POSNA Ponseti Clubfoot Course 2012

The Relapsed and Neglected Clubfoot – Surgical Implications

More than 2/3 of all children born with clubfoot deformity live in circumstances where they do not have access to specialized medical care. Therefore neglected clubfoot deformity is common worldwide in developing countries. Meanwhile, practitioners in developed countries are increasingly seeing children referred with neglected clubfeet due to immigration, adoption, and medical transfer.

What is the upper age limit for starting Ponseti treatment?
Experience in Brazil, Nepal, India, Africa and elsewhere is showing that manipulation and casting can be effective to a surprisingly older age group.

17 patients ages 1.9 to 9 years of age. 16/17 corrected, mean time in casts 3.9 months. 5 patients relapsed, requiring posterior release.

171 patients presenting at 1-6 years, mean of 7 casts required with no difference between age groups. 95% underwent heelcord lengthening. 8% needed posterior release and 6% posteromedial release.

21 children older than 7 years at presentation, mean follow-up 4.7 years: 18 feet (85%) achieved full correction. Recurrence in 6 feet (24%)

The capsular contractures can be stretched with casting. Equinus deformity is always the most difficult component to correct. The heel cord always requires tenotomy. There are diminishing returns on correcting bony deformity by casting alone and likely little or no bone remodeling happens after age 8. Secondary bony deformity occurs in the walking child. A greater incidence of relapse, therefore, is to be expected as the bone settles back into pre-corrected position. Severe cavus is difficult to correct and might require plantar fascia release.
Casting in walking age children.

- Longer casting period.
- More casts required.
- Little progress in first 3 or 4 casts, then improvement.
- Logistically more difficult for parents.
- Barriers of time and transport in developing countries. Some form of hostel accommodation facilitates the program (Ronald McDonald House equivalent).
- Increasing need for supplementary surgery with increasing age.
- Potentially higher risk of relapse due to bony deformity.
- Difficult logistics of post-correction bracing.

Advantages of preliminary casting.
ALL clubfoot corrections should start with a trial of Ponseti casting.

- Minimizes the need and extent of open procedures.
- Foot adduction deformity corrects significantly.
- Stretches the medial skin reducing the risk of skin breakdown with open surgery.
- Allows for healing of calluses and ulcers before surgery.

All neglected clubfeet are not the same!
The rearfoot is always rigid, but there is a varying degree of forefoot rigidity. If the forefoot has retained some degree of flexibility the child will be walking on the lateral side of the foot with the foot more or less pointing ahead. The prognosis for Ponseti casting is good. If there is significant forefoot rigidity, and especially cavus, the foot will be facing backward with all the weight taken on the dorsum. These are extremely rigid feet. Prognosis for cast correction alone is poor.

Surgical principles:
Have a low threshold for extra-articular surgery (Achilles tenotomy, Tib Ant transfer, plantar fascia release)
Have a high threshold for capsular release

Analyze the social circumstances:

Scenario 1: Committed parents, no barriers to transport and clinic attendance
- Ponseti casting for as long as needed (usually 7-12 casts)
- Extra-articular surgery as appropriate
- Continue casting to gain further equinus correction

Scenario 2: Committed parents, difficult transport logistics, poverty
- Is there a rehabilitation hostel available (Ronald McDonald House equivalent)?
- Is longer term hospital admission possible?
If so...accelerated Ponseti program. Cast changes 2-3X weekly.
Extra-articular surgery, including TAT, in over age 2 children.

Scenario 3: Outreach program, poverty, severe transport & infrastructure logistics. Difficulties with parental compliance.
This may be a child’s only opportunity for correction.

- Primary surgical treatment
- Age 8 and under: STR and lateral column osteotomy
- Over age 8, rigid foot: Modified Lambrinudi triple arthrodesis

Procedure algorithm:
- Ponseti casting until no further correction
- Percutaneous tenotomy if forefoot completely corrected (local, sedation, or GA).
- Continue weekly casting post-tenotomy to gain further equinus correction
- Plantar fascia release as necessary
- Posterior/posteromedial release if tenotomy not enough (complete subtalar release seldom required anymore)
- Tib Ant transfer if child over age 2.5
- Lateral column shortening if soft tissue release not enough. Options:
  - Closing wedge anterior process of calcaneus
  - Litchblau procedure (excision anterior process of calcaneus)
  - Evans calcaneo-cuboid wedge resection
  - Cuboid decancellation is NOT recommended (wrong side of the deformity)

The child with rigid neglected clubfoot, marked cavus (foot facing backward), over age 6, developing country with limited resources, outreach surgery.
- Triple arthrodesis.
  - This is the most expeditious way to gain correction with least complications.
- Modified Lambrinudi approach.
- Personal experience has shown that extensive soft tissue release with osteotomies results in a foot just as stiff as with triple, more complications, particularly with the skin, much longer operative time.
- Growth of the foot is not affected any more than with osteotomy procedures.

Technique of modified Lambrinudi procedure

- Medial soft tissue release not necessary
- Ollier lateral incision
- Transverse excision anterior process of calcaneus
- Oblique excision of head and neck of talus
• Oblique anteriorly based wedge resection of anterior process of calcaneus and subtalar joint
• Decortication of cuboid and navicular
• Dorsal and lateral displacement or forefoot on rear foot corrects the deformity as pseudo-rocker bottom foot.
• Fixation where available. Careful cast correction without fixation in children still gives an acceptable result.

The role of distraction & external fixation.
Requires committed parents and patient, a rehabilitation hostel or hospital admission.
Requires knowledge and experience with the technology
Advantage vis-à-vis triple: retains length of the foot
Disadvantage vis-à-vis triple: long, painful treatment course. Relapse rate higher.
Tend to be more painful feet over the long run.
The degree of stiffness with triples, distraction external fixators and STR with osteotomies is more or less the same.
Best use of a fixator: stiff neglected unilateral clubfoot to gain preliminary length and skin stretching then proceed to triple or mid-foot osteotomy. Less severe bone resection required, less loss of foot length. (This is the experience of surgeons in India where the Joshi fixator has been used extensively.)
Severe, stiff bilateral neglected clubfeet: The length differential is not as important. Triples or osteotomies are most practical.

Bracing logistics
Is it possible to brace a walking age child full time? Probably not practical!
There is a need for research to identify if the 3 months full-time brace use after initial correction is necessary in this age group.

My practice:
1. Night and nap bracing in walking age children until age 3 or 4 years.
2. Children over age 3 at time of correction:
   • Where operative facilities available: heel cord tenotomy under GA with immediate tibialis anterior tendon transfer.
   • Tib Ant transfer bypasses the need for Foot Abduction Bracing
   • Post-op AFO until outgrown, night bracing and part-time day use (few hours out of brace per day to facilitate mobility)
3. Children over age 3 where bony corrections have been performed:
   • Consider Tib Ant transfer at the time of correction.
   • AFO postop until outgrown, night bracing and part-time day use.

J. Norgrove Penny, MD, FRCS(C)
November 2011