



Mission in Tanzania

Before we left for Tanzania this year, I looked back at the report from our 2009 trip. There were six of us that year—I was the only neurosurgeon, and I had with me one neurotrauma surgeon, one neurosurgical resident, one operating room nurse, a biomedical engineer, and a medical student. We supervised the unloading of a container of donated equipment, and we got to work evaluating conditions in three different hospitals, where we trained local doctors in neurosurgical procedures for patients with traumatic brain and spine injuries as well as children with severe and untreated birth defects.

We certainly had our work cut out for us. The facilities were not up to Western standards of sanitation, and poor infrastructure meant periodic interruptions in power and water supplies. Local medical providers lacked training in the needs of neurosurgical patients, including routine steps like raising the head of the bed for brain trauma patients.

Ten years later, I am so proud of what we've accomplished, and so impressed by the progress that's been made in the country's infrastructure (today we are not surprised by water or power outages). We learned quickly that equipment and supplies have limited usefulness if nobody knows how to maintain or repair them. Visiting a country once a year to perform surgery saves a few lives, but training local providers to perform those surgeries every day saves thousands. A far cry from the six of us who traveled in 2009, our team this year consisted of 24 Western providers, including neurosurgeons, orthopedic surgeons, a rehabilitation medicine doctor, nurse practitioners, physiotherapists, and a physician assistant.

When we go to Tanzania today, we work with doctors we've trained (both there and in New York) and we continue to teach more providers, not only from Tanzania but from other African nations—eager professionals who travel many miles to attend the formal course we started six years ago. We offer three days of intensive classroom training before moving to the OR for hands-on instruction. At the end of every trip we leave behind more providers who take new skills and knowledge back to the ORs and recovery rooms, where they offer better care.

There is still much to be done. We are training African doctors in the science of evidence-based medicine, developing databases of patients with traumatic brain and spine injuries in order to develop protocols that work with locally available supplies. We are also teaching medical staff to create a new organizational structure within the programs to better implement those new protocols. Finally, we had the opportunity this year to reach beyond neurotrauma, as we started training in complex reconstruction for spinal deformity (see page 3) and the medical and surgical management of epilepsy (see page 2).

The 2009 report, and all the annual reports since then, are available at weillcornellbrainandspine.org/tanzania—I encourage you to take a look for yourselves to see how far your generous support has taken us. I am so grateful to those whose gifts have made it possible for this program to truly take root. Your donations are changing lives every single day, and I thank you.



Help support our ongoing work. Make a donation today at weillcornellbrainandspine.org/tanzania

New Focus on Epilepsy

Expanding our efforts to include management of seizure disorders will help fill a desperate need in African nations

For the past decade, our neurosurgical program in Tanzania has focused on neurotrauma and birth defects largely because they affect children and young adults; returning them to good health results in a large number of additional productive years of life. This year we expanded our scope to include seizure disorders, which also disproportionately affect children. Untreated seizures can lead to cognitive deficits and greatly limit a young patient's ability to lead a normal life, making epilepsy an important area of focus for education and surgical development.

Tanzania is one of several developing nations with a high incidence of epilepsy due to the prevalence of conditions (parasitic, bacterial, or viral infections; perinatal brain damage; head injuries; toxic agents) that can cause seizures. The burden on children is high, but the multi-disciplinary tools to evaluate and treat the condition are still in development in these countries. Since early evaluation and intervention can prevent cognitive and functional decline, teaching local providers to assess and treat these patients can greatly serve communities and children.

Once properly diagnosed, many cases of epilepsy can be managed medically by a neurologist. Although not all patients respond to anti-seizure medication, many of these refractory cases can be treated surgically. As a result, neurologists and neurosurgeons work together in a comprehensive effort to provide the best care for epilepsy patients, determining what medication regimens are most appropriate and which patients will benefit from surgical intervention.

That's why it was so important that this year's classroom course included, for the first time, a full session on epilepsy led by pediatric neurosurgeon Caitlin Hoffman, M.D., of Weill Cornell Medicine and pediatric neurologist Evan Lewis, M.D., of the Neurology Centre of Toronto. Lectures began with an overview of epilepsy, followed by detailed presentations on proper diagnosis, EEG interpretation, and selecting the most effective treatment option. After the lectures, Dr. Hoffman and Dr. Lewis conducted an interactive case review to put real examples of patients in front of the participants. Dr. Lewis is currently planning a webinar on epilepsy diagnosis and management for early next year.

Our new epilepsy effort made news in Tanzania when Dr. Hoffman performed the first-ever functional hemispherotomy in Tanzania on a four-year-old boy with intractable seizures. This procedure involves disconnecting one hemisphere of the brain from the other and can greatly reduce or even eliminate seizures. Dr. Hoffman was assisted by Dr. Whitney Parker, a Weill Cornell Medicine neurosurgical resident, as well as by Dr. Japhet Ngerageza, the patient's attending neurosurgeon. The surgery was successful, and the little boy is now seizure free.

We hope for this to represent the beginning of a successful collaboration to build sustainable, effective care for children with epilepsy in Tanzania.



Top: Dr. Japhet Ngerageza, Dr. Caitlin Hoffman, and Dr. Evan Lewis before the first-ever hemispherotomy performed in Tanzania. Below, Dr. Hoffman and Dr. Parker (left) teach local surgeons the procedure



Global Fellows Making a Difference

One of the most effective elements of our program in Tanzania is our Global Health Fellowship, begun in 2016. Each year, in partnership with the Foundation for International Education in Neurological Surgery (FIENS), we fund a neurosurgeon to work in Tanzania to provide direct care to patients and day-to-day training to local providers. This daily reinforcement of annual training has proven to be invaluable. Our in-country fellows also participate in ongoing research and the development of treatment protocols.

Dr. Albert Lazaro has completed his 2018-2019 posting, and we welcomed Dr. Beverly Cheserem as the 2019-2020 fellow. Dr. Cheserem, who was raised in Kenya before receiving her medical and neurosurgical training in the U.K., will continue to implement a newly developed protocol to get spine trauma patients to surgery within 72 hours. The protocol was developed by Dr. Scott Zuckerman, who has been working as interim Global Health fellow, accompanied by his wife, Autumn Zuckerman, PharmD.

That new protocol revealed the need to improve peri-operative care in the ICU and ward, so another new protocol is being developed to optimize all stages of patient care. Dr. Cheserem is also supporting the development of a critical care medication reference guide and a prescription chart to im-

prove drug treatment compliance.

We were fortunate to have Dr. Zuckerman arrive in July, filling in until Dr. Cheserem arrived in October. He will remain until the end of 2019. His willingness to take the assignment and stay on through the end of the year has been valuable to us as Dr. Cheserem begins her fellowship year.

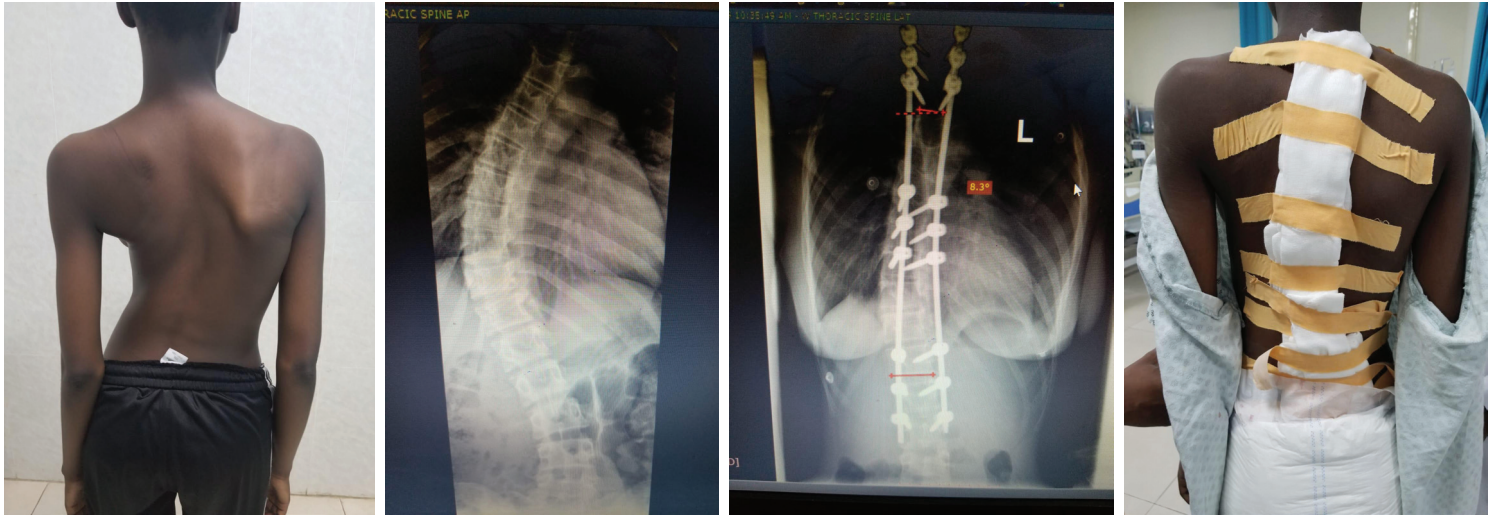
We are delighted to announce that we have received funding for a second permanent Global Health Fellowship, this one in neurocritical care. Having Western-trained fellows in neurological surgery and neurocritical care in Tanzania will provide for more seamless care before, during, and after surgery. We are now recruiting for the 2020-2021 fellowship year. Visit weillcornellbrainandspine.org/tanzania for details.



A reunion of our Global Fellows: Dr. Scott Zuckerman, Dr. Beverly Cheserem, Dr. Albert Lazaro, and Dr. Andreas Leidinger with Dr. Härtl

Bringing Relief to a Child with a Spinal Deformity

Spinal deformities can be heartbreaking, but are rarely treatable surgically in developing nations. We were glad to have with us this year Dr. Alaaeldin Ahmad, a pediatric orthopedic surgeon at Palestine Polytechnic University, and Dr. Christopher M. Bonfield, a pediatric neurosurgeon at Vanderbilt University, who together performed the first correction surgery in Tanzania on a young patient with a severe case of scoliosis. From left to right, these photos show the patient and her x-ray before the surgery, then after. The patient is doing well and is walking very well. We are grateful to Depuy Synthes for equipment and support, and for the technical assistance of Nicholas Matthews.



How can you help:

All gifts are 100% tax deductible. There are many ways to give:

By check: Make check payable to Weill Cornell Medical College, with Mission in Tanzania in the memo area. Please mail your check to:

Weill Cornell Medicine Brain and Spine Center
c/o Roseann Henry, Director of Special Projects
525 East 68th Street, Box 99
New York, NY 10065

By credit card: Make a secure online donation by visiting our website at weillcornellbrainandspine.org/tanzania and clicking on the "Donate Now" button.

Please contact Christophe Larroque at cjl2006@med.cornell.edu to learn about other ways to contribute.

Your contribution will be used for:

- Data collection of neurosurgery outcomes at the Muhimbili Orthopedic Institute (MOI). We support a salary for a data collection person and the maintenance of the database.
- Support for fellowship program that brings Tanzanian MDs to the Weill Cornell Medicine Brain and Spine Center and sends fellows from the U.S. and Europe to Tanzania.
- Support of neurosurgery courses at MOI. For example, we may help pay for travel of African MDs to the courses in Tanzania, acquisition of cadavers for practical courses, and costs for meeting venues.
- We DO NOT use your contribution to support travel of any U.S. surgeons to Tanzania.
- We DO NOT use your contribution to purchase any medical supplies or equipment. We may, however, use it to fund a container to ship urgently needed equipment to Tanzania (for example, an operating microscope).



This year's course drew more than 160 participants from six East African nations. Three days in a classroom covered brain and spine trauma, ICU care, epilepsy, and rehabilitation medicine; the course included a separate track for nursing (top left). Dr. Hamisi Shabani (top right) joined a teaching faculty that included providers from Weill Cornell Medicine in New York as well as experts from elsewhere in the United States and Canada plus Europe and the Middle East. Bottom left, Dr. Karol Budohoski of Cambridge University; bottom right, rehab medicine specialist Dr. Leroy Lindsay of Weill Cornell.

A Minimally Invasive Discectomy

Compared with open surgery, minimally invasive procedures result in faster recovery times, reduced infection rates, and fewer post-operative complications. Neurosurgical patients in the West are offered minimally invasive options whenever possible, and they would be excellent options in developing nations. Unfortunately, minimally invasive procedures typically require the use of surgical microscopes and other advanced tools that not available everywhere. It's ironic, then, that patients who could most benefit from these procedures are the least likely to have them available.

During this year's trip to Tanzania, Dr. Härtl taught local faculty how to perform a minimally invasive microdiscectomy using locally available tools and equipment. He worked on the procedure with Dr. Japhet Ngerageza, who trained with him during a 2014-2015 fellowship in New York and is now an attending neurosurgeon at Muhimbili University of Health and Allied Sciences (MUHAS). The patient, who had severe nerve compression and lumbar spinal stenosis, did very well after surgery.

This was also the first procedure in Tanzania to use intraoperative neuromonitoring, an advanced capability that allows a surgeon to monitor a patient's nervous system during a brain or spine procedure. Having this information available in real time can prevent injury or complications, and it has become invaluable to Western neurosurgeons. We are grateful to Depuy Synthes for providing supplies (and for the assistance of Nicholas Matthews) and to Accurate Neuromonitoring for the loan of equipment (and to technician Fernando Honorio for providing demonstrations and training. We hope to send more neuromonitoring technicians to Tanzania or bring African providers to Weill Cornell for training.



Dr. Härtl and Dr. Ngerageza performing microscopic surgery together.

ABOUT THE WEILL CORNELL NEUROSURGERY PROGRAM IN TANZANIA

The Neurosurgical Mission in Tanzania, now in its eleventh year, is conducted in collaboration with the Foundation for International Education in Neurological Surgery (FIENS) and consists of several components:

1. Our multidisciplinary teams of surgeons, anesthesiologists, nurses, and biomedical engineers train local health care providers to deliver basic neurosurgical care using locally available equipment and resources. Each year we hold a "hands-on" course for doctors and nurses in Tanzania, empowering them with a high level of expertise in the management of neurosurgical disorders and neurosurgical procedures. Providing the highest level of surgical training to these eager, talented surgeons impacts every other level of care—nursing, anesthesia, intensive care treatment, and general ward care. Setting the bar high encourages a positive response and team effort involving all areas.
2. After the course our faculty members stay in Tanzania and operate together with local colleagues. Together we are operating on children and adults in the region, with very good surgical outcomes.
3. Promising African surgeons are selected for short-term observational fellowships at Weill Cornell Medical College in New York. The purpose of this fellowship is to provide motivated surgeons firsthand experience with high-level surgical care. The close working relationship also greatly facilitates the communication between the Weill Cornell Medicine team in New York and the MOI surgeons once the surgeon has returned to Tanzania.
4. Each year we fund one European or North American neurosurgeon to live and work in Tanzania for 12 months; in 2020 we will add a second funded fellowship, this one in ICU care.
5. Weekly conference calls and Skype conferences are held between the Weill Cornell team and their colleagues at MOI to discuss challenging cases, patient management, and ongoing research.
6. An IRB-approved database for traumatic brain and spinal injury has been implemented at MOI to monitor patient care and ensure quality. This and previous projects have led to several publications in peer-reviewed journals.
7. Tanzanian and Western teams prepare joint scientific publications and lectures at medical meetings.

Dr. Härtl hopes that these efforts will over time improve patient outcomes and serve as a model for other hospitals and programs.

For more information please see our Facebook page:
<https://www.facebook.com/TanzaniaNeurosurgeryProject/>