

Study identifies potential fix for damaged knees

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Investigators from Hospital for Special Surgery have shown that a biodegradable scaffold or plug can be used to treat patients with damaged knee cartilage. The study is unique in that it used serial magnetic resonance imaging (MRI) and newer quantitative T2 mapping to examine how the plug incorporated itself into the knee. The research, abstract 8372, will be presented during the annual meeting of the American Orthopedic Society for Sports Medicine, June 9-12, in Keystone, Colo.

"The data has been encouraging to support further evaluation of this synthetic scaffold as a cartilage repair technique," said Asheesh Bedi, M.D., a fellow in sports medicine and shoulder [surgery](#) at Hospital for Special Surgery who was involved with the study. Dr. Bedi performed analysis of MRI scans of patients primarily treated by Riley Williams, M.D., director of the Institute for Cartilage Repair at Hospital for Special Surgery. "The Trufit plug has been designed to have mechanical properties that are similar to cartilage and bone," Dr. Bedi said.

Damage to so-called articular cartilage can occur in various ways, ranging from direct trauma in a motor vehicle accident to a noncontact, pivoting event on the soccer field. "Articular cartilage lacks the intrinsic properties of healing—you are essentially born with the articular cartilage that you have," Dr. Bedi said. Left untreated, these injuries can increase loads placed on the remaining intact cartilage and increase the risk of progression to degenerative arthritis. One way to treat patients with symptomatic chondral lesions is an OATS procedure, in which

cartilage is transferred from one portion of the knee to treat another. Because this is a "robbing Peter to pay Paul" situation, researchers at Hospital for Special Surgery set out to examine whether they could use a biodegradable plug, the Trufit CB plug, to fill the donor site. The goal was to monitor how the plug incorporated itself into the knee and to evaluate the quality of the repair cartilage.

The Trufit plug has two layers. The top layer has properties similar to cartilage and the lower layer has properties similar to bone. The bilayered structure has mechanical properties that approximately match the adjacent cartilage and bone. Surgeons inserted the plug in the knees of 26 patients with donor lesions from OATS procedures and followed up with imaging studies (with MRI and T2-mapping) at various intervals for a period of 39 months.

"Quantitative MRI, when combined with morphologic assessment, allows us to understand the natural history of these repair techniques and define those patients who are most likely to benefit from the surgery," said Hollis Potter, M.D., chief of the Division of Magnetic Resonance Imaging, director of Research in the Department of Radiology and Imaging at Hospital for Special Surgery and lead author of the study. "We gain knowledge about the biology of integration with the host tissue, as well as the repair tissue biochemistry, all by a noninvasive imaging technique."

"What we found was that the plug demonstrated a predictable process of maturation on imaging studies that paralleled the biology of their incorporation," Dr. Bedi said. "With increasing postoperative duration, the repair tissue demonstrated encouraging properties with T2-values that resembled native [articular cartilage](#)."

Dr. Williams, Dr. Bedi and other surgeons at Hospital for Special Surgery are involved in ongoing studies to investigate the efficacy of the

TruFit plug in treating primary cartilage defects as well. "What is unique about this study is that we have serial MRI with T2 mapping at various time points after surgery, which allows us to really examine the natural history of plug incorporation," Dr. Bedi said.

Dr. Williams believes that there is a role for scaffold-based cartilage repair strategies in the treatment of symptomatic cartilage lesions. "It is our hope that we can successfully treat these cartilage problems over the long term, thus restoring normal knee function and slowing the progression of knee arthritis," Dr. Williams said.

Source: Hospital for Special Surgery

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