



UNIVERSITY of PITTSBURGH **neurosurgery**news

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Pediatric Neurosurgery at Children's a national leader

The Pediatric Neurosurgery department at the Children's Hospital of Pittsburgh is one of the top five centers for pediatric neurosurgery in the country providing care for children with tumors, spinal deformities, cranial malformations and disorders such as spasticity and epilepsy.

This center, led by Dr. A. Leland Albright and assisted by Drs. Ian Pollack and P. David Adelson, has gained international recognition for their treatment of pediatric brain tumors, cerebral palsy and traumatic brain injury.

"We provide a very high level of care," Albright says in explaining the center's highly regarded status. "We keep careful accounts of our outcomes. This published data is a benchmark against which other people can compare their results. For example, our success rate with shunts is better than has ever been reported by anybody."

Albright points out the department publishes "more manuscripts, books and book chapters than any other pediatric neurosurgery department in the world."

More importantly, though, Albright attributes much of the center's success to its people. "Ian is probably the one pediatric neurosurgeon who knows the most about brain tumors," he says, "and David is probably the leader in pediatric head injury in both research and in practice. We do state-of-the-art research and work here."

Dr. Pollack's primary research focuses on identifying and evaluating innovative strategies for treating

"One-hundred years from now, it will not matter what type of car you drove, nor what kind of house you lived in, nor how much money you had in the bank, nor what my clothes looked like. But the world may be a little better because I was important in the life of a child."

— from poster in Dr. A. Leland Albright's office

malignant brain tumors, improving the treatment of children with brain tumors, and optimizing the management of childhood craniofacial disorders. Dr. Adelson maintains an active clinical and laboratory research program that focuses on the comprehensive aspects of traumatic brain injury, plasticity and recovery in children.

The Children's Hospital staff also plays a large role in the success enjoyed at the center, according to Dr. Albright. "The advantage of being at Children's is not so much the reputation of the name, but the quality of the staff here. The personal quality care of the anesthesiologist, the nurse and everyone else involved is exceptional. The group of people we collaborate with is probably the best in the country."

This level of care has obviously not gone unnoticed. Dr. Albright states that the department sees "kids week-in and week-out from all over the country."

Albright is proud of the work done at the center. "We've tried very hard to contribute to the development of various pediatric neurosurgery elements," he says. "We're much better than we were five years ago and we're striving very hard to be better five years from now."

In the future — in addition to acquiring additional funding for the work done by Drs. Pollack and Adelson — Dr. Albright would like to establish a national center for cerebral palsy, a goal he is earnestly working to accomplish.

Not long ago someone asked Dr. Albright what he was most pleased of, or proud of, in the last 10 or 20 years of work. Pointing to a bulletin board in his office containing numerous photos of former patients, he said, "It's not one thing, but instead, it's the privilege associated with participating in the care of all those kids. At the very minimum, it's the ability to give someone hope. It's purely a gift to be able to do that." ■



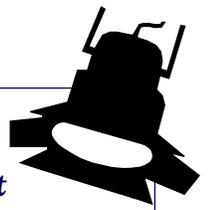
Dr. Adelson



Dr. Pollack

Dr. A. Leland Albright, chief of pediatric neurosurgery, with patient.





Spotlight: Sports Neurosurgery

Drs. Marion, Maroon, Sheptak work on 'team' effort

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(Vice Chairman)
Peter Sheptak, MD
(Vice Chairman, Clinical Affairs)

Clinical Associate Professor

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Clinical Assistant Professors

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Matt ElKadi, MD, PhD
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Research Professor

Edwin Nemoto, PhD

Research Associate Professors

John Herron, PhD
Mingui Sun, PhD

Research Assistant Professors

Hideho Okada, MD, PhD
Ronda Pindzola, PhD
Ajay Niranjana, MCh

Visiting Assistant Professor

Anthony Fabio, PhD

Research Instructor

Wendy Fellows-Mayle, MA

Visiting Instructor

Catherine A. Mazzola, MD

The world of sports medicine has become increasingly complicated. Athletes today are larger and faster than their predecessors and the injuries sustained are often more serious. With alarming frequency these injuries often involve the head, neck and back.

Three faculty members from the Department of Neurological Surgery lend their expertise to local sports teams in this demanding discipline. Dr. Donald Marion, director of the Brain Trauma Center, is team neurosurgeon for the University of Pittsburgh athletic department; Dr. Joseph Maroon, department vice chairman, is team neurosurgeon for the NFL's Pittsburgh Steelers; and Dr. Peter Sheptak, department vice chairman for clinical affairs, is neurosurgeon consultant for the NHL's Pittsburgh Penguins.

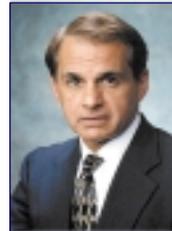
"Sports-related concussions present the most unique challenge due to the difficulty in determining when you allow an athlete to return to play," says Dr. Marion. "Years ago there was considerable pressure on coaches, administrators, and even the players themselves to return to play as soon as possible." Now, according to Dr. Marion, there is far more willingness to hold back an athlete until all symptoms are gone, particularly given recent high-profile cases such as those involving NFL stars Troy Aikman and Steve Young.

Dr. Maroon agrees most athletes today are more cautious. The challenge for the doctor, he continues, "is managing brain and spinal injuries in correct ways so as to not jeopardize an athlete's health, but at the same time not denying the athlete an opportunity to participate in his profession."

Dr. Sheptak points out there is more of a demand for the professional athlete to return to "normal life" than the average patient simply because of the nature of their profession. But, he continues, because of the financial nature of today's sports environment,



Dr. Marion



Dr. Maroon



Dr. Sheptak

and the huge investment teams have in their players, teams are very reluctant to let a player return to action before he is absolutely ready. Besides the obvious health concerns, a team would sooner miss a player for the year as opposed to losing that player for an entire career.

To help treat concussions, all three doctors are involved with The Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) program — helped pioneered by Dr. Maroon — underway at the UPMC Sports Medicine Department. The program is the first totally automated system allowing athletic trainers to more accurately determine the severity of a concussion and to better dictate a return to play.

"Years ago (former Steeler head coach) Chuck Noll challenged me to come up with a system to

better treat concussions," Dr. Maroon said. "We started with a pencil test and gradually built it into a computer-based screening." That screening is employed by hundreds of pro, college and high school teams today.

To augment the ImPACT program, the National Institutes of Health recently awarded Dr. Marion and his research team a \$3 million grant to perform a long-term study of sports-related concussions using functional MRIs (see page 6).

All three docs have been with their teams for 20+ years with Dr. Sheptak having the longest stint at 29 years. He may also arguably enjoy the most celebrated case. He was the surgeon overseeing hockey hall-of-famer Mario Lemieux's well-documented back surgery. Dr. Sheptak states that he is "very pleased" with Lemieux's recovery — both on and off the ice.

Despite the notoriety of the Lemieux case, Dr. Sheptak stresses that Lemieux "was just a patient. In fact, his case was very straightforward. You treat everyone the same — to the best of your ability — professional athlete or otherwise." ■

Lumbar spinal stenosis: a common challenge

by Peter Gerszten, MD, MPH

Lumbar spinal stenosis (LSS) is defined as any narrowing of the spinal canal, nerve root canal, and/or intervertebral foramina. The etiology of LSS can be classified as congenital, acquired or a combination of the two. The majority of cases of LSS are acquired, most often due to facet joint arthrosis, thickening and bulging of the ligamentum flavum, posterior bulging of the anterior vertebral discs, spondylolisthesis and/or post-surgical fibrosis. Acquired LSS can also result from fractures, tumors, infection, or systemic bone disease, but these cases are rare. Further classification of LSS can be made on the basis of the anatomical location of the narrowing. Central LSS involves the narrowing of the spinal canal around the nerve root or cauda aquina within the dural sac. Lateral LSS occurs around the spinal nerve in the nerve root canal and/or the intervertebral foramen.

LSS has been described for over a century. But, it was not until 1949 that it was actually clinically defined. Between 250,000 and 400,000 Americans have symptoms referable to LSS. This represents 5/1,000 Americans over the age of 50. Men are affected more than women. It is believed that the incidence will dramatically increase in the future as the population ages.

The pathology of LSS has a well-described structural component as well as a dynamic component. Research has demonstrated that extension of the lumbar spine results in a narrowing of the dimensions of both the central and lateral spinal canals. In a severely stenotic spine, the narrowing with spinal extension can increase to almost 70%. A second dynamic factor capable of narrowing the dimensions of the spinal canal is axial loading and is experienced by the spine during standing or walking.

The natural history of LSS is unpredictable. It is not preventable by diet or exercise. It is usually progressive, resulting in chronic pain. A misdiagnosis of LSS risks extended suffering (often diagnosed as "arthritis"), unnecessary surgery (e.g. hip replacement surgery), or a misdifferential diagnosis (e.g. vascular claudication, spinal fractures, spinal tumor).

The hallmark finding of patients with LSS is the postural-dependency of the symptoms. Symptoms are typically reported to worsen with standing or walking and be relieved or diminished by sitting. "Neurogenic claudication" is defined as poorly localized pain, paresthesias and cramping of one or both lower extremities of a neurological origin that is brought on by walking and is relieved by sitting. Patients may also develop bowel or bladder dysfunction.

The diagnosis of LSS requires a careful history and physical examination. Imaging studies include an MRI or a myelogram. LSS will not show up on plain x-rays. The differential diagnosis may be challenging because the symptoms are often intermittent and may also differ from patient to patient. Patients are able to manage pain by limiting activity, thus limiting the symptoms. Finally, co-morbidities are common in older patients (back strain, arthritis, osteoporosis, etc.).

The treatment of LSS involves both a non-surgical and surgical component. Patients are often first treated with medications that include analgesics, anti-spasmodics, and anti-inflammatories. Oral steroids are sometimes given. Epidural steroid injections are somewhat controversial.

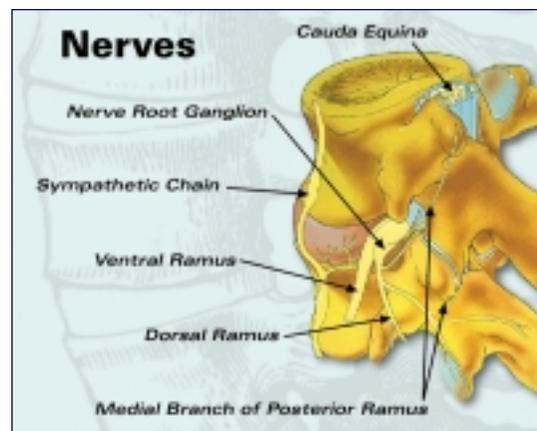
Patients are frequently prescribed physical therapy. This may provide temporary or longer relief. Exercises include lumbar exercises as well as aerobic exercises. Physical therapy is thought to increase flexibility and increase strength of the abdominal and lumbar musculature.

A lumbar decompression is the most common surgical treatment for LSS. Over 60,000 such procedures are performed in this country per year. Indications for surgery include back and leg pain that limit normal activity and impair quality of life. Patients must have difficulty standing or walking, even for short distances. They must have also failed physical therapy and analgesics. Surgery is a priority when there is a significant or progressive neurological deficit. Age is NOT a contraindication for the surgical treatment of LSS. Surgery often provides long-term relief in most cases. Ninety three percent of patients report immediate relief of pain. Long-term results find that 64% of patients report pain relief. Seventy-five percent of patients reported satisfaction with surgery in one large study.

(see *Spinal Stenosis* on page 6)



▲
Dr. Gerszten
Assistant Professor
of Neurological Surgery



Epilepsy remains one of the most common neurologic disorders affecting both adults and children alike. Over two million individuals in the United States have a diagnosis of epilepsy, requiring treatment. Epilepsy is characterized as a seizure disorder with electro-physiologic abnormalities and is most often diagnosed by history and electroencephalography (EEG). In the majority of cases, it can be treated effectively medically with anti-epileptic drugs (AED)

by
P. David Adelson, MD

a comprehensive overview of the seizure syndrome. The patient's history, epileptic syndrome and complete data set are then reviewed by the members of the Comprehensive Epilepsy Program (CEP) to determine the likely benefit of surgery. The CEP is comprised of neurosurgery, neurology/ epileptology, neuropsychology, neuroradiology, speech and language and neurophysiology. Based on this review of the initial phase evaluation, a decision for proceeding directly to surgical intervention

Epilepsy:

A look at the surgical options



▲
Dr. Adelson
Associate Professor
of Neurological Surgery

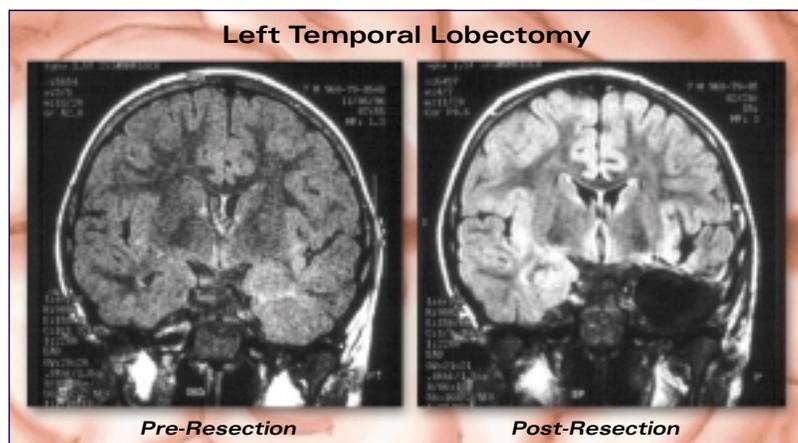
though approximately 10% of patients with chronic epilepsy are considered “medically intractable” meaning that they continue to have seizures despite maximal medical therapy including mono- and poly-therapy. It is in this group of patients that the seizures have the most significant impact on quality of life including psychosocial interactions, vocation and importantly driving. In these instances, it has been estimated that upwards of 10% to 15% of those patients with medically intractable epilepsy may have the potential for a surgical cure.

“Medically intractable” patients by definition have failed at least two or more adequate trials of first and second line AED. Of those determined to be potential candidates for surgical intervention, an extensive evaluation including video/EEG telemetry, anatomical (MRI) and functional (positron emission tomography (PET) or (single photon emission computerized tomography (SPECT), imaging and extensive neuropsychological testing, with and without angiography or Amytal testing is performed. This initial, non-invasive/Phase I evaluation provides

and either the type of surgical treatment or the need for further diagnostic studies, specifically, the need for invasive monitoring is decided. The majority of surgery patients require no further monitoring and go on directly to surgery. The type of surgery is based on the epileptic syndrome, imaging and electrophysiologic findings. When there is a lack of concordance of this initial evaluative data (e.g.) it is unclear as to the exact origins of the seizure focus, or there is concern of the proximity of the seizure focus to eloquent or functionally important areas of the brain, (e.g.) somatosensory cortex, speech, language, then it is recommended that the patient undergo invasive monitoring.

Invasive monitoring requires the surgical implantation of EEG electrodes, either directly using stereotaxis in the parenchyma or on the surface of the brain in order to better lateralize and localize the seizure focus. By stimulating each of the contacts, one can determine the specific functional areas of speech and motor functions. Previously, the most common electrodes utilized were depth electrodes, which cross the parenchyma, and are most often used for temporal lobe epilepsy. With improvements in imaging and the diagnosis of temporal lobe epilepsy non-invasively, surface electrodes are now more commonly used due to their lower morbidity, broader range of evaluation capability, and ability for functional assessment through cortical stimulations.

Surgical intervention consists of either a resective and/or disconnected procedure. Resective procedures include the different types of lobectomy, (e.g.), temporal frontal, etc., topectomy (excision of a small area tailored to the seizure focus itself) or hemispherectomy (the “ultimate” focal resection with the removal of one-half of the brain). Resective procedures are more likely to result in a cure since



they excise the seizure focus itself. Disconnective procedures include corpus callostomy and multiple pial transections and tend to be more palliative rather than curative since they do not eliminate the seizures but interrupt the propagation of the seizures, limiting their generalization. Despite that, these procedures can improve the patient's quality of life by decreasing the frequency and intensity of the seizures. One other type of surgical procedure available are the implantation of neural stimulators, more specifically, the vagal nerve stimulator (VNS).

Outcomes following surgery for the treatment of epilepsy have markedly improved over the last few decades. In a recently published article in the *New England Journal of Medicine*, 80 patients were randomized into a clinical trial for the efficacy and safety of surgery for temporal epilepsy, assigned to surgical treatment with temporal lobectomy or medical treatment with AED over one year's time. At completion of the study, the cumulative proportion of the patients who were free of seizures was 58% in the surgical group as compared to only 8% in the medical group. Those that had surgery had a marked improvement with fewer seizures and a significantly better quality of life. The mortality was higher in the medical group since no patients died from surgery and one patient died from his seizures in the medical group. For patients with temporal lobe epilepsy, surgery was deemed superior to prolonged medical therapy. Frequently with this type of surgery, with strict selection criteria, the proportion of patients seizure free from surgery can be upwards of 90%.

While the other types of resective surgery are less likely to have a seizure free outcome, the numbers are proportionately better than medical therapy alone. Seizure free outcomes range from 30- 70% for extra temporal lobe epilepsy syndromes. Again improvements in outcome have come with improved understanding and imaging. For some children with a hemispheric abnormality and catastrophic epilepsy, upwards of a 100 seizures a day, a cerebral hemispherectomy is the treatment of choice. The results for these patients are excellent with 70 to 100% becoming seizure free. Since many of these children are treated at a very young age, there is a remarkable amount of plasticity that allows them the potential for recovering significant motor functions with often an improvement in their cognitive function. This is likely due to the lessened impact of the intractable seizures on their cognitive and neurodevelopment.

For the disconnective procedures, a seizure free state is much less likely. A corpus callostomy, when indicated for drop attacks, can eliminate the atonic seizures, although it will have less of an impact on those patients that have multiple other seizure types such as

generalized tonic-clonic and complex partial seizures. Multiple subpial transections are often used in conjunction with resective surgery for the areas of the brain where resection would cause significant neurologic injury (e.g.) speech and language or somatosensory areas. This technique though also been reported to have a marked impact on seizure frequency and intensity with good localization of the seizure focus. The data for this remains incompletely defined and will likely continue to increase with better understanding.

The VNS was FDA approved in 1997 and has been found to significantly lessen the intensity and frequency of seizures greater than 50% in over half the patients that are treated. It is indicated for patients who are medically intractable and are not candidates for other types of surgical intervention. Easily implantable, it is similar to AED treatment in that the treatment is easily adjustable for both intensity and frequency. Unlike medications, it does not negatively impact on mental awareness and quality of life and interestingly the efficacy of VNS treatment increases over time.

It is likely that surgery will be the option of choice for those patients who suffer and are affected by this disease.

The future of surgical epilepsy is likely to continue to grow since the majority of patients who are potential surgical candidates have not been evaluated and treated. With improved awareness of the benefits of surgery, improvements in neuroimaging to identify lesional or abnormal areas, and improved technologies for intervention, it is likely that surgery will be the option of choice for those patients who suffer and are affected by this disease. On the horizon and presently intense areas of research are the use of deep brain stimulation (DBS), gene transfer and cellular transplantation so as to modify or eliminate the seizure focus. Another very promising technology in this area is the use of gamma knife radiosurgery (GKR). Clinical trials of GKR for temporal lobe epilepsy are presently ongoing in the United States. (The University of Pittsburgh Department of Neurosurgery is one of the five sites involved in this study). This therapy has been trialed in Europe and elsewhere and, preliminarily, has been found to have similar seizure free outcomes as surgical resection of the temporal lobe focus in patients with temporal lobe epilepsy. In the future, there is the potential that GKR could actually replace the open surgery through this minimally invasive approach.

With improved awareness, and with improvements in the technology, surgery for epilepsy has become more established and readily identified as the optimal therapy for many forms of intractable seizures. ■

Researchers awarded \$3 million grant for concussion study

The University of Pittsburgh Department of Neurological Surgery, in collaboration with the Sports Medicine Program of the Department of Orthopaedic Surgery, the Department of Psychiatry, and Carnegie Mellon University has received a \$3 million grant from the National Institutes of Health to study the effects of single and multiple concussions on the brain.

During the next five years, researchers plan to use functional magnetic resonance imaging (fMRI) to study 200 high school and college athletes who have suffered a concussion in order to characterize postconcussive abnormalities in brain activation patterns. They will correlate changes in functional MRI with changes detected using neurocognitive test battery developed two years ago at the university.

Donald W. Marion, MD, professor of neurological surgery and director of the Brain Trauma Center, is the principal investigator of the study. Co-investigators are Mark Lovell, PhD and Michael Collins, PhD, both of the UPMC Sports Medicine Concussion Program.

Current standards of care for concussions vary widely and are based on subjective experiences. The neurocognitive tests that researchers will be using assess memory and attention, the two most common cognitive functions impaired by concussion. These tests were field-tested and found to accurately reflect the onset and resolution of concussion induced symptoms.

The researchers intend to distinguish between the effects of single versus multiple concussion, the influence of age and gender on these abnormalities, and how these abnormalities correlate with academic performance at three and six months after injury.

The results of this study are expected to provide a physiologic and anatomic underpinning for the cognitive deficits observed after one or more concussions in different at risk groups. This information should enable the development of far better and far more objective guidelines for who can safely return to athletic competition, to school, or to work.

Participants in organized sports, particularly football, hockey, and soccer, are at increased risks for sustaining one or often multiple concussions. Not only can multiple concussion cause long-term or permanent neurologic dysfunction, but there is evidence that athletes who suffer a second concussion before they have fully recovered from the first are vulnerable to acute severe brain swelling or death. However, there are no reliable standards for determining when an athlete can safely return to play after a concussion, nor whether different criteria are needed depending on their age or gender. Such guidelines await elucidation of the pathophysiology and long-term effects of concussion, which are poorly understood.

Study consultants also include Freddie Fu, MD, professor of orthopaedic surgery and chairman of the Department of Orthopaedic Surgery and Joseph C. Maroon, MD, clinical professor of neurological surgery and vice-chairman of the Department of Neurological Surgery. ■

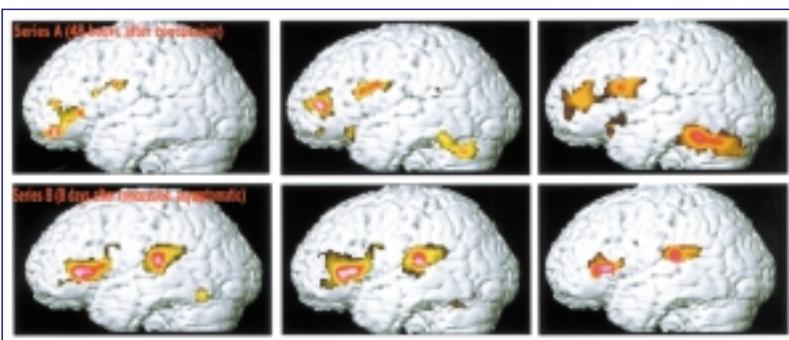
Lumbar spinal stenosis

(from page 3)

The Departments of Neurological Surgery and Physical Therapy of the University of Pittsburgh Medical Center are currently conducting a National Institutes of Health sponsored trial to compare the outcome of different forms of physical therapy to surgical decompression. Over 200 patients will be randomized in this clinical trial. Patients will be followed for a total of two years. The results of this study will help to clarify which treatment strategies are the most effective and which patients should undergo surgery versus physical therapy. This study is the largest one of its kind ever attempted to prospectively study LSS.

In summary, LSS is common and is increasing in prevalence. There is significant associated disability and cost to LSS. Most importantly, LSS is treatable. The symptoms of LSS should not be attributed simply to "old age."

For more information regarding our NIH funded study, please contact (412) 647-6773. ■



▲ Above fMRI shows a 17-year-old right-handed female athlete who suffered a concussion while playing basketball 48 hours prior to evaluation. Immediately after injury, she had altered sensorium but no loss of consciousness. She had one prior concussion three weeks earlier. Series A (48-hour study): Symptoms were general irritability, slowing of mentation, and headache. Tests showed deficits in visual memory, attention, reaction time and speed of information processing. Series B (8 days after injury): asymptomatic. Tests showed all modules were normal or high normal.

Resident Spends Year on Capitol Hill

Neurosurgery resident Dr. Alan Scarrow, MD, JD, recently returned from Washington D.C. following a one-year public policy fellowship sponsored by the Congress of Neurological Surgeons. Recipient of the Charles Plante Public Policy Fellowship, the sixth-year resident spent the year in our nation's capital studying public and health policy issues.

While in Washington, Dr. Scarrow worked for Senator Arlen Specter, senior Republican Senator from Pennsylvania. Dr. Scarrow served as a professional staff member on two Senate committees that Sen. Specter serves as ranking Republican member — the Senate Veterans Affairs Committee (SVAC) and the Appropriations Subcommittee for Labor, Health and Human Services and Education (LHHSE).

While serving on the SVAC, Dr. Scarrow helped write federal legislation to restructure statutory pay capitation for physicians employed by Veterans' Health Administration. It is hoped that the revision of current statutes will allow the VHA to hire neurosurgeons onto their clinical staff without being compelled to outsource the provision of neurosurgical services and improve the quality of care being provided to veterans.

Dr. Scarrow also was involved in the annual Senate budget process and confirmation hearings. He provided written briefings to Sen. Specter on issues such as the link between Agent Orange exposure and type II diabetes mellitus, Gulf War syndrome, and the provision of health care services for veterans outside the VHA system.

In his work on the LHHSE subcommittee, Dr. Scarrow was responsible for meeting with executive branch employees — as well as constituents — interested in obtaining discretionary federal money from the appropriations bill.

In addition, Dr. Scarrow prepared Sen. Specter and his professional staff on subcommittee hearing issues such as Alzheimer's disease, breast cancer, and federal funding of the National Institutes of Health.

Dr. Scarrow also spent considerable time researching and formulating policy for the federal funding of human embryonic stem cell research, an issue which Sen. Specter has been a staunch advocate. This issue received much debate recently culminating with President George W. Bush agreeing to limited federal funding of research on existing human embryonic stem cell lines. Currently, the University of Pittsburgh has active interest in pursuing this type of research for treatment of Parkinson's disease and stroke now that the federal ban has been lifted.

Dr. Scarrow will use the experiences from the fellowship to help his fellow residents and colleagues at the University of Pittsburgh better understand the interplay between neurosurgery, the government and the legal system. He will be giving a series of

lectures to the Department of Neurological Surgery over the next year on topics such as medical malpractice, expert witness testimony, giving a deposition, the standard of care in neurosurgery, physician unions, physician reimbursement under Medicare, and the politics of health care in Washington. Several of these topics have been the subject of academic papers written by Dr. Scarrow that will be published over the next several months.

Recent Grant Awards:

- "Effects of Single and Multiple Sports-Related Concussions of the Brain," **Dr. Donald Marion** from National Institutes of Health (\$3 million). Use of functional magnetic resonance imaging (fMRI) to study 200 high school and college athletes who have suffered a concussion in order to characterize post-concussive abnormalities in brain activation patterns. Researchers will correlate changes in functional MRI with changes detected using neurocognitive tests. (See page 6).

Media:

Dr. Michael Horowitz was interviewed by Marilyn Brooks of WTAE-TV (Pittsburgh) on July 2 regarding his work with small metal coils to treat brain aneurysms.

Dr. P. David Adelson, was cited in the August 21 edition of the *Pittsburgh Post Gazette* discussing the evaluation and treatment of children with birth brachial plexus injuries.

Awards:

Dr. Donald Marion and the UPMC Presbyterian SICU staff were among the 244 recipients of UPMC Health System's first ever Award for Commitment and Excellence in Service (ACES). ACES winners were nominated

by their peers, managers and patients for going above and beyond their job descriptions. Dr. Marion and staff were cited for their "outstanding efforts" by the family of a recent trauma victim.

Promotions:

Maureen Hatch to financial administrator; **Patricia Marino** to medical records supervisor.

New Employees:

Dr. Jonathan D. Sherman, spine fellow; **Kathy Baldauf**, secretary for Dr. Howard Yonas; **Edward Shaffer, Jr.**, physician assistant; **Agnes C. Zachoszcz**, secretary to Dr. William Welch; **Marcia Lerch**, medical records assistant; **Dr. Catherine A. Mazzola**, visiting instructor.

Congratulations:

New baby boy (Matthew, August 7) to **Paul Stanick**, web graphics specialist, and wife Sandy; new baby boy (Panikos George, August 7) to **Dr. Costas Hadjipanayis**, resident, and wife Lorraine; marriage for **Dr. Matthew Wetzel**, resident, to Fotini Abatzis (September 2); new baby boy (David, October 5) to **Louisa Urgo**, physician assistant, and husband David. ■



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Patient Referrals
(412) 647-3685

Clinical trials underway at the Department of Neurosurgery

Dose Escalation Study of LBS-Neurons Implanted into the Basal Ganglia of Patients Following Stroke. Funded by Layton Bioscience, Inc. Contact: Douglas Kondziolka, MD, (412) 647-6782.

Efficacy of Ventricular Catheters Impregnated with Minocycline and Rifampin versus Standard Ventricular Catheters in the Reduction of Catheter Infection. Funded by Cook Incorporated. Contact: Donald Marion, MD, (412) 647-0956.

Evaluation of Durasis™ Dural Substitute as a Dura Mater Substitute. Funded by Cook Biotech Incorporated. Contact: Ghassan Bejjani, MD, (412) 647-9336.

Hypothermia During Intracranial Aneurysm Surgery. Funded by National Institutes of Health. Contact: Howard Yonas, MD, (412) 647-6360.

Hypothermia for Severe Traumatic Brain Injury in Children. Funded by National Institutes of Health. Contact: P. David Adelson, MD, (412) 692-6347.

The Optimal Management of Cerebral Aneurysms. Funded by National Institutes of Health. Contact: Joseph T. King, Jr., MD, (412) 647-0182.

A Prospective, Randomized, Controlled Multicenter Clinical Study to Evaluate the Safety & Effectiveness of the COOLGUARD™ System with COOL LINE™ Catheter to Reducing Fever in Neurointensive Care Unit Patients. Funded by: Alsius Corporation. Contact: Donald Marion, MD, (412) 647-0956.

Radiosurgical Treatment of Temporal Lobe Epilepsy. Funded by National Institutes of Health. Contact: Douglas Kondziolka, MD, (412) 647-6782.