Light Exercise Best to Prevent Knee Osteoarthritis

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CHICAGO – The wisdom about practicing everything in moderation also may hold true for knees, especially in middle-aged adults with risk factors for osteoarthritis.

Light exercise, such as walking, appears to protect against OA, but the extremes – a sedentary lifestyle or more aggressive workouts – may accelerate OA onset in at-risk individuals, according to baseline data from the Osteoarthritis Initiative, a longitudinal, multicenter, observational study funded by the National Institutes of Health.

Osteoarthritis risk can be reduced by avoiding aggressive exercise and exercising safely, said the study's lead author, Dr. Thomas M. Link, professor of radiology and chief of musculoskeletal imaging at the University of California, San Francisco.

Among at-risk patients, light exercisers had significantly less degeneration of the cartilage surrounding the knees on magnetic resonance imaging (MRI) than did those whose exercise routines were characterized as either minimal or moderate to strenuous.

Moderate-strenuous exercise may accelerate cartilage degeneration and increase osteoarthritis risk in women who engage in more intense workouts.

Middle-age adults, particularly those with OA risk factors, need to be "extremely careful" with their cartilage, Dr. Link said in a press briefing Nov. 29 during the annual meeting of the Radiological Society of North America. "Once cartilage is gone, it's gone forever."

This doesn't mean that patients should stop running, but it does mean they must make sure they are exercising safely to avoid sustaining an injury that could "initiate an osteoarthritis cascade, which will be very difficult to stop," he said.

Research associate Keegan K. Hovis, R.N., said the key for patients who exercise strenuously is to focus on modifiable risk factors, such as maintaining a healthy weight and strengthening the knee stabilizing muscles, including the quadriceps.

Subjects included 132 at-risk patients and 33 controls matched for age and body mass index (99 women and 66 men between the ages of 45 and 55 years, BMI range of 18-27 kg/m^2). Risk factors for OA included a previous knee injury or knee surgery, a family history of total knee replacement surgery, bone spurs on the fingers, and occasional knee symptoms.

Based on responses to the leisure activity component of the Physical Activity Scale for the Elderly, study participants were stratified according to intensity of exercise habits into sedentary, light, or moderate-strenuous exercisers. Patients also were grouped by whether they engaged in frequent knee-bending activities. These activities included climbing at least 10 flights of stairs daily, lifting objects weighing more than 25 pounds, or squatting, kneeling, or deep-knee-bending for at least 30 minutes per day.

Sedentary exercisers walked less than or equal to 2 days a week for less than 2 hours per day. Light exercisers walked or participated in other forms of light exercise such as table tennis or Frisbee at least 3 days a week for less than 2 hours a day. Moderate-strenuous exercisers engaged in sports such as running, tennis, or soccer at least 3 days a week for greater than or equal to 1 hour per day.

To assess cartilage health, researchers used T2 mapping, a quantitative and qualitative MRI technique that, unlike anatomic imaging, reveals the chemical composition and structure of the cartilage (including collagen and water content) and can provide an image marker of cartilage degeneration in its earliest stages.

"T2 values can detect changes in cartilage at the molecular level, prior to irreversible changes in the structure; therefore, it has the potential to identify, with

the earliest signs of degeneration, who may benefit from early treatment or behavioral intervention," said Dr. Link.

Two radiologists analyzed T2 values in five cartilage areas – patella, medial femur, medial tibia, lateral femur, and lateral tibia – and graded overall visible signs of cartilage and meniscus damage using a modified whole-organ MRI scoring method (WORMS).

Among the 132 at-risk patients, T2 values were significantly lower, indicating less cartilage degeneration, in light exercisers than sedentary and moderate-strenuous exercisers in the overall average of all compartments (43.5 vs. 44.5 and 45.0, respectively) and in the lateral tibia (38.0 vs. 39.7 and 40.2). "Light exercise was associated with more intact collagen structure and lower cartilage water content, which are indicative of healthier cartilage," said Ms. Hovis.

Moderate-strenuous exercise in women was significantly correlated with higher T2 values in the medial femur, indicating that moderate-strenuous exercise may accelerate cartilage degeneration and increase osteoarthritis risk in women who engage in more intense workouts, she reported.

Differences in cartilage health were not found in any of the three exercise groups in the control cohort. However, knee-bending activities were associated with higher T2 values in both the at-risk and control cohorts. In the at-risk cohort, those who engaged in frequent knee-bending activities had significantly higher T2 values in all compartments than those who did not (44.7 vs. 43.2) and a significantly higher WORMS score, indicating visible signs of cartilage degeneration. In the normal cohort, knee-bending activities were associated with higher T2 values in the medial femur and the medial tibia (49.9 vs. 47.0 and 35.4 vs. 32.5, respectively) with a trend toward significance in the overall average in all compartments.

"Knee-bending activity may accelerate cartilage degeneration in all individuals, but potentially to a greater degree in subjects already at risk for knee osteoarthritis," Ms. Hovis said.

The researchers plan to collect longitudinal data at 2 and 4 years and are finishing an analysis of data on strength training.

Dr. Link disclosed that he has received research support from Merck. ■