

Discovery to Recovery

CLINICAL AND RESEARCH HIGHLIGHTS AT HSS | SPRING 2010

HOSPITAL
FOR
SPECIAL
SURGERY



Osteoarthritis Research at HSS: Understanding a Pervasive Disease

Osteoarthritis (OA), the painful and often debilitating joint disease in which cartilage breaks down until it can no longer serve its function as a cushion between the bones, is the most common underlying condition of patients seeking treatment at Hospital for Special Surgery (HSS). While the symptoms of OA are well-known, scientists are still uncovering the root causes of the disease. In the late stages of OA, the best treatment remains joint replacement. But today's active patients are developing OA symptoms at younger ages, and the prevalence of OA is expected to increase dramatically as the Baby Boomers age. A leading cause of disability in the United States, OA is one of the most urgent research challenges of twenty-first century medicine.

Staffed with the world's best orthopedic surgeons, musculoskeletal-trained radiologists, biomedical engineers, and basic scientists, and with patients with a wide range of OA symptoms to learn from, HSS is uniquely situated to lead in OA research.

Steven Goldring, MD, Chief Scientific Officer and St. Giles Research Chair, explains that a multidisciplinary focus is necessary to face the complicated research challenges posed by OA. "OA affects every part

of the joint: the bone, ligament, tendon, cartilage and even the muscles surrounding the joint. You can't think of it as just a cartilage disease. OA is really the failure of an organ."

Inflammation

Mary Crow, MD, Benjamin M. Rosen Chair in Immunology and Inflammation Research, is a senior scientist and rheumatologist who will soon step into the leadership role of Physician-in-Chief and Chair of the Division of Rheumatology. Dr. Crow is renowned for her scientific contributions to autoimmune disease research and rheumatology, and her translation of this research to patient care. Along with colleagues Jenny Scott, PhD, and Steven Goldring, MD, she is also involved in multidisciplinary OA research, which evolved from her study of inflammation in systemic lupus erythematosus and rheumatoid arthritis. She is now testing the hypothesis that inflammatory cells are present in OA and might play a role in disease progression.

HSS scientists have been studying inflammation in the large membrane



An interdisciplinary group of scientists and physicians meets regularly to discuss the ACL registry, which contributes valuable information to the Hospital's osteoarthritis effort.

that lines the joints, called the synovium, in an attempt to learn whether inflammation contributes to joint damage as OA progresses and, if so, whether the factors that determine progression of OA can be defined. By examining samples of synovial tissue and joint fluid gathered from previous surgeries, Dr. Crow and Carla Scanzello, MD, PhD, a rheumatologist who recently completed her training at

synovium might result in cartilage damage, and why some people develop more severe OA, while others develop milder symptoms.

Osteoarthritis and ACL Injury

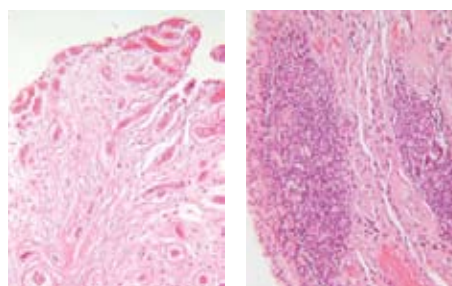
The Hospital's registry of patients undergoing anterior cruciate ligament (ACL) repairs benefits OA research. Initiated by the Sports Medicine Service, the registry includes clinical data collected from patients receiving this surgery. Because HSS performs over 800 ACL repairs each year, this database is expected to become an important source of information on the long-term outcomes for these patients. Members of the Sports Service, including Scott Rodeo,

MD, Jo Hannafin, MD, PhD, and Russell Warren, MD, work with research staff and colleagues in the Hospital's Research Division to analyze tissue from patients participating in the ACL Registry.

Scientists

compare tissue from patients with simple ACL tears and more serious joint damage to determine cellular and genetic differences between the two groups. The Sports Medicine surgeons will follow patients over time, collecting clinical data on who develops OA.

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Above: HSS scientists are studying the role of inflammation in the progression of osteoarthritis. These two images show joint tissue from OA patients with low level (left), and extensive infiltration of inflammatory cells (right).

Right: William Humphrey's osteoarthritis was so severe that he required a total disc replacement at HSS. Since his surgery, he has resumed his active life as a commercial painter and dad.



HSS, documented that certain inflammatory molecules were increased in the joints of patients who turned out to have early OA. In current research, Drs. Scott and Crow are investigating how molecules produced in the

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Our Mission

Dedicated to Mobility

At Hospital for Special Surgery, osteoarthritis is the most common underlying medical condition for our nearly 250,000 patient visits each year. Our skilled surgeons, rheumatologists, radiologists, physiatrists and nursing and rehabilitation professionals treat patients with a wide range of osteoarthritis symptoms at all stages of this debilitating disease. An injured athlete may have the first signs of early osteoarthritis without even realizing it, while a patient with late-stage arthritis may require a joint replacement. In every case, patients come to Special Surgery hoping to move without pain, and our skilled and compassionate clinical staff works to improve their mobility.

At Special Surgery, the research team is equally committed to helping patients with osteoarthritis. Nineteen of Special Surgery's 53 NIH-funded research studies are dedicated to osteoarthritis, and 12 of the Hospital's 26 NIH-funded Principal Investigators study osteoarthritis.

Osteoarthritis research at Special Surgery is diverse. Cellular biologists, physician scientists and bioengineers all bring their own perspectives and skill to their research questions. Regardless of their specific professional training, all HSS scientists are committed to working together to understand the root causes of the disease. We are convinced that the only way to conquer a pervasive, complex disease like osteoarthritis is through a multidisciplinary approach. Physicians who

see patients with osteoarthritis every day raise questions, which our scientists then take to their laboratories for investigation. At HSS, the feedback loop is continuous.

Special Surgery is dedicated to fighting osteoarthritis on all fronts, and our long-standing relationship with the Arthritis Foundation also illustrates our commitment. Laura Robbins, Vice President for Education, recently received the Foundation's highest nationwide volunteer award, the Charles B. Harding Award for Distinguished Service, for her leadership in promoting advocacy and research for people with arthritis. Senior HSS rheumatologists and orthopedic surgeons sit on the Arthritis Foundation Board, providing organizational leadership at the regional and national levels.

As the world leader in musculoskeletal care, we are uniquely situated to lead in osteoarthritis research. We appreciate the generosity of all those who help make it possible for us to achieve our research goals. We are proud of the many skilled and compassionate HSS scientists, clinicians and educators who fight osteoarthritis in their practices, the OR and the lab.

Sincerely,



Thomas P. Sculco, MD
Surgeon-in-Chief



Louis A. Shapiro
President and CEO



Steven R. Goldring, MD
Chief Scientific Officer

In the News



HSS Receives More Than \$2.8 Million in Federal Stimulus Grants

Hospital for Special Surgery will receive more than \$2.8 million in funding over the next two years through our success with the federal stimulus package, formally known as the American Recovery and Reinvestment Act of 2009 (ARRA), which provided a number of competitive funding opportunities for scientists through the National Institutes of Health (NIH).

"The new grants highlight our faculty as leaders in orthopedic and rheumatology research," said Steven Goldring, MD, Chief Scientific Officer at Special Surgery. "Not only will the ARRA funds enable us to continue pursuing high quality research, but they allow for the creation of four new positions and the retention of three positions, one of the ARRA's key objectives."

Special Surgery successfully received two Challenge Grants and secured funding for seven additional proposals. The Challenge Grants include:

Hollis Potter, MD, Chief, Magnetic Resonance and Imaging and Matthew Koff, PhD, Assistant Scientist. "Evaluation of an MRI Biomarker for Meniscal Repair." This study will evaluate the use of biomarkers in magnetic resonance imaging (MRI) to better visualize repair and function of the meniscus. HSS collaborators include Drs. Scott Rodeo, Suzanne Maher and Li Foong Foo, and an investigator at Cornell University.

Stephen Lyman, PhD, Director of Epidemiology & Biostatistics. "Referral Patterns and Risk of Early Revision After Primary Total Joint Arthroplasty." This study will identify risk factors for early revision arthroplasty, which will help prevent the need for revisions and improve patient outcomes. HSS collaborators include Drs. Robert Marx, Douglas Padgett, and Timothy Wright.

Other ARRA grants will allow HSS to investigate osteoarthritis, osteoporosis, pain management, lupus and other musculoskeletal conditions that impact public health (see sidebar).

Additional Federally-Funded Stimulus Grants

Adele Boskey, PhD, "FT-IR Microscopy of Mineral Structure in Osteoporosis." Dr. Boskey, Starr Chair, Mineralized Tissue Research and Director of the Musculoskeletal Integrity Program, received funding for a college student's summer internship to help define a new measurement parameter for crystals in infrared spectral images of bone and teeth.

Carl Blobel, MD, PhD, "ADAMs: Key Regulators of EGFR Signaling." Dr. Blobel, Virginia F. and William R. Salomon Chair in Musculoskeletal Research, and Director of the Arthritis and Tissue Degeneration Program, received funds to extend his research of ADAM proteins, which play critical roles in rheumatoid arthritis, cancer, and Alzheimer's disease.

Semih Gungor, MD, "Comparative Effectiveness of Interventions for Chronic Pain Management." Dr. Gungor, Director, Pain Medicine Research, received funding in collaboration with Weill Cornell Medical College to create a pain registry to determine which pain management interventions are the most effective.

Lisa Mandl, MD, MPH, "Partial Meniscectomy in Osteoarthritis: Randomized Control Trial." Dr. Mandl, Assistant Attending Physician, Rheumatology, Charles L. Christian Research Fellow, is collaborating with the Brigham and Women's Hospital in Boston, Massachusetts, on a multi-center trial evaluating whether patients with tears in the meniscus along with knee osteoarthritis have better outcomes with surgical or nonsurgical methods.

Sergei Rudchenko, PhD, "Theranostic Molecular Automata for Specific Cell Elimination." In collaboration with researchers at Columbia University, Dr. Rudchenko, Director of the Flow Cytometry Core Facility, will pursue the development of theranostic tools – devices combining diagnostic and therapeutic abilities – that can target and remove specific cells leaving surrounding healthy cells untouched.

Jane Salmon, MD, "Predictors of Pregnancy Outcome in SLE and APS." Dr. Salmon, Collette Kean Research Chair and Co-Director, Mary Kirkland Center for Lupus Research, received a supplement for her multi-center PROMISSE Study (Predictors of pRegnancy Outcome: bioMarkers In anti-phospholipid antibody Syndrome and Systemic lupus Erythematosus), which seeks to determine factors involved with pregnancy complications and loss in patients with systemic lupus erythematosus (SLE) and anti-phospholipid syndrome (APS).

Jane Salmon, MD, "Regulation of the Anti-Phospholipid Response in SLE." In collaboration with colleagues at the Feinstein Institute for Medical Research, Dr. Salmon will examine the role of anti-phospholipid antibodies in pregnancy complications and loss using an animal model of anti-phospholipid syndrome.

Clinical Trials at HSS

“Becoming involved in a clinical trial gives patients the opportunity to have a seat at the table of innovation,” says Robert Hotchkiss, MD, Medical Director of Clinical Research, HSS. “Study participation is about taking a more active role in health care.”

Why Participate in a Clinical Study?

From a medical research perspective, the benefits include a better understanding of disease, enhanced treat-



Robert Hotchkiss, MD

ment measures, and improved quality of care. For patients, the decision to become a part of a scientific investigation requires a clear sense of what participation means. Currently, Hospital for Special Surgery is busy with over 400 active human studies and preparing for more to come.

The Patient Perspective

Weighing the pros and cons of study participation requires careful consideration and information. Prospective candidates should learn as much as possible about the study, including facts about trial protocol, length and design, tests involved, randomization, potential risks and side effects, hospitalization, reimbursement for medical and related expenses, and how participation will affect everyday life.

“Some patients who enroll do not fully understand the commitment that is necessary,” notes Dr. Hotchkiss. “Study participation can be time consuming and inconvenient, a fact that can pose a problem in recruitment and in patients opting out.”

For many patients who decide to sign up for a clinical study, however, the benefits outweigh the risks or interruption of daily routine. Patients may volunteer for a clinical trial when standard treatment options are unsuccessful and with the expectation that, if proven effective, they will be “first in line” for a new therapy. Others hope to participate in the research

process, help fellow patients, and contribute to the advancement of medical knowledge. Healthcare costs are also a consideration for clinical trial entry, as expenses associated with study treatment are typically covered. Patients are also likely to volunteer as a study subject when the goal of treatment is focused on improving quality of life. “If a treatment is novel and offers benefits with low risk,” observes Dr. Hotchkiss, “enrollment is more attractive to a patient.”

In addition, a bit of publicity can play an important role in generating interest in study enrollment. Dr. Hotchkiss points to the influence of Internet sources such as the NIH-sponsored ClinicalTrials.gov, as well as targeted announcements in other communication vehicles which help to spread the word about trials and recruitment. In fact, news about the current trial in the treatment of Dupuytren’s contracture, a degenerative disease of the hand, circulated so quickly that HSS reported immediate and overwhelming interest in participation.

Beverly Lambert’s Story

For Beverly Lambert, singing and playing the piano would always go hand in hand, until a crippling disease took away mobility in her fingers. “As a vocal coach, I use the piano to practice scales with my students,” explains Ms. Lambert, age 58, of Fairfield, Connecticut. “The problem in my right hand not only impacted my ability to teach, it had a great effect on my livelihood.”



A male study participant’s hands before (top), during (middle), and following (bottom) collagenase treatment for Dupuytren’s contracture.

Dupuytren’s contracture is a progressive shrinkage of the connective tissue in the palm of the hand that can make fingers curl in. The cause is unknown although minor injury and genetics (in Ms. Lambert’s case, both her mother and father have the condition) may contribute to disease.



Following successful non-surgical treatment at HSS for Dupuytren’s contracture in her right hand, singer and vocal coach Beverly Lambert can once again play the piano (top) and extend her fingers (right).



Surgical treatment can restore normal movement to the fingers, but is often associated with lengthy recovery, potential nerve damage, and high rate of recurrence.

“During a visit for a second opinion about surgery for my condition, I was informed about a clinical trial to test a nonsurgical treatment and I wanted to learn more,” recalls Ms. Lambert. “After searching and waiting, I found Special Surgery and Dr. Hotchkiss.”

At HSS, Ms. Lambert signed up for a randomized, controlled clinical trial to explore the safety and efficacy of enzyme (collagenase) injections for Dupuytren’s contracture, which included 20 participants. A Phase III study, recent findings published in the *New England Journal of Medicine* revealed that the collagenase injection showed promise in restoring nearly full extension of the affected fingers. “The idea behind the collagenase is dissolving the diseased tissue, rather than surgically removing it,” explains Dr. Hotchkiss. Based on those findings, an FDA Advisory Committee has recommended approval of the injection, which would make it the first FDA-approved treatment alternative to surgery for this condition.

For three months, Ms. Lambert received the placebo injection in her fingers, and following her enrollment opted to receive the medication. Her results were immediate. “It was very frustrating to receive the placebo during the trial, but I knew that it was a possibility and that I could eventually get the medication,” says Ms. Lambert. “For me, participation was worth any reservations, pain and time involved to get back to my life.”

Clinician Considerations

Treating physicians who are also investigators recognize their primary duty is to promote their patients’ welfare.

“As a clinician and researcher, I have to be interested in the investigative aspect and also believe that I would be willing to subject myself or my family to the randomization process, even if I’m not sure if the treatment will work,” says Dr. Hotchkiss. “If it doesn’t pass that test [for me], then participation is most likely not possible.”

This approach to decision-making, known as clinical equipoise (or principle of equipoise), provides the ethical basis for medical research involving patients assigned to different treatment arms of a clinical study. For treating physicians considering participation in a trial, it raises important questions about study purpose, design, safety, bias, and research intent. Therefore, based on equipoise, if a clinician is contemplating research of a drug or treatment versus placebo control, and strongly believes that the study treatment is better than placebo, then the clinician is ethically bound not to participate in that study.¹ An objective, unbiased study and its conclusions are achieved only when a clinician-researcher sets out not to prove a theory, but to challenge it.¹

Using equipoise as a guide, Dr. Hotchkiss also advises health professionals to practice vigilance and choose words carefully when speaking to their patients about trial enrollment. “It should be presented as an opportunity to participate in a study of a drug or treatment, regulated by the FDA, that may show promise.” Accordingly, Dr. Hotchkiss stresses that “patient care comes first.” Thus, when interacting with an individual who is your patient and also a study subject, it is important to always be mindful of preserving the doctor-patient relationship. ●

¹Kraemer, Helena. 2006. “Understanding Clinical Equipoise.” Available from 4researchers.org [cited 20 July 2006]; INTERNET.

THE

HAPPENINGS AROUND THE HOSPITAL



HSS and SmartFish for Healthier Computing >

With the mutual goal of preventing injury and discomfort, Hospital for Special Surgery partnered with SmartFish Technologies to study the effects of motion while computing. SmartFish focuses on the development of smart technology and true ergonomic innovation for electronics.

The HSS Rehabilitation Department helped SmartFish create the breakthrough ErgoMotion™ technology. By applying motion to computer peripherals, ErgoMotion makes subtle, incremental changes to a user's hand and wrist positions to help

increase blood flow and reduce inflammation, minimizing the risk of repetitive stress injury associated with keyboard use, such as carpal tunnel syndrome, tendonitis and tenosynovitis. Products incorporating ErgoMotion technology include the *ErgoMotion Keyboard*, and the *ErgoMotion Mouse*.

A portion of proceeds from the sale of ErgoMotion products supports the HSS Rehabilitation Education Fund.



▲ HSS Medical Team in Haiti

HSS anesthesiologists, nurses and orthopedic trauma surgeons (pictured above) were one of the first orthopedic teams to arrive in Haiti just a few days after the catastrophic earthquake. They performed over 120 surgeries in four days before returning home.

Led by David Helfet, MD, Director of the Orthopedic Trauma Service at HSS, and with physicians from NewYork-Presbyterian Hospital, the

team performed surgeries at Hopital de la Communaute Haitienne, a few miles from the earthquake's epicenter. With air transport provided by global medical device company Synthes – and surgical supplies donated by Synthes, HSS, and NewYork-Presbyterian – the team worked to save lives and limbs. Seth Sherman, MD, HSS Orthopedic Surgery Resident, joined a second team to Haiti soon afterwards.



▲ Big Apple Circus Benefit for Pediatrics

Hospital for Special Surgery held its Third Annual Benefit at Big Apple Circus on Sunday, December 6, 2009, raising \$164,000 in support of pediatric care and research. This year's family event featured a silent auction, face painting for children, and a dessert reception with Grandma the Clown.

Serving as honorary chair for the benefit was Susan Rose, HSS Trustee, along with co-chairs Michelle Carlson, MD, an orthopedic surgeon who is the Director and founder of the Children and Adolescent Hand and Arm (CHArm) Center at HSS, and Daniel Green, MD, an orthopedic surgeon specializing in pediatrics at HSS.

POUNDS ELSE

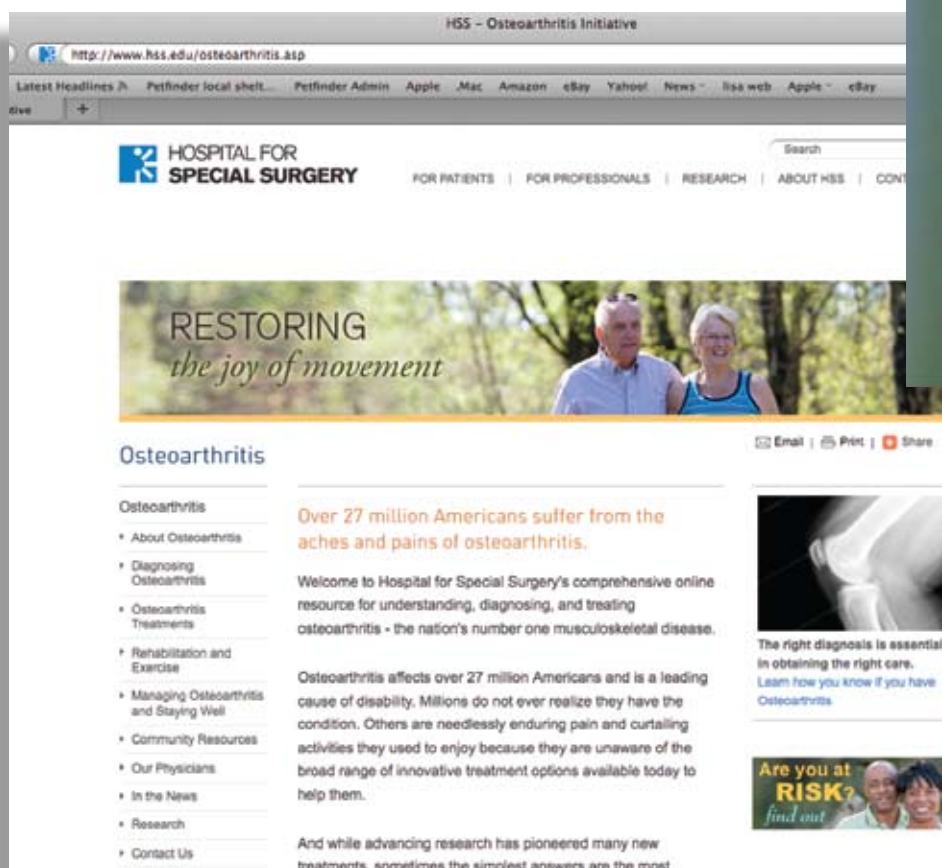
Tough on Turf >

A recent study at HSS found that athletes put less strain on their anterior cruciate ligament (ACL) when making a cut on a natural grass surface while wearing a cleat.

“As a former football player, I was always curious about why I was more sore after playing on artificial surfaces than playing on grass, and I wanted to find out the reasons behind that using a biomechanical model,” explains Mark Drakos, MD, formerly an orthopedic fellow in the Sports Medicine and Shoulder Service at HSS.

Investigators tested the strain placed on the ACL of four different shoe-surface interactions: AstroTurf/turf shoe, modern playing turf/turf shoe, modern turf/cleat, and natural grass/cleat. Findings revealed that the natural grass/cleat combination placed a statistically lower maximum strain on the leg.

The study appears in the *Journal of Biomechanical Engineering* (January 2010).



▲ HSS Supports Osteoarthritis Awareness Campaign

The Arthritis Foundation and Ad Council have launched a nationwide awareness campaign focused on osteoarthritis. With the message: “Moving is the Best Medicine,” the effort will increase public health education, and support breakthrough research for osteoarthritis (see ads above).

In support of this campaign, HSS has launched an educational Web site for patients, www.hss.edu/osteoarthritis (see left), which brings together information about the Hospital's osteoarthritis initiatives.

Focused Diagnostic Treatment Centers for Hip and Spine

New Center Focuses on Hip Pain and Preservation

After winning the 3000-meter, 2009 USA Masters Indoor Track & Field Championship, Therese Caffrey felt her hip catch. “I went running and suddenly could barely walk.”



Therese Caffrey is examined at the new Center for Hip Pain and Preservation (bottom) and running again (top).

Hip problems once ended sports careers or stopped young, active, recreational athletes in their tracks. Now improved understanding of hip abnormalities combined with diagnostic imaging advances and minimally invasive surgical treatments are giving patients new hope for relieving chronic, and sometimes misdiagnosed, hip pain. Increasingly, hip specialists can slow or reverse the progression of degenerative hip disease, return patients to their

chosen activities and sometimes reduce the need for more extensive surgeries.

These advances have led Hospital for Special Surgery to form the Center for Hip Pain and Preservation. Patients seeking help at the Center range from active people at varying stages in life to profes-

sional and elite athletes. “Our understanding of hip structural abnormalities has increased, allowing specialists to better identify underlying conditions that previously went unrecognized,” explains Douglas E. Padgett, MD, Chief, Hip Service, and Co-Director of the newly opened Center.

“Some patients arrive in my office having searched for an answer to their hip pain for up to three years,” says Bryan T. Kelly, MD, sports medicine orthopedic surgeon and Co-Director of

the new Center. “These advances have helped us to better recognize and treat conditions such as hip impingement, labral tears and hip dysplasia.”

Therese’s diagnostic tests showed a labral tear, impingement, and psoas tendon problems. Hip Center sports medicine surgeon Dr. Struan Coleman repaired these problems arthroscopically. “Immediately the pain was gone,” says Therese. Following rehabilitation, Therese resumed training and racing, and recently broke her personal best time in both the 1,500 and 3,000 meter competitions. “My HSS experience was remarkable. I now tell my running friends not to put off treatment, but to go and get evaluated.”

Spine Care Institute Established

Back pain sufferers will now receive holistic treatment for all non-operative and operative back disorders from a collaborative team of experts in various Hospital departments, which recently formed the Hospital for Special Surgery Spine Care Institute. Established as a top U.S. center of excellence for the treatment of all spine disorders, the Institute is focused on comprehensive patient care, education and research into new areas of diagnosis and treatment. HSS currently

has 29 active clinical trials underway evaluating innovative approaches for spine conditions.

The Institute brings together dedicated specialists in surgery, neurology, physiatry, rehabilitation, pain management, anesthesia, radiology and integrative complementary medicine to provide seamless care. “Navigating through the many treatment options is challenging,” explains Frank P. Cammisa, Jr., MD, Chief of the Spine Service at Hospital for Special Surgery. “Our goal is to help patients who don’t need surgery to have as limited a disability as possible and for those who do need surgery, to make it as safe and efficacious as possible.”

Advances in diagnostic imaging combined with vast orthopedic patient experience have enabled Special Surgery to earn a reputation for excellence in accurate diagnosis. Explains Helene Pavlov, MD, Radiologist-in-Chief at HSS, “The technical expertise combined with years of experience in spine and musculoskeletal image interpretation by our radiologists enables us to make clinical decisions for surgical planning.”

Special Surgery has long been recognized as a world leader in spine disorder treatment. Institute physicians have subspecialty training in pediatric and adult spine conditions – both acute and chronic. They have the expertise to address the most routine as well as the most complex spine disorders using minimally invasive techniques whenever possible. ●

News & Notes

Comparative Effectiveness Expert Joins HSS

In support of the Hospital’s commitment to comparative effectiveness research, HSS welcomes Art Sedrakyan, MD, PhD, to its Research Division. Comparative effectiveness examines the different outcomes between drugs, devices and/or interventions. The federal government



Art Sedrakyan, MD, PhD

recently established this kind of research as a priority by awarding the field \$1.1 billion in grants.

While HSS had previously established clinical registries to track patient outcomes, the appointment of Dr. Sedrakyan will further our efforts in patient-oriented comparative effectiveness. In a joint appointment with Weill Cornell Department of Public Health and NewYork-Presbyterian Hospital, Dr. Sedrakyan will design studies and perform patient-oriented comparative effectiveness research at HSS, focusing on orthopedics. Trained as a cardiothoracic surgeon, Dr. Sedrakyan will perform cardiothoracic research at Weill Cornell, providing opportunities for the two institutions to collaborate.

Formerly a Medical Officer at the Federal Drug Administration and a Senior Advisor at the Agency for Healthcare Research and Quality in Washington, DC, Dr. Sedrakyan has designed comparative effectiveness studies for the federal government and collaborated with Weill Cornell and HSS on their Centers for Education and Research on Therapeutics (CERT). ●

Dr. Wilson Celebrates 90 Years

Philip D. Wilson, Jr., MD, welcomed his 90th birthday with a poignant tribute at the HSS Alumni Association Meeting held November 12 – 14, 2009. In the opinion of those who have had the pleasure to know and learn from him, Dr. Wilson is a person of great character and dedication who has touched the lives of many in his roles as a healer, teacher, innovator, colleague and friend.

A highly respected educator and surgeon for over 50 years, Dr. Wilson has helped transform Hospital for Special Surgery from one of local recognition to a national center of excellence. Following in the footsteps of his renowned father, Philip Wilson, Sr., MD, who initiated the Hospital’s rise to international acclaim, Dr. Wilson completed his orthopedic surgery residency at HSS in 1950, and was officially appointed to the staff in 1951. Among his many academic and professional accomplishments, including as past president of the AAOS,

Dr. Wilson’s career is hallmarked by a two-decade role as Surgeon-in-Chief at HSS (1972-1989), in



Philip D. Wilson, Jr., MD

which time he established a robust research department, encouraged an interdisciplinary approach to medical care, ushered in biomechanics, and developed an esteemed medical education program that culminated in the graduation of more than 300 residents and fellows in the course of his tenure.

Today, at age 90, Dr. Wilson continues to work alongside HSS staff to educate young, aspiring health professionals about becoming not only good physicians and scientists, but also well-rounded individuals who understand the importance of cultivating relationships, promoting teamwork, and leading by example. ●

Scientists will then look for a connection between inflammation and other biologic processes occurring in the joints early on and the development and severity of OA later in life.

“We’re getting closer to predicting the progression of OA, and to relating those clinical outcomes to a biologic process that we can understand,” Dr. Crow says. “The goal is to develop approaches to interrupting disease progression.”

“It’s likely that there are many contributing factors to who goes on to develop severe OA. Some of those contributors will be the severity of the injury, and some contributors will be genetic. Some people respond to the same injury with more inflammation than others,” Dr. Crow explains. “So what determines the difference between different people? And what can that teach us about therapies that might prevent serious progression of this disease?” These are just some of the questions being asked at HSS.

Cartilage Tissue Research

Senior Scientist Mary Goldring, PhD, the Ira W. DeCamp Fellow in Musculoskeletal Genetics and Director of the Laboratory for Cartilage Biology in the Tissue Engineering Repair & Regeneration Program at HSS, specializes in the study of cartilage tissue research, specifically chondrocytes, the cells within the cartilage tissue. Dr. Goldring and her laboratory collaborators also work with Thomas Sculco, MD, Surgeon-in-Chief and Korein-Wilson Professor of Orthopedic Surgery, and members of the Arthroplasty Service, to obtain tissue samples from patients undergoing joint replacement, from which they investigate genes that play a role in the regulation of cartilage degradation and repair.

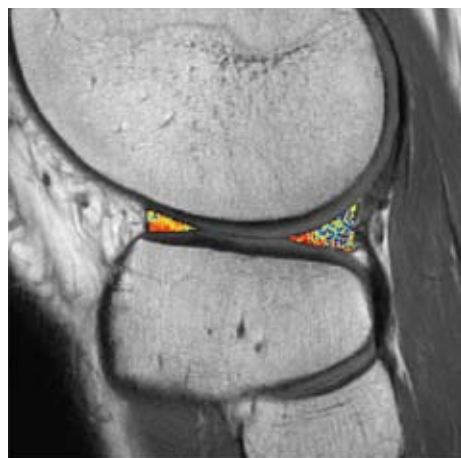
This work is critical to understanding the onset and progression of OA. Because cartilage has no blood vessels, it has little capacity to remodel in response to healthy loads across the joint or to heal when it is damaged by injury or disease. When cartilage breaks down, it cannot rebuild itself.

HSS Orthopedic Surgeon Russell Warren, MD, performed ACL surgery on Jay Alford of the New York Football Giants, one of more than 800 ACL repairs performed at HSS last year. ACL injury may lead to osteoarthritis later in life.



Dr. Goldring says, “the idea is to understand the very basic cellular mechanisms that lead to problems. If we understand the basic mechanisms involved in cartilage injury and repair, we may be able to define cellular targets for treatment and develop effective therapies.”

One particular challenge in OA research is that the disease begins before a patient feels any symptoms. Once new therapies are developed, patients may well need to be screened early on to fully benefit from treatment. To address this problem, skilled orthopedic radiologists and biomechanical engineers at HSS are already developing new ways to diagnose cartilage breakdown early in the disease process.



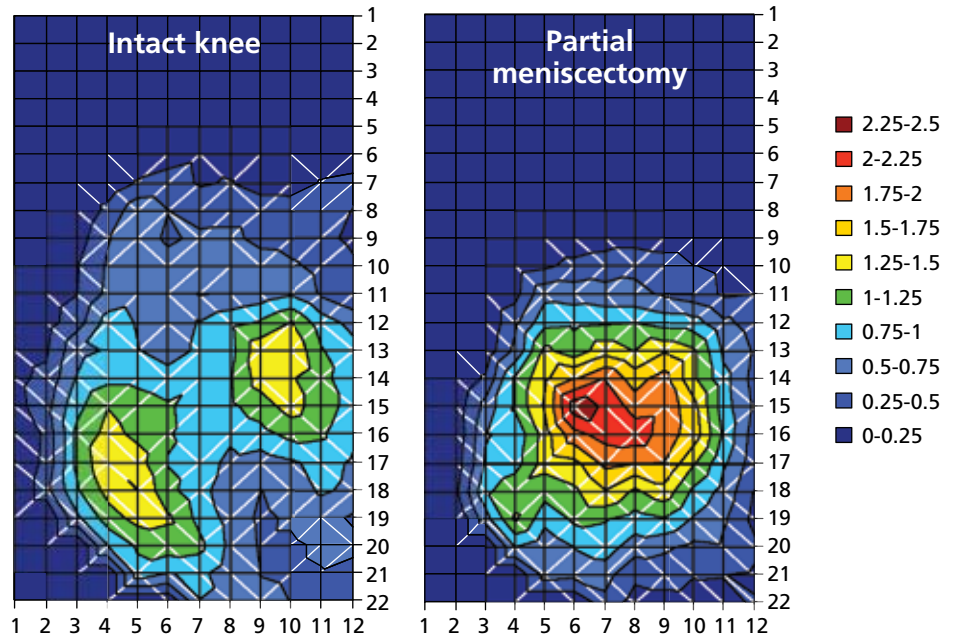
MRI images measure cartilage health after meniscal repair.

Imaging and Biomechanics

Hollis Potter, MD, Chief, Division of Magnetic Resonance Imaging in the Department of Radiology and Imaging and Director of Radiology and Imaging Research at HSS, specializes in musculoskeletal magnetic resonance (MR) research. She and her colleagues have developed techniques to non-invasively examine cartilage tissue. An MRI is essentially “a visual, objective, non-invasive microscope,” Dr. Potter explains. In the recent past, a surgical biopsy would have been required to diagnose disease in cartilage tissue. Now, MRI images can show if the cartilage is healthy.

MR can also objectively test new therapies. The FDA is increasingly requiring drug companies to use MR as a tool to assess the outcomes of new medications. “At HSS, we do clinically relevant research that will ultimately have an impact on patients’ lives,” says Dr. Potter.

With support from an NIH grant included in the American Recovery and Reinvestment Act of 2009 (See *In the News*), Dr. Potter, her co-Principal Investigator biomedical engineer



HSS biomechanical engineers develop color-coded models to show how injury and surgical treatments affect contact pressure on joint cartilage (higher numbers correlate with more pressure). Here, there is higher pressure on the knee cartilage with the partial meniscectomy. Scientists believe that increased pressure over time can lead to osteoarthritis.

Matthew Koff, PhD, and other scientists are exploring another important fibrocartilage tissue in the knee joint called the meniscus. By correlating MR images with the biomechanical and biochemical properties throughout the meniscus, Dr. Potter and her colleagues are building a predictive model to determine when patients will begin to lose function in this important load-carrying structure.

The ability to measure cartilage health through MRI is a boon for OA research. Cartilage damage can be detected long before symptoms are felt. Because meniscal transplants will fail if the articular cartilage is too worn, cartilage imaging helps surgeons determine when a transplant is necessary and also objectively measures when a meniscus is fully healed after surgery.

In this study and others, the role of the Hospital’s biomechanical engineers, who apply the principles of engineering to study the effects of loads on the skeletal system, is integral to OA research at HSS. Working with radiologists and surgeons, HSS engineers examine how injury affects the structure and function of the skeletal system, and help figure out why injury is a risk factor for developing OA.

Motion Analysis

Howard Hillstrom, PhD, is a biomedical engineer and Director of the Motion Analysis Lab at HSS, whose engineers, technologists, physical therapists and physician researchers conduct a wide range of studies on OA from the perspective of structure (body alignment) and function (e.g., standing and walking). Dr. Hillstrom explains that “we’re interested in how OA affects the neuromusculoskeletal system in terms of pain and function, and how treatments aimed to conservatively (i.e., with a brace) or surgically realign limbs can improve clinical outcomes.”

Physicians and physical therapists refer patients to the Motion Analysis Lab for comprehensive evaluations of how their bodies move in the context of their condition, physical limitations or disability. This information makes it possible for the medical team to devise the best, most personalized plan of treatment for each patient.

The lab, filled with high-tech electronic equipment, investigates mechanical factors that may play a role in the development of OA. Researchers study anatomy by measuring what happens to the body when it moves, with the goal of understanding how the relationships between joint alignment and body weight can influence the development of OA.



Biomechanical engineers in the Motion Analysis Lab test the effects of a knee brace on a patient with osteoarthritis.

Translational Research

While still a fellow, Lisa Mandl, MD, MPH, a rheumatologist and recipient of the Charles L. Christian Research Fellowship at HSS, noticed that many patients suffered from basal thumb arthritis, a painful condition with few existing treatment options: non-steroidal

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Recognition from Around the World

Kudos

Jessica Berman, MD, won the Physician/Scholarship Educator Award at the American College of Rheumatology conference for her innovative curriculum.

Carl Blobel, MD, PhD, Virginia F. and William R. Salomon Chair in Musculoskeletal Research, served as Chair of the 2009 Gordon Conference on Matrix Metalloproteinases held in Les Diablerets, Switzerland.

Richard S. Bockman, MD, PhD, was appointed to the Clinical Research Committee of the Federation of American Societies for Experimental Biology as a representative for The American Society of Bone and Mineral Research.

Adele Boskey, PhD, Starr Chair in Mineralized Tissue Research, received the Alfred R. Shands, Jr. Award from the Orthopaedic Research Society and the American Orthopaedic Association in recognition of her contributions to orthopedic research. The award was presented at the 56th Annual Meeting of the Orthopaedic Research Society in New Orleans.

Michelle Carlson, MD, along with her colleagues **Krystle Hearn, Timothy Wright, PhD**, and **Kate Meyers**, received a one-year Zimmer research grant from the Ruth Jackson Orthopaedic Society for “The Anatomy of the Collateral Ligaments of the Thumb MP Joint and Strength Testing of a New Reconstruct.”

Mary Crow, MD, Benjamin M. Rosen Chair in Immunology and Inflammation Research, was the Paul J. Bilka Endowed Lecturer at the Mayo Foundation. Dr. Crow also served as Chair of an NIH Study Section that reviewed the Grand Opportunities (GO Grants), proposals submitted for funding through the American Recovery and Reinvestment Act of 2009.

Doruk Erkan, MD, presented a lecture entitled “Cardiovascular Disease Prevention in Lupus and Antiphospholipid Syndrome”

at the 2nd Rheumatology Nurses Society Meeting held in Las Vegas, Nevada. Dr. Erkan was also an invited speaker at the 4th Greek-Turkish Rheumatology Days, held in Athens, Greece.

Mary Goldring, PhD, Ira W. DeCamp Fellow in Musculoskeletal Genetics, has been elected by the Orthopaedic Research Society as their 4th Vice President. This five-year leadership commitment culminates with the ORS presidency.

Steven Goldring, MD, St. Giles Research Chair, co-chaired the organizing committee for “Post-Traumatic Arthritis of the Knee: A Model for the Study of Osteoarthritis,” a meeting co-sponsored by HSS and the Arthritis Foundation held in Chicago, Ill. Presenters at the meeting included **Mary Goldring, PhD**, **Stephen Lyman, PhD**, **Hollis Potter, MD**, and **Scott Rodeo, MD**. Dr. Goldring will also serve as Chairman of the Basic Science Program Committee for the American College of Rheumatology Annual Meeting in 2010.

Jo Hannafin, MD, PhD, presented the keynote address “A Career as a Clinical Scientist: Medical Specialty Matters!” at the American Physician Scientist Association-New York Physician Scientists Program, held at Mount Sinai Medical Center.

Richard Herzog, MD, received the International Society for the Study of Lumbar Spine Research prize for his work entitled, “Does discography cause accelerated progression of degeneration changes in the lumbar disc: A ten-year cohort study.”

Chisa Hidaka, MD, received a one-year award from NIH/NIAMS in collaboration with Temple University to study “Evaluation of Cartilage Tissue Engineering Strategies by IR Imaging.”

John Kennedy, MD, received a grant to research “The Biomechanics of Cartilage Injury and Repair at the Ankle Joint” from the American Orthopedic Foot and Ankle Society to characterize mechanical conditions after ankle injury and repair with the goal of developing guidelines to improve surgical outcomes.

Dale Lange, MD, received a three-year award from the Muscular Dystrophy Association for “Lowering SOD1 in FALS with Pyrimethamine: Is response mutation specific?”

Thomas Lehman, MD, presented the main Oration for the Indian Society of Pediatric Rheumatology held in Nagpur, India.

David B. Levine, MD, received a lifetime achievement award from the Scoliosis Society. Oheneba Boachie-Adjei, MD, himself the recipient of the David B. Levine Endowed Clinical Research Chair, presented the honor.

Michael Lockshin, MD, chaired two sessions at the Annual European Congress of Rheumatology meeting of the European League Against Rheumatism in Denmark.

Dejan Milentijevic, PhD, received a \$175,000 NIH grant for his research “Leukocyte Adhesion Molecules Modulate Inflammation of Cartilage in Joint Trauma.”

Aldo Papone, Co-Chair, Board of Trustees, was presented with the prestigious Founders’ Award by the New York Chapter of the Arthritis Foundation.

Hollis Potter, MD, was appointed to the NIH/NIAMS Study Section reviewing grants for Ancillary and Complementary Research under the OA initiative.

Laura Robbins, DSW, Vice President for Education, received the Charles B. Harding Award for Distinguished Service from the Arthritis Foundation at its national meeting in Atlanta. The Harding Award is the Arthritis Foundation’s highest nationwide volunteer honor. Robbins is also a co-investigator for a new \$2 million National Institute on Aging Grant that will create the Cornell-Columbia Translational Research Institute on Pain in Later Life.

Scott Rodeo, MD, was an invited presenter at the recent Annual Meeting of the Arthroscopy Association of North America held in Palm Desert, CA, and a Visiting Professor at the University of Virginia.

Jane Salmon, MD, the Collette Kean Research Chair, served on the NIH/NIAMS Rheumatic Diseases Clinical Trials Roundtable and was the Pfizer Visiting Professor at University of Kentucky.

Peter Torzilli, PhD, served on an NIH/NIAMS Study Section reviewing proposals to the R03 Small Grant Program. He also presented a talk on osteoarthritis at the Distinguished Lecture Program in Biomechanical Engineering held at Stanford University.

Andrew Weiland, MD, was elected Vice-Chair of the American Foundation for Surgery of the Hand. He was also a Visiting Professor at Yale University.

Scott Wolfe, MD, and colleagues received an award for Best Paper at the annual meeting of the American Society for Surgery of the Hand for their work entitled “Augmentation of Zone II flexor tendon repairs.” Dr. Wolfe also presented the 53rd Annual Edward T. Smith Orthopedic Lectureship at the University of Texas Medical Branch, Houston and was an invited guest lecture at the American Association of Neuro-Electrodiagnostic Medicine.

Timothy Wright, PhD, the F.M. Kirby Chair in Orthopaedic Biomechanics, attended the Board of Specialty Societies meeting of the AAOS in Colorado Springs as the research representative of the Knee Society. Dr. Wright was also the Grand Rounds Speaker and the Research Fellows Award Invited Speaker for the Department of Orthopaedic Surgery at Mayo Clinic. Dr. Wright along with **Douglas Padgett, MD**, and colleagues in Biomechanics received an award as one of the two top scientific posters at the 19th Annual Meeting of the American Association of Hip and Knee Surgeons for “A study of retrieved mobile bearing knee replacements.” ●

For more information, please visit HSS on the Web at www.hss.edu

Osteoarthritis Research continued from page 7

anti-inflammatories, a cortisone shot, a splint, or surgery. Dr. Mandl is now involved with orthopedic surgeon Robert Hotchkiss, MD, Medical Director of Clinical Research and Director of Research for the Hand and Upper Extremity Service, as well as other HSS orthopedic surgeons and radiologists, in a randomized control trial to test whether an injection of a viscosupplement in the thumb (hyaluronan) will relieve symptoms without surgery.

Hyaluronan (HA) is a carbohydrate found in joint fluid. High levels of HA make the joint fluid a good lubricant and shock absorber. People with OA have lower levels of HA in their joint fluid. In this multidisciplinary study funded by the NIH, the Arthritis Foundation and an investigator-initiated grant from a maker of a hyaluronan product, HSS scientists investigate the efficacy of HA injections in the thumb. As part of this study and working with biomedical engineers in the Motion Analysis Lab and Cornell University, HSS scientists also use a specially designed device to measure treatment efficacy in the thumb.

Conclusion

The Hospital’s efforts in the area of OA are comprehensive. The research division supports clinical care areas by providing direct access to new research, including information about cartilage and inflammatory cells; the ability to identify early-stage OA in patients with sports injuries; and new treatments, braces, and prostheses. Regardless of their areas of specialization, HSS scientists share a commitment to helping our patients with OA, and people with OA around the world, move without pain. ●

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Our Physicians
**REPAIRING
SARA'S KNEE**

Scott A. Rodeo, MD

Dr. Rodeo is an NIH-funded clinician-scientist at Hospital for Special Surgery, with appointments in the Research Division and the Department of Orthopedic Surgery, where he is Co-Chief of the Sports Medicine and Shoulder Service. Dr. Rodeo is also associate team physician of the New York Football Giants and served as team physician for the 2004 and 2008 U.S. Olympic Teams.

Dr. Rodeo is a true clinician-scientist, and his attitude toward his work reflects the way re-

search is conducted at HSS.

"At HSS, research questions come directly out of clinical practice. When we see a problem, we go to the laboratory to study it. Our goal is to translate our findings back to patient care."

In treating Sara Wingate (see other side), Dr. Rodeo performed three surgical procedures, including an osteochondral allograft of fresh cartilage donor cells, to give her back her mobility. "Sara is an example of how osteoarthritis impacts people of all ages. In Sara's case and others like her, early intervention is key," Dr. Rodeo says.

Our Patients

SARA'S NEW YORK STORY

Sara Wingate

Sara's passion for fashion landed her a job in New York City, but that's not what originally led her to the Big Apple. "My situation was so complex that few doctors in Atlanta, where I'm from originally, would take my case," explains Sara, "that is when I turned to Hospital for Special Surgery."

In high school, Sara suffered a severe tear of her lateral meniscus which led to progressive osteoarthritis of her knee and several surgeries in Atlanta, including a meniscal allograft transplantation and cartilage replacement. When the transplant failed, she could no

longer perform everyday activities without help.

"I researched online for the top orthopedic hospital in the country and found HSS," recalls Sara. "My parents and I made the trip to see Dr. Rodeo."

Sara was put on the waiting list to receive donor bone and cartilage. After a year, a match was found. Sara was on her way back to HSS – and a new lease on life.

"After the long journey to get to where I am today, it's amazing to think that I can ice skate in Central Park."

