



James Ficke

The Total Ankle Replacement Continues to Evolve

The total ankle prosthesis recently approved by the Food and Drug Administration requires the resection of less bone than other systems now in use in the U.S. “This is an important development because if we do a total ankle replacement with a minimal cut and it fails, there are now other device options for use in revision, without needing to resort to fusion,” says **James Ficke**, professor of orthopaedic surgery at the Johns Hopkins University School of Medicine and director of the Department of Orthopaedic Surgery.

The survivorship of ankle prostheses is roughly 80 percent at eight years, compared with more than 95 percent at 10–15 years for hips and knees. “If you were a patient with ankle arthritis in that 20 percent who failed and you’re 50 years old, you were in a really tough spot because, until recently, there hasn’t been another good option,” says Ficke. “We really need to continue to challenge the designs and surgical techniques in order to improve the survivorship for total ankles.”

Although the typical treatment for late-stage osteoarthritis of the hip or knee is total replacement, that has not been the standard approach for the ankle. For decades, fusion has been considered the best

option, although patients’ recovery can last several months and they must adjust to life with limited joint mobility.

A handful of orthopaedic surgeons in the U.S. are now using the device for total ankle replacement. The Johns Hopkins orthopaedic surgery team implanted its first one in April 2018 and are hopeful that the new device will mean more choices for patients.

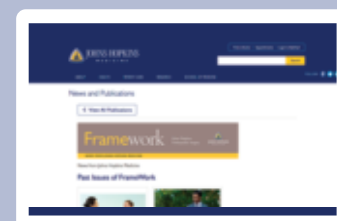
“We really need to continue to challenge the designs and surgical techniques in order to improve the survivorship for total ankles.”

—James Ficke

The Johns Hopkins team was led by Ficke, who has no financial interest in the newly approved device or any other total ankle prostheses. The team will follow the outcomes of the patients and continue to seek improvements in function for those who suffer from arthritis after injury.

Ficke previously served for three decades in the U.S. Army, and says his interest in ankle treatments springs from his work with soldiers who suffered traumatic foot and ankle injuries.

“That really led me to my current work on post-traumatic arthritis,” he says. “While people don’t die from arthritis, it does create tremendous disability.” ■



Read more **Framework** articles online at bit.ly/hopkinsframework

89-Year-Old Returns to Her Active Life, Thanks to a Knee Replacement

They might have taken place more than a half-century ago, but chemistry classes are still fresh in Jean Smith's mind. "I was the only woman in my class," says Smith, a Baltimore native. "The department head made it known that he didn't appreciate women cluttering his chemistry department, because all they were going to do is look for a husband and waste the professor's time."

That, however, was not on the to-do list of a woman who would go on to conduct industrial research and run her family's business. From a young age, Smith loved chemistry; she received her first chemistry set when she was 12 years old and proceeded to take over the third floor of the house to build stink bombs.

Undaunted by her chairman's views, she earned her Ph.D. in chemistry in 1953, the same year a vaccine for polio was developed and Queen Elizabeth II was crowned.

"I was going to show him," says the 89-year-old.

After graduating, Smith worked for W.R. Grace for the next 23 years, where she conducted industrial research—including nuclear fuel production using non-fissile materials. In 1976 she joined her father at his business running Eastern Outdoor Advertising Company, which owns billboards in Maryland, Washington, D.C., and Virginia.

Smith has been Eastern Outdoor Advertising's president since 1985, but her work and lifestyle were complicated in 2016 by pain in her right knee.

Since she had previously been a patient at Johns Hopkins, she decided to make an appointment with the Johns Hopkins Department of Orthopaedic

Surgery. At her first appointment, orthopedic surgeon **Julius Oni** told her she had severe arthritis in her knee and had little if any cartilage left.

Smith asked for a total knee replacement.

"At first, Dr. Oni came back and said knee replacements aren't usually performed on people in their 80s," recalls Smith.

But the two discussed how Smith had been active her entire life. She was still working full time, living independently and visiting state parks for walks. The only obstacle slowing her down was her knee pain. This information confirmed Oni's decision.

"What matters is less the chronological age of the patient than the physiological age and a patient's function before surgery," explains Oni. "She was outstanding when it came to doing her part; she took on the rehabilitation process head-on with incredible zeal and flew through it."

Smith says the successful operation in 2016 alleviated her pain, and her incision is barely visible. She continues to visit Oni for annual follow-ups. The surgery has allowed her to be active again—and begin planning for retirement.

Jean Smith



"No, no, no," she corrects immediately. "I'm only 89."

To show her gratitude, Smith is a loyal supporter of Johns Hopkins. ■

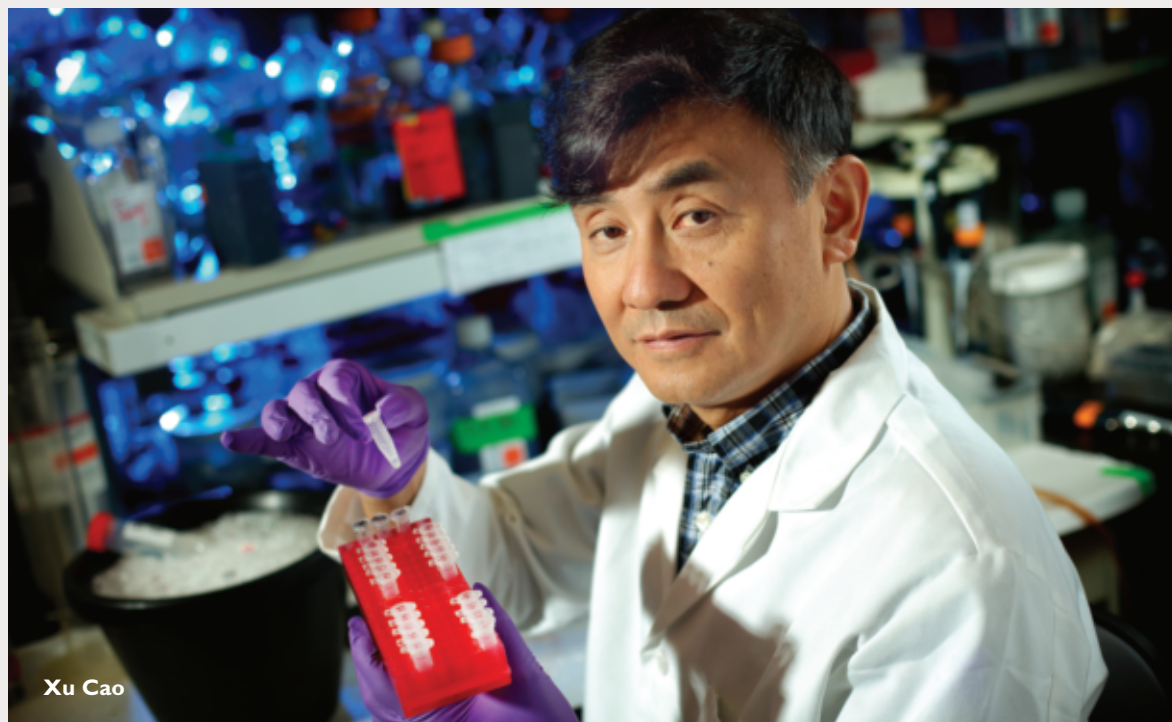
Supporting Our Work

The Johns Hopkins Department of Orthopaedic Surgery provides outstanding treatment of musculoskeletal disorders, fosters innovation and nurtures the next generation of orthopaedic surgeons.

Your support and partnership will help us better diagnose and treat disabling conditions.

To make a tax-deductible gift, please visit hopkinsortho.org/philanthropy, call **410-955-6936**, or send a check payable to Johns Hopkins Orthopaedics at 601 N. Caroline Street, Suite 5251 Baltimore, MD 21287.

JOINT REPLACEMENT SURGERY



Xu Cao

Developing New Treatments for Osteoarthritis

Although there are currently no treatments that can modify or halt the course of osteoarthritis in its trajectory, research led by **Xu Cao**, professor of Orthopaedic Surgery at the Johns Hopkins University School of Medicine, may change that.

About five years ago, Cao's team unveiled a new hypothesis about the biology of osteoarthritis and how it first unfolds. Unlike other prevailing views of the disease, which focus primarily on the articular cartilage, Cao's research centered on articular cartilage and subchondral bone as a functional unit, particularly the molecular signals that drive the pathological

Rare Limb Length Differences in Pediatric Patients



Eva Ricano-Medina and Claire Shannon

Limb length differences of under 1.5-2 centimeters are tolerable for most, requiring either no intervention at all or mild fixes such as shoe lifts, says **Claire Shannon**, a Johns Hopkins pediatric orthopaedic surgeon. However, patients with larger differences—which Shannon

can estimate using measurements and algorithms that calculate growth—often require surgical intervention to avoid pain and functional mobility limitations.

When patients come to see Shannon for the first time, she starts by performing a comprehensive physical exam of all the limbs as well as other areas of anatomy that might give a tip-off for undiagnosed genetic syndromes. She also works with colleagues in radiology to collect imaging that can help characterize a patient’s deformity.

For smaller limb differences, she often recommends epiphysiodesis to introduce scar tissue in the growth plate of the unaffected limb to halt its growth, allowing the affected limb to catch up as it continues to grow longer. For those with more severe limb differences, she recommends lengthening procedures with an external frame for patients whose growth plates are still active. For those whose growth plates are closed, she recommends an internal rod controlled by magnets.

Each of these lengthening procedures can take up to several months to complete. Patients with congenital deformities often require multiple

“Every time Eva comes in, she wants to tell me how much straighter and stronger her leg is becoming. It’s great to hear.”

—Claire Shannon



Physical therapist Alex Parra and Eva Ricano-Medina

procedures every few years as they grow. Close follow-up over time allows Shannon to get to know her patients and families, and to celebrate their successes.

For example, five-year-old Eva Ricano-Medina was born with Ollier’s disease, which caused benign cartilaginous tumors at the growth plates in her left leg, bowing the leg and restricting its growth. After a comprehensive physical exam, Shannon used an external frame as part of Eva’s treatment.

“When she first met me, she said that all she wanted to do was play soccer. But she just couldn’t keep up with the other kids,” says Shannon. Now, “Every time Eva comes in, she wants to tell me how

(continued on page 4)

changes of the subchondral bone on cartilage. The team showed that by intercepting the signals of the protein called TGF- β 1, they could stave off the development of osteoarthritis in mouse models of the disease.

Cao and colleagues, both at Johns Hopkins and at research organizations in China, are now working to translate this discovery into novel therapies for osteoarthritis patients. They are studying two different types of TGF- β 1 inhibitors: One is a small molecule inhibitor linked to the osteoporosis drug bisphosphonate, and the other is a chemical analog of a plant-derived compound used in ancient Chinese herbal medicine to treat malaria. The latter inhibitor, known as halofuginone, is now undergoing clinical trial in China to evaluate its safety and efficacy.

The trial, which opened in June, seeks to enroll 40 patients with early stage osteoarthritis of the knee. Participants will receive a single injection of halofuginone into the subchondral bone under

the guidance of an orthopaedic surgeon. This clinical approach is unique among groups currently evaluating potential therapies for osteoarthritis, says Cao. Other investigators typically inject therapeutics into the synovial cavity surrounding the joint. Halofuginone is directly delivered into subchondral bone to inhibit excessively active TGF- β 1 and a progression of osteoarthritis.

Participants in Cao’s trial of halofuginone will be followed for one year and monitored both for improvement in joint pain as well as reduction in bone marrow edema in the subchondral bone as visualized by MRI. If successful, the trial in China could enable future trials in the U.S.

“There is no disease-modifying therapy for osteoarthritis, period. So if halofuginone proves safe and effective, it will be the first of its kind,” says Cao. “More broadly, it will also represent a real change in philosophy for how skeletal diseases are treated—addressing both mechanical loading and modulating molecular signals.” ■



To support the work of James Ficke, Julius Oni, Claire Shannon, Xu Cao or any others in the Johns Hopkins Department of Orthopaedic Surgery, please visit bit.ly/orthogift

Rare Limb Length Differences in Pediatric Patients

(continued from page 3)

much straighter and stronger her leg is becoming. It's great to hear."

Many length discrepancies stem from congenital or genetic causes, like Eva's; others develop after trauma, such as an injury to the growth plate of a bone. Shannon specializes in correcting limb length discrepancies and is one of a small group of experts in this field nationally and internationally. ■

Your Vital Links

Johns Hopkins Orthopaedic Surgery

Call 443-997-9330

Email hopkinsortho@jhmi.edu

Visit hopkinsortho.org

Philanthropy

Learn how you can help provide a better quality of life for the world

Visit hopkinsortho.org/philanthropy

Call 410-955-6936

Online Physician Directory

Find a Johns Hopkins physician by name, specialty and more

Visit hopkinsmedicine.org/doctors

Clinical Trials

Find Johns Hopkins studies that are enrolling volunteers

Visit trials.johnshopkins.edu

Health Library

Get the facts on diseases, conditions, tests and procedures, learn how to improve your health, sign up for Johns Hopkins Medicine's free monthly e-newsletter and more

Visit hopkinsmedicine.org/health



Johns Hopkins Office of Gift Planning

800-548-1268

giftplanning@jhu.edu

rising.jhu.edu/giftplanning

Framework

This newsletter is one of the many ways we seek to enhance our partnership with our thousands of friends and patients. Comments, questions and topics you would like to see covered in upcoming issues are always welcome.

Framework is published for the Johns Hopkins Department of Orthopaedic Surgery by Johns Hopkins Medicine Marketing and Communications.

Johns Hopkins Medicine
Department of Orthopaedic Surgery
601 North Caroline Street
Baltimore, MD 21287

Orthopaedic Surgery

James Ficke, M.D., F.A.C.S., *Director*

Thomas Clemens, Ph.D., *Vice Chair for Research*

A. Jay Khanna, M.D., *Vice Chair for Professional Development*

Dawn LaPorte, M.D., *Vice Chair for Education*

Lee Riley, M.D., *Vice Chair for Clinical Operations*

Donna Clare, CFRE, *Director of Development*

© 2018 The Johns Hopkins University and
The Johns Hopkins Health System Corporation

Marketing and Communications

Lisa Rademakers, *Editor*

Christen Brownlee, Nicole Davis, Sarah Richards,
Writers

Rachel Sweeney, *Designer*

Keith Weller, *Photographer*

For questions or comments, contact:

Lisa Rademakers at lradema1@jhmi.edu

or 443-287-2527.

Non-Profit Org
U.S. Postage
PAID
Baltimore, MD
Permit No. 5415

Framework

Johns Hopkins
Orthopaedic Surgery

Winter 2019

Inside



1

The Total Ankle Replacement Continues to Evolve



2

89-Year-Old Returns to Her Active Life, Thanks to a Knee Replacement



3

Rare Limb Length Differences in Pediatric Patients