Mesenchymal stem cells for treating knee osteoarthritis

Cartilage in the knee does not heal very well nor very quickly, so continued use of the leg when walking for example can result in further damage, bony projections (osteophytes), stiffening and swelling of the joint (Fig. 1). This can progress to osteoarthritis. Osteoarthritis of the knee joint is very common and causes pain and disability, particularly in the elderly. Traditional treatments only offer some benefit in treating the pain, but do not actually repair the damaged cartilage that is causing the problem. The use of mesenchymal stem cells are being investigated as an option to repair, restore and regenerate the damaged cartilage.

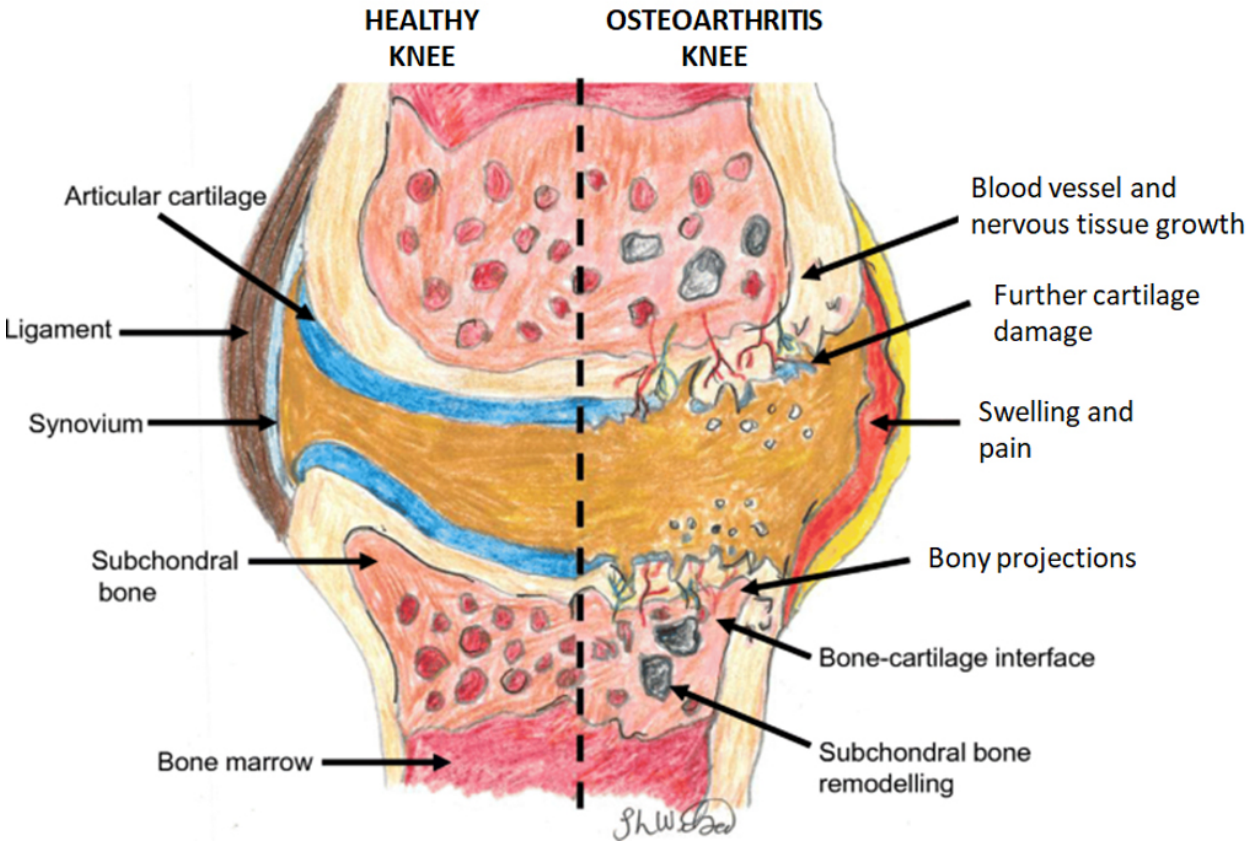

Fig. 1. A comparison of a healthy knee joint (left) compared to a knee with osteoarthritis (right)

Mesenchymal stem cells can be obtained from many different locations in the body, including bone marrow, adipose (fat) tissue, umbilical cord blood and dental pulp found in the centre of teeth. They can be delivered to the damage knee using several different techniques, although they are most commonly injected into the knee. However, the best source and technique used to deliver the mesenchymal cells to damaged knees is not yet known. The use of a patients own cells (autologous cells) from bone marrow and fat are most used to treat osteoarthritis. Although the

way that the cells are obtained, prepared, treated and the actual number of cells used to treat patients varies widely between studies.

The age of the patient can also influence the number and quality of the cells obtained; it is more difficult to get lots of healthy cells from elderly patients. This makes comparing different study results difficult, since some studies use 2 million cells to treat a patient whereas some will use 50 million cells. Although more cells does not necessarily mean better healing. The number of people included in the different studies varies greatly from 7 to 56 patients. This is important when comparing studies since the patients themselves can influence how successful a treatment is, for example somebody who has had to have previous knee surgery to treat their osteoarthritis may not react to treatment as well as somebody who has not. The smaller the number of patients used in a study, the less likely this kind of information is to be accurately captured.

The way that the “success” of mesenchymal cell treatments is assessed often makes use of questionnaires. Although these are relatively simple to perform, the results obtained often over-estimate the actual results, meaning that they appear to be more successful than they are. Also, the length of time that researchers and clinicians continue to follow-up and question the patients for can affect how “successful” a treatment is. Most patients are followed for 12 months after receiving treatment. However, a patient could feel great 12 months after receiving mesenchymal stem cells, but these benefits could wear off after 3 years. So, despite the use of mesenchymal stem cells to treat knee osteoarthritis becoming more commonplace, the long-term benefits of are still unknown.

So far, 22 clinical trials have taken place, however only 5 products so far are available to buy. Unfortunately, information related to how many and the quality of the cells used in these products is not readily available. The amount or “dose” and characteristics of the cells is important to know, particularly when trying to compare different study results. Furthermore, it is important that when developing any new treatment that the cost versus patient benefit is considered. If a treatment is too expensive and only offers short-term relief then it is unlikely to be used by doctors in the clinic.

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