

# Operating on the Brain

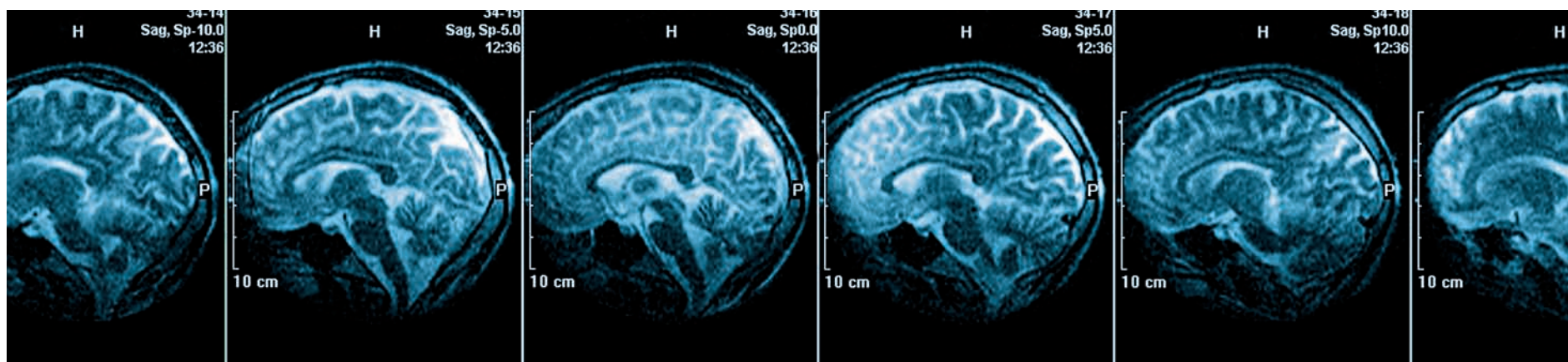


Photo courtesy of Medtronic Surgical Navigation Technologies

Until recently, neurosurgeons had to rely on images of the brain taken just before surgery to guide them through complex procedures.

**But now a breakthrough in** magnetic resonance imaging (MRI) is allowing doctors to perform tumor surgery while viewing the brain in real time—before, during and after the procedure.

**The shifting brain.** Called intraoperative MRI, the system utilizes electromagnetic waves to produce highly detailed pictures of the brain as the operation unfolds. “Because the brain is composed of soft tissue, it constantly shifts during surgery,” says **Dr. Mark Linskey**, chairman of the UCI Department of Neurological Surgery and co-director of the multidisciplinary Neuro-Oncology Program at UCI Medical Center’s Chao Family Comprehensive Cancer Center. “As a result, the brain is never in precisely the same position before an operation as during it.” Now, instead of relying on scans taken pre- and post-surgically, doctors can see the brain in three-dimensional detail during all stages of an operation. This allows them to monitor subtle shifts in brain tissue as they occur, resulting in increased surgical precision.

**Before, during and after.** Here’s how it works: Scans taken before the first incision pinpoint the location of the tumor in exacting detail. This helps doctors determine the best surgical pathway to minimize contact with healthy tissue. During surgery, the intraoperative MRI system alerts surgeons to the slightest movement of the brain within the skull. This can arise from the surgical manipulation necessary to access a tumor, or the shifting of tissue due to other causes. Based on this information, doctors can make minor adjustments in their approach to the tumor, remaining meticulously on target. The MRI machine also optically tracks the doctor’s surgical instruments, showing their precise location in relation to the patient’s anatomy. This information allows neurosurgeons to avoid delicate structures within the brain.

[The intraoperative MRI machine allows surgeons to perform tumor surgery while viewing the brain in real time.](#)

“Another major benefit of the intraoperative MRI system is that it gives doctors an incredibly detailed look at brain tumors,” says Linskey. “We can see exactly where the tumor ends and normal tissue begins.” Having access to this information allows neurosurgeons to verify that the entire growth has been removed without increasing risk to nearby

healthy brain tissue. “In the past, surgeons had to rely on scans taken after surgery to confirm that the entire malignancy had been removed,” says Linskey. “If part of the tumor remained, another operation was needed.” The intraoperative MRI system helps avoid this situation, resulting in safer surgery—and fewer follow-up operations for patients.

The new system can be wheeled in and out of a surgical suite much like a portable X-ray machine. When not in use, it’s stored under the operating room table, lifting into position at the press of a button. But best of all, it allows doctors an unprecedented view as they navigate deep within the brain—an advantage that can improve patient outcomes, reduce hospital stays and help avoid complications.

The intraoperative MRI is being installed during the spring and is expected to be functional by this summer, making UCI the only medical center south of Los Angeles to have such technology. “This state-of-the-art navigational system has made surgery an option for some brain tumor patients who were previously considered too high risk to operate,” says Linskey. “As it enters the mainstream, intraoperative MRI will have a major impact on the way brain surgery is performed worldwide.”

For referral to a UCI neurosurgeon, call 1-800-UCI-DOCS.

**Toll free 1-877-UCI-DOCS**