Arthroereisis (Latin: artro = joint; -ereisis = support or prop up) describes the limitation of a joint motion. Arthroereisis of the subtalar joint with a sinus tarsi implant is a surgical technique used to treat flatfeet in the paediatric population and also in adults. It has been demonstrated that subtalar arthroereisis returns substantially deforming forces and moments of the flatfoot back toward the values experienced in a normal foot.

Surgical treatment of children’s flexible flatfoot is unusual and only indicated in patients whose feet do not correct spontaneously and are symptomatic. Symptoms are pain, fatigue, difficulty playing sports or walking on uneven surfaces, and cramps. Surgery is indicated if the child also demonstrates most of these criteria: severe flatfoot without clinical and radiologic improvement after at least 2 years of conservative treatment, hindfoot valgus greater than 10°, shortness of the Achilles tendon, Viladot footprint type II, III, or IV, pathologic x-ray measurements. The purpose of arthroereisis is to relocate the talus properly over the calcaneus to allow remodelling of these bones and the subtalar joint during the rest of the growing period. In adults, subtalar arthroereisis is an alternative to medial displacement calcaneal osteotomy (MDCO) in the treatment of stage IIA posterior tibial tendon (PTT) dysfunction, where valgus hindfoot is the main deformity. The sinus tarsi implant maintains the normal foot architecture and acts as a splint allowing the healing of the tibialis posterior tendon reconstruction.

Subtalar arthroereisis has some advantages compared with MDCO: it is easy and quick to perform; it is a less invasive procedure; there is no risk of nonunion or malunion; there is no risk of damaging medial neurovascular structures and the sural nerve; and it requires less immobilization time and less non-weightbearing time after surgery (shorter recovery time). Subtalar arthroereisis has a greater potential of hindfoot valgus correction than calcaneal osteotomy: the limit for calcaneal displacement is one third of its width approximately, whereas greater valgus correction can be achieved with arthroereisis using increasing implant sizes. It allows further future surgery if needed: osteotomies, arthrodesis, and soft tissue procedures are not hindered by subtalar arthroereisis. Also, subtalar arthroereisis provides a 3-
dimensional correction of the flatfoot deformity by repositioning the talus in its physiologic position, preventing it from slipping forward, inward, and downward. However, there are also disadvantages of subtalar arthroereisis: it limits subtalar motion, although it is not completely blocked. The rate of pain at sinus tarsi is high (30% of patients); this pain may be temporary or may require implant removal (no significant loss of correction has been observed after implant removal). Most implants in the market are more expensive than the 1 or 2 screws needed for calcaneal osteotomy. Calcaneal osteotomy and subtalar arthroereisis can be performed combined on the same patient.

Surgical technique. The patient is placed in a supine position. Percutaneous Achilles tendon lengthening is performed if required. When PTT reconstruction is needed (adults) a medial approach is performed and reconstruction is prepared, but not finalized. A 2 cm skin incision is made on the lateral side of the hindfoot over the sinus tarsi. A direct approach to the sinus tarsi is obtained and it is debrided removing its contents: fatty tissue with abundant nerve endings. The powerful interosseous talocalcaneal ligament must not be damaged. A blunt lever is introduced through the sinus tarsi and under the neck of the talus. The lever is pushed distally, so that the hindfoot is supinated, and at the same time, the assistant pronates the forefoot. This procedure aims to move the head of the talus upward, backward, and outward, so that it is repositioned in its physiologic position and hindfoot pronation is corrected. To maintain the correction obtained, an endorthesis is inserted in the sinus tarsi. First, the trial implants (with increasing diameters) are inserted until the appropriate implant size is determined. The author chooses the smallest implant that corrects the deformity and remains stable in the sinus tarsi while moving the subtalar joint. At this point (with the trial implant inserted) PTT reconstruction is completed with the correct tendon tension. Finally, the definitive endorthesis is implanted, the same size as the trial implant. Closure of the wound is performed in a routine fashion and a below-the-knee compression cast is applied.
Picture shows pre and postoperative x-rays of an adult with stage II posterior tibial tendon dysfunction. Subtalar arthroereisis, FDL tendon transfer and Achilles tendon lengthening was performed.

Subtalar arthroereisis has proved to yield good mid to long-term results in children. There is little scientific evidence that proves its usefulness in adults with acquired flatfoot deformity, but the results of the first clinical series published are promising.