

Autologous Matrix Induced Chondrogenesis (AMIC) for focal chondral defects of the knee – first clinical and MRI-results

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Introduction:

Focal chondral defects of the knee joint can be dealt with by bone-marrow stimulating techniques like microfracturing (MF). By penetrating the subchondral layer emerging mesenchymal stem cells are used for the reparation process. Microfracturing shows good results for smaller defects up to 2 cm² while in larger defects early secondary degeneration has been observed. Autologous Matrix Induced Chondrogenesis (AMIC) combines MF with the application of a collagen matrix for covering the defect, hosting of the stem cells and mechanically stabilizing the blood clot.

Methods:

43 patients (30m, 13f, mean age 37y (18-53y)) with focal chondral defects of the knee joint (ICRS III-IV°) of condyle, trochlea or patella were treated by standardized MF and application of a porcine collagen type-I/III bilayer matrix (Geistlich Biomaterials, Wolhusen, Switzerland). Clinical Scores and MRI were evaluated with a follow-up of 6 to 24 months. 33 patients had at least one intervention (1-4) of the knee before. The mean defect size was 3.2 cm² (1.3-7.5cm²). 19 defects were caused by trauma.

Results:

All patients considered their knee as abnormal (78%) or severely abnormal (22%) preoperatively in comparison to the contralateral knee. The ICRS functional status showed an improvement from 100% ICRS III/IV° to 66.7 % ICRS II/I°. For 63.7% of all patients knee function was perceived improved, for 27.2% unchanged and for 9.0% worsened after self-evaluation. Pain decreased considerably from 5.7 to 1.9 (10=max.) on the visual analogue scale. The MRI follow-ups showed a reasonable filling of the defect, no prolonged effusion occurred.

Conclusion:

Microfracturing in combination with a collagen matrix (AMIC) can be considered feasible as a minimal invasive single step procedure for the repair of focal cartilage defects without using cultured chondrocytes. The first results concerning clinical functional improvement, pain reduction and patients' satisfaction as well as defect filling in MRI are promising.

Key words: microfracture, matrix, knee, AMIC