



Update Article

Surgical treatment of neglected clubfoot using external fixator[☆]

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ABSTRACT

The definition of neglected clubfoot (NC) includes a variable range of complex deformities of the foot that are refractory to conventional treatments or are treated inappropriately. Several etiologies may be related to this. The Ilizarov method has become established as a tool for treating these deformities. It minimizes soft-tissue damage through gradual correction of the deformity, with a high success rate in relation to achieving a plantigrade foot, with low incidence of recurrence. The indications for treatment include severe rigid deformities (Dimeglio III and IV), or adverse skin conditions. Careful clinical and radiological examination is fundamental for proper planning and installation of the external fixator. The techniques used include selection of external fixation assemblies, which can be closed when there is a connection between the leg, hindfoot and forefoot. This closed assembly may or may not be constricted, according to whether hinges are provided or whether use of the natural anatomical hinges during correction of the deformity is envisaged. An open assembly makes it possible to add flexibility to the foot through histogenesis, while allowing closed corrections of greater precision later on. Hexapod fixators are an innovation with high potential for accuracy in correcting deformities. Procedures associated with external fixation include soft-tissue release and bone procedures. These procedures enable corrections that are more anatomical, for different degrees of severity and stiffness of deformity. It can be concluded from analyzing this case series that treatment of neglected clubfoot using an external fixator has a high rate of good and excellent results, with low frequency of complications.

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Tratamento cirúrgico do pé torto inveterado com fixador externo

R E S U M O

Palavras-chave:

Pé torto
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Procedimentos cirúrgicos operatórios
Fixação externa

O pé torto inveterado (PTI) inclui em sua definição uma gama variável de deformidades complexas do pé refratário a tratamentos convencionais ou tratados de forma inadequada. Diversas etiologias podem estar relacionadas. O método de Ilizarov é consagrado como uma ferramenta de tratamento dessas deformidades, minimiza danos a partes moles, através de correção gradual da deformidade, com alto índice de sucesso em relação à obtenção de um pé plantígrado com incidência baixa de recidiva. As indicações do tratamento incluem deformidades graves e rígidas (Dimeglio III e IV) ou em condições de pele desfavoráveis. O exame clínico e radiológico criterioso é fundamental para um planejamento adequado e a montagem do fixador externo. As técnicas empregadas incluem a seleção das montagens do fixador externo, que pode ser fechada, quando há conexão entre perna, retro e antepé. Essa montagem fechada pode ser constricta ou não, quando se oferecem as dobradiças ou quando se espera usar dobradiças anatômicas naturais durante a correção da deformidade. A montagem aberta permite flexibilizar o pé através da histogênese, permite correções fechadas mais precisas posteriormente. Os fixadores hexapodais representam inovações com alto potencial de precisão na correção de deformidades. Os procedimentos associados à fixação externa incluem as liberações miotendíneas e os procedimentos ósseos. Esses procedimentos permitem correções mais anatômicas para graus diferentes de gravidade e rigidez de deformidade. Conclui-se, na análise das séries de casos, que o tratamento do pé torto inveterado com fixador externo apresenta um alto índice de bons e excelentes resultados, com baixa frequência de complicações.

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Introduction

Neglected clubfoot (NC) can be interpreted in several ways. The English terms that define this condition (neglected, resistant, or relapsed clubfoot) include the likely related situations of no treatment; inadequate, insufficient, or discontinued treatment; resistant cases (most often syndromic or teratologic); or relapsed and refractory to traditional treatments, whether conservative or surgical.¹⁻³

NC is a common problem in developing or underdeveloped countries. Approximately 80% of children with congenital clubfoot (CCF) are born in developing countries, many of those with limited and/or late access to the healthcare system and trained specialists for treatment.^{1,3,4}

Treatment with external fixators is presented as an established option in several case series. The main advantages relate to the high success rate in detriment to the common complications in the treatment of these feet in sharp corrections. The most common complications are related to soft tissue, vascular and surgical wounds, and recurrence, as well as those that arise from the use of open techniques (arthrodesis and bone resections) in skeletally immature patients. This study presents the indications, technical variations, and innovations, through a review of case series.^{2,3,5,6}

Indications

There is no consensus on when to consider a clubfoot as neglected, or not eligible for conservative treatments.^{1,2}

The criteria for indicating treatment with external fixation include adult patients or children older than 5 years, those with non-reducible feet after manipulation and serial casting, those who underwent over three unsuccessful surgical treatments, syndromic cases (arthrogryposis, sequelae from neuromuscular diseases, Freeman-Sheldon syndrome, Streeter syndrome, Marfan syndrome), patients who underwent complicated open surgical treatments with soft tissue necrosis, and recurrence.^{2,3,5} However, some of these criteria are questionable and subjective, particularly those related to age, number of surgeries, and etiologies. Another selection criterion for treatment is the classification proposed by Dimeglio et al., in which those classified as grade III and IV would be eligible for treatment (Fig. 1).^{6,7}

The indicated etiologies include sequelae (contractures) from burns, polio, refractory clubfoot (whether idiopathic or untreated), trauma sequelae, central or peripheral neurological damage sequelae, meningitis sequelae, and lower limb length discrepancy sequelae.^{2,3,5,8}

Anatomopathology

In NC, the anatomical deformities do not necessarily conform to those described in CCF, given that this entity covers a range of conditions (added for clarity) from classic CCF deformities to post-traumatic deformities and under- or overcorrections from previous treatments. Thus, a careful analysis of the deformities and joint mobility, from the clinical and radiological standpoint, is necessary for proper three-dimensional understanding of the deformity and subsequent preoperative

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