

Bone Marrow Derived MSCs a Better First Treatment for Degenerative Disc

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Degenerative Discs in the low back affect almost 80% of people on the planet [1]. In the last 20 years, several promising biological therapies have been studied for degenerative disc disease (DDD). Some of these strategies have transplanted bone marrow derived Mesenchymal Stem Cells (BM-MSCs). These cells are also called pluripotent mesenchymal stem cells (MSCs) [2-5]. The exact mechanism in which this works however is not completely understood beyond theory but is likely a combination of concentration of all of the components of bone marrow.

For the millions of Americans who live with chronic pain of spinal disc degeneration, treatment options are limited. They can hope that non-surgical treatments, such as bed rest and opioid level pain medication will help them, or they can undertake a variety of different surgical procedures such as spinal fusions or disc replacements. The drawback is that surgery does not treat the degeneration or restore the disc to its natural function.

The non-surgical approach with BM-MSCs may provide a solution to back pain along with reducing the time and cost associated with surgery and rehabilitation.

Autogenous stem cells however, cells from the patient's own body, are supported by research suggesting that they work.

One of the more compelling articles relates the outcome to having a critical number of the right type of stem cell [2]. Compared to the surgical options such as fusion and disc replacement, it resulted in better outcomes for the patients and more patient satisfaction. These results have remained at 2 years of follow up. If a patient would be satisfied with relief for two years and then the option to inject again or simply to postpone an operation, the article should be encouraging.

The FDA has designed very restrictive testing criteria for the approval of these disc replacement devices and fusion devices. The disc injection study used the same criteria [6-8].

Below is a graph showing the outcomes of the disc injection results using a BM-MSC concentration technique from Celling Biosciences (Austin, Texas (USA)) compared to the various fusion and disc replacement outcomes after 12 months. The ODI is the Oswestry Disability Index which is a well-known back pain questionnaire. Also included are the results of the Mesoblast FDA study, an allogenic stem cell product to indicate how allogenic stem cell products do not yield the same results as the patient's own cells.

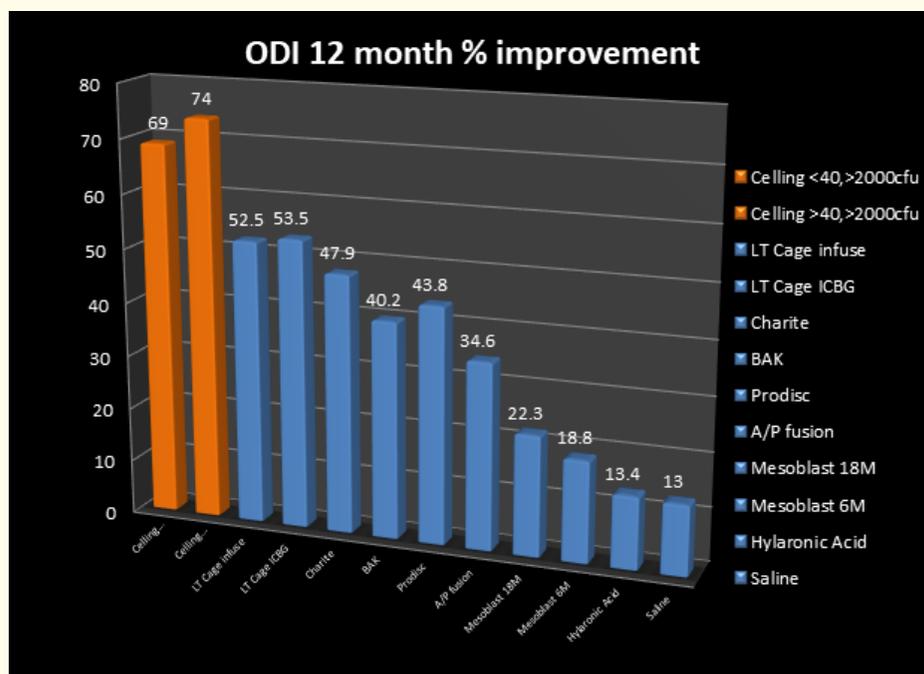


Figure 1

At the 2 year mark, the results were similar. The graphs below compare the ODI scores of BM-MSc injections using the Celling Biosciences protocol versus the surgical options as well as patient satisfaction and improvement results.

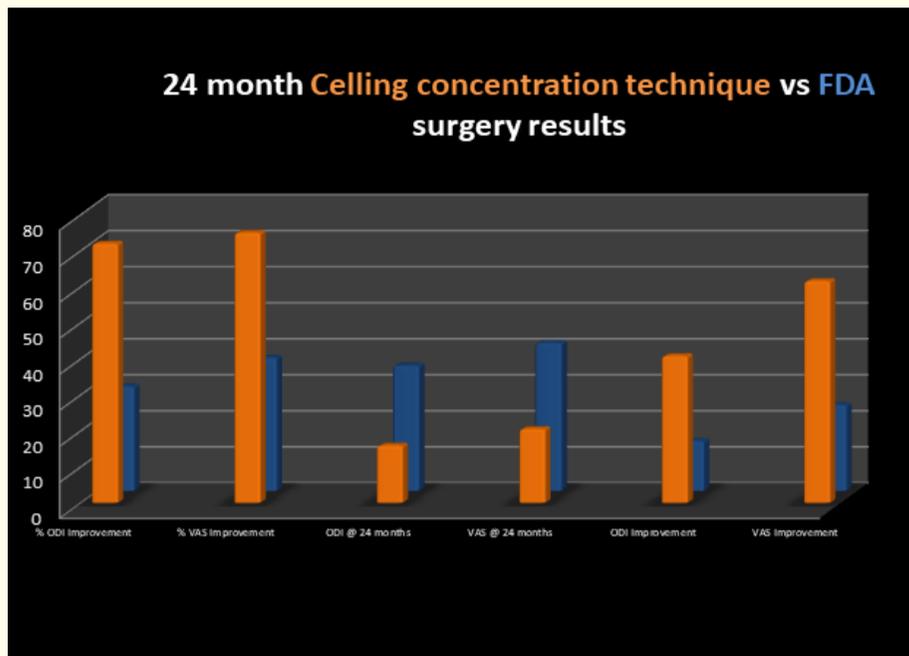


Figure 2

As with any procedure, there are no guarantees. Often the alternative is chronic pain, surgery or narcotic pain medication.

The most striking difference between the BM-MSc data and the surgery patients is the complication profile. These are listed as adverse events in the FDA studies. At the risk of oversimplifying these, I won't even consider ongoing back pain as an adverse event, which is listed in the FDA data. In the Charite and BAK trial there were several categories of adverse events worth noting. Severe or life threatening events, device related events and device failure (additional surgery) were significant enough that they warrant considering. Amongst the Charite patients, 15% had severe or life threatening events, 7.3% had device related events, and 4.9 had device failures (requiring another surgery). In the BAK group those same categories were 9%, 4%, and 8.1%.

Research into the role of Stem Cells in back pain continues. As with the many other applications in the body, they are encouraging.

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