

CLINICAL OVERVIEW OF CARTILAGE REPAIR

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The problem of managing patients with articular cartilage damage has tantalised surgeons from the earliest times and it has been recognised that intrinsic healing of cartilage is, at best, a limited occurrence. The subject was carried forward immensely by the work of Audrey Smith who first successfully isolated chondrocytes and made possible the early animal experiments to transplant freshly isolated and stored chondrocytes into joints to heal surface defects. This pioneer work laid the foundation for cell-engineering as it is now recognised and for the clinical applications in the last decade of various cell-based repair techniques.

Petersen and colleagues in Gothenburg have demonstrated that repair of articular cartilage defects with isolated cells which have been cultured and then re-implanted can be successful and this has been confirmed by a number of other individuals and centres throughout the world. Data is emerging which suggests that this method of cell implantation is superior to any method of transplanting intact cartilage with or without its subchondral bone.

However the results are not universally successful and the interaction of biomechanical with the biological factors which are necessary for success are crucial in achieving a high proportion of success in patients. Thus randomised controlled clinical trials are vital to carry the subject forward and to indicate much more precisely what constitutes long-lasting repair in the damaged joint as distinct from temporary repair and also the correct indications for particular techniques in different joints and different locations.

Many very exciting laboratory techniques are being developed which will enhance this work for clinical application. The prospect of having a matrix or membrane carrier for cells which can be inserted by minimally-invasive techniques would be a great advantage from the point of view of patient rehabilitation. Alternative methods such as the use of stem cells or allograft cells are interesting but carry possible risks which require careful evaluation by both animal experimentation and carefully designed clinical trials.

It now appears definitely established that cell-based cartilage repair is successful in appropriate cases

but there are technical problems to be solved such as the presence of large bone defects and also there is uncertainty as to the longevity of such repair. These questions will be answered progressively by collaboration between clinicians and scientists and promise to reduce not only disability in young people following injury to joints, but also to prevent early onset osteoarthritis. In the longer term it may be possible to treat more advanced joint damage by such methods.