



## Technical Note

# Articular reconstruction of the humeral head with autogenous allograft in the treatment of the osteonecrosis<sup>☆</sup>



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## ABSTRACT

The authors describe a surgical biological reconstruction of the humeral head with frozen autogenous allograft technique for the treatment of young patients with focal osteonecrosis of the humeral head. This represents a possible alternative, maybe even definitive for some patients, when compared to hemiarthroplasty or total shoulder arthroplasty. The technique consists of the fixation of a frozen autogenous allograft with previously-molded articular cartilage from the humeral head, after cleansing the osteonecrotic focus. Five patients under 50 years of age were treated, with three very satisfactory results, one patient was lost to follow-up, and one patient had an unsatisfactory result (converted to hemiarthroplasty). The study describes the technique in detail and the three cases with a longer follow-up time.

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## Reconstrução da superfície articular da cabeça umeral com enxerto homólogo no tratamento da osteonecrose

## RESUMO

Os autores descrevem a técnica cirúrgica de reconstrução biológica da cabeça umeral com enxerto ósseo homólogo congelado usada no tratamento da osteonecrose segmentar da cabeça umeral em pacientes jovens e destacam a abordagem como uma possibilidade opcional e talvez definitiva à hemiartroroplastia ou artroplastia total do ombro. Resumidamente, a técnica consiste em reconstruir a falha encontrada na região necrótica da cabeça

### Palavras-chave:

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umeral com o uso de enxerto ósseo congelado com cartilagem para refazer a superfície articular comprometida. No total, cinco pacientes com menos de 50 anos foram tratados com essa técnica, conseguiram-se resultados muito satisfatórios em três deles, uma perda de seguimento e um resultado negativo, convertido para hemiartroplastia. O estudo descreve a técnica usada com detalhes, bem como os três casos com maior tempo de seguimento.

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## Introduction

Segmental osteonecrosis of the humeral head has been the subject of few scientific publications, despite the fact that it is a classically expected complication in some fractures and/or fracture-dislocations of the shoulder, representing the second most common site of non-traumatic osteonecrosis.<sup>1</sup>

Initially described by Heimann and Freiburger,<sup>2</sup> several treatments for osteonecrosis of the humeral head are available. The classic conservative treatment in the pre-collapse phase consists of limiting the use of the joint.<sup>3</sup> With the failure of this approach, or in cases of a more advanced disease, the treatment of choice is partial or total arthroplasty.<sup>2</sup> Thus, patients younger than 50 years who undergo shoulder arthroplasty suffer a large number of revisions.<sup>4,5</sup> Bartelt et al.<sup>4</sup> reassessed a series of total and partial arthroplasties performed in patients under 55 years of age and found a lifespan of 72% for partial arthroplasties and 92% for total arthroplasties in a minimum follow-up of 10 years. Johnson et al.<sup>5</sup> published a review article in which they also questioned the longevity of arthroplasties performed in patients younger than 50 years.

Other surgical options, such as humeral head decompression, surface arthroplasty, arthroscopic debridement, and vascularized bone grafting have been described; however, due to their small sample sizes, the results were inconclusive.<sup>1</sup> Procedures involving articular biological reconstruction using fresh homologous graft have been described by Görtz et al.<sup>6</sup> in the treatment of femoral condyle osteonecrosis, with good results.

This type of treatment has also been used to fill in the defects of the humeral head resulting from posterior instability of the shoulder<sup>7,8</sup>; chondral defects in the knee, femoral head, and talus; or even for the treatment of ankle osteoarthritis.

In this context, the authors describe a surgical technique with the use of frozen homologous graft with cartilage for the treatment of segmental osteonecrosis of the humeral head in patients under 50 years of age as an alternative to arthroplasties, since no reports in the literature of this type of approach for osteonecrosis of the humeral head were retrieved in the literature. It is worth noting that until the time these procedures were performed, fresh homologous grafts were not available in our tissue bank. The authors also describe the results of the three patients with longest follow-up.

## Surgical technique

The surgery is performed under general anesthesia, with the patient in a supine “beach chair” position through the deltopectoral access route. After disinsertion of the subscapularis muscle tendon, the humeral epiphysis is exposed and the focus of necrosis is resected (Fig. 1). The articular defect resulting from necrosis resection is filled with a frozen homologous graft of cartilage from a humeral head (obtained from the tissue bank of our institution), which is sculptured intraoperatively according to each case (Fig. 2). The graft is then secured with two 4.0 mm partial thread cancellous screws (in four cases) or with two headless compression screws (in one case), depending on material availability in each situation.

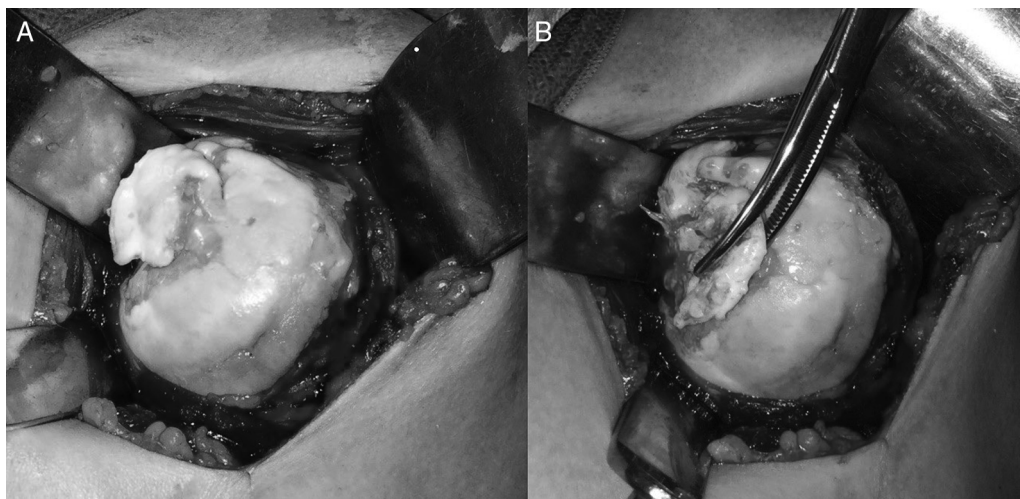


Fig. 1 – (A) Exposure of the humeral epiphysis, focusing on the evident necrosis; (B) removal of the necrosis focus.

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