Comparison of Accelerated VS Standard Ponseti Method in Management of Idiopathic Clubfoot

Syed Furqan Gilani, Salman Ahmed, Obaid-Ur-Rehman, Muhammad Ali Bashir

Abstract
Objective: To compare the efficacy of accelerated Ponseti vs standard Ponseti method for treatment of idiopathic clubfoot as assessed by Pirani scoring system.

Study design: Randomized controlled trial.

Method: A total of 80 patients, 40 in each group were randomly allocated to either Group A (Standard Ponseti) or Group B (Accelerated Ponseti). Group A underwent serial manipulations and castings weekly and Group B received manipulations and castings twice weekly. Pirani scoring was documented at presentation, at each cast and at the time of removal of final cast to assess the success of treatment in terms of Pirani score ≤ 1.

Results: 61.3% babies were male. Mean number of casts required was 5.2 in group A and 5.12 in group B. Correction of all deformities was achieved in 95% patients in group A and 90% of patients in group B. This difference was not found to be statistically significant (p=0.396).

Conclusion: Accelerated Ponseti method is a good alternative for CTEV requiring shorter time period and with comparable efficacy to standard method.

Key words: CTEV, clubfoot, congenital deformity

Introduction
The current standard of care consists of weekly manipulations and casting by Ponseti technique with successful correction of idiopathic clubfoot deformity in 98% of children reducing need for surgery. Many of these cases are untreated or poorly treated, resulting in painful and deformed feet. Therefore if left untreated, clubfoot affects an individual's mobility and threatens his or her potential productivity.

A common problem to any treatment regimen is compliance with the treatment protocols. Long distance travel and staying away from home and work make it difficult for families belonging to low economic class to attend foot clinics, a problem also found in other developing countries. In addition, keeping a plaster clean and dry for one week can be challenging especially for parents with limited literacy. This study thus aims to determine effectiveness of a shorter duration of treatment so that most effective and economical strategies may be adopted in management of these patients.

Corresponding Author: Syed Furqan Gilani, Department of Orthopedics, Benazir Bhutto Hospital. furqangilani@gmail.com, 03335321144
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from the time of application of last cast. In first cast cavus deformity was addressed. In subsequent manipulations/castings forefoot adduction deformity was corrected and lastly the equinus deformity, if present, was addressed by Achilles tenotomy in both groups. Final cast was applied for three weeks with the foot in 10-15 degrees dorsiflexion and 70 degrees external rotation in all patients. The final Pirani score was documented at the time of removal of final cast to assess the success of treatment in terms of Pirani score ≤ 1.

Foot abduction orthosis was applied to both feet with 15 degrees dorsiflexion and 70 degrees external rotation at the end of treatment to be used for 23 hours a day for 3 months, and then only at night and nap time for 4 years to prevent recurrence.

Chi square test was used to compare efficacy in accelerated and standard Ponseti groups. P value <0.05 was considered significant.

Results
A total of 80 patients (123 clubfeet) were included in study. 61.3% babies were male. Mean age of children was 5.09 months (mean ± SD=4.43) in group A and 4.57 months (mean ± SD =3.60) in group B. Mean number of casts required was 5.2 (mean ± SD = 1.62) in group A (standard Ponseti) and 5.12 (mean ± SD = 1.53) in group B (accelerated Ponseti). Achilles tenotomy was required in 71.2% patients. Correction of all deformities was achieved in 95% patients in-group A similar to study by Kampa et al8 and 90% of patients in group B. Although standard Ponseti appears to be somewhat more effective in absolute numbers, this difference is not statistically significant (p=0.396).

At presentation mean Pirani score was found to be 4.14 (Mean ± SD = 1.17) for left foot and 4.10 (Mean ± SD = .96) for right foot in standard ponseti group and 4.48 (Mean ± SD = .91) for left foot and 4.17 (Mean ± SD = 1.01) for right foot in accelerated ponseti group.

### Frequency Tables

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Standard Ponseti</td>
<td>40</td>
<td>5.0957</td>
<td>4.43671</td>
</tr>
<tr>
<td>Age Accelerated Ponseti</td>
<td>40</td>
<td>4.5758</td>
<td>3.60378</td>
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</tbody>
</table>

### Efficacy in terms of Final Pirani Score <= 1

<table>
<thead>
<tr>
<th>Group assigned Ponseti</th>
<th>Count</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Ponseti</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>Accelerated Ponseti</td>
<td>36</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>80</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-Square Tests</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>.721</td>
<td>1</td>
<td>.396</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion
There are two phases of Ponseti method, the treatment and maintenance phase. The treatment phase consists of correction of deformity using plaster casts and maintenance phase uses bracing regimen to maintain corrected position of foot. The author’s aim was to evaluate the efficacy of the treatment phase of this technique in accelerated mode, as has been described in literature recently7,8 in comparison with weekly plaster changes in terms of achieving correction of clubfoot deformity.
Maintenance of corrected clubfoot in a foot abduction brace is a different part of treatment protocol, which was not part of this study. The age of babies ranged from one day to 1.5 years, this range was similar to a study by Willis et al. in which the range was from 1 to 52 weeks. A few babies did present late but this is largely attributable to illiteracy and lack of awareness of treatment options.

53.8% of babies enrolled in this trial had bilateral deformity. In a study by Gupta et al. 60% had bilateral clubfeet. Right foot found to be slightly more frequently involved (23.8%) than left foot (22.5%) in patients with unilateral CTEV. Mean number of casts required in our study was 5.2 and 5.12 in-group A and B respectively which was quite similar to reported requirement of casts in literature. The number of casts required does increase in patients presenting late, with prior attempts at treatment and also in patients with atypical clubfoot. The number of casts required may also increase if plaster is removed for more than a few hours before application of next cast as demonstrated in a study by Terrazas-LaFargue and Morcuende. For this reason the author removed previous cast and applied next cast after manipulation on same day. 71.2% of patients’ required Achilles tenotomy for correction of equinus, which is somewhat, less than the figure mentioned in the textbook.

A total of six patients enrolled in the trial did not achieve complete correction of clubfoot deformity by the ponseti technique. Of the 3 patients with persistent adduction and equinus deformity, two had short, stubby feet – the so-called atypical clubfoot. Attempts at correction of these feet did not meet with the same success as patients with typical clubfoot. One patient was treated by quacks previously and feet were already quite stiff and rigid therefore not responding to conservative treatment. All patients whose deformity could not be corrected by casting were treated surgically.

The major limitation of this study is that it lacks follow up of patients for a long period of time to assess for recurrence and for problems faced by these patients in later life. Dr. Ponseti and colleagues have followed up their patients for many years and found that their patients did well over time. The maintenance phase in which foot abduction brace is worn is as important as the treatment phase and if bracing program is not followed properly, there are high chances of recurrence.

Conclusion
Ponseti method is an excellent option for management of Idiopatic clubfoot and should be regarded as the standard mode of treatment. Its efficacy remains unaltered if plaster casts are changed twice weekly and lead to correction in much shorter period of time.

References