



New study aims to prevent hip injury

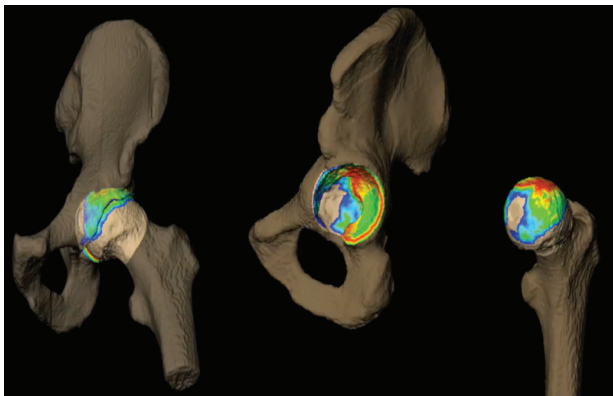
Understanding hip disorder could lead to new treatment.

Many young athletes suffer severe hip injury due to a defect in the joint known as femoral-acetabular impingement (FAI). SPRI scientists are committed to better understanding this condition through a study that will potentially lead to new tools to diagnose FAI earlier and prevent subsequent hip damage.

“This study is really a big, big part of understanding how these injuries happen and how we can correct them,” says Dr. Marc Philippon, SPRI co-chairman and managing partner of The Steadman Clinic.

WHAT IS FAI?

FAI is caused by extra bone on the pelvis and thigh bone around the hip joint. This can cause bones to rub, triggering pain and injury. In fact, FAI causes the majority of labral tears and is linked to cartilage damage and osteoarthritis.



Many athletes have this abnormality, but not all develop symptoms or require treatment. While most previous studies focused only on bone shape, we believe it's the combination of shape and motion that leads to FAI symptoms.

BIOMOTION LAB RESEARCH PINPOINTS CAUSE OF HIP PAIN

“Our research is all about injury prevention and developing and validating treatment for FAI injury,” says Scott Tashman, PhD, director of Biomedical Engineering. “The first step is to identify the factors that cause symptoms. Then we can develop strategies to avoid FAI and individualized treatments for people with symptoms.”

The study will include 120 adult recreational athletes who participate in sports with high risk for FAI, such as skiing. History shows many of these

individuals will have the abnormality associated with FAI. Some will have hip pain and damage.

Our researchers will analyze these athletes' anatomy, using advanced 3D imaging. They will also assess their joint function with dynamic 3D X-ray technology. The team will then create animated 3D computer models of

Thanks to generous benefactors, research of femoral-acetabular impingement is uncovering new ways to prevent hip injury.

how each subject's hip joint moves during different activities. With this data, we can pinpoint the combination of anatomy and motions that cause impingement and can lead to pain and joint damage.

Subjects will be followed for three years. The Imaging Research team will review annual MRI scans for changes in hip labrum and cartilage. And our Center for Outcomes-Based Orthopaedic Research will collect data regarding hip pain or function loss. This follow-up will help identify specific factors that cause injury.

Based on the results, our teams plan to design a screening tool to determine which people are at risk for FAI-related damage. This research will help improve injury prevention, as well as treatment of FAI symptoms.

“By understanding the relationship between anatomy and movement, we can help people alter their activities to prevent damage,” Dr. Tashman says.



New tool predicts patient outcomes

Model helps manage expectations after shoulder surgery.



This study was funded by philanthropy.

and function through this survey. Other tools were used to measure participants' general health and satisfaction.

The COOR team gathered pre- and post-op data on 12 variables that included age, injury details, imaging results and previous surgeries. They found the most predictive variables for recovery are sex, injury severity and cause of injury. Men had slightly better recoveries.

Overall patient outcomes were superb with over 95% fully recovered after surgery. And only a few required revision surgery.

“This tool will be incredibly helpful because we will be more able to understand or predict a patient’s outcome after surgery,” says Dr. Millett. “This will enhance patient care to levels not previously available.”

Study results will be submitted for publication in a leading orthopaedic scientific journal next month.

Four to six months. That’s what it takes for most people to return to daily activities and pain-free after rotator cuff repair. But everyone’s different. Thanks to a recent SPRI study, surgeons can now predict patients’ long-term outcomes after arthroscopy.

Scientists and surgeons in our Center for Outcomes-Based Orthopaedic Research (COOR) built the model that makes this possible.

The model also helps physical therapists adapt standard rehab protocol to best match each patient’s progress. And physicians can use it to manage patient expectations.

“Predictive modeling is a powerful tool to help understand what will happen in the

future,” says Peter Millett, MD, director of shoulder surgery and principal investigator of this study. “Big data from our patient registry allows us to develop these models.”

MOST COMPREHENSIVE SHOULDER RESEARCH ENHANCES CARE

This is the first shoulder surgery research of its kind. COOR researchers analyzed data from over 500 of Dr. Millett’s patients who had rotator cuff repair between 2005 and 2014. The study group averaged 60 years of age. And all levels of joint damage were represented.

Participants were followed for at least two years after surgery, using multiple measurements. The most telling was the American Shoulder and Elbow Surgeons Score. Patients reported their levels of pain

SHARING INNOVATION VIA APP

With the study complete, Grant Dornan, COOR director, is turning the model into an easy-to-use app. It will enable physicians to enter key patient data into the model during the initial clinic visit. In seconds, patients and their doctors will know what to expect in recovery, even before surgery.

“The model will give surgeons a preview of each perspective patient’s outcomes and recovery,” Dornan says. “This should help improve patient selection and education.”

Dr. Millett adds, “There is a revolution in health care right now, and SPRI is once again leading the way.”

Research to find best fix for ankle injuries

Robot compares surgeries for optimal outcomes.

Ankle sprains and fractures are the most common musculoskeletal injuries. And they often lead to instability and post-traumatic arthritis.

Repairing these injuries frequently requires surgery to connect ligaments at the ankle joint, using either a screw or sutures. And there are varying opinions on which method is best. A study at SPRI aims to settle this debate with scientific evidence.

“This controversy is due to difficulty in producing the exact ankle injury in a laboratory and then testing the repair in a biomechanically sound way,” says Tom Clanton, MD, director of Foot and Ankle Sports Medicine and SPRI researcher.

ROBOT TESTS SCREWS VS. SUTURES

Our study will kick off with an examination of cadaver ankles in an intact, uninjured state. The ankle’s various ligaments help stabilize the ankle joint. When they’re damaged, the joint becomes unstable, leading to pain and functional limitations.

Scientists will move each ankle with our research robot to analyze the joint’s stability and mobility. Once they have a baseline, they’ll damage certain ligaments in ways that mimic real-life injuries. Surgeons will then repair half of the ankles with a screw and the other half with sutures in our Surgical Skills Lab.

After surgery, our scientists will return to the robotic lab to test each ankle again. Since the robot accurately duplicates real-life movement, they’ll get a good sense of which type of repair will lead to better patient outcomes.

“Most people would be surprised to learn our robot was initially designed for automated manufacturing. We have repurposed it to test joints. We harness the power of robotics to provide highly accurate, repeatable testing of orthopaedic research questions,” says Travis Turnbull,

PhD, deputy director, Biomedical Engineering.

PATIENTS VALIDATE RESEARCH

But the study won’t end there. Using the SPRI Biomotion Lab’s special 3D imaging equipment, scientists will evaluate the progress of actual patients who have had ankle repair with either screws or sutures. The ankle stability of these individuals will be measured while they’re walking, using a unique dynamic stereo X-ray system.

In addition, researchers in our Center for Outcomes-Based Research will collect and analyze patient-reported outcomes data over many years.

If patient outcomes don’t validate the findings in phase one, it’s back to the robotics lab. Our teams will continue the research cycle until they have identified the surgical method that produces the best results.

Because of generous supporters like you, SPRI scientists have state-of-the-art technology to prove which ankle surgery is best for patients.

Dr. Clanton adds, “Testing actual patients with each type of repair will add considerably to finding the very best solution to this common and often serious injury.”

Once the study is complete, surgeons will have a conclusive answer to the question—“Screws or sutures?” This information will be shared with the orthopaedic community, redefining the best practice in ankle repair.



SPRI promotes collaboration and idea sharing

The Steadman Philippon Research Institute continues to build on its legacy of collaboration worldwide. Two outstanding examples are the Vail Scientific Summit and Conference on the Prevention of Injury and Illness in Sport.



Dr. Marc Philippon will be one of the presenters at the 4th Annual Vail Scientific Summit Aug. 23-26, 2018.

3RD ANNUAL VAIL SCIENTIFIC SUMMIT A SUCCESS

The summit attracted more than 60 researchers, physicians and scientists to Vail last August.

“We were excited to see the growth in numbers of both those presenting and those attending the conference,” says

Johnny Huard, PhD, SPRI’s chief scientific officer. “We were able to assemble the best scientists, researchers and clinicians and put them in the same room with world-class orthopaedic surgeons.”

Presenters represented many of the world’s leading research institutions, including Harvard, Mayo Clinic, Northwestern,

John Hopkins, Cambridge, the National Institute of Rehabilitation in Mexico City and the Italian Institute of Technology. They covered such topics as aging, stem cells, biomotion, cartilage repair, meniscus, bone and translational studies—from basic research to clinical practice.

“These meetings are good places to develop long-lasting collaboration,” says Mayo Clinic’s James Kirkland, MD, PhD.

2ND ANNUAL CONFERENCE ON THE PREVENTION OF INJURY AND ILLNESS IN SPORT

SPRI and the United States Olympic Committee will host the 2nd Annual Conference on the Prevention of Injury and Illness in Sport in Vail this May.

According to SPRI’s Dr. Marc Philippon, people attending will be better prepared to identify sport-specific injuries and how to reduce them, and to implement screening in high-risk populations.

Date set for 2018 golf classic

The annual Steadman Philippon Golf Classic is scheduled for Sept. 20 at Sanctuary Golf Course near Denver. Designed by famed architect Jim Engh, the course features spectacular views of the Rocky Mountain foothills. Presented by RE/MAX, the team event has raised more than \$1.6 million since 2004 to support SPRI research. To register for this year’s classic, go to sprivail.org. Or call 970-479-1590 or 970-479-1563.

