New surgery improves outcomes for severe flat foot deformity

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A surgery developed at Hospital for Special Surgery can improve patient outcomes in individuals with severe adult flat foot deformity, a problem that is increasingly being seen in hospitals across the country. Patients who undergo the new surgery have better long-term outcome and mobility than those who undergo traditional surgery. The paper will be presented at the annual meeting of the American Orthopaedic Foot and Ankle Society in National Harbor, Md., on July 8.

"Before this study, we were not sure whether you could salvage patients with flat foot and ankle deformity and correct their ankle as well as their foot deformity," said Jonathan Deland, M.D., chief of the Department of Foot and Ankle Surgery at Hospital for Special Surgery (HSS). "Now we know that with this technique you can save the ankle, and it provides a correction of the deformity even at nine years after surgery." Dr. Deland developed the surgery and is senior author of the study.

Adult acquired flat foot deformity is basically a severe type of flat foot that develops for unknown reasons in individuals who have had flat feet all their life. It is more prevalent in women and those who are overweight, and it usually develops in individuals in their 40s and 50s. In stage I of the deformity, the tendon that runs along the inside of the ankle begins to degenerate. In stage II, the arch starts to fail, and a person develops a more severe case of flat foot. As the arch continues to collapse and the flat foot becomes more pronounced, mobility becomes difficult, and the foot becomes stiff, which is considered stage III.

In the most severe stage, stage IV, the ankle starts tilting and is at risk of developing arthritis as a result of the deformity. "These people have tremendous flat foot to the point that their ankle is involved," said Scott Ellis, M.D., foot and ankle orthopedic surgeon at HSS and first author of the study. In these people, the extreme flat foot has injured the deltoid ligament, a strong, flat triangular ligament that is located on the inside of the ankle that provides support to prevent the ankle from over pronating. In stage IV, the deltoid ligament has become stretched and incompetent, which is what allows the ankle to tilt.

If the ankle deformity is severe and symptomatic enough, then surgeons either perform an ankle replacement, which is very difficult, or, more commonly, fuse the ankle. "The fusion is not ideal because it takes all the motion away in the ankle in a patient who already has a foot problem," Dr. Ellis said. "Imagine walking without motion in your ankle. It changes your gait and it leads to arthritis in the other joints of the foot over time, eight to 10 years down the line, because you start having to use those joints to take up the slack of motion that is not occurring in the ankle."

In the new surgery for stage IV deformity developed at HSS, surgeons not only reconstruct the flat foot deformity, but they also reconstruct the deltoid ligament using a tendon that runs along the outside of the calf called the peroneus longus. A person can function without their peroneus longus. Alternatively, the peroneus longus can be kept and a cadaver tendon used.

In the study presented at the AOFAS meeting, HSS investigators conducted the new surgery in five patients, four men and one woman, and monitored the surgery's success. The mean age was 67 years. Patients underwent X-rays that showed the surgery improved the alignment in the ankle and the effects were long-lasting. "The X-rays showed the maintenance of the correction of the tilt. The alignment was

still improved nine years later," Dr. Ellis said. Patients had excellent mobility at eight to 10 years following the surgery and none of the patients had arthritis.

Doctors also measured outcomes through several questionnaires including the Foot and Ankle Orthopedic Survey, an outcome scale that assessed 42 items divided among six categories. The average FAOS scores were 61.4 for symptoms, 1.5 for stiffness, 78.3 for pain, 87.9 for function/daily living, 71.7 for function/sports/recreational activities, and 42.1 for quality of life. "The FAOS scores were good," Dr. Ellis said.

Patients were asked how far they could walk in blocks or miles and the cohort of patients was able to walk an average of 25 blocks (range 10 to 40), equivalent to 1.25 miles, after surgery. Two patients continued to play golf without significant problems, another exercised regularly on a treadmill, one was involved in circuit training, and the final patient played volleyball, although he did notice some stiffness. All patients reported they were satisfied with the procedure and, given the result, would have the operation again.

Dr. Ellis says he thinks the new surgery may be increasingly useful with stage IV flat foot deformity. No surgeons that the authors know of at other hospitals are currently using the surgery. The procedure is expected to become more popular. "I see a lot of this deformity in my office. It's one of the major problems I deal with," Dr. Ellis said, pointing out that it is very prevalent.

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