

# Strong Quad Muscles May Slow Knee Osteoarthritis

BY JEFF EVANS  
Senior Writer

WASHINGTON — Strong quadriceps muscles appear to protect against cartilage loss in some parts of the knee in most people, but larger muscle mass in the leg may be associated with x-ray progression of knee osteoarthritis in women, according to findings from two studies presented at the annual meeting of the American College of Rheumatology.

Specifically, strong quadriceps muscles protected the patellofemoral joint from cartilage loss and did not worsen its loss in the tibiofemoral joint in both men and women.

A large leg muscle mass overall did not appear to influence the x-ray progression of osteoarthritis (OA) in the patellofemoral joint, except for the medial aspect of the joint in women.

Speaking during a press conference, Dr. Shreyasee Amin of the Mayo Clinic, Rochester, Minn., noted that strong quadriceps have generally been viewed as protective against knee OA. But some previous studies have found evidence that greater quadriceps strength may actually do more harm than good in the tibiofemoral joint in knees with mechanical malalignment.

But these earlier studies used x-rays to measure progression, which is an indirect measure of cartilage loss, the hallmark of OA. Pathologic changes to the meniscus on x-ray also can appear to cause an increase in joint-space narrowing, yet not reflect any real change in cartilage, she said.

Dr. Amin and her colleagues prospectively performed MRI scans at baseline, 15 months, and 30 months, and measured the quadriceps strength at baseline in a cohort of 265 men and women with symptomatic

knee OA. The patients had a mean age of 67 years and a mean body mass index (BMI) of 31.5 kg/m<sup>2</sup>.

Upon dividing the patients into three levels of strength for each gender, the investigators found that men and women who had the greatest quadriceps strength were 60% less likely to lose cartilage in the lateral aspect of the patellofemoral joint after 30 months than were those who had the least strength.

"The quadriceps muscle could help stabilize the patella and prevent it from subluxing laterally, and so we feel that that might be a reason why greater quadriceps strength protects against cartilage loss at the lateral patellofemoral joint," she said.

MRI scans showed no evidence that greater quadriceps strength either protected or worsened cartilage loss at other areas of the knee (the tibiofemoral joint or the medial aspect of the patellofemoral joint).

The analyses were adjusted for age, BMI, gender and baseline cartilage scores.

In a subgroup analysis of patients who had their knees measured for malalignment, varus alignment (bowleg) of 5 degrees or more did not increase the risk for tibiofemoral joint cartilage loss. There were too few people who had a valgus alignment (knock knee) of 5 degrees or more for analyses.

During a separate presentation at the same meeting, Dr. David J. Hunter of Boston University reported that a large amount of lean muscle mass in the leg had no effect on the x-ray progression of patellofemoral OA, after correcting for race, height, and total percentage of fat. But women with the largest muscle mass were more likely to experience progression of medial patellofemoral OA than were women with the least amount of leg

muscle mass, even after adjusting for those confounding variables.

"I really want to emphasize that a lot of the effects that we saw with muscle mass were largely mitigated when we adjusted for total percent fat and race. The differences in prevalence [of joint space narrowing progression] were quite profound in this study, such that it was much more common in blacks, particularly in black women," Dr. Hunter said at the meeting.

Dr. Hunter and his associates measured OA progression with weight-bearing, skyline x-rays that were taken at baseline and after 36 months in a subset of 796 patients with and without knee pain on most days of the month. The patients were originally part of a cohort of 3,075 white and black men and women aged 70-79 years in the multicenter, community-based Dynamics of Health, Aging, and Body Composition (Health ABC) study on knee OA. The investigators defined OA progression as an increase in the joint space narrowing score as observed on the radiograph.

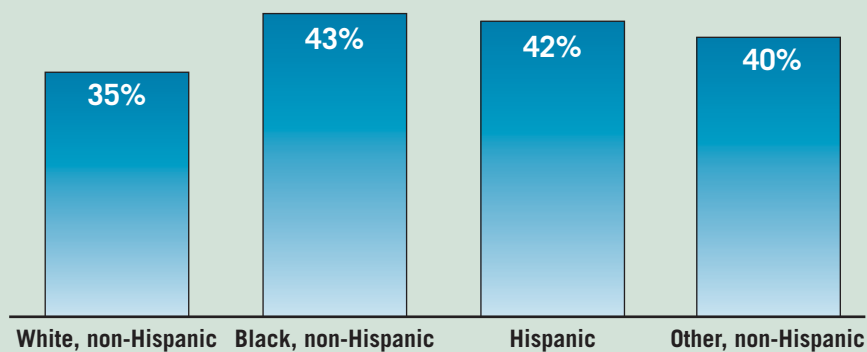
The results could possibly be explained by an increased pull of the vastus medialis oblique muscle in patients with large muscle mass, which would pull the patella medially and increase the potential for medial patellofemoral joint space narrowing progression.

The force of knee flexion might also be increased in individuals with large leg muscle mass because of a large hamstring muscle, which could potentially increase the patellofemoral joint reaction force, Dr. Hunter proposed.

Muscle mass itself also might be a proxy for physical activity, which itself may predispose a person toward progression, he added. ■

## DATA WATCH

### Proportion of Adults Whose Physician-Diagnosed Arthritis Limited Their Activity in 2003-2005



Note: Based on age-adjusted responses from the National Health Interview Survey.  
Source: Centers for Disease Control and Prevention

ELSEVIER GLOBAL MEDICAL NEWS

# Sitting Up Straight May Please Mom, But Not Patients' Backs

BY PATRICE WENDLING  
Chicago Bureau

CHICAGO — Straight backed isn't the optimal sitting position for the spine, according to a study conducted in Scotland using positional magnetic resonance imaging.

The study demonstrated that a 135-degree body-thigh sitting posture, in which the hips are higher than the knees, causes less strain on the lumbar spine and most simulates the "relaxed" supine position, Dr. Waseem Amir Bashir said at a press briefing during the annual meeting of the Radiological Society of North America.

"I know we've always been told to sit up right with our backs straight, but our study shows that this position is not naturally favorable for your back at all," he said. "The bottom line is that we don't have any chairs available to us that are appropriate for the best sitting position."

The study included 22 healthy volunteers (mean age, 34 years; weight 67 kg; height 169 cm) with no history of back pain or surgery who underwent measurements of lumbar lordosis angles, intervertebral disc (IVD) heights, and translation of the nucleus pulposus using a 0.6

-tesla whole-body, positional MRI scanner.

The patients were scanned in three different positions: a slouching position in which the body was hunched forward, as if over a desk or video console; an upright 90-degree sitting position; and a relaxed position where the volunteer reclined backward 135 degrees while the feet remained on the floor.

Each scan was separated by a 10-minute supine rest period because at least 10 minutes is needed by the body to rehydrate intervertebral discs, Dr. Bashir said. Research has shown that as much as 75% of disc height, lost throughout the day, can be regained with a 20-minute supine rest.

The worst position for the spine—as reflected in disc height—was the slouching position, followed closely by the upright 90-degree position, the University of Aberdeen (Scotland) investigators reported.

Disc heights decreased as lumbar lordosis increased in each sitting position from reclining to forward flexion. The two lowest spinal disc levels, the L4/5 and L5/S1, showed the greatest loss of disc height. "Even if it's only 2 mm at the second lowest levels, if you add it all up, it's quite significant," said Dr. Bashir, now a

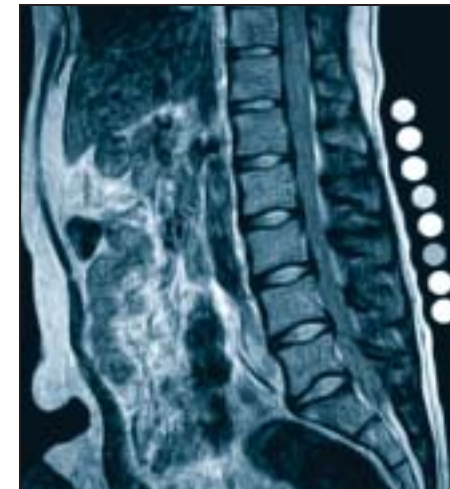
clinical fellow at the University of Alberta Hospital, Edmonton.

There was a significant difference for the upright and slouched positions, compared with the 135-degree and supine positions in disc height and movement of the nucleus pulposus, the gel-like mass that forms the middle of an intervertebral disc.

Disc movement was most pronounced with the forward slouching position, while

the 90-degree position showed a slight movement backwards, he said. The 135-degree position was similar to a supine position, placing very little strain on the spinal discs and associated musculature, he said.

The 135-degree position has found its way into seat designs for luxury auto manufacturers. But until furniture makers take note, Dr. Bashir advocates the use of adjustable desks and chairs, and footrests. ■



The two worst positions: MR images show that disc height was most diminished among those slouching forward (left) and those sitting perfectly upright at 90 degrees.

PHOTOS COURTESY DR. WASEEM AMIR BASHIR/RSNA