New procedure bests standard of care for fixing damaged cartilage

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A new study has demonstrated that a procedure wherein healthy cartilage is transplanted to fix an area of damaged cartilage (osteoarticular cartilage transplantation or OATS procedure) is superior to the standard of care for repairing cartilage defects. It is thought that fixing such lesions may ultimately help to prevent the onset of osteoarthritis, and get athletic individuals back to sporting activities reliably. The study by Hospital for Special Surgery researchers was reported at the annual meeting of the American Academy of Orthopaedic Surgeons, Feb. 7-11.

"Studies have shown that there is only about a 40% return to sport after the microfracture procedure which is the standard of care treatment in the U.S. Over 90% of patients return to sport with the OATS procedure, said Riley J. Williams, III, M.D., a sports medicine orthopedic surgeon at Hospital for Special Surgery (HSS) in New York City and senior investigator of the study. "For those who have isolated cartilage lesions of the femur and are interested in a return to sport in a timely and predictable fashion, the OATS procedure, relative to microfracture, represents a better option."

For years, researchers have known that erosion of articular cartilage, the soft lining or cushion at the end of bones, can lead to symptomatic osteoarthritis. The cartilage can be damaged from normal wear and tear or from a traumatic injury. Once the cartilage is damaged, it continues to deteriorate. Athletes with progressive osteoarthritis are often forced to stop playing their sport of choice.

Over the years, researchers have developed a number of procedures for repairing cartilage in patients who range from roughly 16 to 50 years of age. The current standard of care is microfracture, an arthroscopic procedure that involves using a tiny pick to punch holes into the base of the damaged cartilage area. This promotes bleeding and allows bone marrow cells to come to the surface of the damaged tissue. As a result, the cells then change into fibrocartilage cells and heal the defect. A study from the HSS Cartilage Registry showed that only about 40% of athletes return to sport after this procedure. "40% is such an abysmal rate of return to sport, which is why we keep looking for other repair methods to help our patients," said Dr. Williams, who is also director of the HSS Institute for Cartilage Repair.

Another more recently developed procedure is OATS, which involves transferring healthy cartilage tissue from one part of a person's knee to the damaged area. The transplanted graft includes cartilage and underlying bone and can be performed arthroscopically. A single plug of cartilage may be transferred or multiple plugs may be transferred in a procedure called mosaicplasty. Each plug is a few millimeters in diameter, and when multiple plugs are moved to the damaged area, it creates a mosaic appearance.

Several European studies have shown that the OATS procedure provides a higher return to sport and a longer lasting result, but HSS researchers wanted to verify the results in the U.S. population. "There is an essential difference between American sports and European sports. When you talk about European sports, you are really talking about soccer," said Dr. Williams, whereas most U.S. patients mostly participate in American football, basketball, running, as well as soccer.

To test the two procedures in the U.S. population, HSS investigators recruited 48 patients who had "potholes" in their cartilage in the area known as the femoral condyle, an area located at the end of the

thighbone in the upper half of the knee. For the control group, the researchers identified 48 patients in the HSS Cartilage Registry who were matched for gender and underwent microfracture for a similar cartilage repair, same lesion size and location.

Clinicians evaluated patients prior to surgery and at one, two, three and five years of follow-up. They used a variety of tools commonly used to measure outcomes in patients undergoing these types of procedures. They used the short-form (SF)-36 health survey, a 36-question scale that includes a gamut of questions about general health and is widely used across all fields of medicine. They used two knee specific questionnaires: the international knee documentation committee (IKDC) scores and the Knee Outcome Survey (KOS). And they used the Marx Activity Level that is scored on a scale from 0 to 16 and gauges a person's ability to do four activities: running, cutting, decelerating, and pivoting.

They found no difference in the knee outcome surveys or SF-36 form, but they did identify significant differences in the Marx Activity Level. Patients who underwent the OATS procedure had higher scores than patients who underwent microfracture at one year from baseline (score 5.21 vs. 4.11), two years (7.29 vs. 3.71), three years (7.75 vs. 2.91) and five years (8.55 vs. 2.89).

"The Marx activity rating scale correlates directly to the amount of physical activity that you can do at the time of the assessment," said Dr. Williams. "Patients who underwent the OATS were able to do more sports and more athletic activities compared to the microfracture group at the same time point. We now have another procedure which is likely to result in a return to sport more predictably."

He said the results are not surprising given that the OATS repair results in a natural cartilage repair whereas microfracture results in a repair

comprised mainly of fibrocartilage that has been shown to be biomechanically inferior to articular cartilage.

Dr. Williams is the head team physician for the Nets NBA basketball team and the Major League Soccer's New York Red Bulls.

Provided by Hospital for Special Surgery