



CLIENT REPORTED OUTCOMES

MULTIPLE SCLEROSIS

This study overview illustrates the benefits seen using one's own MSCs, cultured by Celltex, to help alleviate symptoms of multiple sclerosis.

DISCLAIMER: The Celltex study on multiple sclerosis is being shared with you at your request. It reflects actual outcomes from individuals who received therapy using Celltex-produced mesenchymal stem cells. The study shows positive results for these individuals. It is important to note that the study is not scientific. No representation is being made that you or any other individual would get similar positive results. You should consult with your physician on what is best for you. Please call us if you wish to find out more about Celltex and the positive results individuals are having as reflected in this study.

STEM CELLS AND MULTIPLE SCLEROSIS: HOW IT WORKS



Multiple Sclerosis (MS)

MS is an autoimmune disease that damages the myelin sheath covering the nerves in the central nervous system, making it progressively more difficult for the brain and body to communicate – creating problems with balance, muscle control, vision, and more.

How MS affects the body can vary dramatically from individual to individual. Some may lose the ability to walk entirely, while others may experience frequent and extended periods of remission.

There is no known cure for MS. Current conventional treatments focus on reducing the length of flare-ups while managing the impact of symptoms.

Why Mesenchymal Stem Cells?

Mesenchymal Stem Cells (MSCs) are a unique, naturally occurring type of stem cell known to have immunomodulating and anti-inflammatory properties that could help curb the overactive immune system and limit damage to the myelin sheaths during MS flare-ups.^[1]

MSCs also possess regenerative properties that may help promote tissue repair.

While this doesn't represent a potential "cure" for MS, it does represent a promising new avenue for alleviating symptoms and further improving the quality of life in situations where conventional treatments are not enough.

This study overview illustrates the benefits seen using one's own MSCs, cultured by Celltex, to help alleviate symptoms of MS.

Data is based on reported outcomes of Celltex clients with MS.

Overview based on study conducted by the Celltex Research & Development Team: *Retrospective Surveys of Multiple Sclerosis Patients Receiving Autologous Mesenchymal Stem Cell Therapy, 2016.*

CLIENT REPORTED OUTCOMES FOR MS

Study Overview

Celltex conducted a retrospective study based on the reported results of our clients with MS.

The study took survey results from a 3-year span, as clients were asked about specific symptoms and changes after stem cell therapy using their own MSCs processed by Celltex.



Study Demographics

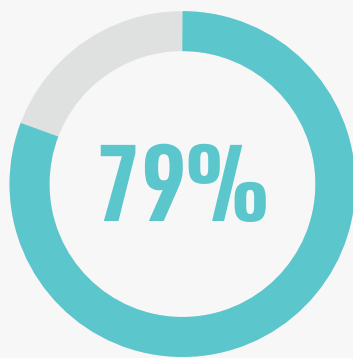
It's important to note that these results were seen in an aging population with progressive types of MS and high EDSS levels – **most were expected to see continued deterioration in their quality of life.** ^[2,3]

OF ALL CELLTEX CLIENTS WITH MS WHO PARTICIPATED IN OUR SURVEY:

73% were older than 50 years of age

50% had lived with MS for over 15 years

68% had an EDSS score above 6.5



OF CLIENTS WITH MS INDICATED IMPROVEMENT IN ONE OR MORE SYMPTOMS

Most respondents reported improvements in at least one of their symptoms.

The majority of those surveyed were at a point in their disease where functional losses are generally considered irreversible and further deterioration is typical – making the improvements seen here even more promising.

IMPACTING THE SYMPTOMS OF MS

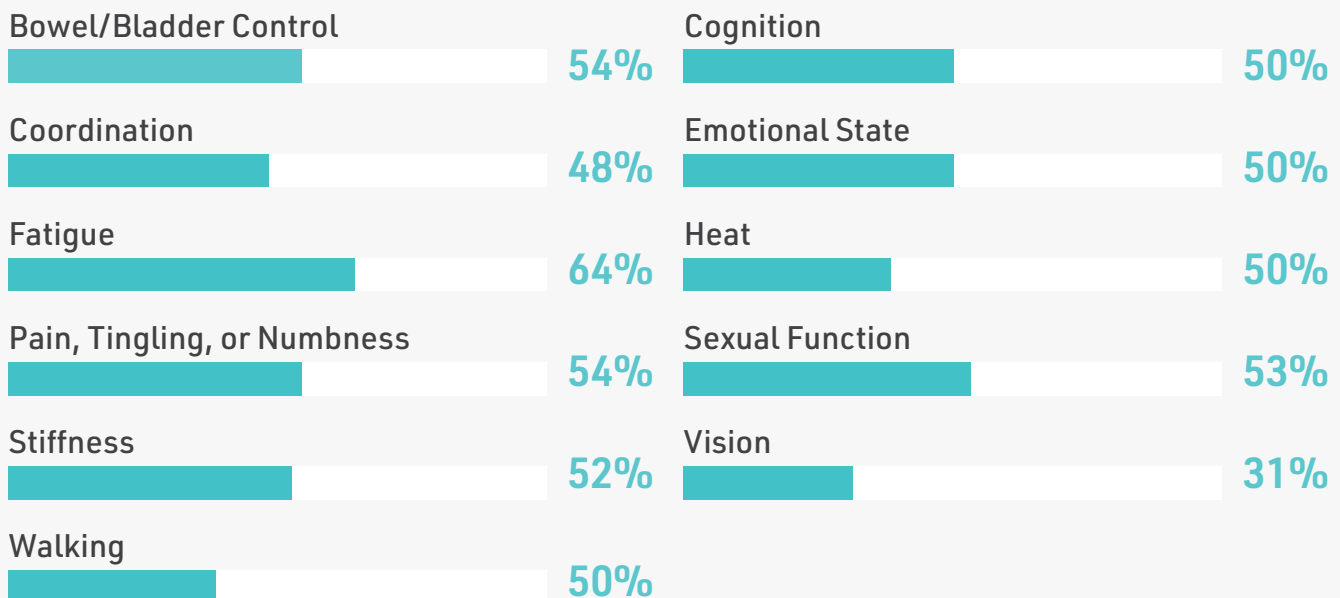
What We've Learned

While most participants reported improvements in at least one symptom, which symptoms and to what degree those symptoms improved varied significantly between individuals – **making the potential benefits of MSC therapy for MS highly individualized and difficult to predict.**



Frequency of Symptom Improvements for MS Clients

The chart below represents the percentage of respondents that reported seeing improvement for the indicated symptom. Not every individual had every symptom.



Individualized Improvements

Beyond the individualized manifestations of MS itself, another potential factor in the individualized results seen in this study was the varying methods of administration. How MSC therapy was administered varied based on clients' specific needs.

ADMINISTERING STEM CELL THERAPY

Both the type of administration and frequency of therapies varied based on the clients' specific circumstances – potentially contributing to the varied, individualized results seen in the study.



Routes of Administration

How MSCs are administered into the body varies based on physician recommendation and the individual client's needs.

Intravenous (IV)

The most common form of infusion is where MSCs are administered through an IV.

Intrathecal (IT)

The MSCs are administered through an injection into the spinal canal.

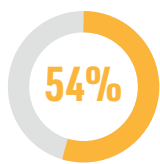
Lymphatic (Li)

The MSCs are administered through an injection into the lymph nodes.

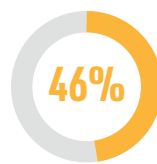
Intranasal (IN):

While not mentioned in this study, MSCs can be infused through the nasal passage. This route may be recommended for those with MS.

IV INFUSIONS ARE OFTEN ACCOMPANIED BY ANOTHER ROUTE OF ADMINISTRATION



54% of respondents received therapy via IV only



46% of respondents received therapy via a combination of IV with IT or Li.

Are Repeat Therapies Needed?

It's possible that repeated rounds of MSC therapy could enhance benefits; particularly for those reporting symptom improvements that faded over time. Additional studies are needed to adequately answer this question.

Most clients surveyed (64%) felt like they would need repeat therapies, but the current cost of therapy limits many from doing so. Celltex is committed to helping make repeat therapies more accessible in the future.

MOVING FORWARD

Safety of MSC Therapy

There were no severe adverse events to MSC therapy in this retrospective study of Celltex clients with MS.

In fact, Celltex-produced MSCs have been used in over 10,000 therapies across various disease categories with no severe adverse events.

More Research is Crucial

Using MSCs to help alleviate the symptoms of MS certainly has potential, but more research is still a priority.

MSC therapy may already be an option for some. Learn more at [CelltexBank.com/Therapy](https://www.celltexbank.com/Therapy).

The Celltex Difference

Stem cell banking is the critical first step in the MSC therapy process that separates Celltex from other stem cell companies. Stem cell banking with Celltex involves (1) extracting a one-time sample of an individual's fat tissue, (2) isolating the MSCs from that sample, (3) expanding the pure MSCs in quantity, and (4) cryopreserving a lifetime supply for future therapeutic uses.

Celltex's technology enables an individual's stored MSCs to be expanded into quantities exponentially greater than that of current same-day stem cell clinic offerings, greatly increasing the potential for positive results when therapeutic application is necessary.

This difference in cell quantity, along with the compatibility from using one's own cells contributes to the superior quality of Celltex-produced MSCs. **Celltex-produced MSCs have the potential to succeed where same-day stem cell therapies have failed before.**

YOUR NEXT STEPS

Take Our Virtual Consultation

Visit [CelltexBank.com/MS-Eval](https://www.celltexbank.com/MS-Eval) to see if stem cell banking or therapy is right for you.

Talk to Your Celltex Representative

Here for you every step of the way, we can answer any question you might have about our process.

SUPPORTING INFORMATION

References

Overview based on study conducted by the Celltex Research & Development Team:

Patient Reported Outcomes: Retrospective Surveys of Multiple Sclerosis Patients Receiving Autologous Mesenchymal Stem Cell Therapy, 2016.

Additional References:

- [1] Andrzejewska, A., Dabrowska, S., Lukomska, B., Janowski, M., Mesenchymal Stem Cells for Neurological Disorders. *Adv. Sci.* 2021, 8, 2002944. <https://doi.org/10.1002/advs.202002944>
- [2] Koch, M. W., Greenfield, J., Javizian, O., Deighton, S., Wall, W., & Metz, L. M. (2015). The natural history of early versus late disability accumulation in primary progressive MS. *Journal of neurology, neurosurgery, and psychiatry*, 86(6), 615–621. <https://doi.org/10.1136/jnnp-2014-307948>
- [3] Tutuncu, M., Tang, J., Zeid, N. A., Kale, N., Crusan, D. J., Atkinson, E. J., Siva, A., Pittock, S. J., Pirko, I., Keegan, B. M., Lucchinetti, C. F., Noseworthy, J. H., Rodriguez, M., Weinshenker, B. G., & Kantarci, O. H. (2013). Onset of progressive phase is an age-dependent clinical milestone in multiple sclerosis. *Multiple sclerosis (Houndmills, Basingstoke, England)*, 19(2), 188–198. <https://doi.org/10.1177/1352458512451510>

Acknowledgments

We would like to acknowledge the generous contribution of those who received their own MSCs under the registry study in which this overview is based on. Their willingness to perform and submit surveys throughout repeated data collection cycles made these analyses possible.

We give our deepest thanks to these people for their contribution to help advance understanding in stem cell research.

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