

Outcomes of Management of Severe Clubfoot among Children by Ilizarov External Fixator

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ABSTRACT

Introduction: Clubfoot remains the most common birth defect involving the musculoskeletal system. There are various surgical and non-surgical treatment options available for the management of clubfoot. Using the minimally invasive Ilizarov external fixator method has been reported to have good success rates and fewer complications.

Materials and methods: This study aimed at analysing the morphological and functional outcomes of treating severe clubfoot by Ilizarov external fixator among children from July 2017 to March 2020. Thirty-two children who had either failed Ponseti / surgery or neglected with 44 clubfeet of Dieglio type III and type IV were included in the study. A short-leg walking cast was applied for an additional six weeks after removing of Ilizarov frame and additionally followed by an orthosis for another six weeks. Outcomes were measured by the functional rating system by Laaveg and Ponseti and interpretation done at 1 month and 12 months after the ankle-foot arthrosis.

Results: About 86.4% of the patients had good or excellent outcome scores. Pre and post-Dimeglio scores and functional rating scores were statistically significant ($p < 0.001$) by using Paired t-test. Complications included superficial pin site infections in 13 feet (29.54%), 5 feet (11.36%) had claw toes, 3 feet (6.81%) had linear skin necrosis and 2 feet (4.54%) had calcaneal fractures which were manageable with minor interventions.

Conclusion: The study findings highlighted that the Ilizarov external fixator method can correct complex foot deformities of severe clubfoot with minimum morbidity. Further larger and long-term studies are needed to investigate the effects of the stiff hindfoot and possible degenerative changes on the function and symptoms of these patients as adults.

Keywords:

resistant clubfoot foot, Ilizarov frame, complex deformities

INTRODUCTION

Congenital Talipes Equinovarus (CTEV) or idiopathic clubfoot is one of the most common congenital abnormalities involving the musculoskeletal system with an incidence of about 1-6 in every 1000 live births¹. Classical CTEV deformities include ankle equinus, hindfoot varus, midfoot supination, forefoot adductus, and variable degree of cavus. Although clubfoot can be easily diagnosed by a general practitioner or trained midwife, accurate classification and assessment of underlying pathology would require the expertise of an experienced clinician². There are two common methods of evaluation for CTEV, namely the Pirani and Dimeglio classifications^{3,4}. Dimeglio classification relies on the passive range of motion in four planes of the foot, where grades III and IV are the most severe forms and are associated with the least satisfactory outcome. In many developing countries, children with severe CTEV presenting late after walking age are still common despite the advancement of information technology, and their management remained a challenge to the orthopaedic community⁴.

Many methods of treatment for CTEV have been reported over the years. For the non-surgical treatment, Kite and Mackay popularised serial casting during the 70s and 80s of the last centuries⁵⁻⁷. The French daily strapping method was introduced in 1990⁵. Ponseti and his team reported good treatment outcomes using his serial casting protocol for CTEV children under two years of age⁸. However, for children presenting later than two years, the correction might