Results of Foot Injuries -- Airbags

Physical Therapy in Merrimack Valley for Foot

You probably won't be surprised to know that front-end collisions resulting in airbag release cause significant physical injuries. The force of the bag inflating against the body protects the person from smashing into the dashboard or going out the front window.

But as Newton's third law of motion states, For every action, there is an equal and opposite reaction. This means that for every force there is a reaction force that is equal in size but in the opposite direction. The transfer of force during the car crash and air bag release can result in a traumatic injury to the otherwise unprotected body. And more than one-third of those injuries are to the foot and ankle.

Such injuries can lead to arthritis of the foot. In particular, the midfoot or tarsometatarsal joint (TMT) joint is affected. This is where the bones and connecting joints between the heel and the base of the toes are located. Pain from midfoot arthritis can cause limping when walking and an inability to navigate uneven surfaces or move faster than a slow walk. Going up and down stairs can be next to impossible.

There are other causes of midfoot arthritis such as gout, inflammatory conditions, and degeneration due to age or neurologic conditions affecting the foot. But torn ligaments, fractures, and dislocations from high-energy car accidents are the main cause of midfoot arthritis developing years later.

Structural changes from the injury lead to abnormal alignment, collapse of the arch, and other foot deformities. The patient experiences instability as the foot is no longer able to provide a rigid lever over which the body moves during forward propulsion.

What can be done for patients with this type of foot arthritis? The first goal is to reduce the painful symptoms and any destructive inflammation that might be present. Nonsteroidal antiinflammatory drugs (NSAIDs) are used at first to accomplish this.

Next, an attempt is made to stabilize the midfoot. This may be done with special shoes, shoe modifications, or orthotics (inserts placed inside the shoe). The orthotics help off-load the midfoot and protect the already damaged joint. Special plastic braces that fit inside the shoe (called polypropylene ankle-foot clamshell orthosis) can reduce pressure on the bottom of the foot by 30 per cent.

When nonsurgical measures such as these just described are not successful in reducing pain and stabilizing the joints, then surgery may be needed. The surgeon fuses the bones of the midfoot together. The procedure is called an arthrodesis. The specific bones that get fused depend on where the damage is located. Surgeons rely on imaging studies (X-rays, CT scans) taken before surgery to plan the type of procedure needed.

Often, the base of the metatarsal bones (long bones in the forefoot) must be fused to the bones in the midfoot to achieve the rigid stabilization needed. Metal plates and screws are used to hold everything together.

As with all fusion procedures, there is a chance that the fusion won't be successful and movement will continue to occur in the midfoot. Research has not been done to show which method of fixation works best. Other possible complications include infection, pain from the hardware, stress fractures, and joint arthritis in the adjacent joints. The need for a second surgery due to complications arises in up to 10 per cent of all

cases.

There is some evidence from studies that the surgeon's ability to line the bones of the midfoot up as close to normal as possible before fusing them gives the best results. The senior surgeon who helped write this article provided her preferred technique for the surgical management of post-traumatic midfoot arthritis that does not respond to conservative care.

Specific surgical techniques are described and discussed. Specific location and type of incision, use of tourniquet, and type of anesthesia and nerve block are presented. Fixation devices and their location are included along with advice on how to fuse patients whose bone quality is less than normal.

Finally, the surgeon advises that patients should be warned that arthrodesis of the midfoot helps reduce but doesn't always eliminate foot pain. The procedure provides stability to improve function but the patient should not expect to regain normal motion. Recovery includes rehab and final results aren't known until at least 12 months after the surgery (longer if a second surgery is required).

Reference: Amar Patel, MD, et al. Midfoot Arthritis. In Journal of the American Academy of Orthopaedic Surgeons. July 2010. Vol. 18. No. 7. Pp. 417-425.