

[Mercy Tissue Engineering](#)

INFORMATION FOR PATIENTS (GENERAL PUBLIC)

Articular Cartilage Repair

Articular cartilage is the firm, smooth covering on the ends of bones where they contact other bones to form an articulating joint such as the knee. Together with the thick synovial fluid within the joint, articular cartilage forms a surface that allows low friction movement and assists as a shock absorbing tissue, distributing loads around the joint when walking or running.

Chondrocytes (articular cartilage cells) build articular cartilage by forming a matrix (a complex combination of proteins and water). When articular cartilage is damaged, it does not repair itself effectively like other tissues. Consequently injury can lead to increasing joint pain and reduction in joint movement and can also lead to degenerative change or osteoarthritis (slow degeneration of articular cartilage).

Autologous Chondrocyte Implantation (ACI)

Autologous Chondrocyte Implantation is a surgical technique aimed at repairing damaged articular cartilage. It involves implanting chondrocytes (articular cartilage cells) into the damaged region. These cells subsequently form new articular cartilage.

ACI is suitable for treating cartilage damage caused by direct injury (e.g. sports injuries, car accidents, falls) where the damaged area is surrounded by normal healthy cartilage. Widespread cartilage damage (osteoarthritis) or inflammatory disease (rheumatoid arthritis) is not suitable for this treatment. Your specialist surgeon will advise you whether ACI is suitable for your condition.

Biopsy of Articular Cartilage

The first operation involves the surgeon taking a small biopsy (sample) of your articular cartilage. The operation is performed as a day case and an overnight stay is usually not necessary. The articular cartilage biopsy is then sent to Mercy Tissue Engineering for processing.

Cell Culture

The biopsy is processed, releasing the chondrocytes (articular cartilage cells) from the articular cartilage.

These cells are placed in a nutrient rich medium and incubated which promotes cell growth. The culture process continues until an optimal cell number is attained. This can vary depending upon lesion size but normally ranges between 3 and 4 weeks.

Implantation of Cells

The second operation is performed to deliver the new cells into the damaged area. The surgeon achieves this by sealing the damaged area with a waterproof cover and injecting the cells underneath the cover into this area. The cells attach to the bone and then begin the process of re-establishing the articular cartilage matrix. To ensure the implanted cells are protected, it is necessary to stay in hospital for a number of days to allow progressive joint mobilization.

Rehabilitation

A special rehabilitation program needs to be followed following the implantation of cells. This involves bracing of the knee and a gradual return to full weight bearing. It is vital that the rehabilitation protocol given by the surgeon is followed closely to maximize the benefit of the operation.

Cost of Autologous Chondrocyte Implantation

The total cost of the operation depends upon the type of private health insurance the patient has. For the cell implant, there are no out of pocket costs to patients with private health insurance, and for approved compensable patients e.g. Workers compensation.

Results of Autologous Chondrocyte Implantation

International studies show that with the use of cartilage culture and implantation, about 85% of patients are significantly improved, many returning to full, normal pain free activity. The results of cartilage cell implantation are substantially better than those of previous treatments.