Treatment of Residual Clubfoot Deformities with the Taylor Spatial Frame Using a Ponseti Sequence

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Introduction
Correction of relapses after open clubfoot surgery is challenging. Repeat open surgery leads to more scarring and stiffness. The Ilizarov frame has been used to treat such cases, however it does not control rotation well.

Methods
We propose an alternate treatment method using the Taylor spatial frame (TSF) and Ponseti principles. We call this combination the Ponsetaylor technique. The Ponsetayor type I frame is programmed to first correct varus and internal rotation, then equinus. The Ponsetaylor type II frame follows the same sequence but includes a final phase in which the foot ring is cut for correction of forefoot cavus and adductus.

17 Patients (22 feet)
8 Baltimore, MD, USA
5 Haifa, Israel
4 Afula, Israel

Demographics
Mean age: 6.5 years (range, 1.8–15 years)
8 Boys / 9 girls

Etiology
9 Idiopathic talipes equinovarus (TEV)
5 Arthrogryposis
1 Spina bifida
1 Developmental clubfoot

TSF Stage 1

1. Stirrup wire through distal tibial epiphysis to prevent growth plate separation
2. Tibial wire removed from tibial ring and attached to foot ring in preparation for ankylosis
3. Lateral olive wire through talus and attached to tibial ring to block talar rotation

TSF Stage 2

1. Take wire removed from tibial ring and attached to foot frame in preparation for ankylosis
2. Tibial joint distracted and equinus corrected
3. Equinus deformity overcorrected 20°

Stage 1 correction completed

Ponsetaylor Type I Frame: Order of Correction

TSF Stage 1

1. Correct internal rotation
2. Correct talus and calcaneus
3. Partially correct equinus
4. Distractions subtalar joint

TSF Stage 2

1. Modify frame
2. Correct remaining equinus plus slight overcorrection

TSF Stage 3

1. Stirrup wire through distal tibial epiphysis to prevent growth plate separation

Ponsetaylor Type II Frame

Same as Ponsetayor type I except for one additional stage: correction of cavus and forefoot adductus.

Conclusions
Ponseti sequence of correction with the TSF is a viable alternative for older children with previously operated club feet.

Results
Mean time in frame: 3.6 months (range, 3–8 months)
1 patient had residual equinus
All other patients achieved full correction of deformities

Complications
9 Superficial pin site infections (treated with oral antibiotics)
1 Temporary subluxation reduced using the residual TSF program
2 First metatarsophalangeal joint subluxations (corrected by pinning in a separate surgery in both cases)

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