

Department of Neurosurgery
 Louisiana State University Health Sciences Center
 PO Box 33932, Shreveport, LA 71130-3932
 Academic Office 318.675.6404
 Clinic Office 318.813.1555
 universityneurosurgery.com

Nonprofit Organization
 U.S. Postage
 PAID
 Shreveport, LA
 PERMIT NO. 4

Traumatic spondylolisthesis of the Axis: A biomechanical comparison of clinically relevant anterior and posterior fusion techniques

Prashant Chittiboina, MD, MPH, Esther Wyles, MD, Alan Ogden, BSME, Debi P. Mukherjee, Sc.D, Anil Nanda, MD, FACS

Surgical management of unstable traumatic spondylolisthesis of the axis (hangman's fracture) includes both posterior and anterior fusion methods. We performed a biomechanical study to investigate the relative stability of anterior fixation at C2/3 and posterior fixation of C1 through C3 in hangman's fractures.



Figure 1

Fresh frozen cadaver spine specimens (occipital to T2) were subjected to a stepwise destabilization of the C1-C2 complex, replicating a Type II hangman's fracture. Intact specimens, fractured specimens, and fractured specimens with either anterior screw and plate or posterior screw and rod fixation were each tested for stability. Each spine was subjected to separate right and left rotation, and bending, flexion, and extension.

Anterior fixation restored stiffness in flexion and extension to

values more than intact specimens. For other parameters, the values approximated intact specimens. Posterior fixation increased the stiffness to above those values seen for anterior fixation specimens.



Figure 2

In cadaver spine specimens subjected to a Type II hangman's fracture, both anterior fixation at C2/3 and posterior fixation with C1 lateral mass screws and C2 and C3 pedicle screws resulted in a consistent increase in stiffness, hence in stability, over intact specimens. While each method has advantages and disadvantages, either anterior or posterior fixation is likely to provide adequate stability for successful fracture stabilization. ■



University Neurosurgery Brain & Spinal Column



Volume 4

Summer 2008

RRC Approves Neurosurgery Residency Program Increase

The Department of Neurosurgery at LSUHSC-Shreveport is pleased to announce the approval of additional residency slots in the Neurological Surgery program.

The University Hospital but to the Ark-La-Tex as well, especially Louisiana since there is an inadequate number of neurosurgeons practicing in the state to serve our population.

Training two residents per year, for a total of 14 per program cycle, makes this program the largest in the state and one of the largest in the South.

This addition is a benefit not only to the Department and

the University Hospital but to the Ark-La-Tex as well, especially Louisiana since there is an inadequate number of neurosurgeons practicing in the state to serve our population.

In addition to the exposure to fundamentals of neurosurgical procedures, residents are taught the importance of patient care, professionalism, utilization of resources, and education of patients,

families, clinical, and support

staff. Our commitment to our patients, our community, and to research and advancement in health care is enhanced by the addition of bright young minds. We are honored to turn out highly trained neurosurgeons, many of whom will ultimately practice in this area. ■



Spine Update 2008 October in Downtown Shreveport

University Neurosurgery at LSUHSC-S is hosting the "2008 Spine Update" on Saturday, October 4 at the Petroleum Club of Shreveport.

Regis Haid, MD is our featured speaker and will discuss artificial disks. He graduated from the University of Notre Dame, and received his medical degree and neurosurgical training from West Virginia University.

He directed the Spinal Fellowship at Emory University where he was Professor before founding Atlanta Brain & Spine Care. He has been a visiting professor at universities worldwide, directed more than 60 spinal courses, and presented over 400 papers.



Regis W. Haid, Jr., M.D.



and the Schneider Lecturer at the AANS. He has served on the Editorial Boards of such publications as *Journal of Neurosurgery*, *Spine*, and *Clinical Neurosurgery*.

LSUHSC-S, School of Medicine designated this activity for a maximum of 4.25 AMA PRA Category 1 Credit(s)[™] and Northwestern School of Nursing has also granted 4.25 contact hours for nurses and nurse practitioners.

Back pain is the leading cause of disability, and even though it is not often life threatening, estimates of its total cost range from \$20 - \$50 billion a year in the U.S.

The conference begins at 8 a.m. with continental breakfast, followed by lectures and educational instruction, a break with exhibitors, and a closing luncheon. Please reference page 7 for agenda and registration information.

He has been the Drake Professor at the University of Virginia,

On the inside...

Hemedex Monitoring System
page 3

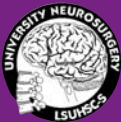
Staff Profile: Anthony Sin, M.D.
page 5

Multilevel Spinal Instrumentation
page 5

Endoscopic Pituitary Tumor Surgery
page 6

Type II Odontoid Fractures
page 6

Traumatic Spondylolisthesis of the Axis
page 8



Message from the Chairman



We are delighted to announce the addition of Dr. Anthony Sin as an Assistant Professor and Director of Complex Spine in the Department of Neurosurgery. Dr. Sin completed his undergraduate at Johns Hopkins and received his medical degree from Emory. He finished his neurosurgical training with us and did a spine fellowship with world renowned Dr. Kevin Foley in minimally invasive spine and complex deformity surgery at UT-Memphis.

On a personal level, I am delighted to have one of our residents come back and I think he will be an outstanding spine surgeon and academician.

The department continues to grow and

were delighted to have Professor of Neurosurgery at Harvard, Dr. Art Day, a Shreveport-Bossier native coming back to be the Mary Louise & Ben Levy visiting professor.

We are also delighted that the RRC has given us an additional resident to train and this is a tribute and vote of confidence in our department and LSUHSC.

Once again we are pleased to offer the tripod of patient care, education, and research. We also look forward to assisting the entire community with any neurosurgical needs.

Sincerely,

Anil Nanda, MD, FACS

New Resident Wins Donald R. Smith Award



The Donald R. Smith Award for Excellence in Neurosurgery is given in honor of Dr. Smith's innumerable contributions to the practice of neurosurgery in Louisiana to a graduating medical school student at LSUHSC - Shreveport, who has shown outstanding commitment and dedication to the field of neurosurgery.

This year's recipient is Justin Haydel, who was presented with the award by Dr. Smith and Dr. Anil Nanda at the Awards Convocation May 23. Past recipients have included Christina Notarianni, MD, Cedric Shorter, MD, and Rishi Wadhwa, MD.

Haydel was also selected by the Department of Neurosurgery faculty and staff as the newest resident in the Neurosurgery Residency Program. He began his training on July 1.

Our Neurosurgical Residency Training Program provides an academic environment that fosters excellence in clinical neurosurgery and research. At the completion of the seven-year program, residents are trained to be outstanding clinicians, active investigators, and experienced educators in the field of Neurosurgery and the Neurosciences. ■

Upcoming Lectures & Conferences



Spine Update 2008

Featured Lecturer - Regis W. Haal, MD
Petroleum Club of Shreveport
416 Travis Street, #1500
October 4, 2008, 8 a.m. - 1:30 p.m.



Grand Rounds: Clarence Watridge, MD

Associate Professor
Chairman of Semmes-Murphy Clinic
University of Tennessee
November 19, 2008, 4 p.m., LSUHSC-S



Grand Rounds: Ian F. Pollack, MD

Chief of Pediatric Neurosurgery
Children's Hospital of Pittsburgh
December 3, 2008, 4 p.m., LSUHSC-S



Grand Rounds: Richard Ellenbogen, MD

Professor and Chairman of Neurological Surgery
Theodore S. Roberts Endowed Chair
in Pediatric Surgery
Washington School of Medicine
February 18, 2009, 4 p.m., LSUHSC-S



Grand Rounds: John Wilson, MD

Vice Chair, Associate Professor,
Residency Program Director
Wake Forest University School of Medicine
March 4, 2009, 4 p.m., LSUHSC-S



Grand Rounds: Tae Sun Park, MD

Chief Neurosurgeon, Professor of Neurosurgery
Department of Neurosurgery
St. Louis Children's Hospital
March 18, 2009, 4 p.m., LSUHSC-S



Mary Louise & Ben Levy, Jr. Visiting Professorship in Neurosurgery

Mitchel S. Berger, MD
Chairman, Dept. of Neurological Surgery
Director, Brain Tumor Research Center
University of California - San Francisco
April 22, 2009, 10 a.m., LSUHSC-S

Spine Update Agenda October 4, 2008

8:00 am	Breakfast
8:30 am	<i>Widom</i> Anil Nanda, MD, FACS, Professor & Chairman Dept. of Neurosurgery, LSUHSC-S
8:35 am	<i>"Arthritis Management"</i> Seth Mark Berney, MD Professor and Chief, Section of Rheumatology Director, Center of Excellence for Arthritis and Rheumatology, LSUHSC-S
9:00 am	<i>"Minimally Invasive Spine Surgery"</i> Anthony Sin, MD, Assistant Professor Dept. of Neurosurgery, LSUHSC-S
9:25 am	<i>"Update on Cervical and Lumbar Arthroplasty"</i> Featured Speaker Regis W. Haal, Jr., MD Atlanta Brain and Spine Care
10:10 am	Break with Exhibitors
10:25 am	<i>"Cranio-Vertebral Junction Abnormalities"</i> Anil Nanda, MD, FACS, Professor & Chairman Dept. of Neurosurgery, LSUHSC-S
10:50 am	<i>"Pediatric Spinal Diseases with an Emphasis on Spinalis"</i> Richard E. McCall, MD, Professor & Chairman Dept. of Orthopaedic Surgery, LSUHSC-S
11:15 am	<i>"Workman's Comp and Liability Issues with Spinal Injuries"</i> Donald R. Smith, MD, Clinical Professor Dept. of Neurosurgery, LSUHSC-S
11:40 am	<i>"New Pain Modalities for Spinal Disease"</i> Randall Brewer, MD, Clinical Faculty Clinical Practice of Pain Medicine The Spine Institute Willis Knighton Health Systems
12:05 pm	<i>"Cutting Edge Interventions for Neurological Rehabilitation"</i> Suzanne Tinsley, PhD, PT, Associate Professor of PT, School of Health Professions, LSUHSC-S
12:25 pm	Lunch
1:00 pm	Multidisciplinary Clinical Scenarios and Panel Discussion
2:00 pm	Adjourn

Registration forms can be found by visiting universityneurosurgery.com, under the calendar section, or by calling the CME office at 318.675.7565.



University Neurosurgery
Brain & Spinal Column

Medical Editors:
Anil Nanda, MD, FACS
Designer/Writers:
Jennifer M. Adams
and Morgan Greif

Brain & Spinal Column is written for physicians and should be relied upon for medical education purposes only. It does not provide a complete overview of the topics covered, and should not replace the independent judgment of a physician about the appropriateness or risks of a procedure for a given patient.

University Neurosurgery's
multidisciplinary team is pleased to serve you and
your patients in five locations.

Clinics

LSUHSC-Shreveport

1501 Kings Highway
Shreveport, LA 71103
318.813.1555, Fax: 318.813.1556

Willis Knighton North

Medical Arts Building
2551 Greenwood Rd., Ste. 320
Shreveport, LA 71103
318.635.6363, Fax: 318.631.5392

Willis Knighton Bossier

2300 Hospital Dr., Ste. 350
Bossier City, LA 71111
318.742.8666, Fax: 318.742.8488

Willis Knighton Pierremont

8001 Youree Dr., Ste. 830
Shreveport, LA 71115
318.813.1555, Fax: 318.675.8958

Willis Knighton South

2520 Bert Kouns, Ste. 105
Shreveport, LA 71118
318.813.1555, Fax: 318.675.8958

Gamma Knife Radiosurgery

1501 Kings Highway
Shreveport, LA 71105
318.675.6195, Fax: 318.675.8950

NeuroInterventional Surgery

1501 Kings Highway
Shreveport, LA 71103
318.675.8129, Fax: 318.675.8184

Administrative Main Office

University Neurosurgery
LSUHSC-Shreveport, Dept. of Neurosurgery
1501 Kings Hwy., P.O. Box 33932
Shreveport, LA 71130-3932
318.675.6404, Fax: 318.675.4615

Billing Office: 318.813.1576, Fax: 318.813.1577
Business Office: 318.675.8299, Fax: 318.675.4457
Editorial Office: 318.675.5392, Fax: 318.675.7111
Nursing Office: 318.813.1555, Fax: 318.813.1556
1.888.740.7246

Chief Resident Wins Louisiana Neurosurgical Society Award

The Louisiana Neurosurgical Society hosted their 34th Annual Meeting in Lafayette January 18-19. The meeting participants included approximately 75 neurosurgeons from throughout Louisiana. Drs. Anil Nanda, Donald Smith, and Bharat Guthikonda from University Neurosurgery attended the two-day conference.



Chief Resident of the Department of Neurosurgery at LSUHSC-Shreveport, Christina Notarianni, MD won the 2008 Resident Award for her presentation "Congenital hydrocephalus still beats the shunt technology: Programmable shunts did not change the scenario of revisions."

Other presentations were made by faculty and staff of the Department of Neurosurgery. ■

International Neurosurgeon lectures to Residents

Professor and Chairman of the Department of Neurosurgery at Beijing Tiantan Hospital, Jizong Zhao, gave a lecture to the Department of Neurosurgery March 17, 2008.



Dr. Zhao is the President of the 7th Asian Congress of Neurological Surgeons and also the President of Chinese Neurosurgical Society.

His talk was titled "Neurosurgery in China." ■

Profile

Anthony Sin, MD



Dr. Sin earned his medical degree from Emory University School of Medicine. From 1988-92, he attended Johns Hopkins University where he received his Bachelor of Arts in Physics with Honors.

He completed his clinical fellowship at Mount Sinai School of Medicine with the Department of Neurosurgery in Neurotrauma. Dr.

Sin completed internships in Internal Medicine at Emory and General Surgery at the State University of New York - Stony Brook prior to his Neurosurgery training at LSUHSC-S. He

served as Chief Resident in 2007 before graduating the program. His clinical interests include minimally invasive spinal instrumentations and complex spinal disorders, including deformity corrections and spinal tumors. Dr. Sin has published articles in journals including *Journal of the Louisiana State Medical Society*, *Journal of Neurosurgery - Spine, Surgical Neurology*, and *Child's Nervous System*.

In 2005, Dr. Sin won the John Jackson Award for his Clinical Research Presentation "Testing Surgical Approach Stability to Spinal Fusion" from the Louisiana Neurosurgical Society.

He completed a one-year spinal fellowship with Dr. Kevin Foley at the University of Tennessee in Memphis in June. ■

Case Report: Minimally Invasive Multilevel Spinal Instrumentation

Anthony Sin, MD
Assistant Professor & Neurosurgeon

A 65-year-old female felt a sudden onset of severe back pain after her boat went up on high tide and came down during her trip down to Florida. She was taken to a local hospital and x-rayed,



Figure 1

(Fig. 1) which revealed a burst fracture of T12 vertebral body, resulting in severe kyphosis. The physicians placed her in a TLSO brace, and she was referred for further management.

Her neurological exam was completely intact. She has never developed any radiculopathy or neurological deficits. Although she had severe deformity, she indicated a strong desire to be treated non-

operatively as long as she does not develop any neurological deficits or worsening in her kyphosis. Subsequent follow-up CT scans failed to show adequate healing of her fracture even after six months (Fig. 2).



Figure 2

procedure.

An anterior-lateral approach was taken on day one for a T12 corpectomy with expandable cage and single-screw fixation. This was reinforced with posterior instrumentation with percutaneous pedicle screws utilizing the Longitude system, a new spinal instrumentation system with a minimally invasive principle for thoracic and upper lumbar levels. It enables a surgeon to perform multilevel instrumentation

percutaneously with minimal tissue interruptions and smaller incisions. This device has been available only since October of 2007.

The patient did well post-operatively with the correction of her deformity almost to normal alignment (Fig. 3 & 4).

This case is a good example of recent advances made in minimally invasive spinal surgery. Although many obstacles remain in the future, it is not unreasonable to imagine performing every spinal operation with the same minimally invasive principles in a near future. ■



Figure 3



Figure 4

Innovative Spinal Surgical Procedure Preserves Neck Motion



Brian K. Willis, MD
Professor &
Neurosurgeon

Type II odontoid fractures are a common fracture, particularly among older patients, of

the base of the odontoid process of the second vertebra, also known as C-2. These fractures are notorious for not healing well using bracing or other bulky and uncomfortable orthotic immobilizing devices such as the Halo vest.

Typically, a posterior atlanto-axial fusion is performed, which is a rather invasive surgical procedure performed to wire the C2 spinous process to the C1 arch. This operation may take up to four hours, involves moderate blood loss and postoperative pain, requires three to four days of hospitalization, and

results in significant reduction in the ability to rotate the head side-to-side. This loss of motion interferes with daily activities such as driving a car, playing golf, and other activities that require turning of the head.

A review of recent treatment outcomes from a novel surgical procedure designed to stabilize a Type II odontoid fracture while preserving normal neck motion and function was done among our patients.

This newer, fresh approach, called the anterior odontoid screw fixation, requires a much smaller incision on the front of the neck. It is then followed by a placement of a cannulated screw through the C2 body into the fractured odontoid process which is done using fluoroscopic X-ray guidance.



The operation takes less than an hour, involves minimal blood loss, and allows the patient to return home usually within a day after surgery. Most importantly, it preserves the normal anatomic motion of the cervical spine. After appropriate healing time, patients are able to return to full activities without restrictions.

The review of our experience with this technique found a very definite improvement in patient functional outcome, as well as patient satisfaction. ■



Endoscopic Pituitary Tumor Surgery

A Minimally Invasive Way to Remove Brain Tumors

Bharat Guthikonda, MD
Assistant Professor & Neurosurgeon

Pituitary adenomas are the third most common brain tumor, accounting for 10-15 percent of all intracranial neoplasms. They are usually benign tumors which may be limited to the sella turcica or may enlarge to involve the nearby suprasellar space or cavernous sinus. Seventy percent of these tumors are "functional," indicating that they overproduce one of the pituitary hormones. Overproduction of prolactin, ACTH, growth hormone, or TSH can lead to severe medical problems and may be fatal. "Non-functional" tumors tend to be larger at the time of diagnosis and cause symptoms such as visual deficits or hypopituitarism due to mass effect.



Figure 1

Historically, the surgical management of pituitary tumors has required approaches to the base of the skull either through the nasal septum

(endonasal) or underneath the lip (sublabial). In recent years, endoscopy has been used to obtain access to the pituitary gland without an incision.

The endoscopic approach has several advantages. First, it is less traumatic to the patient allowing speedier recovery and earlier hospital discharge. Patients are often discharged on post-operative day one. Second, the exposure is superior to that obtained with the standard microscopic view. It allows a more panoramic view inside the sphenoid sinus, around the pituitary gland, and of the carotid arteries in the cavernous sinus (Fig 1). Third, once resection is completed, intrasellar endoscopy allows us to look for residual tumors in "corners" that would not be visible with the traditional microscope approach (Fig 2).

Endoscopic resection of pituitary tumors is a new, minimally invasive technique. It is well tolerated by patients, often allowing earlier discharge. This technique does not compromise exposure, but in fact allows a better view of the important structures to maximize tumor resection. ■

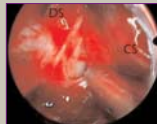


Figure 2

Minimally Invasive Spine Surgery: An Overview



Donald Smith, MD
Clinical Professor &
Neurosurgeon

Now popular in peer review literature and the lay press, this term on initial perusal seems to be an oxymoron. Can disk excision, laminectomy, spinal fusion, and even insertion of instrumentation really be a "minimal" surgery?

Closer inspection reveals advances in technology and the development of instrumentation which has greatly diminished the collateral damages formerly imposed by the performance of many spinal surgical procedures. These improvements have allowed less surrounding tissue trauma by requiring less muscular dissection, smaller incisions, and preservation of normal functional musculoskeletal relations. These factors lessen immediate operative problems by the decrease in blood loss and lower risks of infection, improve the long-term outlook and biomechanical function, and allow a shorter convalescent period.

Many of these technologies entail the development of smaller focused retractor systems which can be



Fig. 1: Allows serial placement of progressively larger tubular retractors precisely overlying a disk space or facet joint.

accurately inserted through very small incisions using the advanced imaging systems for guidance. These systems can allow extensive surgical procedures through very small openings of the skin and the underlying muscular layers. The refinements of the operating microscope with its magnification and superb coaxial illumination allow precise dissection through minimal exposures.

Examples include small tubular retractors (Fig. 1) which once inserted are maintained by a mechanical arm, thus freeing the surgeon and assistant to work through this guide using appropriate instruments and the operating microscope (Fig. 2). Devices have also been developed that allow percutaneous insertion of entire instrumentation systems (Fig. 3). Using this technique, disk fusions, decompressions, and even limited fusions can be performed.

Use of such technology in carefully selected cases certainly may benefit the patients, allowing shorter recovery periods and improved results. Selection still requires rigorous adherence to the clinical and biomechanical indications for performance of the underlying procedures. ■



Fig. 2: Performance of a lateral interbody fusion using similar instrumentation for exposure.



Fig. 3: Insertion of pedicle screws and rods using only small stab wounds.

Neuro ICU at the Fore Front of Minimally Invasive Neurosurgery

The Neuro ICU, the only one of its kind in Louisiana, has secured the Codman Hemedex Cerebral Blood Flow Monitoring System for evaluation in the ICU setting. The unit is at the cutting edge of technological advances in the management of neurosurgical patients.

The Hemedex is the only minimally invasive device currently available that provides doctors with continuous, real-time, bedside measurement of cerebral blood flow in absolute units.

Clinical data suggests that this technology may help physicians better identify and manage those patients at risk for complications from stroke, traumatic brain injury, and SAH due to decreased cerebral blood flow by providing continuous, real-time, soft tissue perfusion measurement in absolute units.

"The Hemedex probe will provide an important advance in our neuro monitoring capabilities," said Denise Taylor, manager of the Neuro ICU. "We plan to use the Hemedex technology whenever we are treating a severe traumatic brain injury in our unit." ■

