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Stephen J. Seiner, MD
Director, Psychiatric Neurotherapeutics Program
Medical Director, Electroconvulsive Therapy (ECT) Service

(L to R) Mahdi Razafsha, MD, associate medical director, TMS Clinic; Stephen J. Seiner, MD, director, Psychiatric Neurotherapeutics Program; Paula Bolton, MS, CNP, ANP-BC, program director, Psychiatric Neurotherapeutics Program; Joshua C. Brown, MD, PhD, medical director, TMS; Robert C. Meisner, MD, medical director, Ketamine Service

Neurotherapeutics Offer Hope for Treatment-Resistant Depression

As a young psychiatrist, Stephen Seiner, MD, witnessed how effective electroconvulsive therapy (ECT) was for some of the depressed patients he encountered during a geriatric fellowship at McLean. "I saw how lifesaving it could be for patients who did not respond to medication," said Seiner. After his fellowship, he stayed at McLean to focus on ECT.

Now, 25 years later, Seiner is medical director of McLean's ECT service and director of McLean's Psychiatric Neurotherapeutics Program (PNP), which includes ECT, transcranial magnetic stimulation (TMS), and ketamine. "The world of neurotherapeutics is constantly expanding," he explained. "It's a fascinating and promising area of psychiatry."

During ECT, a mild current is delivered through electrodes attached to the scalp, causing a brief seizure in the brain. The procedure, done under general anesthesia, has come a long way. Muscle relaxants, anesthesia, and medications to treat side effects have transformed the patient experience. "It's changed from a scary treatment to a quick and comfortable procedure," said Seiner.

McLean's ECT service, which treats more patients than any facility in the country, primarily addresses treatment-resistant depression, but can also be a treatment option for people suffering from mania, catatonia, and schizophrenia. Efficacy rates vary from illness to illness. For treatment-resistant depression, most patients have some response, and about 40-50% of patients go into remission. "For these patients, nothing – including medication – has been shown to be more effective than ECT," said Seiner.

Mary Gartland is one of those patients. In 2017, she was suffering from severe depression when she began ECT treatments at McLean. "It was the kindest, most compassionate care I have ever

received, in any sphere of medicine," said Gartland. "The clinicians were wise; they held hope when I had none." She continues to participate in support groups and has been a resource for patients considering ECT or ketamine. Gartland's belief in the treatment and her gratitude to McLean have inspired her to become a regular donor – supporting the ECT service philanthropically.

No one knows exactly how ECT works. It seems to affect neurotransmitters, stress hormones, regional blood flow, and plasticity – the brain's ability to rewire itself. "The simplest way to think about ECT is that it reboots the brain," explained Seiner. "It brings people back to their baseline, to themselves. It doesn't change personality, depression changes personality."

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Mary Gartland



Donor Mary Gartland

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Stephen Seiner, MD, (R) and his team in the Belmont ECT suite.

“The vision keeps expanding as new innovations come on board. We want to make sure we’re up to date with new technologies – the ones we think our patients with treatment-resistant illnesses will get the most benefit from. And we want to bring those services to McLean.”

Paula Bolton, MS, CNP, ANP-BC

Program Director, Psychiatric Neurotherapeutics Program

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The ECT service also collects data for research. Over the last several years, McLean researchers have analyzed their extensive database and published some of the largest studies done on ECT, showing that it can be an effective treatment for many different types of patients. “We’ve looked at patients of all ages, from late teens to the very old, patients with dementia and agitation, as well as understudied, underserved populations like transgender patients to show the advantages of ECT for specific groups,” said Seiner.

Current and former ECT patients and their families can get support through two McLean groups. One is a traditional support group, which meets virtually twice a month. The second group, a philanthropically supported program called ENCODE (Enhancing Cognitive Domains after ECT), also held virtually, teaches participants strategies to deal with side effects like memory loss. (See “ENCODE Addresses Most Troubling Side Effect of ECT: Memory Loss,” p.5.)

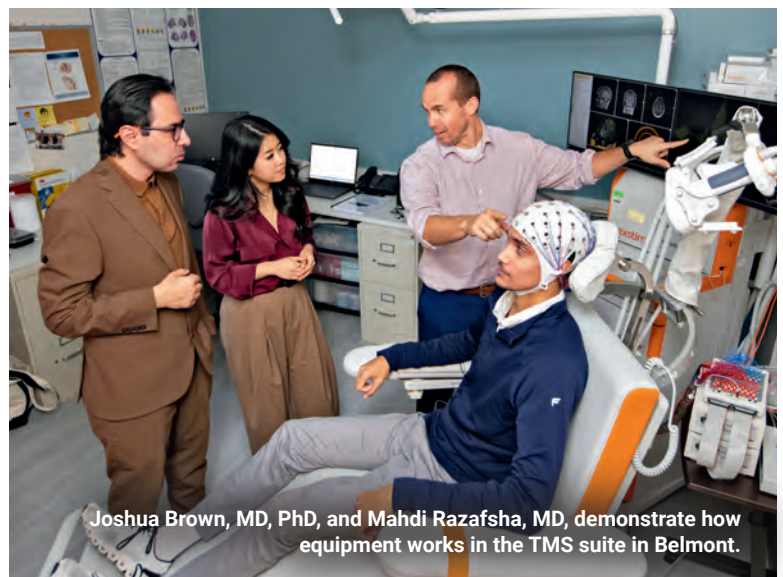
Transcranial Magnetic Stimulation

Some patients who are experiencing difficult to treat depression but don’t want to take time out of work or school may opt for transcranial magnetic stimulation (TMS) over ECT, according to Seiner. McLean has one of the busiest TMS services in the country and recently, the hospital launched a second TMS site in Middleborough, Mass. Also used to treat obsessive compulsive disorder, the process involves placing an electromagnetic coil on the patient’s head, then delivering magnetic pulses to the brain. It’s believed to work through a process called long-term potentiation – the strengthening of connections between brain cells. The procedure is quick – less than half an hour – and about 30% of patients go into remission, according to Josh Brown, MD, PhD, medical director of the TMS service.

The service has just begun offering accelerated TMS, which Brown believes has tremendous potential. In this model, patients undergo 10 sessions per day for five days vs. the standard 6-8 weeks of daily treatments. “They found a very strong remission and response rate which led to quick FDA clearance,” said Brown.

Brown and his collaborators are doing several studies focused on accelerated TMS with the goal of increasing the treatment’s efficacy. One involves innovating a method to precisely determine the amount of energy needed to activate the brain. (Typically, the dose is approximated.) In a second study, patients undergo treatment while taking a specific medication. “These are, arguably, the two most important innovations in TMS in the last 20 years,” shared Brown. “We’re looking at whether combining them will make TMS more effective.”

McLean also offers a virtual TMS support group, spearheaded by Teresa Henderson, NP, for patients at all stages of their treatment, as well as for their families. “Someone who is in an earlier stage of TMS and not getting better can talk to someone who is further along and can offer hope,” said Brown. McLean’s neurotherapeutic support groups are co-led by nurses and a peer – someone who has successfully completed treatment. “Peers provide that sense of hope and encouragement,” said Paula Bolton, MS, CNP, ANP-BC, program director of McLean’s neurotherapeutics program.



Joshua Brown, MD, PhD, and Mahdi Razafsha, MD, demonstrate how equipment works in the TMS suite in Belmont.



Joshua Brown, MD, PhD, poses in the new TMS suite at McLean Southeast.

Ketamine

Ketamine and its cousin esketamine round out McLean's neurotherapeutic offerings. Ketamine was developed as an anesthetic and later discovered to relieve symptoms in some people with treatment-resistant depression or bipolar disorder. Ketamine is delivered intravenously, and esketamine, a ketamine derivative, is administered through the nose. Patients are required to be on antidepressants when undergoing treatment.

"It's quick," said Robert Meisner, MD, medical director of McLean's ketamine service. "You can get relief within hours, but if a patient stops after one infusion, the depression will likely come back. Patients typically need three to eight infusions of ketamine, with tapered treatments after that."

As with ECT and TMS, researchers aren't exactly sure how ketamine and esketamine work. The leading theory is that they cause a connection, or synapse, between neurons in the brain to develop, a process called synaptogenesis, which can improve mood. Response rates range between 45-55%.

The service is about to release the largest comparative study of different forms of ketamine. In collaboration with Massachusetts General Hospital, the team is also using AI to determine which patients would benefit most from ECT, TMS, esketamine, or ketamine. A third study, in collaboration with Diego Pizzagalli, PhD, director of McLean's Center for Depression, Anxiety, and Stress Research, measures the brain's electrical activity to evaluate changes to the brain before and after a ketamine treatment.

McLean is also developing a cognitive behavioral therapy (CBT) group for patients receiving infusions. CBT is a highly effective psychotherapy that aims to change dysfunctional thoughts, emotions, and behaviors. "There is robust evidence for using CBT for depression," said Meisner. "Ketamine may, through synaptogenesis, allow for cognitive flexibility, and combining it with an evidence-based modality like CBT may increase efficacy."

McLean's neurotherapeutics team continues to explore a range of other novel treatments. "The vision keeps expanding as new innovations come on board," said Bolton. "We want to make sure we're up to date with new technologies — the ones we think our patients with treatment-resistant illnesses will get the most benefit from. And we want to bring those services to McLean."

ENCODE Addresses Most Troubling Side Effect of ECT: Memory Loss

When Cynthia Piltch underwent ECT many years ago, she forgot an entire summer. Long known to be a common side effect of ECT, memory loss is something most patients who benefit from ECT — like Piltch — learn to live with.

Fast forward a couple of decades. Piltch was working as a health educator and sat in on a class on cognitive remediation — a behavioral intervention that uses learning principles to improve cognitive functioning. "Why don't ECT patients get this kind of training?" Piltch asked. The teacher agreed, and the pair began working on the curriculum for a course. Piltch took her idea to McLean, where she volunteered with an ECT support group as a peer co-facilitator. The collaboration blossomed, and eventually ENCODE (Enhancing Cognitive Domains after ECT) was born.

The six-week, philanthropically funded program is co-facilitated by Piltch and two nurses. The group educates participants about how memory works and offers strategies to address cognitive challenges and the anxiety that accompanies them. Strategies include choosing a "memory spot" to consistently put everyday objects like phones and keys; carrying a notebook to jot down reminders; and looking at photos and other mementos to jog memories about forgotten events.

The program has a robust following, and Piltch's work has been recognized with a national patient advocacy award from the International Society for ECT and Neurostimulation (ISEN). Piltch is both enthusiastic about the program and so grateful for her ECT treatment that she also supports the effort philanthropically. Another donor, who also received lifesaving ECT, which successfully treated both her mania and her anxiety, made a significant gift to help launch ENCODE. Their motivation for supporting the program is to help quell unnecessary fear and offer ongoing support to people during and after treatment.

A recent study of ENCODE, published in the Journal of ECT, showed that after the program, participants' perception of their memories matched up more closely to their actual memories.

Piltch and the research team are now collaborating on a manual for ENCODE so the unique program can be replicated across the country.



Cynthia Piltch facilitates an ENCODE support group.