



Failed Subtalar Arthroereisis Due to Extensive Implant Reaction: A Case Report

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Abstract

I present a case whereby STA-peg were used to treat bilateral painful flexible flatfoot deformities in children. A boy, presented at 8 years of age, 2 years after STA-peg procedures and tendo-Achilles lengthening for painful flatfeet. I had a minimal subtalar motion and pain at the sinus tarsi. Radiographs demonstrated surgical defects in the calcaneus with surrounding high signal on the magnetic resonance imaging (MRI) in the subchondral bone of the calcaneus and talus. The patient failed conservative management and had his implant removed with good relief of his pain. Histology was submitted at the time of implant removal. I present the radiographic and pathologic findings seen in this patient with failed subtalar arthroereisis due to extensive implant reaction.

Keywords: Arthroereisis; Pes planus; Children; Subtalar synovitis

Introduction

Flexible flatfoot in children is one of most disorders encountered by the pediatric orthopaedic surgeon. The true incidence is unknown, in part, because there is poor agreement on strict clinical and radiographic criteria for defining a flatfoot and also because most with this condition never seek treatment. It is believed by some those flexible flatfeet in children, if left untreated, may lead to disabling secondary deformities and foot pain in adolescence or early adulthood, although this has never been substantiated [1-9]. Despite the absence of any convincing evidence that flexible flatfeet actually lead to functional problems and or pain, many authors recommended surgical treatments for children with painless flexible flatfeet [2,4,5,9]. Among the procedures recommended, subtalar arthroereisis utilizing a high molecular weight polyethylene implant is considered to be a minimally invasive procedure. The reported advantages of this technique over Chambers [3] first described arthroereisis in 1946 as a technique for the treatment of pediatric pes planus utilizing a bone block to fill the sinus tarsi and limit hindfoot eversion. In 1977, Miller [5] advocated the addition of the Achilles tendon lengthening to the arthroereisis procedure, and described using triangular bone graft obtained from the posterolateral portion of

the calcaneus and placed in an osteotomized segment of the anterolateral facet of the calcaneus, just behind the calcaneocuboid joint. In 1983, Smith [9] popularized the use of a polyethylene peg implant to prevent excessive anterior shift of the talus during hyperpronation. Despite report of good result, subtalar arthroereisis has associated complications such as persistent pain, avascular necrosis of the talus, sinus tarsi, intraosseous cystic formation in the talus, subluxation of the prosthesis, and subtalar joint arthrosis [1,6,7,8,10]. I report a case with a previously undescribed complication of extensive implant reaction after failed subtalar arthroereisis with polyethylene peg implant (STA-peg).

Case Report

A boy presented to our clinic at 8 years of age with complaints of bilateral foot pain. He had a history of Bilateral painful flatfeet ever since he was a small child. He was initially treated with orthotics and physical therapy, than at 6 years of age, he underwent a subtalar arthroereisis with an STA-peg implant and Achilles lengthening by a podiatrist at an outside institution. On presentation to our clinic 2 years after surgery his pain severely limited his sporting activities and limited his walking to no more than three blocks and was also interfering with his abilities at

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school. On exam, he had flexible flatfeet with reconstitution of his arch when standing on his toes. He had minimal subtalar motion and tenderness at the sinus tarsi bilaterally. There was crepitus upon passive motion of the subtalar joint. He had a better correction of the appearance of his flatfoot on the right side compared to the left. Dorsiflexion of his ankles was limited to 5° past neutral with his knees extended, with 45° of plantar flexion on examination. Radiographs of the feet demonstrated surgical defects and outlines of the pegs in the calcanei (Figure 1). Also noted was some arthrosis in the posterior facet of the subtalar joint. The AP roentgenograms demonstrated increased talonavicular angles with lateral displacement of the navicular on the talar head. The lateral talocalcaneal angle was increased with talonavicular joint breach. A Magnetic Resonance Imaging (MRI) of both feet revealed the polyethylene peg in the anterolateral portion of the calcaneus with the orizontal platform of the peg between the non-articular surfaces of the talus and calcaneus laterally. The peg was surrounded by high signal on MRI in the subchondral bone of the talus and calcaneus (Figure 2). Specimens were sent for histologic examination (Figure 3), which demonstrated sclerotic synovium with chronic granulomatous reaction to refractile polyethylene shards. After removal of the implants and a brief period of immobilization, the patient had improvement of his pain. He required UCBL orthotics for 1 year after surgery and had continued relief at 3-year follow up. He is now able to participate in full athletic activities without pain.



Figure 1: AP and lateral radiographs of right and left, feet demonstrating reactive bone in the calcanei around the implants.



Figure 2: Oblique coronal and sagittal fast spin echo MR images of the ankle demonstrate moderate osseous reaction around the implant with a margin of high signal and sclerosis.

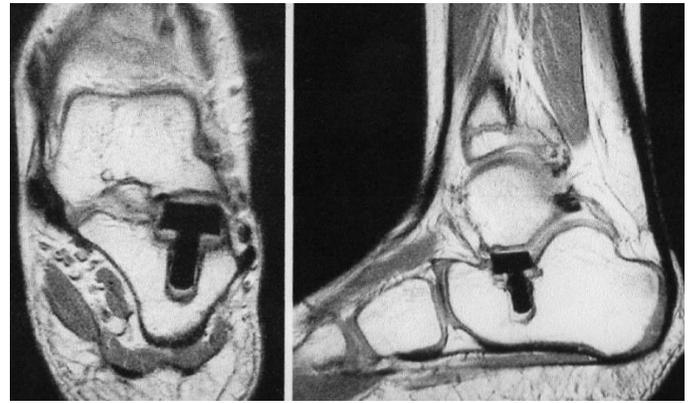


Figure 3: Photomicrographic showing histiocytic and foreign body giant cell reaction to shards of polyethylene particles.

Discussion

Arthroereisis is a term applied to procedures that limit but not eliminate the motion of a joint with abnormal mobility. The report has described the use of various materials for subtalar joint arthroereisis including a bone plug, silicone, poly-L-lactic acid and ultra-high weight polyethylene. This procedure has been popularized in the podiatric community [3,4,9,11]. Complications reported in the literature are common and wide ranging. The most commonly seen complication is continued severe postoperative pain with failure to reconstitute the longitudinal arch on weight bearing and a residual flatfoot deformity [1]. Marked loss of motion of the subtalar joints is also seen and is associated with arthrosis at the talonavicular and subtalar joints. Rocket [7] described bilateral intraosseous cysts in the talus after subtalar arthroereisis with an STA-peg implant. The cyst contained clear, thick, yellow gelatinous fluid in conjunction with an eroded implant that was sitting loosely in the calcaneus. Pathologic review of the cyst material was described as an interosseous ganglion. Siff and Granberry [8] reported on avascular necrosis of the talus which was diagnosed 10 years after the original procedure. It was postulated that the patient developed a foreign body reaction resulting in the avascular necrosis.

The patient in this study had painful flatfeet treated by subtalar joint arthroereisis using a polyethylene peg implant placed in the subtalar joint. In this instance, the patient had persistent pain, after arthroereisis procedure, which became progressively worse with time. Upon removal of the polyethylene implant from the subtalar joint, there was noted to be extensive polyethylene debris with granulomatous reaction. The pathologic process seen in this patient has not been reported previously as a complication of subtalar arthroereisis, although it is certainly a well-recognized complication of polyethylene implant. Furthermore, I believe that persistent or recurrent foot pain after subtalar arthroereisis with a polyethylene implant warrants excision of the implant.



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