Deep-brain stimulation (DBS) — the implantation of a "brain pacemaker" and electrodes to ease symptoms of movement disorders — is a safe and effective procedure that could bring symptomatic relief to many patients who are currently experiencing a severely impaired quality of life, says Nader Pouratian, MD, director of UCLA’s Neurosurgical Movement Disorders Program. “This is a technology that’s extremely underutilized,” says Dr. Pouratian. “When you consider the number of patients with movement disorders who aren’t benefiting from medication, it has the potential to help many more people.”

DBS functions like a heart pacemaker, except that instead of going to the heart, the
Learn about the Latest Advances from UCLA

**Diabetes Education**
New self-management education guidelines represent a paradigm shift in diabetes education from a content-driven practice to patient-centered goals. Diabetes educators aim to help patients adopt healthy behaviors and actively partner with their healthcare providers.

**Pediatric Pulmonology**
The UCLA Division of Pediatric Pulmonology offers specialized clinics for children and adolescents with asthma, bronchopulmonary dysplasia, cystic fibrosis, neuromuscular-disease respiratory disorders, and for those who need mechanical ventilatory support.

**Pelvic-Organ Prolapse**
UCLA pioneered many of the innovations now considered the standards of care for such conditions as vaginal and uterine prolapse, as well as other pelvic-floor disorders. UCLA is a leader in laparoscopic-abdominal-pelvic-floor reconstruction, including robotically assisted laparoscopic techniques.

**Soft Tissue Sarcoma**
UCLA experts have introduced refinements to targeted biopsy of prostate cancer, greatly improving the ability to distinguish men who should have treatment from those who could defer.

**Thyroid Nodules**
Fine-needle biopsy performed under ultrasound guidance targets the highest-yield portions of thyroid nodules and reduces the risk of a failed biopsy.

**Musculoskeletal Ultrasound**
Musculoskeletal ultrasound provides a closer look at joints, nerves, tendons and other structures without exposing patients to radiation and at a lower cost than using a CT scan or MRI. Because it is dynamic, it can show how a tendon moves or help guide a needle to a precise site — useful for treating arthritis, tendonitis and other disorders.

**Urinary Incontinence**
UCLA provides a full range of treatment options for stress incontinence, from individualized regimens in a physical-therapy program that focuses exclusively on pelvic-floor issues to the most advanced interventional procedures. UCLA is also at the forefront of developing safe, effective and durable new therapies for stress incontinence.

To download these and other clinical advances at UCLA Health, go to: uclahealth.org/clinicalupdates

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**News from UCLA Health**

**Portable Device for Common Kidney Tests**
A lightweight and field-portable device invented at UCLA conducts kidney tests and transmits data through a smartphone to the patient’s physician, significantly reducing the need for frequent office visits by people with diabetes and others with chronic kidney ailments.

[Visit uclahealth.org/kidneytests](uclahealth.org/kidneytests)

**Lower-Cost Drug Substitution**
A new UCLA-led study finds that substituting less-expensive counterparts with a similar therapeutic effect to brand-name medications can contribute to reducing healthcare costs.

[Visit uclahealth.org/drugsubstitutes](uclahealth.org/drugsubstitutes)

**Chronicling Cancer Experience Online**
In the first known study of its kind, UCLA researchers discovered that creating a personal website to chronicle the cancer experience and communicate with one’s social network can reduce depressive symptoms, increase positive mood and enhance appreciation for life among women diagnosed with breast cancer.

[Visit uclahealth.org/chroniclecancer](uclahealth.org/chroniclecancer)

**Jules Stein and Doheny Eye Institutes Pursue Affiliation**
The Jules Stein Eye Institute and the Doheny Eye Institute announced that they have entered into exclusive negotiations under a signed letter of intent for a long-term affiliation to create the nation’s preeminent centers for ophthalmic patient care, vision research and education.

[Visit uclahealth.org/steindoheny](uclahealth.org/steindoheny)
New Treatment Options Available for Acoustic Neuroma

A new technique for treating acoustic neuroma enables neurosurgeons to visualize the facial nerve pre-surgery, improving the results of treatment for the benign but difficult-to-reach tumor. UCLA is among a handful of centers in the world that is using the technique, known as facial-nerve tractography.

Acoustic neuroma is a slow-growing tumor that occurs at the junction of the brain, the nerve to hearing and the nerve to controlling facial movement. Its location puts patients at risk for serious symptoms, which include hearing loss, ringing in the ears, balance problems and facial numbness or tingling. The delicate location of the tumor also makes treatment complex, with risks that include a weakened facial nerve that leaves the patient with a crooked smile.

The most recent development is facial-nerve tractography. UCLA is one of a handful of centers in the world that is performing this pre-surgical procedure, which increases precision by enabling the surgical team to visualize the small, thin facial nerve ahead of time. “When we weren’t able to see the facial nerve in advance, we had to guess based on the most common location. We’ve learned that the nerve is not always where we expect it to be,” says Isaac Yang, MD, UCLA neurosurgeon who specializes in treating acoustic neuroma, which also is known as vestibular schwannoma. “This allows us to plan the surgery in a safer, more thoughtful way so that we can preserve the facial nerve.”

UCLA is also now treating acoustic neuroma with another minimally invasive method, radiosurgery. “Treatment of these tumors with radiation has shown varying levels of success in preserving patients’ hearing,” Dr. Yang notes. “The radiosurgery approach is more focused — stereotactic — targeting just the tumor.” His group recently completed a study showing that breaking down the radiosurgery treatment into multiple small doses increases the safety, improving hearing outcomes. Within the next year, Dr. Yang adds, the UCLA Acoustic Neuroma Program will begin utilizing a new approach to treating large tumors called adaptive hybrid surgery — first reducing the tumor size through conventional surgery and then using radiosurgery to treat what remains.

These and other minimally invasive treatment approaches underscore the importance of early detection, Dr. Yang says. “When the tumor is smaller, we have more options, and our research has shown that the smaller the tumor, the better the outcomes in terms of their facial-nerve function,” he explains. Acoustic neuroma is most commonly presented as a one-sided hearing loss, or ringing in one ear. Patients experiencing such symptoms should be given an MRI to check for a tumor, Dr. Yang says.

If a tumor is detected, treatment depends on a host of factors. “It can be a very personal decision, so we sit down and talk with the patient about the most minimally invasive, pain-free way of treating the tumor,” Dr. Yang explains. “For a patient who is a musician, hearing may be everything, while for another patient, the ability to smile — and thus preservation of the facial nerve — is most important. If an older patient has a large tumor, we are likely to take a more conservative approach, while for a younger patient we may want to be more aggressive — as long as we’re not risking the facial nerve.”

For some patients, “minimally invasive” can mean doing nothing. “If it’s a small acoustic neuroma that isn’t causing any problems, we may just follow it — getting MRIs once a year or every few months to make sure it isn’t pushing against the brain stem,” Dr. Yang says.

The UCLA program’s emphasis on quality-of-life outcomes represents a departure from the way acoustic neuroma was treated in the past. “It used to be that the approach was to get the entire tumor out at all cost,” Dr. Yang says. “We want to take out as much as we safely can, as minimally invasively as we can, while leaving patients with the best possible quality-of-life outcomes, both in terms of their hearing and their facial muscles. At the end of every surgery I want my patients to smile — literally.”

For more information about the UCLA Acoustic Neuroma Program, go to: acousticneuroma.ucla.edu
Deep-brain stimulation (DBS) functions like a pacemaker to correct abnormal patterns of brain activity for patients with neurological disease. DBS carries relatively minimal risk and in most cases significantly improves the patient’s quality of life.

Deep-Brain-Stimulation Surgery
Eases Symptoms for Patients with Some Movement Disorders

(continued from cover)

electrodes are strategically placed in the brain. The pacemaker includes a chest-implanted generator that sends continuous pulses. Just as the heart pacemaker helps to correct an abnormal heart rhythm, the brain pacemaker uses these pulses to correct the abnormal patterns of activity in the brain for patients with neurological disease — easing the involuntary movements characteristic of such conditions as Parkinson’s disease and essential tremor.

DBS is most commonly performed as an asleep/awake/asleep procedure: The patient is asleep and anesthetized at the beginning of the surgery, as a hole is being drilled in the skull; once the potentially uncomfortable phase is over and the brain is exposed, the patient is awakened and asked to respond to verbal commands, providing feedback to assist the surgical team in optimal placement of the electrodes before being put to sleep again as the skull is closed up. Since there are no pain receptors within the brain, patients experience no discomfort while awake during the operation.

“This is a surgery whose goal is to improve function and quality of life,” explains Dr. Pouratian. “The best way to ensure that we are achieving that goal is to actually test the patient during surgery, when we first put the electrode in, and make sure we’re getting the benefits from the stimulation while limiting the side effects. If it’s not in the optimal position, that’s our opportunity to move the electrode.”

First approved by the U.S. Food and Drug Administration (FDA) in the late 1990s, DBS carries relatively minimal risk and, in most cases, it significantly improves patients’ quality of life. “This doesn’t change the underlying disease,” Dr. Pouratian says. “It doesn’t change
Deep-Brain-Stimulation Surgery Eases Symptoms for Patients with Some Movement Disorders

To read Twitter feeds and see video clips of Brad Carter’s surgery, go to: uclahealth.org/uclaorlive

UCLA Tweets Surgery Live

The world was watching when UCLA’s Neurosurgical Movement Disorders Program performed its 500th deep-brain-stimulation surgery earlier this year.

UCLA Health invited Twitter followers to observe a surgery-in-progress on social media as a way to educate the public about deep-brain stimulation. In addition to live-tweeting the procedure, UCLA Health posted Instagram photos and short video clips via the new Twitter application Vine. The event went viral, appearing in millions of Twitter news feeds and attracting widespread attention from conventional news media. Adding to the interest, the patient, musician and actor Brad Carter, played guitar during the awake portion of the procedure, helping the neurosurgery team to optimize placement of the electrodes for Carter’s brain pacemaker.

“As a teaching institution, we’re used to having medical students, residents, fellows and visitors from other parts of the country and around the world observe our surgeries and learn from us,” says Nader Pouratian, MD, who performed the surgery.

“We thought this would be a great opportunity to bring the world into the operating room.”

For more information about UCLA’s Deep-Brain-Stimulation Program, go to: dbs.ucla.edu

Since DBS was initially performed approximately 20 years ago, some 100,000 people have been implanted throughout the world. UCLA has performed more than 500 of the surgeries. While most often used for patients with Parkinson’s disease or essential tremor, it is also FDA-approved for a third movement disorder, dystonia (characterized by sustained involuntary muscle contractions), as well as for obsessive-compulsive disorder. It is currently being studied for its potential to help in a number of other conditions — including chronic pain, post-traumatic stress disorder, Alzheimer’s disease, Tourette’s syndrome and depression.

In the United States, an estimated 10-million people have essential tremor, and 1 million have Parkinson’s disease. Although a large number of these patients could benefit from DBS, many are unaware of the procedure, while some who do know about it are reluctant to undergo a brain operation, Dr. Pouratian says.

He notes that medications are the first-line therapy for movement disorders, and they can be effective in many patients. But patients who either don’t receive satisfactory benefit from their drugs, experience complications that can’t be managed, or have intolerable side effects should be evaluated to determine whether DBS is an option. At UCLA, patients are seen by a multidisciplinary team, led by a neurosurgeon and by neurologist Yvette Bordelon, MD, PhD, who help to determine the best course of action.

“We are fortunate in our field to have very good studies — randomized controlled trials — that show DBS to be an excellent therapy,” says Dr. Pouratian. “There is significant improvement in quality of life with the surgery, well beyond what patients get from the available medications. It’s not a cure, but it’s quite clear that they spend much more of their day in a better condition — able to participate in many more activities and to enjoy their lives more. One of the most powerful comments I hear from many patients is that they wish they had done it earlier.”

To read Twitter feeds and see video clips of Brad Carter’s surgery, go to: uclahealth.org/uclaorlive
How is epilepsy defined, and what proportion of epilepsy cases can be controlled by medication?

Epilepsy is commonly defined as having two or more unprovoked seizures separated by at least 24 hours. The rate of newly diagnosed seizures for those under age 15 is about 500 cases per 1-million children per year. Of these, about 70 percent are controlled or nearly controlled by anti-epilepsy drugs. Of the remaining 30 percent of children with epilepsy, about half have more than a seizure per month. About 15 percent of children with epilepsy are medically refractory, which is defined as failure of two-to-three anti-epilepsy drugs and with frequent-enough seizures that they affect the child’s life. Of those with medically refractory epilepsy, about one-third are candidates for epilepsy surgery.

Has drug therapy for epilepsy improved?

There have been anti-epilepsy drugs around since the 1940s, and there has been an explosion of drugs that have been approved since the 1990s. The new drugs have reduced the side effects, but the bottom line is that the incidence of medically refractory epilepsy has not changed.
Which patients are most likely to respond to medication?

Broadly, the etiology of epilepsy can be divided into three groups. About 30 percent of cases are presumed to be genetic — and among this group, there is about a 90-percent response rate with drug treatment. The second group — about 20 percent of the patients — have a structural brain problem, something we can identify on imaging studies. This group fares the worst on drugs; only about a 50-percent response rate. These are also generally the patients who might be candidates for surgery. And then for the remaining 50 percent of cases, we are unable to diagnose the cause.

The important thing from the perspective of referring physicians is that among children with structurally caused epilepsy, after they have failed to respond to two or three drugs, the chance of continued medical therapy controlling the epilepsy is less than 5 percent. So there is no reason to continue trying more drugs before referring to a specialty center.

Beyond the daily impact, what is the long-term danger of continued uncontrolled seizures?

Having medically refractory epilepsy has two major impacts on a child’s life. Frequent seizures, especially during the formative years of early brain development — before age 5 and especially before age 2 — are strongly linked to significant developmental delay that is generally not reversible. These children don’t gain their intellectual capacities at the same rate as other children, and our data suggest that if you don’t obtain seizure control within about 18 months of onset in a child, that child ending up with an IQ above 80 is difficult if not impossible. Frequent seizures are also associated with premature death, generally from accidents and sudden unexpected death related to epilepsy.

This poor natural history of the disease — cognitive problems along with increased mortality — justifies a surgical intervention in medically refractory patients if a targeted area can be identified, particularly because of our success rates. So it is critically important that a child whose seizures are not adequately controlled by two-to-three trials of anti-epilepsy drugs be referred to a specialty center for evaluation and treatment — both to confirm the cause and to address whether there are alternate treatments. UCLA’s Pediatric Epilepsy Surgery Program is one such specialty center, with more than 25 years of experience in the field.

What does epilepsy surgery in children involve, and what are the outcomes at UCLA?

Epilepsy surgery in children involves different types of operations, from focal resections for different etiologies to cerebral hemispherectomy — removal of half of the brain. Many of these are very rare, which is another reason for having a child and family come to a major referral center where there is experience in rare conditions. UCLA has operated on more than 750 children, with published outcome measures and quality metrics that are among the best in the world. Our short- and long-term seizure-free outcomes are 75-to-80 percent, and are sustained over many years post-surgery. These outcomes have improved over time, due to the tireless efforts of our team. This is a team effort — including the pediatric epileptologist and surgeon, who work together to assess the risks and benefits of surgery in a particular case; and the expertise of the anesthesiologists, pathologists, pediatric intensive care unit and the imaging group that has worked with us to develop new technologies to identify subtle legions that would have been missed five or six years ago.

Do those technologies help to identify more surgical candidates?

Yes. We are better at identifying structural abnormalities in the brain than we were even 10 years ago. We are able to move children from the group whose epilepsy has an unknown origin to the group with a known structural cause by using more advanced imaging, as well as through refinements in our EEG technique. It’s important to stress that referral to our center doesn’t mean that every child gets surgery. We start with a comprehensive evaluation by our team of experts. Tests may include inpatient video EEG monitoring to capture and characterize the seizures; and imaging, such as FDG-PET and MRI. If the child is truly medically refractory and we have a target, then we will offer surgery.

“UCLA has operated on more than 750 children, with published outcome measures and quality metrics that are among the best in the world.”
While pituitary tumors generally are benign, and many will never produce symptoms, there can be potentially life-threatening complications. When surgery is called for, the endoscopic approach reduces the chance that residual tumor cells will be left behind.

**Endoscopic Approach Makes Surgery for Pituitary Tumors Easier**

Because of their location near the brain and their influence on the endocrine-hormone functions of the body, treating and removing pituitary tumors can be complex. Today, however, advanced endoscopic technology and high-definition visualization are making things easier for surgeons and their patients.

Until recently, for example, it has been a significant technical challenge to completely remove large pituitary tumors utilizing what is called the pseudocapsular dissection technique. “Five years ago, we were rarely able to identify the pseudocapsule. Instead, our technique relied on blindly scooping out a tumor, largely by feel, from within this pseudocapsule because we had a limited view of the tumor using the surgical microscope,” says Marvin Bergsneider, MD, codirector of UCLA’s Pituitary Tumor Program. “Because the pseudocapsule frequently has some tumor cells embedded in it, leaving it behind increased the chances of an incomplete removal. The endoscopic approach has radically changed pituitary tumor surgery, allowing us to accurately define and maintain the very thin pseudocapsule during dissection to actually peel out the tumor, often in one piece, in a more anatomical manner.”

But with new minimally invasive endoscopic surgery, the encapsulated tumor can be removed entirely through the nose without an incision. “With the endoscope, we can literally look around corners and see things we were completely blinded to in the recent past,” Dr. Bergsneider says. “It’s a whole different surgery now.”

While pituitary tumors generally are benign, and many will never produce symptoms, there can be potentially life-threatening complications that arise when hormone-seeking tumor cells grow out of control. Severe hormonal abnormalities can result. Neurological dysfunction, rapid growth, infertility and problems related to an overproduction of hormones such as prolactin (absent periods, reduced libido and breast milk production), growth hormone (enlargement of body parts, high blood pressure and heart disease), cortisol (obesity, high blood sugar and high blood pressure, for example) are among the most debilitating symptoms. Because pituitary tumors often masquerade as other clinical conditions, multidisciplinary evaluation and treatment are needed to address potentially life-threatening complications that arise when hormone-secreting tumor cells grow out of control.
grow out of control. When that happens, severe hormonal abnormalities can result. Neurological dysfunction, rapid growth, infertility and problems related to an overproduction of hormones such as prolactin (absent periods, reduced libido and breast milk production), growth hormone (enlargement of body parts, high blood pressure and heart disease), cortisol (obesity, high blood sugar and high blood pressure, for example) are among the most debilitating symptoms. Because pituitary tumors often masquerade as other clinical conditions, multidisciplinary evaluation and treatment are needed to address potentially life-threatening complications that arise when hormone-secreting tumor cells grow out of control.

When surgery is called for, the endoscopic approach, which may be used to remove most pituitary tumors, reduces the chance that residual tumor cells will be left behind and may be associated with improved cure rates, according to Dr. Bergsneider. To date, more than 500 endoscopic pituitary-tumor surgeries have been performed at UCLA. For the rare case in which a pituitary tumor extends laterally into the brain cavity, UCLA surgeons are experts at the minimally invasive “key-hole” craniotomy (opening of the skull), utilizing a small incision hidden in the eyebrow to access and remove the tumor.

Despite important surgical advances over the last decade, Dr. Bergsneider emphasizes that abnormalities associated with hormone-secreting pituitary tumor cells, rather than the actual tumors, are most problematic if left untreated. At UCLA, experts in the Pituitary Tumor and Neuroendocrine Program collaborate to provide comprehensive evaluation and management for all types of pituitary tumors and related disorders. Outpatient evaluations are available, often within 24-to-48 hours of initial contact, by a UCLA neurosurgeon, endocrinologist and other pituitary-tumor experts, during a single, coordinated visit.

“Many patients with pituitary tumors face serious disease morbidity or mortality caused by excess hormones secreted from the pituitary tumor cells or following treatment for the tumors, such as repeated surgery and/or radiation therapy, that can damage the pituitary gland,” says endocrinologist Anthony Heaney, MD, PhD, codirector of the UCLA Pituitary Tumor Program. “The beauty of our program is that we work together to accurately identify these problems, which are not always obvious, and then we collectively employ multiple strategies to fix them.”

For example, Cushing’s disease is a relatively rare but potentially life-threatening hormonal disorder caused by prolonged exposure of the body’s tissues to high levels of the hormone cortisol. The symptoms of Cushing’s disease are sometimes difficult to differentiate from other conditions and may require months of testing to reach a definitive diagnosis. Once diagnosed, however, surgery is performed to remove the tumor. Newly FDA-approved medications are also now available to manage this debilitating disease.

“We’re attempting to get at the heart of what drives hormone production in Cushing’s disease,” Dr. Heaney says. “Discovery of factors that impact adrenocorticotropic hormone (ACTH) in Cushing’s has the potential to go from bench to bedside and may have applications in related disorders where altered cortisol dynamics may play a role, including certain forms of depression and metabolic syndrome.” Dr. Heaney and colleagues recently published findings related to a potential novel therapeutic target in Cushing’s disease in the *Proceedings of the National Academy of Sciences*. UCLA also is participating in several multicenter clinical trials to evaluate the efficacy of new medications for treatment of various pituitary tumors, including acromegaly and Cushing’s disease.

“With the endoscope, we can literally look around corners and see things we were completely blinded to in the recent past. It’s a whole different surgery now.”

Top: Pituitary tumor, pre-op.  
Bottom: Pituitary tumor, post-op.
In the past, cerebrovascular conditions such as stroke and cerebral aneurysms were treated almost exclusively with surgical techniques that required a craniotomy. Today’s latest neurovascular techniques, however, chart smarter, and less risky, pathways to treat problems in hard-to-reach areas of the brain. “We are radically changing the history of how we treat problems of the brain,” says UCLA neurosurgeon Nestor R. Gonzalez, MD, who was one of the first surgeons in the country to receive complex training in neurosurgery and interventional radiology that enables him to perform both neurosurgery and endovascular neurosurgery. “We now combine conventional surgical techniques with modern endovascular intra-arterial and intra-venous approaches to effectively treat brain lesions that were previously challenging and resulted in less favorable outcomes.”

For example, endovascular coiling is a minimally invasive catheter-based procedure that blocks blood flow to a weakened artery wall in the brain (cerebral aneurysm) to prevent the aneurysm from rupturing. According to Dr. Gonzalez, endovascular coiling is now the dominant form of treatment for aneurysms around the world.
Several clinical trials have now shown that the coiling technique ... has excellent outcomes that are superior, in some cases, to craniotomy for treatment of cerebral aneurysms.

Several clinical trials have now shown that the coiling technique, when used appropriately, has excellent outcomes that are superior, in some cases, to craniotomy for treatment of cerebral aneurysms,” he says. The procedure may also be used, in combination with surgical resection and radiation, to treat arteriovenous malformations (AVMs), which are abnormal connections between the arteries and veins of the brain. AVMs occur in less than 1 percent of the U.S. population, but may cause life-threatening intracranial bleeding in more than 50 percent of affected patients.

More recently, endovascular techniques are being used to treat strokes — the third leading cause of death in the U.S. UCLA interventional radiologists invented the first FDA-approved medical tool, the Mechanical Embolus Removal in Cerebral Ischemia, or MERCI device, to remove blood clots from the brain in patients experiencing an ischemic stroke. Until a few years ago, it was possible to treat ischemic stroke only with clot-busting medications that had to be administered within a few hours from initial onset of the event.

“MERCI has improved the treatment of stroke in two major ways,” Dr. Gonzalez explains. “Thanks to that development, we can now open arteries from the inside without medications or tools that may potentially increase complications, and we have an expanded window of time to treat patients. Rather than having only a few hours, we now can effectively treat stroke patients using mechanical devices from six to as many as 12 hours after onset of ischemic stroke symptoms.”

For Dr. Gonzalez, the next frontier is developing surgical techniques to prevent strokes. In a procedure called encephalo-duro-arteriosynangiosis (EDAS) surgery, he reroutes healthy arteries located below the ear and places them in close proximity to narrowed arteries in other areas of the brain. Over time, the rerouted arteries will grow, form new connections with nearby brain tissue and increase blood flow to diseased areas, Dr. Gonzalez explains. To date, he has performed the procedure in more than a 100 patients at UCLA, with good results and few complications. He received the American Heart Association 2012 Innovation Award in Stroke Research for his work in this area.

Over the next 10 years, Dr. Gonzalez anticipates that stroke research will focus on identifying methods to expand treatment for acute stroke patients, including methods of neuroprotection to improve the body’s resistance to stroke, and on advancing stem cell research in the area of brain tissue repair. The goal is to prevent both new and recurrent strokes. Approximately 25 percent of people who recover from their first stroke will have another one within five years.

“We’re happy to evaluate all patients in the UCLA Stroke Center, even those whose risk factors have already been treated,” Dr. Gonzalez says. “We’re available 24-7 with a complete spectrum of services. Every day, we make new discoveries and our patients are an important part of developing innovative techniques that will save lives in the future.”
Four Smart Ways to Make Patient Referrals

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