Discovery to Recovery

HOSPITAL FOR SPECIAL SURGERY

CLINICAL AND RESEARCH HIGHLIGHTS AT HSS | FALL 2010

Comparative Effectiveness Research at Special Surgery: Improving Patient Outcomes

Above left: Stephen Lyman, PhD, analyzes state databases to study patient outcomes of total joint revisions, with the goal of systemic improvement.

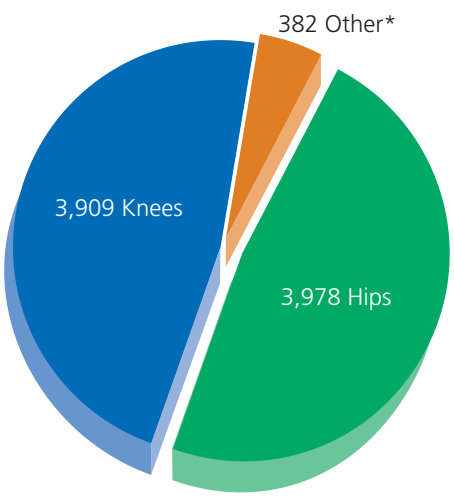
Above: Douglas Padgett, MD, performs one of over 8,000 joint replacements conducted each year at HSS. No hospital performs more.

Left: Timothy Wright, PhD, and Art Sedrakyan, MD, PhD, discuss comparative effectiveness of weight-bearing surfaces in total hip replacements.

Comparative effectiveness research allows scientists to evaluate and compare the health outcomes, risks, and benefits of two or more established treatments. It gives physicians, patients, and policymakers the information they need to make informed decisions and improve patient outcomes at the individual and population levels.

HSS has recently established the Center for Comparative Effectiveness Research in collaboration with the Department of Public Health at Weill Cornell Medical College. The new Center is chaired by Art Sedrakyan, MD, PhD, formerly a Medical Officer at the FDA and a Senior Advisor at the Agency for Healthcare Research and Quality. The Center will benefit from the Translational Research Epidemiology and Biostatistics Core, established at HSS in 2007 and directed by Stephen Lyman, PhD. The Core consists of three faculty-level and three masters-level biostatisticians who support clinicians in study design and statistics, and train residents and fellows in these skills.

HSS Performed 8,269 Joint Replacements in 2009



Elbows, shoulders, and ankles

Drs. Sedrakyan and Lyman and their colleagues help clinicians frame research questions into viable studies, and help scientists disseminate their findings. Dr. Sedrakyan explains that comparative effectiveness research offers a "dynamic, continuous improvement process that can advance healthcare outcomes to a new level."

Physicians want to provide their patients with the best and safest care, but often no definitive data exist to tell them which treatment is best. Comparative effectiveness studies provide information to guide patients and physicians through healthcare choices. As Dr. Sedrakyan explains, "Comparative effectiveness research is the science that matters most to surgeons. Surgeons have questions that can only be answered by comparative effectiveness research. It is truly relevant to everyday clinical practice."

Registries

HSS performs more orthopedic surgeries than any other hospital in the country; its surgeons perform over 8,000 total joint replacements each year (see chart at left). While high procedural volume has long been associated with clinical excellence, it also provides unique access to the real-world data necessary for high quality comparative effectiveness research.

One way to capture data is through clinical registries, in which information is collected from patients with the same clinical problem, procedure, or treatment, with the goal of analyzing the data to answer important research questions and to establish high quality best practices. Special Surgery currently collects data in more than 30 registries ranging from autoimmune conditions, to sports injuries, to total joint replacements.

Timothy Wright, PhD, Director of the Department of Biomechanics

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HSS Is #1 in Orthopedics

HSS has been named the top hospital in the nation for orthopedics by *U.S.News & World Report* in its 2010 "America's Best Hospitals" issue. The Hospital also ranked number 3 in rheumatology and number 16 in neurology. *U.S.News & World Report*'s "America's Best Hospitals" is a resource for consumers seeking the highest quality care. With more than 5,000 hospitals evaluated nationwide, rankings are based on reputation and quality measures, such as patient volumes and mortality rates, nursing care, and technology services. "We are honored to be recognized as the leader in our specialty areas," says Louis A. Shapiro, HSS President and CEO.

Our Mission

Advancing Medicine through Research

Hospital for Special Surgery has long been a groundbreaker in orthopedics and rheumatology. In the 1970s, HSS scientists pioneered landmark designs and surgical techniques that led to the first modern total knee replacement. Earlier this century, HSS took the lead in developing new instruments, surgical techniques, and regional anesthesia blocks that made minimally invasive hip and knee replacement surgery possible. Our scientists and engineers continue to contribute to breakthroughs in musculoskeletal medicine.

Our team of surgeons, anesthesiologists, nurses, and physical therapists now guide our patients through more total joint replacement surgeries than anywhere in the world. To date, HSS has performed more than 43,000 knee replacements and more than 51,000 hip replacements. In 2009, more than 8,000 total joints were replaced at Hospital for Special Surgery, ensuring that our patients, many of whom had suffered from debilitating osteoarthritis, can once again move without pain and get back to doing the things they like to do.

The infection rate at HSS for total hip replacement was recently documented as the lowest in New York State. Also leading the way, HSS rheumatologists were visited by nearly 34,000 patients in 2009 for the treatment of a broad spectrum of joint and autoimmune conditions. In recognition of our excellence, Hospital for Special Surgery has been ranked first in the nation for orthopedics, third in rheumatology, and sixteenth in neurology in the 2010 *U.S.News & World Report* "America's Best Hospitals" issue.

At Special Surgery, we are proud of the exceptional clinical care that makes us the best at what we do. Our compassionate and skilled clinicians work hard to ensure the best possible outcomes for our patients, who come to us with a broad array of conditions: osteoarthritis, back and neck pain, sports injuries, rheumatologic and chronic disease. Whatever their symptoms, our physicians, nurses, and therapists work together to provide the best care, so that patients can live their lives as fully and actively as possible.

HSS attracts the best surgeons, rheumatologists, anesthesiologists, radiologists and imaging professionals, nurses, and physical therapists in part because of its world-wide reputation for clinical excellence, and because the Hospital has a culture of innovation. Here, we are not satisfied with practicing the best medicine; we are committed to making medicine better.

Our physicians work closely with scientists, biomechanical engineers, and biostatisticians to collect and analyze information from our patients, with the goal of advancing the fields of orthopedics and rheumatology. Currently, HSS collects data through more than 30 registries. This data, over time, will help scientists determine best practices for specific conditions and treatments. The Hospital's investment in this research technology will pay off in the future with better care for patients at HSS and around the world.

At Special Surgery, specialists collaborate, share ideas, and develop hypotheses about how to improve patient care. In this issue of *Discovery to Recovery*, we highlight several comparative effectiveness studies in which HSS clinicians and scientists collaborate to accurately test the hypotheses that come out of clinical experience. We also highlight our Nursing research, in which nurses investigate questions raised by their clinical work. Through its research, Hospital for Special Surgery works to ensure the increased safety and effectiveness of healthcare for all our patients.

Louis A. Shapiro
President and CEO

Thomas P. Sculco, MD
Surgeon-in-Chief

Steven R. Goldring, MD
Chief Scientific Officer

In the News

Low Infection Rates at HSS Gain Recognition

OR Manager Magazine Asks Hospital Officials How They Do It

When *OR Manager* magazine decided to focus on how to prevent infections in the operating room, the publication turned to Hospital for Special Surgery. A writer interviewed Thomas P. Sculco, MD, Surgeon-in-Chief and the Korein-Wilson Professor of Orthopaedic Surgery, and Ron Perez, RN, JD, CNOR, Assistant Vice President for Surgical Services, about the Hospital's infection control practices.

The article noted that although HSS has one of the highest total joint replacement volumes in the world, it also has one of the lowest surgical site infection (SSI) rates. The Hospital performs about 8,000 joint replacements each year. Its extremely low infection rate of 0.1% for hip replacements is significantly lower than the New York State average of 1.3%.

One factor contributing to low infection rates at HSS is that surgery is performed quickly, according to Dr. Sculco. The average surgical time for a joint replacement is 1 to 1 1/2 hours. The duration of surgery is an independent risk factor for SSI, according to the Centers for Disease Control.

The type of anesthesia used also comes into play, Dr. Sculco noted in the article. "All of our joint replacement operations are done with regional anesthesia," he said. "We use hypotensive anesthetic techniques that reduce bleeding, which we have pioneered for the past 15 to 20 years. That allows the operation to proceed more rapidly."

Another advantage is that procedures are performed systematically using specialized teams, so procedures can be completed expeditiously. "We try to keep consistent staffing with each surgeon," Mr. Perez explained.

During surgery, patients are isolated from the environment and surgical team as much as possible to minimize exposure to contaminants. Operating rooms are equipped with laminar airflow. Surgery is performed within a Plexiglas enclosure, with the patient's head outside of the enclosure. Instruments and implants are passed through an opening in the enclosure, which is used for all joint replacements.

"A lot of the bacteria that settle in incision sites are attached to dust particles, so we filter out the dust particles," Dr. Sculco explained. Although the enclosures are costly to maintain, he said the Hospital believes the investment is worthwhile because "an infection after a joint replacement is a catastrophe."

As an additional safeguard, OR teams wear body exhaust suits that look like "space suits," which help protect patients from bacterial shedding.

Operating rooms are cleaned after every case in accordance with high standards. A surgical services infection prevention nurse monitors the meticulous OR cleaning that takes place. The process entails wiping down the entire room, panels, and all furniture and equipment.

Eileen Finerty, RN, MS, CIC (certified in infection-control), Nursing Director for Infection Control and Occupational Health at HSS, elaborated, "The infection prevention nurse observes the way the unit assistants are cleaning to make sure they maintain the highest standard."

The practices used to prevent infections at HSS are working. Special Surgery was recently commended by the New York State Department of Health for its extremely low infection rate for hip replacements. ●

At HSS, total joint surgery is performed within a Plexiglas enclosure to protect patients from contaminants.

Peggy Crow, MD

Lupus Care and Research at HSS: A Partnership

When Dr. Peggy Crow stepped into her new roles as Physician-in-Chief and Chair of the Division of Rheumatology at HSS earlier this year, she affirmed her support of centers of excellence across the Hospital's clinical specialties. Through these centers of excellence, HSS patients receive comprehensive healthcare and have the opportunity to participate in research that may lead to better treatments and cures.

HSS currently has centers of excellence in lupus and anti-phospholipid syndrome, inflammatory arthritis, scleroderma, vasculitis, and myositis. Centers that will focus on other rheumatologic disorders, including osteoarthritis and osteoporosis, are in development.

In fact, HSS has been a world leader in lupus patient care and research for over 40 years. In 1993, HSS became the nation's first National Institutes of Health-sponsored Specialized Center of Research in systemic lupus erythematosus (SLE). Since then, HSS has developed one of the largest registries of adult and pediatric lupus patients in the United States, with more than 1,000 patients enrolled.

Mary Kirkland Centers for Lupus Care and Research

Thanks to the generous support of Katherine and Arnold Snider of Rheuminations, Inc., HSS established the Mary Kirkland Center for Lupus Research in 2001, and the Mary Kirkland Center for Lupus Care in 2009. These centers work symbiotically to provide excellent patient care for people with lupus and to conduct research that will improve patient care and outcomes in the future.

In 2009, there were almost 34,000 visits to the HSS Rheumatology Division, including almost 3,000 visits by people with lupus. Lupus is a highly complex autoimmune disease in which the immune system cannot distinguish between the body's own cells and tissues and foreign matter, such as viruses. Rather than simply producing antibodies to attack foreign antigens (viruses, bacteria, and similar foreign matter), the immune system creates auto-antibodies that attack the immune system itself. Lupus affects each patient individually, making it especially challenging to diagnose and treat.

The Mary Kirkland Center for Lupus Care provides comprehensive medical care to people with lupus and antiphospholipid syndrome. Through the Lupus Center, HSS rheumatologists Doruk Erkan, MD, and Kyriakos Kirou, MD, the Center's Clinical Co-Directors, and six additional faculty-level rheumatologists, work closely with HSS fellows, nurses, social workers, and physical therapists to provide innovative, comprehensive care to patients with lupus, including 600 adult and child clinic visits per year to people who might not otherwise have access to world-class rheumatological care.

When patients first arrive at the Mary Kirkland Center, they immediately become a member of the HSS family. Pretima Persad, MPH, is the manager of the Center, and knows each patient personally. Along with the Mary Kirkland Center Nurse Coordinator Monica Richey, NP, Ms. Persad performs every intake interview and speaks to patients at most follow-up visits. Ms. Persad explains that it is the philosophy of the Center to "always maintain a prolonged relationship with patients. For this reason, patients appreciate the services and continuity of care that we provide."

Translational Research and Lupus

While continuity of care benefits individual patients, it also benefits the many lupus research studies conducted by HSS scientists. Jane Salmon, MD, Co-Director of the Mary Kirkland Center for Lupus Research and the Collette Kean Research Chair, encourages physicians to offer patients opportunities to participate in clinical trials. In translational research, clinician-scientists identify research questions through their work with patients, and then conduct studies with the goal of improving patient care and outcomes.

One example of translational research in lupus is a longitudinal study that Drs. Kirou and Crow and their colleagues at the Center developed to identify the relationships between immune system triggers such as infections, the production of interferon and other immune system mediators, and lupus disease activity and flares. Patients participated in the study over the course of eight visits to the Lupus Center. Investigators concluded that there was a strong correlation between disease biomarkers in the blood, such as interferon, and disease activity. This study brings scientists one step closer to finding a cure for lupus.

As Ms. Persad explains, "People with lupus are sometimes wary of participating in an ongoing study. When you develop and maintain a professional friendship with the patients, they are more than happy to continue."

Basic Science and Lupus

HSS basic scientists also study lupus at the cellular level. Their goal is to understand the disease well enough to develop better pharmaceutical interventions and, ultimately, to find a cure. "The goal of our research in lupus is to unravel the mechanisms of disease," explains Dr. Crow, who is also Director of the Autoimmunity and Inflammation Program at HSS. "It is through an understanding of disease that we can have a positive impact on patient care."

Dr. Crow has long been interested in identifying patterns of gene activity that could be used as biomarkers of lupus flare. In 2001, she initiated studies to detect molecular pathways associated with active disease in lupus patients. She noted a pattern of gene expression in the blood cells of people with lupus that was similar to the pattern stimulated by type I interferon, or interferon-alpha, a group of proteins released by cells in response to some viruses.

"By identifying molecular markers that measure early disease activity," explains Dr. Crow, "we're hoping to intervene earlier with new or existing drugs and treat patients before their disease becomes highly active and organ damage occurs."

With support from the National Institutes of Health, Dr. Crow moved forward with studies of the initiators of interferon production as well as the role of RNA-containing immune complexes. In 2004, HSS clinician-scientists and collaborators launched an investigation of interferon activity in lupus patients and their healthy relatives, and compared this group to interferon levels in non-relatives. They also determined the ages at which interferon levels are highest.

Using datasets from lupus patient registries and serum blood samples, investigators found that interferon-alpha activity is higher in healthy family members of lupus patients when compared with similar unrelated individuals. Moreover, interferon levels were highest during the reproductive years, with significantly elevated levels in affected individuals (*Arthritis & Rheumatism*, 2008). Thus, it appears that interferon-alpha activity is an inherited genetic trait associated with more severe lupus flares. This finding led to additional research of specific genetic variants that impact immune response. This research is important to patients with lupus because once a gene is identified, scientists will have a target for developing more effective treatments or a cure for this debilitating disease.

Right: Rheumatology fellow Beverly Johnson, MD, consults with patient Simone Devone at the Mary Kirkland Center for Lupus Care.

Below: Kyriakos Kirou, MD, and Pretima Persad, MPH, discuss a patient's progress.

Bringing It All Together

The Mary Kirkland Centers for Lupus Care and Research are examples of how HSS clinicians and scientists collaborate to advance medicine and improve patient outcomes. "These centers of excellence represent the constant integration of science and clinical care that is the formula of hope for our patients with chronic conditions," says Dr. Crow.

Visit www.hss.edu/mary-kirkland

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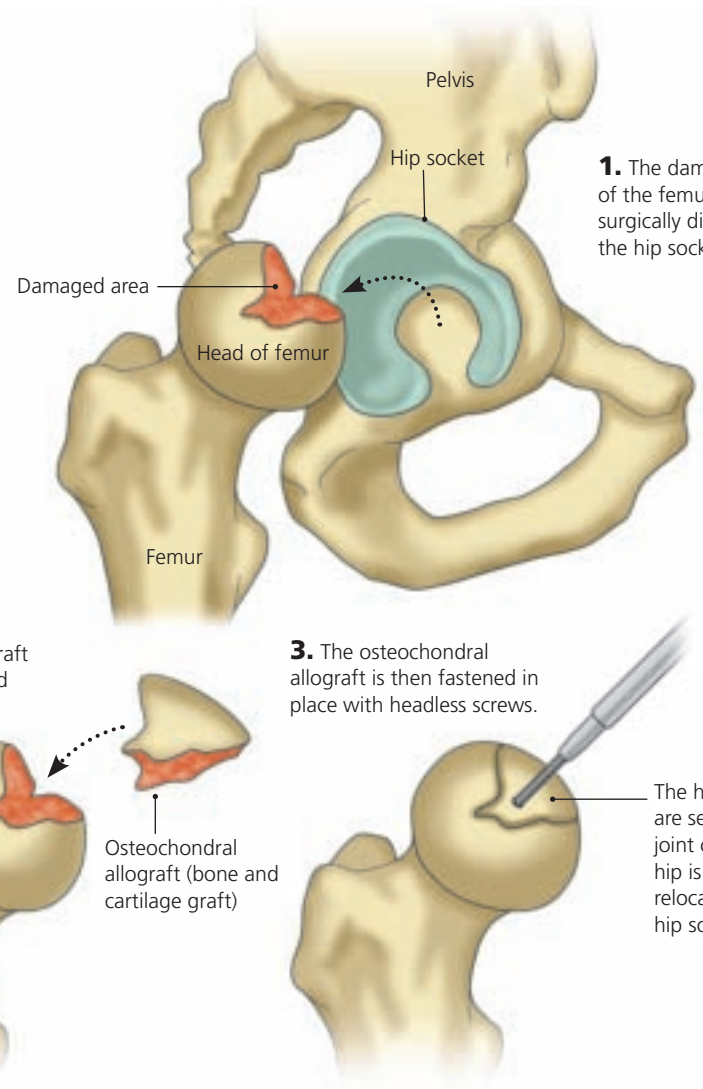
HAPPENINGS AROUND THE HOSPITAL

Helping Young Trauma Patients Avoid Hip Replacement >

Surgery using transplanted bone and cartilage may help young patients avoid a hip replacement after a traumatic injury to the hip joint, according to a case study by orthopedic trauma specialists at HSS. The case involved an injury to an 18-year-old man who was a seat-belted driver involved in a motor vehicle collision, in which his vehicle struck a pole. With such fractures, a young patient would likely need multiple hip replacement surgeries in a lifetime. "This novel technique can help young patients to delay, or even possibly avoid altogether, the need for a total hip replacement," said David L. Helfet, MD, Director, Orthopedic Trauma Service, who led the study published in the *Journal of Orthopaedic Trauma*.



1. The damaged head of the femur is carefully surgically dislocated from the hip socket.

2. An osteochondral allograft from a bone bank is shaped to fit the damaged area.

3. The osteochondral allograft is then fastened in place with headless screws.

Improving Pitching Performance ^

Mickey Levinson, PT, CSCS, Clinical Supervisor in the Sports Rehabilitation and Performance Center, HSS Rehabilitation Department, works with baseball players from Little League to the Majors in the Thrower's Performance Program, in which throwers work with rehabilitation specialists to prevent or recover from injury and achieve full performance. The rehabilitation team evaluates throwing and pitching mechanics that can lead to injury, and teaches players to improve velocity, control, and consistency through modifications in body mechanics. Michael Martinez, a pitcher for Southern University in Louisiana, is working with Levinson following successful elbow surgery at HSS. "The Special Surgery team is teaching me ways to protect my arm in the future," Mr. Martinez said.

Team Approach Leads to Stunning Victory ^

Doctors at Hospital for Special Surgery are accustomed to treating elite athletes. But they marveled at the achievements of Amy Palmiero-Winters, an ultramarathon runner who lost her leg after a motorcycle accident. Amy recently took first place in a grueling 130-mile race, competing with a prosthetic leg against able-bodied runners. She became the first amputee to qualify for a national track and field team. Since her amputation, Amy has faced a number of medical problems that could have sidelined her, including a painful nerve problem that was repaired through a nerve transfer surgery at HSS. Ms. Palmiero-Winters credits her team of HSS doctors with enabling her to compete at the highest level. The medical team included Drs. Scott Wolfe, Daniel Richman, Joseph Feinberg, Gregory Lutz, Brian Halpern, and Ronald Adler. "The doctors played a huge role as far as the successes I've had," Amy said. "They're the top doctors in the world in their fields."

PULSE

< Back on Tour

Professional golfer Luke Donald faced a potentially career-ending injury to his wrist at the 2008 U.S. Open at Torrey Pines. He had surgery to fix a torn tendon and missed the rest of the 2008 season. Six months later, back on tour, Mr. Donald felt soreness and had to withdraw from the Accenture match play. Fortunately, the pain was caused by scar tissue, not a new injury. Sidelined for only one tournament and not the season, Mr. Donald's surgeon reassured him that he could return to golf successfully with anti-inflammatory treatment. His doctor, HSS hand surgeon Andrew Weiland, MD, was right. This year, Mr. Donald won the Madrid Masters and matched a course record at the Wales Open. He is currently ranked seventh in the world. Dr. Weiland takes great pride in Mr. Donald's return to the course and his continued success. "I'm pleased that he is performing well," says Dr. Weiland. "It is gratifying to see our patients resume their profession and passion in life."

HSS Is #1 >

It's official. Hospital for Special Surgery has been ranked #1 in the country for orthopedics in *U.S.News & World Report* "America's Best Hospitals" issue. Nationally, HSS also ranked #3 in rheumatology and #16 in neurology. HSS has developed a marketing plan to spread the word about this honor.

HSS Partners with Public Schools >

HSS has partnered with the New York City Public Schools Athletic League (PSAL) to provide high school football players with game-day medical care and a weekly football clinic. Here, PSAL teams compete in the 2009 championship game, where HSS physicians were available to treat injuries. Andrew Pearle, MD, Associate Team Physician for the New York Mets, works with orthopedic residents to care for the players. "We develop a relationship with the players and the coaches, and when players are hurt we make sure they are seen here at HSS. If the players need surgery or rehabilitation, we all come together to make sure that happens. Our goal is to provide kids with limited resources access to the same type of care that professional athletes receive."

Supporters of Our Success

CA Technologies: Investing in Pediatric Rehabilitation at HSS

HSS provides more than 17,000 sessions of physical, speech, and occupational therapy each year to children with complex musculoskeletal conditions and injuries. These therapies promote healing, increased function, and mobility.

In support of pediatric rehabilitation therapy, CA Technologies, an IT management software and solutions company, has committed $5 million to create the "CA Technologies Rehabilitation Center" at the newly planned Children's Pavilion at Hospital for Special Surgery. This generous gift marks the completion of the Hospital's Building on Success campaign, which surpassed its $100 million goal, raising more than $116 million to expand clinical facilities and advance research.

When CA Technologies CEO Bill McCracken first met Special Surgery's President and CEO Lou Shapiro, they recognized their organizations' shared commitment to helping children live healthy, productive lives. As Mr. McCracken learned more about HSS, he was confident that supporting the Hospital would improve access to high quality rehabilitation therapy for children in New York City.

The CA Technologies Rehabilitation Center will occupy over 7,000 square feet, more than twice their current space, and will include a physical therapy gym; therapy rooms for babies and children to develop fine motor skills; a suite of rooms for speech therapy; an occupational therapy gym with a room for sensory integration therapy; an equipment clinic specializing in wheelchair and mobility needs; and special cardiovascular fitness equipment to help children with impaired mobility develop endurance. The Center will also offer toys and virtual reality software designed to help physically challenged children improve their balancing skills and mobility.

Bill Hughes, Chief Communications Officer, CA Technologies, says, "We are extremely proud to offer our support to Hospital for Special Surgery to create a pediatric rehabilitation center at the new Children's Pavilion. HSS has a long history of providing unparalleled healthcare to children from a variety of socioeconomic backgrounds, not only locally, but also to children from around the world. The CA Technologies Rehabilitation Center will not only help children recover faster, but also will help improve the quality of care to children for years to come."

The new CA Technologies Rehabilitation Center will more than double the space available for pediatric rehabilitation.

Roger Widmann, MD, Chief of Pediatric Orthopedic Surgery at HSS, is confident that the new center will help Special Surgery continue to provide top-notch care for children. "There have been major strides in pediatric orthopedic medicine, and our team has been at the forefront of providing life-changing treatments. Now, with this gift from CA Technologies, our pediatric rehabilitative therapists will continue to meet the needs of our patients in a facility that complements the high level of care they provide."

Leon Root, MD, Medical Director of Rehabilitation and former Chief of Pediatric Orthopedics at Hospital for Special Surgery, agrees, "The CA Technologies Rehabilitation Center provides a significant addition to our world class pediatrics program."

The CA Technologies Rehabilitation Center at the Children's Pavilion at Hospital for Special Surgery is expected to be completed in summer 2011.

Caring for Our Patients

HSS Nursing: Research to Improve Patient Care

Nurses at Hospital for Special Surgery focus on providing skilled, safe, and compassionate bedside care. This focus extends to research conducted by HSS nurses, which is firmly grounded in improving patient care and outcomes.

"At HSS, nursing research addresses patients' most immediate concerns," says Patricia Quinlan, DNSc, MPA, CPHQ, Director of Nursing Education, Quality and Research.

Nursing Research Council

The HSS Nursing Research Council provides guidance to nurses engaged in various levels of research, and currently oversees more than 10 active studies. Comprised of nurses from varying levels of practice, the Council uses the Iowa Model of Evidence-Based Practice (Titler, 2002) to help frame research questions.

Advanced practice nurses and academic nurse researchers with doctorates provide nursing research teams with study direction as they identify clinical problems, conduct literature reviews, initiate research questions, obtain Institutional Review Board approval and grant funding, conduct and/or analyze research, and present and disseminate findings. Evidence-based practice teams, which include nurses from across many service and clinical areas, generate ideas by identifying knowledge deficits while caring for patients – unanswered questions, recurring problems, and quality issues that require systematic resolution. One recent evidence-based project overseen by the Nursing Research Council focused on reducing patient falls.

Katie Horan, RN, and Nicole Haynes, RN, participate in research that impacts patient care.

"Patient falls were identified by our nurses as requiring a carefully planned and coordinated effort," explained Dr. Quinlan. "Using daily practice, observation and discussion, and review of studies in falls prevention, our nurse researchers were able to merge what they learned into effective protection strategies for our patients."

For a year, the Interdisciplinary Falls Team – comprised of nurses, physicians, and other health professionals – examined established best practices to prevent falls. Data collected and analyzed was compared with falls prevention findings in the literature and also categorized by types of patient falls (physiological, accidental) and attributing factors such as age, frailty, mobility factors (e.g., loss of balance) or judgment errors (e.g., overestimation of ability to ambulate). As a result, new clinical guidelines for falls prevention at HSS, including standardization of falls wrist bands, routine environmental rounds, staff education, and e-learning programs, were put into effective practice.

In fact, this transfer of evidence resulted in a 36% reduction in patient falls at HSS, and underscores how the team approach to research can help nurses deliver better care, educate others, and manage nursing practice. "Patients are more likely to receive nursing care that promotes comfort and facilitates the best outcomes," says Dr. Quinlan.

Quality Research Center

In addition to evidence-based practice projects overseen by the Nursing Research Council, nurses at HSS conduct interdisciplinary research. Expanding on the Interdisciplinary Falls Team findings, nurses are now involved in a 10-year retrospective study in collaboration with HSS principal investigator, Lisa Mandl, MD, and the newly created Quality Research Center at HSS, led by Steven Magid, MD. Through the Quality Research Center, nurses are positioned alongside physicians, scientists, and other health professionals to perform studies on quality initiatives.

This decade-long investigation in falls prevention is one of many to come that will help to identify those patients at risk, and determine which practices result in the best patient outcomes, according to Dr. Quinlan. It is also a way for health professionals at all levels to collaboratively assess, introduce, and improve quality care initiatives.

Says Dr. Quinlan: "At HSS, there is no question that studies that can potentially enhance quality care and professional development are worth the commitment of our nurses."

For more, visit www.hss.edu/nursing

Compararive Effectiveness Research continued from page 1

and F.M. Kirby Chair in Orthopaedic Biomechanics at HSS, coordinates the Hospital's registries. "We cannot do comparative effectiveness research without data, and registries are about gathering data from the real-world experiences of our many patients." Special Surgery's high patient volume and focus on musculoskeletal conditions uniquely position it to be a world leader in comparative effectiveness research.

Giving Physicians and Patients the Tools to Choose

In the following three comparative effectiveness studies, HSS scientists ask questions about how to best care for patients. Statisticians have analyzed data to answer these clinical questions:

- Can some patients use a mobile compression device at home to prevent post-surgical blood clots?
- Should a patient with a history of pulmonary hypertension have both knees replaced during the same hospitalization?
- Where should a patient go for a hip replacement revision?

Preventing Blood Clots: A Non-Pharmaceutical Option

Without preventive care, as many as 30 to 50 percent of patients undergoing joint replacement surgery would develop blood clots, usually in the thigh or calf. If the blood clot breaks free and travels through the veins, it can reach the lungs, where it becomes a pulmonary embolism.

Hospital for Special Surgery has an active surveillance program to identify at-risk patients and to monitor all patients for blood clots. While excellent preventive care at Special Surgery makes this complication rare, HSS physician-scientists are constantly trying to discover better ways to prevent post-surgical blood clots.

To prevent blood clots after surgery, doctors have the choice of using pharmaceutical blood thinners, such as heparin, or a compression device that wraps around and pumps the leg to maintain normal blood flow. In the past, these compression devices were too large to allow walking, and could only be used in the hospital.

Recently, a medical device company developed a small, battery-operated mobile compression device that patients can wear both in the hospital and at home, potentially eliminating the need for blood-thinning medication. The sleeve fits over a patient's leg and is secured by Velcro. The FDA-approved device applies intermittent, sequential pressure to the leg in correlation with the patient's respiratory cycle, maximizing blood flow to reduce the risk of clot formation. Douglas E. Padgett, MD, Chief of the Adult Reconstruction and Joint Replacement Division and Chief of the Hip Service at HSS, and colleagues tested the safety and effectiveness of this device in comparison to the medication heparin. "The College of Chest Physicians believes the best way to prevent blood clots is to use pharmacologic agents to thin the blood and make it difficult to clot," Dr. Padgett said. "Orthopedic surgeons, on the other hand, have to balance the need to reduce the risk of blood clots with the reality that many of these blood thinners are in fact associated with complications." Because blood thinning medications are associated with serious side effects, patients taking them require monitoring with blood tests, and must modify their diets. Only through a well-designed comparative effectiveness study could scientists compare the risks and benefits of the two interventions.

A Multi-Center Trial

Investigators at eight hospitals, including HSS, recruited hip replacement patients. Multi-center trials ensure that institutional particularities do not sway results.

Patients received either the compression device or low-molecular-weight heparin for 10 days following surgery. Through a comparative effectiveness analysis, investigators found that the compression devices worked at least as well as heparin to prevent blood clots. This is an important finding, which will give hip replacement patients options to prevent blood clots after surgery. Study findings were published in *The Journal of Bone and Joint Surgery* in March 2010.

Based on the results of this study, HSS will soon use the device in its total hip replacement protocol for patients who are discharged within 48 hours of surgery.

"This study allows us to take the next step, which is to test the device in a larger study to see if we can start to use this device for all elective hip replacements, and eventually knee replacements, and eliminate the need for blood thinners," Dr. Padgett says.

HSS clinician-scientists tested mobile compression devices like this one to prevent post-surgical blood clots.

Winifred Davis' HSS orthopedic surgeon evaluated her risk factors and recommended that she receive two total knee replacements in separate hospital stays.

Safer Surgery

Many people who come to HSS require the replacement of both knees as a result of severe osteoarthritis. For years, orthopedic surgeons have debated whether it is best to perform both surgeries at the same time (which is called simultaneous or single-stage bilateral), staged a few days apart during the same hospitalization, or staged over two hospital visits separated by a few months.

In the late 1990s, bilateral total knee replacements became popular because they reduced the total cost of hospital care, decreased the overall length of hospital stay, increased patient convenience, and required only one anesthetic. By the early 2000s, however, physicians realized that there were risks associated with the bilateral approach. Hospitals that were concerned with patient safety, including HSS, set criteria about which patients were suitable for a bilateral surgery.

Stavros G. Memtsoudis, MD, PhD, is an anesthesiologist at HSS. He says, "Knee replacement is an elective procedure. So it is not justified ethically to subject patients considered prone to complications to increased risk if there is a clear alternative. While there are benefits to bilateral procedures, our main concern has to be patient safety, which we believe can be heightened by appropriate patient selection and education."

Dr. Memtsoudis and colleagues, including Surgeon-in-Chief Thomas Sculco, MD, wanted to find out whether there was increased risk of developing complications, including pulmonary embolism, with the bilateral procedure, and if so, if staging surgeries during the same hospitalization affected the risk. "Bilateral knee replacement is a safe and efficacious procedure, but patients must be selected carefully," explains Dr. Sculco. Because serious complications are rare at Special Surgery, they analyzed the Nationwide Inpatient Sample data from 1998 to 2006 to ensure a large sample. This database has information on over eight million hospital stays each year from over 1,000 U.S. hospitals.

Identifying Risk Factors

Dr. Memtsoudis and colleagues found that the risk of complications increases in bilateral procedures, especially in those patients with certain risk factors, including pulmonary hypertension, increased age, renal disease, and history of heart failure. They also found, for the first time, that staging two knee replacements several days apart during the same hospital visit increases the risk of developing surgical complications. So, patients who are not good candidates for bilateral knee replacement surgery are also not good candidates for staging during the same hospitalization. These findings were published in the journal *Anesthesiology** in December 2009.

Based on these findings, a committee of hospital physicians, led by Dr. Sculco and including surgeons and anesthesiologists, updated existing guidelines about who should be excluded from bilateral

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**Co-investigators include Yan Ma, PhD; Alejandro González Della Valle, MD; Madhu Mazumdar, PhD; Licia Gaber-Baylis, BA; C. Ronald MacKenzie, MD; and Thomas Sculco, MD.*

Recognition from Around the World

Kudos

Richard Bockman, MD, PhD, has been appointed to the Advisory Committee for Reproductive Drugs of the U.S. FDA.

Adele Boskey, PhD, Starr Chair in Mineralized Tissue Research, and collaborators received funding from NIAMS to further study bone breakage in osteoporosis.

Mathias Bostrom, MD, Senior Clinician Scientist in the Musculoskeletal Integrity Program, received a four-year research grant from NIAMS for a new study to examine the mechanism of bone integration in joint arthroplasty.

Mary (Peggy) Crow, MD, received a five-year renewal from NIH/NIAMS for the HSS Rheumatology Research Training Program.

Doruk Erkan, MD, and **Michael Lockshin, MD**, were Organizing Committee Members and speakers at the 13th International Congress on Antiphospholipid Antibodies held in Galveston, Texas.

Steven Goldring, MD, St. Giles Research Chair, was an invited speaker at the European Workshop of Rheumatology Research held in Bamburg, Germany, and a Visiting Professor and Speaker at the University of Massachusetts Medical Center.

Jessica Gordon, MD, received a new two-year award from the National Scleroderma Foundation to study "Imatinib in Systemic Sclerosis."

David Helfet, MD, was inducted into the Johns Hopkins University Society of Scholars.

Howard Hillstrom, PhD, served as an Ad Hoc grants reviewer for the NIH-National Institute on Aging (NIA).

Robert Hotchkiss, MD, presented the 2010 Robert A. Robinson Memorial Lecture at Johns Hopkins University School of Medicine and the Maryland Orthopedic Society on "The Evidence against Evidence-Based Medicine."

Lionel Ivashkiv, MD, David H. Koch Chair for Arthritis and Tissue Degeneration Research, received renewal of two NIH research grants – a five-year award from NIAMS to study "Cytokine Regulation of RA Synoviocyte Phenotype," and a five-year award from the National Institute of Allergy and Infectious Diseases (NIAID) to study "Inhibition of Stat3 and Inflammatory Cytokine Production."

George Kalliolias, MD, received a three-year award from the SLE Lupus Foundation for "Regulation of Interferon-TNF Axis at the Signal Transduction Level."

Joseph Lane, MD, received the inaugural JBJS/OREF Orthopaedic Journal Club Award at the University of California at Davis.

Michael Lockshin, MD, was a Site Visitor at the Medical Research Council/University of Edinburgh MRC Centre for Inflammation Research in Edinburgh, Scotland.

Theresa Lu, MD, PhD, William T. Morris Fellow in Pediatric Rheumatology, received a new 4-year NIH grant to study "Vascular Quiescence and Stabilizer in Immunity," and served as an ad hoc member of the NIH study section on Atherosclerosis and Inflammation of the Cardiovascular System.

Yan Ma, PhD, was elected to Fellowship in the American College of Chest Physicians (ACCP). Dr. Ma also received the Statistics in Epidemiology Young Investigator Award from the American Statistical Association.

Suzanne Maher, PhD, received a new four-year research grant from the NIH-NIAMS to study "Designing a Meniscal Substitute through an Integrated Experimental Computational and Statistical Approach."

Lisa Mandl, MD, MPH, Charles L. Christian Research Fellow, received a Pilot Award from the Agency for Healthcare Research and Quality through CERT to study "Association between Social Support, Mental Health, Physical Status, and Pain in Patients Preceding Total Hip Replacement."

Robert Marx, MD, presented the Keynote lecture at the 26th annual Jerusalem Sports Medicine Symposium in Ma'ale Chamicha, Israel, and gave a presentation at the European Society for Sports Traumatology, Knee Surgery, and Arthroscopy (ESSKA) meeting in Oslo, Norway.

Andrew Pearle, MD, Helen Frankenthaler Fellow in Restorative Mobility, and colleagues received the 2010 Cabaud Memorial Award from the American Orthopaedic Society for Sports Medicine (AOSSM) for the paper "Comparison of Single and Double Bundle ACL Reconstructions in Pivot Shift Kinematics in ACL and Meniscus Deficient Knees."

Hollis Potter, MD, served as a Consultant on the Orthopaedic and Rehabilitation Devices Panel, Medical Devices Advisory Committee and Center for Devices and Radiological Health of the FDA. Dr. Potter was also a reviewer on the NIH study section on Biomedical Imaging Technology, and participated in the NIH-NIAMS Roundtable on "Initiatives in Post-Traumatic Osteoarthritis."

Xiaoping Qing, MD, PhD, received a new three-year award from the SLE Lupus Foundation to study "Long Term Expression of Antiphospholipid Antibodies by Adeno-Associated Virus."

Cathleen Raggio, MD, received a new award from the Osteogenesis Imperfecta Foundation to study "Efficacy of RANKL Inhibition in Adult oim/oim Mice."

Scott Rodeo, MD, served as a member of the NIH Skeletal Biology Structure and Regeneration Study Section. Dr. Rodeo, along with colleagues **Russell Warren, MD, Asheesh Bedi, MD, Alice Fox, MSc, Xiang-Hua Deng, MD**, and **Paul Harris, PhD**, received the Charles Neer Award from the American Shoulder and Elbow Society for their paper titled "Diabetes Mellitus Impairs Tendon-Bone Healing after Rotator Cuff Repair."

Jane Salmon, MD, Collette Kean Research Chair, received a new five-year award from the NIH/National Institute of Allergy and Infectious Diseases in collaboration with North Shore/Feinstein Institute for Medical Research to study "Regulation of the Anti-Phospholipid Response in SLE." Dr. Salmon was also the first American and first woman to open the annual European Congress of Rheumatology meeting.

Art Sedrakyan, MD, PhD, was invited to serve on the Medicare Evidence Development and Coverage Advisory Committee (MEDCAC).

Peter Torzilli, PhD, received a new two-year award from the NIH/NIAMS to study "Resurfacing Damaged Articular Cartilage to Regain Functional Properties." Dr. Torzilli also served on the Advisory Council for the Department of Biomedical Engineering at Rensselaer Polytechnic Institute, and as Chair of the NIH grant review Special Emphasis Panel on Bone and Cartilage Biology.

Marjolein van der Meulen, PhD, was elected Fellow of the American Society of Mechanical Engineers, and was appointed to the NIH Skeletal Biology Structure and Regeneration Study Section.

Geoffrey Westrich, MD, received a Pilot Award from the Agency for Healthcare Research and Quality through CERT to study "Short-Term Complications Associated with Total Hip and Knee Arthroplasty."

Timothy Wright, PhD, with colleagues **Robert Hotchkiss, MD, Mark Figgie, MD, Joseph Lipman, MS**, and **Donald Bartel, PhD**, received a new three-year award from the NIH/NIAMS to study "Improving the Performance of Elbow Reconstruction." Dr. Wright also served on the NIAMS study section reviewing proposals for the Loan Repayment Program and is among this year's AAOS Achievement Award Winners, an honor that recognizes volunteer participation in AAOS programs and other initiatives in orthopedics.

Thomas L. Wickiewicz, MD, was the honoree at his alma mater The Saint Peter's College Hearts & Minds Annual Scholarship Dinner, for his dedication to integrity, leadership, and generous service to others.

Baohong Zhao, MD, received a three-year award from the Arthritis Foundation to study "Suppression of Osteoclastogenesis and Arthritic Bone Resorption by IRF-8."

HSS at the ORS/AAOS Annual Meeting

HSS physician-scientists presented over 200 lectures, symposia sessions, papers, posters, and scientific exhibits at the Orthopaedic Research Society and American Academy of Orthopaedic Surgeons annual meeting held March 6 – 13, 2010, in New Orleans.

Comparative Effectiveness Research continued from page 7

and staged knee replacements during one hospitalization due to risk factors. Dr. Memtsoudis hopes that national guidelines will emerge from the research.

Improving Revision Outcomes

As part of the American Recovery and Reinvestment Act of 2009, the NIH awarded a grant to Dr. Lyman and colleagues to study referral patterns and the risk of early revision surgery after an initial total joint replacement fails. Dr. Lyman will analyze two state databases of patients with total joint replacements to answer three questions: 1) What are the risk factors that lead to revision surgery? 2) When patients need a revision, where do they go for their surgery? and 3) Do patients who have their revision surgery at lower volume hospitals or with lower volume surgeons have more complications than patients who go to higher volume hospitals/surgeons? This comparison of surgical revision outcomes in different healthcare settings is another example of comparative effectiveness research.

HSS scientists believe that this study has the potential to influence national health policy. Because revisions are expensive and difficult procedures that usually involve senior citizens, Medicare is interested in the study results.

If it is found that surgeons and hospitals with higher volumes have better results, then higher volume hospitals could partner with lower volume hospitals, improving care overall. Dr. Lyman hopes that hospitals everywhere will improve the care they provide based on the study's findings. "It is important that we answer these questions so that those who need revision surgery receive the best possible care with the best possible outcomes," he says.

Conclusion

Because HSS is uniquely focused on musculoskeletal medicine and research, performing an unprecedented number of orthopedic procedures and housing world renowned experts in orthopedic surgery, rheumatology, clinical and basic scientific research, biomechanics, anesthesiology, and nursing, HSS has the ability to be a leader in comparative effectiveness research. Comparative effectiveness research is the science that will most quickly and directly help physicians provide the best patient care.

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Our Physicians

GIVING PATIENTS HOPE

Jessica Gordon, MD

As a fellow at Hospital for Special Surgery, Jessica Gordon, MD, conducted important studies of the care of people with scleroderma, a connective tissue disease that involves widespread changes in the skin, blood vessels, muscles, and internal organs.

Dr. Gordon's contributions to scleroderma research are inspired by the patients she sees every day. Along with HSS rheumatologist Robert Spiera, MD, Dr. Gordon recently completed a clinical trial of a drug therapy for scleroderma that has revealed promising results. It was during this investigation that Dr. Gordon began working with Mahmoud Watad, whose severe case of scleroderma responded well to study treatment (see other side).

"Patient perseverance despite pain and uncertainty is what drives our team to uncover better ways to improve quality of life for those coping with chronic autoimmune and rheumatic conditions," explains Dr. Gordon, newly appointed as HSS assistant attending physician in rheumatology. "Our goal at HSS is to provide patients and their families with hope, healing, and understanding of complex disease."

Our Patients

JOURNEY TO WELL-BEING

Mahmoud Watad

It was the fall semester and a typically busy day of classes for Mahmoud Watad, a business professor and father of four, until he was approached by a concerned student who pointed to the strange coloring of the teacher's hand – it was blue.

Within weeks, Mr. Watad experienced swelling in his extremities leading to a considerable decrease in mobility. "I could barely walk," recalls Mr. Watad. He also suffered from a chronic cough and tightening of the skin. Following many tests, Mr. Watad was diagnosed with scleroderma. With no cure available, his New Jersey-based rheumatologist suggested that he contact Hospital for Special Surgery, where physician-scientists including Drs. Robert Spiera and Jessica Gordon (see other side) were investigating a new drug intervention.

In addition to participating in the clinical trial, Mr. Watad changed his diet and pursued alternative therapies. After six months, Mr. Watad experienced significant symptom relief. "My energy level rose, my appetite returned," says Mr. Watad, "and my quality of life improved."

"Dr. Gordon and the HSS team bring a 'human' element to medicine; they help you to cope with the disease," says Mr. Watad.