

Fundamentals of Clubfoot Treatment: **understanding some critical principles needed for success**

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“This treatment is economical and easy on the baby and on the parents, and **is in the best tradition of Orthopedia.**” – Ignacio Ponseti

Typical conversation:

Ortho surgeon #1 - Experienced Ponseti method practitioner (>90 to 95% initial correction rate) : “So, are you using the Ponseti method now for initial casting of your clubfoot patients?”

Ortho surgeon #2 - Inexperienced Ponseti method practitioner : “Yeah, I started using it, but it’s not working for me.”

What are the possible reasons for failure of the method to achieve initial correction for #2’s patients?

1. #2 is seeing patients with more severe / difficult clubfeet – evidence lacking
2. #2 is not faithfully applying Ponseti principles and method – lack of understanding / practical knowledge

I. Understand pathoanatomy :

1. calcaneo-pedal block inwardly rotated and in equinus beneath talus
2. forefoot in pronation relative to hindfoot giving cavus
3. medial and posterior tendons and ligaments tight

II. Understand foot kinematics / functional anatomy (Farabeuf and Huson)

1. the calcaneus moves beneath the talus by rotating around the interosseous talocalcaneal ligament
2. in clubfoot the calcaneus adducts and inverts under talus
3. in clubfoot cuboid and navicular adduct and invert distal to calcaneus
4. tarsal joints rotate about moving axes – not simple hinges
5. tibial rotation and foot inversion/eversion are kinematically linked- for foot to invert the tibia must rotate outward and vice versa

III. Manipulation and Casting keys

1. In the first cast the forefoot should be supinated to match the supination of the hindfoot- thus reducing cavus (medial crease)
2. The supinated forefoot/midfoot is used as a lever arm to transmit stretching forces to the hindfoot ligaments/tendons with fulcrum being lateral talar head (avoid Kite’s error)

3. The cast extends above the knee to the groin- why? = to prevent slipping (slipping may lead to development of atypical – excessive plantar flexion of entire forefoot-clubfoot), to maintain rotational stretch on medial structures (prevent ankle and talus from rotating), and to take advantage of kinematic linkage of tibial rotation and foot inversion/eversion (leg in slight external rotation and knee at 90 degrees as cast extended to upper thigh)
4. Change the cast every 5-7 days- take advantage of viscoelasticity of musculoskeletal tissues (creep and stress relaxation)

IV. Tendo Achilles Tenotomy (TAT) - why and when

1. sectioning the Achilles tendon allows forces to be transmitted to posterior ankle and hindfoot ligaments to increase dorsiflexion
2. Do not attempt dorsiflexion / TAT until anterior process of calcaneus has come out laterally from beneath talar head
3. if less than 15 degrees of dorsiflexion after foot abducted 60 degrees or more then TAT
4. TAT – heals rapidly (3 weeks), tendon still glides after healing, and no evidence of overlengthening (tight posterior ligaments and talar/calcaneal malformations do not allow excessive dorsiflexion).

V. Need for abduction – external rotation splinting during growth to prevent relapse

1. keeps foot firmly in external rotation, allowing motion (unlike KAFO)
2. foot grows most rapidly in first few years of life- brace to prevent relapse during rapid growth spurts

Reference : Congenital Clubfoot. Fundamentals of Treatment, by Ignacio V. Ponseti. Oxford University Press, New York NY, 1996.

NOTES :