System's unique motion synchronization capabilities to reduce margins and provide additional precision when treating tumors that move with respiration, such as lung tumors. The sophisticated motion synchronization technology eliminates the need to use uncomfortable restraints, or ask you to hold your breath for example.

BENEFITS

- The first robotically-guided radiation delivery system
- Working under image guidance, continually adjusts as the body or tumor shifts position
- Used to treat small, well-defined tumors
- Offers new hope to patients with inoperable or surgically risky tumors
- Pain-free treatment, performed in five days or less

WHAT TO EXPECT BEFORE, DURING AND AFTER TREATMENT

Prior to treatment, your radiation therapy treatment team will take a high-resolution scan of your tumor to determine its shape and location. The data from this scan will then be digitally transferred to the CyberKnife workstation. Your team will develop a treatment plan, including the number of treatments you will need, and the shaping and dosage levels for the radiation beam.

Once the treatment plan is complete, you can begin your therapy. You will be scheduled for an appointment or series of appointments that typically last from 30 to 90 minutes each. Treatment sessions usually take no more than five days total.

When you come in for a treatment session, the radiation oncologist will position you comfortably on the treatment table. The robotic arm of the CyberKnife will then slowly move around you, programmed to stop at various locations where it will deliver a very precise beam of radiation to the tumor.

After the treatment is over, you are free to resume normal activity. Because there is no need for sedation, you can drive yourself to and from your appointment.