Arthroscopic Releases and Hindfoot Fusion for Spastic Equinovarus Foot Deformities: An All-Inside Technique

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Acute brain injuries, most commonly anoxic brain injuries or traumatic brain injuries, affect more than 2 million individuals per year in the United States. These injuries are followed by myriad of musculoskeletal complications, including progressive stiffness, muscle imbalance, and rigid contractures in the extremities. Spastic equinovarus foot (SEF) deformities are the most common foot deformities observed in adults with an acute brain injury. The SEF cascade is initiated by upper motor neuron damage, specifically damage to pyramidal cells in the motor cortex, which terminate on interneurons in the lateral corticospinal tract. The initiation of the SEF cascade is commonly observed in patients with a traumatic brain injury involving the primary motor cortex in the frontal lobe. In patients with an anoxic brain injury, there is a lack of oxygen from the anterior cerebral artery, leading to lower extremity muscle hypotonia and spasticity in the stance phase of the gait cycle. Long-term spasticity of the posterior leg compartment results in fixed contractures and deformity of the ankle. These fixed contractures lead to muscle weakness of the ankle dorsiflexors, affecting the swing phase of the gait cycle. Ultimately, the muscle imbalance results in equinus and hindfoot varus. Approximately 30% of patients with this deformity are unable to ambulate without assistance. Over time, these deformities lead to pain, pressure sores, and difficulty with bracing, which increases the risk for wound complications, infection, and amputation.

Surgical management of SEF improves quality of life by reconstructing a functional foot, decreasing skin problems, reducing pain, and decreasing overall healthcare costs. These surgical treatment options typically are not implemented until 18 months after an acute brain injury, during which potential exists for patients to functionally improve. During this time, nonsurgical treatment options, including custom orthotic braces, targeted physical therapy, muscle relaxants (eg, baclofen, diazepam, dantrolene), anesthetic nerve blocks (local or open), botulinum toxin injections, and electrical stimulation, can be performed. Previous literature has shown that if surgical management is indicated, generally after failed nonsurgical management, techniques for contracture release involve multiple large incisions. For example, the standard of care for posterior compartment release involves a 5- to 7-cm incision along the posteromedial ankle. To release the lateral compartment, a 4-cm incision along the posterolateral fibula is recommended. These incisions may be under increased tension after deformity correction, occasionally necessitating skin grafting or advanced wound closure techniques. In addition, these patient populations tend to have poor nutritional status, which increases the risk for wound healing problems and infection. Currently, limited reports are available on minimally invasive arthroscopic techniques for SEF correction. The goal of this video is to illustrate arthroscopic-assisted, minimally invasive contracture releases with tibiotalocalcaneal arthrodesis to achieve improved alignment and functional reconstruction of SEF.