The Ponseti Method: Details, Tips and Tricks

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The Ponseti Clubfoot Treatment Center

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Clubfoot = Static

DEVELOPMENTAL DEFORMITY

What is the Ponseti Method?

Manipulation & casting

Ponseti Method

Tenotomy

Ippolito et al. 2009
The Ponseti method is:

- A specific method of manipulation
- A specific method of casting
- A specific method of preventing relapses
- A specific method of treating relapses

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<td>Int. Symp.</td>
<td>Iowa City, Oct 2012 (56,246)</td>
<td>97%</td>
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• Precise position of the fingers
• Precise molding of the cast
• Clinical setting critical

Relaxed patient, no pain !!

Ponseti Cast Application
It can't be done alone!

Operator at end of table  
Parents comforting and distracting baby  
Assistant
Manipulation technique

- Localize lateral maleolus and talar head
- Place thumb on the talar head to block rotation
- Elevate slightly the first metatarsal (no supinate the whole foot) to correct cavus

Cotton & Cast

- Just one protective layer of cotton to allow good molding of the cast
Foot Abduction Brace

- "Maintain" correction
  Not "obtaining" correction

- Wearing Schedule:
  - 23 h / day : 3 months
  - Night / naps : 4 years

- Shoe rotation:
  - Affected : 60 degrees
  - Normal: 30 degrees

- Distance between shoes: shoulder width

Clubfoot Clinic Scheduling

- Families together in waiting room
  - “Support group”
  - Difficult to see patients in busy clinic
  - Parents scared of other pathologies:
    - Fractures, CP, frames .......

- Parents are part of the team!!
  - Provide time for questions and education
THANK YOU!!

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http://www.ponseti.info
Persistent and Recurrent Clubfoot Deformity Following Treatment by the Ponseti Method

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Wallace B. Lehman
Alice Chu

Treatment of idiopathic clubfoot using the Ponseti method: minimum 2-year follow-up

Amer Abdelgawad, Wallace B. Lehman, Harold J.P. van Bosse, David M. Schor and Debra A. Sala

One hundred and thirty-six idiopathic clubfeet were treated by the Ponseti technique and followed for at least 2 years. Ninety-two (73%) were not constrained with night casts and required early surgery. Recurrence after correction was related to compliance with bracing. At latest follow-up, 79 of 83 noncompliant with bracing had recurrences with 14% of these requiring re-operation for an anterior talo-fibular translation while only 1% of those compliant with bracing had recurrences with none requiring more than Achilles tenotomy and anterior talo-fibular tendon transfer. Early failure and recurrences contributed about equally to the overall failure rate of 11%. The Ponseti method was highly followed, including night casting, compliance with brace and treatment of recurrences as needed.

Group 1 - Those maintained in an ankle-foot orthosis (AFO) - 93% success rate
Group 2 - Those not maintained in an AFO (noncompliant) - Recurrence rate 50% or greater
What is a Persistent or Recurrent Clubfoot Deformity?

Persistent Clubfoot Deformity
A clubfoot that has not been fully corrected and will **NOT** fit into or be controlled in an ankle-foot orthosis (AFO). It will therefore lead to failure or full recurrence and the patient may present with:

1. Equinus – most common
2. Midfoot adduction
3. Varus of the heel
4. Cavus deformity
5. Midfoot rocker bottom deformity

Recurrent Clubfoot Deformity
A fully corrected clubfoot maintained in a proper AFO that shows evidence of a recurrent (relapse) deformity several months or years after treatment.

The patient may present with:
Recurrent Clubfoot Deformity (cont.)

1. Heel elevation – equinus
2. Rocker bottom deformity – midfoot dislocation (midfoot breach – Noonan) through the talonavicular and calcaneocuboid joints
3. Cavus deformity
4. Varus of the calcaneus
5. Callus at lateral aspect of the foot
6. Inability to shoe correctly, i.e. due to recurrent deformity
7. Midfoot adduction – navicular not corrected over the talus
8. Forefoot adduction – adduction through Lisfranc’s joint
9. In-toeing gait – corrected clubfoot and flexible foot with overactive anterior tibial tendon
10. Complete recurrence to original clubfoot deformity

Recurrent Clubfoot Deformity (cont.)

1. Heel elevation – equinus

Recurrent Clubfoot Deformity (cont.)

2. Rocker bottom deformity – Chopart’s joint
Recurrent Clubfoot Deformity (cont.)

3. Cavus deformity

Recurrent Clubfoot Deformity (cont.)

4. Varus of the calcaneus

Recurrent Clubfoot Deformity (cont.)

5. Callus at lateral aspect of the foot
Recurrent Clubfoot Deformity (cont.)

6. Inability to shoe correctly
7. Midfoot adduction

8. Forefoot adduction

Recurrent Clubfoot Deformity (cont.)

9. In-toeing gait – corrected clubfoot and flexible foot with overactive anterior tibial tendon

10. Complete recurrence to original clubfoot deformity
Most Common Causes of Persistent or Recurrent Clubfoot Deformities

1. Feet prone to persistent or recurrent deformities. Such as:
   A. Clubfoot due to unrecognized syndrome – i.e. arthrogryposis
   B. Complex or atypical clubfoot described by Moreuende and Ponseti
   C. Patient initially treated after seven months of age
   D. Unrecognized neurological clubfoot i.e. spastic or paralytic deformity (Frick, S. Drop Toe Sign. CORR. 2009)
   E. Foot previously treated with “supposed” Ponseti technique that failed (Helig: Current Management of Idiopathic Clubfoot Questionnaire. JPO, 2003) (26.2% correction with the Ponseti technique)

2. Failure to maintain correction – usually a deformity that was uncorrected and forced into an AFO
3. Noncompliance with regard to use of the DB bar (AFO?)
**Treatment of Persistent Clubfoot Deformity:**
*An Uncorrected Foot Treated by the Ponseti Technique*

1. Start from the beginning using all the steps of the Ponseti technique
2. This may require more casts than the usual foot and each step of casting may have to be repeated several times

3. Percutaneous tenotomy may have to be repeated as well. Note: The tenotomy is only done when the head of talus is covered by the navicular. Otherwise a rocker bottom deformity may occur. The head of the talus can be felt laterally when not covered.

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**Treatment of Recurrent Clubfoot Deformity:**
*A Previously Corrected Foot*

The first decision to be made is - which part of the deformity has recurred? Attention must then be directed to that part of the foot.

- **Equinus** – the foot is corrected except that dorsiflexion cannot go beyond neutral position.

Decide from the following:
- A. Physical therapy – French method?
- B. Recasting
- C. Repeat percutaneous tenotomy
- D. Posterior release – Formal: Includes Achilles tendon release (Strayer procedure), ankle joint release, and release of the subtalar joint.
A. Mild deformity may persist throughout life and may only require intelligent neglect.

B. If it occurs early after treatment, recast being sure to cover head of talus, followed by maintenance with AFO fitted into a shoe for walking.

C. If persistent, may require release of adductor muscle, surgical release of talonavicular joint, plus or minus a release of the first cuneiform navicular joint.

D. In older children (5-10 years of age), it may be necessary to perform a calcaneocuboid fusion or a first cuneiform opening wedge osteotomy and a closing wedge cuboid osteotomy, or a complete midtarsal osteotomy.

E. If associated with heel varus, a closing wedge osteotomy of the heel may be necessary in addition to the other procedures – what we refer to as a triple osteotomy involving the cuneiform, cuboid and calcaneus.

F. Before maturity – soft tissue Lisfranc’s release (Heyman) Not effective. After maturity, a transmetatarsal osteotomy or triple arthrodesis may be necessary.
Treatment of Recurrent Clubfoot Deformity (cont.)

- Cavus Deformity
  A. Under the age of 5 – Soft tissue and/or plantar release;
  B. Over the age of 5 – Plantar release and base of the first metatarsal osteotomy and heel osteotomy or midtarsal osteotomy.

Köse, 1999

Treatment of Recurrent Clubfoot Deformity (cont.)

- In-toeing Gait
  If foot is fully corrected (not stiff) and gait is related to overactive anterior tibial tendon and weak peroneal power, the anterior tibial tendon may be transferred to the lateral or middle cuneiform after the age of 5 when the cuneiform is ossified.

Anterior tibial tendon transfer

Treatment of Recurrent Clubfoot Deformity (cont.)

- In-toeing Gait Due to a Supinated Midfoot
  • This means that the navicular is not completely covering the head of the talus. This must first be corrected by casting and/or a talonavicular release, and then laterally transferring the anterior tibial tendon. Do not transfer the tendon if the foot is stiff and the midfoot is not corrected. The tendon will not move a fixed foot.
  • If internal tibial torsion persists, tibial osteotomy (?)

Tibial osteotomy
Treatment of Recurrent Clubfoot Deformity (cont.)

• Rocker Bottom Deformity
This is due to aggressive dorsiflexion of the foot against a hindfoot contracture.

A. Stop treatment and allow the midfoot to correct itself or cast in a vertical talus position
B. Release the hindfoot, Achilles tendon and posterior structures, and cast in a congenital vertical talus position
C. A fixed rocker bottom deformity is difficult to treat and may require aggressive management, similar to releasing a vertical talus

Treatment of Recurrent Clubfoot Deformity (cont.)

• Major Recurrence
“À la carte” treatment as reported by the late Dr. Henri Bensahel. Each patient must be treated individually, and in most cases tendon releases, hindfoot releases, and/or midfoot releases will do. It is rarely necessary to perform a complete subtalar release that was popular in the past and very often resulted in stiff, painful feet.

Treatment of Recurrent Clubfoot Deformity (cont.)

• Major Recurrence – gradual external fixator correction
In summary:

Gentle manipulation of the clubfoot +/- percutaneous Achilles tenotomy +/- anterior tibial tendon transfer (Ponseti technique) will be effective if done properly in all clubfoot deformities at least 80 - 90% of the time.

Persistence of clubfoot deformity is most likely due to incomplete correction of the deformity.

Recurrent deformity has to be addressed depending upon which part of the deformity recurs and when.

Bibliography for Persistent Clubfoot Deformity Following Treatment by Ponseti Method.


and

Goodbye
Congenital Clubfoot—Older Infants and Early Childhood

Steven L. Frick, MD
Chairman, Dept. of Orthopaedic Surgery
Nemours Children’s Hospital
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No financial disclosures

Clubfoot Outcome

- Plantigrade, mobile, strong, pain-free foot that functions well and lasts
- If you achieve this goal, does it matter how you get there?
- Minimize risks
- Minimize length of treatment time
- Minimize resource utilization/expenditures
Does abnormal anatomy lead to poor function and arthritis?

- Data for hip and knee joints convincing
- Surgical strategies – alter anatomy to normalize, improve function and delay arthritis
- Is the foot different?
- Data not as convincing

Like fractures- better reduction, less likely to recur

Defining a Good Result

- Normal shape (clinical correction of deformity)
- Plantigrade standing (stable platform)
- Tripod restored
- Functional motion
- No pain
Ponseti Clubfoot Treatment in Older Infants for Whom Traditional Casting Has Failed

John E. Herzenberg, MD
Noam Bor, MD
Steven L. Frick, MD

Baltimore, MD
Afula, Israel
Charlotte, NC

ZM 7 month old male – casted birth to 4 mos, PMR recommended

Before Ponseti treatment
After Ponseti treatment
Older infants and children

- More challenging to cast
- Hungry with a bottle
- Experienced holder/cast roller
- Often go every two weeks
- If mild deformity and walking may use below knee, but usually above knee
- Be patient

9 mos old – failed “Ponseti”-
primary outcome = correct deformity

Older infants and children

- Relapsed or no prior treatment
- Check careful neuro exam, esp if relapse
- Typical Ponseti method approach
- Often plaster on foot, fiberglass overwrap and above knee (more durable)
Older Clubfoot - sometimes SLC

Too low

After re-casting/tenotomies
Cast in equinus, abduct until 40-60 deg

Older than 4 mos- TAT under GA

TAT in OR
At time of TAT in OR

- Measure for braces
- Casted with plaster and FG
- 3 weeks
- If walking I just use FAO at night

Untreated 1 year old multiple attempts to cast- noncompliant

Older patients

- Ever effort to use Ponseti method
- Be patient
- Will take more casts
- TAT or TAL in OR
- Sometimes need a la carte releases
A la carte release - what deformities are left?

- Lengthen tendons
- Plantar fascia
- Calcaneofibular ligament
- Posterior ankle / subtalar

Bilateral a la carte PMR at 18 mos, ATT on left 3 years

At 6 years old

Syndromic foot - incisions?
Older patients- questions

- What is the upper age limit for successful Ponseti method treatment?
- Is TAT ok or do older kids need TAL?
- How about repeat TAT vs TAL?
- How many casts are ok? Is there a maximum?
- Is a little rocker-bottom bad?
- Is surgery that opens joints a sign of failure?
Vumedi Clubfoot Webinar

Discussion Questions

Is the Ponseti Method the best we can do? The results of the Ponseti Method are obvious, nearly immediate, and are impressive to parents and practitioners. Some have suggested these criteria make the success of an intervention so self-evident that better evidence (EBM) is not needed. Our best long-term outcome study of Ponseti method patients involved only 45 patients, and 22% had a fair or poor outcome.

How much ankle dorsiflexion is enough? Most expert clubfoot surgeons using the Ponseti method perform Achilles tenotomy 90% of the time. The indications for tenotomy differ, with some using less than 10 degrees, while others use less than 15 or 20. How is this measured? And once the child is walking, how much ankle dorsiflexion is enough – 0 or plantigrade, 5, 10 or more degrees? We do not have validated information about this, and opinions seem to vary.
While initial Achilles tenotomy in clubfoot seems to have few complications or functional implications, little is known about the indications for and long term results of repeat Achilles tenotomy or Achilles lengthenings after prior tenotomy. Is repeat TAT or TAL ok?

What is the best way to manage patients who do not respond as expected to Ponseti method manipulations and casting? What should be the approach for the rare patient who does not respond? Do we apply the principles of “al a carte” surgery and address the residual deformities specific to that foot? Most frequently in my experience this will mean hindfoot surgery to address persistent equinus and varus- what are the long term results for these patients?

How many patients with clubfoot who relapse have neurological abnormalities that contribute to propensity to relapse? Some authors recommend neurology referral, electrodiagnostic testing and/or neuro-imaging for relapsing clubfeet. What are the indications for these types of tests, and what information do the tests yield?
What is the best approach for patients managed initially with the Ponseti method who relapse, are treated with repeat casting and then tibialis anterior transfer, but still have residual deformity leading to gait and functional abnormalities? What are the causes of persistent intoeing in clubfoot patients?