


UH

Innovations In Orthopaedics

Department of Orthopaedics



**Individualized
Arthroplasty for
Optimal Outcomes**

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An Inside Look



2009 ended on a high note for the Department of Orthopaedic Surgery at Case Western Reserve University School of Medicine/University Hospitals Case Medical Center. We were once again honored when the American Orthopaedic Association selected us to host its North American Traveling Fellows, promising leaders in orthopaedic surgery who tour the nation's major orthopaedic centers. In October, the five fellows visited Case Western Reserve University School of Medicine, where they engaged in a stimulating exchange of ideas with our faculty. The American Orthopaedic Association, founded in 1887, is the oldest orthopaedic association in the nation.

Two other promising leaders in orthopaedic surgery joined our faculty in the fall: **Glenn Wera, MD**, and **Jason Eubanks, MD**. Each of these orthopaedic surgeons brings new and innovative techniques to our department. This issue of *UH Innovations in Orthopaedics* highlights their work:

- **Optimizing outcomes in total hip and total knee arthroplasty:** Dr. Wera, an adult joint reconstruction specialist, fits the implant to the patient's individual anatomy and clinical situation. He discusses the pros and cons of patient-specific implants, and cases where this results in the best outcome.
- **Cervical laminectomy with fusion protects the spinal cord and relieves symptoms:** Cigarette smokers are at higher risk than the general population for nonunion with standard techniques for relieving cervical stenosis. Dr. Eubanks, a spine specialist, discusses his choice of posterior cervical laminectomy and fusion to protect the spinal cord and relieve symptoms in a cigarette smoker. He highlights the benefits of this procedure over the alternatives.

In another point of pride, the Case Western Reserve University Spartan football team has completed its third consecutive undefeated football season. Former competitive figure skater, martial arts instructor and orthopaedic surgeon **Shana N. Miskovsky, MD**, has been the head team physician during this period. *UH Innovations in Orthopaedics* discusses her care of these and other athletes, including athletes at Lake Erie College.

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

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Among the nation's leading academic medical centers, University Hospitals Case Medical Center is the primary affiliate of Case Western Reserve University School of Medicine. The Case Western Reserve University School of Medicine is a nationally recognized leader in medical research and education.

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The commitment to exceptional patient care begins with revolutionary discovery. Faculty at the Case Western Reserve University School of Medicine, who also are physicians at UH Case Medical Center, are at the forefront of medical research and innovation. The School of Medicine is the largest medical research institution in Ohio and among the nation's top medical schools for research funding from the National Institutes of Health.

AOA Traveling Fellows Visit Department of Orthopaedics

In October 2009, the Case Western Reserve University School of Medicine Department of Orthopaedic Surgery was selected by the American Orthopaedic Association to host the five North American Traveling Fellows:

- **Ryan Bicknell, MD**, Queen's University (Kingston, Ontario, Canada)
- **Robert H. Brophy, MD**, Washington University School of Medicine (St. Louis, Mo.)
- **Gregory J. Della Rocca, MD, PhD**, University of Missouri – Columbia
- **Wellington Hsu, MD**, Northwestern University Feinberg School of Medicine (Evanston, Ill.)
- **Amanda D. Marshall, MD**, University of Texas Health Science Center at San Antonio

The fellows visited the department for two days as part of a tour of 17 orthopaedics departments (14 in the U.S. and three in Canada).

SPINE SURGERY AND JOINT-RECONSTRUCTION SPECIALISTS JOIN DEPARTMENT OF ORTHOPAEDIC SURGERY

Jason Eubanks, MD, and **Glenn Wera, MD**, have brought innovative techniques in spine surgery and joint reconstruction, respectively, to the Department of Orthopaedic Surgery at University Hospitals Case Medical Center. The two assistant professors at Case Western Reserve University School of Medicine are both members of the national medical honor society Alpha Omega Alpha.

Dr. Eubanks received his medical degree from Case Western Reserve University School of Medicine and completed his residency at UH Case Medical Center. During a fellowship in spine surgery at The University of Pittsburgh Medical Center, Dr. Eubanks specialized in adult spine reconstruction and deformity utilizing minimally invasive techniques. He has published scientific articles on orthopaedic surgery and is also a published poet.

Dr. Wera graduated from the University of Illinois College of Medicine and completed his residency at UH Case Medical Center. He completed a fellowship in adult reconstruction at Rush University Medical Center in Chicago, where he received specialized training in complex joint replacement, utilizing minimally invasive techniques, as well as revision joint replacement.

A TRADITION OF EXCELLENCE IN ORTHOPAEDICS

Clinical and research excellence is a longstanding tradition for the Department of Orthopaedic Surgery at University Hospitals Case Medical Center and its faculty, including:

- In the early 20th century, **Clarence Heyman, MD**, followed later by **Charles Herndon, MD**, pioneered many treatments at Rainbow Babies & Children's Hospital, part of University Hospitals Case Medical Center, for pediatric paralysis from poliomyelitis, congenital deformities and developmental conditions.
- In 1966 UH Rainbow Babies & Children's Hospital opened one of the first multispecialty myelodysplasia clinics for children with congenital spine problems.
- Since 1970, **Henry Bohlman, MD**, and his team of spine surgeons have developed innovative treatments for adult spinal disorders of the cervical and lumbar spine.
- In the 1980s and 1990s, orthopaedic surgeons developed improvements in fracture fixation implants and joint replacements that are used worldwide.

CASE ORTHOPAEDIC JOURNAL HIGHLIGHTS

The 2009 *Case Orthopaedic Journal* features selected scientific manuscripts; achievements of clinicians, scientists, residents and staff of the Department of Orthopaedic Surgery at University Hospitals Case Medical Center; and information about educational programs at Case Western Reserve University School of Medicine. Published annually by the department's residents, the 2009 issue is available online at UHhospitals.org/case, keyword "Orthopaedic Journal."



The University Hospitals Case Medical Center Department of Orthopaedics dinner for the American Orthopaedic Association North American Traveling Fellows. Seated from left clockwise: Amanda D. Marshall, MD, NATF; Edward Greenfield, PhD, CWRU; Wellington Hsu, MD, NATF; Henry Bohlman, MD, CWRU; Robert H. Brophy, MD, NATF; Randall Marcus, MD, CWRU; Gregory J. Della Rocca, MD, PhD, NATF; John Wilber, MD, CWRU; Ryan Bicknell, MD, NATF; George Thompson, MD, CWRU; and Victor Goldberg, MD, CWRU.

Optimizing Outcomes in Total Hip and Total Knee Arthroplasty

A look at individual considerations is key to fitting the implant to the patient



Glenn Wera, MD, Attending Surgeon in the Department of Orthopaedic Surgery at University Hospitals Case Medical Center

Appropriate implant selection for the individual total hip or total knee arthroplasty patient is integral to a successful outcome. For **Glenn Wera, MD**, an Attending Surgeon in the Department of Orthopaedic Surgery at University Hospitals Case Medical Center and an Assistant Professor of Orthopaedic Surgery at Case Western Reserve University School of Medicine, who specializes in adult joint reconstruction, fitting the implant to the patient's individual anatomy is a key consideration. In some cases, this requires the use of a gender-designed implant, while in others, a standard or universal implant is appropriate.

GENDER-DESIGNED IMPLANTS BENEFIT SELECTED PATIENTS

Anatomical differences between female and male knees and hips have been identified. These differences include a narrower medial-lateral width for the same anterior-posterior height on the distal femur in women compared with men and a shorter femoral neck with less offset in women than in men.

Whether these anatomical differences affect outcomes in total knee arthroplasty (TKA) and total hip arthroplasty (THA) is the subject of a great deal of discussion and research. Some clinical studies have shown that women who undergo TKA and THA with standard knee and hip implants have equal or better outcomes than men in functional improvement, pain improvement, satisfaction and need for revision surgery.

Standard implants are appropriate for the vast majority of male and female patients who undergo TKA or THA, according to Dr. Wera. This accounts for the inability of some of these studies to tease out the differences in outcomes for women who receive gender-designed implants. Also, the instruments currently used to measure patient satisfaction postsurgery are not always designed to capture significant differences in outcomes when it comes to how people and their prostheses perform after surgery.

"My philosophy is that women aren't small men. At the time of surgery, we need to take a look and see if they would benefit from a gender-designed implant due to their anatomy," says Dr. Wera.

Patients who will have the greatest benefit from gender-designed implants include very small females undergoing TKA and females with a short varus neck or low offset undergoing THA. Dr. Wera estimates that

up to 50 percent of his TKA patients and approximately 20 percent of his THA patients would benefit from a gender-designed implant.

DIFFERENT IMPLANTS FOR DIFFERENT CLINICAL SITUATIONS

Two recent arthroplasties performed by Dr. Wera on small female patients illustrate the way in which he fits the implant to the patient's individual anatomy. Dr. Wera selected a gender-designed knee implant for one case and created a patient-tailored hip implant for the other.

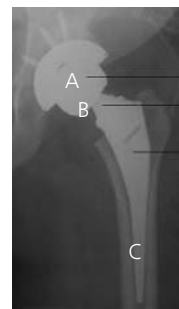
An 88-year-old female approximately 5 feet tall presented to Dr. Wera with degenerative osteoarthritis in the left knee. "This was a classic female knee. She was a very small patient and her knee was very narrow in the medial to lateral direction," says Dr. Wera, who chose a female-specific knee that closely matched the width of the patient's native femur (see Case 1 below). "If a standard implant had been used, there is a chance that the patient could be bothered by the metal protruding on the sides beneath the skin."

In the case of a 60-year-old female approximately 5 feet tall who presented with left hip dysplasia, Dr. Wera determined intraoperatively that a standard off-the-shelf implant was inappropriate. The neck component was too long and had an angle that did not fit with the patient's anatomy.

In assembling the implant for this patient, Dr. Wera selected a large ball to facilitate range of motion, a



Case 1: A knee designed for a woman closely matches the patient's native femur.



Case 2: This patient-tailored hip implant consists of (A) a large ball for more range of motion, (B) a short femoral neck to match the patient's anatomy, and (C) a narrow, tapered, titanium stem without cement to fit inside the patient's femur.



“My philosophy is that women aren’t small men. At the time of surgery, we need to take a look and see if they would benefit from a gender-designed implant due to their anatomy.”

short femoral neck to match the patient’s anatomy, and a narrow, tapered, titanium stem without cement to fit inside the femur. “The patient benefited from a hip that matched her anatomy and feels natural,” says Dr. Wera, who creates a patient-tailored hip implant in about 20 percent of cases (see Case 2 on previous page).

PATIENT PREFERENCES INFLUENCE USE OF GENDER-DESIGNED IMPLANTS

Another consideration in the use of gender-designed implants is patient demand for them. Aggressive marketing by the manufacturers of these implants, including direct-to-consumer advertising, has raised awareness of them among women considering TKA or THA. “The patients are convinced this is important to them. I’ve had many patients who have requested this,” says Dr. Wera.

Gender-designed implants can provide a more comfortable fit, prevent irritation of the soft tissue, and be less palpable and visible to the patient, according to Dr. Wera. However, gender-designed implants are more expensive than other implants and any additional long-term benefits are not yet proved.

For more information, please call **216-844-7200**.

Total Joint-Replacement Specialists Generate High Volume and Excellent Outcomes

University Hospitals Case Medical Center is one of the top hospitals in the United States in arthroplasty volume. Joint-replacement specialists in the Department of Orthopaedic Surgery perform approximately 1,400 TKAs and THAs each year, as well as other types of arthroplasty. The department consistently ranks as one of the best programs in the state of Ohio for arthroplasty outcomes and has been recognized nationally for outstanding clinical results.

The joint-replacement specialists at UH Case Medical Center are Richard E. Grant, MD; Matthew J. Kraay, MD; Randall E. Marcus, MD; William J. Petersilge, MD; Glenn E. Wera, MD; and Roger G. Wilber, MD. For an appointment, call **216-844-7200**.

The Department of Orthopaedic Surgery has been at the forefront of arthroplasty since its surgeons performed one of the first THAs in the United States in 1969. All of the department’s joint-replacement specialists have completed fellowships in adult reconstructive and joint-replacement surgery. Their extensive surgical expertise, combined with specialized nursing and rehabilitation during hospitalization and throughout recovery, provides patients with the optimal opportunity to achieve a great result with their new joint. Research within the Department of Orthopaedics, including improved design of joint-replacement implants, has improved the outcomes for patients throughout the country.

Sports Medicine Specialist Shana N. Miskovsky

Helping athletes prevent injuries, enhance performance and return safely post-injury



Shana Nicole Miskovsky, MD (right), Attending Surgeon in the Department of Orthopaedic Surgery at University Hospitals Case Medical Center and Head Team Physician for the Case Western Reserve University Spartans, with Head Athletic Trainer Susan Higgins (left) and football running back Cameron Boyd (center).

Sports medicine is the natural specialty for former competitive figure skater and martial arts instructor **Shana N. Miskovsky, MD**. The board-certified orthopaedic surgeon is a U.S. Figure Skating Association triple gold medalist in freestyle, figures and ice dance, and a bronze medalist in pairs skating. She is also a fourth-degree black belt instructor of Isshinryu (Japanese) karate and a certified black belt instructor of Tang Soo Do (Korean) karate.

"I'm privileged to take care of athletes," says Dr. Miskovsky, an Attending Surgeon in the Department of Orthopaedic Surgery at University Hospitals Case Medical Center and Assistant Professor of Orthopaedic Surgery at Case Western Reserve University School of Medicine. She joined Case Western

Reserve University in 2005 after completing fellowships in orthopaedic sports medicine at the Hughston Clinic (Columbus, Ga.) and in orthopaedic foot and ankle surgery at the American Sports Medicine Institute (Birmingham, Ala.). Dr. Miskovsky earned her medical degree from The University of Pittsburgh School of Medicine.

TREATING ATHLETES

Much of Dr. Miskovsky's practice focuses on helping athletes prevent injuries, enhance their performance and return to sports safely after an injury. As the head team physician for the Case Western Reserve University

Spartans and the Lake Erie College Storm, she works with a variety of athletes, from football players to swimmers. Dr. Miskovsky has also been a consultant team physician for the Cleveland Gladiators, the professional arena football team, and a physician for U.S. Olympic athletes in speed skating, weightlifting, boxing and ice hockey. She has been selected by the United States Olympic Committee to be a volunteer physician/orthopaedic consultant at the 2010 Vancouver Paralympic Games.

Dr. Miskovsky uses minimally invasive arthroscopy extensively in her practice, including for evaluation and treatment of ankle, great toe, knee, shoulder and hip conditions. For example, she performed hip arthroscopy on a 25-year-old female runner with synovial chondromatosis to remove loose bone and cartilage fragments and debride the cartilage flaps on the acetabulum and femoral head. In another case, Dr. Miskovsky performed arthroscopic evaluation on a 45-year-old male who fractured his fibula and medial malleolus and sustained cartilage damage with loose fragments in a fall. She removed the fragments and treated the cartilage lesions and was then able to fix the fracture through smaller incisions. Her other interests include ankle replacement, foot and ankle surgery and reconstruction, and knee and shoulder surgery.

EDUCATIONAL AND RESEARCH ACTIVITIES

At the Case Western Reserve University School of Medicine, Dr. Miskovsky developed and is teaching a monthlong advanced musculoskeletal anatomy course for students in the M.S. in Applied Anatomy program and for orthopaedic interns. She is also director of the musculoskeletal section of undergraduate medical education and co-leader of course content she helped design on cognition, sensation and movement.

Dr. Miskovsky and other researchers are working on developing an animal model of osteoarthritis to compare four treatments – glucosamine/chondroitin, cortisone injections, saline injections and hyaluronic acid injections – and their effect on the physiology of the cartilage and marker levels. The goal is to use the results to diagnose arthritis earlier and increase understanding of the influence of these treatments on the progression of arthritis.

Dr. Miskovsky has published articles in *The American Journal of Sports Medicine* and in *Sports Medicine and Arthroscopy Review*. She is a reviewer for *The Journal of Bone & Joint Surgery* and for *The American Journal of Sports Medicine*.

Comprehensive Services

The Sports Medicine program at University Hospitals Case Medical Center provides cutting-edge diagnosis and treatment of sports-related injuries. Shana N. Miskovsky, MD, is one of nine sports medicine specialists on the team, which also includes musculoskeletal radiologists, physical therapists and athletic trainers. "We're a very integrated team oriented to treat athletes and get them back to sport safely. We're also involved in performance enhancement and community programs to help make athletes better, safer and stronger," she says.

The team's sports medicine specialists are Donald B. Goodfellow, MD; Susannah Briskin, MD; Allison Gilmore, MD; Amanda Weiss-Kelly, MD; J. Robert Anderson, MD; Reuben Gobezie, MD; Shana N. Miskovsky, MD; Brian N. Victoroff, MD; and John H. Wilber, MD. For more information or an appointment, call **216-844-7200**. Services include:

- Computerized balance testing/fall prevention program
- Injury prevention programs
- Occupational therapy
- Physical therapy
- Sports performance enhancement
- Sports medicine/athletic training
- Advanced therapy programs

Cervical Laminectomy with Fusion Protects Spinal Cord and Relieves Symptoms

A UH Case Medical Center surgeon finds best option for patient who could not abstain from smoking

A 71-year-old male smoker with severe neck pain presented to University Hospitals Case Medical Center with pain that went into his arms, bilateral hand numbness and periodic difficulty with balance, indicating the beginning of myelopathy. The patient had documented cervical stenosis on a previous MRI and had been treated by another surgeon with cervical epidurals. This did not effectively treat his pain, however, and he was becoming increasingly dysfunctional.

EVALUATION

Spine surgeon **Jason Eubanks, MD**, an Attending Surgeon in the Department of Orthopaedic Surgery at University Hospitals Case Medical Center and Assistant Professor of Orthopaedic Surgery at Case Western Reserve University School of Medicine, ordered an MRI. Findings were consistent with a previous MRI and showed severe stenosis at C3-C4 and stenosis at C5-C6 and C6-C7. The patient had generalized cervical spondylosis throughout the cervical spine, but no significant kyphosis.

TREATMENT

Treatment options to protect the spinal cord and attempt to halt the progression of his myelopathy were anterior decompression and fusion, cervical laminoplasty, cervical laminectomy, and posterior cervical laminectomy and fusion. Problems with anterior decompression and fusion include the pathology's multilevel nature and the higher nonunion rate for smokers in anterior cervical arthrodesis operations. The patient's severe neck pain made laminoplasty a less-than-ideal option, as laminoplasty



Left and left-center: Preoperative lateral cervical spine radiographs demonstrating extensive degenerative changes and preoperative sagittal MRI showing multilevel cervical stenosis from C3-C4 down through C6-C7. Right-center and far right: Postoperative lateral and anterior-posterior cervical spine radiographs showing the laminectomy and lateral mass instrumentation from C2-C7.

patients may have more postoperative neck pain than laminectomy and fusion patients. Laminectomy alone has great potential for postoperative instability and resulting deformity.

Dr. Eubanks performed posterior cervical laminectomy and fusion. "This procedure allows for decompression of the spinal cord by removing the posterior cervical elements and stabilization with lateral mass screws, rods and bone graft," says Dr. Eubanks. "It provides immediate, rigid fixation, maintaining cervical alignment and preventing latent instability. It offers a more predictable outcome in patients with severe neck pain than cervical laminoplasty and has a higher fusion rate than anterior cervical arthrodesis."

Postoperatively, the patient's arm pain resolved and preoperative hand tingling decreased. "Most importantly, the patient's spinal cord is protected from future damage," says Dr. Eubanks.

For more information, please call **216-844-6170**.



Jason Eubanks, MD, Attending Surgeon in the Department of Orthopaedic Surgery at University Hospitals Case Medical Center

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Smokers vs. Nonsmokers

Jason Eubanks, MD, is conducting a large study of fusion rates and clinical outcomes in smokers vs. nonsmokers undergoing posterior cervical arthrodesis with lateral mass instrumentation. Early evidence suggests that smoking does not appear to affect the fusion rate in posterior cervical arthrodesis, but clinical outcomes differ between smokers and nonsmokers.

The spine surgeons in the Department of Orthopaedic Surgery at University Hospitals Case Medical Center are Henry Bohlman, MD; Jason Eubanks, MD; Christopher Furey, MD; and Nicholas U. Ahn, MD. For an appointment, call **216-844-7200**.



WHEN TO REFER/GRAND ROUNDS

Call Our Hip and Knee Arthroplasty Experts

Total hip and knee arthroplasty are two of the most reliable and gratifying interventions in medicine. The overwhelming majority of patients obtain dramatic pain relief and improvement in mobility following these procedures. The initial nonoperative treatment of arthritis, however, can be effective for years before joint replacement is appropriate. Careful use of NSAIDs and non-narcotic analgesics form the cornerstone of treatment for most patients. Elimination of impact and joint-overloading activities are also appropriate to minimize pain and further deterioration of those joints affected with arthritis. Weight loss can also be extremely helpful in minimizing symptoms

and slowing progression of disease. Patients with knee arthritis may benefit from intra-articular cortisone injections or viscosupplementation with hyaluronic acid.

WHEN TO REFER PATIENTS FOR ARTHROPLASTY

When patients with radiographically significant arthritis fail to respond to the above nonoperative treatments, total hip or knee arthroplasty should be considered. Pain relief is the most reliable benefit of joint-replacement surgery; pain and loss of function that interferes with activities of daily living despite a thorough trial of nonoperative management is the primary indication for surgery. Physicians should also consider referring for further evaluation those patients who

truly feel that their quality of life is impaired by their arthritis.

Although most patients with advanced arthritis are over 60 years of age, occasionally, young patients may have a relatively rare developmental

condition that predisposes them to arthritis. Early intervention can identify the rare patient who may be amenable to a joint-preserving procedure that can eliminate the eventual need for arthroplasty.

Grand Rounds

■ Feb. 10: "Meniscus and Cartilage Disorders of the Knee"

Donald Goodfellow, MD
Assistant Professor
Department of Orthopaedics
Case Western Reserve University School of Medicine

■ March 1: "Infections in Children"

Allison Gilmore, MD
Assistant Professor
Department of Orthopaedics
Case Western Reserve University School of Medicine

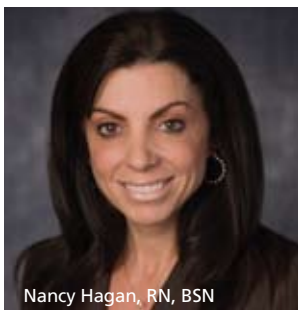
■ March 17: "The Team Physician"

Amanda Weiss-Kelly, MD
Assistant Professor
Departments of Orthopaedics and Pediatrics
Case Western Reserve University School of Medicine

■ March 31: "Current Concepts in Shoulder Arthritis"

Reuben Gobezie, MD
Assistant Professor
Department of Orthopaedics
Case Western Reserve University School of Medicine

For further information about these events, held at the Wolstein Research Building Auditorium from 7-8:30 a.m., including directions, please contact Ellen Greenberger, Education Coordinator, Department of Orthopaedics, at **216-844-3233**, or **Ellen.Greenberger@UHhospitals.org**.



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 **216-983-3089** to access orthopaedic specialists and refer patients to University Hospitals Case Medical Center's Department of Orthopaedic Surgery.