

## What is a Stem Cell?

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Most cells in the human body have an assigned purpose. They are liver cells, fat cells, bone cells, and so on. These cells can replicate more of their own kind of cell, but they cannot differentiate into another kind of cell.

Stem cells are the primitive cells from which all other cells developed. They are undifferentiated cells with the ability not only to self-replicate, but to specialize to become different types of human cells. There are several types of stem cells, but the kinds used in orthopedic stem cell therapy are called *mesenchymal stem cells (MSCs)*.

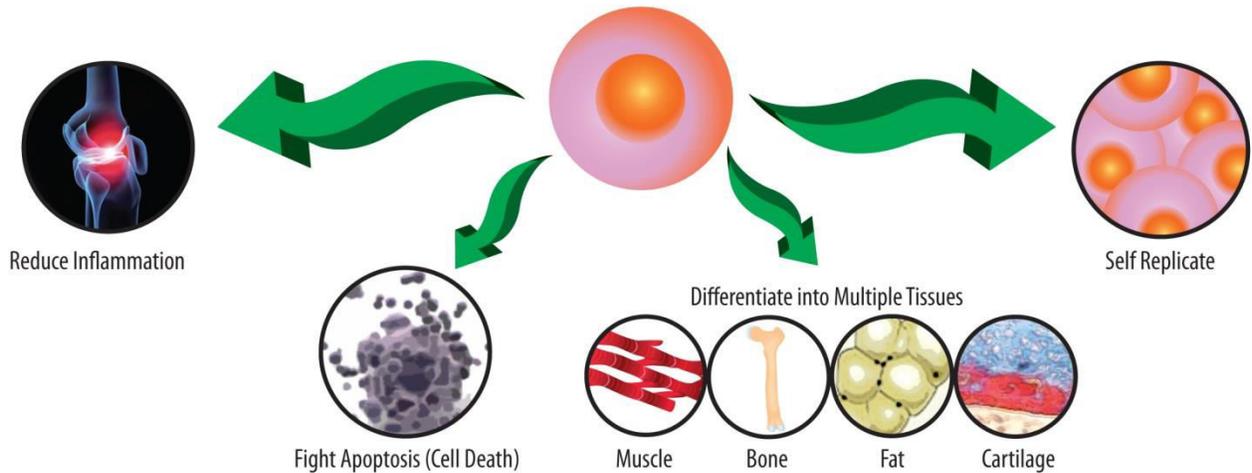
An MSC is a cell with strong potential for tissue repair because it can:

- Self-replicate
- Reduce inflammation
- Combat cell death
- Differentiate into more than one specialized cell of the body (including bone cells, muscle cells, cartilage cells, and fat cells)

In medical research, tissues such as muscles, cartilage, tendons, ligaments, and vertebral discs have shown some capacity for self repair. As a result, tissue engineering and the use of mesenchymal cells and/or bio-active molecules such as growth factors are being tested and studied to determine the role they can play in tissue regeneration and tissue repair.

## What is a Stem Cell?

A mesenchymal stem cell is a primitive cell with the ability to:



## How Does Orthopedic Stem Cell Therapy Work?

Mesenchymal stem cells (MSCs) are adult stem cells that can be found in bone marrow. Doctor Moore performs *autologous stem cell therapy*, which means that the stem cells used in your treatment are taken from your own body, not from a donor. Using your own stem cells for the procedure helps reduce your risk of infection and eliminate the possibility of immune rejection.

In an autologous stem cell procedure, your physician will draw a sample of fat or bone marrow from the abdomen or hip. The sample is then filtered and concentrated in a sterile environment, then injected into the area of your body that you are trying to heal. This procedure is done on an outpatient basis while under sedation and leaves minimal scarring.

The idea behind orthopedic stem cell therapy is that the injection of these concentrated regenerative cells at an area of your body experiencing degeneration will kick start your body's ability to heal itself. These injections can be given independent of or in conjunction with an orthopedic surgical procedure

## Orthopedic Areas of Interest for Stem Cell Therapy

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- **Articular Cartilage** – Damage to the articular cartilage following an injury has poor potential for repair and can lead to arthritic changes many years after injury. Recent studies have shown favorable outcomes and better knee scores at 2 year follow up for mesenchymal cells compared to current techniques of microfracture and autologous chondrocyte implantation.
- **Bone** – Trauma and some pathological conditions can lead to extensive bone loss, which requires transplantation of bone and other bone substitutes to restore structural integrity. A large number of studies have shown great potential for mesenchymal cells to repair critically sized bone defects, noting better bone growth and more robust bone formation than controlled groups.
- **Tendons and Ligaments** – Injuries to tendons and ligaments heal by forming inferior quality tissue. Autografts, allografts, and resorbable materials have been used to repair defects in tendons and ligaments, but these carry risks including donor site morbidity, scar formation, and tissue rejection. A number of studies on the use of mesenchymal stem cells to improve the repair of tendons and tendon defects have been carried out with favorable results when measured in histology and tissue strength. The use of mesenchymal cells with tissue allografts enhances the graft and improves the biomechanical properties compared to control studies.
- **Meniscus** – Most tears of the meniscus occur in avascular zones with little or no potential for repair. Standard biological healing processes produce limited results and meniscectomy (removal of all or part of the torn meniscus) has been shown to have a strong association with subsequent development of osteoarthritis. Recently, studies have shown that self-paced therapy including mesenchymal stem cells demonstrates biological healing and adherence of meniscal tears in avascular zones.
- **Spine** – Degeneration of intervertebral discs is a common cause of back pain and morbidity. Most patients are treated conservatively with improvement in approximately 90%. If conservative treatment proves ineffective, the surgical options for discogenic back pain are

limited and usually invasive. Cell-based tissue treatments, including mesenchymal stem cell injections for degenerative disc subjects have been shown to diminish the incidence of low back pain, with clinical results noting improvement in back pain and MRI results showing regeneration of disc tissue. In cases where spinal fusions are necessary, the use of stem cells has shown greater success in obtaining fusion through bone formation as compared to standard fusion techniques.

- **Osteonecrosis** – Osteonecrosis or *avascular ischemia* of the hip can be associated with progression to an advanced arthritic joint. Standard treatment for osteonecrosis has included core decompression with limited results. Studies report improvement in hip scores in patients treated with mesenchymal stem cells and core decompression versus core decompression alone.

## Is Orthopedic Stem Cell Therapy Covered By My Insurance?

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No. Because mesenchymal stem cell injections are considered investigational for orthopedic applications, most insurance companies will not cover the cost. Please contact our office to discuss cash payment options.

## What is the Cost of Orthopedic Stem Cell Therapy?

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Your out-of-pocket cost will vary, depending upon whether you have stem cell therapy independent of or in conjunction with another surgical procedure.

## References:

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