

Exosome Therapy for Spine (AI generated)

Exosome therapy is a promising treatment for spinal conditions, offering a non-surgical, minimally invasive approach to manage pain and inflammation. Here's how it works and what it can offer for spinal health:

- **Mechanism:** Exosomes carry biological signals from stem cells to injured tissues, promoting healing and reducing inflammation. They are acellular, meaning they do not contain whole cells, which reduces the risk of unwanted cell proliferation and immune system attack.
- **Procedure:** The therapy involves extracting exosomes from mesenchymal stem cells, purifying them, and injecting them directly into the affected area. The procedure is typically completed in an outpatient setting, requiring minimal downtime.
- **Conditions Treated:** Exosome therapy is effective for spinal degeneration, disc injuries, nerve inflammation, and other spinal conditions. It can also be used for sports injuries, soft tissue damage, neuropathic pain, chronic inflammation, and degenerative disc disease.

Exosome therapy is still experimental and not fully proven for all conditions, but it shows potential as a natural, non-invasive option for spinal health. Patients considering this therapy should consult with a healthcare provider to discuss the benefits and risks. 🌐🌐

3 Sources

NIH – NATIONAL LIBRARY OF MEDICINE

Exosomes for the Management of Low Back Pain: A Review of Current Clinical Evidence

[Ashim Gupta](#) ^{1,2,3,4,}✉

Editors: Alexander Muacevic, John R Adler

- Author information
- Article notes
- Copyright and License information

PMCID: PMC11068073 PMID: [38707134](#)

Abstract

Low back pain affects millions of people, creating an enormous financial burden on the global healthcare system. Traditional treatment modalities are short-lived and have shortcomings. Recently, orthobiologics, including extracellular vesicles or exosomes derived from mesenchymal stem cells, have markedly increased for managing musculoskeletal conditions. Here, the primary aim is to review the outcomes of clinical studies using extracellular vesicles or exosomes for treating low back pain. Numerous databases (Scopus, PubMed, Web of Science, Embase, and Google Scholar) were searched using terms for the intervention 'exosomes' and the treatment 'low back pain' for

studies published in English to March 18, 2024. Articles utilizing exosomes for the management of low back pain were included. Articles not utilizing exosomes, not explicitly stating the presence of exosomes in their formulation, or not targeting low back pain were excluded. Two articles that met our pre-defined criteria were included in this review. The results showed that administering extracellular vesicles or exosomes is safe and potentially effective in patients suffering from low back pain. Yet, more sufficiently powered, multi-center, prospective, randomized, and non-randomized trials with longer follow-up are essential to assess the long-term safety and efficacy of extracellular vesicles or exosomes derived from various sources and to support its routine clinical use for managing low back pain.

Discussion

The absence of efficient gold-standard therapy for managing low back pain poses a significant challenge for clinicians and results in significant disability in patients and a substantial burden on healthcare systems throughout the world [2]. Intra-articular administration of steroids is the most widely used option, but no short-term or long-term benefits, even compared to the placebo, were reported [2]. Lately, cellular therapy involving the use of mesenchymal stem cells (MSCs), derived from various autologous and allogenic sources, including bone marrow, adipose tissue, and perinatal tissue, have shown potential for regenerative medicine applications, attributed to their ability for self-proliferation and multipotency [28]. EVs, including Exos, secreted by MSCs in a paracrine manner, are the key mediators responsible for the therapeutic efficacy of MSCs [29]. EVs or Exos can help overcome certain challenges MSCs present, including insufficient retention and survival at the administration site; unfavorable survival and proliferation in inflammatory and ischemic microenvironment; and release of inflammatory cytokines by dead cells, which may lead to adverse effects on the peripheral cells. EVs or Exos are also known to exhibit anti-inflammatory properties, enhance macrophage polarization to the M2 phenotype, and offer a basis for tissue healing [30]. In addition, EVs or Exos have lower immunogenicity than the MSCs and will not result in immune rejection [31].

The current study reviewed the therapeutic ability of EVs or Exos for managing low back pain. Clinical studies using EVs or Exos for low back pain treatment were included. Based on our pre-defined search terms and inclusion/exclusion criteria, two studies fit the scope of our review (Table 1). Phillips et al. demonstrated that administration (epidural) of BM-MSC-Exo in lumbar and cervical radiculopathy patients is safe and resulted in decreased pain and improved function at 1-month follow-up compared to the baseline [26]. Wilson et al. showed that administration (in the facet joint space) of BM-MSC-EV in lumbar facet joint patients is safe and led to significant improvements in pain and function at three months follow-up compared to the baseline [27]. The results from these studies are in accordance with the literature demonstrating the efficacy of MSCs in ameliorating low back pain [32-34]. Thus, EVs or Exos may have the potential to circumvent limitations posed by MSCs while retaining their regenerative ability.