Joint reconstruction: Cartilage transplantation

Articular cartilage damage in the knee is commonly seen in the elderly as part of the degenerative process of arthritis, and can relatively easily be managed with joint replacement surgery when symptoms are sufficiently severe. Articular cartilage damage in the younger population is a far more challenging dilemma with no currently accepted and effective treatment. This can lead to pain, loss of function and an inability to participate in everyday activities. This damage can also lead to further breakdown of the joint resulting in early osteoarthritis. Joint replacement in active, younger patients often gives inferior outcomes and will result in premature implant failure due to the higher demands being placed upon the implant.

The Cartilage Transplantation Unit at the world-renowned Royal National Orthopaedic Hospital, Stanmore has over the last fifteen years pioneered the technique of two-stage cartilage transplant in the United Kingdom. Over 1500 cases have been performed with high success rates, producing healing of the joint, relief of pain and restoration of function. The onset of osteoarthritis, which affects 25% of people over 50, is also delayed, preventing the need for joint replacement.

The first stage is a telescopic examination of the knee to take a small piece of normal cartilage which is sent to the cell culture laboratory. This cartilage is then cultured for 4 to 6 weeks to increase the number of cartilage cells. These cells are then transplanted back into the damaged area of the knee by an open operation to develop a new cartilage surface in the joint.

This method has proved very valuable in relieving pain and restoring activity in younger patients. However it requires two operations, it is costly and the rehabilitation period before full activity is long, taking up to 12 months.

More recently the surgeons on the Cartilage Transplantation Unit have begun using an exciting and novel single stage procedure involving the patients’ own stem cells. Stem cells are initially harvested from the patient’s bone marrow in the pelvis using a small needle and are then centrifuged in a specialised machine in the operating room. This provides a concentrated volume of stem cells which, when transplanted and secured back into the knee joint, will give rise to new cartilage cells and repair the damaged part of the joint.

So far the team have performed over 75 procedures with promising short to medium term results. Only one operation and hospital stay are required for the patient, rehabilitation is accelerated and the procedure is more cost effective. The study has commenced at the RNOH for younger patients (under 45 years) with painful knees and cartilage damage. It will also hopefully provide further possibilities for the treatment of other joints such as the hip, ankle and the upper limbs.
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