Arthroereisis for symptomatic flexible flatfoot deformity in young children

Flexible flatfoot is a common deformity in the pediatric population. The foot due to ligamentous laxity is unable to support the body weight at its three contact areas to the ground (The plantar aspect of the calcaneus, and the plantar aspect of the head of the 1st and 5th metatarsal). As result, the foot collapses at its subtalar and talonavicular joint, producing valgus deformity of the calcaneus and elimination or vanish of the medial foot arch. In severe forms of flexible flatfoot deformity, children are symptomatic, presenting decreased endurance in sports activities and long walks due to aching and easy fatigue of the lower extremities, and non-responding, for at least six months, to conservative treatment modalities, such as stretch exercises, activity modifications, shoe insoles, and foot orthosis. All these children shared clinical and radiological features in the stance position under full weight-bearing.

Fig. 1.

Clinical findings: Total collapse of the longitudinal medial arch of the foot. Feet externally rotated.

Plantar and medial bulging of the prominent talar head, leaving the plantar and medial region of the articular surface of the talus uncovered due to the dorsal and lateral subluxation of the talonavicular joint (Fig. 1). Concave lateral border of the feet due to the lateral subluxation of the calcaneocuboid joint. Excessive midfoot and forefoot abduction «too many toes sign». Heels in valgus position, due to eversion of the subtalar joint. Achilles tendon bows laterally, due to Achilles tendon shortness, exacerbating heels valgus position. Tenderness at tibialis posterior tendon insertion, due tendon stretching. Tenderness over sinus tarsi, due to sinus tarsi impingement.

Radiological findings:

Lateral view: Increased Meary's angle. Decreased calcaneal inclination angle. Increased talar declination angle. Increased talocalcaneal angle (Fig. 1).

Anteroposterior view**:** Increased Meary's angle, due to talonavicular joint lateral subluxation. In talonavicular joint lateral subluxation (moderate 25%-50% and severe >50%), the talar head is no longer covered medially and plantarly by its articulation with navicular, due to the medial foot ray lateral displacement. Increased talocalcaneal angle (Kite angle) (Fig. 1).

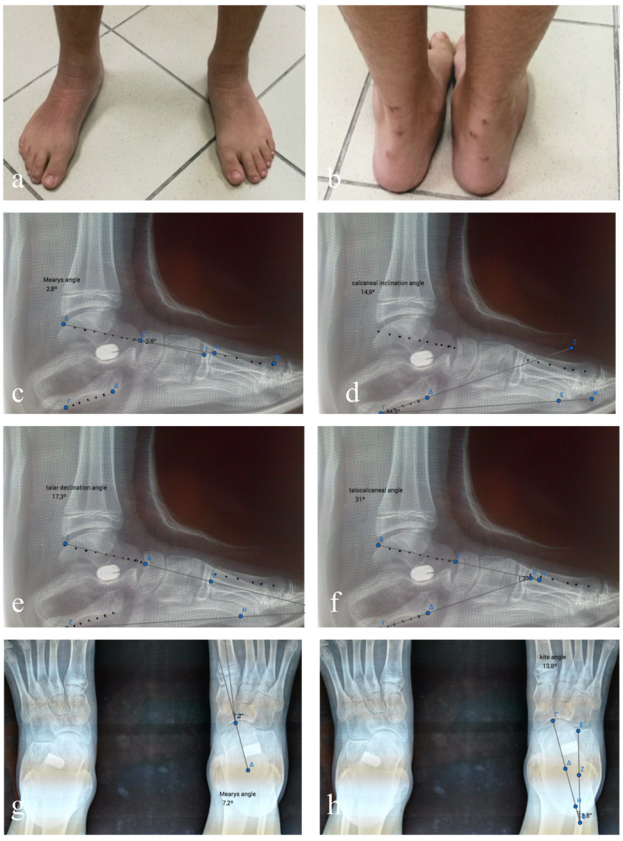

Fig. 2.

These children were the ideal candidates for subtalar arthroereisis in association with percutaneous triple-hemisection lengthening of the Achilles tendon. Subtalar arthroereisis involves the insertion of an implant, barrel-shaped, into the sinus tarsi, between the middle and posterior facets of the subtalar joint, through a small skin incision to keep open the sinus tarsi and block the excessive pronation of the subtalar joint, elevating the talus and reinstating in its position the talonavicular joint. The purpose of arthroereisis in symptomatic flatfoot deformity in children is to restore the subtalar and talonavicular joints, relocating the talus properly over the calcaneus allowing the remodeling of these bones during the rest of their growing period. So, the possible complication of tibialis posterior tendon lesions initially, and the development of arthritic changes later in the adulthood, of the talonavicular, subtalar, and calcaneocuboid joints can be avoided.

This study includes 28 feet of 14 children treated with subtalar arthroereisis with MBA subtalar implant (Integra MBA implant size 10mm in 20 feet and 8mm size in 8 feet). The mean age at surgery was 10.7143 years (range 8-14 years). The mean follow-up was 2,9 years. For estimation of the efficacy of the surgical procedure, X-Rays, and the American Foot and Ankle Score (AFOAS) rating scale were used preoperatively and postoperatively in all our patients. Normal radiological measurements were restored (Fig. 2). The mean preoperative AFOAS score was 65,1429 points. The mean postoperative AFOAS score was 88,851 points. We strongly recommend this simple technique in young children with symptomatic flexible flatfoot deformity who do not respond clinically and radiologically to 6-month conservative treatment.

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Publication

Arthroereisis for Symptomatic Flexible Flatfoot Deformity in Young Children: Radiological Assessment and Short-Term Follow-Up
Panos Megremis, Orestis Megremis
J Foot Ankle Surg. 2019 Sep