

INNOVATIONS

in orthopaedics

Fall 2011



A New Approach to Treating Younger Patients with Shoulder Osteoarthritis

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- UH experts are recognized for work on a range of research topics pg 3
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Chairman's Message

Sharing Our Advances



Innovative treatments, cutting-edge research and outstanding surgeons and physicians are the hallmarks of the Department of Orthopaedic Surgery at Case Western Reserve University School of Medicine and University Hospitals Case Medical Center.

This issue of *UH Innovations in Orthopaedics* allows us to share a few of our achievements, starting with our new Joint Preservation and Cartilage Restoration Center, which offers advanced treatments for arthritic and pre-arthritic conditions of the shoulder, hip and knee, under the direction of **Michael J. Salata, MD**. One of those treatments is a new procedure for younger, active patients with advanced glenohumeral osteoarthritis: Arthroscopic biological total shoulder resurfacing. Developed by **Reuben Gobezie, MD**, and performed only at UH Case Medical Center, this procedure uses fresh osteochondral allografts to resurface the shoulder instead of metal and plastic materials.

World renown orthopaedic traumatologists and brothers **John H. Wilber, MD**, and **Roger G. Wilber, MD**, both graduated from Case Western Reserve University School of Medicine, chose to specialize in orthopaedic trauma and returned to Case Western Reserve University School of Medicine as faculty members after their fellowships. We profile their accomplishments, which include managing the only orthopaedic trauma fellowship in Cleveland.

In the research arena, **Shunichi Murakami, MD, PhD**, is searching for the keys to bone formation and growth and bone healing through his basic research on the role of the MAPK (Mitogen-activated Protein Kinase) pathway in skeletal development and osteochondro progenitor cells in the periosteum. He is conducting this research at Case Western Reserve University School of

Medicine under two grants from the NIH and one from the National Center for Regenerative Medicine.

We also highlight recent awards and honors given to our orthopaedic surgeons, residents and researchers, and The Timothy L. Stephans, Jr. MD, Orthopaedic Fellowship — the only orthopaedic fellowship program in the nation for under-represented minority medical students.

The Department of Orthopaedic Surgery's multidisciplinary team approach is further enhanced by a Magnet-certified, dedicated and caring nursing staff, and the support and resources that come from being part of UH Case Medical Center. Among the nation's leading academic medical centers, UH Case Medical Center is the primary affiliate of Case Western Reserve University School of Medicine, a nationally recognized leader in medical research and education.

For the sixth consecutive year, UH Case Medical Center is recognized by Thomson Reuters as one of the top 15 major teaching hospitals in the country — the only hospital in Northeast Ohio to achieve this designation. In addition, UH Case Medical Center is the only hospital in the state of Ohio and one of only three nationally with five or more Beacon Award-winning intensive care units.

We welcome your comments, questions and suggestions. Feel free to contact us via email or phone, or through our professional referral service.

Randall E. Marcus, MD
Charles H. Herndon Professor and Chairman,
Department of Orthopaedics
Case Western Reserve University School of Medicine/
University Hospitals Case Medical Center

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Contributors: Randall E. Marcus, MD; Reuben Gobezie, MD;
Shunichi Murakami, MD, PhD; Michael J. Salata, MD;
John H. Wilber, MD; Roger G. Wilber, MD
Publication Coordinator: Rich Riley
Director of System Marketing: Donna Casey, RN, MBA

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On the cover: Arthroscopic resurfacing of diseased glenoid is accomplished using medial tibial condyle allograft, which is prepared and cut for eventual glenoid replacement prior to beginning the procedure.

The commitment to exceptional patient care begins with revolutionary discovery. University Hospitals Case Medical Center is the primary affiliate of Case Western Reserve University School of Medicine, a national leader in medical research and education and consistently ranked among the top research medical schools in the country by U.S. News & World Report. Through their faculty appointments at Case Western Reserve University School of Medicine, physicians at UH Case Medical Center are advancing medical care through innovative research and discovery that bring the latest treatment options to patients.

Orthopaedic Surgeons and Researchers – Recent Awards and Honors

Recent awards and honors given to orthopaedic surgeons and researchers at University Hospitals Case Medical Center and Case Western Reserve University School of Medicine include:

- **Best Clinical Paper, 2011 Annual Meeting of the International Congress of Early Onset Scoliosis:** To **George Thompson, MD**, Chief, Division of Pediatric Orthopaedics, and Professor of Orthopaedics, Case Western Reserve University School of Medicine, for “Growing Rods for Scoliosis in Spinal Muscular Atrophy.”
- **\$50,000 Grant, Sarcoma Foundation of America:** To **Edward Greenfield, PhD**, Director, Orthopaedic Research, and Harry E. Figgie III Professor of Orthopaedics, Case Western Reserve University School of Medicine, for “A Small Molecule Inhibitor of AXL as a Novel Therapeutic Strategy in Osteosarcoma.”
- **2011 Aircast Award for Best Basic Science Paper, 2011 Annual Meeting of the American Orthopaedic Society for Sports Medicine:** To **Michael J. Salata, MD**, Attending Surgeon, and Assistant Professor of Orthopaedics, Case Western Reserve University School of Medicine, for “Effect of Acetabular Rim Recession on Anterior Rim Angle.”
- **Appointment to the Centers for Medicare & Medicaid Services Medicare Evidence Development & Coverage Advisory Committee:** **Randall E. Marcus, MD**, Chairman, Department of Orthopaedics, and Charles H. Herndon Professor, Case Western Reserve University School of Medicine.
- **Election to the AAOS Board of Councilors:** **Christopher Furey, MD**, Attending Surgeon, and Associate Professor of Orthopaedics, Case Western Reserve University School of Medicine.
- **First Place, 2011 Mount Sinai Barry Friedman Orthopaedic Research Competition:** To **Ryan Garcia, MD**, Chief Resident, Orthopaedic Surgery, for “A Multimodal Approach for Postoperative Pain Management Following Lumbar Decompression Surgery” (with second author Patrick Messerschmitt, MD).
- **2011 Cleveland Orthopaedic Society Resident Essay Contest:**
 - **Second place: Lorraine Stern, MD**, Resident, for “Effect of Near-Terminal Damage on the Long-Term Viability of Cortical Bone Allograft.”
 - **Third place: Patrick Messerschmitt, MD**, Chief Resident, Orthopaedic Surgery, for “A Multimodal Approach for Postoperative Pain Management Following Lumbar Decompression Surgery” (with first author Ryan Garcia, MD).
- **2011 Resident Leadership Award**, AOA Orthopaedic Research and Educational Foundation, **Ari Levine, MD**, Resident.
- **2011 AAOS/OREF/ORS Clinician Scholar Development Program Award**, **Erik Schnaser, MD**, Orthopaedic Surgery Resident.

Fellowship Program Draws Minority Medical Students to Orthopaedics

University Hospitals Case Medical Center has the only orthopaedic fellowship program in the nation for underrepresented minority medical students: The Timothy L. Stephens Jr., MD, Orthopaedic Fellowship. Established in 2008 and funded by St. Luke's Foundation, the fellowship seeks to increase the number of underrepresented minority medical students pursuing careers in orthopaedic surgery. Fellows spend a year at University Hospitals Case Medical Center between their second and third years of medical school. Current fellows are Eldra Daniels from Howard University College of Medicine and Keisha French from SUNY Upstate Medical University, Syracuse. **Richard Grant, MD**, Professor of Orthopaedics at Case Western Reserve University School of Medicine, directs the program.

New Center for Joint Preservation and Cartilage Restoration

Advanced treatments for arthritic and pre-arthritic conditions of the hip and knee are available at the new Center for Joint Preservation and Cartilage Restoration at University Hospitals Case Medical Center. Treatment options include:

Cartilage restoration:

- Autologous chondrocyte implantation
- Osteochondral allograft transplantation
- Juvenile particulate chondrocyte implantation
- Marrow stimulation/microfracture surgery
- Osteoarticular autograft transfer

Joint sparing hip surgery:

- Hip arthroscopy and labral repair
- Arthroscopic treatment for femoroacetabular impingement

Pelvic osteotomies

Meniscal transplantation

Knee preservation surgery:

- Tibial and femoral osteotomies

Shoulder preserving surgery:

- Biologic resurfacing

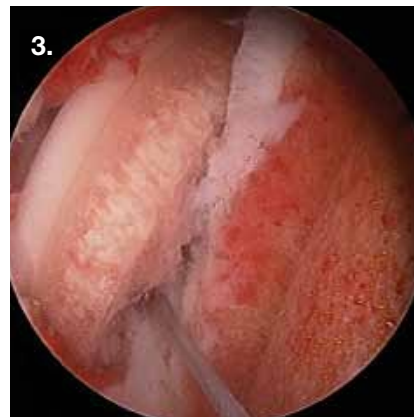
Michael J. Salata, MD, Attending Surgeon, University Hospitals Case Medical Center, and Assistant Professor of Orthopaedics, Case Western Reserve University School of Medicine, directs the center.

Introducing Arthroscopic Biologic Total Shoulder Resurfacing

An innovative procedure for younger patients with advanced glenohumeral osteoarthritis



Reuben Gobezie, MD, Chief, Division of Shoulder and Elbow Surgery, Department of Orthopaedic Surgery, University Hospitals Case Medical Center, and Assistant Professor of Orthopaedics, Case Western Reserve University School of Medicine



Total shoulder arthroplasty is an effective and durable treatment for advanced arthritis in the older patient. Better treatment modalities, however, are needed for younger, more active individuals. “The data in the literature is clear. If you’re under 50 or in your early 50s and active, total shoulder arthroplasty with metal and plastic parts wear out much faster and these patients tend to do less well than their older counterparts who are less active,” says **Reuben Gobezie, MD**, Chief, Division of Shoulder and Elbow Surgery, Department of Orthopaedic Surgery, University Hospitals Case Medical Center, and Assistant Professor of Orthopaedics, Case Western Reserve University School of Medicine.

“The traditional approach to treating an active young patient with end-stage osteoarthritis is hemiarthroplasty. However, the results of conversion for these patients to total shoulder arthroplasty is humbling. Alternative bearing surfaces such as patch grafts don’t seem to be ‘the answer’ either,” says Dr. Gobezie, who specializes in arthroscopic and open surgical techniques to manage a wide spectrum of shoulder disorders. He also notes that the outcomes for alternative surgical interventions to arthroplasty, such as arthroscopic debridement with or without chondroplasty and capsular release, are unpredictable, often offering little or no, or short-lived, pain relief and functional improvement.

Addressing Loss of Cartilage

Recognizing the clinical need for a treatment tailored to younger patients with advanced glenohumeral osteoarthritis, Dr. Gobezie, in partnership with Arthrex Inc., has developed an innovative procedure that focuses on the root of the problem – loss of cartilage – and is performed arthroscopically through the rotator interval, without violating or injuring the rotator cuff muscles.

Arthroscopic biologic total shoulder resurfacing uses a fresh osteochondral allograft of the humeral head and medial tibial condyle or distal tibial plafond to resurface the glenohumeral joint, enabling both sides of the joint to be replaced with a cartilage transplant. Designed for younger, active patients who have relatively flexible arthritic shoulders, it is performed as an outpatient procedure. Dr. Gobezie is a paid consultant for Arthrex Inc., which develops products for arthroscopic surgery.

He performed the first arthroscopic biologic total shoulder resurfacing in the world at University Hospitals Case Medical Center in December 2010. He based his development of the procedure on cartilage transplantation operations for the knee and the glenohumeral joint, for which good outcomes have been reported. It is the first shoulder cartilage transplant procedure to be performed arthroscopically and the first to include the glenoid in the transplant procedure.

The Most Anatomic Method

Arthroscopic biologic total shoulder resurfacing has several advantages over arthroplasty of the shoulder. Using an osteochondral allograft rather than metal and/or plastic implants enables Dr. Gobezie to reproduce normal anatomy and function. “Putting in a cartilage graft the exact same size as you took out is the most anatomic you can possibly make it,” he says. Performing the procedure through the rotator interval prevents injury to the rotator cuff muscles, a cause of complications, including catastrophic failure, in up to 40 percent of shoulder arthroplasties. The arthroscopic procedure is significantly less painful than total shoulder arthroplasty, allows for early rehabilitation and offers the potential to significantly decrease the rehabilitation required after surgery compared with total shoulder arthroplasty.

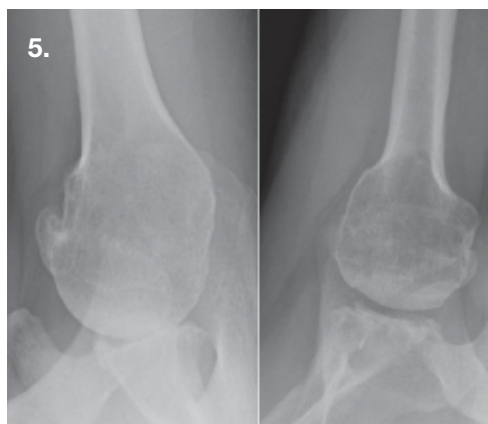


Figure 1: Arthroscopic view of the right shoulder, beach chair position, posterior portal. Bipolar osteochondral defects of the humeral head and glenoid were found on initial arthroscopic examination in a patient who underwent arthroscopic biologic shoulder resurfacing. Such large defects have historically been difficult to treat in younger patients.

Figure 2: Arthroscopic view of the right shoulder, beach chair position, posterior portal. Placement of glenoid and humeral allografts may be performed arthroscopically with novel instrumentation. A glenoid defect has been reamed arthroscopically with instrumentation passed through the humeral head, creating a site for placement of a tibial condyle allograft.

Figure 3: Arthroscopic view of the right shoulder, beach chair position, posterior portal. Humeral resurfacing is accomplished after reverse-reaming arthroscopically over a transhumeral guidepin. The allograft humeral head is moved into position with a traction suture, creating a humeral head articular surface that is free of defects.

Figure 4: Arthroscopic view of the right shoulder, beach chair position, anterior portal. A defect-free articular surface has been created by resurfacing the humerus and glenoid. Chondral darts have been used to secure the tibial condyle graft within the native glenoid.

Figure 5: Axillary radiographs taken preoperatively and postoperatively in a 53-year-old patient demonstrate the re-creation of glenohumeral joint space and a smooth articular surface. The grafts are beginning to incorporate into the surrounding host bone.

Since arthroscopic biologic total shoulder resurfacing preserves bone stock, revision to conventional shoulder arthroplasty or arthroscopic revision with another allograft can be performed if necessary.

Building the Evidence

Arthroscopic biologic total shoulder resurfacing is currently available only at University Hospitals Case Medical Center. Dr. Gobezie also performed this procedure in June 2011 at the largest live surgery course in the world, the Ancey Live Surgery Course, in France, hosted by Laurent Lafosse, a renowned shoulder surgeon. "If this procedure works," Dr. Gobezie says, "it could be a paradigm change for the treatment of shoulder arthritis in young patients. There is significant interest in this procedure within the shoulder community and I am hopeful that it provides a new treatment option for young patients that relieves their pain and improves their function."

To study the long-term efficacy of arthroscopic biologic total shoulder resurfacing, Dr. Gobezie is conducting a prospective clinical study using standardized and validated preoperative and postoperative outcome measures of patients who undergo the procedure. The main risk is that the osteochondral graft may not incorporate in a given patient's shoulder. If this occurs, the patient may require total shoulder arthroplasty or another procedure. Dr. Gobezie has also developed a prospective shoulder and elbow database comprising pre- and postsurgery data on all of his patients.

In 2010, Dr. Gobezie was elected to American Shoulder and Elbow Surgeons, the most prestigious specialty society in the United States for shoulder and elbow surgeons. He also received the Patients' Choice Award in 2009 and 2010, given to "physicians who have received near perfect scores as voted by patients."

Insights from Radiostereometric Analysis

Through the largest shoulder radiostereometric analysis research program in the United States, **Reuben Gobezie, MD**, and colleagues are contributing to knowledge about glenoid component wear rates, translation and rotation, and humeral component migration in total shoulder arthroplasty. Results to date cover 29 patients who underwent total shoulder arthroplasty between 2007 and 2009, as part of a five-year clinical study now in its fourth year.

Dr. Gobezie's research team is the first to analyze polyethylene wear rates in primary total shoulder arthroplasty using radiostereometric analysis, and has found that wear of a conventional, high-molecular-weight polyethylene glenoid component at two years is minimal. The team is also the first to evaluate component stability of uncemented humeral stems, and has shown that these prostheses remain stable without subsidence two years after surgery. Radiolucent lines appeared early for the glenoid and humeral components, but do not necessarily indicate instability.

The shoulder radiostereometric analysis research program is funded through grants from industry and the Orthopaedic Department's Research endowment. Continued follow-up of the patient cohort will provide information on midterm wear and stability.

Contact Our Expert

For more information about arthroscopic biologic total shoulder resurfacing, please call **216-844-7093** or e-mail **OrthoInnovations@UHhospitals.org**.

Physician Highlight

Brotherly Bond

Repairing fractured bodies is a family affair for orthopaedic traumatologists John H. and Roger G. Wilber



John H. Wilber, MD, Director, Orthopaedic Trauma Service, University Hospitals Case Medical Center, and Hansjörg Wyss Professor of Orthopaedic Traumatology and Professor of Orthopaedics, Case Western Reserve University School of Medicine



Roger G. Wilber, MD, Traumatologist, University Hospitals Case Medical Center, and Assistant Professor of Orthopaedics, Case Western Reserve University School of Medicine

John H. and Roger G. Wilber have more in common than most brothers. Both physicians graduated from Case Western Reserve University School of Medicine, chose to specialize in orthopaedic trauma and returned to Case Western Reserve University School of Medicine as faculty members after their fellowships. John completed his fellowship in orthopaedic trauma at Harborview Medical Center/University of Washington and, on an AO Fellowship, Rätisches Kantons und Regionalspital in Switzerland. Roger's fellowship at Wayne State University School of Medicine focused on adult reconstructive surgery.

Combining Family Tradition and Mechanical Ability

The Wilber brothers have a family history of medical careers and strong ties to Case Western Reserve University. Their grandfather, uncle and father all were physicians. Their father and a brother who passed away, Geoffrey, graduated from Case Western Reserve University School of Medicine. Like John and Roger, Geoffrey was an orthopaedic surgeon and served on the medical school's faculty. Their mother graduated from Case Western Reserve University with a master's degree in social work.

Orthopaedic trauma suited the brothers' mechanical ability and provided the continual challenge they craved. "There's something appealing about putting things back together, making things right again," says Roger, who specializes in pelvic and acetabular injuries. "It's not just putting bones together, but putting them together in a way that you're protecting and preserving soft tissue and vascularity of the bone," adds John, an expert in knee and shoulder injuries. The Wilber brothers have both been listed in Best Doctors in America.

Typical cases for the traumatologists are intra-articular fractures and complex fractures, including those with areas of missing bone. They also handle post-injury cases of nonunion, malunion and infection. To restore anatomy and function as much as possible, they use minimally invasive surgical techniques, including minimal dissection around bone. They work as part of a trauma team that includes other traumatologists, general surgeons, physical therapists and plastic surgeons.

Training and Informing Orthopaedic Traumatologists

Training residents, fellows and surgeons is an important part of the Wilber brothers' work. They manage the only orthopaedic trauma fellowship in Cleveland and frequently lecture and lead seminars nationally and internationally on orthopaedic trauma, primarily as part of the AO faculty.

Their research focus is the treatment of multi-injury patients, particularly the efficacy of orthopaedic trauma care by traumatologists affiliated with Case Western Reserve University School of Medicine. Recent publications include a 2010 article about stabilization of unstable pelvic and acetabular fractures in the *Journal of Trauma*. John has published nine book chapters and 25 articles; Roger has published three articles.

Innovative Approaches to Traumatic Musculoskeletal Injuries

The Trauma and Fracture Division at University Hospitals Case Medical Center offers innovative minimally invasive approaches to treating traumatic musculoskeletal injuries, including:

- Improved bone-grafting techniques, such as the Ilizarov technique, a tensioned wire external fixator attached percutaneously through bones that is used to lengthen bone or stimulate new bone formation through distraction osteogenesis.
- Skeletal realignments and stabilizations using closed, percutaneous, external and internal fixation techniques.

A multidisciplinary team of physical therapists provides post-traumatic rehabilitation. For more information, please call **216-844-7200** or e-mail OrthoInnovations@UHhospitals.org.

The Discovery of Solutions Through Basic Research

Case Western Reserve University researcher **Shunichi Murakami, MD, PhD**, seeks keys to bone formation and healing

By studying the role of the MAPK (mitogen-activated protein kinase) pathway in skeletal development and osteochondro progenitor cells in the periosteum, **Shunichi Murakami, MD, PhD**, hopes to discover keys to bone formation and growth and bone healing that can be used to develop new therapies for osteoporosis, genetic skeletal syndromes, nonunion fractures and bone defects. Dr. Murakami, Assistant Professor of Orthopaedics and Assistant Professor of Genetics, Case Western Reserve University School of Medicine, has two National Institutes of Health grants for the MAPK research, and has received past support from the NIH, the Arthritis Foundation, the March of Dimes Birth Defects Foundation and the Musculoskeletal Transplant Foundation. He also has a grant from the National Center for Regenerative Medicine for his research on osteochondro progenitor cells.

Regulatory Mechanisms of Bone Formation

Under the first NIH grant, Dr. Murakami is using genetically engineered mouse models to identify the regulatory mechanisms of bone formation by the extracellular signal-regulated kinase (ERK) MAPK pathway (ERK1 and ERK2), which has been implicated in many skeletal disorders. "The identification of the regulatory mechanisms will provide much needed information for controlling bone formation in skeletal disorders such as osteoporosis and genetic skeletal syndromes," he says. This information can be translated into new pharmacological therapies.

Results to date show that genetic inactivation of ERK1 and ERK2 in chondrocytes enhances the growth of cartilaginous skeletal elements and that postnatal inactivation of ERK1 and ERK2 in chondrocytes delays synchondrosis closure and enlarges the spinal canal (*J Orthop Res*, 2011 Mar;29(3):375-9). Dr. Murakami also published results in the *Journal of Biological Chemistry* (2010) and *Molecular and Cellular Biology* (2009).

Under the second NIH grant, Dr. Murakami is studying the regulatory mechanisms of bone formation by FGF (fibroblast growth factor) and the ERK MAPK pathway. FGF signaling has been implicated in craniosynostosis syndromes, and ERK MAPK pathway mutations have



Shunichi Murakami, MD, PhD, Assistant Professor of Orthopaedics and Assistant Professor of Genetics, Case Western Reserve University School of Medicine

been identified in a number of skeletal disorders. The results can be used to develop pharmacological therapies or possibly gene therapies for these disorders.

Osteochondro Progenitor Cells and Bone Healing

In related research, Dr. Murakami has developed a method of isolating osteochondro progenitor cells from the periosteum, known for its regenerative properties, in mice. Using transgenic mice that express GFP (green fluorescent protein) in osteochondro progenitor cells in the periosteum and flow cytometry, he is isolating these cells to study their potential to differentiate into chondrocytes and osteoblasts, and enhance healing of nonunion fractures and bone defects in mice. Dr. Murakami expects to be able eventually to isolate osteochondro progenitor cells from the periosteum in humans, which could lead to their differentiation into cartilage, bone or other cells and then transplantation to enhance bone healing.

In 2011, the National Center for Regenerative Medicine awarded Dr. Murakami a one-year grant for this research. Founded by Case Western Reserve University, Cleveland Clinic and University Hospitals Case Medical Center, the center seeks to translate innovative laboratory research into clinical trials and commercial use to replace and repair diseased tissues and organs.



Arthroscopy Expertise

Hip arthroscopy enables surgeons at the Joint Preservation and Cartilage Restoration Center at University Hospitals Case Medical Center to access the hip with minimal neurovascular risk and lower morbidity than open arthrotomy, and on an outpatient basis. Referral is appropriate for a number of conditions treatable by hip arthroscopy:

- Early onset hip arthritis
- Femoroacetabular impingement (FAI)
- Acetabular labral tears
- Removal of loose bodies
- Gluteus medius tears
- Chronic trochanteric bursitis
- Coxa saltans (snapping hip)
- Iliopsoas tendinitis
- Early onset hip arthritis

UH Case Medical Center is one of the only hospitals in the region offering hip arthroscopy for all these disorders.

For intra-articular conditions—the most common ailments treatable by hip arthroscopy—patients between 15 and 55 years of age with pain localized to the hip joint and minimal evidence of osteoarthritis of the hip are candidates. Patients with extra-articular problems, particularly those who have failed conservative management, are generally candidates up to age 65, provided they have minimal evidence of osteoarthritis of the hip.

These conditions can be difficult to diagnose, resulting in treatment delays of up to 21 months, according to **Michael J. Salata, MD**, Attending Surgeon, Department of Orthopaedic Surgery, UH Case Medical Center, with subspecialty training in hip arthroscopy, and Assistant Professor of Orthopaedics, Case Western Reserve University School of Medicine. “Patients who fit the criteria for these conditions should be evaluated by a hip specialist,” he says. “That can save them a lot of time and discomfort.”

To refer a patient, please call **216-844-6094**.



Michael J.
Salata, MD

Grand Rounds

Nov. 9: “Injuries to the Foot and Ankle”

Shana Miskovsky, MD, Assistant Professor of Orthopaedics, Case Western Reserve University School of Medicine

Dec. 14: “Tumors of the Spine”

Jason D. Eubanks, MD, Assistant Professor of Orthopaedics, Case Western Reserve University School of Medicine

For further information about these events, held at the Wolstein Research Building Auditorium, including directions, please contact Ellen Greenberger, Education Coordinator, Department of Orthopaedics, at **216-844-3233** or **Ellen.Greenberger2@UHhospitals.org**.

UH Transfer Referral Center Hotline

Expedite adult and pediatric transfers with one call. Services include:

- Basic or ALS transports
- Ground and air medical evacuation
- Critical care transports

216-844-1111 or **800-421-1999**

Your Feedback Is Important

As a medical professional, your input is invaluable in helping us shape future issues of *UH Innovations in Orthopaedics*. We want to know what's important to you. Do you want to read about cutting-edge research, learn about the latest technology, or hear firsthand case studies of how others in your specialty are improving and saving lives? Tell us what you want to read about and your name will be entered to **win one of two Apple iPad 2s!** Simply visit **UHhospitals.org/innovations**.



Image courtesy of Apple



Nancy Hagan, RN,
BSN

Orthopaedic Triage Service

Clinical Nurse Manager Nancy Hagan, RN, BSN, answers physicians' questions, triages patients, and ensures that appointments are made within 48 hours when necessary. Call **216-983-0393** to access orthopaedic specialists and refer patients to University Hospitals Case Medical Center's Department of Orthopaedic Surgery.