

# Autologous Chondrocyte Implantation in a patient with severe Hemophilia

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## Introduction

Hemophilia leads to a severe destruction of the target joints. A consequent prophylaxis may prevent from early damage of the joint. Therefore, common pathologies which have not been seen before in those patients and are not implicitly traced to the underlying disease may be in the forefront of our treatment. Osteochondritis dissecans leads to a local damage of the cartilage and the subchondral bone. A repetitive mechanical overload seems to be the main pathophysiological cause for the osteonecrosis of the underlying bone.

## Objectives

We report about a 35 year old patient with severe hemophilia and an osteochondritis dissecans in the knee joint in which we have performed a Autologous Chondrocyte Implantation (ACI).

## Methods

In a two-stage surgical procedure we assessed the knee joint and its defect and harvested a cartilage biopsy. 3 cylinders of articular cartilage were harvested from a non-weight-bearing intercondylar region of the knee. The cartilage then underwent enzymatic digestion in order to release cells and was cultured for 3 weeks prior to implantation. The chondrocyte cells were incorporated into a type-I/III collagen scaffold during the culturing process. Then, an arthrotomy of the knee was performed. At first, the defect required surgical debridement to healthy articular tissue around its edge and subchondral bone at its base. Because of a subchondral defect a transplantation of autogenous spongiosa was required. After filling the defect the synthetic collagen-membranes including the cultivated chondrocytes were inserted directly into the defect and secured with sutures.

## Results

We allowed partial weight-bearing using crutches and passive knee motion for 3 months after. Then, full weight bearing was allowed. During this period a consequent physiotherapy was performed. Sporting activity, especially sports with jumping or excessive axial loading of the knee joint, were denied for 12 months. The patient remains pain free in his daily activity and regained full range of motion of the knee joint.

## Discussion

To our knowledge, this is the first report of ACI in a patient with hemophilia. Especially the intraoperative findings showed that prophylaxis can prevent severe destruction of the cartilage. Nevertheless, the young and active patients will suffer from other common pathological changes of the joint, such as osteochondritis dissecans, which need adequate therapy.

ACI has proven its efficacy in many studies. The defect is filled up with sufficient regenerative tissue that shows most of the qualities of hyaline cartilage. Compared to other methods for the treatment of articular cartilage lesions including microfracture, osteochondral grafting procedures and arthroscopic debridement ACI is superior when looking at postoperative activity levels and return-to-sport – rates.

We have shown that ACI can be done safely in a patient with severe hemophilia. Besides the surgical technique the outcome of this procedure is dependent on perioperative substitution.

## Literature

1. Batty L et al. Autologous chondrocyte implantation: an overview of technique and outcomes. ANZ J Surg 2011;81:18–25
2. Harris JD et al. Autologous chondrocyte implantation - A systematic review. J Bone Joint Surg Am. 2010;92:2220-33
3. Vasiliadis HS, Wasiak J. Autologous chondrocyte implantation for full thickness articular cartilage defects of the knee. John Wiley & Sons, Ltd. The Cochrane Library 2011, Issue 7



Fig. 1: Radiological signs of Osteochondritis dissecans on medial femoral condyle. (a) x-ray (b) MRI

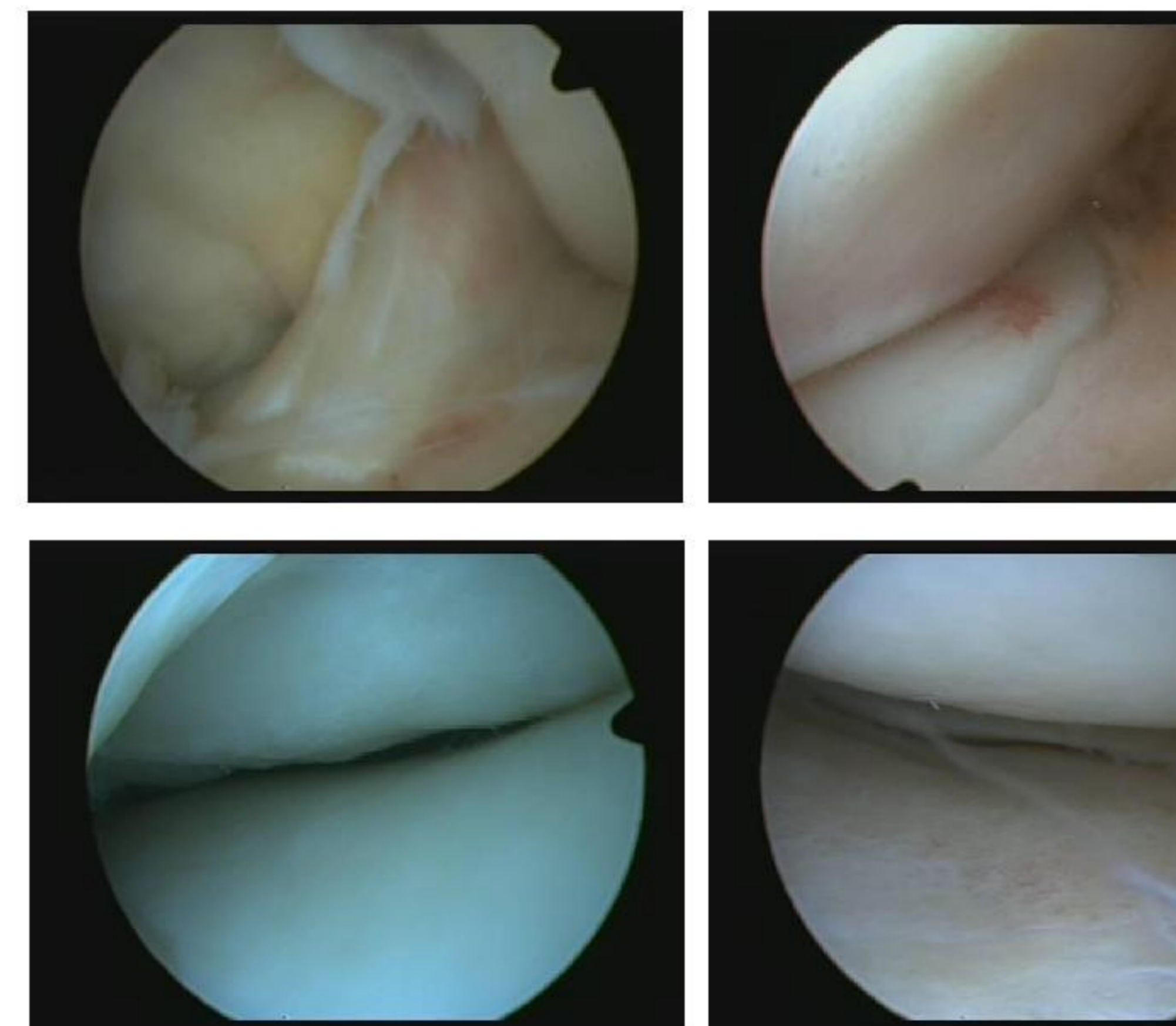


Fig. 2: Arthroscopic view of the right knee. After sufficient prophylaxis the cartilage does not show any signs of degeneration.

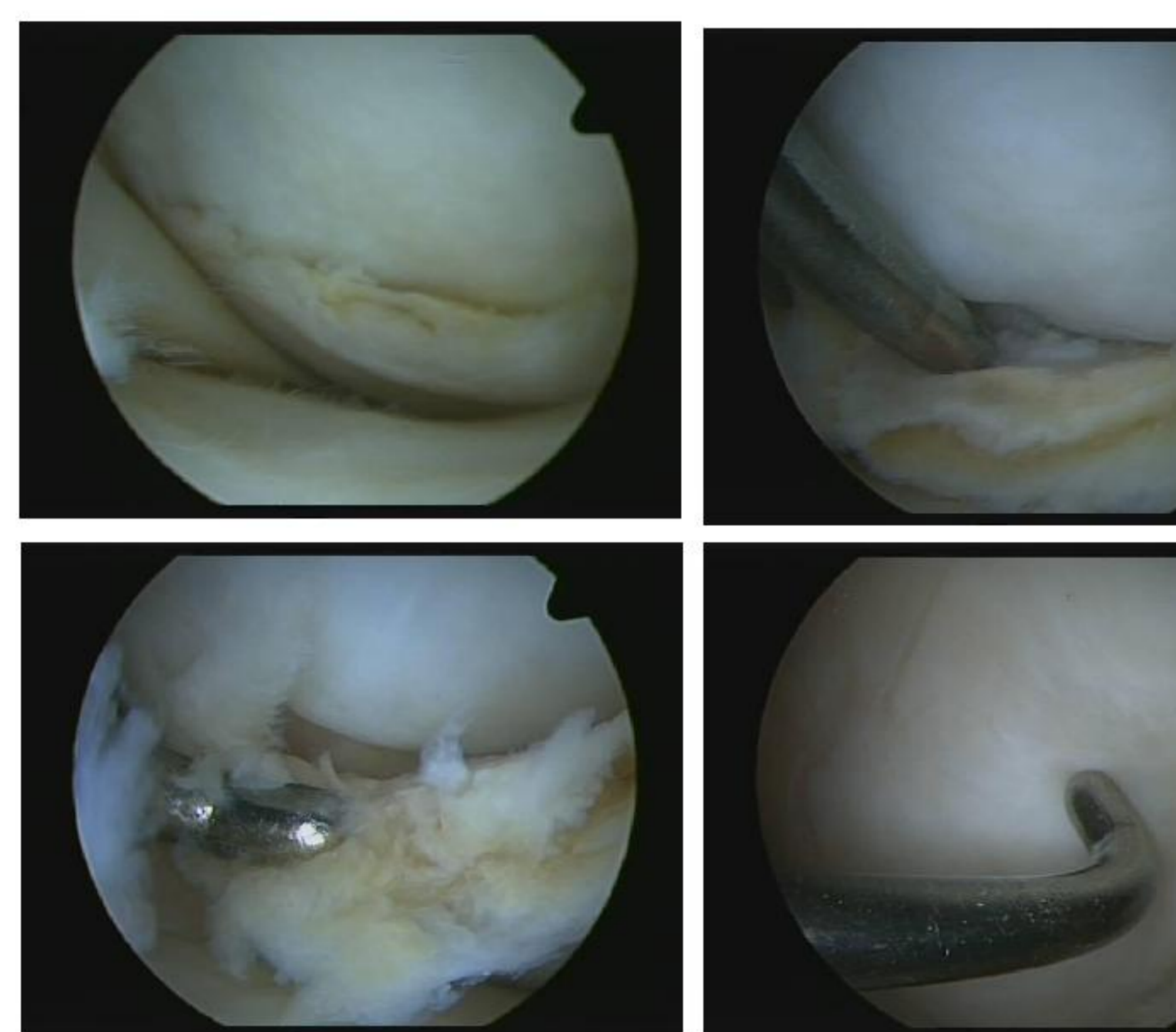


Fig. 3: Arthroscopic view of the left knee. Delamination of the cartilage on the lateral femoral condyle.

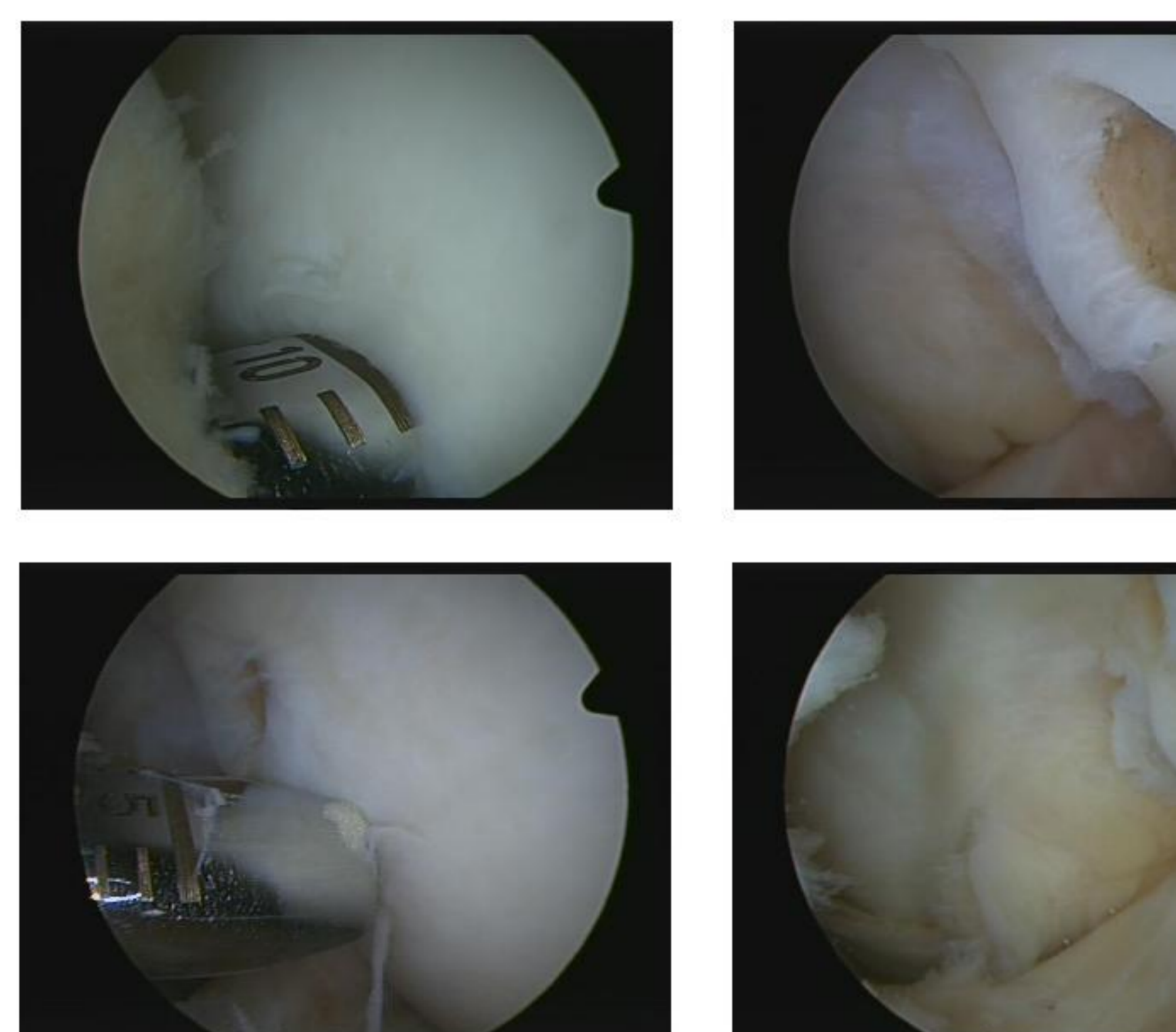


Fig. 4: 3 cylinders of articular cartilage were harvested from the non-weight-bearing intercondylar region of the knee



Fig. 6: Clinical findings 6 months postoperative. Full extension and flexion of 140° of the knee joint. No pain during normal weight bearing and plain sport activity

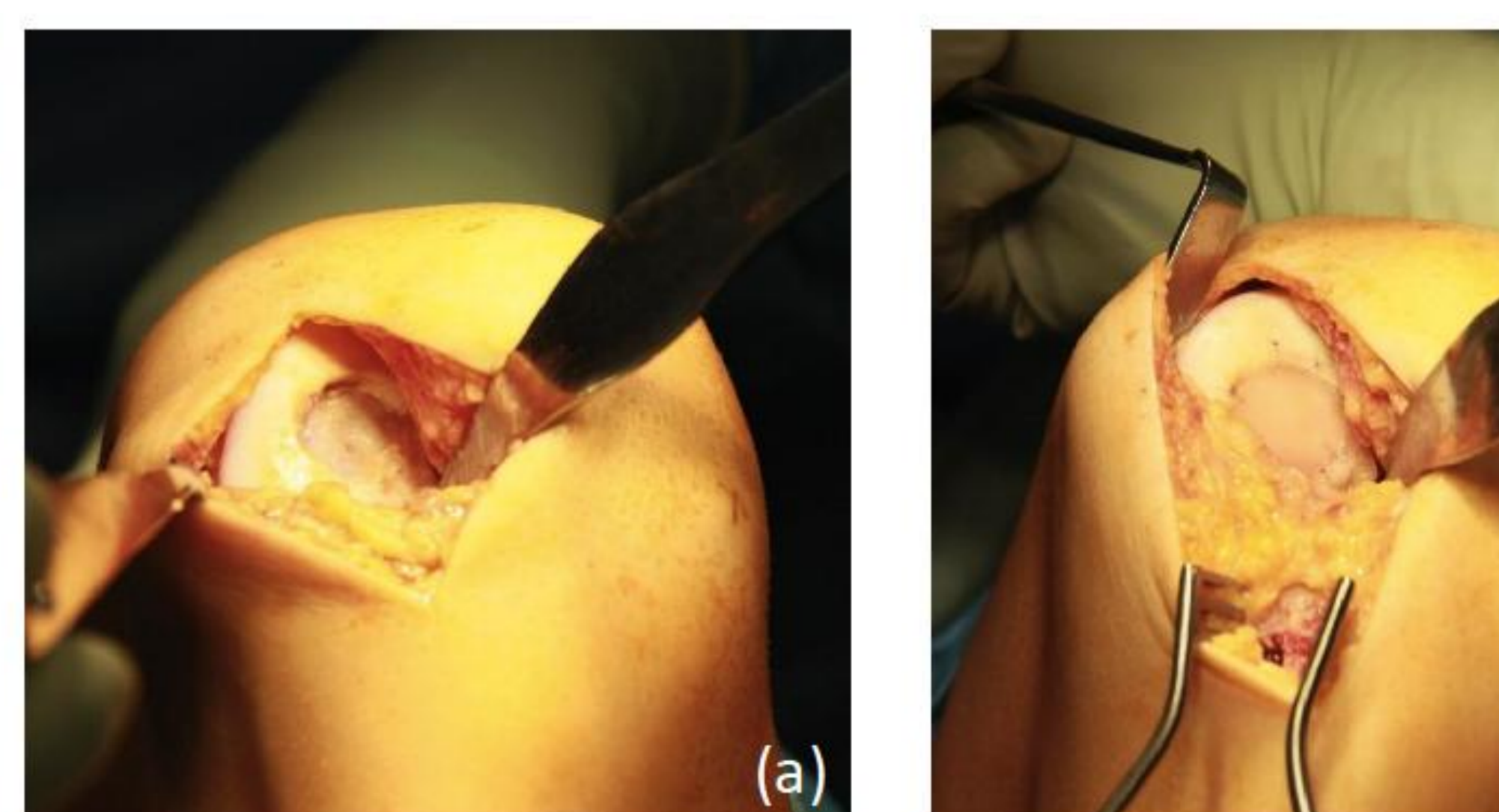


Fig. 5: Insertion of the collagen membrane which contains cultured chondrocytes. (a) the defect after debridement (b) defect after insertion of the membrane. Notice the extension of the incision in order to gain spongy bone of the tibia which will be underneath the membrane.

