# Outcomes of Ponseti Method for the Treatment of Clubfeet in Children with Arthrogryposis

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INTRODUCTION:
The Ponseti serial casting method is the method of choice in treating children with congenital clubfeet. The arthrogrypotic clubfoot has traditionally been considered challenging to treat, with higher rates of recurrence and the need for more corrective surgeries. However, initial reports have found promising results in using the Ponseti method to treat arthrogrypotic feet. This study aims to compare the outcomes of idiopathic vs. arthrogrypotic clubfeet following initial treatment with the Ponseti serial casting method.
METHODS:
A retrospective review of medical records from a single institution was conducted. Data was collected from children ages 0-18 with idiopathic or arthrogrypotic clubfoot treated from 2002-2022 with Ponseti-style serial casting with a minimum two-year follow-up. Recurrence was defined as the need for additional casting or subsequent surgeries following initial correction. Data was collected on relevant patient demographics, previous treatment, casting records, Achilles tenotomies, and surgical treatments.
RESULTS:
352 patients (546 feet) met inclusion criteria. 334 idiopathic and 18 arthrogrypotic patients were analyzed with an average follow-up duration of 3.4 and 4.2 years, respectively. 12 patients had distal arthrogryposis, and 6 had amyoplasia. 93.4% of idiopathic and 72.2% of arthrogrypotic patients successfully achieved correction with Ponseti-casting and Achilles tenotomy. Recurrence rates were significantly higher in the arthrogrypotic group at 83.3% compared to 44.6% in the idiopathic group (P=0.001). A posterior or posterior medial release was performed in 35.0% of idiopathic and 66.7% arthrogrypotic feet.
DISCUSSION AND CONCLUSION:
We report the largest series of arthrogrypotic clubfeet treated by Ponseti-casting, to the best of our knowledge. In contrast to earlier reports, our investigation underscores that while the Ponseti method may be able to secure initial correction in arthrogrypotic clubfeet, on average, at a 3-year follow-up, the prognosis is less favorable. These patients exhibit higher recurrence and often require operative treatment. Notably, a posterior medial release may eventually be needed in up to 6 out of 10 patients.

Table 1. Outcomes of Ponseti method in idiopathic vs. arthrogryposis patients

| | Idiopathic (N=334) | Arthrogryposis (N=18) | P-value |
|---|---|---|---|
| Number of initial casts [mean (SD)] | 6.24 ± 2.71 | 7.00 ± 3.33 | 0.337 |
| Achilles tenotomy for Initial Treatment [n/N (%)] | 300 (89.8%) | 17 (94.4%) | 0.448 |
| Initial treatment w/ casting and tenotomy [n/N (%)] | 312 (93.4%) | 13 (72.2%) | ***<0.001*** |
| Posterior or posterior medial release during initial treatment[n/N (%)] | 22 (6.6%) | 5 (27.8%) | |
| Recurrence* [n/N (%)] | 149 (44.6%) | 15 (83.3%) | ***0.001*** |
| Additional casting only | 20 (6.0%) | 1 (5.6%) | 0.399 |
| Operative treatment | 129 (38.6%) | 14 (77.8%) | |
| Number of recurrences [median (IQR)] | 1 (1-2) | 2 (1-3.5) | ***0.048*** |
| Age at 1st recurrence (years) [median (IQR)] | 2 (1-4) | 1 (0-3.5) | 0.131 |

*Defined as additional surgeries or rounds of casting after initial correction

TABLE 2. Surgical Outcomes *idiopathic vs. arthrogryposis*

| | Idiopathic (N=334) | Arthrogryposis (N=18) | P-value |
|---|---|---|---|
| *Overall Rates of Surgery* [n/N (%)] | 145 (43.4%) | 15 (83.3%) | ***<0.001*** |
| Number of surgeries [median (IQR)] | 1 (1-2) | 2 (2-4) | ***<0.001*** |
| *Type of Surgery* [n/N (%)] | | | |
| Overall STR | 141 (42.2%) | 15 (83.3%) | ***<0.001*** |
| PR [n/N (%)] | 23 (6.9%) | 3 (16.7%) | 0.139 |
| PMR [n/N (%)] | 117 (35.0%) | 12 (66.7%) | ***0.007*** |
| MR [n/N (%)] | 1 (0.3%) | 0 | 0.949 |
| Tibialis tendon transfer | 72 (21.6%) | 2 (11.1%) | 0.230 |
| Bony | 13 (3.9%) | 4 (22.2%) | ***0.008*** |
| Epiphysiodesis | 10 (3.0%) | 2 (11.1%) | 0.120 |
| Other | 3 (0.9%) | 3 (16.7%) | ***0.002*** |

STR=soft tissue release; includes PR, PMR, and MR
PR=posterior release
PMR=posterior medial release
MR=medial release