International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

Pitfalls in Conservative Congenital Clubfoot Treatment

Raykov D.

Varna University of Medicine
Dep. of Orthopaedics and Traumatology

Abstract: ***The contemporary trends in treatment of congenital clubfoot tend to prefer conservative approach due to the presence of the so called "embryonal myosin" that is proven to be very sensitive to surgical activities and very reliable to manual and plaster correction for either longer or shorter period of time. Thus the conservative methods became preferable, avoiding hyperfibrosis that occur after limited or large surgical corrections. There are two methods that are generally accepted as proved to be effective in conservative clubfoot treatment. Dr. Kite (193) first introduced his method in correction of the clubfoot by using a series of plaster casts. Two decades later his follower – Ignasio Ponseti (1968) modified the method, developed and completed it. Regardless of literature evidence of the effectiveness of conservative treatment there are plenty of mistakes, that causes the surgeon to be disappointed by the results. The aim of the study is to point out many of the possible pitfalls in conservative treatment of ideopatic congenital clubfoot in both methods – Kite's and Ponseti's. Conclusions: Knowledge of both methods and the possible pitfalls, while applying them, create a positive outlook for improvement in the prognosis and treatment outcomes of this disease.***

Keywords: congenital clubfoot, Ponseti method, Kite's method, pitfalls in equinovarus treatment

1. Introduction

Conservative approaches in congenital clubfoot [CCF] [[Figure 1] treatment, began following the critical analyses for the unsuccessful middle an long term results after the classical surgical techniques [1, 2, 3, 6, 7, 14].

The founder of this new concept became the American surgeon Kite [8]. After his personal disappointment in surgical treatment of CCF, he changed the therapeutic approach towards conservative treatment using plaster casts. Despite of his efforts and personal statements, there were a large percentage of cases, which needed additional surgical correction [4, 5, 11, 13].

During this period of primary investigation on the reasons for these failures another American orthopedic surgeon – Dr. Ponseti, did few significant changes, based on the knowledge of the pathobiomechenics of the normal and deformed foot[9, 10, 12, 16]. Thus he formed an individual and finished conservative new approach that managed to improve the final outcome and to reduce the need for further small and major surgeries.

Figure 1: Typical varus, adductus and equinus deformity of the idiopathic CCF

Most of his basic changes were critically assessed as Kite's pitfalls [17]. Here bellow they are defined:

1. The adduction is corrected by abduction of the fore foot by a counter pressure over a point in the medial plantar compartment.

Figure 2: Abduction of the anterior plantar compartment with counter pressure on calcaneocuboid joint.

2. The varus is corrected by eversion of the posterior plantar department.
3. The equinus of the medial and anterior plantar departments are corrected by progressive dorsiflexion.

These steps in Kite method, determined as wrong, are fulfilled as non-simultaneous corrections maneuvers as follows:

- Attempts in correction of the foot adduction in Shopard join separately.
- The abduction of the foot is achieved with counter pressure at the calcaneo – cuboideal join [Figure 2]. However, this wrong counter pressure blocks the abduction and stops the heel in varus.
- Weekly removal of wedges from the cast fulfils this wrong maneuver. [Figure 3].

Licensed Under Creative Commons Attribution CC BY

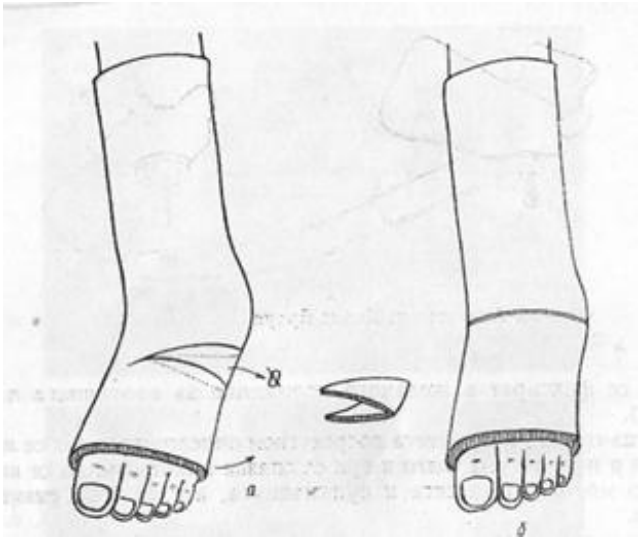

Figure 3: Removal of wedge in the zone of the calcaneocuboid joint

- The heel varus cannot be corrected and the talocalcaneal angle will not open later by everting the calcaneus.
- Attempts to correct the cavus by pressing the foot to the flat sole of the cast cause limitation and recurrences [19].
- Subluxated navicular bone is attempted to be reduced by lifting the foot, but not supinating it.
- The author limits the hypercorrection in abduction to avoid foot pronation.

Ponseti method generally is based on the following rules [12, 16, 17, 18]:

- The correction starts with cavus buy a hyper supination of the forefoot [Figure 4].
- Then constant abduction of the forefoot is applied with counter pressure on the lateral aspect of the talar head [Figure 5].
- Heel equinus and varus are corrected in 85% of cases by percutaneous Achilotomy.
- Denis Broun abduction foot device is mandatory for a long period of time – 2-4 years.

Figure 4: Cavus deformity correction by hyper supination of the forefoot.

Figure 5: Counter pressure over the lateral aspect of the talar head

While fulfilling these steps few mistakes are possible:

1. Trying to abduct the foot by giving counter pressure on the Calcaneo-cuboid joint blocks the heel and it stays in varus.
2. External rotation of the foot as attempting to correct foot adduction is a big error. It can cause a posterior displacement of the lateral malleolus, which is one of the biggest iatrogenic deformities. This will not happen if the foot is abducted with counter pressure on the lateral part of the talar head [Figure5].
3. Pronation in any of the treatment stages must be avoided. It increases the foot cavus by twisting the mid foot and forefoot. The heel remains locked in adduction under the talus [Figure6].
4. The foot needs to be fully abducted in over correction: 70°abduction in the child, under 1 year and 50°-60°abduction in the walking age. Otherwise a relapse is likely to appear.
5. The wrong cast application is one of the general mistakes in Ponseti protocol. Long leg casts with 90° knee flexion in age up to 1 year and 70° knee flexion in the walking age has to be performed. The long cast prevents the ankle and talus from rotating. The bellow knee cast is a mistake.
6. Equinus correction must be performed after achieving mid foot inversion and heel varus. Its save correction is provided by an achilles percutaneal tenotomy. If this concept is not strictly followed, a rocker bottom deformity may develop.
7. Long term application of abduction foot braces has a crucial role for the final success in treatment by a Ponseti method. It may be misunderstood and interrupted earlier. This is a big mistake that causes usually early relapse and repeating the treatment stages as “Late Ponsety”.

Licensed Under Creative Commons Attribution CC BY

Figure 6: Foot pronation – inadmissible mistake during plaster correction.

Figure 7: Relapse of foot adductus and heel varus.

2. Discussion

Thorough analysis of the normal and pathological foot motion and functions, which Ponseti did before introducing his technique, made it a method of choice in treatment of CCF [16, 17, 18]. According to many authors it has significantly higher levels of excellent or very good results [5, 7, 10, 11]. The treatment process takes considerably short time. This seems to be the other serious advantage for the child's parents.

Regardless of the treatment applied, clubfoot tends to relapse in 20% of treated children – earlier [after the second year or later about the 6th-7th year] [Fig 7].

The reasons for the relapses are mostly due to improper application of the manual, plaster and operative maneuvers [7, 11].

Cases, treated according to Kite's method show recurrence mainly at the expense of the heel varus and this mistake, according to critics, is the basic one underlying the failures of Kite. Talonavicular joint is in extreme medial subluxation – the navicular bone is with medial almost plantar position to the head of the talus. Therefore the aim of the adjustment is the stretching of medial capsule and the ligaments making the navicular bone to pass laterally. Putting a counter pressured on the talar head instead on the calcaneocuboid joint will render this impossible. This maneuver is called "The Ponseti magic move". While fulfilling it, higher results in the correction are achieved in a shorter time. Therefore the need of surgical management is significantly reduced [11, 19].

3. Conclusions

Conservative management of congenital clubfoot became a golden standard. From the perspective of contemporary critics, any complications and relapses may occur as a result of inaccurate maneuvers. Being aware of the possible pitfalls and avoiding them the orthopaedic surgeon will Kite method possess many inaccuracies and formulations, but it is the basis on which contemporary authors such as Ponseti, Demeglio and other developed their theories and conservative methods, which are already established with much more higher final results in the management of clubfoot, at that with safer and easier maneuvers for the child.

References

[1] B. B. Boychev, Gerchev A. Diseases of the foot. Medicine and Sports, 1970
[2] Aronson J, Puskarich CL (1990) Deformities and disabilities from treated club foot. J Pediatr Orthop 10(1):109
[3] Cooper DM, Dietz FR (1995) Treatment of idiopathic clubfoot-a 30-year follow-up note. J Bone Joint Surg 77-A(10):1477–1489
[4] Cummings RJ (2002) Letter to editor. J Bone Joint Surg 84-A(10):1890
[5] Herzenberg JE, Radler C, Bor N (2002) Ponseti versus traditional method of casting for idiopathic club foot. J Pediatr Orthop 22(4):517–520
[6] Herring JA (ed) (2002) Congenital talipes equinovarus (clubfoot) in Tachdjian's paediatric orthopaedics, vol. 2, 3rd edn. Philadelphia, Saunders p 927
[7] Ippolito E, Farsetti P, Caterini R, Tudisco C (2003) Long-term comparative results in patients with congenital clubfoot treated with two different protocols. J Bone Joint Surg 85 A(7):1286–1294]
[8] Kite JH (1939) Principles involved in the treatment of congenital clubfoot. J Bone Joint Surg 21:595–606
[9] Laaveg SJ, Ponseti IV (1980) Long-term results of treatment of congenital clubfoot. J Bone Joint Surg 62-A:23–31
[10] Lehman WB, Mohaideen A, Madan S, Scher DM, Van Bosse HJ, Iannacone M, Bazzi JS, Feldman DS (2003) A method for the early evaluation of the Ponseti (Iowa) technique for treatment of idiopathic clubfoot. J Pediatr Orthop (B) 12:133–140
[11] Morceunde JA, Dolan LA, Dietz FR, Ponseti IV (2004) Radical reduction in therate of extensive corrective surgery for clubfoot using the Ponseti method. Pediatrics 113:376–380
[12] Morceunde JA, Abbasi D, LA Dolan, Ponseti IV (2005) Results of an accelerated Ponseti protocol for club foot. J Pediatr Orthop 25(5):623–626

Licensed Under Creative Commons Attribution CC BY

[13] McKay DW (1982) New concept of approach to clubfoot treatment. Section 1-Principles and morbid anatomy. J Pediatr Orthop 2(4):347–356
[14] Nather A, Bose K (1987) Conservative and surgical treatment of clubfoot. J Pediatr Orthop 7(1):42–48
[15] Pirani S, Zeznik L, Hodges D (2001) MRI study of congenital clubfoot treated with Ponseti method. J Pediatr Orthop 21(6):719–726
[16] Ponseti IV (1996) Treatment. Congenital clubfoot-fundamentals of treatment. New York; Oxford University Press pp 61–81
[17] Ponseti IV (1997) Common Errors in the treatment of congenital clubfoot. Current Concepts, Int Orthop (SICOT) 21:137–141
[18] Ponseti IV (2000) Editorial club foot. J Pediatr Orthop 20(6):699–700
[19] Scher DM (2006) The Ponseti method of treatment of clubfoot. Curr Oper Pediatr 18(1):22–28

Licensed Under Creative Commons Attribution CC BY