

Bone Marrow vs. Fat Derived Stem Cells: Is there a controversy in the orthopedics world?

Whether your adult mesenchymal stem cells come from bone marrow or from fat probably does not make a difference in terms of clinical results. Although some centers claim that bone marrow derived cells are superior to fat derived cells, there is no evidence to substantiate that. Recent studies show that fat derived cells make bone tissue much better than the bone marrow derived cells. Some studies are showing different outcomes but it is important to realize that these studies are all done in petri dishes and may not relate to living organism. Also, it is important that one is not misled in some marketing materials by the word “bone” in “bone marrow”, possibly implying that since this is an “orthopedic source” it must be better for treating orthopedic conditions such as cartilage regeneration. In fact, the bone marrow is part of the reticulo-endothelial system (makes blood cells) and just happens to be found in the center of bone. The truth is, both bone marrow derived and stromal (from fat) derived stem cells are both effective for regenerative therapy and both have the potential to differentiate into mature functional cartilage. However, stem cells from fat are 100 to 1000 times more plentiful and this makes same day procedures (allowed in the US) much more effective with fat derived cells. The higher numbers of cells in fat leads to better clinical outcomes. Also, the quality of bone marrow declines with age and it has less numbers of cells and less healthy cells compared to the fat. The diminution in quantity and quality of bone marrow cells related to age and chronic illness is well documented. Last but not least, the ease of removing fat from under the skin using a mini-liposuction under local anesthetic is much less invasive and MUCH LESS painful than undergoing bone marrow aspiration to obtain bone marrow cells.

In addition to the quality and ease of obtaining and using adipose derived cells rather than bone marrow derived cells, it is important to consider that there is NO safety data on the intravenous use of bone marrow derived cells and we have safety data (manuscript accepted for publication in American Journal of Cosmetic

Surgery Mar 2017) on 1524 patients. It is very important for a successful clinical outcome to use intravenous cells in addition to intra-articular cells for orthopedics since the cells are smart and will home into wherever they are needed including soft tissue, other parts of the joint and even other joints. A joint injection alone is insufficient in our experience of over 6000 patients.