



Original Article

Initial experience of use of an articulated external fixator in treating Legg-Calvé-Perthes disease by means of arthrodiastasis during the active phase of the disease[☆]



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ABSTRACT

Objective: To present the preliminary results from treating patients with Legg-Calvé-Perthes Disease (LCPD) by means of hip arthrodiastasis using a monolateral external fixator applied to the hip and to succinctly describe the surgical technique used, in a prospective study.

Methods: Prospective study on 18 patients with LCPD who underwent surgical treatment by means of the hip arthrodiastasis technique using a monolateral external fixator. There were 13 male and five female patients of mean age 8.5 years, ranging from five to 13 years. All the patients presented unilateral hip impairment: nine on the right side and nine on the left. The results were evaluated at maturity using clinical and radiological criteria.

Results: All the patients evolved with improvement of joint mobility, and pain relief was achieved in 88.9% of them. Reossification of the femoral epiphysis occurred within the first three months of the treatment. The hips operated at the necrosis stage of the disease did not pass through the fragmentation stage, thus shortening the evolution of the disease. The results were 77.8% satisfactory and 22.2% unsatisfactory.

Conclusion: Hip arthrodiastasis with a monolateral external fixator during the active phase of LCPD improved the degree of joint mobility. Use of the arthrodiastasis technique at the necrosis stage or at the fragmentation stage (active phase of the disease) presented satisfactory results from treatment of LCPD.

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Experiência inicial com o uso de fixador externo articulado no tratamento da doença de Legg-Calvé-Perthes por meio de artrodiástase na fase ativa da moléstia

R E S U M O

Palavras-chave:

Doença de Legg-Calvé-Perthes
Procedimentos ortopédicos
Fixadores externos
Articulação do quadril

Objetivo: Apresentar os resultados preliminares do tratamento da DLCP com o uso de artrodiástase com fixador externo monolateral aplicado ao quadril e descrever sucintamente a técnica operatória usada em um estudo prospectivo.

Métodos: Estudo prospectivo de 18 pacientes com DLCP submetidos ao tratamento operatório com a técnica de artrodiástase do quadril por meio de fixador externo unilateral. São 13 pacientes do gênero masculino e cinco do feminino com idade média de 8,5 anos com variação de cinco a 13 anos. Todos os pacientes com acometimento unilateral do quadril, nove à direita e nove à esquerda. A avaliação dos resultados foi feita na maturidade e considerou critérios clínicos e radiográficos.

Resultados: Todos os pacientes evoluíram com melhoria da mobilidade articular com alívio da dor obtido em 88,9% dos pacientes. A reossificação da epífise femoral ocorreu nos primeiros três meses do tratamento. Os quadris operados na fase de necrose não passaram pela fase de fragmentação e abreviaram o tempo de evolução da doença. Os resultados foram 77,8% satisfatórios e 22,2% insatisfatórios.

Conclusões: A artrodiástase do quadril com fixador externo monolateral na fase ativa da DLCP melhora o grau de mobilidade articular. O emprego da técnica de artrodiástase nas fases de necrose e fragmentação (fase ativa da doença) apresenta resultados satisfatórios no tratamento da DLCP.

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Introduction

A childhood hip disorder was described simultaneously in 1910 by Legg (United States), Calvé (France), and Perthes (Germany) as an obscure alteration, pseudocoxalgia, and juvenile deforming arthritis, which characterize the picture known today as Legg-Calvé-Perthes disease (LCPD).¹

The disease is self-limiting, originated by ischemia of the femoral head in varying grades, leading to bone necrosis. The etiology is still unknown, although several hypotheses that attempt to explain the deficiency in blood supply of the femoral head have been raised.²

There are various degrees of avascular necrosis in LCPD, which depend mainly on the extent of the injury. The presence of new episodes of ischemia, likely to occur during the course of the disease, may result in a femoral head with different stages of self-repair.³

Initially, necrosis affects the epiphyseal tissue and give rise to newly formed bone tissue. The hyaline cartilage becomes relatively thickened, as it continues to receive normal nutrition from the synovial fluid and maintains the spherical shape of the femoral head.⁴

In the second stage of the disease, there is fragmentation of the femoral head, followed by resorption and bone replacement, which lasts from one to three years. In this stage, there is a spread of necrotic tissue by vascularized connective tissue; resorption and necrosis when replacement by immature bone tissue takes place. The epiphysis loses

height due to the collapse of the trabecular bone and the absorption of fragmented bone. In moderate and severe cases, metaphyseal changes in the femoral neck take place.

The third stage of the disease, the repairing stage, is characterized by the replacement of necrotic and immature bone by mature bone tissue. The histopathological pattern observed in this stage ranges from areas without bone infarction to femoral heads with several areas of necrotic and mature bone.

The child with LCPD feels pain in the hip and/or knee and decreased joint range of motion, primarily in the internal rotation and hip abduction movements.

Radiographic examination in LCPD is characterized by three signs: first is the shrinking of the ossification nucleus of the femoral head, with widening of the joint space; second is a subchondral fracture (Caffey's sign), which, according to Salter and Thompson,³ marks the beginning of the clinical symptoms and is considered, depending on its length, a prognostic factor for disease; third sign is the increase of the radiopacity of the femoral head, characterizing avascular necrosis. From that moment on, the repair process produces heterogeneous images, depending on the areas of revascularization and new necrosis outbreaks.

The objectives of orthopedic LCPD treatment are pain relief, the containment of the femoral head in the acetabulum, and the recovery of joint range of motion in the affected hip. Treatment methods commonly used to achieve these targets are traction, load restriction, tenomyotomy, abduction orthosis, and osteotomies at both the proximal femur and the acetabulum.

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