

ARTHROSCOPIC MICRODRILLING AND ATELOCOLLAGEN GEL FOR CARTILAGE REPAIR OF THE KNEE



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Introduction

A novel single stage approach using arthroscopic microdrilling and atelocollagen/fibrin gel application is employed for cartilage repair of the knee.

The aim of our study was to investigate the clinical results and repair tissue biochemistry using T2* mapping and morphological MRI for this technique.

Materials and Methods

A retrospective case series of ten patients (6 male and 4 female) with symptomatic chondral defects in the knee who were treated arthroscopically with microdrilling and atelocollagen application were included.

The mean age of patients was 38 years. The lesions were located on the Medial Femoral Condyl (MFC) in five, Lateral femoral Condyl (LFC) in one, trochlea in two, and patella in six patients (four had two lesions). All defects were ICRS grade III or IV and the sizes were 2-8 cm² intraoperatively. The arthroscopic surgical technique involved cleaning of the defect and microdrilling.

Under carbon dioxide insufflation the defect area was dehydrated with a suction tube and cotton swabs. Then the gel mix consisting of type I atelocollagen, thrombin and fibrin was applied through one of the portals using a double chamber syringe. After a 5 minutes delay saline was reinfused and the stability of the graft was checked by moving the knee within the range of motion.

For the clinical assessment the Lysholm score was assessed preoperatively and at 2 year follow-up. All patients underwent morphological Magnetic Resonance Imaging (MRI) and quantitative T2* (T2-star) mapping one year after surgery on a 1.5 Tesla unit using a dedicated knee coil. T2* is known to reflect collagen, matrix structure and water content of articular cartilage. T2* was evaluated on a single sagittal (MFC, LFC, trochlea) or axial (patella) slice in the center of the repair tissue. Regions for RT and native cartilage were selected manually.

The magnetic resonance observation of cartilage repair tissue (MOCART) score was assessed for all lesions by an experienced musculoskeletal radiologist.

Results

The Lysholm score improved from 51.7±27.1SD pre-operatively to 81.3±24.6 at 1 year follow up (P<0.05).

The mean T2* relaxation times for RT and native cartilage were 29.9±14.1 and 29.7±8.6 respectively. However more extreme values were observed in RT (range 13 to 50 ms) in comparison to native cartilage (range 18 to 39 ms).

The mean MOCART score at 1 year follow-up was 70.4±20.2 ranging from 15 to 95.

The MOCART on patella lesions was similar to lesions in other locations: 73.3±11.7 and 68.1±25.5 respectively.

Conclusion

An arthroscopic single stage procedure using microdrilling in combination with atelocollagen gel and fibrin glue can provide satisfactory clinical results at 2-year follow-up.

The morphological MRI shows good cartilage defect filling and the biochemical MRI (T2* mapping) suggests a repair tissue composition similar to the surrounding native cartilage (indicative of hyaline like repair tissue).