Abstract

Background

Autologous chondrocyte implantation (ACI) is an important procedure when repairing cartilage defects of the knee. We previously reported several basic studies on tissue-engineered cartilage, and conducted a multicenter clinical study in 2009. In this clinical study, we evaluated the patients′ clinical scores and MRI findings before and after tissue- engineered cartilage implantation, and compared the data obtained at 1 year and approximately 6 years post-implantation.

Methods

Fourteen patients who underwent implantation of tissue-engineered cartilage to repair cartilage defects of the knee were evaluated. Tissue -engineered cartilage was produced by culturing autologous chondrocytes three dimensionally in atelocollagen gel. The patients were evaluated clinically using the Lysholm score, and the original knee-function score at pre-implantation and at 1 year and approximately 6 years post- implantation. MRI scans were obtained at the same observation periods. A modified magnetic resonance observation of cartilage repair tissue (
MOCART) system was used to quantify clinical efficacy based on the MRI findings.

Results

In approximately 6 years of follow-up, none of the 14 patients reported any subjective symptoms of concern. The mean Lysholm score and the original knee-function score (63.0 ± 10.1, 59.9 ± 5.7) significantly improved at 1 year after implantation (86.4 ± 11.8, 94.1 ± 9.2), and were maintained until 6 years after implantation (89.8 ± 6.2, 89.9 ± 11.
2), although some patients showed deterioration of Lysholm and original knee scores between 1 year post-implantation and the final follow-up.

The mean MOCART score was 13.2 ± 12.0 pre-implantation, and 62.5 ± 24.7 at 1 year and 70.7 ± 22.7 at approximately 6 years post-implantation.

The MOCART scores at 1 year and 6 years were significantly higher than the pre-implantation score, but there was no significant difference between the scores at 1 and 6 years, indicating that the MRI results at
1 year after implantation were maintained for the next 5 years.

Conclusions

The clinical scores and MRI findings after implantation of tissue- engineered cartilage were improved at 1 year after implantation and were maintained until 6 years after implantation.