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A Randomized Multicenter Trial Comparing Autologous Chondrocyte Implantation with Microfracture:Long-Term Follow-up at 14 to 15 Years

Other than perhaps for the largest lesions, this exhaustive (15-year) study, rated the highest Level-1 for accuracy, puts to rest evidence that ACI, a 2-stage, expensive procedure with a high complication rate, is any better than single-stage, inexpensive and joint-sparing micro-fracture, judged by:

cartilage regeneration type (2-yr findings)

clinical result (5-yr data)

long -term clinical and xray comparisons.

What it does not settle is what procedure is best for long-term preservation of knee/joint function in the active patient.

It would seen that some combination of marrow stimulation (microfracture) and cellular biologics (containment, matrices, stem cell) will hold the answer.

- Kelly Cunningham MD

Abstract

Background: The management of cartilage and osteochondral lesions in the knee remains problematic and controversial. Our group (previously, 2004 & 2007) reported the 2-year and 5-year results of a randomized controlled trial comparing autologous chondrocyte implantation (ACI) and microfracture in patients with focal femoral cartilage injuries. The objective of the present study was to report the long-term results.

Methods

Eighty patients with a single symptomatic chronic cartilage defect on the femoral condyle without general osteoarthritis were included in the study at the time of the index operation (January 1999 to February 2000). We used the International Cartilage Repair Society (ICRS), Lysholm, Short Form-36 (SF-36), andTegner forms to collect data at the time of inclusion and at follow-up evaluations. Standing weight-bearing radiographs were evaluated for evidence of osteoarthritis according to the method described by Kellgren and Lawrence. For the long-term follow-up in 2014, we used the Synaflexer frame to standardize the radiographs. The operation was considered to have failed if a reoperation was performed because of
symptoms from a lack of healing of the treated defect.

Results

At the long-term follow-up evaluation, no significant differences between the treatment groups were detected with

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respect to the results on the clinical scoring systems. At the 15-year evaluation, there were 17 failures in the ACI group compared with 13 in the microfracture group. We observed that more total knee replacements were needed in the ACI group than in the microfracture group (6 compared with 3). The surviving patients in both groups, i.e., those who had not had a failure, had significant improvement in the clinical scores compared with baseline. 57% of the surviving patients in the ACI group and 48% of such patients in the microfracture group had radiographic evidence of early osteoarthritis (a Kellgren and Lawrence grade of >=2); the difference was not significant.

Conclusions

The survivors in both groups improved their clinical scores in the short, medium, and long-term evaluations, and no significant difference between the groups was found at the long-term follow-up. The risk of treatment failure and the frequency of radiographic osteoarthritis are problematic. Our findings raise serious concerns regarding the efficacy of these procedures in delaying osteoarthritis and preventing further surgery. Continued basic and clinical research is needed in this field.

Level of Evidence: Therapeutic Level I.

Gunnar Knutsen, MD, PhD; et. al.
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