



COMPARATIVE STUDY OF PONSETI METHOD VERSUS FRENCH FUNCTIONAL METHOD IN THE TREATMENT OF IDIOPATHIC CLUBFOOT

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Abstract

Background

Idiopathic clubfoot is a common congenital deformity affecting the musculoskeletal system. The Ponseti method and the French functional method are two widely used non-surgical approaches for its management. This study aims to compare the effectiveness of these two techniques in terms of treatment success, recurrence rate, and functional outcomes.

Materials and Methods

A prospective comparative study was conducted on 60 infants (90 feet) diagnosed with idiopathic clubfoot. The participants were randomly allocated into two groups: the Ponseti method group (n=30, 45 feet) and the French functional method group (n=30, 45 feet). The Ponseti technique involved serial manipulations, casting, Achilles tenotomy (if required), and bracing. The French method included daily physical therapy, stretching, taping, and splinting for the first three months, followed by a gradual transition to night splinting. Treatment outcomes were assessed at six months and one year using the Pirani score, Dimeglio classification, and the rate of recurrence requiring additional intervention.

Results

At the one-year follow-up, the Ponseti method demonstrated a significantly lower mean Pirani score (0.5 ± 0.2) compared to the French method (1.2 ± 0.3) ($p < 0.05$). Successful correction was achieved in 90% of cases using the Ponseti method versus 75% in the French method. The recurrence rate was higher in the French method group (20%) than in the Ponseti group (8%). The need for additional surgical intervention was also more frequent in the French group (15%) compared to the Ponseti group (5%).

Conclusion

Both methods are effective for managing idiopathic clubfoot, but the Ponseti method showed superior outcomes in terms of correction, recurrence rate, and need for surgical intervention. Given its simplicity, cost-effectiveness, and higher success rate, the Ponseti technique should be preferred for primary treatment.

Keywords: Idiopathic clubfoot, Ponseti method, French functional method, clubfoot treatment, non-surgical correction, Pirani score.

Introduction

Idiopathic clubfoot, a common congenital musculoskeletal deformity, affects approximately 1 in 1,000 live births worldwide, with a higher prevalence in males (1). It is characterized by four main components: cavus, adduction, varus, and equinus, which, if left untreated, can result in severe functional disability (2). The primary goal of treatment is to achieve a plantigrade, painless, and functional foot with minimal recurrence while avoiding extensive surgical interventions (3).

Non-surgical approaches, particularly the Ponseti method and the French functional method, are widely employed for clubfoot management (4). The Ponseti technique involves serial manipulations, plaster casting,

Achilles tenotomy when necessary, and long-term bracing to maintain correction (5). This method has been globally accepted due to its high success rate, minimal invasiveness, and cost-effectiveness (6). On the other hand, the French functional method, also known as the functional physiotherapy method, relies on daily stretching, massage, taping, and splinting over several months to gradually correct the deformity (7).

Despite their widespread use, there is ongoing debate regarding the relative effectiveness of these methods in achieving and maintaining correction. Studies suggest that the Ponseti method has a higher initial success rate with a lower recurrence risk compared to the French method (8). However, some authors argue that the French method preserves joint flexibility and may have advantages in long-term functional outcomes (9).

Given the need for a clearer understanding of the comparative efficacy of these two techniques, this study aims to evaluate their outcomes based on correction success, recurrence rates, and the necessity for additional surgical intervention. By comparing the two methods, we seek to provide evidence-based recommendations for optimal clubfoot management.

Materials and Methods

Study Design and Participants

This prospective comparative study was conducted on 60 infants (90 feet) diagnosed with idiopathic clubfoot. The participants were randomly assigned to one of two treatment groups:

- Ponseti method group ($n = 30$, 45 feet)
- French functional method group ($n = 30$, 45 feet)

Inclusion criteria consisted of infants aged ≤ 3 months, diagnosed with idiopathic clubfoot, and who had not received prior treatment. Exclusion criteria included syndromic clubfoot, neurological disorders, or previous surgical interventions. Parental consent was obtained before enrolling the participants.

Treatment Protocols

Ponseti Method

The Ponseti technique involved weekly manual manipulation of the foot, followed by serial plaster casting to gradually correct the deformity. If required, an Achilles tenotomy was performed under local anesthesia before applying the final cast. After the correction phase, foot abduction braces were used full-time for three months, followed by nighttime wear up to four years of age to prevent recurrence.

French Functional Method

The French method included daily physiotherapy, which involved gentle stretching, mobilization, and taping to progressively correct the deformity. This therapy was performed by trained professionals and continued for three months. After achieving initial correction, night splints were prescribed for several years to maintain foot alignment.

Outcome Measures

The effectiveness of both techniques was assessed using the Pirani Score and Dimeglio Classification at six months and one year. The primary outcomes included:

- Degree of correction (measured using Pirani and Dimeglio scores)
- Recurrence rate (defined as the need for re-treatment or additional interventions)
- Requirement for additional surgical procedures

Statistical Analysis

Data were analyzed using SPSS software. Continuous variables (e.g., Pirani scores) were compared using the *t*-test, while categorical variables (e.g., recurrence rates) were analyzed using the chi-square test. A *p*-value < 0.05 was considered statistically significant.

Results

Baseline Characteristics

A total of 60 infants (90 feet) were included in the study. The mean age at the start of treatment was 2.1 ± 0.5 months in the Ponseti group and 2.0 ± 0.6 months in the French functional method group ($p = 0.72$). The male-to-female ratio was 2:1 in both groups. There was no significant difference in the initial Pirani scores between the groups ($p = 0.68$) (Table 1).

Table 1. Baseline Characteristics of the Study Participants

Characteristic	Ponseti Method (n=30)	French Functional Method (n=30)	p-Value
Mean Age (months)	2.1 ± 0.5	2.0 ± 0.6	0.72
Male : Female Ratio	2:1	2:1	-
Initial Pirani Score	5.2 ± 0.5	5.3 ± 0.6	0.68

Treatment Outcomes

At the six-month follow-up, the mean Pirani score in the Ponseti group was 0.8 ± 0.3 , whereas in the French functional method group, it was 1.6 ± 0.4 ($p < 0.05$). At the one-year follow-up, the Ponseti group demonstrated a significantly lower Pirani score (0.5 ± 0.2) compared to the French group (1.2 ± 0.3) ($p < 0.05$) (Table 2).

Table 2. Comparison of Pirani Scores at Follow-Up Intervals

Follow-Up Period	Ponseti Method (Mean ± SD)	French Functional Method (Mean ± SD)	p-Value
6 Months	0.8 ± 0.3	1.6 ± 0.4	<0.05
1 Year	0.5 ± 0.2	1.2 ± 0.3	<0.05

The Dimeglio classification also showed better outcomes in the Ponseti-treated feet. At one year, 85% of feet in the Ponseti group were classified as grade 0–1 (good correction) compared to 65% in the French group ($p < 0.05$) (Table 3).

Table 3. Dimeglio Classification at One-Year Follow-Up

Classification Grade	Ponseti Method (n=45 feet)	French Functional Method (n=45 feet)	p-Value
Grade 0–1 (Good Correction)	38 (85%)	29 (65%)	<0.05
Grade 2–3 (Moderate Deformity)	5 (11%)	12 (27%)	<0.05
Grade 4 (Severe Deformity)	2 (4%)	4 (8%)	0.32

Recurrence and Need for Additional Intervention

The recurrence rate was significantly lower in the Ponseti group (8%) compared to the French group (20%) ($p < 0.05$). Additionally, 5% of the Ponseti group required further surgical intervention, while 15% of the French group underwent additional surgery ($p < 0.05$) (Table 4).

Table 4. Recurrence Rate and Need for Additional Surgery

Parameter	Ponseti Method (n=45 feet)	French Functional Method (n=45 feet)	p-Value
Recurrence Rate	8% (4 feet)	20% (9 feet)	<0.05
Additional Surgery Required	5% (2 feet)	15% (7 feet)	<0.05

The findings indicate that the Ponseti method results in better correction, lower recurrence rates, and reduced need for additional interventions compared to the French functional method.

Discussion

The findings of this study suggest that the Ponseti method is more effective than the French functional method in the treatment of idiopathic clubfoot, particularly in terms of correction success, recurrence rates, and the need for additional surgical intervention. The Ponseti method resulted in significantly lower Pirani scores at both six-month and one-year follow-ups, indicating superior correction (Table 2). This aligns with previous studies that have reported higher success rates with the Ponseti technique, which is widely regarded as the gold standard for clubfoot management (1,2).

Comparison of Treatment Outcomes

The Ponseti method showed a significantly lower recurrence rate (8%) compared to the French method (20%) (Table 4). The recurrence rate in the Ponseti group observed in this study is consistent with findings from previous research, which reported recurrence rates ranging from 5% to 10% following Ponseti treatment.

(3,4). In contrast, the French method has been associated with higher relapse rates, which may be due to less effective long-term maintenance of correction (5,6). The primary reason for the lower recurrence rate with Ponseti treatment is the use of foot abduction braces, which has been shown to play a crucial role in preventing relapse (7,8).

The Dimeglio classification also confirmed better correction outcomes with the Ponseti method, as 85% of feet in this group were classified as Grade 0–1 (good correction) compared to 65% in the French method group (*Table 3*). These findings are consistent with earlier reports that demonstrated more predictable and complete correction with the Ponseti technique compared to functional physiotherapy methods (9,10).

Need for Additional Surgical Intervention

A significantly lower proportion of cases required additional surgical intervention in the Ponseti group (5%) compared to the French method group (15%) (*Table 4*). This is consistent with previous studies showing that the Ponseti technique reduces the need for extensive surgical procedures, primarily because of its ability to correct all four components of the clubfoot deformity in a structured and reproducible manner (11,12). In contrast, the French method relies more on daily physiotherapy and stretching, which, while effective in some cases, has been reported to be less reliable in achieving complete correction, often necessitating surgical intervention (13,14).

Clinical Implications and Recommendations

The superior outcomes of the Ponseti method make it the preferred choice for the initial management of idiopathic clubfoot, particularly in settings where access to trained physiotherapists for daily manipulation (as required in the French method) may be limited (15). Additionally, adherence to bracing protocols plays a crucial role in long-term success, highlighting the need for caregiver education and compliance to prevent recurrence.

Conclusion

Although the French functional method remains a viable alternative, particularly for cases where parents prefer non-casting approaches, the higher recurrence and surgical rates observed in this study suggest that it may not be the optimal first-line treatment in most cases. Future studies should explore the long-term functional outcomes of both methods and assess the impact of patient compliance on treatment success.

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