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# **Delayed Presenting Congenital Talipes Equino Varus in African Decent: A Case Report**

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Abstract

Case Report

**Introduction:** Congenital Talipes Equinovarus (CTEV) also known as clubfoot is one of the most common congenital musculoskeletal deformities. CTEV affect 1 in every 1000 newborns. Children born with clubfoot have an inward curved forefoot, high arches and inverted heel with a downward pointing ankle. 'Delayed-presenting Clubfoot' (DPC), refers here to clubfoot abnormalities, of idiopathic cause, present at birth and not treated before walking stage. We use 'delayed presenting clubfoot'(DPC) in this paper as a preferred nomenclature as the term 'neglected clubfoot' infers a degree of blame and deliberate inaction on the parents and caregiver. DPC is common in low and middle-income countries (LMICS) particularly in Africa and South East Asia, due to lack of access to clubfoot treatment. Treating club foot in walking-age Children non-operatively is debated. This case report aimed at presenting the outcome of a 6 month management of a 4 years old male child with bilateral CTEV, using the Ponseti method.

**Methods:** A case of a 4-year-old male child who presented to the clubfoot clinic of Delta State University Teaching Hospital, Oghara with complaint of bilateral foot deformity, with no identifiable syndromic or secondary causes, he was subsequently evaluated as a case of DPC, severity and flexibility level was evaluated with the PIRANI SCORE, with the patient having a total score of 4.5. Non-Operative option of management was started immediately with the Ponseti method. Serial manipulation and casting were done, patient had a total of 6 cast sessions and percutaneous Achilles tendon tenotomy.

**Result:** After six manipulation and casting sessions, and subsequent Percutaneous Achilles tendon tenotomy, with foot plantigrade and all component of the clubfoot corrected. He was placed on Foot Ankle Braces (FAB). Currently on FAB for night use only and will use it for the next 4years. Patient is currently ambulating normally, with no residual deformity.

**Conclusion:** The implementation of the Ponseti method for the management of patients with DPC, has shown good outcome and reduced surgery rate. There is need for enlightenment on the importance of early presentation and prompt intervention. However there exist research gaps on the non-operative management of this group of patients, exploration of this area of research is needed.

Keywords: Congenital Talipes Equinovarus (CTEV), Clubfoot, Delayed Presenting Clubfoot, Pirani Score, Ponseti Method.

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#### **INTRODUCTION**

Congenital talipes equinovarus (CTEV, congenital clubfoot) is one of the most common structural congenital abnormalities affecting the lower extremities, with an incidence of one to two per 1000 live births (1,2). However, the incidence of CTEV has been reported to vary across the various regions of the world from 0.6/1,000 individuals in Asia, 0.9/1,000

individuals in Australia to 6.9/1,000 individuals in Hawaii, Polynesia and Maori. Evidence suggests that 80% of infants with congenital clubfoot live in Low- and middle-income countries (LMICs) (3,4,5). It is a structural deformity with four components: talipes equinus, midfoot cavus, forefoot adduction, and hindfoot varus and equinus. CTEV is among the most common developmental deformities, primarily affecting the ankle, subtalar, and metatarsal joints. This accounts for 53%

of all congenital malformations. The condition is more prevalent in male children, with a male-to-female ratio of 4:1. If left untreated, children with CTEV may face severe physical, social, and psychological challenges that significantly impact their quality of life. Physical disabilities commonly include callus formation on the weight-bearing limb, skin and bone infections, foot stiffness, disfigurement of the tarsal bones, and an inability to wear standard footwear (6,7). The aetiology of CTEV remains uncertain. however, several theories have been proposed. These include myogenic, neurogenic, and vascular anomalies; regional growth disturbances; and intrauterine extrinsic pressures. Gene-environment interactions have also been implicated. There is also evidence of a genetic predisposition, with a 10% risk of recurrence in subsequent child if one sibling is already affected. Family history of CTEV increases the risk of an individual being born with CTEV. Siblings of a CTEV patient have a 2–4% chance of also having CTEV. If both parents and a previous child or other family member have CTEV, the probability of another child having CTEV increases from 10% to 20%. The more family members who have CTEV, the greater the chances that a new family member would be born with CTEV (9). No evidence to show the association of CTEV with embryonic malformation. The development of CTEV has been noted to occur in the second trimester of pregnancy (10,11,12). Delayed Presenting Clubfoot (DPC), refers to cases of idiopathic clubfoot that are untreated beyond the walking age, often resulting in increased deformity severity and functional impairment. Delayed presentation of clubfoot (DPC) remains a major concern in low- and middle-income countries (LMICs) such as Nigeria. In these settings, more than half of children with the condition face delays in receiving appropriate care. This can be due to low level of parents' education and income. This is further aggravated by the lack of health care services in the rural areas, and poor health seeking behavior of people in LMICs (13).

The diagnosis of clubfoot is typically clinical and is usually made shortly after birth through a thorough examination of the foot. Clubfoot presents in two forms: "syndromic", in which other malformations exist, and the more common "idiopathic" form, where there are no other associated malformations (17). Clubfoot has been classified into mild, moderate and severe but this is too subjective. There are different classification systems used to determine the severity and outcome of treatment among Dimeglio/Bensahel which are classification system, Catteral/Pirani classification system, Ponseti and Smoley classification Harrold system, and Walker classification system and the International Clubfoot Study Group classification system. Out of these systems, the

commonly used ones are the Dimeglio/Bensahel and the Catteral/Pirani systems. The Pirani system, was devised by Shafiq Pirani, MD, of Vancouver, it has six categories; three in the mid-foot and three in the hind-foot. The mid-foot contracture score; are curvature of the lateral border of the foot (CLB), medial crease (MC), uncovering of the lateral head of talus (LHT). The hind-foot contracture score; are posterior crease (PC), emptiness of the heel (EH), and degree of dorsiflexion. Each category can have three scores depending on the severity which are 0, 0.5 and 1. The best possible score for a normal foot is 0 and the worse is 6. Pirani et al. system had been validated and proven reliable to accurately quantify the severity of a clubfoot deformity. The Pirani scoring system is also routinely used to describe the outcome of treatment (17-23).

This case report is aimed at presenting the outcome of a 12 months management of a 4-year-old male child with bilateral CTEV, using the Ponseti principle. The Ponseti technique of treatment, which is primarily non-surgical, can successfully treat clubfoot in up to 95 percent of cases.

#### **CASE REPORT**

A 4-year-old male child who weighed 3.5kg at birth, presented to the clubfoot clinic of DELSUTH. Oghara, with deformity of both foot since birth and has progressively worsened with ambulation. He is the 2<sup>nd</sup> out of 3 children. Pregnancy was desired, spontaneous, booked at gestational age of 12 weeks but was not compliant with ANC visits and medications. Baby was delivered via spontaneous vertex delivery (SVD), immediate post-natal period was uneventful. He was adequately immunized for age and has achieved all developmental milestone for age and sex. Nil history of other associated abnormality. Patient initially opted for tradiomedical interventions but no further improvement was achieved hence, his presentation to our facility for expert care. On examination, the forefoot was curved inward with high arches, with an inverted heel, ankle was pointing downward which was in keeping with Cavus, Adduction, Varus and Equinus deformity. The patient showed good gait agility, weight-bearing primarily over the dorsolateral region of the feet, with cutaneous callus aggregation over the region. The foot was subsequently assessed using the PIRANI Scoring system with a total score of 4.5. Relatives were counselled on the findings, diagnosis and option of management. Manual manipulation and casting were performed as described by Ponseti, with no modifications. While the above-the-knee cast was changed, the deformed foot was manipulated exactly as described by Ponseti (10, 14, 15).



Fig 1. Clinical photograph at presentation

Cast changes at 1 week intervals were carried out until all deformities were corrected this was evident from the Pirani score giving a mid foot contracture score of zero. All deformity except for the equinus deformity were corrected. Six bilateral non-weight-bearing casting sessions for over 42 days were needed before the tenotomy of the calcaneal tendon. There were no complications associated with cast application. Calcaneal

tenotomy was performed under local anesthesia. During tenotomy, the patient verbalized absence of pain, and ankle dorsiflexion to around  $0^{\circ}$  was achieved bilaterally. Following the procedure on the tendon, the patient was kept in an above-the-knee cast with the ankle positioned in talar neutral for an additional 3 weeks. Fig. 1 shows the pre-treatment clinical photographs.



Fig 2. Clinical photograph immediately 1 year after tenotomy

After removal of the cast, an abduction foot braces were prescribed to minimize the chance of recurrence and was recommended for 24 hours use after which it was recommended for use only at night for 1 year of follow-up. A home exercise program was developed and included a mixture of active movement and passive stretching. In addition, walking with comfortable sneakers was recommended for periods without the braces. Visits to the outpatient clinic were scheduled with maximum intervals of 1 month over the first 8 months of follow-up; during this period, the adequacy of the abduction foot braces were observed, with evaluation criteria including distance between ankles, bar angled 10° apex distal with attached shoes that were positioned in 40° of outward rotation. The patient reported compliance with the use of the abduction foot braces at the last follow-up review, approximately 1-year post-tenotomy, when he was advised to stop using it. The patient returned to her normal daily activities with 6 months follow-up. Fig. 2 shows a plantigrade foot with 1 year post tenotomy with no residual deformity

#### DISCUSSION

The treatment of CTEV varies but is usually nonoperative in initial cases, with surgical(operative) options reserved for correction of any resistant (residual) deformity. Non-operative treatment includes: stretching, for example the French Functional method; varied serial casting (plaster casts) and bracing, including Ponseti and Kite techniques.

The Ponseti method was employed in the management of our patient. The limit of age for applying the Ponseti method for patients with delayed presenting CTEV is challenging to predict. However, we considered that the age of our patient, 4 years at presentation and onset of treatment, will not be the limit for applying the Ponseti method in delayed presenting idiopathic CTEV.

Our patient had 2 mins of manipulation before casting on every cast visit., but in a study done by Lourenço and Morcuende, recommended a longer manipulation time and advocated fortnightly cast changes, as these allow a longer foot remodeling period than weekly changes (24). We had similar findings with Khan and Kumar, who in a similar study recommended weekly changes, which allow for a shorter treatment time, and produce satisfactory outcomes in cases of delayed presenting CTEV (25).

Only six casting sessions were required before tenotomy in our patient. Though in a study done by Sinha et al. it reported that an increasing number of casting sessions is required for maximal correction of deformity with increasing age (26). In line with similar studies which recorded low level of complications with Achilles tendon tenotomy, our patient had now complication following tenotomy.

In the past DPCs, were managed with surgical intervention, non-operative management with Ponseti technique has proven to give successful outcome, in a case study done in Enugu Nigeria by Ezeukwu et al, conservative management, with physical therapy was noted to have given good outcome within one year of treatment (27). We had a short follow-up, period for this case, but the aim of the study was to report the non-operative management of clubfoot beyond walking age.

#### CONCLUSION

Current management is moving away from operative towards a more conservative treatment using the Ponseti regimen. The long-term results of have should good outcome with minimal cases of relapse.

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