

Motor Cortex Stimulation (MCS)

What is Motor Cortex Stimulation (MCS)?

Motor cortex stimulation (MCS) is a surgical procedure that implants electrodes on the surface of the brain (primary motor cortex) to stimulate areas that control pain signals. Motor cortex stimulation is a promising technique for the management of chronic neuropathic and central pain conditions that do not get better with other treatments. MCS has proven most successful for patients with neuropathic facial pain and post-stroke pain. This type of surgery is a safer alternative to permanent ablative procedures, allowing for reversible effects, without destroying pathways in the central nervous system. *It is an off label procedure, which means it is not yet FDA-approved.*



This is an illustration of a primary motor cortex stimulator lead placement for neuropathic pain during stage 1. This lead will then be connected to an implantable pulse generator or battery as part of stage 2.

What is the goal?

Motor cortex stimulation is a way to manage trigeminal neuropathic facial pain and post-stroke pain refractory to non-surgical methods such as oral medications, injections and nerve blocks. When these non-surgical options fail and severe pain turns into a chronic condition, motor cortex stimulation may be a next step. Motor cortex stimulation is not a cure for pain, but it can help significantly relieve symptoms and decrease the amount of pain medications you are taking. It may also take up to 6 months of adjustments after surgery to reach optimal results.

What happens before surgery?

You will receive paperwork from Dr. Lad's office and from the Department of Surgery with instructions and reminders regarding preparation to make before you have surgery. You will also have pre-anesthesia testing to make sure you are healthy enough to undergo the surgery. The anesthesiologist caring for you on the day of surgery may meet with you to review your medical history and answer any questions you may have. Dr. Lad will also visit you before the surgery to review the procedure and complete any necessary evaluations.

We know you will accumulate a lot of paperwork. You might want to start a small binder or folder with important information you need to read and keep track of.

What happens during surgery?

A nurse will start your IV fluids and give you a medication to make sure you are comfortable. Once in the operating room, monitoring devices will be attached for your safety (blood pressure cuff, ECG, etc). The procedure happens in two stages:

Before surgery: In preparation for surgery, your doctor will order a specialized functional MRI to map your brain's motor cortex. It will be used to pinpoint the precise area of your brain to target for motor cortex stimulation.

Stage 1: On the day of surgery, while you are sedated, Dr. Lad will use frameless navigation to provide a precise roadmap of the brain using the brain imaging studies obtained prior to surgery. Using these images, he will perform a craniectomy and implant an electrode over the covering of the targeted area of your brain.

Stage 2: The inpatient trial lasts for one week, and the electrode is then connected to the Internal Pulse Generator (IPG). If it provides no relief, then we will explant the system.



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What happens after Surgery?

Once the surgery is complete, you will be transferred to the recovery room. You will be closely monitored here by specially trained nurses. Dr. Lad will then explain the results to your family in the waiting room and you will be transferred to the Neurosciences Intensive Care Unit. The inpatient trial lasts for one week.

How do I take care of myself after surgery?

You will receive post-operative information from Dr. Lad's office and from the Department of Surgery.

Patients considering motor cortex stimulation should have realistic expectations for results. The surgery relieves symptoms, but it is not a cure. It can also take up to six months of adjustments after surgery for some patients to achieve optimal results. In carefully selected patients, up to 50% experience relief from motor cortex stimulation.

You will need to continue all preoperative pain medication. These will be slowly decreased by the physician who started them. Staples/sutures are removed 10 to 14 days after surgery. Some patients may also experience muffled hearing on the side of surgery, facial numbness, fatigue from anesthesia, nausea/vomiting in the hospital (meds will be given) which usually improves over time. You may not drive or go back to work for about one month. You cannot wear wigs, use hair dye or other harsh products for 6 months. These will interfere in long term healing and may cause infection which could require further surgery.

What are the risks of surgery?

Motor Cortex Stimulation is an invasive procedure, and while safe in expert hands, does have potential rare/infrequent risks, including:

- Infection
- Cerebrospinal fluid leak
- Difficulty with speech or swallowing
- Stroke or hemorrhage (very rare)
- Malfunction or damage to the implanted system

If at any time following your implant you notice:

- Redness, swelling, drainage or foul odor from the surgical site
- Excessive bleeding
- Increase in pain at the surgical site
- Fever of 101°F or higher with any of the above symptoms

CALL THE OFFICE IMMEDIATELY OR, IF AFTER HOURS, PAGE THE OPERATOR TO SPEAK TO THE NEUROSURGEON ON CALL AT 919-681-8111

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