Science News

Running Shoes May Cause Damage to Knees, Hips and Ankles, New Study Suggests

ScienceDaily (Jan. 6, 2010) — Knee osteoarthritis (OA) accounts for more disability in the elderly than any other disease. Running, although it has proven cardiovascular and other health benefits, can increase stresses on the joints of the leg. In a study published in the December 2009 issue of *PM&R: The journal of injury, function and rehabilitation*, researchers compared the effects on knee, hip and ankle joint motions of running barefoot versus running in modern running shoes. They concluded that running shoes exerted more stress on these joints compared to running barefoot or walking in high-heeled shoes.

Sixty-eight healthy young adult runners (37 women), who run in typical, currently available running shoes, were selected from the general population. None had any history of musculoskeletal injury and each ran at least 15 miles per week. A running shoe, selected for its neutral classification and design characteristics typical of most running footwear, was provided to all runners. Using a treadmill and a motion analysis system, each subject was observed running barefoot and with shoes. Data were collected at each runner's comfortable running pace after a warm-up period.

The researchers observed increased joint torques at the hip, knee and ankle with running shoes compared with running barefoot. Disproportionately large increases were observed in the hip internal rotation torque and in the knee flexion and knee varus torques. An average 54% increase in the hip internal rotation torque, a 36% increase in knee flexion torque, and a 38% increase in knee varus torque were measured when running in running shoes compared with barefoot.

These findings confirm that while the typical construction of modern-day running shoes provides good support and protection of the foot itself, one negative effect is the increased stress on each of the 3 lower extremity joints. These increases are likely caused in large part by an elevated heel and increased material under the medial arch, both characteristic of today's running shoes.

Writing in the article, lead author D. Casey Kerrigan, MD, JKM Technologies LLC, Charlottesville, VA, and co-investigators state, "Remarkably, the effect of running shoes on knee joint torques during running (36%-38% increase) that the authors observed here is even greater than the effect that was reported earlier of high-heeled shoes during walking (20%-26% increase). Considering that lower extremity joint loading is of a significantly greater magnitude during running than is experienced during walking, the current findings indeed represent substantial biomechanical changes." Dr. Kerrigan concludes, "Reducing joint torques with footwear completely to that of barefoot running, while providing meaningful footwear functions, especially compliance, should be the goal of new footwear designs."