Microfracture (MFX) and Autologous Chondrocyte Implantation (ACI) have been utilized in an effort to promote the regeneration of articular cartilage in the knee. The purpose of this study is first, to determine which of these two treatments yields the best clinical results and, second, to determine whether the MR appearance of treated cartilage lesions correlates with clinical outcome. Thirty-five patients with isolated articular cartilage lesions of the medial femoral condyle (MFC) were treated either with ACI (17 patients) or with MFX (18 patients, 19 knees). Patients were evaluated clinically using the modified Cincinnati Knee Questionnaire and with a physical exam. MRs were graded using eight different criteria; an MR score of 100% represents normal cartilage. The average follow-up was 2.6 years for the ACI group and 2.8 years for the MFX group. The average size of the lesion was 472 mm² for the ACI group and 326 mm² for the MFX group. The Cincinnati scores improved an average of 22% for the ACI patients and 42% for the MFX patients from preoperatively to postoperatively. The average MR score was 66% for the ACI group and 44% for the MFX group. Fifty-nine percent of the ACI patients required at least one additional procedure. This is the first clinical and MR comparison of ACI and MFX to treat full thickness cartilage lesions of the MFC. Clinical improvement was 2 times greater for the MFX patients compared to the ACI patients. The MR scores did not correlate with clinical outcome using our grading system.