

Articular Cartilage Repair

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Articular cartilage defects are a major clinical problem; however, presently there is no treatment that is widely accepted to repair these lesions. The current therapeutic approach is to penetrate the subchondral bone of the defect to expose the defect with cells and growth factors from bone marrow. This usually results in a repair tissue of fibrocartilage which is thought to function poorly in the loaded joint environment. Recently, mosaic plasty was explored. We can repair small articular cartilage defects using this method although there remain some problems, such as donor site problems and delamination of the grafts.

Autologous cultured chondrocyte implantation has been performed in more than 10,000 patients. However, the effectiveness of these is still controversial. One of the major problems is dedifferentiation of cells during culture to expand cells. To regenerate articular cartilage by autologous chondrocyte implantation, cell proliferation technique without losing their capacity for differentiation is required.

For the better methods to repair articular cartilage defects, transplantation of progenitor cells other than chondrocytes are under investigation. These include bone marrow mesenchymal cells, synovial cells, adipocytes, muscle satellite cells, embryonic stem cells, and amnion cells. Appropriate culture conditions, mechanical stress, growth factors, and gene transfection have been explored, but they have not been applied clinically yet.

On the other hand, the controversy of the effectiveness of cartilage repair is partly due to the uncertainty of the clinical symptoms of articular cartilage defect and to lack of standard criteria to estimate cartilage regeneration. They should be clarified.