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Stanford Health Care Now

ORTHOPAEDICS AND SPORTS MEDICINE INNOVATIONS AND ADVANCEMENTS

Innovations in Joint Preservation Surgery for Hip and Knee Arthritis

05.28.2021

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At Stanford Health Care, sports medicine has evolved from an athlete-only practice to also serve all active adults. Innovative new techniques for joint preservation of the hip and knee are especially valuable—they can help prevent the need for total joint replacement due to injury or arthritis.



LEADING-EDGE WORK IN HIP ARTHROSCOPY

The hip joint is the most difficult on which to perform arthroscopy due to it being surrounded by deep, soft tissues and the unique curvature of the joint. Orthopaedic surgeons prefer keyhole arthroscopy using one-quarter-inch incisions because it reduces injury and disturbance of the surrounding muscle and tissue.

“Surgery on the hip is also different than arthroscopy on other joints,” says [Marc Safran, MD](#), chief of sports medicine and orthopaedic surgeon at Stanford Health Care. “That’s because it is a very confined ball in a socket. Since there is no naturally occurring space between the ball and socket, surgeons must apply traction to separate the two bones to access the joint.”

Dr. Safran performs hip arthroscopy on Olympic, professional, and college athletes, as well as numerous recreational athletes. He recommends hip arthroscopy for several conditions including femoroacetabular impingement (FAI), hip instability, and labral tears.

Femoroacetabular impingement (FAI)

FAI, where the ball and socket can collide or impinge, can occur on either side of the joint (ball or socket) or both. Some types of FAI are more common in women than men, and others in men more than women. Surgeons use arthroscopic treatment to reshape the head or socket to reduce impingement. Most patients regain 80% of their functionality within four to six months. Left untreated, impingement can show up later in life as hip pain and possibly premature hip arthritis.

Hip instability

Female athletes, especially gymnasts and ballet dancers, often present with hip pain due to microinstability with or without hip dysplasia (shallow hip socket). In situations where the socket is mildly shallow, or in those with loose ligaments, Stanford Health Care is

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leading the way to arthroscopically tighten the hip ligaments with high success rates for returning to full activity.

Hip labral tears

Labral tears can occur on their own, or in conjunction with either of the above conditions. Labral tears result from trauma to the hip, and normal wear and tear exacerbates them. Surgeons can repair or remove the damaged tissue during an outpatient procedure, with most patients regaining 80% of their functionality in three months, though improvement occurs for a year or more after surgery. In some situations, new tissue can be used to replace irreparable labral tears, called a labral reconstruction.

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INNOVATIONS IN KNEE CARTILAGE RESTORATION AND TRANSPLANT

Dr. Safran, along with the broader Stanford Sports Medicine team, are looking at better ways to understand and address knee problems. Unlike other joints, the patella is susceptible to both compression and shearing stresses, which makes treatment of the patella even more challenging than elsewhere in the body.

The patella has more cartilage than any other joint in the body, especially where it meets the thigh bone. Patellar cartilage is a very complex structure with few cells—tissue cells comprise only 10% of cartilage.

The rest is an extracellular matrix that contains protein and collagen fibers. There is no blood supply to the cartilage, nor does it have any nerve fibers or reparative properties. Thus, a patient can injure the cartilage and not know until years later, when the onset of patellofemoral arthritis occurs. But the lack of blood supply, unique structure and high forces make treatment of injuries to the patellar cartilage most challenging. This particularly challenging problem of kneecap (patellar) disorders, including cartilage damage and joint preservation has led Stanford Health Care to start a Patellofemoral and Knee Cartilage Preservation Center of Excellence, led by [Dr. Seth Sherman](#).

Knee cartilage restoration and transplant innovations at Stanford Health Care include:

Osteochondral autologous transfer system (OATS)

One of the newer techniques Stanford Health Care uses is the OATS procedure. This procedure takes bone and cartilage plugs from one part of the knee and merges them together in another part of the knee.

However, because the knee doesn't have a lot of spare cartilage, plugs should be no more than 10 millimeters across. Anything larger has the potential to affect knee function, negating the procedure.

It is also challenging to replicate the curvature of the patellar cartilage. And OATS can only work when there is damage on one side of the joint. Therefore, it cannot help with patellofemoral arthritis where there is cartilage damage on both sides.

Osteochondral allograft transplantation of patellar cartilage

One of the ways that Dr. Safran and the team at Stanford Sports Medicine address the limitations of the OATS procedure is with a patellar cartilage transplant from a deceased person. This approach avoids a cobblestone effect by filling the defective area with one single, smooth piece of donor cartilage of almost any size.

There is no real risk of rejection with this type of transplant because cartilage is immunoprivileged tissue with few cells. The body doesn't recognize the tissue as foreign

and will not trigger an immune system response. The curvature of the structure, however, must be perfectly matched.

The suitable donor is a younger person without arthritis, with a knee similarly sized to that of the patient. Surgeons must implant the cartilage within two weeks of being tested and released for use.

ONGOING INVESTIGATION IN JOINT PRESERVATION

“What’s going to be key with the older population is to prevent the diseases of aging,” says Dr. Safran. “To me, that’s the Holy Grail. Everyone is looking to solve or prevent arthritis.”

To that end, he and his peers at Stanford Health Care are conducting biomechanical studies on hip microinstability caused by excessive motion of the femoral head within the acetabulum. They are also looking at ways to further optimize hip arthroscopy outcomes. Dr. Safran is personally leading an effort to create the first North American hip arthroscopy registry.

He seeks to collect data on patient-specific factors, such as BMI, details of the arthroscopic procedures performed, and other metrics from patients across the United States and Canada. The key is to understand arthroscopy outcomes and limitations of hip arthroscopy. He anticipates 7,000 to 8,000 patient entries in the registry per year, which would deliver useful and reliable data over the next couple of years.

Referring patients with hip and knee arthritis to Stanford Health Care

Learn more about [Sports Medicine](#) and our innovations in treating patients with hip and knee arthritis. To make a patient referral, please call **1-866-742-4811**, Monday – Friday, 8:30 a.m. – 5 p.m.

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