Autologous matrix-induced Chondrogenesis versus arthroscopic Minced Cartilage Implantation in the knee – A five-year follow-up of 46 patients

Joannes Holz[1,2], Dagmar Linnhoff[1], Nora Steinemann[1] & Stefan Schneider[1]

[1]OrthoCentrum Hamburg

[2] MSH Medical School Hamburg

Introduction:

For the ongoing challenge of cartilage repair several biological methods are available. Two recent methods are Autologous Matrix-Induced Chondrogenesis (AMIC), developed in 2005, and Arthroscopic Minced Cartilage Implantation (MCI), with the first technical notes published in 2020. Both are one stage approaches but defer in technical aspects. While in AMIC a matrix is implanted after microfracturing, in MCI cartilage fragments are extracted, cut into small pieces and reattached to the defect. The aim of this analysis was to compare patient-reported outcomes up to five years for these two approaches.

Methods:

The patient-reported outcomes of 23 patients treated with AMIC were retrospectively compared to 23 patients treated with arthroscopic MCI. The groups were balanced according to gender, age and preoperative pain (VAS). The AMIC-group included 29males and /4females aged: 41.1 ±12.2 with mean baseline of VAS: 3.2 ± 2.2. The MCI-group 28 included males and 5 females aged: 41.4 ± 9.6 with mean VAS of 3.2 ± 1.9. The patient data was collected by an established online data register Surgical Outcomes System (Arthrex GmbH., Munich), which was replaced by a similar registry in 2024 (Outcomes Matter, OrthoCentrum Hamburg). The VAS and KOOS-Scores of the respective groups were statistically compared via ANOVA with repeated measures (group*time). The Tegner activity score (TAS) was additionally evaluated.

Results:

All clinical outcomes significantly improved in both groups over 5 years ($p < .01$). The VAS score decreased from 3.2 ± 2.2 to 2.7 ± 2.3 in the AMIC group and from 3.2 ± 1.9 to 2.1 ± 2.0 in the MCI group. KOOS-Pain improved from 64.7 ± 16.4 to 78.8 ± 18.7 in the AMIC and from 65.3 ± 15.4 to 83.1 ± 13.1 in the MCI-group. KOOS-ADL improved from 75.7 ± 17.7 to 92.3 ± 11.5 in the AMIC and from 74.5 ± 15.7 to 88.9 ± 13.2 in the MCI-group. KOOS-QOL improved from 35.8 ± 20.1 to 53.1 ± 34.9 in the AMIC and from 36.5 ± 9.6 to 59.1 ± 19.8 in the MCI-group. There was no interaction between group and time for all outcomes. In the AMIC group, the Tegner reached the preoperative level after one year and in MCI after 6 months.

Discussion:

Both methods seem comparably effective for the treatment of cartilage lesions in the knee. Notably, for the direct comparison is that both procedures were not performed at the same time. Further research would be highly recommended in form of a randomized controlled study for the purpose of directly compare both methods.