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Original article

Functional and clinical results achieved in congenital clubfoot patients treated by Ponseti's technique☆

*Pedro Augusto Jaqueto**, *Guilherme Salgado Martins, Fernando Saddi Mennucci, Cintia Kelly Bittar, José Luís Amim Zabeu*

Pontifícia Universidade Católica de Campinas (PUC-Campinas), Hospital e Maternidade Celso Pierro, Campinas, SP, Brazil

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ABSTRACT

Objectives: To analyze and evaluate functional and clinical results in patients with congenital clubfoot treated with Ponseti's technique.

Methods: This study evaluated 31 patients diagnosed with 51 congenital clubfeet, treated between April 2006 and September 2011 with Ponseti's technique. The patients who did not achieve an equinus correction with manipulation were treated with Achilles tenotomy. An anterior tibial tendon transfer was performed in patients who maintained residual adduction. All plasters were made by fellows and supervised by Ankle and Foot Chiefs. The technique was performed without the need for physical therapists, orthotics, and plaster technicians. Patients were submitted to pre- and post-treatment examination and evaluated under Pirani's classification.

Results: Male patients had an increased incidence and the right side was more affected, while bilateral involvement was observed in 64.5% of the cases. The mean number of cast changes was 5.8, and Achilles tenotomy was necessary in 26 patients. There were significant deformity improvements in 46 of the 51 treated feet (90.2%); Pirani's mean score improved from 5.5 to 3.6 after treatment.

Conclusion: The Ponseti method was effective in both functional and clinical evaluation of patients, with significant statistical relevance ($p = 0.0001$), with a success rate of 90.2% and mean improvement in the Pirani's index of 65.5%.

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☆ Study conducted at the Hospital e Maternidade Celso Pierro, Pontifícia Universidade Católica de Campinas (PUC-Campinas), Campinas, SP, Brazil.

* *Corresponding author*.
E-mail: pajaqueto@hotmail.com (P.A. Jaqueto).

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Resultados funcionais e clínicos alcançados em pacientes com pé torto congênito tratados pela técnica de Ponseti

Palavras-chave:
Deformidades do pé
Anormalidades congênitas
Pé torto
Resultado do tratamento

RESUMO

Objetivos: Analisar e avaliar os resultados funcionais e clínicos em pacientes com pé torto congênito tratados pela técnica de Ponseti.

Métodos: O estudo incluiu 31 pacientes diagnosticados com 51 pés tortos congênitos, tratados entre abril de 2006 a setembro de 2011 pela técnica de Ponseti. Os pacientes que não alcançaram a correção do estado equino com manipulação foram tratados com tenotomia do Aquiles. Uma transposição do tendão tibial anterior foi feita nos pacientes que mantiveram uma adução residual. Todos os gessos foram feitos por residentes e supervisionados pelos chefes de Tornozelo e Pé. A técnica foi aplicada sem a necessidade de fisioterapeutas ou técnicos de gesso. Os pacientes foram submetidos a exame antes e depois do tratamento e avaliados de acordo com a escala de Pirani.

Resultados: Os pacientes do sexo masculino apresentaram um aumento de incidência e o lado direito foi o mais afetado, enquanto que o acometimento bilateral foi observado em 64,5% dos casos. A média de mudanças de gesso foi de 5,8 e a tenotomia do tendão de Aquiles foi necessária em 26 pacientes. Houve melhorias significativas das deformidades em 46 dos 51 dos pés tratados (90,2%), a escala de Pirani pontuou um avanço na média de 5,5 para 3,6 após o tratamento.

Conclusão: O método de Ponseti foi eficaz nas avaliações funcionais e clínicas dos pacientes, com uma relevância estatística significante ($p = 0{,}0001$), com uma taxa de sucesso de 90,2% e um avanço na escala de Pirani de 65,5%.

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Introduction

Congenital clubfoot (CCF) is a deformity characterized by a complex misalignment of the feet, involving both soft and bony parts, with varus and equinus deformity of the hindfoot (talipes equinovarus), as well as cavus and adduction of the midfoot and forefoot.[1–5] Its incidence is approximately one in every 1000 live births, with a predominance of males at the ratio of 2:1, and with bilateral involvement in 50% of cases.[6,7]

CCF has a wide variety of clinical expressions; some classifications consider only the clinical aspects, while others also take radiographic features into account. To date, no classification has prevailed. Nonetheless, the literature indicates that the most used classification is the Pirani[8] scale, which is simpler and more recent.

The first reference to CCF treatment was described by Hippocrates (400 BC), who mentioned repeated and gentle manipulations, followed by immobilizations. Guerin is known as the first physician to use plaster in 1836. Around the 20th century, new technologies were developed to support these corrections, such as the Thomas device. In 1932, Kite[9] advocated smooth and repeated manipulations followed by plaster immobilization, in an attempt to prevent forced and prolonged corrections. This combination became known as the Kite method for CCF treatment.[10]

Around 1940, Ponseti, after several in-depth studies of the pathological and functional anatomy of the CCF, developed and perfected his treatment technique. Ponseti described details about maneuvers and plaster immobilization, as well as follow-up after Achilles tendon resection, guided by the patient's age. He also identified and published the most common errors in treatment management at the time.[11] The most important advantage of the Ponseti method is the degree of mobility achieved at the end of treatment when compared with other techniques.[10]

His method is based on gentle manipulations and serial plaster changes, percutaneous resection of the Achilles tendon, and the use of a foot abduction brace.[1,4,12] It has become the preferred method for treating idiopathic CCF in many countries.[5,13,14] In the past decade, with its wide acceptance, this method has been extended to be used in older children[15,16]; complex and refractory feet[17]; recurrent feet,[18] including recurrence after extensive surgical decompression[19]; relapsed feet, without taking into account non-idiopathic cases such as myelomeningocele,[20,21] and distal arthrogryposis.[22,23] The foundation of the manipulation technique consists of correcting deformities through plastic change of contracted and shortened elements, which have a high elastic capacity in children, especially in the first year of life. Ponseti advocated that clinical and physical examinations are paramount; he did not value imaging exams in his assessments. Other authors, such as Pirani et al.,[24] used magnetic resonance imaging (MRI) to confirm that the Ponseti method, in addition to correcting the relationship between the foot bones, also promoted mechanical stimuli that were important and played a role in bone remodeling.

CCF treatment with the Ponseti technique is widely used in many countries due to its good results, close to 90%.[4,13,14,25,26] In turn, approximately 50% of patients treated with Kites' technique require surgical intervention and 40% present residual deformity.[27] Another interesting factor to support the

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