



Cartilage Replacement in the injured knee

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A well-injured full thickness anterior cartilage lesion within the knee presents a difficult problem, especially in the young. Usually the result of trauma, if left untreated the potential loss of the knee can be predicted. Autologous chondral grafting has become the procedure of choice for those who fit the selection criteria. It is well tolerated and the knee is effectively restored to the "pre-injury state".

Over the past couple of years options have been available to treat cartilage damage, including:

- microfracture of the exposed bone (technique) Microfracture (see below) grafts,
- various autografts (excised the affected compartment),
- osteochondral "plugs" (good for small lesions), and
- partial and total joint replacement (noting the problems).

Of these there is one becoming possible to collect the patient's own hyaline cartilage cells in the laboratory and then fix the cells into the lesion area later date.

The cells are processed on a membrane that allows handling, allowing to the appropriate size and shaping and being to the underlying bone which has been suitably prepared.

There are good studies that confirm the cells can only "take" for an ankle, elbow and produce a close normal hyaline cartilage replacement for the lost cartilage.

It can be seen from the MRI, histopathology and gross appearance that the articular surface is maintained.

When patients require two procedures, the first is arthroscopically harvest suitable cells for culture and the second to implant the cells at arthroscopy, the main difficulty of the procedure is the post-operative protocol, which some patients find daunting. This involves three or four weeks of crutches for most knee wounds and the use of a knee brace fulltime for a couple of weeks.

Autologous chondral grafting is occasionally combined with other procedures about the knee, especially necessary to "release" the affected compartment.

Not all patients are suitable and not all lesions are suitable for the procedure (which is not generally suitable for osteoarthritis at the stage).

Selection criteria

- 15 to 55 years of age
- Localised trauma or osteochondral fracture lesions
- Lesion 1 to three in size
- Presence of healthy remaining cartilage
- Failure of medical
- Patient ability and preparation to undertake a 12 month graded rehabilitation program.

The procedure is well tolerated, those who are thoroughly informed prior to commencement and who are closely followed by their treating surgeon.

The graft material is not cheap. The cost of producing the cells in a three suitable for grafting is currently £3,000 (currently 100% related by the health trust).



■ Histology (type II collagen (BAM) staining) of biopsy taken 12 months after implantation shows sparse elongated chondrocytes in the superficial zone and spherical chondrocytes in the transitional zone.

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■ Operative view and preparation (BAM) of a smaller lesion in a 19-year-old male with the lesion anteromedial/anterior of the right femoral condyle. The BAM defect's characteristics include hyaline architecture and absence subchondral cysts.



■ The bed after preparation of the bed



■ Fixation of the graft fixed in situ.



■ Three MRI slices at 2 months, one year and three years respectively demonstrate graft progress in a 19-year-old male. The articular surface is intact as well as normalised. The sub chondral bone has also improved (dark in above view).