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Review Article

Hip salvage surgery in cerebral palsy cases: a systematic review☆

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ABSTRACT

Imbalance and muscle spasticity, in association with coxa valga and persistent femoral anteversion, compromises hip development in cases of cerebral palsy and may result in chronic pain and even dislocation. Some of these hips undergo salvage surgery because of the severe impact of their abnormalities in these patients' quality of life. We conducted a systematic review of the literature to compare the results from the main hip salvage techniques applied to these individuals. The literature search focused on studies that evaluated results from hip salvage surgery in cases of cerebral palsy, published from 1970 to 2011, which are present in the Embase, Medline, PubMed, Cochrane Library and SciELO databases. Although the results were not statistically comparable, this systematic review demonstrates that hip salvage surgery should be indicated after individual evaluation on each patient, due to the wide spectrum of presentations of cerebral palsy. Therefore, it seems that no surgical technique is superior to any other. Rather, there are different indications.

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Cirurgias de salvamento do quadril em paralisia cerebral: revisão sistemática

Palavras-chave:
Paralisia cerebral
Salvamento
Quadril
Fêmur

RESUMO

O desequilíbrio e a espasticidade muscular, associados à coxa valga e à anteversão femoral persistente, comprometem o desenvolvimento do quadril na paralisia cerebral e podem resultar em dor crônica e até luxação. Alguns desses quadris são submetidos a cirurgias de salvamento decorrentes do grave impacto das suas alterações na qualidade de vida. Fizemos uma revisão sistemática da literatura para comparar os resultados das principais técnicas aplicadas para salvamento do quadril nesses indivíduos. A busca na literatura teve como

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foco estudos que avaliaram resultados de cirurgias de salvamento do quadril em paralisia cerebral, publicados de 1970 a 2011, presentes nas bases de dados Embase, Medline, Pubmed, Scielo e Cochrane Library. Apesar de os resultados obtidos não serem estatisticamente comparáveis, essa revisão sistemática demonstra que as cirurgias de salvamento do quadril devem ser indicadas após avaliação individual de cada paciente, decorrente do amplo espectro de apresentações da paralisia cerebral. Logo, aparentemente, não há uma técnica cirúrgica superior às outras, mas sim indicações diferentes.

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Introduction

Hip development is determined through the constant actions of the musculature on this joint. Individuals with cerebral palsy (CP) are born with normal hips.[1] However, through the muscle imbalance generated by the spasticity present in this condition, in association with coxa valga and uncorrected femoral anteversion, hip development becomes compromised and this results in deformities of different levels of severity.[1,2]

The incidence of hip subluxation and dislocation in spastic CP cases is highly variable, between 7% and 60%. Higher prevalence, from 33% to 70%, is found among patients with greater neurological impairment, quadriplegic cases or cases presenting GMFCS (Gross Motor Function Classification System) levels III, IV or V.[3,4] Pain, difficulty in sitting down, pressure ulcers and impaired perineal hygiene are the main problems resulting from these alterations when the condition goes untreated.[5]

The aim of the treatments is to obtain a pain-free hip that allows adequate range of motion and provides better positioning and capacity to sit, in addition to implementing hygiene and general care measures.[6,7] The results from the various closed or surgical treatments are directly linked to the qualities of the joint surface, acetabular cartilage and femoral head.[8] Thus, younger patients benefit more from closed reconstruction procedures. On the other hand, hips that present chronic subluxation or dislocation may require salvage surgery, such as femoral head resection, arthroplasty, osteotomy or arthrodesis.[9,10]

The literature on this subject is sparse, particularly with regard to presenting groups of patients that can be compared. There are no controlled prospective studies, systematic reviews or meta-analyses comparing the various hip salvage surgery techniques applied in CP cases. The objectives of the present study were to carry out a systematic review of the literature in order to compare the results from the main techniques applied for hip salvage among these individuals and answer the following question: which surgical technique is the most effective for treating dislocated and painful hips in CP cases, given the salvage surgery methods available?

Material and methods

A qualitative and quantitative systematic review of the literature was carried out, which had the aim of identifying all the evidence on hip salvage surgery in CP cases.

Two reviewers separately performed a literature search focusing on studies that evaluated the results from hip salvage surgery in CP cases, published between 1970 and 2012, using the Embase, Medline, PubMed, SciELO and Cochrane Library databases. For this, the following descriptors were used: *cerebral palsy*, *hip*, *femur*, *femoral* and *salvage*.

The studies selected complied with the inclusion and exclusion criteria that we established. All the inclusion criteria had to be met for the study to be used in the review. Prospective clinical trials, with or without randomization, and also retrospective studies, published in Portuguese, English, French, Spanish, German or Italian were included. Samples with at least 10 participants and length of follow-up of at least 12 months were also included.

The exclusion criteria were: case reports, editorials, descriptions of surgical techniques, studies that contained a sample of patients with neuromuscular diseases other than CP, and samples with mean age greater than 30 years (Appendix A: protocol model).

The data-gathering process and inclusion and exclusion of studies were performed separately by the authors twice. The efficacy of each study was evaluated regarding improvement of pain, ease of personal hygiene, functional improvement, satisfaction and presence or absence of heterotopic ossification. The results were then evaluated and, lastly, a balanced and impartial synthesis was elaborated with due remarks relating to flaws in the evidence.

Results

Forty-eight published papers evaluating patients with CP and painful hips who underwent salvage surgery were found. Ten observational retrospective cohort studies were selected, while 38 studies were excluded (two descriptions of surgical techniques and 36 observational studies). No randomized and controlled experimental studies were found. Only one article presented a control group, and this study compared the techniques proposed by Castle and by McHale.[11]

The surgical techniques used and analyzed in these selected articles were: hip arthroplasty ($n = 1$)[12]; Schanz femoral valgus osteotomy ($n = 1$)[13]; hip arthrodesis ($n = 1$)[14]; McHale valgus osteotomy ($n = 2$)[15,16] and resection of the proximal end of the femur ($n = 6$).[2,16–19] One study[11] compared two surgical techniques (resection of the proximal end of the femur and McHale valgus osteotomy) (Table 1).

The main reason for excluding the remaining studies was the surgical techniques used ($n = 13$), which did not consist of

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