PT Restores Function After Bunionectomy

Physical Therapy in Merrimack Valley for Foot

Sometimes evidence-based medicine reveals some surprising findings. You may find this article interesting. Take for example, surgery for bunions, a condition referred to in medical terms as hallux valgus. The surgeon removes a pie-shaped piece of bone from one side of the big toe and wedges it on the other side of the joint to restore a more normal alignment of the toe. The idea is to restore function in weight-bearing for walking.

But new studies using plantar pressure analyses have shown that all is not as expected or hoped for. Although the X-rays show the toe is lined up nicely and the person appears to be walking well, in fact, the normal physiologic gait (walking) pattern is not restored. And over time, that could mean arthritis will develop.

Hallux valgus (bunion) is a condition that affects the joint at the base of the big toe. The bunion actually refers to the bump that grows on the side of the first metatarsophalangeal (MTP) joint. Hallux is the medical term for big toe, and valgus is an anatomic term that means the deformity goes in a direction away from the midline of the body. So, in hallux valgus, the big toe begins to point towards the outside of the foot. The bunion that develops is actually a response to the pressure from the shoe on the point of the angle. At first the bump is made up of irritated, swollen tissue that is constantly caught between the shoe and the bone beneath the skin. As time goes on, the constant pressure may cause the bone to thicken as well, creating an even larger lump to rub against the shoe.

Plantar pressure analysis is done using a platform with 1,760 sensors that map how much pressure is exerted on each square centimeter on the bottom surface of the foot. The measurements are taken as the patient walks across the sensor platform and recorded in different colors to represent various amounts of pressure. The data goes directly into a computer that calculates peak pressure, contact area, and contact time for each anatomical region of the foot.

In this study from the Gait Analysis Laboratory at the Foot and Ankle Center in Vienna, Austria, 30 patients were tested after surgery for hallux valgus. All had pain in the area of the first toe (metatarsophalangeal joint). There were no other musculoskeletal or orthopedic problems in the low back, hip, or leg to account for this pain.

All patients were tested using the plantar pressure analysis before and after surgery. Post-operative measurements were taken at four weeks, eight weeks, and six months following the procedure. Other measures taken included range-of-motion of the toe and function using the American Orthopaedic Foot and Ankle Society (AOFAS) questionnaire. The patients completed the AOFAS survey before surgery and again six months later.

The results of pre-operative testing did, indeed, show low scores on the function test, decreased range-of-motion of the first toe, and increased plantar pressures. There was also evidence of load shifting in the forefoot from before to after surgery. At first (before surgery), patients shift the load off the painful metatarsophalangeal joint. After surgery, the patient shifted more load away from the great toe region. The result is an even more pathologic gait pattern.

What can be done to help patients recover fully after surgery for hallux valgus? Physical Therapists have

demonstrated through this study that a multimodal rehabilitation program can help restore more normal weight-bearing and walking patterns. Right after surgery, the patients were placed in a special cold cast called an Aircast cryo-cuff. This device helps reduce inflammation and swelling. All patients wore a special shoe for the first four weeks after the operation. The shoe allowed the patients to put weight on the toe with less stress through the forefoot. By decreasing the load at the surgical site, bone healing can take place uninterrupted.

Physical Therapy began four weeks after surgery with leg elevation, lymphatic drainage, gait training, manual therapy, and strengthening exercises. Manual therapy included release techniques for the muscles of the foot and lower leg as well as manipulations of the big toe, forefoot, and ankle. Specific training exercises to restore normal walking patterns were also part of the rehab program. Everyone had four sessions (once a week for four weeks) and did a home program of daily exercises as well.

Post-rehab testing showed marked improvement in function and motion along with a decrease in the maximum force placed on the first toe. Total motion did not change significantly but dorsiflexion of the big toe improved by five degrees. Dorsiflexion describes the movement of the big toe needed to push off from the ground to move forward.

Analysis of the plantar pressure patterns from before to after surgery showed improvement. This suggests improved function of the big toe in pushing off while walking. This particular finding helps support the benefit of Physical Therapy intervention after bunionectomy surgery. Although there wasn't a control group in this study (i.e., patients who had the surgery but did not have rehab), other before and after studies using plantar pressure data have not shown this type of change.

Physical Therapy has been shown effective following many types of orthopedic surgeries (e.g., joint replacements, ligament reconstruction, bone fractures). This is one of the few studies to show how function can improve with rehab after forefoot surgery. Changes in plantar pressure distribution while walking were used to document the benefit of a rehab program following surgery for hallux valgus. The authors point out that without a control group, future studies including a control group are needed to verify their findings.

Reference: Reinhard Schuh, CM, et al. Rehabilitation After Hallux Valgus Surgery: Importance of Physical Therapy to Restore Weight Bearing of the First Ray During the Stance Phase. In Physical Therapy. September 2009. Vol. 89. No. 9. Pp. 934-945.