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Patient Care • Teaching • Research

Image-guided spinal navigation improves speed, precision of complex procedures

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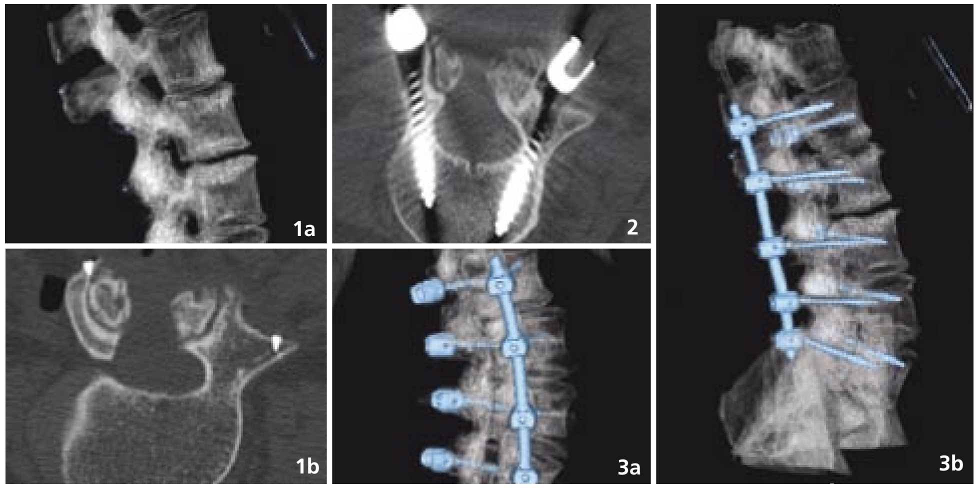


Fiducials are placed in rigid bone surface landmarks for registration. Visible in blue in the three-dimensional sagittal reconstruction image (*1a*) and in the axial plane CT image (*1b*); Figure 2 axial CT image demonstrated precise screw placement. This provides superior mechanical stability. In figures 3a and 3b, three dimensional CT reformats show a L5-S1 lumbar pedicle fusion. The placement of the pedicle screws was confirmed with this CT-scan before the construct was finalized.

Spinal instrumentation is a well established treatment for a multitude of spinal disorders. Pedicle screw fusion along the entire spinal axis is a very common operation. The tools and instrumentation available now have been perfected over the last decade, but the placement of the instrumentation still demands high technical skills and precise spatial orientation by the neurosurgeon.

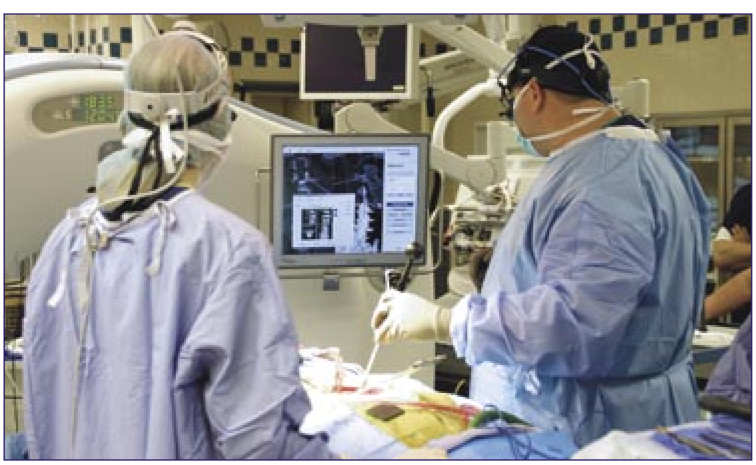
With increased acceptance and use of spinal instrumentation it was seen that routine radiography such as fluoroscopy to assess pedicle screw placement was not reliable. The rate of penetration of the pedicle cortex by an inserted screw ranged from 21 to 31% in some studies. The disadvantage of conventional radiography in orienting the surgeon to the unexposed spinal anatomy is that it displays only two planar images.

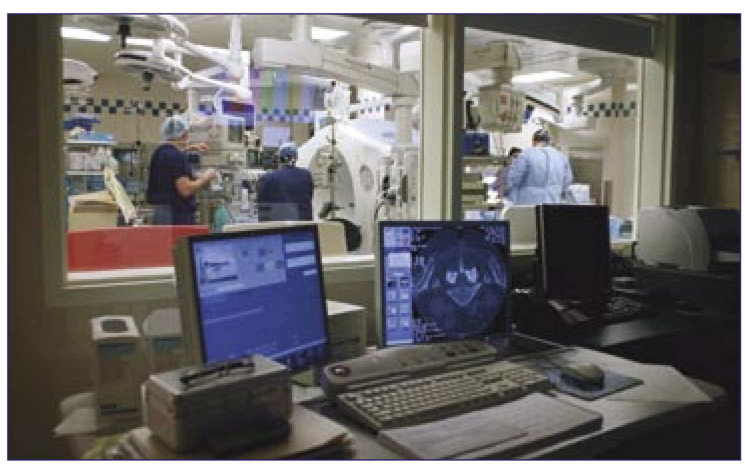
Image-guided spinal navigation allows the surgeon to identify the non-visualized anatomy in three planes of any selected point in the surgical field. CT image-guided spinal navigation provides the spine surgeon with superior imaging data compared with conventional devices such as fluoroscopy. Image-guided spinal navigation can improve the speed, accuracy, and precision of complex spinal surgery eliminating the need for cumbersome intraoperative fluoroscopy.

UPMC Presbyterian has installed an intraoperative CT suite to allow state of the art intraoperative imaging. Recently, our spine team has been able to perform complex spinal reconstructions using intraoperative CT imaging and spinal navigation.

For a pedicle screw fusion with image guidance the patient is positioned on the operative CT scanner table. The surgical exposure of the anatomical landmarks is performed in routine fashion. Reference markers, fiducials, are placed in rigid bone landmarks immediately after the surgical exposure. This preserves the spinal and anatomical landmarks that facilitate an easy and accurate registration. Next, an intraoperative multiplanar CT-scan is obtained without moving the patient out of his surgical position. This takes less than 60 seconds. A 3D volume data-set of contiguous axial CT scans is obtained and transferred to the image-guidance work sta-

*(see **Image-guidance** on page 6)*





(*Left*) Neurosurgeon places image-guidance probe on pedicle entry point and confirms trajectory by observing reformatted views of intraoperative anatomy displayed on navigation system. (*Right*) Image-guided operating suite with CT-scanner in background and image-guidance working station in front.

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Advances in technology allow revolution in care

Few individuals would argue that quality neurosurgical patient care rests on the foundation of a thorough neurological examination. As surgeons, however, we must also acknowledge that modern neurosurgery has become possible due to advances in imaging and localization that have in many instances become just as important as the examination when it comes to delivering safe and effective surgical therapy.

Hippocrates, Broca, Penfield and others contributed significantly to the understanding of neurologic function as it related to the peripheral and central nervous system and in the process used this localization to guide surgical procedures. Dandy's development of ventriculography; Sicard, Forestier, Steinhausen and others' development of contrast agents, and Moniz' work in cerebral angiography, however, heralded a new era in neurosurgery. With these discoveries came the ability to not only intellectually localize the rough location of a lesion but to now confirm location and more accurately target a specific region for focused care.

For many years neurosurgery relied on these elegant techniques for surgical guidance. The next quantum leaps in neurosurgical diagnosis, localization, and visualization came with the arrival of the Horsley-Clark apparatus for stereotactic localization of deep seated cerebral structures, the surgical microscope for illumination and binocular magnification at great depths, the CT scanner and magnetic resonance imaging. With the advent of these ingenious devices, diagnosticians and their surgical counterparts could even more accurately locate and treat neurologic abnormalities that up until then were often unimaginably elusive.

In this issue of our newsletter you will notice a cover article on the advent of frameless CT guided intraoperative spinal neuronavigation. Spine surgeons in the University of Pittsburgh Medical Center's Department of Neurosurgery have collaborated with industry to develop this first of its kind system for intraoperative three-dimensional visualization of spinal abnormalities thus making placement of surgical hardware safer and quicker while at the same time significantly reducing patient, nurse, and physician exposure to ionizing radiation.

We believe this new and enabling technology will revolutionize spine surgery making procedures safer and more effective. As the technology becomes more widespread we expect costs to drop such that within the next 5-10 years all complex spine procedures will be performed using this new form of intraoperative localization and visualization. •

Amin Kassam, MD
Chairman
Department of Neurological Surgery

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Surgery with a smile: Wide-awake brain surgery

by Anita Srikameswaran
Pittsburgh Post-Gazette

It's not the usual operating room conversation: "Smile for me again, Steve. Move your foot for me. Good job. Smile again, Steve. Squeeze my hand."

Stephen Dubovich, a 61-year-old from McClellandtown, Fayette County, was having surgery as he followed the instructions issued by a neurophysiology technician crouching by him at the operating table.

Behind a plastic drape, Dr. Arlan Mintz, director of neurosurgical oncology at the University of Pittsburgh Medical Center, carefully probed the exposed surface of the right side of the patient's brain, near his temple.

"I'm just listening to what's going on around me," Mr. Dubovich said. "They told me I'd be awake and talking. I'm awake and talking."

Hearing him say he'd be glad when it was over, Dr. Mintz got him to chuckle by responding, "If you find this boring, it's very good. It means you're not in pain and everything is going fine."

The operation is called an awake craniotomy, and Mr. Dubovich had it done so that the surgeon could carefully resect—the medical term for cut out—a tumor that threatened to invade the brain's motor strip, which lets him use his left side.

"If he's awake and I keep taking tumor out and he keeps moving and he's fine, I can keep pushing the resection," Dr. Mintz explained before the surgery. The goal: excise more than 90 percent of Mr. Dubovich's cancer, called a glioblastoma, because studies indicate that can lengthen survival time.

"We know we can't remove the entire tumor," the surgeon said. "At some point, we have to stop because the tumor is intermingled with normal brain matter."

Imagine the brain is the white paint in a bucket, and the tumor is a glob of red paint dropped into it, Dr. Mintz said. There are very red areas that could be scooped out, but then some pinky-white parts, whitey-pink parts and then white.

"As you get into that whitey-pink area, you're taking more brain than tumor," he said, and that could unacceptably impair the patient's function.

To find the right balance, Dr. Mintz and his team used sophisticated GPS-like technology to map out the region around the tumor before attempting to remove any of it.

After identifying brain tissue that is "eloquent," or functional, then "we'll bring in the microscope and start taking out the tumor," Dr. Mintz said.

In Mr. Dubovich's case, he said, "during the operation, we continue to have him move to assess if we're getting closer to any deeper areas that affect motor function."

Not every brain cancer surgery needs to be done with the patient awake. Conventional operations with the patient under general anesthesia may be the better choice when the tumor is located in a spot where the risk of removing normal tissue is low.

Dr. Mintz recently did an awake procedure on a woman whose speech center should have been exclusively in the left brain, according

Patient is lightly sedated during awake craniotomy—aware and awake, providing feedback to neurosurgeons to help assess the extent of a tumor resection.

to textbook anatomy. But while mapping the right side of her brain for the operation, he found that she reliably stopped talking whenever a certain location was stimulated, warning the surgeon that he should leave it intact.

"We could have injured her speech if we [hadn't done] it awake," he said. "A lot of times I know I would have given a patient a deficit because I would have gone in that area," which mapping would have designated off-limits.

Most large medical centers have surgeons who do brain surgery on awake patients, Dr. Mintz said. Recently, UPMC's neuro-oncology program has been developing it into a strength that is beginning to draw surgical candidates from around the country. He performs about four awake craniotomies monthly.

In the procedure, the patient is lightly sedated during the first part of the operation, during which the scalp is numbed, the head is clamped to a frame so it remains still, a piece of skull is removed and an incision is made through the covering layers to expose the brain.

At that point, the sedation is lightened to allow the patient to awaken.

"He'll have no pain," Dr. Mintz said. "There's no pain in the brain."

Many patients are initially uncertain, but get over their qualms after learning more about the awake craniotomy. Still, there are some risks to consider.

Because the patient is expected to be aware and talking, a breathing tube is not inserted. If the patient has a seizure, or a respiratory or cardiac problem during the surgery, precious time could be lost until the exposed brain is recovered and ventilatory support can be provided.

Mr. Dubovich had a seizure shortly before his surgery was to begin, and the team decided to postpone until his medications could be adjusted.

Generally, awake craniotomy patients are comfortable and pain-free during surgery. Some are curious enough to watch the surgeon's-eye-view on operating room monitors. One man noticed the anesthesiologist checking e-mail, so he asked to have his own account checked, Dr. Mintz said.

Patients recover more quickly than they would from general anesthetic, so a large majority go home the next day or the day after, he added.

*(see **Surgery** on page 6)*

Implanted cortical stimulation device may help decrease severity of depression

An implanted cortical stimulation device may help decrease the severity of depression and increase psychological function in patients suffering from major depressive disorders, according to preliminary findings from a phase 1 feasibility study conducted at the University of Pittsburgh and two other institutions nationwide.

The FDA-approved PROSPECT study involved the implanting of Northstar Neuroscience's Renova™ Cortical Stimulation System investigational device delivering targeted electrical stimulation to the outer surface of the brain—the prefrontal cerebral cortex. Department vice chairman of education, Douglas Kondziolka, MD, and Robert Howland, MD, of the department of psychiatry were co-investigators in the study. The first study patients were evaluated and had surgery by the University of Pittsburgh team.

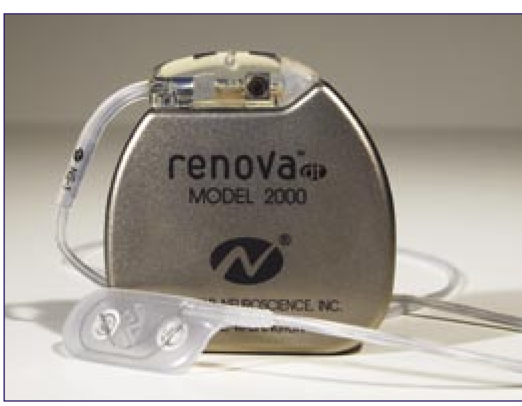
The PROSPECT study was designed to assess the basic safety and effectiveness of cortical stimulation for patients diagnosed with major depressive disorder. The patients in the PROSPECT study were not responsive to an average of nine previous antidepressant treatments and endured their current depressive episode for an average of seven years. Ten of the 12 patients were treated previously with electroconvulsive therapy. Thus, this represented a subset of patients with a severe depression history.

After a baseline observation period, five patients received active cortical stimulation during the first eight weeks, while five patients received sham stimulation. After the initial eight-week period of sham stimulation, these patients also received active stimulation.

Initial findings at the eight-week primary endpoint show the Hamilton Depression Rating Scale (HDRS; an established scale used to rate the severity of a patient's depression) scores of the active cortical stimulation patients improved an average of 24% from baseline. In contrast, only a 3% improvement in HDRS scores from baseline was reported in patients in the sham group. After eights weeks of active stimulation in ten patients, 20% achieved an improvement of 50% or more in HRDS score.

Additionally, after the ten patients received 16 weeks of active stimulation, HDRS scores improved by an average of 27% from baseline and the Montgomery-Asberg Depression Rating Scale (MADRS; another established scale used to rate the severity of a patient's depression) scores improved by 31% from baseline. The Global Assessment of Functioning (GAF; a scale used to rate the social, occupational and psychological functioning) scores improved by 50% from baseline, indicating an improvement in patient's quality of life and ability to function. Each of these rating scales indicated a continuing trend of improvement at 16 weeks.

There have been no device related serious adverse events during the study. Primary endpoint results on all patients enrolled in the study will be reported later this year. All surgeries were performed without incident.



Courtesy Northstar Neuroscience

Renova™ cortical stimulation device (left); implanted in patient (right).

"These early findings in this very severe group are encouraging and suggest that cortical stimulation holds promise for individuals with major depressive disorder who have endured numerous unsuccessful treatments such as antidepressants or electroconvulsive therapy," said co-investigator Brian Kopell, MD of the Medical College of Wisconsin's Department of Neurosurgery who presented the initial findings recently at the Congress of Neurological Surgeons in San Diego.

"The inherent advantage of cortical stimulation for continuous, long-term relief of depressive symptoms is its ability to modulate neural function without surgically penetrating brain tissue. This results in a shorter procedure and relatively quick recovery time."

According to the study's documentation, major depressive disorders are the most common of all psychiatric disorders. The World Health Organization estimates that 340 million people worldwide suffer from an episode of major depression each year, accounting for 4.4% of the overall global disease burden. In the United States, about 9.5% or 19 million people are affected by a depressive disorder, with a lifetime risk of about 17% for a major depressive disorder.

While depression can be effectively treated in the majority of patients by medication and psychotherapy, up to 20% of patients fail to respond. electroconvulsive therapy (ECT) is effective in approximately 70% of cases where antidepressant medications do not provide sufficient relief of symptoms. However, as many as 20-50% of the people who respond well to a course of ECT relapse within six months, therefore, periodic maintenance therapy is often required.

For those patients who are resistant to the therapies noted above, more invasive approaches have been used, including Vagus Nerve Stimulation (VNS) and more recently Deep Brain Stimulation (DBS).

Direct cortical stimulation of the cortex via an implanted device system may provide long lasting benefit with minimal side effects. The PROSPECT study seeks to assess the safety and efficacy of this approach.

In addition to the University of Pittsburgh and the Medical College of Wisconsin, physicians at Massachusetts General Hospital in Boston also participated in the study. •

Spine injury in sports: Understanding neurapraxia in athletes

by Joseph C. Maroon, MD
Professor of Neurological Surgery

Jeff Bost, PAC
Clinical Instructor

Neurapraxia—often referred to as "concussion of the spine"— is usually caused by hyperflexion or extension when tackling and can potentially have catastrophic consequences.

Each year, there are approximately 10,000 cases of spinal cord injury in the United States, 10% of which occur during athletic events. Approximately 1.2 million high school athletes and 200,000 college and professional athletes participate in American football each year. Spinal injuries among professional football players are the most highly profiled. The range of spine injury can be as simple as a strain to complex fractures and cord injuries resulting in permanent injury and even paralysis.

Within this spectrum is a spinal cord injury referred to as neurapraxia. Neurapraxia is defined as transient posttraumatic paralysis of the motor and/or sensory tracts in the spinal cord. It has often been referred to as a "concussion of the spine," however it can be a harbinger of a future potentially catastrophic injury in an athlete and can be a career-ending event in some cases.

The prevalence of neurapraxia is estimated to be seven per 10,000 football participants. Although not just a football injury it is usually is caused by hyperflexion or extension that can occur during tackling. Neurapraxia is most always associated with an underlying compromised or stenotic spinal canal. Stenosis may be due to degenerative disc disease with osteophyte formation, a herniated disc, congenital narrowing of the canal, or combinations of these elements. Symptoms are transient and are not associated with fracture dislocation or spinal instability.

Management of this condition is individualized and determined by the severity of symptoms, which usually involve transcend upper extremity numbness, and the underlying anatomical abnormality. In the April 2007 issue of *Journal of Neurosurgery: Spine* (6:356-363) we published a case study of five elite football players—four of which were professional players in the prime of their career—and presented their ultimate clinical management and outcome. All players required surgical intervention and all where able to return to playing football for an average of 2.5 years after surgery. (*see Table 1 below.*)

Underlying Spine Abnormality

The prevalence of congenital cervical stenosis in football players is reported to be between 7.6 and 29 cases per 100 players and therefore an inherent factor in these participants. Screening for stenosis can be done with MR imaging to assess the absolute spinal canal dimensions and to determine if there is compression of the spinal canal and cord from bone or disc causes. Loss of CSF around the cord is viewed by some as a possible risk for SCI.

Characteristics obtained in five football players who suffered neuropraxia *

Age	Position	Symptoms	Level	Treatment	Results
29	defensive end	quadriparesthesia (Grade III)	C4-5	ACDF w/o plate	played 3 years; asymptomatic
29	fullback	quadriparesthesia (Grade III)	C6-7	ACDF & plate	played 3 years; asymptomatic
26	defensive back	quadriparesthesia (Grade I)	C4-5	ACDF & plate	played 27 games; new HNP C5-6; ACDF
20	linebacker	BUE paresthesia (Grade III)	C4-5	ACDF & plate	played 7 games; new C3-4 HNP; no surgery
32	offensive lineman	BUE paresthesia (Grade I)	C3-4	ACDF & plate	played 2 years; asymptomatic

** All subjects male; BUE: bilateral upper-extremity; HNP: herniated nucleus pulposis*

Return to Play

Return-to-play decisions after an episode of neurapraxia and subsequent surgery are controversial. It is generally recommended that athletes with neurapraxia secondary to a herniated cervical disc, focal stenosis, or compressive osteophyte not be allowed to participate further in contact sports.

In our review of managing neurapraxia, a strong case is made for safe return to play following correction of the anatomical abnormality for single level disease. There has generally no consensus on this issue but most agree that two- or three-level cervical decompression and fusion is considered a relative contraindication for returning to play.

We demonstrated that in neurologically intact athletes, at the time of surgery, with focal cord compression due to a single-level herniated disc, they may safely return to football after successful surgical decompression and fusion. Interestingly in this series of five cases, two of the subjects required career-ending surgery for repeated herniation above and one below the previously fused level.

We are unaware of any permanent neurological deficit suffered by an athlete returning to play after he has undergone a single-level ACDF for neurapraxia but the decision to return to play must include a complete and through review of potential risks and complications and the full awareness and understanding of the patient. •

(Ed. Note: Dr. Maroon is team neurosurgeon for the Pittsburgh Steelers and a noted expert in the field of sports injuries.)

Surgery with a smile: Wide-awake brain surgery

(continued from page 3)

That was the case for Mr. Dubovich, who has since joined a clinical trial at UPMC Hillman Cancer Center for further treatment of his brain tumor.

In November 2005, he was at a grocery store bank when he felt his face twitching and his tongue thicken. He walked to the parking lot and leaned against his truck until he regained his composure, as he put it.

He drove home and, thinking he'd had a stroke, called his brother to help.

A brain scan showed a suspicious shadow, and a biopsy confirmed it was a tumor. Since then he has had multiple rounds of chemotherapy and 30-some radiation treatments. Until recently, daily medication kept the cancer at bay. Then the symptoms began returning, leading him to seek Dr. Mintz's help.

Survival rates for glioblastoma are low, the surgeon noted. Most patients who have it die within 12 months, even with surgery, radiation and chemotherapy.

But Mr. Dubovich already passed that milestone, and "that's why we're pushing ahead with the aggressive therapy, because he's done so well," Dr. Mintz said.

The awake craniotomy didn't intimidate Mr. Dubovich.

"I'm not a squeamish person," he said. "I prefer to go the route that gives me the best chance."

Dr. Mintz took out all the tumor he could find during the surgery, and a postoperative brain scan shows empty space where the cancer used to be. He figured more than 95 percent of it was removed.

Mr. Dubovich, who turned 20 while serving in Vietnam, was chosen for the honor guard that escorted President Eisenhower's funeral cortege and worked in coal mines as a laborer and later as a federal safety and health inspector, understands that the cancer will likely grow back.

He wants to mow his lawn in the summer, shovel his driveway in the winter, go out to eat and maybe even play some golf for as long as possible.

"The research is better every day," Mr. Dubovich pointed out. "As long as it gets you back on your feet, you go. That's my way of looking at it. I just can't see being a quitter." •

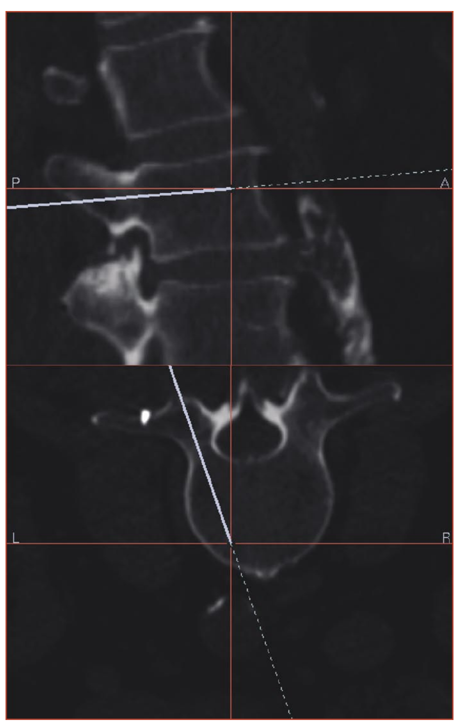
Image-guidance improves speed, precision of complex procedures

(continued from page 1)

tion. An image guided tracker is attached to the spinous process and then registration is accomplished. The system is accurate to 1mm using this technique.

The image guided tools are now able to show the exact location of any point in the exposed spine. Coronal, sagittal, axial, and 3D images are available to the surgeon in real time. The orientation of each pedicle to be instrumented can be assessed rapidly and accurately. Any errors in trajectory or entry point selection can be determined and corrected by adjusting the position of the probe and the drill guide through which it passes. Once the instrumentation has been placed confirmation by a second intraoperative CT-scan is obtained.

The UPMC intraoperative CT suite solves the traditional problems associated with utilizing image guidance in the spine. This represents a significant improvement to the existing technology of spinal instrumentation. •



Intraoperative navigation image showing pedicle probe entering the pedicle.

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(All amounts 'Up to $1,000, except where noted.)

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For more information on donations, please contact **James A. Olsen** at **(412) 647-7781**.

news & NOTES

Perfexion Enters Service at UPMC

The next generation of the world's leading radiosurgical technology, the Leksell Perfexion® Gamma Knife, was placed into service at UPMC Presbyterian's Center for Image-Guided Neurosurgery on September 28, 2007.

In making the announcement regarding the procedures, **L. Dade Lunsford, MD**, co-director of the center, stated, "Today we successfully treated three difficult cases, demonstrating that this new technology has major advances and advantages. All patients did well." **Douglas Kondziolka, MD**, center co-director noted, "The efficiency and comfort for the patient was unparalleled. We have been able to treat complex tumors and patients with multiple tumors in less time."

Adelson Named President-Elect of CNS

Department vice-chair of research, **P. David Adelson, MD**, was named president-elect of the Congress of Neurological Surgeons (CNS) for 2007-08 at the group's annual meeting held September 15-20 in San Diego. He will lead the organization beginning with their annual meeting in September of 2008.

CNS is a leading international neurosurgical organization with a mission to promote public welfare through the advancement of neurosurgery, through a commitment to excellence in education, and by dedication to research and scientific knowledge.

Dr. Adelson is an internationally recognized expert in head injury and epilepsy in children. He is director of Pediatric Neurotrauma at Children's Hospital of Pittsburgh, director of surgical epilepsy at the University of Pittsburgh Epilepsy Center, and co-director of the Brachial Plexus and Peripheral Nerve Injury Center at Children's Hospital of Pittsburgh. He is also director for The Walter Copeland Neurosurgical Research Laboratory.

Dr. Adelson was also recently named recipient of The A. Leland Albright Endowed Chair at the University of Pittsburgh. The chair honors the career accomplishments of A. Leland Albright, MD, former chief of neurosurgery at Children's Hospital of Pittsburgh.

Lunsford Honored Guest at CNS Meeting

L. Dade Lunsford, MD was the honored guest at the annual international gathering of the Congress of Neurological Surgeons. Dr. Lunsford presented six special lectures at the conference and was feted at a black tie dinner at San Diego's historic Coronado Hotel, attended by over 150 friends, colleagues, trainees, residents, fellows and guests from around the world.

Media

• **Amin Kassam, MD**, and Ricardo Carrau, MD, were mentioned in an *Europa Press* article, July 2, discussing endoscopic surgery in the treatment of complex tumors of the skull base.

• **Joseph Maroon, MD**, was quoted in an Associated Press article circulated nationally in September, regarding the serious neck injury suffered by Buffalo Bills TE Kevin Everett in an NFL game. Dr. Maroon, an expert in sports medicine, was consulted in the case. *(See related article on spine concussions in athletes on page 5.)*

• **Dr. Adelson** was quoted in an Associated Press article circulated nationally October 3 dealing with hypothermia treatment in children suffering severe brain injuries.

• **Dr. Kassam** and colleague **Carl Snyderman, MD**, were featured on a NBC-TV *Today Show* segment, October 4, profiling two boys treated with the expanded endonasal neurosurgery technique. The two were also mentioned in a related *Las Vegas Journal-Review* column, September 17, discussing one of the boys.

• **Dr. Lunsford** was interviewed on the WTAE-TV (Pittsburgh) *Evening News,* October 9, about the installation and benefits of the new Gamma Knife Perfexion unit.

Prominent Lectures

• **Drs. Kassam** and **Snyderman** presented the Annual William Wilson Lecture at the George Washington University Medical Center, October 10.

• **Peter Gerszten, MD**, was a visiting professor at Yale University, October 9-10. He was also a visiting professor at the University of Rochester, August 24.

Department Promotion

• **Desiree Playso-Doyle** was promoted to practice manager.

Congratulations

• **Peter Gerszten, MD**, was promoted to associate editor of *The Spine Journal.*

• **Xinmei Zhu, MD, PhD**, a post doctoral fellow in the lab of Hideho Okada, MD, PhD, received the "Excellence in Translational Medicine Award for 2006-07" from the *Journal of Translational Medicine.*

• **Cindy Watkins** was selected UPMC Patient Ambassador for September 2007.

• **Brian Jankowitz, MD**, was awarded the Novo Nordisk Award for Neurotrauma Research at the 2007 Congress of Neurological Surgeons meeting. His paper, "Controlled Normothermia Attenuates Intracranial Hypertension after Severe Traumatic Brain Injury," was co-authored by **Ava Puccio, Michael Fischer,** and **David Okonkwo, MD, PhD**.

• **Debra Morris** was inducted into Alpha Sigma Lambda, Honor Society for the College of General Studies, on September 7.

Welcome

Anita Fetzick, RN, research nurse for Dr. Okonkwo; **Kathleen Seelman**, physician assistant for Arlan Mintz, MD; **Jennifer Cochran**, pediatric secretary; **Beth Eckman**, senior administrative assistant for Lois Burkhart; **Stephanie Henry**, MINC nurse; **Julie Martin**, MINC Secretary II; **Linda Murawski**, transcriptionist.

Personal Congratulations

• **Stephen Pirris, MD**, wed Kristin Grudowski on August 4.

Calendar of Events

• December 5: **3rd Annual Stuart Rowe Society Lectureship/Research Day**. Day-long series of lectures intended to showcase research activities in the field of neurological surgery. John Jane, Sr., MD, PhD, professor of neurological surgery at the University of Virginia Health System will be the honored guest speaker. Call (412) 647-0990 for more information.

• January 7-11: **Principles and Practice of Gamma Knife Radiosurgery.** For neurosurgeons, radiation oncologists and medical physicists interested in Gamma Knife certification. Call (412) 647-7744 for more information. •

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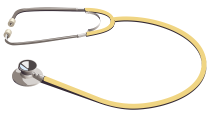

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FALL 2007 • VOLUME 8, NUMBER 4

Department researchers awarded $2.4 million grant for novel study of obesity

Researchers at the Department of Neurological Surgery's Center for Clinical Neurophysiology were recently awarded a $2.4 million grant from the National Institute of Health to help prepare a novel, multimedia approach for the study of obesity.

The project is based on an electronic chronicle format (or e-chronicle), which will capture and organize daily events related to diet and physical activity.

Mingui Sun, PhD, is principal investigator on the project that will focus on developing a unified sensor device, cosmetically pleasant and easily worn by study subjects. The device will contain a miniature video camera configured to record the same scene the wearer sees. A set of physiological sensors will also be included.

The data recorded will be uploaded to a powerful computer where extensive multimedia processing will be performed to organize information using the newly developed e-chronicle technology. Diet and activity related events will be extracted, indexed and organized into an easily accessible form. The technology will de-identify any human appearance in the video.

The project hopefully will provide a new platform to study and better understand lifestyle, behavior and environmental trends prevalent in obesity and help provide more effective methods in its treatment.

This technology builds on extensive capabilities within the Center for Clinical Neurophysiology for video processing and miniaturization of electronics developed in support of physiological monitoring, endoNeurosurgery and brain computer interface systems.

Other investigators include Robert Sclabassi, MD, PhD, director of the Center for Clinical Neurophysiology; James Delany, MD, university provost office; John Fernstrom, MD, and Madelyn Fernstrom, MD, both from the department of psychiatry; and Jie Yang PhD, Carnegie Mellon University.

This project is one of the first grants awarded in a much larger NIH project known as the "Genes, Environment and Health Initiative" (GEI), a unique collaboration between geneticists and environmental scientists focusing on common conditions and personal environmental exposures.

In a news release announcing the GEI awards, U.S. Department of Health and Human Services Secretary Mike Leavitt said, "This is ground-breaking research in understanding the complex factors that contribute to health and disease. Researchers have long known that our genes, our environmental exposures and our own behavioral choices all have an influence on our health. This new initiative will use innovative genomic tools as well as new instruments for measuring environmental factors—from diet and physical activity to stress and substance addiction—in order to begin sorting out how these different factors affect a person's risk for a number of health conditions." •