Autologous Cartilage Implantation (ACI and MACI)

- Articular Cartilage Repair Surgery

Rehabilitation Programme - Physiotherapy Guidelines January 2006

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Adapted from Professor G Bentley Royal National Orthopaedic Hospital Trust, Stanmore

INTRODUCTION

Autologous Chondrocyte Transplantation (ACT) is performed to repair areas of full thickness localised loss of articular cartilage on the bearing surfaces of the knee. It involves resurfacing of the damaged areas with the patients own cultured articular cartilage cells (chondrocytes). These are cultured in the laboratory following harvest of a small piece of healthy cartilage at an initial arthroscopy. Implantation of the new cells or tissue takes place through an open arthrotomy (opening of the joint rather than a keyhole technique) after 4 weeks (Fig 1 – 7).

Full details of the procedure are contained in the information booklet produced by VERIGEN UK. The current procedure has been developed in conjunction with Professor Bentley at the Royal National Orthopaedic Hospital, Stanmore, London.

Rehabilitation: The main principle in the rehabilitation process is to avoid impact loading and twisting or shearing forces for 12 weeks following surgery as this may damage the repair and disperse the cartilage cells.

Following the cartilage repair operation the knee will be immobilized in a cylinder POP cast for approximately 1 week before being reviewed by the surgical team and physiotherapist to commence rehabilitation.

Hydrotherapy can be used as a treatment modality at any stage in the rehabilitation. Wound healing is always of paramount concern and should be assessed appropriately. Exercises in the pool should be based on the guidelines set below.

The following programme acts as a guideline for treatment. If there are any queries at all please do not hesitate to contact one of the supervising physiotherapists:

Ivor Hughes at Rugby St Cross (01788 572831)

Michelle Henry at Warwickshire Nuffield Hospital (01926 427971)

Rehabilitation Programme

POST OP – 1 WEEK

Straight Leg splint applied in theatre to immobilise leg in extension
Elevate leg on frame or pillows
Drain removed Day 1 if inserted
Dressing reduced and POP Cylinder applied in extension Day 1 or Day 2 depending on pain and swelling.
Aim to discharge home day 2 – 4 post op depending on mobility and pain control
Full Weight bearing with crutches to reduce shearing forces
IF PATELLA OR TROCHLEA REPAIR: order hinged knee brace (TROM)

ONE – FOUR WEEKS

POP Cast and skin clips removed at 7 – 10 day review appointment on the ward
Weight bearing as tolerated with crutches
Progress flexion/extension exercises
IF FEMORAL CONDYLE REPAIR: aim for full range of movement at 6 weeks
IF PATELLA OR TROCHLEA: apply hinged knee brace aiming for 0 - 45 degrees only for first 6 weeks
Gait re-education
Progressive hamstrings
Progressive gluteals
Ensure normal flexibility of quadriceps, hamstrings and calf muscles
Progressive quadriceps, especially closed-chain. Use caution with open-chain quads with patella transplantations.
Proprioception, maintaining neutral alignment.
Mobility of PatelloFemoral joint - *Do not mobilise into end range resistance or pain*
Monitor wound and if any problems please contact surgeon directly or via secretary.

FOUR – SIX WEEKS

Continuing above and progressing as appropriate
Commence swimming as pain allows, including breaststroke.
Weight bearing as tolerated with crutches building up to Full weight bearing
Exercise bike with supervision on minimal resistance. Progress as pain allows.

SIX - EIGHT WEEKS

OUTPATIENT REVIEW AT 6 WEEKS

Goal is virtually full range of movement
Full range rowing machine. Progress resistance as pain allows.
Driving – Driving should not be commenced until the knee bends enough and is pain free (approx 6 weeks post op). It is important to be able to perform an emergency stop. It is advisable for the patient to inform their insurance company.

EIGHT – TWELVE WEEKS

Progressive WB closed chain exercises e.g. wall slides, (Not full range - work between 0-60∞)
Proprioception Æ progressive WB e.g. mini trampett work (double Æ single leg stance), wobble board

TWELVE WEEKS

Progressing gym work (NB no heavy weights)
Progress squatting through full range as pain allows.
Cycling - ordinary bike

TWELVE WEEKS ONWARDS: RETURN TO FUNCTION

Treadmill - supervised. Commence at fast walking and increase to slow jog as appropriate.
Physiotherapy supervised exercises including gentle jogging and shuttle runs
Skills will need to be developed to enable return to sporting activities at 6 months (*NB* contact sports not started until 1 year).
No jogging or running unsupervised until month 6
Return to sports specific training can start at month 6 if all parameters are satisfactory. Exercises should be maintained at a low level and non-contact e.g. figure of 8 runs, gentle acceleration/deceleration runs.
The sports that can be participated in at 6 months post surgery include - competitive swimming and cycling.
Sports that should not be attempted until 1 year post surgery and after consultant's approval include - badminton, tennis, squash, rugby, football, judo and hockey.

Return to work

This is very much dependent on the individual. As a guideline:
Sedentary jobs – from 2 weeks to six weeks allowing for the fact the leg should be elevated for periods. Regular exercises should be undertaken throughout the day.
Non-Sedentary jobs – to be determined at 6-week clinic review. Estimated minimum time 6 weeks to 3 months.