Management of the Recurrent Deformity in a Flexible Foot Following Failure of Tendon Transfer: Is Arthrodesis Necessary?

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KEYWORDS

• Flexible flatfoot • Hindfoot arthrodesis • Posterior tibial tendon dysfunction

KEY POINTS

- Management of recurrent deformity in the flexible foot begins with a detailed history and physical examination, including review of previous operative records and, in some cases, evaluation of advanced imaging studies.
- The goals of treatment in the flexible flatfoot should include restoration of alignment and alleviation of pain while minimizing stiffness, maintaining motion, and avoiding overcorrection.
- Failure of soft tissue procedures and extra-articular corrections may necessitate limited hindfoot arthrodesis to facilitate maintenance of deformity correction.
- Particularly in younger, more high-demand patients, every effort must be made to preserve normal joint mechanics while alleviating pain and restoring functional alignment.

Johnson and Strom,[1] as well as other authors,[2–4] described a classification system for adult-acquired flatfoot deformity, which was later modified by Myerson and colleagues.[5] The classification is helpful as it relates to directing treatment. Broadly speaking, stages I and II represent flexible flatfoot deformities, while stages III and IV represent more severe fixed deformities. Most authors agree, in stage I flatfoot refractory to conservative nonoperative management and mild to moderate stage II

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deformities, soft tissue reconstruction with posterior tibial tendon (PTT) debridement, tendon transfer, and medial displacement calcaneal osteotomy provide sufficient deformity correction while maintaining motion.[2,4–8] More severe stage II deformities represent a slightly more controversial treatment dilemma as some surgeons advocate lateral column lengthening with or without a calcaneal osteotomy, spring ligament repair, and/or primary limited arthrodesis procedures to achieve deformity correction.[6,9–12]

The goals of flatfoot treatment should include correction of deformity and alleviation of pain, while minimizing stiffness and maintaining motion. Surgical treatment of adult-acquired flatfoot may result in a variety of complications including recurrence of deformity as well as overcorrection of deformity with excessive stiffness and persistent pain.[9] Approaching the patient with recurrent deformity following a tendon transfer must be undertaken carefully as the tendency may be to introduce an element of overcorrection or resort to motion-sacrificing arthrodesis that may, in fact, be unnecessary. Either of these can result in significant stiffness of the foot and further dysfunction. In younger patients in particular, an effort to avoid motion-sacrificing arthrodesis due to its association with adjacent joint degeneration over time has a theoretical advantage. The focus of this article is to explore the approach to a recurrent flexible flatfoot deformity following failed primary tendon transfer, including the indications for arthrodesis.

EVALUATION OF RECURRENT DEFORMITY

Evaluation of the patient with recurrent deformity following tendon transfer for flexible deformity requires a detailed history and physical examination. In some cases, the evaluator may not have participated in the index surgical procedure. The authors recommend obtaining any previous operative reports if available as a clear understanding of the patient's complaints as well as the extent of the previous surgical procedure must be elucidated. The extent to which extra-articular corrections including either a medial displacement calcaneal osteotomy (MDCO), lateral column lengthening (LCL), or both were used to augment the medial soft tissue procedure and tendon transfer must be elucidated. The presence of a residual equinus deformity must also be recognized. Standing plain film radiographs including anteroposterior (AP) and lateral films of the foot with an AP film of the ankle are required to evaluate the radiographic alignment of the foot. Obtaining prior radiographs may be helpful to evaluate whether the index procedures failed due to undercorrection of the initial deformity. Magnetic resonance imaging may be helpful to more clearly evaluate the integrity of the medial soft tissues including the PTT and the tendon transfer. Particularly in patients with recurrence of deformity following limited arthrodesis or LCL, a computed tomography scan may be helpful to evaluate for nonunion resulting in collapse.

MEDIAL DISPLACEMENT CALCANEAL OSTEOTOMY IN THE TREATMENT OF RECURRENT DEFORMITY

A flexor digitorum longus (FDL) transfer with PTT debridement with or without advancement is occasionally utilized in the treatment of stage I and early stage II deformities. Although tendon transfer used in isolation to address flatfoot deformity may demonstrate satisfactory relief of pain at short-term follow-up, it does not address the biomechanical changes in flatfoot deformity. Eventually, it will fail leading to recurrence of pain and functional limitations.[6,7]

In patients developing progressive deformity following tendon transfer alone but without significant medial soft tissue attenuation and midfoot collapse resulting in forefoot abduction, an MDCO may be appropriate to augment the transfer. A