Too Much Or Too Little Activity Can Lead To Knee Surgery

Both very high and very low levels of physical activity can accelerate the degeneration of knee cartilage in middle-aged adults, according to a new study presented at the annual meeting of the Radiological Society of North America (RSNA). Nearly one in every two people in the U.S. may develop knee osteoarthritis by age 85, according to the Centers for Disease Control and Prevention. By 2030, an estimated 67 million Americans over the age of 18 are projected to have physician-diagnosed arthritis.

Researchers at the University of California in San Francisco (UCSF) previously had found an association between physical activity and cartilage degeneration, but that study focused on one point in time. For the new study, the UCSF researchers looked at changes in knee cartilage among a group of middle-aged adults over a four-year period. They used magnetic resonance imaging (MRI)-based T2 relaxation times to track the evolution of early degenerative cartilage changes in the knee.

"T2 relaxation times generated from MR images allow for analysis of the biochemical and molecular composition of cartilage," said Wilson Lin, B.S., research fellow and medical student at UCSF. "There is increased water mobility in damaged cartilage, and increased water mobility results in increased T2 relaxation time." The researchers analyzed 205 patients, age 45 to 60, from the UCSF-based Osteoarthritis Initiative, a nationwide study funded by the National Institutes of Health on the prevention and treatment of knee osteoarthritis. Participants used a questionnaire to record their physical activity. The researchers measured T2 values of cartilage at the patella, femur and tibia of the right knee joint at baseline and at two and four-year visits.

According to the results of the study, participating frequently in high-impact activities, such as running, appears associated with more degenerated cartilage and potentially a higher risk for development of osteoarthritis. "When we compared the scores among groups, we found an accelerated progression of T2 relaxation times in those who were the most physically active," said Thomas M. Link, M.D., professor of radiology and chief of musculoskeletal imaging at UCSF. "Those who had very low levels of activity also had accelerated progression of T2 values. This suggests that there may be an optimal level of physical activity to preserve the cartilage."

Along with the findings on changes in knee cartilage, the study also highlighted the potential of T2 relaxation times as an early indicator of cartilage degeneration. "Standard MRI shows cartilage defects that are irreversible," Dr. Link said. "The exciting thing about the new cartilage T2 measurements is that they give us information on a biochemical level, thus potentially detecting changes at an earlier stage when they may still be reversible."

Dr. Link noted that people who have a higher risk for osteoarthritis (such as family history of total joint replacement, obesity, history of knee injury or surgery) can reduce their risk for cartilage degeneration by maintaining a healthy weight and avoiding risky activities and strenuous, high-impact exercise. "Lower impact sports, such as walking or swimming, are likely more beneficial than higher impact sports, such as running or tennis, in individuals at risk for osteoarthritis," he said.

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