

The image shows a glass wall with the words "Spine Institute" etched onto it in a serif font. The background is a blurred view of a modern office or hospital lobby with large windows overlooking a city skyline. A person is visible in the background, looking out the window.

Spine Institute

Spine Institute

OVERVIEW AND OUTCOMES REPORT 2010



ABBOTT
NORTHWESTERN
HOSPITAL
Allina Hospitals & Clinics



Spine Institute

OVERVIEW AND OUTCOMES REPORT 2010

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Letter from Joseph Perra, MD

Chairman of the Spine Physician Advisory Board



The Spine Institute represents spine-related services and programs of Abbott Northwestern Hospital, the Institute for Low Back and Neck Care, KIM Neurosurgery, Metropolitan Neurosurgery, Neurosurgical

Associates, Twin Cities Spine Center, Penny George Institute for Health and Healing and the Sister Kenny Rehabilitation Institute.

This report details the unique and collaborative efforts of the independent specialty physician groups who devote most or all of their practices to spine patients, and the state-of-the-art facilities, technologies, services and staff that make Abbott Northwestern a hospital of choice for specialty spine care. The Spine Institute demonstrates that harnessing these talented and experienced resources achieves synergistic results that greatly benefit spine patients.

Key Strengths

Every year, more spine surgeries are performed at Abbott Northwestern than at any other hospital in the state. This breadth of experience among the Spine Institute physicians and other professionals involved in spine care at Abbott Northwestern ensures comprehensive and innovative care for spine patients. Key strengths of the Spine Institute include:

Collaboration and cooperation among nationally and internationally known physician groups. Spine Institute physicians include both orthopaedic surgeons and neurosurgeons who perform the full range of spinal surgeries, including decompression, stabilization and fusion. Many of these independent physicians are recognized internationally for their expertise and innovative spinal care. These highly trained specialists pursue their independent practice group missions while collaboratively providing expertise, input and direction to the Spine Institute. Together, they strive to provide the best possible patient care in an efficient manner.

The Spine Institute also benefits from the involvement and collaboration of physicians from other specialties, including hospital-based medicine, intensive care, neurophysiology, neuroradiology, pain management and psychiatry. These physicians make significant contributions to the diagnosis, care and recovery of spine patients.

Highly specialized surgical services and inpatient services with dedicated staff and facilities. In 2010, U.S. News and World Report cited Abbott Northwestern as one of the nation's Best Hospitals in neurology, neurosurgery and orthopaedics, including spine care and spinal surgery. Abbott Northwestern has assembled a surgical spine specialty team that allows the Spine Institute to provide the best possible surgical care more efficiently. Operating Room nurses and technologists prepare for and assist with spinal procedures every day, offering a level of expertise that is achieved only through specialized training and experience.

Dedicated nursing staff on the spine inpatient unit understand and address the unique needs of spine patients. They have received advanced training in spine care and provide the skilled assessment and monitoring that spine patients require, while offering reassurance and support to patients and family members.

Abbott Northwestern has spine-dedicated operating rooms and spine-focused perioperative teams comprising Surgery, Anesthesiology, Preoperative and Postoperative staff. The operating rooms are equipped with the specialized instruments and technology that allow surgeons to perform all types of spine surgery. Specialty inpatient units for spine patients have been developed to optimize post-operative care. These units are located in the newest addition to the hospital and were designed to facilitate the recovery of spine patients.

Research, education and innovative approaches that contribute to improvements in spine care. Many of the physicians participate in leading research and education focused on conditions of the cervical, thoracic and lumbar spine as well as spinal deformities. Of particular interest is research to explore and substantiate advances in operative and non-operative methods of diagnosis and management of spinal problems. Some physicians also have research affiliations with leading medical technology organizations, maintain university appointments, and lecture and publish on issues related to the treatment of spinal diseases and disorders. In addition, the Twin Cities Spine Center offers a Spine Fellowship that is one of 18 programs in the country approved by the Accreditation Council for Graduate Medical Education (ACGME) for postgraduate training in spine surgery.

Advanced technology that expands treatment options and enhances safety and effectiveness. Abbott Northwestern has invested in technology that offers important benefits to spine patients, including electrodiagnostic technology, magnetic resonance imaging and fluoroscopic computed tomography scanning. Allina's electronic medical record system is also an asset to the Spine Institute, allowing timely access to patients' medical history, progress notes and test results; medication cross-checking capabilities and other safeguards; and strict protection of patient privacy.

Challenges and Opportunities in Spine Care

One of the challenges in spine care is that most interventions are reactive. Spine Institute physicians are participating in efforts within Allina to more fully integrate preventive medicine and primary care into spine care strategies. Because spine problems are often related to degenerative conditions and overall health status, there is great potential for improving spine care through a better understanding of the role of genetics and other risk factors.

In addition, in an era of limited resources, documenting and improving the outcomes and functional ability of patients in a cost-effective manner is critical. Recent research, including the Spine Patient Outcome Research Trial (SPORT) study, has demonstrated the effectiveness of surgical care. In some cases, surgery may be the most conservative form of care and may help to restore function more quickly and more completely than other forms of treatment. Through collaboration with Abbott Northwestern's Outcomes Institute, Spine Institute physicians are working to define those conditions for which surgery is the best option for care.

IN THIS REPORT

As detailed in the following pages, the physicians of the Spine Institute are dedicated to providing comprehensive care for all types of spine problems through collaboration, innovation, research and advanced technology. This report highlights their work and the specialized facilities, advanced capabilities and latest developments in spine care at Abbott Northwestern.



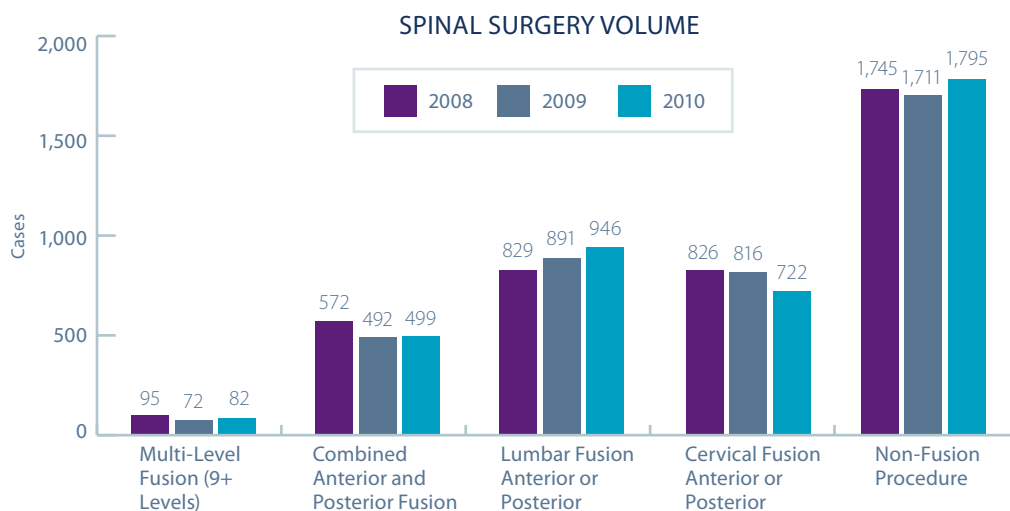
Foundation for Excellent Care

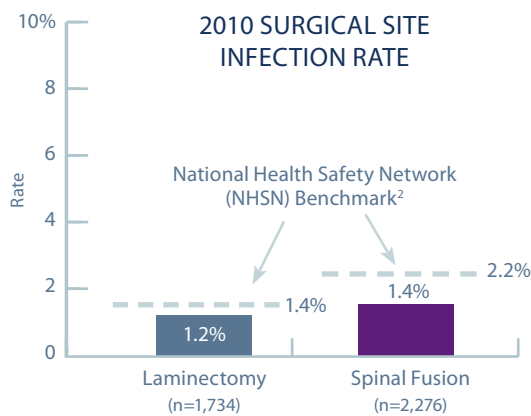
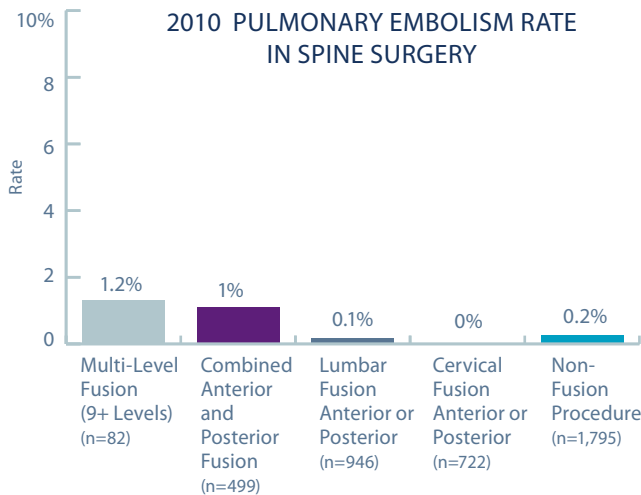
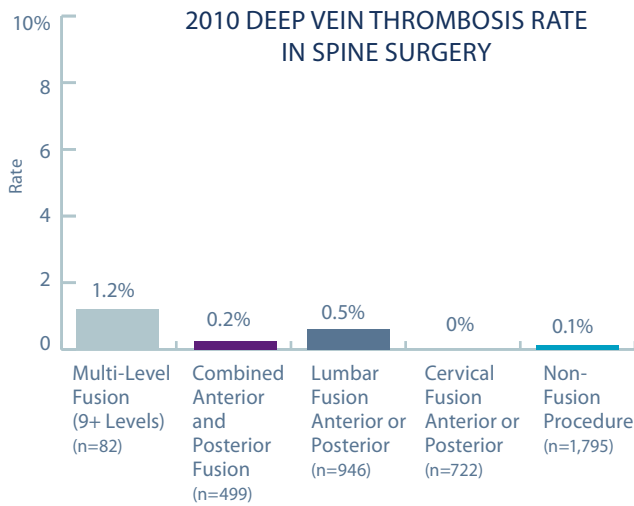
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Spine Specialty Operating Rooms

Abbott Northwestern's Operating Rooms (OR) are staffed by a specialty team of 30 perioperative and operative professionals. The team is highly experienced in the care of patients during complex spinal procedures. In fact, the spine specialty team performs more spinal procedures than any other hospital operating room team in the state. The spine specialty ORs have access to advanced operating technologies, including microscopes, computerized navigation systems and the O-arm imaging system. Intraoperative monitoring of spinal cord and nerve root function is routinely done to protect patients from neurological injury. In 2007, the newest OR opened, equipped with a moveable high field intraoperative MRI scanner. The combination of experienced personnel and leading-edge technology helps spinal surgeons and neurosurgeons at Abbott Northwestern offer patients the best possible care for their conditions.





1. Data is collected based on Centers for Disease Control definitions of infection. Both superficial and deep incisional infection are included. Data is current as of January 2010.
2. For benchmarking, the NHSN requires that all procedures assigned a designated ICD-9 code be included in the denominator.
3. NHSN, formerly known as the National Nosocomial Infection Study, includes data from various size hospitals across the country.

BLUE DISTINCTION CENTER FOR SPINE SURGERY®

Abbott Northwestern is designated by the Blue Cross and Blue Shield Association as a Blue Distinction Center for Spine Surgery. Abbott Northwestern is recognized for its demonstrated expertise in offering comprehensive inpatient spine surgery services, including discectomy, fusion and decompression procedures by board-certified orthopaedic spine surgeons and neurosurgeons.



Photo by Daryll Dykes, MD, PhD



Inpatient Unit

The Spine Inpatient Units H7000 and H8000 are located on the top floors of Abbott Northwestern's Heart Hospital. This award-winning space provides a complete healing environment, with care centered on the needs of spine patients and their families.

Each of the 83 private rooms includes amenities for patients and visitors, including a refrigerator, safe, DVD/VCR player and a family area with a separate phone, computer jack, reading lamp and seating that converts to a bed, allowing a family member to spend the night. For patient safety and comfort, each room has an overhead lift track that can be used to reposition patients or move them from the bed to the bathroom or a chair. Each private bathroom is equipped with grab bars, a lipless shower, a shower chair and several other safety features.

In addition to well-designed patient rooms, H7000 and H8000 have attractive waiting areas for patients and family members. The solarium features a fireplace, microwave oven, coffee maker, refrigerator and ample seating. The atrium offers a sense of tranquility, including a cascading water wall and two-story windows with an expansive view.

Two rehabilitation areas are incorporated into the unit to enable early assessment and initiation of treatment. The occupational therapy room includes a full kitchen and bathroom to help patients practice and regain activities of daily living. The physical therapy room contains state-of-the-art rehabilitation equipment, including a driving simulator.

The Spine Units are staffed by highly dedicated registered nurses. During the first year of employment on H7000 and H8000, nurses receive specialized training in the care of patients with spine disease or injury.

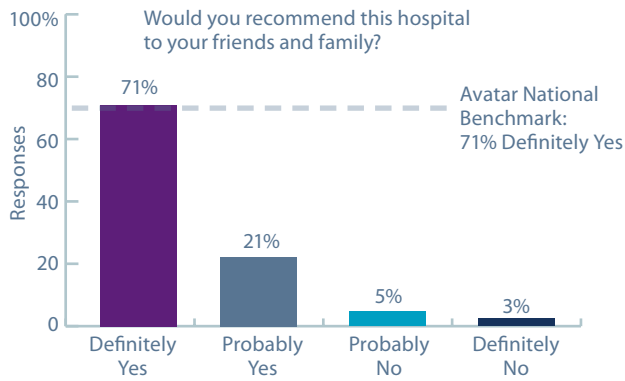


Inpatient Satisfaction Survey

The inpatient satisfaction survey instrument is HCAHPS (Healthcare Consumer Assessment of Hospital and Provider Services), which is recommended by the Centers for Medicare & Medicaid Services (CMS). The HCAHPS survey allows direct comparison of Abbott Northwestern patients' experience to results from other institutions. The Avatar Benchmark shown here reflects results from approximately 400 hospitals nationwide.

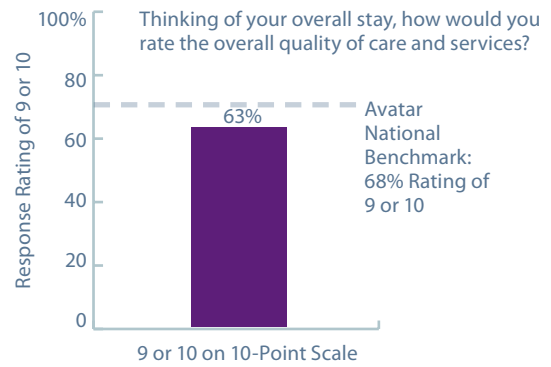
2010 STATION H7000
PATIENT SATISFACTION SURVEY

(n=1,454)

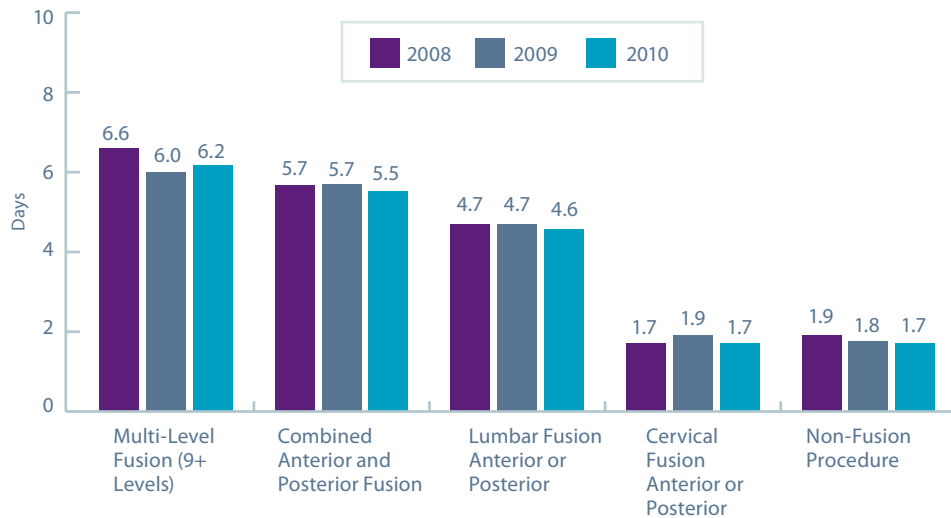


2010 STATION H7000
PATIENT SATISFACTION SURVEY

(n=1,454)



AVERAGE LENGTH OF STAY SPINAL PROCEDURES





Neurophysiology

Stanley Skinner, MD, medical director

The Neurophysiology Program performs the full spectrum of electrodiagnostic studies, including electroencephalography/evoked potentials (EEG, EP), electromyography (EMG) and intraoperative neuromonitoring (IONM). Two physician neurophysiologists staff the operating rooms.

Program professionals focus on comprehensive electroclinical care and ongoing neurophysiology research, especially the development of advanced methods in electromyography and evoked potentials. These methods have permitted our intraoperative team of neurophysiologists and certified technologists to diagnose and intervene during the early evolution of intraoperative neural dysfunction, preventing or minimizing postoperative neurological deficits.

We are also actively involved in education, providing hands-on training and didactic instruction of departmental technologists and students from local neurophysiology programs. We have presented our experience nationally,

and where appropriate, have integrated the experiences of others within our program. We believe patient care is much enhanced by these endeavors.

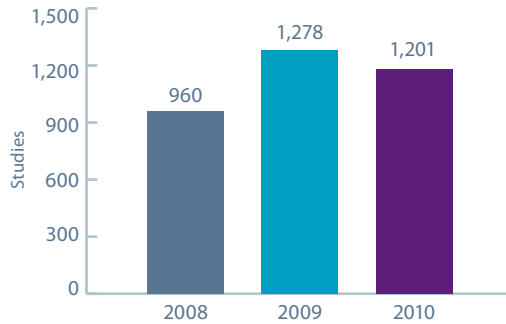
The Program has focused particular clinical and research attention on spinal cord and nerve root pathophysiology. Of our neuromonitored cases in 2010, 42 percent were spine procedures. Our bibliography of peer-reviewed journal articles documents our ongoing research interest in intraoperative spine monitoring.

The Program's dedication to high quality neurophysiological care has led to a significantly increased demand for these services. Each study, whether in the lab or operating room, is tailored to the patient. Professional interpretations are reported expeditiously (real time in the operating room) to the referring physician. In particular, our individualized approach to IONM is exceptional among neuromonitoring services, and we take pride in this distinction.

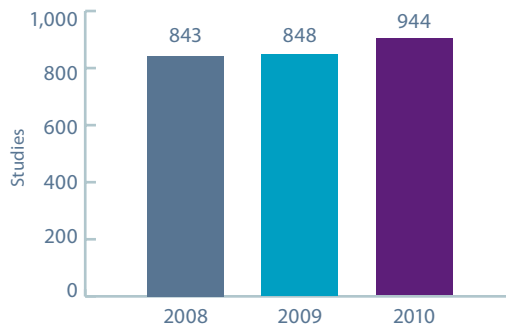
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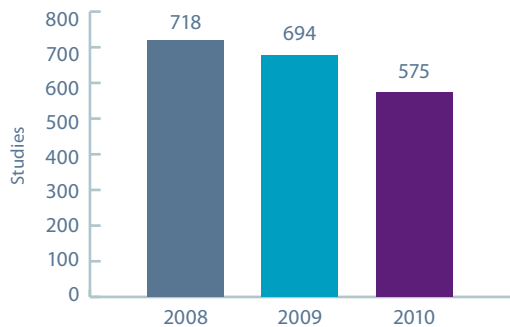
INTRAOPERATIVE NEUROPHYSIOLOGIC MONITORING VOLUME



ELECTROMYOGRAPHY VOLUME



ELECTROENCEPHALOGRAPHY AND EVOKED POTENTIALS VOLUME



OUR COMMITMENT TO REFERRING PHYSICIANS AND THEIR PATIENTS:

We will:

meet the highest standards of laboratory and intraoperative neurophysiology

provide timely, accurate and pertinent reports to referring physicians

improve the understanding and application of clinical neurophysiology through basic and clinical research.



Diagnostic Neuroradiology

Neeraj Chepuri, MD

Spine radiology services are provided by Abbott Northwestern's Diagnostic Neuroradiology Program, which is staffed by seven fellowship-trained neuroradiologists. They are responsible for interpreting MRI and CT scans of the head, neck and spine and for performing CT- and fluoroscopically-guided biopsies, aspirations and injections.

The neuroradiologists actively collaborate with the neurosurgeons and spine surgeons at Abbott Northwestern. They attend weekly spine conferences with physicians from the Institute for Low Back and Neck Care, Metropolitan Neurosurgery, Neurosurgical Associates and Twin Cities Spine Center, supporting a multidisciplinary approach to diagnostic and pre-surgical consultation.

Abbott Northwestern's Radiology Department has four high-field MRI scanners; three operate at a field strength of 1.5 tesla and one operates at 3 tesla. The department has four modern CT scanners with C-arm technology for fluoroscopy-guided minimally invasive procedures. The department also provides O-arm fluoroscopy studies, which provide a three-dimensional view of the spine to aid in planning surgery.

Numerous spine MRI scans and spine CT scans are performed daily. In addition, more than 600 minimally invasive spine injection procedures are performed annually.

Diagnostic procedures. Diagnostic procedures include lumbar and cervical myelograms to investigate the cause of pain or weakness in the back, legs, neck or arms.

Minimally invasive spine procedures. The goal of minimally invasive spine procedures is to provide short- and long-term pain relief using epidural steroid injections in the lumbar, thoracic or cervical region of the spine. Several types of injections are available, including lumbar transforaminal epidural steroid injections, facet injections and nerve blocks.

Research. In 2008, a diagnostic neuroradiology study was completed in conjunction with the Twin Cities Spine Center that assessed the presence of spinal epidural hematomas among postoperative lumbar surgery patients. The focus of the study was to determine if the hematoma size correlated with postoperative pain symptoms.

Numerous spine MRI scans and spine CT scans are performed daily. In addition, more than 600 minimally invasive spine injection procedures are performed annually.

Interventional Neuroradiology Program

David Tubman, MD
Benjamin Crandall, DO
Josser Delgado Almandoz, MD

One of the nation's busiest and most sophisticated interventional neuroradiology practices is located at Abbott Northwestern Hospital, with three full-time interventional neuroradiologists. The program has a 25-year history at Abbott Northwestern. The program is enhanced by two nurse practitioners experienced in neurology and neurosurgery care; a patient care coordinator; and a dedicated research coordinator who assists in ongoing research studies and clinical outcomes tracking. The interventional neuroradiology service coordinates care with colleagues in neurosurgery, neurology, neuro-oncology, intensive care and otolaryngology.

The scope of the practice includes inpatient and outpatient consultative and therapeutic services. The interventional neuroradiologists perform many technically demanding neurovascular and percutaneous procedures. Some of the neurovascular procedures include spinal angiography and spinal arteriovenous malformation (AVM) and fistula (AVF) embolization. Percutaneous procedures performed to manage spinal and sacral pain secondary or due to pathologic and osteoporotic compression fractures include vertebral augmentation (vertebroplasty and kyphoplasty) and sacralplasties. Other pain management procedures are epidural steroid injections and facet and sacroiliac joint injections. Lumbar drain placement is also performed to treat intraoperative and spontaneous cerebral spinal fluid leaks.



The technically demanding nature of this specialty requires appropriate resources for an optimal operative/procedural environment. Abbott Northwestern Hospital operates two biplane neurointerventional suites, with modern 3D vascular imaging and on-the-fly CT imaging.

The Interventional Neuroradiology Program staff maintains competence through educational programs and clinical research. Advances in the field and improved results for patients are derived from volume-based expertise in clinical care and ongoing incorporation of new information.

For example, vertebral augmentation patients' outcomes are monitored by the interventional neuroradiology staff. Approximately 91 percent of vertebral augmentation patients seen from 2008 to 2010 reported that their pain was reduced. The 24-question Roland-Morris Disability Questionnaire administered in 2010 showed a 75 percent improvement in disability related to back pain.

VERTEBRAL AUGMENTATION

Pain relief at 1-2 weeks postprocedure

Pain relief	91%
No relief	8%
Increased pain	1%

Data (n=360) are cases from 2008, 2009 and 2010 with follow up in 1-2 weeks postprocedure.

DISABILITY ANALYSIS

Using 24-question Roland-Morris Disability Questionnaire administered by the Interventional Neuroradiology nurse practitioner

Average disability score preprocedure	4
Average disability score postprocedure	18
Improvement	75.6%



Hospital-Based Services

Intensivist

Abbott Northwestern's intensivist service manages the care of Spine Institute patients who require intensive care before or after surgery. The intensivist group comprises 11 board-certified critical care specialists who are available 24 hours a day. This group manages 65-85 percent of intensive care patients at Abbott Northwestern and is highly skilled in providing exceptional care to a wide variety of critically ill patients. This provides an extra level of skill and expertise for patients in the intensive care units at Abbott Northwestern Hospital.

Hospitalist

Abbott Northwestern's hospitalist service is a group of 62 physicians who are available 24 hours a day to manage the care of hospitalized patients. This group of physicians is highly experienced in the diagnosis, treatment and coordination of care for hospitalized patients. They can act as primary care providers for hospitalized patients. They also work closely with nurse coordinators and social workers to assist in discharge planning and help to identify and address any social services needs that the patient may need during or after the hospital stay.

Abbott Northwestern's hospitalist service is a group of 62 physicians who are available 24 hours a day to manage the care of hospitalized patients.



Pain Management Service

Matthew Monsein, MD

John Mrachek, MD

For patients undergoing spinal surgery, adequate postoperative pain management is critical. Inadequate pain control after surgery can result in a traumatic experience, even if the technical aspects of the surgery are performed well. Also, an increasing number of spine surgery patients are taking moderate to high doses of long-acting narcotic analgesics to manage pain before surgery. These patients frequently have an extremely high tolerance to commonly used narcotic analgesics, and therefore require careful and aggressive treatment to provide optimal postoperative pain management.

The Pain Management Service includes a Chronic Pain Service and an Acute Pain Service. By offering both specialities, patients receive immediate postoperative pain control and adequate transitions from intravenous to oral pain medication. The Pain Service provides guidance to surgeons and primary care physicians as they help their patients recover from surgery.

In addition to using patient-controlled anesthetic pumps, spinal and regional blockades, intravenous infusions and oral medications, the Pain Management Service works with Abbott Northwestern's Penny George Institute for Health and Healing to help patients manage postoperative pain, nausea and anxiety. Integrative medicine practitioners from the George Institute work with patients to incorporate relaxation and breathing techniques, acupuncture and other approaches into pain management strategies.

By combining state-of-the-art technology, medical expertise and integrative medicine, the Pain Management Service can provide patients with excellent pain control and minimize the anxiety and stress that are associated with poor pain management.



Abbott Northwestern Hospital has a dedicated Pain Management Service to meet the special needs of spine patients, as well as all patients with postoperative pain management issues. The Pain Management Service has specialty departments for both chronic and acute pain. This gives patients access to highly experienced practitioners who can help address their specific pain management needs.



The Penny George Institute's Pre-Hospital Program offers mind-body coaching to prepare patients for a positive hospital experience. By meeting with a mind-body coach before surgery, patients learn techniques to help them relax and feel more in control of their hospital experience including meditation, breath work, relaxation techniques, guided imagery, biofeedback and self-care practices.

Integrative Health Services from the Penny George Institute for Health and Healing

Founded in 2003 by the George Family Foundation and the Ted and Dr. Roberta Mann Foundation, the Penny George Institute for Health and Healing is the nation's largest hospital-based integrative health program.

Patients with spinal diseases and disorders and those requiring spine surgery benefit from the integrative services offered by the Penny George Institute's dedicated spine team, including acupuncturists, massage therapists and nurse clinicians with board certification in holistic nursing.

Patients with complex surgeries may have a longer hospital stay or issues related to chronic pain. The Penny George Institute's Pre-Hospital Program offers mind-body coaching to prepare patients for a positive hospital experience. By meeting with a mind-body coach prior to surgery, patients learn techniques to help them relax and feel more in control of their hospital experience including meditation, breath work, relaxation techniques, guided imagery, biofeedback and self-care practices.



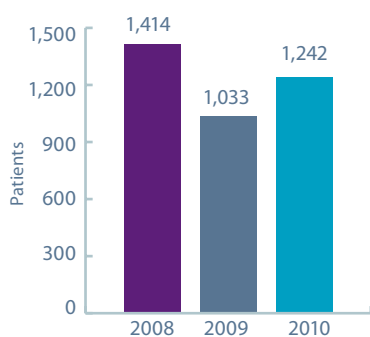


The LiveWell Fitness Center offers a highly credentialed staff of exercise physiologists, physical therapists, licensed nutritionists and aftercare specialists. They help Spine Institute patients develop fitness and nutrition plans to optimize health before or after surgery.

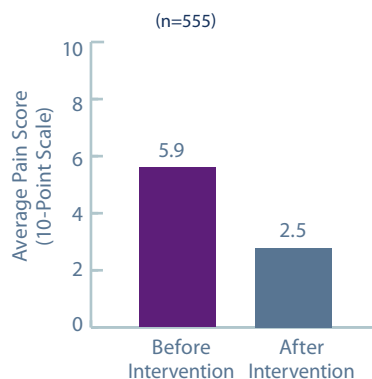
The LiveWell Fitness Center offers a highly credentialed staff of exercise physiologists, physical therapists, licensed nutritionists and aftercare specialists. They collaborate with the Spine Institute's physicians and rehabilitation professionals and help Spine Institute patients develop fitness and nutrition plans to optimize health before or after surgery.

In addition, the Penny George Institute's Outpatient Clinic offers acupuncture, biofeedback, integrative medicine consultation, nutrition services, therapeutic massage and therapeutic yoga instruction.

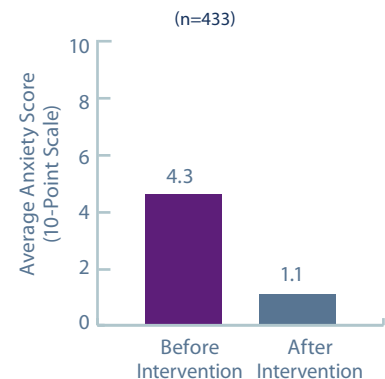
INTEGRATIVE HEALTH VISITS TO SPINE PATIENTS



2010 SELF-REPORTED PAIN SCORE IN SPINE SURGERY PATIENTS



2010 SELF-REPORTED ANXIETY SCORE IN SPINE SURGERY PATIENTS





Non-surgical Treatment for Low Back and Neck Pain

The Sister Kenny Spine Center provides non-surgical treatment for low back and neck pain. It serves a diverse patient population, including patients with acute, sub-acute and chronic neck or back pain. Physicians with specialized spine training evaluate patients and manage their treatment. Treatment may include physical therapy, medications, exercise (including the use of the MedX machine) and education. The Sister Kenny Spine Center treats more than 700 patients a year at three locations.

Spine Rehabilitation at the Sister Kenny Rehabilitation Institute

The Sister Kenny Rehabilitation Institute, the rehabilitation service line of Allina Hospitals & Clinics, provides care across the continuum of rehabilitation needs. The Institute is recognized for its spine rehabilitation expertise, and it treats the entire range of acute and chronic neck and back problems, including spinal cord injuries.

Acute Care Therapy for Postsurgical Spine Patients

At Abbott Northwestern, physical, occupational and speech therapists from the Sister Kenny Rehabilitation Institute treat more than 3,000 spine patients a year, primarily on Spine Inpatient Units H7000 and H8000. Therapy services focus on body mechanics, postsurgical precautions and functional independence.

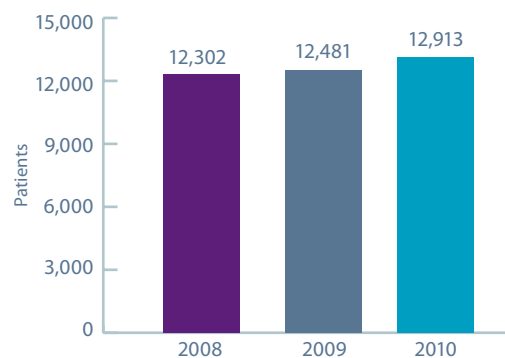
Outpatient Spine Physical Therapy

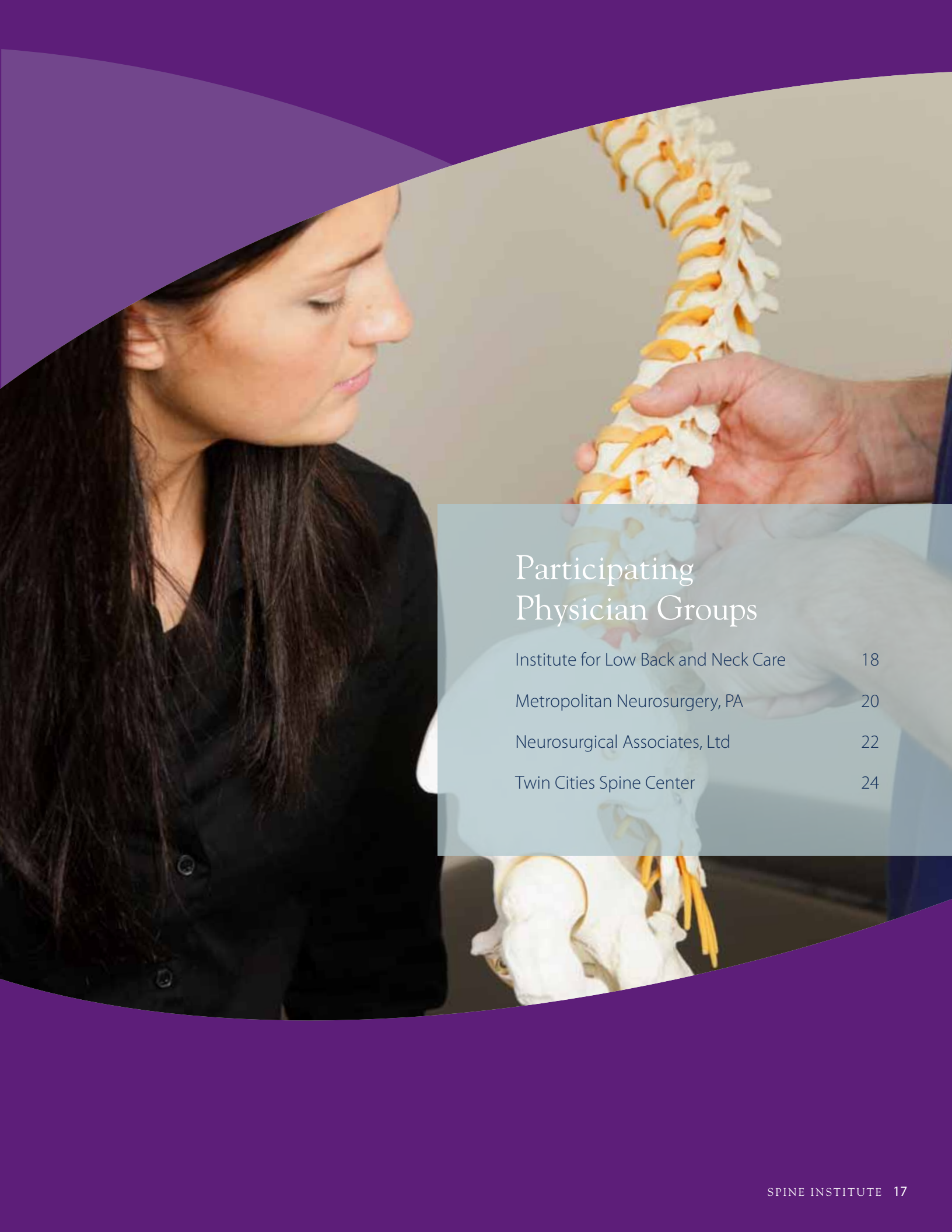
More than 10,000 patients a year receive spine physical therapy at 15 Sister Kenny Sports & Physical Therapy sites. Each patient is assessed by a physical therapist trained in orthopaedics and collaborates with the therapist to develop a plan of care that includes functional goals and a treatment timeline. A plan of care may include therapeutic exercises, functional training, neuromuscular re-education and aquatic therapy.

Spinal Cord Injury Care

The Sister Kenny Rehabilitation Institute's Spinal Cord System of Care at Abbott Northwestern provides lifelong care to individuals with a traumatic or non-traumatic spinal cord injury. It is the only spinal cord care program in the Twin Cities area accredited by the Commission on the Accreditation of Rehabilitation Facilities (CARF). The interdisciplinary team works with patients and their families to develop a unique plan of care to help patients improve function, gain ability and restore health. The program treats 175 individuals per year.

SISTER KENNY SPORTS & PHYSICAL THERAPY CENTER
SPINE PATIENT VOLUME





Participating Physician Groups

Institute for Low Back and Neck Care	18
Metropolitan Neurosurgery, PA	20
Neurosurgical Associates, Ltd	22
Twin Cities Spine Center	24

Institute for Low Back and Neck Care



The Institute for Low Back and Neck Care (ILBNC) has provided specialty spine care services since 1982. Instead of specializing in one approach—either surgery or rehabilitation—ILBNC offers a wide range of treatments for back and neck pain, including rehabilitation, medications, injections and surgery.



Institute for Low Back and Neck Care
2800 Chicago Ave S
Minneapolis, MN 55407
1-800-669-2513
ilbnc.com

Services and Staff

ILBNC physicians do comprehensive evaluations, diagnostic and therapeutic injections, and surgical procedures. They use the most advanced treatments of the spine and participate in clinical trials of new surgical devices and procedures as appropriate. ILBNC also coordinates physical therapy and rehabilitation, radiology services, pain rehabilitation and other outpatient services as needed. Treatment is tailored to each individual's problem and desired level of intervention.

The ILBNC staff includes fellowship-trained, board-certified spine surgeons and rehabilitation specialist physicians, along with nurse practitioners, physician assistants and registered nurses.

Locations and Facilities

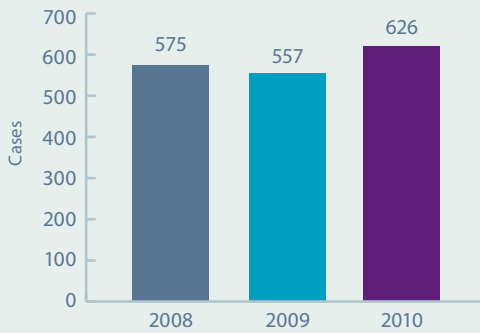
More than 15 years ago, ILBNC pioneered an outreach model for spine care in Minnesota and remains the leader in bringing high quality spine care to outstate patients. In addition to serving Twin Cities metro area patients at clinics in Minneapolis, Plymouth, Apple Valley and Fridley, the ILBNC medical staff serves patients throughout Minnesota at clinics in Faribault, New Ulm, Waconia, Hutchinson, St. Cloud (Sartell) and Brainerd.

Whenever possible, ILBNC offers same-day appointments at its Twin Cities metro area clinics. Outstate patients can also be seen the same day or the next day if they are able to travel to the Twin Cities.

In addition to performing spine surgery at Abbott Northwestern Hospital, the ILBNC medical staff performs outpatient procedures at the ILBNC Special Procedures Surgical Center in Plymouth and at select outstate hospitals.

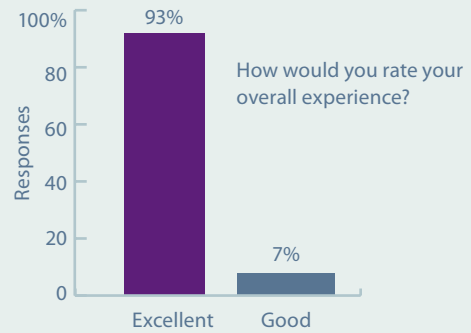
Volume, Quality and Outcome Measures

SPINE SURGERY VOLUME

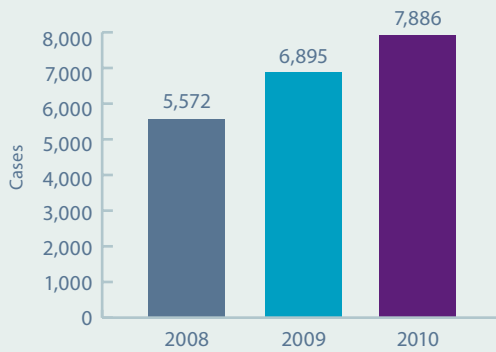


2010 PATIENT SATISFACTION SURVEY

(n=484)

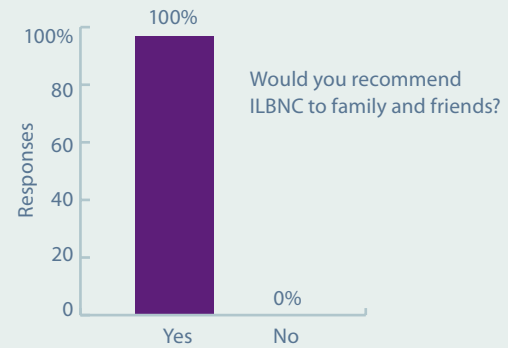


NONSURGICAL PROCEDURES VOLUME

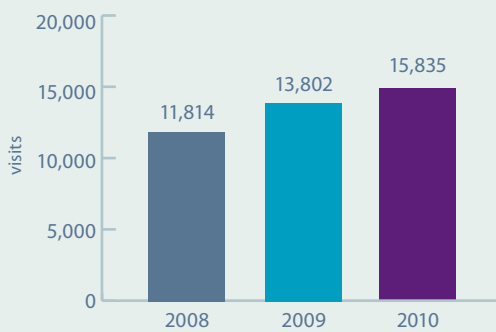


2010 PATIENT SATISFACTION SURVEY

(n=483)



CLINIC VISIT VOLUME



Metropolitan Neurosurgery, PA



Metropolitan Neurosurgery, PA, diagnoses and treats patients with disorders of and injuries to the brain, spinal cord and peripheral nerves.



Metropolitan Neurosurgery
800 E. 28th St., Suite 305
Minneapolis, MN 55407
763-427-1137
metropolitan-neurosurgery.com

Metropolitan Neurosurgery is committed to patients with these disorders and injuries and is the only neurosurgical group in the Twin Cities covering a Level I and Level II trauma center.

The practice also provides a full complement of spinal and brain surgeries, including procedures for degenerative spine disease, head and spine trauma, and head and spine tumors. Metropolitan Neurosurgery employs minimally-invasive spine techniques, including discectomy and fusion, which are a growing part of the Metropolitan Neurosurgery practice. These procedures are performed by skilled physicians using small incisions and, as a result, significantly reduce the length of stay, as well as the cost, of the inpatient hospital care.

Metropolitan Neurosurgery also has extensive experience in treating neurological trauma, including spinal reconstruction, and the neurosurgeons are certified to perform artificial cervical disc surgery, an innovative alternative to spine fusion surgery.

The Metropolitan Neurosurgery neurosurgeons use advanced imaging and monitoring systems that are available at Abbott Northwestern to ensure the safety and effectiveness of a variety of neurosurgical procedures. These systems include intraoperative monitoring, fluoroscopy, and computerized tomography. CT scans during spinal procedures provide navigational guidance to the surgeons to ensure safe placement of instruments and implants. In addition, intraoperative neurological monitoring of nerve conduction provides immediate feedback on whether the procedure is having a detrimental effect on the spinal cord. This is particularly helpful during procedures to remove spinal tumors or during reconstructive spine procedures.

The practice includes four neurosurgeons and three physician assistants. All physicians are board certified and/or board eligible by the American Board of Neurological Surgery. Their professional interests include trauma of the head and spine,

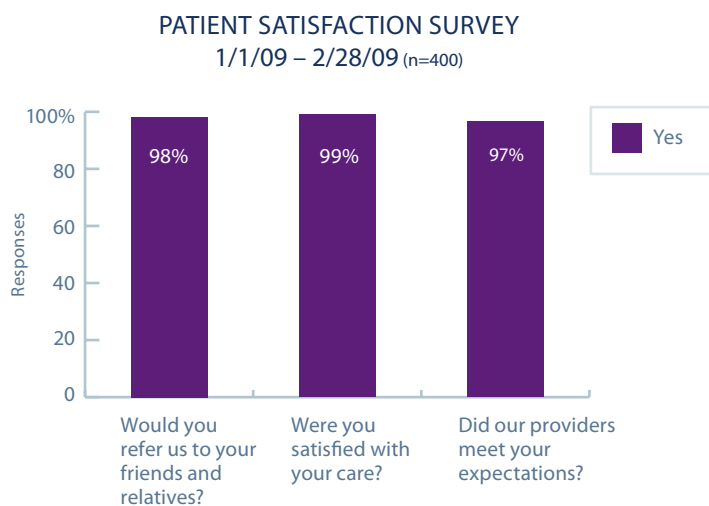
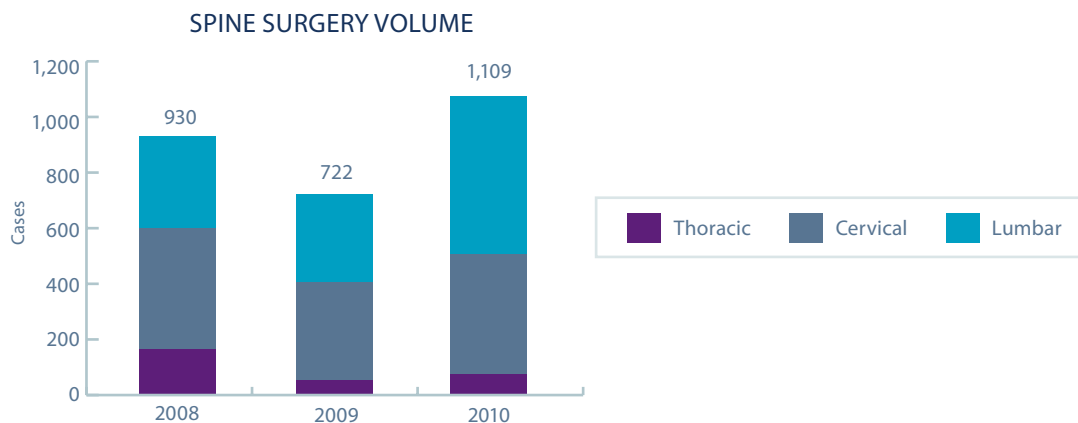
cranial surgery, deep brain stimulation, gamma knife and complex spine surgery. The two physician assistants assist in surgery, help manage hospitalized patients and see patients at all of Metropolitan Neurosurgery's four clinic locations.

Metropolitan Neurosurgery provides care in several locations for the convenience of patients returning to see the physicians postoperatively. These include Abbott Northwestern Hospital, Mercy and Unity hospitals, WestHealth and North Memorial Hospital.



Metropolitan Neurosurgery, PA

Volume, Quality and Outcome Measures



Neurosurgical Associates, Ltd.



NEUROSURGICAL ASSOCIATES, LTD.
Brain & Spine SpecialistsSM

Neurosurgical Associates, Ltd., provides care to patients with a broad range of neurosurgical problems, including brain, spine and peripheral nerve disorders of all types and magnitude.



Neurosurgical Associates, Ltd., is the oldest independent neurosurgical practice in Minnesota. The practice includes five board-certified neurosurgeons and seven highly skilled certified nurse practitioners, certified physician assistants and triage nurses. All members of the team have expertise in spine care, including evaluation and surgical or non-surgical treatment.

Neurosurgical Associates has clinic locations in Minneapolis, Willmar and Waconia. Whenever possible, Neurosurgical Associates offers same-day appointments at its Minneapolis location.

Neurosurgical Associates treats all types of spine problems at every level of complexity. It offers a full range of surgical approaches from minimally invasive spine procedures to the most complicated spine reconstruction procedures. Emphasis is on thoughtful planning and surgical decision-making to accomplish safe and effective surgical care.

Neurosurgical Associates physicians have pioneered evolving technologies to maximize surgical success and minimize recovery times. A recent innovation is the cervical artificial disk. The neurosurgeons have completed specialized training to implant these disks, which offer an alternative to cervical fusion that preserves more neck mobility for a specific patient population.

A collaborative relationship with Abbott Northwestern means that Neurosurgical Associates can offer a variety of resources and technologies that contribute to the safety and effectiveness of spinal procedures. For example, the neurosurgeons use intraoperative CT scans during spinal surgery to explore parts of the spine before beginning a procedure and to place instrumentation like metal rods and screws precisely. These guidance systems enable surgical

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accuracy within one to two millimeters and with three-dimensional direction. The O-Arm Imaging System is also used in the operating room to achieve high resolution for minimally invasive procedures. In addition, intraoperative monitoring of nerve conduction is frequently used in spine surgery to help maximize the patients' outcome.

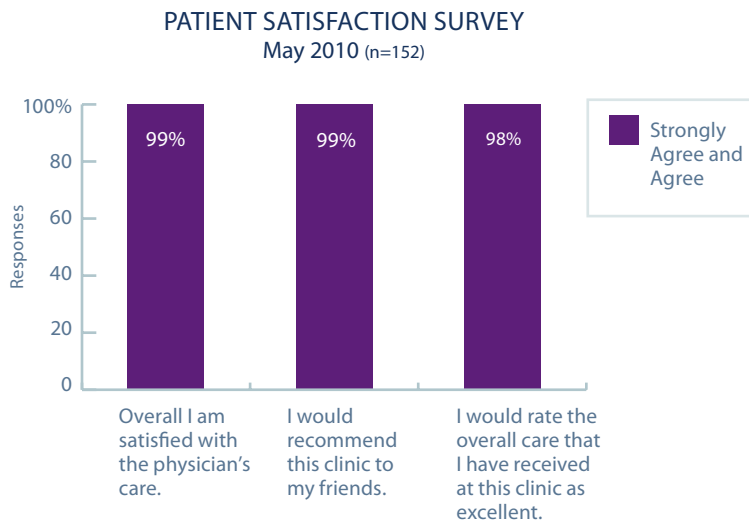
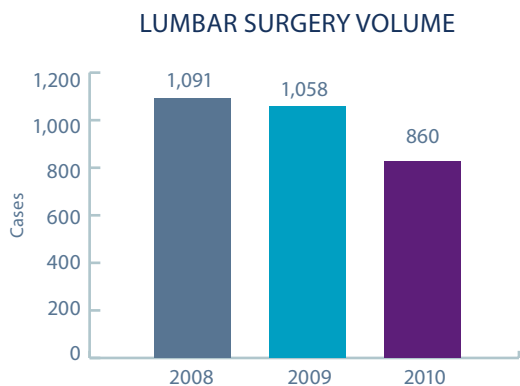
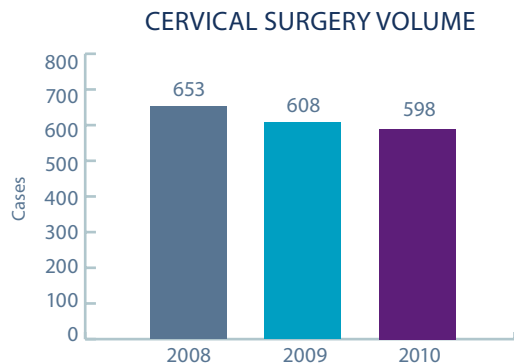
All of the neurosurgeons are board certified by the American Association of Neurological Surgeons. Physician assistants and nurse practitioners work closely with the physicians to provide the highest level of patient care. While the physicians are actively involved in the care of every patient, the physician support team performs patient assessments, manages inpatient and outpatient care, assists in surgeries and provides follow-up care. Along with undergraduate and post-graduate

education, these professionals have extensive neurosurgical experience and help ensure a continuity of care throughout the treatment process.

Despite the very technical nature of this specialty, the physicians and other providers at Neurosurgical Associates focus on the individual, not merely the condition, and strive to maintain the humanistic side of caring for people with spine and neurological conditions.

Neurosurgical Associates, Ltd.

Volume, Quality and Outcome Measures



For nearly 70 years, Twin Cities Spine Center (TCSC) has been known for treatment and research related to spinal disorders and deformities. As an independent specialty practice devoted exclusively to spine care, the mission of Twin Cities Spine Center is to continually improve patient care, education and research in the area of spinal treatment and surgery.



Local Excellence with an International Reputation

TCSC partners with the best hospitals, medical providers and industry resources to apply the latest medical advances to the treatment and surgery it provides. This includes advanced radiological imaging and interventional procedures, intraoperative imaging and neurological monitoring, and minimally invasive surgical techniques. Less invasive surgery, where appropriate, often means shorter hospital stays and quicker patient recoveries.

Recent developments in spine care include improved disc replacement for the lower back and neck. TCSC physicians have participated in studies with a variety of companies and have seen several very promising products, particularly for neck treatment. Another breakthrough has been the use of genetically analyzed saliva samples of scoliosis patients to help predict the course of their disease. This provides new and important information to plan treatment for pediatric and adolescent scoliosis patients.

In 2010, TCSC recorded more than 19,600 patient visits to its clinics located in Minneapolis, Burnsville, Shakopee, Hastings, Mankato, Cambridge and Wyoming. TCSC provided surgical treatment to more than 3,000 spine patients in 2010.

While the majority of patients come from the immediate five-state area, TCSC has provided consultation and treatment for patients from all 50 states and 32 countries. Combining the expertise of TCSC physicians with the best partners in the Twin Cities medical community and beyond allows TCSC to maintain a local, national and international reputation for excellent spine care.

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Staff

TCSC has 10 board-certified, fellowship-trained spine surgeons, all of whom treat patients, perform surgery, contribute to research and publications, lecture and train future spine surgeons. Collectively, TCSC surgeons have more than 175 years of experience and perform more spine surgeries than any medical practice in the region.

The physicians are supported clinically by 11 registered nurses, six certified physician assistants and five spine fellows. With additional professional and support staff and a full research department, TCSC has more than 90 individuals dedicated to serving its patients and its mission.

Outcomes and Patient Satisfaction

Tracking patient outcomes and satisfaction is paramount to TCSC's ability to determine the effectiveness of treatment and care. Along with typically tracked surgical outcomes (such as fusion and infection rates) TCSC assesses patient abilities and disabilities through the use of both the Oswestry and Neck Disability Index. Patients complete these self-assessments at every TCSC clinic visit. These standardized tools allow TCSC to track a patient's self-assessed disability and evaluate the level of perceived progress that the patient reports after various treatments. This standardized scoring at frequent intervals also helps the TCSC research department do comparative analyses.

TCSC measures patient satisfaction using surveys that consist of 20 questions covering everything from scheduling to wait times to physician communication. Satisfaction surveys are given to each new clinic patient and to surgical patients. Satisfaction results are posted to the TCSC website, tcspine.com. The most recent quarterly results showed that 100 percent of surgical respondents (184) would choose TCSC again or recommend TCSC to others for surgical care.

In recent years, TCSC has invested in both an electronic medical record system and a Picture Archiving and Communication System (PACS), which allows organized and immediate access to patients' medical information and radiological images. These information technologies can also help to track patient medications, co-morbidities and outcomes.

Education

As part of its mission, Twin Cities Spine Center maintains an ongoing commitment to education. Central to its physician education efforts is its Spine Fellowship Program, which is accredited by the Accreditation Council for Graduate Medical Education. Since 1970, the program has trained 146 spine surgeons who have come to TCSC from throughout the United States, 19 countries and Puerto Rico. TCSC also sponsors a Visiting Physicians Program, which brings foreign physicians to TCSC for one to 12 months to observe clinical and surgical practices and participate in research. Since its inception, more than 165 physicians from 33 countries have participated in this program. In 2009, TCSC hosted physicians from Brazil, China, India, Korea, Portugal and Singapore.

TCSC conducts a weekly spine conference, attended by fellows, staff surgeons, TCSC medical staff and medical colleagues in the community. The conferences and a weekly lecture series allow for dialogue about cases and promote discussion of publications and ongoing research. TCSC surgeons also lecture on various spine topics for local patient and medical communities and at national and international conferences.



Our patients have come from all 50 states in the USA, as well as 32 different countries.

Research

TCSC has a dedicated research department, and TCSC physicians have published more than 500 scientific papers. In 2010, TCSC physicians published 23 articles in major medical journals, and at any given time, TCSC is leading or participating in 10-20 spine-related studies. The Foundation for the Advancement of Spinal Knowledge biomechanics lab is used to explore biomechanical spine questions.

TCSC physicians also use their experience and expertise to consult and collaborate with various leaders in industry to design and improve spinal treatments, surgical tools and implants that deliver improved spinal products and contribute to future spinal care advancements.

Ongoing Research Studies

The efficacy of braces in adolescent idiopathic scoliosis (AIS) with monitoring.

Genetic testing of neurofibromatosis patients for propensity to develop severe curvatures.

The discrepancy between patient reporting on standard functional testing versus a satisfaction questionnaire: results in 1,037 patients.

Early results and complications of the extreme lateral lumbar interbody fusion technique.

Can preoperative Oswestry Disability Index (ODI) scores predict postoperative improvement?

Low-grade isthmic spondylolisthesis in adults: results of surgery.

High-grade isthmic spondylolisthesis in adults: results of surgery.

High-grade isthmic spondylolisthesis in adolescents: results of surgery.

The transforaminal lumbar interbody fusion (TLIF) procedure: a comparison of open versus minimally invasive approaches.

Post-TLIF radiculopathy in the bone morphogenic protein (BMP) era: incidence, diagnosis and management.

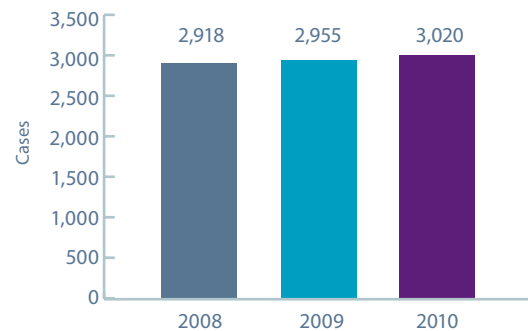
Congenital cervico-thoracic scoliosis: classification, natural history, non-operative treatment and operative treatment.

Congenital cervical instability: comparison of methods of fusion.

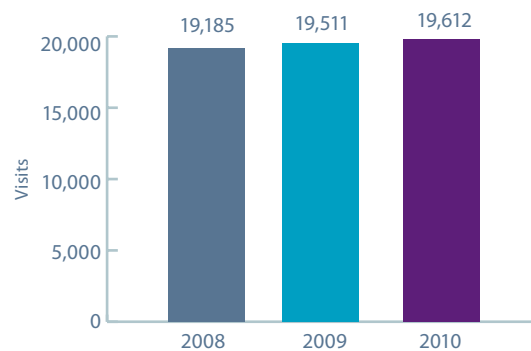
Twin Cities Spine Center

Volume, Quality and Outcome Measures

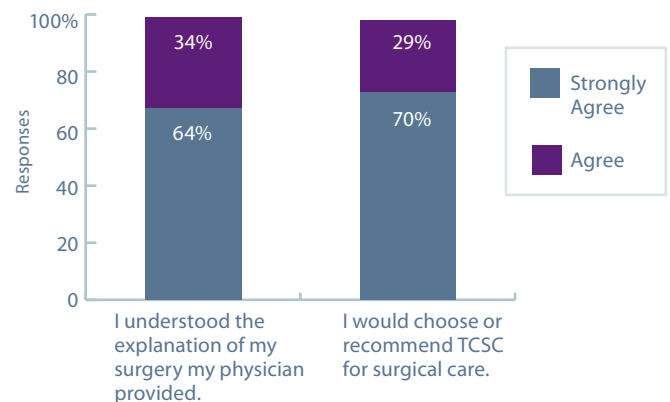
SPINE SURGERY VOLUME



CLINIC VISIT VOLUME



PATIENT SATISFACTION SURVEY
Surgical Patients Oct – Dec 2010 (n=322)





Publications and Presentations 2008-2010

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Presentations

Abbott Northwestern's Neuroscience Institute

Skinner SA. (1)Spinal cord monitoring. (2)EMG as early indicator of spinal cord injury. Presented at: American Society of Neurophysiological Monitoring/International Society of Neurophysiological Monitoring; Nov. 4-5, 2010; Groningen, Netherlands.

Skinner SA. (1)EMG as an early indicator of spinal motor tract injury. (2)EMG in the OR. Presented at: American Society of Neurophysiological Monitoring Regional Meeting; Oct. 23-34, 2010; Chicago IL.

Skinner SA. EMG: Theory and implementation in the OR. Presented at: American Society of Neurophysiological Monitoring Annual Meeting; April 23, 2010 Nashville, TN.

Skinner SA. EMG monitoring of central motor pathways during spine surgery. Presented at: American Clinical Neurophysiology Society 2010 Annual Meeting and Courses; Feb. 3, 2010; San Diego, CA.

Skinner SA. (1)Electromyography detects mechanically-induced suprasegmental spinal motor tract injury: Review of decompression at spinal cord level. (2)Surface electrodes are not sufficient to detect neurotonic discharges: Observations in a porcine model and clinical review of deltoid electromyographic monitoring using multiple electrodes. (3)Expanded use of the external anal sphincter during intraoperative neuromonitoring: Sacral reflex and free-run EMG. Presented at: American Society of Neurophysiological Monitoring: Regional Symposium; Oct. 25, 2009; Chicago, IL.

Skinner SA. Electromyography of the external anal sphincter can detect mechanically-induced suprasegmental spinal motor tract injury and can anticipate motor evoked potential loss. Abstract presented at: American Society of Neurophysiological Monitoring; April 2009; Vancouver, BC.

Skinner SA. Analysis of motor evoked potential waveform measures and stimulation voltage thresholds in neuromonitored true negative cases of cervical spine decompression. Abstract presented at: American Society of Neurophysiological Monitoring; April 2009; Vancouver, BC

Skinner SA. Thermal effects of electrosurgery on spinal motor systems: initial observations in a porcine model. Abstract presented at: American Society of Neurophysiological Monitoring; May 2008; Chicago, IL.

Skinner SA. Spectrum of spine neuromonitoring. Presented at: John Moe Twin Cities Spine Center 2008 Visiting Professor Symposium (Invited Lecture); May 2008; Minneapolis, MN.

Neurosurgical Associates

Nagib M. Patient case studies and referring spine patients to a neurosurgeon. Presented at: AMC Edina Physicians; Sept. 23, 2010; Edina, MN.

Nagib M. Patient case studies and referring spine patients to a neurosurgeon. Presented at: Edina Family Practice; June 23, 2010; Edina, MN.

Nagib M. Surgical treatment for cervical disc disease. Presented at: ABNW Annual Spine Meeting; April 16, 2010; Minneapolis, MN.

Nagib M. Patient case studies and referring spine patients to a neurosurgeon. Presented at: AMC Woodland Physicians; April 7, 2010; Minneapolis, MN.

Nagib M. Neurosurgical management of ischemic stroke. Presented at: Brain Injury Association; March 24, 2010; Minneapolis, MN.

Nagib M. Highfield intraoperative MRI value in intracranial neoplasm management. Presented at: Minnesota Neurosurgical Society Conference; Oct 2, 2009; Brainerd, MN.

Nagib M. Intraoperative MRI and the diffusion tensor imaging capabilities. Presented at: Abbott Northwestern Hospital. Frontline Neurology Conference; Oct. 9, 2009; Minneapolis, MN.

Nagib M. Artificial cervical disc. Presented at: Zurich Insurance case managers; Dec. 9, 2008; Edina, MN.

Nagib M. Gliomas and the use of intraoperative MRI and image guidance. Presented at: Medica case managers; Nov. 25, 2008; Minneapolis, MN.

Nagib M. Multidisciplinary approaches to neurosurgery. Presented at: Brain Injury Association of Minnesota; Nov. 19, 2008; Minneapolis, MN.

Nagib M. Artificial cervical disk. Presented at: United Healthcare, Oct. 25, 2008; Minneapolis, MN.
Nagib M. Cervical disc disease. Presented at Front Line Neurology Symposium, Abbott Northwestern Hospital; Oct. 3, 2008; Minneapolis, MN.

Nagib M. Artificial cervical disc. Presented to: Allina Workers Compensation medical directors; Sept. 24, 2008; Minneapolis, MN.

Nagib M. Artificial cervical disc. Presented to: Sedgwick case managers; Aug. 27, 2008, Eden Prairie, MN.

Nagib M. Cervical spondylosis: From mechanical neck pain to radiculopathy and myelopathy. Presented to: Travelers Insurance case managers; June 25, 2008; St. Paul, MN.

Nagib M. Intraoperative MRI and brain/spine Surgery. Presented at: St. Francis Regional Medical Center; June 6, 2008; Shakopee, MN.

Nagib M. Artificial cervical disc. Presented to: Introcorp case managers; May 20, 2008, Edina, MN.

Nagib M. Artificial cervical disc. Presented to: Corvel case managers; May 6, 2008, Minneapolis, MN.

Nagib M. Presented to: Chiropractic Association; April 30, 2008; Plymouth, MN.

Nagib M. Prestige artificial cervical disc. Presented to: Steve Sviggum, commissioner of Minnesota Department of Labor and Industry; Michael Hoolesten and Patricia Todd, deputy commissioners. April 23, 2008; Minneapolis, MN.

Nagib M. Artificial cervical disc. Presented to: Minnesota Labor Commissioner and Deputy Commissioners; April 11, 2008; Minneapolis, MN.

Nagib M. Artificial cervical disc. Presented at: Wyoming Lakes Clinic; March 21, 2008; Wyoming, MN.

Nagib M. Warning signs of neurological illness. Presented at: Independent Living Masonic Home; Jan. 15, 2008, Minneapolis, MN.

Nagib M. The Brain. Presented at: Association of American University Women; Jan. 7, 2008; Minneapolis, MN.

Walski-Easton S. Management of low back pain. Medica case managers; Dec. 4, 2008; Minneapolis, MN.

Walski-Easton S. X-stop procedure. Presented at: Preferred One case managers; Dec. 2, 2008; Minneapolis, MN.

Walski-Easton S. Management of cerebral edema in trauma. Presented at: Fairview Southdale Hospital; Nov. 20, 2008; Edina, MN.

Walski-Easton S. Management of cerebral edema in trauma. Presented at: Fairview Southdale Hospital; Oct. 30, 2008; Edina, MN.

Walski-Easton S. X-stop procedure. Presented at: Evercare nurse practitioners; Oct. 21, 2008; Minneapolis, MN.

Walski-Easton S. Cervical disc replacement. Presented at: Minneapolis Clinic of Neurology; Aug. 28, 2008; Minneapolis, MN.

Twin Cities Spine Center

Anderson GD, Dimar RJ, Polly Jr DW, **Schwender JD** (moderator). Biologics in lumbar spine fusion: clinical and economic data. Presented at: American Academy of Orthopaedic Surgeons (AAOS); Feb. 25-28, 2009; Las Vegas, Nev.

Anderson GD, Phillips FM, **Schwender JD**, Kim CW (moderator). The current state of minimally invasive spine surgery. Presented at: AAOS; Feb. 25-28, 2009; Las Vegas, Nev.

Carmouche JJ, **Lonstein JE, Winter RB, Schwender JD, and Perra JH.** Complications and feasibility of screw and rod fixation in the pediatric cervical spine. E-Poster presented at: International Meeting on Advance Spine Techniques (IMAST); July 14-19, 2009; Vienna, Austria, and Scoliosis Research Society; September 2009; San Antonio, TX.

Chaudhari R, Zheng X, Wu C, **Mehbod AA, Transfeldt EE, Perra JH.** Pullout strength and screw removal safety of fenestrated screws with cement augmentation. E-Poster presented at: IMAST; July 14-19, 2009; Vienna, Aus.

Chaudhari R, Zheng X, Wu C, **Mehbod AA, Transfeldt EE, Perra JH.** Biomechanical evaluation of a novel expandable meshed bag for lumbar interbody fusion. E-Poster presented at: IMAST; July 14-19, 2009; Vienna, Aus.

Hsu B, **Mehbod AA, Erkan S, Transfeldt EE, Perra JH, Denis F, Garvey TA, Pinto MR, Schwender JD, Dykes DC, Lonstein JE, Winter RB.** Pedicle subtraction osteotomies for correction of fixed sagittal plane deformities: clinical and radiographical outcomes in 151 patients. Presented at: 43rd Annual SRS Meeting; Sept. 10-13, 2008; Salt Lake City, UT.

Choma TJ, **Denis F, Lonstein JE, Perra JH, Schwender JD, Garvey TA, Mullin WJ.** A systematic technique for assessment of thoracic pedicle screw placement: Is it 'in' or 'out'? (co-author). Presented at: 43rd Annual SRS Meeting; Sept. 10-13, 2008; Salt Lake City, UT.

Dressel T, **Denis F, Dykes DC, Garvey TA, Lonstein JE, Mehbod AA, Mullaney KJ, Perra JH, Pinto MR, Schwender JD, Transfeldt EE.** Management of infected instrumented deep space back wounds with the vacuum assisted closure device. E-Poster presented at: IMAST; July 14-19, 2009; Vienna, Aus.

Dykes DC. The "nuts and bolts" of spinal fusions – including multi-level fusions. Presented at: Minnesota CLE's 25th Annual Workers' Compensation Institute; April 17, 2010; Minneapolis, MN.

Dykes DC. Communication for all your patients (instructional course). Presented at: American Academy of Orthopedic Surgeons 2010 Annual Meeting; March 9-13, 2010; New Orleans, LA.

Dykes DC. Culturally competent care in orthopaedics – every surgeon's responsibility. Presented at: University of Minnesota, Department of Orthopaedic Surgery Grand Rounds; March 28, 2008.

Dykes DC. Getting to equal: Strategies to understand and eliminate general and orthopaedic healthcare disparities. Presented at: Brighton Symposium, Nov. 13, 2008; Tampa Bay, FL.

Dykes DC. The aging spine. Advanced techniques for management of complex adult spinal deformity. Presented at: Spine Master's Institute, North American Spine Society; April 9, 2008; Chicago, IL.

Fu KG, Smith J, Shaffrey CI, Berven S, Choma TJ, Goytan MJ, Noordeen H, Knapp DR, Hart RA, Zeller R, Donaldson W, Polly DW, **Perra JH, Boachie-Adjei O.** Morbidity and mortality in the surgical treatment of 605 pediatric patients with isthmic or dysplastic spondylolisthesis: a report from the Scoliosis Research Society Morbidity and Mortality Committee. Presented at: IMAST; July 14-19, 2009; Vienna, Aus.

Garvey TA. Spine radiology. Presented at: Radiology Tech Conference – Continuing Education; October 30, 2010; Minneapolis, MN.

Garvey TA, Forum Faculty. Lumbar disc degeneration. Presented at: Synthes Spine Residents and Fellows Forum; April 17-18, 2010; Minneapolis, MN.

Garvey TA. FUSION 2010: Why is a fusion procedure still relevant? How Does it impact your patient? Presented at: Spine Symposium 2010; April 16, 2010; Minneapolis, MN.

Garvey TA, Faculty member. Cervical spine decompression and stabilization techniques. Presented at: The 3rd CSRS Hands-On Cadaver Course; Jan. 28-30, 2010; St. Louis, MO.

Garvey TA. Fixation principles C7-T3. Presented at: First CSRS Hands-On Cadaver Course: Cervical Spine Decompression and Stabilization Techniques; Jan. 29-31, 2008; St. Louis, MO.

Garvey TA. Pseudoarthrosis diagnosis and repair: Radiographic diagnosis, advantages/disadvantages of treating anterior vs. posterior. Presented at: The 2nd CSRS Hands-On Cadaver Course: Cervical Spine Decompression and Stabilization Techniques; Jan. 29-31, 2009; St. Louis, MO.

Lonstein JE. Classification of scoliosis: lenke system and its shortcomings. Presented at: Florida Spinal Deformity Study Group; Aug. 13-14, 2010; Orlando, FL.

Lonstein JE. CP scoliosis: Is there evidence based data to continue heroic surgical efforts? Presented at: Florida Spinal Deformity Study Group; Aug. 13-14, 2010; Orlando, FL.

Lonstein JE. Adult idiopathic scoliosis. Presented at: Florida Spinal Deformity Study Group; Aug. 13-14, 2010; Orlando, FL.

Lonstein JE. History of spine surgery; Surgical decision making in idiopathic scoliosis; Operative and non-operative treatment of congenital scoliosis; Neuromuscular scoliosis; Sagittal balance. Presented at: Columbian Society of Orthopedic Surgery and Traumatology, 55th Annual Meeting; April 28, May 1, 2010.

Lonstein JE (moderator). Surgical consideration for neuromuscular patients; Adolescent neuromuscular scoliosis. Presented at: University of Colorado Current Techniques in Spine Deformity Surgery; April 10-11, 2010; Boulder, Co.

Mac-Thiong JM, **Transfeldt EE, Mehbod AA, Perra JH, Denis F, Garvey TA, Lonstein JE, Wu C, Dorman CW, Winter RB.** Critical values of sagittal balance associated with deterioration of health-related quality of life in adult scoliosis. E-Poster presented at: IMAST; July 14-19, 2009; Vienna, Aus.

Mehbod AA. Adopting new technology in spine surgery. Presented at: The 5th annual Outgoing Spine Fellows Course; Nov. 19, 2010; Miami, FL.

Mehbod AA. Common back problems: when should you refer? Presented at: Northwestern Chiropractic School; Nov. 13, 2010; Minneapolis, MN.

Mehbod AA. Surgical interventions for arthritis of the spine. Presented at: Arthritis Foundation; Oct. 6, 2010; Minnetonka, MN.

Mehbod AA, Forum chairman. Lumbar disc degeneration. Presented at: Synthes Spine Residents and Fellows Forum; April 17-18, 2010; Minneapolis, MN.

Mehbod AA. Understanding your spine: Watch your back. Presented at: LaborCare Health Fair; April 10, 2010; Minneapolis, MN.

Mehbod AA. Understanding back pain. Presented at: Medica; March 5, 2010; Minneapolis, MN.

Mehbod AA, Transfeldt EE. A novel neuromonitoring phenomenon may anticipate MEP loss and avoid further spinal cord insult during surgery. E-Poster presented at: IMAST; July 14-19, 2009; Vienna, Aus.

Mehbod AA, Transfeldt EE. Effect of fusion levels of lumbosacral fixation in long fusion construct. E-Poster presented at: IMAST; July 14-19, 2009; Vienna, Aus.

Mehbod AA, Transfeldt EE. Changes of sacroiliac joint motion after long fusion: a biomechanical study. Paper presented at: IMAST; July 14-19, 2009; Vienna, Aus.

Mehbod AA. Cervical trauma and advanced techniques in cervical spine surgery. Presented at: June 5, 2009; Las Vegas, NV.

Mehbod AA. Evaluation of pediatric spine. Presented at: Fifth annual Stryker Spine Boot Camp for Spine Fellows; April 24, 2009; Las Vegas, NV.

Mehbod AA. Back pain; pediatric to geriatric. Presented at: Allina Spine Symposium; April 17, 2009; Minneapolis, MN.

Mehbod AA. Limited decompression for adult degenerative scoliosis. Presented at: A Roundtable Symposium: Current Controversies in Spine; March 6-7, 2009; Santa Fe, NM.

Mehbod AA. Transforaminal lumbar interbody fusion for degenerative spondylolisthesis. Presented at: A Roundtable Symposium: Current Controversies in Spine; March 6-7, 2009; Santa Fe, NM.

Mehbod AA. Interbody fusion for degenerative disc disease. Presented at: A Roundtable symposium: Current Controversies in Spine. March 6-7, 2009; Santa Fe, NM.

Mehbod AA. PEEK cages for cervical interbody fusion. Presented at: A Roundtable Symposium: Current Controversies in Spine. March 6-7, 2009; Santa Fe, NM.

Mehbod AA. Adult degenerative scoliosis: limited fusion versus long fusion. Presented at: Hunt for Spine Meeting; Nov. 6-9, 2008, Chamberlain, SD.

Mehbod AA. Spinal cord monitoring. Presented at: Hunt for Spine Meeting; Nov. 6-9, 2008, Chamberlain, SD.

Mehbod AA. Two level degenerative disk: a case for two level disc arthroplasty. Presented at: Hunt for Spine Meeting; Nov. 6-9, 2008, Chamberlain, SD.

Mehbod AA. Adult spinal stenosis: pathoanatomy, diagnosis and treatment options. Presented at: New Ulm Specialty Care Conference for Primary Care; Oct. 10-11, 2008; New Ulm, MN.

Transfeldt EE, Topp R, Mehbod AA, Winter RB. Surgical outcomes of decompression, decompression with limited fusion and decompression with full curve fusion for degenerative scoliosis with radiculopathy. Presented at: Scoliosis Research Society Annual Meeting; Sept 10-13, 2008; Salt Lake City, UT.

Hsu B, **Mehbod AA, Erkan S, Transfeldt EE, Perra JH, Denis F, Garvey TA, Pinto MR, Schwender JD, Dykes DC, Lonstein JE, Winter RB.** Pedicle subtraction versus smith peterson osteotomies for correction of fixed sagittal plane deformities: clinical and radiographic outcomes in 151 patients. Presented at: Scoliosis Research Society Annual Meeting; Sept 10-13, 2008; Salt Lake City, UT.

Mehbod AA. Fundamentals session: lumbar degenerative conditions. Presented at: IMAST; July 9, 2008; Hong Kong.

Mehbod AA. Pedicle screw trajectory is improved with tapping in the thoracic spine. Presented at: IMAST; July 9, 2008; Hong Kong.

Mehbod AA. Systematic technique for assessment of thoracic pedicle screw placement: is it in or out? Presented at: IMAST; July 9, 2008; Hong Kong.

Mehbod AA. Are C7 plumbline and gravity line good predictors of quality of life in adults with spinal deformity? Presented at: IMAST; July 9, 2008; Hong Kong.

Mehbod AA. Minimally invasive lumbar decompression and fusion techniques. Presented at: IMAST precourse meeting; July 8, 2008; Shenzhen, China.

Raverty MK, **Mehbod AA, Perra JH, Garvey TA, Transfeldt EE, Schwender JD, Lonstein JE, Winter RB.** Natural history of adolescent idiopathic scoliosis of 50° or greater at maturity: rate of progression and functional outcomes. Presented at: Minnesota Orthopedic Society Annual Meeting; May 8, 2009; Minneapolis, MN.

Mehbod AA. How to handle new technology. Presented at: 3rd Annual Outgoing Fellows Course; April 25-26, 2008; Las Vegas, NV. **Mehbod AA.** Total disc arthroplasty: indications, outcomes, technique. Presented at: Third Annual Course on Sharpening Your Spine Surgery Skills, The Spine Masters Institute; Chicago, IL; April 18-19, 2008.

Mehbod AA, Perra JH. Thoraco-lumbar course. Presented at: 20th Annual International Bethesda Spine Workshop; April 13-14, 2008; Bethesda, MD.

Mehbod AA. Fusion techniques and potential complications. Presented at: Abbott Northwestern Hospital Spine Symposium; 2008; Minneapolis, MN.

Mehbod AA. Dynamic stabilization techniques. Presented at: Current Controversies and Advanced Techniques in Interbody and Vertebral Body Replacement Surgery; Feb. 22-23, 2008; Denver, CO.

- Mehbod AA.** Adolescent idiopathic scoliosis. Presented at: Minnesota Academy of Family Physicians, 2008 Winter Conference, Feb. 2, 2008, Alexandria, MN.
- Mullaney KJ.** Minimally invasive spine surgery. Presented at: Frontline Neuroscience Symposium; Oct. 7, 2010; Minneapolis, MN.
- Mullaney KJ.** Management of chronic low back pain. Presented at: Glencoe Medical Staff event; Feb. 17, 2010; Glencoe, MN.
- Mullaney KJ.** Advances and new technologies in procedures and care. Presented at: Symposium Medical & Disability Case Management, The Marsh; Nov. 6, 2008; Wayzata, MN.
- Mullaney KJ.** Minimally invasive spinal technologies. Presented at: St. Francis Medical Staff Grand Rounds; January 2008; Shakopee, MN.
- Perra JH.** Spinal stenosis. Presented at: Regina Medical Center; June 2, 2010; Hastings, MN.
- Perra JH.** Spinal balance (spinopelvic balance): What it is, how to measure, is it important, clinical correlation. Presented at: Current Controversies in Deformity Surgery and Spine Trauma; Feb. 29-March 1, 2008; Santa Fe, NM.
- Perra JH.** Treatment of chronic post traumatic injuries/kyphosis. What are the late sequelae? Approach: posterior only, anterior/posterior, posterior/anterior/posterior. Presented at Current Controversies in Deformity Surgery and Spine Trauma; Feb. 29-March 1, 2008; Santa Fe, NM.
- Perra, JH.** Selection of fusion levels in adult deformity, when and how to fuse to pelvis, double major, lumbar curves. Presented at: Current Controversies in Deformity Surgery and Spine Trauma; Feb. 29-March 1, 2008; Santa Fe, NM.
- Perra JH.** Thoracoabdominal approach, anterior biomechanics with case presentations. Presented at: 21st Annual International Bethesda Spine Workshop; April 19-20, 2009; Bethesda, MD.
- Perra JH.** Common spine problems in dwarfism and special considerations (case studies). Presented at: 2009 Spine Symposium; April 17, 2009; Minneapolis, MN.
- Perra JH.** Cervical problems & treatments – cervical discussion moderator. Presented at: A Roundtable Symposium: Current Controversies in Spine; March 5-7, 2009; Santa Fe, NM.
- Perra JH.** Pediatric cervical spine issues – overview. Presented at: University of Minnesota Pediatric Core Curriculum; Feb. 13, 2009; Minneapolis, MN.
- Perra JH.** Pediatric cervical spine issues – overview. Presented at: Blue River Trauma Society; Feb. 7-11, 2009; Blue River, BC.
- Pinto MR.** Low back pain from the young to the elderly: Diagnosis and treatment options. Presented at: Chiropractic Continuing Education; Dec. 4, 2010; Minneapolis, MN.
- Pinto MR.** Low back pain from the young to the elderly: Diagnosis & treatment options. Presented at: Sibley Medical Center; Oct. 28, 2010; Arlington, MN.
- Pinto MR.** Minimally invasive lumbar spine surgery. Presented at: Chiropractic Education Seminar, Feb. 22, 2009; Bloomington, MN.
- Pinto MR.** Minimally invasive spine surgery techniques for the lumbar spine. Presented at: Grand Rounds, Fairview Ridges Hospital; Feb. 20, 2009; Burnsville, MN.
- Schwender JD, Pinto MR.** Minimally invasive spine surgery. Presented at: Fairview Spine Grand Rounds; June 24, 2010; Minneapolis, MN.
- Schwender JD.** Presented at: Minimally invasive spine symposium – SAS; April 27, 2010; New Orleans, LA.
- Schwender JD.** The current state of minimally invasive spine surgery (instructional course). Presented at: AAOS 2010 Annual Meeting; March 9-13, 2010; New Orleans, LA.
- Schwender JD.** Biologics in lumbar spine fusion: Clinical and economic data (instructional course). Presented at: AAOS 2010 Annual Meeting; March 9-13, 2010; New Orleans, LA.
- Schwender JD.** Transforaminal lumbar interbody fusion at L5-S1 when there is a long construct to the sacrum: how to preserve endplates and place the cage so there is truly load-sharing. Presented at: Fourth Annual Course on Sharpening Your Spine Surgery Skills; May 15-16, 2009; Burr Ridge, IL.
- Schwender JD.** MAST transforaminal lumbar interbody fusion: current techniques indications. Presented at: American Academy of Orthopaedic Surgeons/PASE; March 20-21, 2009; St. Louis, MO.
- Schwender JD, Rovner JS, Mullaney KJ, Pinto MR, Garvey TA.** A comparison of infection rates in minimally invasive vs open transforaminal lumbar interbody fusions – a single surgeon retro review. Presented at: IMAST 15th Annual Meeting; July 8-11, 2008; Hong Kong.
- Schwender, JD.** New technologies in orthopaedic surgery: What are the true benefits and how to critically evaluate them as they come to market. Presented at: University of Vermont, 2008 Research Day Visiting Professor, June 13, 2008.
- Smith J, Shaffrey CI, Sansur CA, Kaiming G, Berven S, Choma TJ, Goytan MJ, Noordeen H, Knapp DR, Hart RA, Zeller R, Donaldson W, Polly DW, **Perra JH, Boachie-Adjei O.** Complication rates of three common spine procedures and rates of PE/ DVT following spine surgery based on 108,419 procedures: a report from the Scoliosis Research Society Morbidity and Mortality Committee. Presented at: IMAST; July 14-19, 2009; Vienna, Aus.
- Sokolowski MJ, **Garvey TA,** Perl J 2nd, **Mehbod AA,** Akesen B, Sokolowski MS, **Transfeldt EE.** Neuromonitoring with NIM - spine nerve
- Transfeldt EE.** Spine surgery and P.T. Presented at: University of Minnesota, Physical Therapy Students; Nov. 12, 2010; Minneapolis, MN.
- Transfeldt EE.** Spine. Presented at: University of Minnesota Medical School; Nov. 12, 2010; Minneapolis, MN.
- Transfeldt EE.** The aging spine. Presented at: The Marsh; Nov. 11, 2010; Minnetonka, MN.
- Transfeldt EE.** Lumbar posterior fusion option/ instrumentation (degenerative). Presented at: IMAST; July 23, 2010; Toronto, Canada.
- Transfeldt EE.** Current concepts in spinal disorders. Presented at: Cedars Sinai 9th Annual Symposium; Feb. 5, 2010; Las Vegas, NV.
- Transfeldt EE.** Short segment decompression and fusion in adult degenerative scoliosis. Presented at: AAOS-FOSA; Feb. 25-28, 2009; Las Vegas, NV.
- Wills N, **Pinto MR, Perra JH, Mullaney KJ.** Short term follow up and complications profile from 100 consecutive XLIF procedures. Presented at: Solas Meeting; April 17, 2009; San Diego, CA.
- Winter, RB.** Scoliosophy; The balance of art and science in deformity surgery. Presented at: Complex Spine Study Group; Jan. 11, 2010; San Diego.
- Zheng X, Chaudhari R, Wu C, **Mehbod AA, Transfeldt EE, Perra JH.** Subaxial cervical pedicle screw insertion with a new defined entry point and trajectory: accuracy evaluation in cadavers. E-Poster Presented at: IMAST; July 14-19, 2009; Vienna, Aus.

Staff Listing

Institute for Low Back and Neck Care

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Kevin J. Mullaney, MD
Joseph H. Perra, MD
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James D. Schwender, MD
Ensor E. Transfeldt, MD

Leadership Team

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Neuroscience Institute, Orthopaedic & Spine Programs

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Jennifer Loeper, MS, RN

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About Abbott Northwestern

Abbott Northwestern and its Medical Staff are dedicated to providing outstanding care and service to patients and their families.

Abbott Northwestern Hospital is the largest not-for-profit hospital in the Twin Cities area, with 633 available beds and 65 bassinets. Each year, the hospital provides comprehensive health care for more than 200,000 patients and their families from the Twin Cities area and throughout the Upper Midwest. More than 5,000 employees, 1,600 physicians and 550 volunteers work as a team for the benefit of each patient served.

Abbott Northwestern Hospital is a part of Allina Hospitals & Clinics, a family of hospitals, clinics and care services in Minnesota and Western Wisconsin.

For more than 125 years, Abbott Northwestern has had a reputation for quality services. The hospital is well known for its centers of excellence:

- cardiovascular services in partnership with the Minneapolis Heart Institute®
- Mental Health Services
- medical/surgical services
- Neuroscience Institute
- Orthopaedic Institute
- physical rehabilitation through the Sister Kenny Rehabilitation Institute
- Spine Institute
- Virginia Piper Cancer Institute®
- perinatology, obstetrics and gynecology through WomenCare.

Abbott Northwestern and its Medical Staff are dedicated to providing outstanding care and service to patients and their families. We're proud of what we offer the community: exceptional physicians, nurses and support staff; a commitment to research, education and outcomes; a foundation of clinical partnerships that span the region; and a cultural enthusiasm for growth and improvement. Brought together in one institution, these factors create an energetic and sophisticated environment that inspires caregivers to collaborate in new ways for the benefit of patients.

Our passion for finding new and better approaches to care drives extensive research efforts in clinical areas across the hospital. This ensures that new treatment advances benefit patients as quickly as possible, supports a dynamic environment for medical and nursing education, and is the catalyst for our outcomes measurement program.

In Appreciation

Our sincere thanks go to the Abbott Northwestern Hospital Foundation for its support of Abbott Northwestern's Outcomes Institute and the production of this Overview and Outcomes Report. The commitment of the Foundation and Abbott Northwestern's generous donors to improving patient care through these efforts is greatly appreciated.



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