



Original article

Knee fresh osteochondral allografts in Brazil with a minimum two-year follow-up[☆]

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ABSTRACT

Objective: The present study aimed to report the results of the first series of cases of fresh osteochondral allografts in the knee joint in Brazil with a minimum follow-up of two years.

Methods: A protocol of procurement, harvesting, processing, and utilization of fresh osteochondral allografts in the knee joint was established, beginning with legislation modifications, graft harvesting techniques, immediate processing, storage of fresh grafts, and utilization of two surgical techniques of osteochondral transplantation. Eight patients were treated and followed-up for a minimum of two years.

Results: Patients were evaluated with subjective IKDC, KOOS, and modified Merle D'Aubigne and Postel questionnaires. Mean subjective IKDC score was 31.99 ± 13.4 preoperative and 81.26 ± 14.7 at the latest follow-up; preoperative KOOS score was 46.8 ± 20.9 and postoperative was 85.24 ± 13.9 , indicating a significant improvement over time ($p < 0.01$). Mean modified Merle D'Aubigne-Postel score was 8.75 ± 2.25 , preoperatively, and 16.1 ± 2.59 postoperatively. Friedman test for non-parametric samples demonstrated a significant improvement in postoperative scores ($p < 0.01$).

Conclusion: The use of fresh osteochondral allografts in Brazil is a safe procedure, with good clinical results in the short- and medium-term for the treatment of osteochondral lesions greater than 4 cm^2 in the knee joint.

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Transplante osteocondral a fresco no joelho no Brasil: mínimo de dois anos de seguimento

R E S U M O

Palavras-chave:

Traumatismos do joelho
Cartilagem articular
Transplante homólogo
Ortopedia

Objetivo: Relatar os resultados dos primeiros casos de transplante osteocondral a fresco na articulação do joelho no Brasil com um mínimo de seguimento de dois anos.

Métodos: Foi feito um protocolo de captação, processamento e uso de transplantes osteocondrais a fresco na articulação do joelho. Iniciou-se com modificações na legislação vigente, técnicas de captação de enxertos, processamento imediato, armazenamento a fresco dos enxertos e uso de duas técnicas cirúrgicas de transplante osteocondral. Oito pacientes foram transplantados e acompanhados com mínimo de dois anos de seguimento.

Resultados: Os pacientes foram avaliados por meio dos questionários do *International Knee Documentation Committee* (IKDC) subjetivo, *Knee Injury and Osteoarthritis Outcome Score* (KOOS) e índice de Merle D'Aubigne e Postel modificado. A média da pontuação da escala IKDC subjetiva pré-operatória foi de $31,99 \pm 13,4$ e de $81,26 \pm 14,7$ no pós-operatório e da escala KOOS pré-operatória foi de $46,8 \pm 20,9$ e de $85,24 \pm 13,9$ no pós-operatório, com melhoria significativa ao longo do tempo ($p < 0,01$). A média da pontuação pelo índice de Merle D'Aubigne e Postel modificado foi de $8,75 \pm 2,25$ no pré-operatório e de $16,1 \pm 2,59$ no pós-operatório. O resultado do teste de Friedman para amostras não paramétricas demonstrou melhoria significativa ao longo do tempo ($p < 0,01$).

Conclusões: O transplante osteocondral a fresco no Brasil é um procedimento seguro, com bons resultados clínicos em curto e médio prazo para o tratamento de lesões osteocondrais maiores do que 4 cm^2 na articulação do joelho.

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Introduction

Chondral lesions in the knee joint affect approximately 900,000 US citizens each year, resulting in over 200,000 surgical procedures for diagnosis and treatment.¹ There are no statistics on this disease in Brazil. The goal in the treatment of traumatic chondral and osteochondral lesions is to reestablish anatomy and function of the joint as well as eliminate pain.

The treatment of chondral lesions greater than 4 cm^2 by debridement or microfracture techniques does not promote good results, as it does not address the subchondral bone injury and promotes repair with fibrocartilaginous tissue instead of hyaline cartilage, therefore not being recommended for the treatment of these injuries.^{2,3} Autologous osteochondral transplantation is a good treatment option, as it promotes repair with hyaline cartilage and grafts possible defects of the subchondral bone. However, it is limited by the morbidity of the donor site; it can be ideally used in injuries of up to 2.5 cm in diameter and up to 10 mm deep.⁴⁻⁶

Currently, treatment options for chondral and osteochondral knee lesions larger than 4 cm^2 are autologous chondrocyte implantation and fresh osteochondral allografts (FOA). Autologous chondrocyte transplantation is a complex technique that requires two operations for biopsy and cell transplantation, and has a very high cost.⁷ The use of FOA for the treatment of large osteochondral lesions of the knee is a biological option in young patients; its main advantage is that it is a tissue with live hyaline cartilage, featuring chondrocytes in a chondral matrix with preserved collagen fiber architecture.^{8,9}

In other countries, FOA have been used for decades.¹⁰⁻¹⁴ This technique was first introduced to treat post-traumatic bone defects.^{15,16} However, it is now used for the treatment of various disorders of the knee, such as osteochondritis dissecans (OD), secondary osteonecrosis, and degenerative disease of the knee, as well as in fracture sequelae.¹⁷⁻²⁰ The principle of FOA is to restore the biological structure of the joint, rebuild the articular hyaline cartilage surface, and provide an osteochondral tissue capable of supporting the mechanical load of the individual.^{21,22}

To the best of the authors' knowledge, there are no studies or case reports on the use of the FOA technique in Brazil, because until 2009 the laws regulating tissue banks did not allow fresh tissues to be used for transplantation in time for the release of cultures; it was necessary to wait for the results of these tests before use.²³

This study aimed to report the results of the first cases of FOA transplantation in the knee joint in Brazil, with a minimum follow-up of two years.

Methods

This study was conducted at the Institute of Orthopedics and Traumatology of this institution and was approved by the Ethics Committee for Research Project Analysis (CAPPesq).

The inclusion criteria comprised young patients, between 15 and 45 years of age, with traumatic or acquired osteochondral lesions in the knee, chondral or osteochondral lesions

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