



The Grosvenor Nuffield Hospital Chester Knee Clinic

Wrexham Road, Chester, CH4 7QP

Consultant Orthopaedic Knee Surgeon: Vladimir Bobic, MD, FRCSEd

www.kneeclinic.info

Autologous Chondrocyte Implantation (ACI)

Patient and General Practitioner Information Sheet*

* This information should be read in addition to the enclosed Stanmore patient information sheet, as it contains information specific to research locality (the principal investigator and the Grosvenor Nuffield Hospital in Chester). For further information about the study please contact local principal investigator (Mr Vladimir Bobic, email: info@kneeclinic.info).

Although articular cartilage is unable to repair itself, this advanced orthobiologic technology allows cartilage cells, known as chondrocytes, to be harvested from your knee and cultured and multiplied. The fresh chondrocytes are then re-implanted into your knee and cause hyaline-like cartilage to develop and repair the defect in the articulating surface. The technique of autologous cultured chondrocyte implantation was initially researched at the Hospital for Joint Diseases in New York, USA, and further developed at the University of Gothenburg and Sahlgrenska University Hospital, Gothenburg, Sweden, in an effort to provide a treatment option for people with joint cartilage damage.

ACI restores the articular surface with your own hyaline-like cartilage without compromising the integrity of healthy tissue or the subchondral bone. This technology has demonstrated significant benefits in patients with a femoral or patellar focal lesion, in terms of diminished pain and improved function. If you have this type of lesion, then ACI may be an appropriate treatment option. Suitable patients would be generally young and healthy individuals, who have had an injury to the knee, or a so-called osteochondritis dissecans lesion (OCD), over the past few months or years, and have continued to have pain, swelling and mechanical problems. Although cartilage damage is often associated with ligament and meniscal injuries, it is very important that the knee is stable and that there is no major meniscal deficiency or any alignment problems, prior to cartilage repair.

Patients with a known allergy towards gentamycin or hypersensitivity towards products of bovine origin are unsuitable for this form of therapy. Other conditions in which treatment by ACI is not indicated include osteonecrosis, chondrocalcinosis, osteoarthritis, rheumatoid arthritis and total meniscectomy.

The procedure is initiated through a General Practitioner's or Consultant's referral letter and followed by out-patient assessment and a high-resolution cartilage-sequence Magnetic Resonance Imaging (MRI) knee scan. If the damaged articular area is suitable for ACI repair, the surgical procedure consists of two steps. The first step is a day-case arthroscopic surgery to assess the inside of the joint further and to obtain a small piece of healthy articular cartilage (biopsy). This sample of articular cartilage is sent to a tissue-engineering laboratory. The first laboratory step is an enzymatic process which separates the chondrocytes from their matrix. Cell culture over a period of about 3-4 weeks induces them to multiply to about 15-20 million dedifferentiated cells. These are then placed into a special nutrient solution or on an inoculated collagen membrane (MACI[®]: Matrix-induced Autologous Chondrocyte Implantation) and sent back to arrive in time for the proposed date of implantation.

The second step is the re-implantation of the cultured chondrocytes. This procedure is done through an arthrotomy (open knee surgery): the surgeon debrides the cartilage defect down to the subchondral bone plate and prepares the recipient site. The

defect area is covered with tissue-engineered collagen membrane which is pre-loaded with autologous chondrocytes (MACI), or with the same tissue-engineered collagen membrane but which is not inoculated with chondrocytes (ACI), which is stitched or glued in place and sealed with fibrin adhesive. With ACI procedure, the chondrocyte suspension is injected into this "bioactive chamber". Within this chamber the cells will undergo re-differentiation and will be stimulated by growth factors to proliferate and regenerate their specific cartilage matrix.

Following this operation the leg is placed in a special hinged protective brace (we use The Sentry 2 (www.technologyinmotion.com), which will limit your flexion for the first 2 weeks. The main purpose of using the postoperative brace is to protect the repaired articular surface from too much compression and friction. We also use the Aircast® Cryo/Cuff device, which combines focal compression with cold to provide optimal control of swelling, oedema, haematoma, haemarthrosis, and pain (www.aircast.com).

To get the maximum benefit from ACI, you should adhere to your specific rehabilitation programme. This will include progressive weight-bearing, range of motion, and muscle strengthening exercises which commence as early as the day after surgery. When you successfully complete your rehabilitation, you should be able to resume normal activities, including sports.

The UK Articular Cartilage Repair Study requires a follow-up MRI at 6 months postoperatively and re-arthroscopy and graft inspection/biopsy at 12 or 24 months. Both are required to monitor the development, the quality, and the integrity of the new articulating surface.

This is a new procedure and although it has been performed on over 10000 patients internationally, especially in Sweden and the USA, not every patient is suitable and not every patient achieves a completely satisfactory functional outcome. As with any other surgical procedure, there is a small risk of post-operative complications (bleeding, wound problems, skin and knee joint infection, deep venous thrombosis, graft hypertrophy, etc.).

Before you sign your operation and UK Articular Cartilage Repair Study consent forms, please make sure that you have read this and the Stanmore patient information sheet, and that you fully understand the terms of this study. For more information on articular cartilage repair please visit: www.kneeclinic.info. If you have any further questions or concerns please contact us by email: info@kneeclinic.info.

What happens if something goes wrong? If you experience any postoperative problems please contact Mrs Joanna Rosedale (01244 677 985) or The Grosvenor Nuffield Hospital switchboard (01244 680 444). In an emergency please contact Mr Bobic directly (mobile 07774 981 481). If you want to make a comment or complaint please contact Mr Bobic, Matron or the Hospital Manager. A full copy of Nuffield Hospitals' Complaints Policy and the Independent Healthcare Association (IHA) Guide for Patient Complaints can be provided to you on request.

Your arthroscopic and open surgery may be recorded digitally, kept as a part of your record, and used for research, outcome studies, training and educational purposes. Your personal and clinical data, video-clips and digital images will be stored and kept on a secure standalone computer, according to the Data Protection Act 1998 (www.dataprotection.gov.uk). This information will not be shared with anybody else or used for any commercial purpose. Should we wish to publish any of your clinical images, even if they do not identify you personally, we will ask for your written permission.

Mr Bobic is a co-investigator in the UK Articular Cartilage Repair Study (the Stanmore ACT Project), led by Professor George Bentley, Director of Knee Cartilage Transplantation Service, RNOH Institute of Orthopaedics Stanmore (www.rnoh-stanmore.org.uk). This study is approved by South East MREC (MREC/02/01/73), which will review its progress periodically, and South Cheshire LREC (No. M197/03). The study is based on NHS NICE (National Institute for Clinical Excellence, www.nice.org.uk) guidelines on the use of ACT for full-thickness cartilage defects in knee joints. The study is conducted according to Good Clinical Practices (GCP). The chondrocyte culture service is provided by Verigen Transplantation Service Limited (www.vtsi.de). The Articular Cartilage Repair Service, based at The Grosvenor Nuffield Hospital in Chester, provides treatment for patients with damaged articulating surfaces of the knee joint with ACI and several other cartilage repair technologies (microfracture, osteochondral autograft transfer, etc).