

MESSAGE FROM THE CHAIR

Dear Friends and Colleagues:

Hello from Augusta! As we continue to ride the COVID19 wave into 2021. I hope everyone remains safe (and vaccinated)! As many around the country, we too saw our largest surge after New Years with at one point almost one third of hospitalized patients testing positive for SARS-CoV2. This resulted in shut down to the Epilepsy Monitoring Unit, rapid transition of half of our ambulatory visits to telehealth, and conversion of our Neurointensive Care Unit to a primary destination for Medical Intensive Care Unit overflow. Our teams showed remarkable resilience in managing these sudden changes. Despite a somewhat unpredictable virus and uncertain future, here's hoping that vaccinations will soon guide us to a return to "normal".

Particular thanks go to Dr Moore-Hill, Debbie Langston, our residents and the many faculty who transformed our interview season to a virtual format. Despite the inherent challenges in meeting candidates and presenting our program via Zoom, we interviewed twice the number that we have previously and showed off the dynamism of our department.

I also wanted to remind you that our Neurology Grand Rounds are now streamed live weekly each Thursday morning at 8 am. Please join our current residents, and faculty to stay up to date on our constantly evolving field. You should receive a weekly email from Deana Brown (dbrown3@augusta.edu) containing the grand rounds announcement including instructions on how to log on to the lecture and obtain CME credit if interested. Please contact Deana with any questions and if needed to provide us with an alternative preferred email contact.

From the solid foundation built by our faculty and residents, we are erecting a robust department emphasizing clinical excellence and tripartite academic mission. Please help us by clicking on the attached Doximity link voting for "Augusta University Medical Center." Even a few votes separate us from the pack, increase recognition of our efforts and help us to continue to attract the best and brightest. We will spend every effort to ensure that the clinical neurosciences team at AUMC becomes worthy of your generosity and trust.

Finally, I want to announce to my knowledge the first Department of Neurology alumni reunion for this fall. Amazingly, our department has turned 50! This day is a credit to all of our current and former residents and faculty and to celebrate we are planning an all-day event. We are lining up cutting edge CME presentations from current and former faculty and residents intermingled with plenty of time to reminisce and catch up with former friends. Please save the date for October 16, 2021. We will be back to you soon with more details

Best Wishes,



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UPCOMING EVENT

Medical College of Georgia
at AUGUSTA UNIVERSITY PRESENTS

• NEUROLOGY ALUMNI REUNION

50th ANNIVERSARY

October 16, 2021



NEW FACULTY MEMBERS

Mithilesh Siddu, MD Assistant Professor



Dr Mithilesh Siddu, joined neurology faculty in September 2020 as a vascular neurologist and clinician- educator. After graduating from Andhra Medical College, India, he moved to USA and completed his neurology residency at the George Washington University School of Medicine and Health Sciences in Washington

DC followed by a Vascular Neurology Fellowship at University Of Miami/Jackson Memorial Hospital in Miami Florida in 2020. He is clinically interested in acute stroke management, secondary stroke prevention and intracranial atherosclerosis. Outside of work, he enjoys playing and watching cricket, spending time with wife, friends and family.

Dilip Singh, MD Assistant Professor



Dr Dilip Singh joined neurology faculty in July 2020 as a stroke neurologist. He completed his medical schooling from Seth G S Medical College and KEM hospital in India. He then completed training in internal medicine followed by neurology in India. He worked as an attending neurologist in India for 2 years. He then completed his stroke fellowship from Calgary stroke program at University of Calgary in Canada. He completed his neurology training in USA from The Ohio State University Medical Center. His clinical interests are acute stroke management, Carotid artery disease, TIA secondary stroke prevention. He likes taking care of acute stroke patients as well as patients with acute neurologic disorders. He also runs stroke clinic and general neurology clinic. Outside work, he enjoys spending time with his son and wife. He enjoys running and playing different sports.

John Henson, MD Professor



Dr. John Henson, former medical director of the Ivy Center for Advanced Brain Tumor Treatment at the Swedish Neuroscience Institute in Seattle, is the new director of neuro-oncology at the Medical College of Georgia and the Georgia Cancer Center.

Henson, a neuro-oncologist with more than two decades experience treating patients with brain tumors and other tumors of the nervous system, also served as director of the Swedish Neurofibromatosis Center and the Swedish Neuroscience Institute. He joined MCG as a professor in the Department of Neurology and the Division of Hematology/Oncology in the Department of Medicine in January 2021. He will work collaboratively with the MCG Departments of Medicine, Neurology and Neurosurgery to develop new neuro-oncology services for the medical school and cancer center.

Danielle Weiss, MD Assistant Professor



Dr. Danielle Weiss, joined neurology faculty in September 2020 as an epilepsy neurologist and clinician-educator. She earned her bachelors in science degree in neuroscience and medical degree from the University of Miami, Florida. Following the footsteps of Lebron James, she moved to Cleveland, Ohio, to complete her neurology residency and epilepsy fellowship at Case Western Reserve University/University Hospitals. She is clinically interested in epilepsy management, epilepsy surgery, quantitative EEG, and migraine. Outside of work, she enjoys gardening, cooking, and watching basketball with her husband.

UPCOMING EVENT

Medical College of Georgia at AUGUSTA UNIVERSITY PRESENTS

• WHAT'S NEW IN NEUROSURGERY & NEUROLOGY?

inaugural meeting
October 2, 2021

Augusta Marriott at the Convention Center | 2 10th Street | Augusta, GA 30901



The MCG Department of Neurology always appreciates donations to support our residents, programs and research. You can make a donation by clicking this link. On behalf of those who we educate and care for, thank you for supporting the MCG Department of Neurology.

<https://mcgfoundation.org/neurologysupport/>

FEATURE ARTICLE

Essential Tremor Evaluation and Treatment

Colin McLeod, MD

Essential Tremor (ET) is also known as benign essential tremor, or family tremor. It is the most common cause of tremor, and is one of the most common neurologic disorders. ET affects an estimated 10 million Americans. It has a strong hereditary component, tracing in more than 50% of cases.

ET has commonly been called ‘benign’, however disabling symptoms are not uncommon. Essential Tremor can result in the inability to independently eat, drink, dress, turn a key, write or many other actions. It can have disabling effect on motor tasks of a patient’s work or hobby while in the prime of life. The patient perceived social stigma of tremor symptoms can also lead to seclusion. As ET tends to be alcohol responsive, rarely patient/family alcoholism can actually result from self-treatment.

The most common symptom of ET is bilateral arm action and postural tremor, but tremor can affect the voice, face, head, trunk, and legs. ET is now recognized as a spectrum disorder with potential findings of additional mild appendicular or gait ataxia, myoclonus, or accompanying dystonia.

It is thought that abnormal functioning of the deeper cerebellum, and therefore the dentate-thalamic-cortical circuit is the site of pathophysiology. There is no evidence of neurodegeneration. There are no specific imaging studies or genetic testing for ET. The diagnosis is made based on clinical examination and history.

Treatment is symptomatic only, there is no underlying cure for this circuit disorder. Treatment should be aimed at disabled activities, and goals should be specifically discussed with individual patients.

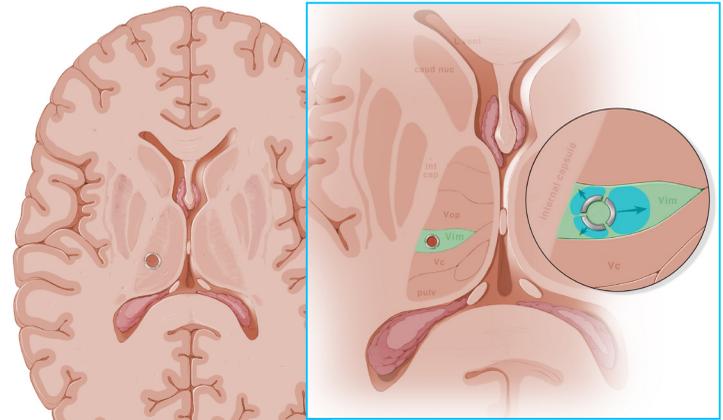
Non-medication treatments: “Cala Trio” is an external wrist worn bracelet utilizing peripheral nerve stimulation that despite potential for placebo effect, has demonstrated mild transient efficacy in multi-center study, it was FDA cleared in 2020.

Medication treatments: Primidone and Propranolol are first line treatments well known to Neurologists. Drug interactions and prohibitive side effects can limit efficacy especially at often required higher dosing. Often excessively high dosing does not provide additional benefit. Nighttime dosing can limit some initial side effects. Certainly in some ET patients these medications have clinical efficacy.

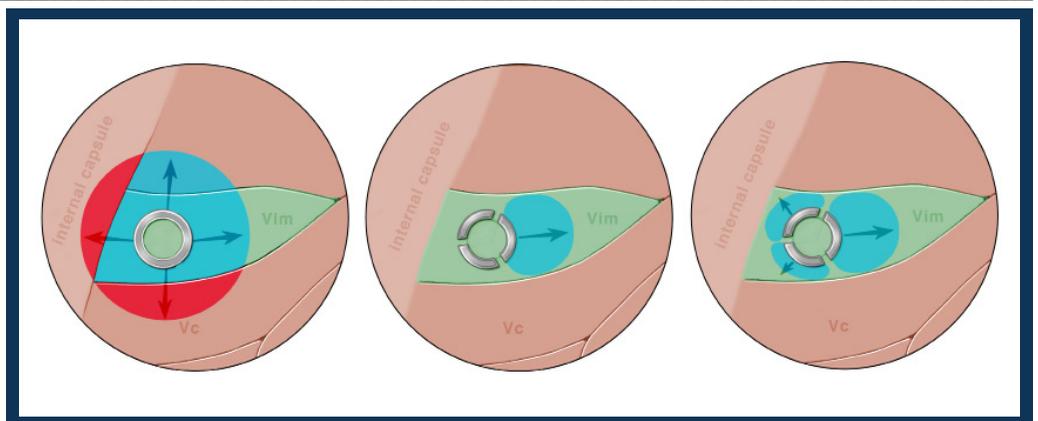
Additional medications commonly utilized include Benzodiazepines (Clonazepam most commonly), Topiramate, Gabapentin, and others. These typically have prohibitive long term side effect profile or limited therapeutic window if any clear efficacy at all.

Surgical treatments: Approximately 50% of essential tremor patients report significant symptoms refractory to oral medications. The goal population for ET DBS treatment are working age with disabling symptoms proven to have medication refractory ET, rather than the most elderly population who may have more comorbidities and risk of the below elective procedures.

MRI guided Focused Ultrasound is a 2016 FDA approved procedure using thermal ablation by MRI targeting. In the pivotal trial, nearly 50% of tremor was reduced on average. Studies are ongoing regarding long-term efficacy and permanent side effect profile as this technique evolves. Only unilateral (therefore one side of the body’s tremors) can be treated due to risk of bilateral lesion induced ataxia, dysarthria, walking or thinking problems, due to off-target lesions.



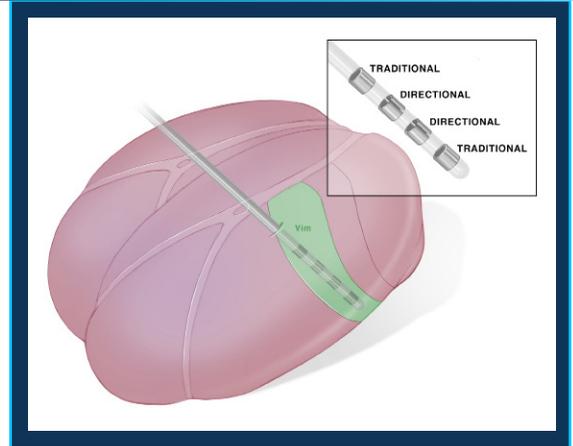
Axial view of a single DBS level/contact shown: Traditional stimulation, Segment stimulation, and multiple independent Segment stimulation, pictured left to right.



Stimulation of off-target, adjacent structures results in acute, reversible side effects (lateral to VIM stimulation of internal capsule resulting in muscle contractions/dysarthria, posterior to VIM stimulation of medial lemniscus tracts result in paresthesia, medial stimulation in ventral thalamus more rarely result in ataxia).

Deep Brain Stimulation remains the most common and effective surgical treatment for disabling ET. Stimulation of the Ventral Intermediate (VIM) nucleus of the thalamus has been studied/utilized as treatment for ET nearly four decades. DBS found to have significant benefit over older Thalamotomy direct lesioning technique, for sake of reversible stimulation side effects. FDA approval of DBS for ET in 1999.

DBS includes option for unilateral or bilateral brain surgery to treat one side or both sides of the body's tremors. Based on experienced center studies, the International Essential Tremor Foundation publishes 90% of patients receive significant tremor reduction, and long-term studies have demonstrated 90% appendicular tremor reduction and 85% improvement in tremor related quality of life scale. Note axial tremor symptoms (voice, head, and trunk) are not a reliable single goal to move forward with DBS surgery, but are often improved significantly (especially in bilateral DBS).



Implanted DBS leads are less than 1.5 millimeter in diameter, with 4 contacts available for use [figure 2]. The operating room procedure is minimally invasive, under mild anesthesia without intubation. Complications are rare but surgery does carry appreciated risk of acute stroke, infection, or seizure.

At Augusta University, Functional Neurosurgery and Movement Disorders Neurology collaborate at each step. The first step in targeting the millimeters of VIM structure, and not adjacent structures, is accomplished preoperatively by our MRI brain DBS protocol. This plan is made on stereotactic software, and then fused to day-of CT head with stereotactic frame on patient.

Augusta University Movement Disorder Neurologist drives a microelectrode recording (MER) tip through a small burr hole on the frame stage, charting patient electrophysiology. Cell layers and neuron firing are characterized/measured while driving to target during awake examination. Therefore assessing the original targeting plan, localizing kinesthetic and tremor cells of the VIM nucleus and surround. If necessary, additional MER-guided passes to better map the functional neuroanatomy can be performed, moving millimeter(s) in parallel trajectories.

Test stimulation with MER equipment, and then the implanted DBS lead, is performed to confirm efficacy and side effect thresholds. Stimulation of off-target, adjacent structures results in acute, reversible side effects [see caption figure 3]. Therapeutic capture of tremor without stimulation side effects is the goal outcome before leaving the operating room, however full therapeutic stimulation may be limited in some cases by sub-millimeter placement resulting in need for complex programming to improve a tight therapeutic window.

Innovations in Deep Brain Stimulation have been coming rapidly in very recent years, with a prior relative drought from 1999-2015. Technological jumps have been fueled by new companies entering the field. Until recently, Medtronic was the only FDA approved DBS device in 1999. Now, Boston Scientific and Abbott have FDA approved devices. All companies have made continued upgrades in the past two years, to both the DBS lead technology as well as significant chest battery upgrades.

Innovation has been directed toward shaping stimulation for more precise therapy that maximizes benefit and avoids the side effects of off-target stimulation. Past upgrades included constant current control, and smaller spacing between contacts to give more usable options in these tight windows.

In 2020, Augusta University began to implant the newest wave of FDA approved devices. These leads include segmented contacts and multiple independent current control. [Figure 2, Figure 3].

Segmentation of the contacts gives the Neurologist "directional" programming ability, stimulating into benefit and away from off target side effect. Now utilized in clinical practice, this clearly improves the therapeutic window of select, more difficult DBS lead placements, further improving the likelihood of excellent tremor benefit with no off-target stimulation side effect. Multiple independent current control allows independent, reliable stimulation control over different levels and segments, again maximizing benefit and reducing off-target side effect.

Summary:

Deep Brain Stimulation surgery in a correctly selected Essential Tremor patient can be exquisitely effective for their disabling appendicular tremor symptoms. After decades of minimal advancement for a surgery that was relatively effective in optimal conditions, there has been a recent significant acceleration in device competition and outcome-improving upgrades. This is an exciting time to utilize evolving Deep Brain Stimulation technology to help our patients.

