Arthroereisis
What Have We Learned?

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KEYWORDS

• Flatfoot • Treatment • Surgery • Arthroeresis • Pedriatrics • Adults

KEY POINTS

- The techniques used to correct flatfoot deformity can be grouped into 3 categories: soft tissue, bone (osteotomies and arthrodesis), and arthroereisis.
- Arthroereisis procedures were originally designed for pediatric treatment and generally involve joint-sparing techniques that correct the flatfoot deformity while preserving foot function.
- Different kinds of arthroereisis procedures are described, including sinus tarsi implants, tarsi canal implants, and calcaneo stop.
- Arthroereisis is a minimally invasive procedure performed near the apex of flatfeet deformity in a constrained structure.
- Arthroereisis can be performed alone or as a complementary procedure to correct flatfoot.

Video content accompanies this article at http://www.foot.theclinics.com.

INTRODUCTION

Flatfoot is a common deformity in adult and pediatric populations, with a 5% incidence. The deformity is characterized by a reduction or absence of the medial arch, medial protrusion of the talar head, and valgus hindfoot under weight-bearing conditions.[1,2] The deformity can be symptomatic or asymptomatic, flexible or rigid.[3] Clinical evaluation must include an assessment for the presence of subtalar or midtarsal synostosis, ligamentous laxity, stiffness, concomitant deformities, Achilles tendon shortening, and so forth. Patients should be examined completely including a proper gait analysis. Patients who are not able to compensate for the deformity during walking and who keep their feet in permanent pronation usually are symptomatic earlier.

Imaging should begin with full weight-bearing radiographs.[4,5] Special attention should be pointed to ask patients not to correct the deformity when the radiographs

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are taken, because the authors have observed confusing conclusions when patients with flexible deformities unintentionally start to correct the flatfoot deformity as they do at rest at the end of the day.

Most symptomatic patients get significant relief when using inserts (off the shelf or custom made).[6]

When conservative treatment does not allow patients to come back to normal life, including daily day activities, moderate physical exercise, basic shoe wear, and so forth, surgical treatment should be considered.[7]

Although indications and surgical treatment are still under debate, different treatment options have been recommended for flatfoot deformity, including soft tissue procedures, osteotomies, arthrodesis, and recently arthroereisis (**Box 1**). The last option has become more popular due to the high success rates reported in Europe, South America, and Asia. It was initially described for children, but increasing indications are expanding even in adults. This has led clinicians to put more attention to indications, technique, rehabilitation, and potential complications.[8,9]

RATIONALE FOR ARTHROEREISIS

Arthroereisis procedures were originally designed for the treatment of pediatric deformities and generally involved joint-sparing techniques, that is, correction of the flatfoot while preserving foot function.[10] Regardless of the implant design or material, the rationale for this procedure is that placing a calcaneal motion locking device into the sinus tarsi or tarsal canal restores and maintains the physiologic alignment between the talus and calcaneus during bone remodeling while correcting the deformity before it turns into a rigid one. Apparently, these locking devices do not negatively affect the biomechanics of the subtalar joint or alter the normal closed kinetic chain mechanics while limiting excessive hindfoot pronation.[11]

Historically, arthroereisis was first described by Grice in 1952[12] for correction of paralytic flatfeet in children without affecting foot growth. Several complications were observed, such as loss of correction or overcorrection. Haraldsson[13] and Lelievere[14] first described the possibility of blocking the sinus tarsi, restricting subtalar motion but avoiding fusions. Lelievre introduced the term, *lateral arthroereisis*, for a temporary staple across the subtalar joint. Batchelor modified the technique with the introduction of a fibular peg blindly inserted through the sinus tarsi. A high nonunion rate, however, was observed.[15]

Box 1
Surgical options for flatfoot deformity

Soft tissue procedures
- Achilles tendon lengthening
- Kidner procedure
- Spring ligament repair

Osteotomies
- Medializing calcaneal osteotomy
- Lateral column lengthening (Evans)
- Z osteotomy

Artrodesis
- Triple arthrodesis
- Double arthrodesis (subtalar and talonavicular)

Arthroereisis