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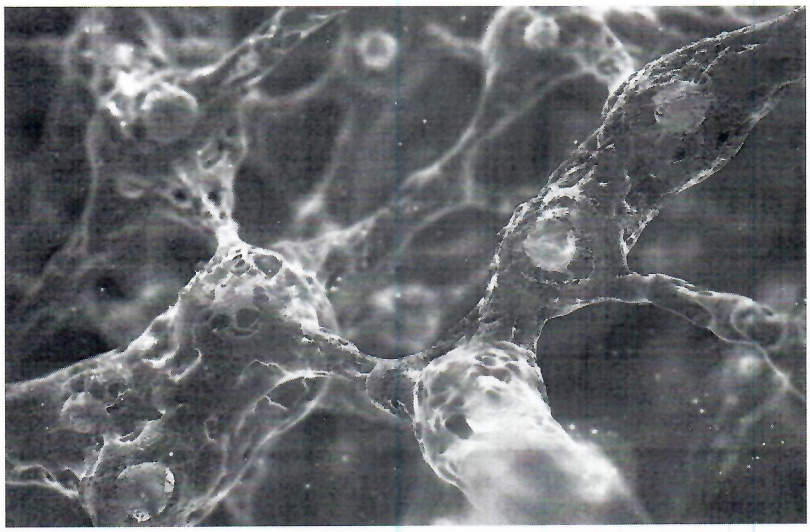

MUSCULOSKELETAL PAIN

Stem Cells for Musculoskeletal Conditions: Hope or Hype?

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WHAT YOU NEED TO KNOW

- Human stem cells possess remarkable potential for advancing cell-based therapies and regenerative medicine, particularly for patients suffering from musculoskeletal diseases.
- However, currently there is a lack of rigorous scientific evidence to validate the effectiveness and safety of treatments offered by commercial stem cell clinics that use adult sourced cells with minimal manipulation.
- This is particularly true for musculoskeletal conditions such as disc pain, tendon pain, hip pain, and knee pain.

Human stem cells possess remarkable potential for advancing cell-based therapies and regenerative medicine, particularly for patients suffering from musculoskeletal diseases. Commercial clinics most commonly use stem cells harvested from fat and bone marrow material.

Systemic Review Is Revealing

A Mayo Clinic research team conducted a systematic review of human clinical studies to measure the effects of stem cells from fat and bone marrow material with minimal manipulation for the treatment of musculoskeletal disease.[5] This study was published in *Pain Medicine*. The research team performed a search of the MEDLINE, EMBASE, and Scopus databases. They included human subject studies that evaluated musculoskeletal disease treatment with mesenchymal stem cells. Two independent reviewers selected and extracted the data. Study quality was assessed using an established measure.

The selection criteria led to the inclusion of eight studies in this review. The review included a total of 941 patients. Patient outcomes were similar for those who received and did not receive stem cell therapy. In other words, stem cells failed to outperform controls in patients with musculoskeletal conditions such as disc pain, tendon pain, hip pain, and knee pain.

More Research: Lack of Effectiveness

Other research teams concur with the Mayo Clinic's findings. Di Matteo and his research team performed a systematic review and concluded that there was a lack of evidence to support the claim of superiority for stem cells from fat and bone marrow material with minimal manipulation for patients with knee osteoarthritis.[3]

Dai, et al., conducted a meta-analysis of clinical studies using intra-articular mesenchymal stromal cell injection for patients with symptomatic knee osteoarthritis. They discovered that stem cells from fat and bone marrow material were not superior to placebo in terms of pain relief and functional improvement.[2]

A Lack of Biological Activity

Commercial clinics most commonly use a type of stem cell treatment that originates from fat and bone marrow material with minimal manipulation. So, two independent research teams examined the number of stem cells in fat and bone marrow samples. They found tiny amounts of stem cells.[7-8]

They concluded that the minuscule quantity of stem cells is incapable of generating biological repairs. In the fat tissue, an injectable dose had a couple of thousand cells, and in the bone marrow, there were even fewer cells. The target for effective treatment needs to be millions of cells, not thousands.

Serious Harms

Proponents of stem cell therapy have suggested that the procedure is safe. However, clinical studies disagree. An international research team found that in 844 procedures, four serious adverse events occurred, including one bone marrow site infection, one pulmonary embolism, and two cancerous tumors at a mean follow-up of 21 months.[6]

Additionally, three elderly patients suffered loss of vision within one year after receiving injections of stem cells derived from their own fatty tissue.[4] (Please note that we have no data from long-term follow-ups for stem cell therapy.)

Cautiously Optimistic Future

The future looks bright for stem cell therapies that have been rigorously tested and have won FDA approval. For example, the blood stem cell transplant procedure for patients with leukemia is effective and safe.

Additionally, there are numerous clinical trials examining the effects of biologically active stem cells on various conditions. Amirdelfan, et al., did a pilot randomized, placebo-controlled trial to look into the effects of allogeneic mesenchymal precursor cells with advanced manipulation on people with

chronic low back pain associated with disc degeneration.[1] The trial had four arms: 6 million cells, 18 million cells, and two controls. The pilot study was successful, and they are now conducting a full study.

Practical Takeaway

Currently, there is a lack of rigorous scientific evidence to validate the effectiveness and safety of treatments offered by commercial stem cell clinics that use adult sourced cells with minimal manipulation, particularly for conditions such as disc pain, tendon pain, hip pain, and knee pain. While these clinics often market their services as cutting-edge and promising solutions for chronic pain, the data does not support those claims.

It is important to acknowledge that the field of stem cell research is still in its early stages and is rapidly evolving. The future of regenerative medicine, including stem cell therapy, holds immense potential. With ongoing scientific exploration and technological innovation, there is hope that stem cell therapy could eventually become a reliable and transformative treatment option.

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