Procedure Selection for the Flexible Adult Acquired Flatfoot Deformity

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KEYWORDS

- Posterior tibial tendon dysfunction • Adult acquired flatfoot
- Posterior calcaneal displacement osteotomy • Lateral column lengthening
- Flexor digitorum longus tendon transfer

KEY POINTS

- Posterior tibial tendon (PTT) dysfunction (PTTD) is the most common cause of adult acquired flatfoot. Failure of the static constraints of the medial column, followed by failure of the PTT, leads to this deformity.
- Equinus deformity of the posterior muscle group is often present and must be addressed.
- The flexible (or nonfixed) adult acquired flatfoot is managed by selective use of calcaneal osteotomies, tendon transfers, and posterior muscle group lengthening.
- Arthrodesis of nonessential joints of the medial column is used to assist in complete reduction of the foot deformity.
- Early identification and aggressive management of the flexible adult acquired flatfoot is important in preventing progression of the deformity, adaptation of the osseous and soft-tissue structures, end-stage arthritis, and ankle malalignment.

INTRODUCTION

Adult acquired flatfoot (AAFF) is a common musculoskeletal condition encountered by foot and ankle surgeons. There have been more articles published in peer-reviewed journals in the past 10 years relating to the AAFF than virtually any other topic. Nebulous treatment options have become more formalized, especially with surgery, due to the improved classification systems and advances in technology. However, there remain regional differences among surgeons in the management of the nonfixed AAFF.

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AAFF is a progressive deformity characterized by collapse of the medial longitudinal arch and dysfunction or insufficiency of the posteromedial and medial soft-tissue constraints of the ankle and hindfoot. The cause of this deformity is most commonly associated with PTTD; however, it can also be secondary to inflammatory arthritis or trauma.

In their classic article, Johnson and Strom[1] described 3 stages of PTTD beginning with painful synovitis progressing to a nonfixed flatfoot deformity and ending with a fixed arthritic flatfoot. This classification system was later modified by Myerson[2] to include a fourth stage encompassing deformity of the ankle. Weinraub and Heilala[3] created a classification system and an algorithmic surgical approach for the treatment of AAFF. This classification system combined both osseous and soft-tissue components into a staging (soft-tissue component) and grading (osseous component) system. Selection of surgical procedures was based off of this combined staging and grading system. A recent classification published by Haddad and colleagues[4] divides stage II into 5 different subcategories (A–E) (**Table 1**). This article focuses on the

Table 1
Comparison of classification systems for adult acquired flatfoot

Classifications for Adult Acquired Flatfoot Deformity	Johnson & Strom,[1] 1989	Weinraub & Heilala,[3] 2000	Haddad et al,[4] 2011
Stage I	PT tenosynovitis, no clinical foot deformity	I A—acute posterior tibial (PT) tendonitis, no deformity I B—acute PT tendonitis, reducible (nonfixed) deformity I C—acute PT tendonitis, rigid deformity	I A—inflammatory disease (ie, rheumatoid arthritis) I B—partial PTT tear, no clinical deformity I C—partial PTT tear, slight hindfoot valgus
Stage II	Reducible hindfoot valgus	II A—PT tendinosis, medial soft-tissue attenuation, no deformity II B—PT tendinosis, medial soft-tissue attenuation, reducible (nonfixed) deformity II C—PT tendinosis, medial soft-tissue attenuation, rigid deformity	II A—reducible hindfoot valgus II B—flexible forefoot supination II C—fixed forefoot supination II D—forefoot abduction II E—medial ray instability
Stage III	Rigid hindfoot valgus	III A—advanced PTT attenuation or rupture, no deformity III B—advanced PTT attenuation or rupture, reducible (nonfixed) deformity III C—advanced PTT attenuation or rupture, rigid deformity	III A—rigid hindfoot valgus III B—rigid hindfoot valgus, forefoot abduction and/or sagittal plane instability
Stage IV	Valgus deformity of the ankle (added by Myerson)[2]		IV A—flexible ankle valgus IV B—rigid ankle valgus