

# Discovery to Recovery

CLINICAL AND RESEARCH HIGHLIGHTS AT HSS | FALL 2012

HOSPITAL  
FOR  
SPECIAL  
SURGERY



## NIH Funds Research to Identify New Treatment Pathways

Hospital for Special Surgery scientists Adele Boskey, PhD, and Alessandra Pernis, MD, have received new NIH funding in 2012 to support their explorations into the how and why of bone and autoimmune disease. They conduct laboratory research that may be the first step in developing new treatments for patients. Both women have earned NIH funding in the past; their newest grants demonstrate the NIH's confidence in their work and the HSS research infrastructure.

The NIH currently supports research at HSS with multi-year grants of more than \$48 million (about \$13 million per year), helping to fund 48 studies covering a full spectrum of basic and clinical research aimed at improving bone, joint, and autoimmune health for patients. This is an especially impressive feat considering the current budgetary stress on the NIH.

"At HSS, all laboratory research is conducted with the patient in mind, and the NIH continues to recognize the accomplishments of our scientists in discovering how orthopedic and autoimmune diseases work. These prestigious new grants will bring us closer to better treatments and, in time, cures for bone and autoimmune diseases," says Steven R. Goldring, MD, HSS chief scientific officer and Richard L. Menschel Research Chair.

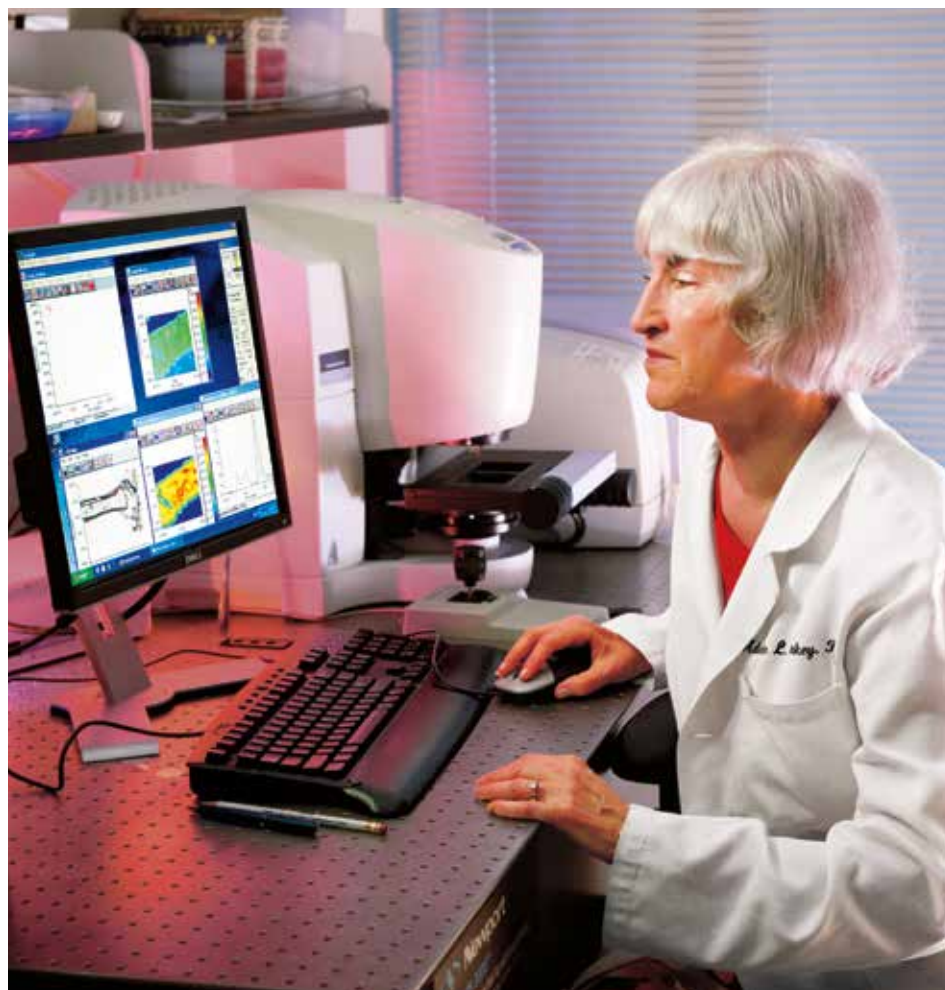
### Bone Chemistry Uncovered

Dr. Boskey, Starr Chair in Mineralized Tissue Research, has investigated bone chemistry at HSS since 1970. Her new grant is the seventh NIH grant for which she has been principal investigator.

Through their study of microscopic bone crystals, Dr. Boskey and her team have made groundbreaking discoveries about how healthy bone serves as the body's reservoir for calcium, learning that in healthy



bone a continuous rapid turnover of bone crystals in the hard part – and collagen in the soft, inner part – of the bone regulates the body's calcium. In bone with osteoporosis or other disorders, this equilibrium becomes interrupted and the body removes more of the bone crystals



Adele Boskey, PhD, (above) has advanced the science of bone chemistry since she joined HSS in 1970. Her current work may lead to new therapies for bone disease.

Alessandra Pernis, MD, (left) studies immune cells, moving towards new treatment options for patients with rheumatoid arthritis, lupus, and other autoimmune diseases.

and collagen than it is able to re-deposit, resulting in porous bone that is prone to fracture.

### Measuring Crystals with Light

Dr. Boskey and her team developed a method of measuring the quality of bone crystals for diagnostic purposes with infrared spectroscopy (in above photo), in which a light beam is shined onto the molecules in biopsied tissues and vibrations are reflected back, producing color images that illustrate bone quality.

Spectroscopy has proven an invaluable research tool to measure the effects of new medications aimed to improve bone health, and has led to key findings on the effects of bisphosphonates and vitamin D.

### The Importance of Disordered Proteins

Dr. Boskey's newest NIH grant supports her team's current study of collagen, the most abundant protein in the body and the matrix upon which bone crystals are

deposited. She is investigating whether the collagen itself is directing new bone formation, or if it's the interaction between collagen and non-collagenous proteins that creates new bone mineral. Dr. Boskey hypothesizes that it may be both, since she has evaluated animal models in which the removal of non-collagenous protein has led to dramatic bone change and even serious bone disease.

Many of these non-collagenous proteins lack a defined structure, and are referred to as "intrinsically disordered proteins" (IDPs). Dr. Boskey postulates that the IDPs are able to interact flexibly with collagen, minerals, and cells depending on the bone's greatest need at the time.

### Helping Patients Get Well

Findings from this research may have a profound impact on the treatment of diseases, including osteogenesis imperfecta, in which physicians already know which proteins do not bond correctly. In these cases, it may ultimately be possible to perform site-specific IDP injections to stimulate bone formation. "If we're correct, there will be many therapeutic options for all kinds of bone diseases associated

*Continued on page 6*

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# Reaching New Heights Together

Hospital for Special Surgery is preparing to celebrate its 150th anniversary next year, and we continue to achieve new heights in performance. In July, we were once again ranked #1 in orthopedics and ranked #3 in rheumatology by *U.S. News & World Report*. For 22 consecutive years, HSS has been among the top-ranked hospitals in these specialty areas.



Why is HSS so successful? At the core of what makes us special is our strong culture with defined values. All 4,000 employees collaborate every day towards the shared goal of helping our patients move without pain. HSS is the only academic medical center in the world focused exclusively on orthopedics and rheumatology. As a specialty hospital, we are able to focus without distraction on orthopedics, rheumatology, and their related specialties; our physicians and scientists are true experts in their fields. As such, they achieve outstanding results for our patients.

This expertise draws high volumes of patients from across the country and around the world, which in turn increases our expertise, further improving patient outcomes. Our patient volume has grown more than 36 percent in the past four years. In 2011, our surgeons performed nearly 26,000 orthopedic procedures with more than 300,000 outpatient visits.

This issue of *Discovery to Recovery* includes a new study on ACL surgery that once again shows that performing more surgeries leads to better results. You will read about our efforts to improve joint replacement for patients through registries – databases that now enroll 84,000

HSS patients. This high number of enrollees enables findings to emerge quickly, immediately benefiting patients.

You will learn about the Lerner Children's Pavilion, a new child-centered hospital-within-a-hospital that will open its doors this fall, as well as the work of our Women's Sports Medicine Center, which is celebrating its fifteenth anniversary of caring for active women through research, prevention, and surgical and non-surgical treatment. Regardless of our patients' age or diagnosis, we aim to provide personalized, patient-centered care, and our research supports this goal.

We highlight two new NIH grants that help fund HSS scientists' quest toward innovative therapies for bone and autoimmune disease. Through all stages of their careers, our scientists work together with clinicians to improve patient outcomes. Research questions at HSS often originate from physicians' work with patients and their desire to help them achieve the best possible results.

At HSS, scientists are in constant communication with clinicians. This is as it should be in a dynamic academic medical center, where scientists and physicians learn from each other and their patients. What makes research at HSS so extraordinary is the seamless collaboration between physicians and scientists, who work together on a daily basis to improve treatment options and results for patients.

Louis A. Shapiro  
President and CEO

Thomas P. Sculco, MD  
Surgeon-in-Chief

Steven R. Goldring, MD  
Chief Scientific Officer

## News & Notes

# Chief Scientific Officer to Hold Richard L. Menschel Research Chair

Steven R. Goldring, MD, chief scientific officer, has been named the first holder of the Richard L. Menschel Research Chair at Hospital for Special Surgery. A gift of \$5 million from an anonymous donor will permanently endow the position of the Hospital's chief scientific officer.



Chief Scientific Officer Steven R. Goldring, MD, (left) with HSS Chairman Emeritus Richard L. Menschel

This chair honors Richard L. Menschel, HSS chairman emeritus and a senior director at The Goldman Sachs Group, L.P., who has been a vital proponent of the Hospital's focus on research and has provided leadership for the HSS Research Division. Dr. Goldring is committed to supporting programs and investigators that translate basic research into new therapies for people with mobility disorders.

"Extraordinary advances in medicine can be accomplished when there are partnerships between visionary leaders like Richard Menschel and scientific innovators like Dr. Steven Goldring," says Louis A. Shapiro, HSS president and CEO.

Dr. Goldring is a strong advocate of the physician-scientist. He has led the recruitment of talented scientists in the areas of arthritis and tissue degeneration; autoimmunity and inflammation; musculoskeletal integrity; and tissue engineering, regeneration, and repair.

"I am truly honored to be the first holder of the Richard L. Menschel Research Chair," says Dr. Goldring. "I began my career as a clinician, but I was also fortunate enough to be in an environment that supported and promoted the great importance of research. While our focus is how best to define disease mechanisms, the ultimate goal is to apply what we learn to patient care."

"A priority for any first-rate medical institution is to have a world-class research program," says Mr. Menschel. "Dr. Goldring has led HSS into a new era of clinical and translational research."

The ultimate goal of Dr. Goldring's research is to develop more effective approaches for some of our most difficult-to-treat orthopedic disorders, including osteoporosis, rheumatoid arthritis, and osteoarthritis. His research focuses on understanding the cellular and genetic mechanisms involved in the regulation of bone remodeling – the process of bone recycling that occurs normally in the body, but is often impaired and altered in certain bone disorders. ●

## HSS Pediatrics: Helping Children Move

Since its founding in 1863, HSS has been committed to the treatment and rehabilitation of children. Today, HSS has a national reputation as a destination for the treatment of complex pediatric bone, joint, and autoimmune conditions, including scoliosis and spinal deformity, limb deformity, sports injuries, cerebral palsy, and juvenile rheumatoid arthritis.

A team of 20 renowned pediatric orthopedic surgeons, rheumatologists, anesthesiologists, and pediatricians collaborate with radiologists, nurses, therapists, social workers, and case managers to create an unparalleled continuum of care for children.

Approximately 18,000 pediatric patient visits took place and 2,550 pediatric surgeries were performed in 2011. To provide the highest quality care for children and adolescents, HSS will open the new Lerner Children's Pavilion in late 2012.

This "hospital-within-a-hospital" will create a child-centered

environment that was designed specifically to meet the needs of children and their families. "HSS doctors have been involved with every step of planning the new Pavilion," says Roger F. Widmann, MD, chief of Pediatric Orthopedic Surgery at HSS. "The space is custom-designed to support our uniquely collaborative approach to exceptional patient care."

With more than 31,000 square feet spanning two floors, the Pavilion's inpatient facilities will include ten private patient rooms with in-room accommodations for parents, in-room medical technology, and a dedicated nursing station with a direct view of every room. Outpatient facilities will include 17 exam and treatment rooms, an expanded pediatric imaging suite, physician offices, and a modern Conference and Education Center.

In November 2011, HSS launched the first stage of the Pavilion with the opening of the CA Technologies Rehabilitation Center. ●





## Supporters of Our Success



## Gift Creates Mary and Fred Trump Institute for Implant Analysis

Judge Maryanne Trump Barry, Donald Trump, Robert Trump, and Elizabeth Trump Grau have generously given Hospital for Special Surgery a \$1 million gift in support of and to name the Institute for Implant Analysis in honor of their parents, the late Mary and Fred Trump. The Mary

and Fred Trump Institute for Implant Analysis aims to advance the way joints are reconstructed to further improve the quality of life for millions of joint replacement patients around the world.

Mary and Fred Trump were grateful patients of Philip D. Wilson, Jr., MD, an orthopedic surgeon at

The Trump family, Surgeon-in-Chief Thomas P. Sculco, and Surgeon-in-Chief Emeritus Philip D. Wilson, Jr., MD, at the new Mary and Fred Trump Institute for Implant Analysis.

HSS and surgeon-in-chief from 1972 to 1989. The Trumps made a commitment of \$1 million to the Hospital in honor of their parents and in recognition of Dr. Wilson's 91st birthday.

"Receiving this donation on behalf of the Hospital is the most important and meaningful birthday gift I could have ever hoped for," said Dr. Wilson, who has been an orthopedic surgeon at HSS for 60 years. "It means that countless people suffering from painful and disabling joint disorders, and who are in need of new medical treatments, will be the ultimate benefactors of the Trump family's generosity."

Translating discoveries in the laboratory to improve patient care has been a hallmark of Hospital for Special Surgery's Department of Biomechanics for decades, starting with the design and fabrication of the first practical knee implant in the early 1970s. The Hospital's Institute for Implant Analysis, under the direction of Timothy

Wright, PhD, F.M. Kirby Chair in Orthopaedic Biomechanics, and Douglas Padgett, MD, chief of Adult Reconstruction and Joint Replacement, has been at the forefront of implant research and design, helping to better treat the pain and disabilities associated with aging and worn joints.

"Our surgeons perform an exceptionally large volume of joint replacement surgeries, nearly 8,400 each year," said Thomas P. Sculco, MD, surgeon-in-chief. "The new Mary and Fred Trump Institute for Implant Analysis will allow us to accelerate patient-oriented research to enhance the mobility and quality of life for countless current and future joint replacement patients."

The Institute has the largest collection of retrieved joint replacements in the world, and has maintained a registry for nearly 34 years.

"Thanks to the generous support of donors like the Trump family, Hospital for Special Surgery is able to offer patients the highest level of orthopedic care and to continue to lead in translating research into cutting edge treatments," said Louis A. Shapiro, president and CEO. ●

## Research Breakthroughs

### Investigating Metal-on-Metal

A new HSS study provides the first comprehensive look at just how some metal-on-metal total hip replacements fail in patients. In the study, presented at the 2012 Annual Meeting of the American

Academy of Orthopaedic Surgeons, scientists analyzed 46 failed metal-on-metal hip replacements. Made possible by the largest archive of failed implants in the country, the research should help doctors develop a better hip replacement prosthesis for future patients.



This image of a retrieved cup from a failed metal-on-metal implant maps the wear damage – colors toward the bottom of the scale (closer to black) correlate with the most wear.

Academy of Orthopaedic Surgeons, scientists analyzed 46 failed metal-on-metal hip replacements. Made possible by the largest archive of failed implants in the country, the research should help doctors develop a better hip replacement prosthesis for future patients.

The most common diagnoses were wear-related concerns such as dissolving bone and adverse soft tissue reactions. Ninety-eight percent of the implant cups and 93 percent of the heads showed moderate to

severe scratching. Forty-three percent of the cups and 67 percent of the heads had moderate to severe pitting.

"This paper is the first step towards understanding what the problems are with metal-on-metal joints. Information gleaned from the study should be useful as well in improving metal-polyethylene implants, the most common hip implant today," says co-author Timothy Wright, PhD, F.M. Kirby Chair of Orthopaedic Biomechanics. "The study suggests that the physical design of the implant might play a role in the failed metal-on-metal implants and not the metal itself."

In recent years, advances in materials have allowed implants with bigger heads to be used, which increases stability, but now evidence suggests this may cause other problems. "What we learn about the effect of head size and positioning, and what we learn about the biologic reaction to metallic debris, is going to help us understand problems in general with joint replacements," says co-author Douglas Padgett, MD, chief of the Adult Reconstruction and Joint Replacement Division at HSS. "A follow-up analysis using high-resolution laser profiling to quantify damage is in process."

Findings will help doctors and scientists improve implant design. ●

### Steep Learning Curve for ACL Surgery

Providing further evidence that practice makes perfect when it comes to surgeries, a new study of anterior cruciate ligament (ACL) reconstruction finds that patients who have their ACL reconstructed by surgeons who have performed fewer than 60 surgeries are roughly four to five times more likely to undergo a subsequent ACL reconstruction.

"We may not be training our sports medicine specialists well enough to perform this complex procedure if the learning curve is still this steep after finishing their fellowship," says senior author Stephen Lyman, PhD, director of Epidemiology and Biostatistics at HSS, who presented the study at the 2012 annual meeting of the American Academy of Orthopedic Surgeons.

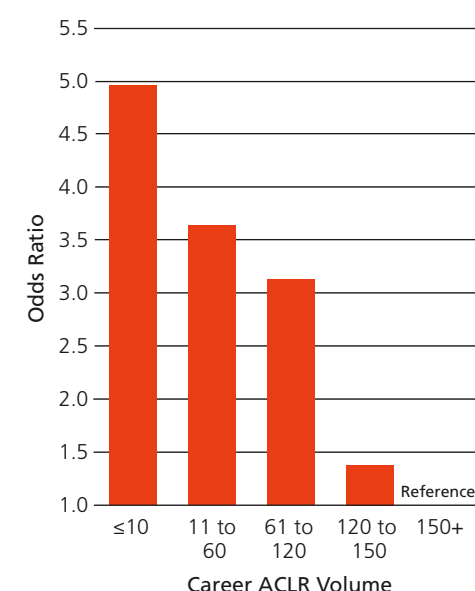
The findings come from an analysis of a New York State Department of Health database. The study includes all ACL reconstructions performed between 1997 and 2006 by surgeons who performed their first reconstruction in 1997 or later.

Controlling for patient factors such as age and comorbidities, the scientists examined whether there was an association between a patient having a subsequent ACL surgery and how many cases a surgeon had performed: 10 or fewer, 11-60, 61-120, or 121-150.

For many procedures, surgeons are expected to gain clinical competency after 10 cases, but the investigators identified a much steeper learning curve for ACL reconstruction. For example, if a patient fell between case 11 and 60 of a surgeon's career, they were 3.7 times more likely to have a subsequent surgery than if they fell in a case over 150.

"Although fairly routine, ACL reconstruction is a complex procedure that has many potential pitfalls," says Robert Marx, MD, an attending orthopedic surgeon on the HSS Sports Medicine and Shoulder Service and co-author. "While the relationship between surgical volume and outcome has been well established, these data indicate that we need to continue to improve the way we train surgeons." ●

#### ACL Reconstruction



Patients of surgeons who have performed a high volume of ACL reconstructions are less likely to require additional surgery.



# THE PER

## HAPPENINGS AROUND THE HOSPITAL



### Inspiring Tomorrow's Leaders ▲

Since 2010, a group of HSS female surgeons and engineers has partnered with The Perry Initiative of the University of California at San Francisco. This project introduces high school women to the wonders of orthopedic medicine and biomechanical engineering through a day-long program that offers hands-on workshops, model surgeries, and lectures. Women now represent only seven percent of working professionals in the fields of orthopedic surgery and engineering. The doctors and scientists who participate as mentors in The Perry Initiative hope to inspire talented young women to enter these professions. "I have the greatest job in the world. I fix bones so people can enjoy active lives without pain. I want young women to know this is a real option for them, too," says orthopedic surgeon Shevaun Doyle, MD, who leads the program at HSS.



### New Technology to Treat Sports Injuries >

A team of HSS scientists led by biomechanical engineer Suzanne Maher, PhD, was the 2012 winner of the New York Investment Fund's highly competitive BioAccelerate Prize, a citywide competition for a grant to help scientists move their research to the marketplace. The HSS team has developed a novel synthetic cartilage implant to replace cartilage damaged in common sports injuries, such as torn menisci and anterior cruciate ligaments (ACLs). The implant is designed to closely mimic healthy cartilage, allowing athletes to return to sport at high levels of play. It will also slow or prevent the development of osteoarthritis. "This award will help us bring our research a step closer to reality for the estimated 500,000 Americans who undergo surgery for cartilage injury each year," says Dr. Maher.

### The Promise of Genomics >

HSS recently entered into a landmark partnership with 11 other academic medical centers and research universities to form the New York Genome Center (NYGC), likely to become one of the largest genomic facilities in North America upon its opening in 2013. An advanced study of the human genome, all of a person's genetic material or DNA, has the potential to significantly advance human health.



This collaboration will afford HSS scientists unprecedented access to the latest DNA sequencing technology and the expertise of a large cadre of specialists in bioinformatics and computational biology. "This is an exciting opportunity for HSS to access a new science," says Lionel Ivashkiv, MD, associate chief scientific officer. "Our scientists will benefit from having the capacity to extend and elevate their research, while our patients will benefit from the discovery of new therapies."



# DUALSSE

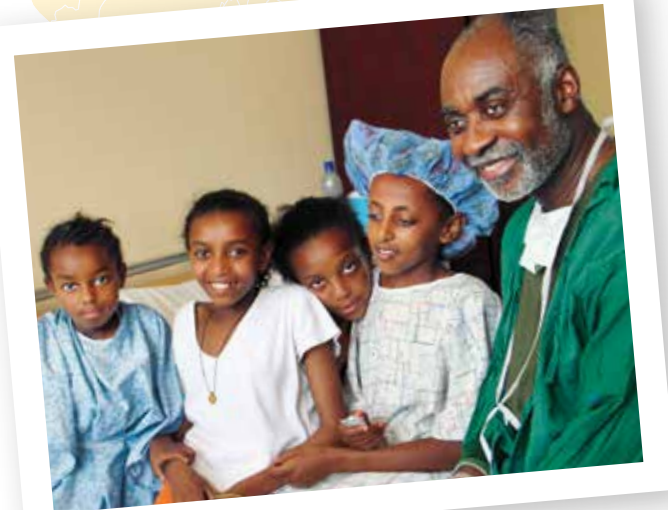
## HSS Partners with Healthcare Leader in Brazil >

With the world focused on Brazil meeting the challenges of the international sports community for the 2016 Summer Olympics and the 2014 FIFA World Cup, a leading Brazilian managed healthcare provider is looking to orthopedic powerhouse HSS as an educational partner. HSS is collaborating with Amil Par, the largest, most widely-recognized and respected managed healthcare organization in Brazil, to provide educational expertise in connection with the opening of its new orthopedic center, Hospitalys, in Rio de Janeiro, the host city of the Games. Hospitalys opened its initial phase earlier this year, with specialization in spine disorders, joint replacement, and sports medicine, orthopedic areas for which HSS is renowned.



## Ghana's New FOCOS Orthopedic Hospital >

On April 28, 2012, members of HSS staff celebrated the official opening of the new FOCOS Orthopedic Hospital in Accra, Ghana, a 50-bed specialty hospital providing comprehensive orthopedic and rehabilitative services for adult and pediatric patients in Ghana and the West African region. Oheneba Boachie-Adjei, MD, chief of the Scoliosis Service at HSS and founder and president of the Foundation of Orthopedics and



Complex Spine (FOCOS), worked with a pioneering team of international volunteers, including colleagues at HSS, to make this hospital in his native Ghana a reality. "In addition to providing orthopedic services for those who would not otherwise have access to such care," says Dr. Boachie, "FOCOS aspires to make this new hospital the premier orthopedic teaching hospital in Sub-Saharan Africa, educating and training future orthopedic surgeons to serve the country and Sub-Saharan region."

## HSS Will Celebrate 150 Years >

2013 will mark the 150th anniversary of Hospital for Special Surgery, founded by Dr. James Knight during the Civil War in 1863. The Hospital archives contain many original photos and artifacts. Here are just a few – watch for many more as we celebrate our accomplishments next year. In 1912, the Hospital moved to its third location (top) on East 42nd Street to make way for the construction of Grand Central Terminal. In the 1940s, HSS became a treatment center for the widespread polio epidemic, offering the most up-to-date rehabilitation therapies (bottom left). Also pictured is a handwritten patient log from the Hospital's first years of operation (bottom right).





## An Evolution in ACL Treatment

**A**nterior cruciate ligament (ACL) injuries are one of the most frequent injuries in many sports, including football, soccer, and basketball. The ACL is part of a complicated network of tendons and ligaments that help stabilize and support the knee.

Orthopedic surgeons at HSS have made significant contributions to the understanding, prevention, and treatment of ACL injuries. “In the 1960s and 1970s, ACL injuries were often missed diagnostically, treated relatively poorly, or not treated at all,” says Surgeon-in-Chief Emeritus Russell F. Warren, MD, who has been the New York Giants team physician for the past 30 years. “Physicians didn’t know enough about the ligament. In fact, there was an ongoing debate as to whether the ACL played a significant role in the knee and whether to fix it at all.” Today, thanks to increased knowledge, more accurate examinations, and advanced imaging technology, physicians can diagnose ACL injuries earlier and more accurately.

### Treatment

While an ACL injury once may have ended an athlete’s career, today doctors are able to successfully manage and treat the injury to allow most players to return to sports. Early methods of surgery involved repairing the ligament or using a synthetic material to replace the ligament, but the failure rate was very high. Today, the most common corrective procedure for this injury is ACL reconstruction, which involves replacing the entire ligament with a tendon graft.

“There’s been an evolution in the way the ligament is reconstructed,” says Scott A. Rodeo, MD, co-chief of the Sports Medicine and Shoulder Service at HSS and associate team physician for the New York Giants. “Today, the results of ACL surgery are good, and we can reproduce knee stability so that patients can get back to high level sports,” he explains. “Moving forward, one of the biggest challenges is to understand why, despite successful ACL surgery, many patients develop arthritis in the knee years down the road. The next frontier for physician-scientists is to identify how we can prevent those late degenerative changes,” says Dr. Rodeo.



Russell F. Warren, MD, consults with a player at Super Bowl XLVI.

### Rehabilitation

Rehabilitation after ACL surgery has also undergone a dramatic shift in the last three decades, and is still evolving as more information emerges about the ideal amount of motion following surgery. In the 1970s, athletes were required to wear a cast and not move their leg for six weeks following ACL surgery. When the cast was removed, the knee joint was very weak and stiff. “We now know that a knee that lacks motion has a greater propensity to get arthritis,” explains Dr. Warren, “so achieving motion right away is important to try to prevent that.”

In more recent years, physicians have also begun to understand how mechanical load on the knee (i.e., how much weight you put on it) affects graft healing. “For many years the push was for more and more aggressive rehabilitation,” explains Dr. Rodeo. “However, today we’ve learned that excess motion may actually impair early graft healing. As a result, rehabilitation for ACL continues to evolve to ensure proper healing.”

For the tens of thousands of people in the United States who may tear their ACL this year, their prognosis is positive for returning to an active lifestyle. ●

### NIH Funds Research to Identify New Treatment Pathways continued from page 1

with either abnormal collagen or abnormal non-collagenous protein,” says Dr. Boskey. “We do the basic science so that later pharmacologists can develop an intervention to help patients restore good bone health.”

Throughout her career at HSS, Dr. Boskey has trained a cadre of successful scientists, one of her proudest accomplishments. She appreciates the collaborative culture of research at HSS. “Physicians and scientists do not work in silos here,” says Dr. Boskey. “One of the best things about HSS

is going to a staff conference and listening to what someone else is saying and getting a new idea about how it relates to your work. We elevate each others’ work by working together,” she says.

### Targeting Autoimmunity

Alessandra Pernis, MD, the first holder of the newly established Peter Jay Sharp Chair in Lupus Research, joined HSS from Columbia University in 2009, transferring her NIH funding for which she was principal investigator. Dr. Pernis’s work

focuses on investigating how lupus, rheumatoid arthritis, and other autoimmune diseases work, with the goal of moving closer to better treatment options for patients. Her newest and fifth award from the NIH will allow her and her team to continue their investigations of the immune system.

The daughter of a renowned immunologist who discovered B cells, the immune cells that produce antibodies, Dr. Pernis says: “I was the only six-year-old in the world who knew I did not want to be an immunologist.” She changed her mind during a fellowship following medical school, where she was drawn to basic science in part because of the creative thinking that is so essential to being a scientist.

### T Cells Rock

Dr. Pernis’s work is focused on investigating the activation of mature T lymphocytes, powerful immune system regulators. “Understanding how T cells work will lead to targeting them to find new treatments for patients,” says Dr. Pernis.

Previous research has found that a type of protein called a kinase can play a key role in controlling the function of a cell. Dr. Pernis and her team have examined the role of a specific kinase called ROCK2 for short. They have learned that ROCK2 seems to regulate the function of T cells in mice with lupus, who get better when the kinase is

inhibited. They have also found that this kinase can control the function of T cells in other autoimmune diseases. Dr. Pernis’s newest NIH grant will support her investigation into ROCK2 as a regulator in a model of autoimmune arthritis similar to rheumatoid arthritis (RA).

Dr. Pernis hopes that ROCK2 will be a key player in new pharmaceutical therapies for many autoimmune diseases, including lupus and RA. Statins, medications commonly used to lower blood pressure, are known to interfere with this kinase. Therefore, part of Dr. Pernis’s grant will fund testing statins on mice with RA. With additional funding, Dr. Pernis hopes to conduct a similar study on lupus in the future.

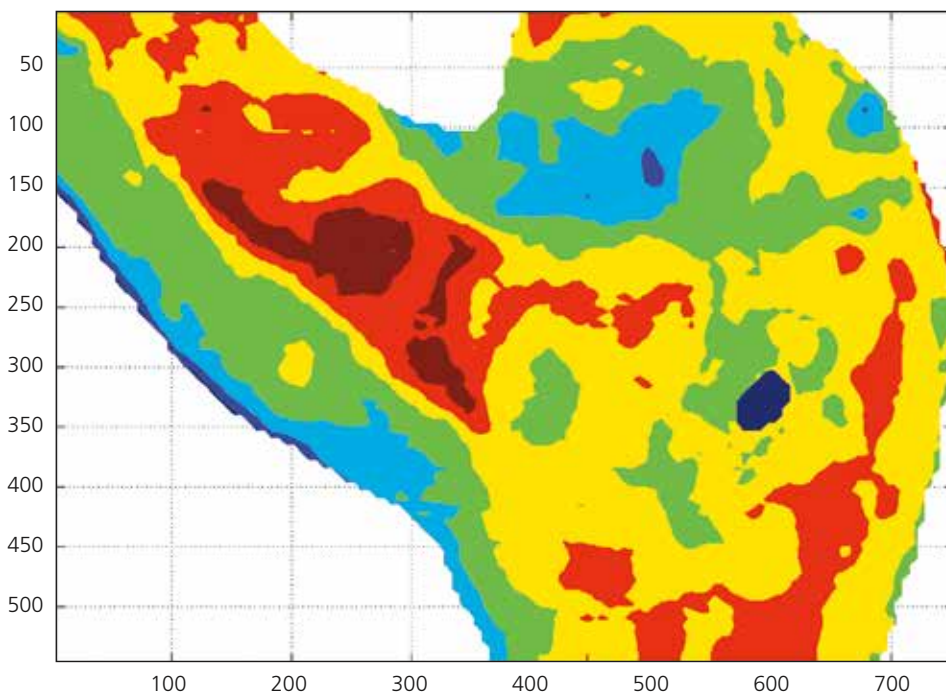
### Back to the Patient

Dr. Pernis works closely with clinicians in the Mary Kirkland Centers for Lupus Care and Research, where a pilot project is currently underway to measure the levels of kinase in people with lupus. Eventually, she would also like to track whether levels of kinase increase during lupus flares.

“HSS is special because bench research can be translated to the bedside seamlessly. There is true collaboration between laboratory scientists and clinicians,” says Dr. Pernis. “We are all committed to helping patients live full and active lives.” ●

### Distribution of Mineral Content in Human Bone

In micrometers



Infrared spectroscopy allows scientists to map the quality of bone mineral for early diagnosis and treatment of bone disorders such as osteoporosis.



# Registries Advance Patient Care

For almost 150 years, HSS physicians and scientists have developed new orthopedic devices and treatments to help patients live the most active lives possible. In the 1960s and 70s, we pioneered the modern artificial knee replacement, developing design concepts and surgical techniques that are now used throughout the world. Back then, investigating how well patients did with a new implant meant manually combing through patient charts and entering data into spreadsheets.

Today, electronic databases called patient registries have vastly improved the way clinical research is conducted at HSS – 84,000 people have been enrolled across 43 registries focused on specific diseases or treatments. Tracking thousands of patients over time through questionnaires and office visits allows researchers to gather valuable information about how well patients are doing months and years after the initial injury, surgery, or diagnosis, answering questions about a specific implant, procedure, or patient characteristic with speed and efficiency, so that physicians can continue to provide patients with the safest, most effective treatment options. “Our registries allow our surgeons to gain a better understanding of what works best for our patients. This information guides practice decisions and allows us to continuously improve patient care,” says Thomas Sculco, MD, surgeon-in-chief.

## Total Joint Registries: Current Findings

HSS’s total joint replacement registries are the Hospital’s largest, enrolling more than 20,000 patients. Douglas Padgett, MD, chief of the Adult Reconstruction and Joint Replacement Division (ARJR), says: “The only way to really know what patients’ outcomes are after surgery is to follow large groups of patients in a registry. HSS now has a rigorous infrastructure in place to collect data about every hip and knee replacement patient, and how they are doing over time. When a patient enrolls in a registry, our goal is to keep in touch with them over the long-term, to really understand how we have helped them achieve their goals, and how we could improve.”

HSS is uniquely situated to study joint replacement outcomes because our surgeons perform more than 8,000 joint replacements per year – more than any other hospital in the United States.

## Squeaky Hips

Registry data enable surgeons to evaluate how well patients do with a specific type of implant. For example, surgeons recently noticed that a small percentage of patients with ceramic-on-ceramic hip implants (in which both implant parts – the ball and socket – are made of ceramic) complained of a “squeaking” sound coming from their hips. While the squeak was not accompanied by pain or discomfort, it was embarrassing. Because squeaking is uncommon following hip replacement, a team of ARJR surgeons led by Geoffrey Westrich, MD, co-director of Joint Replacement Research at HSS, investigated if these implants were also associated with increased complications.

Because 364 patients with ceramic-on-ceramic implants were enrolled in the ARJR registry, the surgeons were able to achieve significant findings in less than a year. To complete this study, a “noise survey” was simply added to the usual registry questionnaire.

The study found excellent results associated with these implants, with patients moving comfortably and with less pain. In addition, fewer than two percent of patients reported a squeak. While ceramic-on-ceramic implants have become less popular over time, this research confirmed them as an excellent choice for appropriate patients.



Registries contain data on how specific types of implants and procedures work over time, including hip implants like this one, in which both the ball (left) and socket (top) are ceramic.

patients who had joint replacements at HSS, they discovered that women were significantly more likely to live alone, experience severe pain, and have limited activity prior to surgery, placing them at possible increased risk for complications and worse outcomes following surgery.

The authors see these findings as a call-to-action to educate patients about their options so they will seek help sooner. “When women live alone, they might wait until they suffer from severe pain and disability before getting the surgery they need, putting themselves at greater

patients and physicians report post-surgical complications in the same way. They wanted to find out if patients know what to expect in their post-surgical experience, since previous research has shown that patients with realistic expectations achieve better results following surgery. They also had questions about the accuracy of patient-reported data. The new HSS studies, published in the *Journal of Arthroplasty*, involved 3,278 knee and 3,976 hip replacement patients. Whenever a patient reported a complication in their registry questionnaire, a physician followed up with a chart review, a clinical exam, and a review of the patient’s x-rays.

Patients and physicians reported most complications similarly, pointing to how well most patients understand what normal side effects and complications to expect after surgery. However, patients over-reported “major bleeding,” sometimes confusing a normal

post-surgical level of bleeding or bruising with this more serious complication.

These studies point to the continued importance of patient education, physician-patient communication prior to total joint replacement surgery, and constant refinement of the methods used to gather registry data. “We need to continue to take the time to educate patients about what to expect after surgery as part of the normal healing process,” says HSS surgeon and study co-author Michael Alexiades, MD.



HSS surgeons use registry findings to improve patient care.

## When Women Wait

A grant from the Agency for Healthcare Research and Quality was used to support the expansion of the ARJR registries to include self-reported information from patients about how they were feeling (e.g., “How easily can you go up and down stairs?” and “How much pain do you have?”).

Dr. Westrich and his team recently analyzed these unique self-reported data. Looking at 5,945

risk. The more fit someone is before surgery, the easier their follow-up therapy is going to be,” says Dr. Westrich. “We need to reach out to people and tell them – if you have arthritis, if you’re suffering, don’t wait. Even if you live alone there are options for rehabilitation that will work for you.”

## Aligning Expectations

HSS surgeons recently used registry data to learn whether

## Improving Care for Patients

Registries allow our doctors and scientists to identify long-term trends and quickly evaluate how well patients do with a specific implant or surgery. These findings help drive the way we practice medicine, since providing patients with the best results is always our top priority. ●



## Recognition from Around the World

### Kudos

**Adele Boskey, PhD**, Starr Chair in Mineralized Tissue Research, received a new two-year grant from the National Institutes of Health (NIH)/National Institute of Dental and Craniofacial Research to study “Noncollagenous Protein Interactions and Biomineralization.”

**Mary K. Crow, MD**, Joseph P. Routh Professor of Rheumatic Diseases in Medicine, was an Invited Participant at the NIH/National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) Annual Intramural Retreat; served as Chair of the NIAMS Centers of Research Translation P50 Review Committee; and served as Chair of the Alliance for Lupus Research Annual Investigators’ Scientific Meeting.

**Austin T. Fragomen, MD**, received the Alpha Omega Alpha Society Alumni Membership Award, presented by Downstate Medical College.

**Mary B. Goldring, PhD**, Ira W. DeCamp Fellow, and **Steven R. Goldring, MD**, Richard L. Menschel Research Chair, served on the review panel for the United Kingdom “Centre of Excellence: Pathogenesis of Osteoarthritis” program grants; and were invited speakers at the Advances in Mineral Metabolism in Aspen, CO.

**Steven R. Goldring, MD**, served on the review panel for the American College of Rheumatology-Research Education Fund Investigator-Initiated Grants; and was a speaker at the Targeted Therapies Meeting in Baveno, Italy.

**Jo Hannafin, MD, PhD**, participated in a multidisciplinary “Chronic OA Management Initiative” meeting sponsored by the U.S. Bone and Joint Initiative as a representative of the American Orthopaedic Society for Sports Medicine; and attended the FISA Medical Commission meeting in London, England, in preparation for the 2012 Olympic Games.

**Xiaoyu Hu, MD, PhD**, served as an ad hoc member of the NIH Atherosclerosis and Inflammation in Cardiovascular Systems Study Section.

**Carl Imhauser, PhD**, received a new one-year Small Business Innovation Research Program award from the NIH/National Library of Medicine in collaboration with Techno-Sciences, Inc., for “Development of a Clinical Robotic Device for Diagnosis, Rehabilitation, and Treatment-Prediction of Knee Injuries.”

**John Kennedy, MD**, received a new one-year grant from Arterioocyte to study “The effect of PRP on Autologous Osteochondral Grafts: A Rabbit Model.”

**Matthew Koff, PhD**, has been elected Secretary of the Musculoskeletal Study Group of the International Society for Magnetic Resonance in Medicine.

**Theresa Lu, MD, PhD**, received a new three-year Novel Research Grant award from the Lupus Research Institute to study the “Mechanism of UV-Induced Skin Inflammation.”

**Suzanne Maher, PhD**, was named a 2012 winner of the BioAccelerate NYC Prize for her project “A Novel Hydrogel for Focal Cartilage Defect Repair.” The team also included **Russell Warren, MD, Hollis Potter, MD, Peter Torzilli, PhD, Timothy Wright, PhD, Scott Rodeo, MD**, and **Tony Chen, PhD**. Dr. Maher also was the Keynote Speaker at the International Symposium on Arthroscopic Cartilage Surgery and Related Research of the Taiwan Arthroscopy and Knee Society.

**Stavros G. Memtsoudis, MD, PhD, Nigel E. Sharrock, MB, ChB, Spencer S. Liu, MD**, and **Yan Ma, PhD**, were part of the team to win the Translational Science 2012 Team Science Award from the Society for Clinical and Translational Science in recognition of their success in the translation of research discoveries into clinical applications and, potentially, widespread clinical practice.

**Jordan D. Metzl, MD**, authored a book entitled *The Athlete’s Book of Home Remedies: 1,001 Doctor-Approved Health Fixes and Injury-Prevention Secrets for a Leaner, Fitter, More Athletic Body!*

**Kyung-Hyun Park-Min, PhD**, received a new two-year Pathway to Independence Award from the NIH/National Institute of Arthritis and Musculoskeletal

and Skin Diseases to study “Negative Regulation of Osteoclastogenesis by Inflammatory Signals.”

**Minda Patt, MD**, 2011-2012 Fellow in Regional Anesthesiology and Acute Pain Medicine, received the “Resident Travel Award” for an abstract at the 2012 American Society for Anesthesia and Regional Anesthesia and Pain Medicine (ASRA) Meeting. Several Fellow Alumni as well as current faculty, fellows, research staff, and administrative staff presented at this meeting.

**Alessandra Pernis, MD**, Peter Jay Sharp Chair in Lupus Research, received a new two-year research grant from the NIH/National Institute of Allergy and Infectious Diseases to study “Effector Tregs in Lupus.”

**Rock G. Positano, DPM, MSc, MPH**, was awarded the degree of Doctor of Science, Honoris Causa, for his many contributions to the New York College of Podiatric Medicine, as well as his service on their Board of Trustees.

**Hollis Potter, MD**, Chase and Stephanie Coleman Chair in MRI Research, was invited to participate in the NIH Medical Imaging Study Section for January and June 2012. She also received the Lodwick Award, given by the Musculoskeletal Division of the Department of Radiology at Massachusetts General Hospital, for her paper titled “MRI After Arthroplasty: Comparison of MAVRIC and Conventional Fast Spin-Echo Techniques.”

**Anil Ranawat, MD**, was inducted into the American Academy of Orthopaedic Surgeons as an AAOS Fellow.

**Linda A. Russell, MD**, was recognized at a recent New York Chapter Arthritis Foundation *Women on the Move* luncheon for her commitment toward achieving a better future for women with arthritis.

**Jane Salmon, MD**, Collette Kean Research Chair, was invited to join the Scientific Advisory Board of the Alliance for Lupus Research. Dr. Salmon also was awarded the Virginia Kneeland Frantz ’22 Award for Distinguished Women in Medicine from the Columbia University College of Physicians and Surgeons Alumni Association.

**Xiomara Santiago** was named the incoming President-Elect of the Metropolitan NY Branch of the American Association for Laboratory Animal Science and received the 2011 Laboratory Animal Technologist of the Year award, presented at the 2012 installation event. **Marriel Rauer** was appointed as Technician Branch Representative and **Francisco Colon** was appointed to the Council for 2012-13.

**Louis A. Shapiro** was named Vice Chair of the Greater New York Hospital Association (GNYHA) Board of Governors for the 2012-2013 term.

Two HSS residents and one fellow received Orthopaedic Research and Education Foundation (OREF) awards in 2012. **Richard Ma, MD**, received a Young Investigator grant to study “The Effect of Anterior Cruciate Ligament Graft Tension on Graft Healing and Joint Biology.” **Benjamin McArthur, MD**, received a Resident Clinician Scientist Training Grant to investigate “The Role of Pro-Inflammatory Cytokines in Fluid Pressure-Induced Osteolysis.” **Stephen Warner, MD**, received a Resident Research Project Award for “The Effects of Diabetes on Bone Quality and Collagen Cross-Links.”

**Timothy Wright, PhD**, F.M. Kirby Chair in Orthopaedic Biomechanics, served on an NIH special review panel for grant applications to the National Institute of Arthritis and Musculoskeletal and Skin Diseases for Centers of Research Translation.

**Baohong Zhao, PhD**, received a new two-year Pathway to Independence Award from the NIH/National Institute of Arthritis and Musculoskeletal and Skin Diseases to study “Regulation of Osteoclastogenesis and Arthritic Bone Resorption by RBP-J.” ●

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## Campus Update

To meet the needs of our growing patient population, HSS continues to modernize and expand facilities at the main Hospital campus and beyond.

The HSS Adult Reconstruction and Joint Replacement Division (ARJR) is in a recently renovated and improved space on the third floor of the main hospital: the *Steve Tisch Adult Reconstruction and Joint Replacement Center*, where patients benefit from state-of-the-art exam rooms and physician offices, as well as the modern and comfortable *Joan H. Tisch Adult Reconstruction and Joint Replacement Reception Area*, offering an environment

complementing the high quality care provided here.

HSS recently opened our *East 75th Street Campus*, a 30,000 square foot, six-floor outpatient facility to help meet the growing demand for our Physiatry and Pain Management services. The Department of Physiatry generates nearly 40,000 outpatient visits annually, specializing in non-operative treatment procedures. The Division of Musculoskeletal and Interventional Pain Management generates some 14,000 office visits each year. With space for clinical care, physician offices, radiology, procedure rooms, research, and education, this new facility advances the Hospital’s commitment to enhancing the mobility of our patients and helping them lead pain-free lives.

Across from the main hospital on the ground floor of the Belaire Building, HSS’s renovated *James M. Benson Sports Rehabilitation Center* and *Tisch Sports Performance Center* offer beautiful, modern facilities for professional and recreational athletes to recover from sports-related injuries, enhance their performance goals, and minimize the risk of re-injury. These new facilities feature private exam rooms, custom-designed massage rooms, an aquatics program, an anti-gravity treadmill, and the Core Performance System powered by Athletes’ Performance, an advanced training system that combines personalized coaching with high-tech equipment for the most effective workout available. ●

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Our Physicians

# ON TOP OF HER GAME



## Lisa R. Callahan, MD

Thousands of female athletes – both amateur and professional – have benefited from the expertise and experience of the Women’s Sports Medicine Center at Hospital for Special Surgery. Co-founded by Lisa R. Callahan, MD, and Jo A. Hannafin, MD, PhD, the Center is a nationally recognized multidisciplinary health resource for active women of all ages. “We offer sports medicine physicians, physical therapists, performance specialists, and nutritionists,” says Dr. Callahan. “Among us, we have all the resources female athletes could need, which we tailor to their own personal fitness or competitive goals. It’s a good way to take care of patients.”

Since its launch in 1998, the Center has become a model for programs across the country, helping to change the way female athletes think, train, and perform. “We find that our female patients are naturally curious about how their bodies function,” says Dr. Callahan. “They want to know the hows and the whys when an injury occurs so that they can try to prevent it from happening in the future.”

According to Dr. Callahan, certain injuries are more prevalent in the female athlete. These include stress fractures, ACL tears, and patellofemoral pain. “Stress fractures are of particular interest to us. Initial thinking was that women suffered more stress fractures than men because they have smaller bones. But other factors, such as nutrition, hormones,

proper training, and mechanics also come into play,” says Dr. Callahan, who, along with her colleagues, recently completed research looking at whether or not stress fractures in certain sites of the body are more likely to be associated with low bone mass.

Dr. Callahan’s commitment to the care of athletes extends beyond the Women’s Sports Medicine Center. For more than a decade, she has been sharing her expertise as Contributing Expert at *Self* magazine. Since 2004, she has served as Director, Player Care, for the New York Knicks and New York Liberty, a WNBA team. “What’s really key is that we can take what we learn working with elite athletes and apply that knowledge to the care we provide to all our patients.”



Our Patients

# IN PEAK CONDITION



## Erica True

By her own admission, Erica True is an “amateur athlete,” but this avid cyclist, runner, and swimmer is a pro at keeping her body in peak condition.

While Ms. True was active in sports growing up, it wasn’t until her late 30s that this pharmaceutical executive became a serious runner. “I started setting goals for myself,” says Ms. True. “I wanted to run races in the park and learn about competitive running.”

She soon began entering half marathons, marathons, and triathlons. In 2006, after participating in a New York City triathlon – involving an Olympic distance swim of just under a mile, a 25-mile bike ride, and a

6.2 mile run in Central Park – Ms. True developed severe hamstring tendonitis.

“That’s when I met Dr. Lisa Callahan,” says Ms. True. “I came in with my history and lots of questions. She really listened to me. Through Dr. Callahan, I’ve learned how my hamstrings work and what could be aggravating them. In my case, I have very strong quads but the hamstrings are a little weak.”

Ms. True has been seeing Dr. Callahan ever since – for occasional hamstring problems, as well as for a stress fracture of her tibia – now healed. “These issues are simply a matter of too much training and not resting myself properly,” she says. “But Dr. Callahan provides options to stay active because she understands how frustrating it is for someone not to be able to do what they love.”

“Rather than telling our patients not to exercise, we have to find alternatives that can keep them active and not take away their identity as an active person,” says Lisa R. Callahan, MD, Co-Director of the Women’s Sports Medicine Center. “For patients like Erica who have stress fractures of the lower extremity, they can begin biking and swimming within a short period of time.”

“Having a really good sports physician like Dr. Callahan as part of my team helps me accomplish my goals,” adds Ms. True. “I’m not in this alone – she continually guides me on what I can do to stay healthy and fit.”