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Hitting the Links May Stress Out New Knees

Study measures impact on artificial knees—from the inside out

SAN FRANCISCO—Until now, the impact of some recreational activities has been hard to judge when it comes to protecting artificial knee replacements. A study presented today at the 75th Annual Meeting of the [American Academy of Orthopaedic Surgeons](#) (AAOS), shows that golf, generally thought to be a low impact activity, can also cause a great deal of stress on an artificial knee.

“Some of our findings were expected. For example, we were not surprised to find that jogging and tennis generate a lot of force on the artificial knee joint,” said Darryl D. D’Lima, MD, PhD, primary author of the study. Dr. D’Lima is director of the research laboratory at the Shiley Center for Orthopaedic Research and Education at Scripps Clinic in La Jolla, California. “However, we did not expect to find that golf swings can be so hard on the knees. During the golf swing, it seems that there is a lot of force on the forward knee.”

Taking data from a specially designed artificial joint, the study authors have determined exactly how much force is put on the implant during some common physical activities.

Clifford W. Colwell Jr., MD, implanted four [total knee arthroplasty](#) (TKA) patients with joints equipped to measure forces from inside the implant. One year following surgery, the patients performed the following activities, for which the force on their replaced knees could be measured:

- jogging
- tennis
- golf swings
- treadmill walking
- biking

Researchers found that jogging, tennis, and golf generated the highest forces on the knees, while walking generated a lower force; walking on a treadmill instead of level ground further reduced the force. The lowest force was generated by biking.

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Most orthopaedic surgeons agree that high-impact activities in any form following a knee replacement have the potential to shorten the life of the artificial joint. However, nearly all previous studies of force from different activities on artificial knees have involved only external measurements or estimates.

More than 478,000 total knee replacements are performed in the United States each year. Patients might have one or both knees replaced. Total knee replacement is a surgical procedure whereby the patient's natural knee joint is replaced with an artificial one, composed of metal and plastic. Some patients might have a unicompartmental replacement, in which only a portion of the knee joint is replaced.

The most common reasons for this surgery are:

- severe pain
- swelling
- stiffness in the knee, frequently caused by [osteoarthritis](#) (OA) that cannot be satisfactorily treated with medications or other therapies

It is often recommended that TKA patients participate in some form of [exercise following surgery](#). Maintaining a healthy weight and strengthening the leg muscles can benefit the artificial joints. This is why it is so important for surgeons to have objective measures of the amount of force that different activities exert on the knee.

“Biking is often recommended for TKA patients because developing the quadricep muscles helps support the knee joint, and the activity was assumed to be low impact,” Dr. D’Lima said. “This study provides the scientific data to verify that assumption. This is not to say that TKA patients have to eliminate jogging, golfing or tennis, but they should consider modifying those activities will lessen the impact on their knees.” For example, the researchers suggest that joggers, who have first discussed running with their orthopaedic surgeon, might run on a treadmill instead of pavement.

Disclosure: Dr. D’Lima and his co-authors received no compensation for this study.

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