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REVIEW

The role of mesotherapy in chronic back pain syndrome: what do we know?

Kamil Koszela[1,2] · Massimo Mammucari[3,4] · Michał Słupiński[5] · Marta Woldańska-Okońska[6]

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Abstract

Back pain syndrome is one of the most prevalent disorders of the 21st century, frequently diagnosed by physicians across various medical specialties. A key clinical priority is to identify the underlying cause and establish an accurate diagnosis. A common etiological factor is the overload of soft tissues due to improper posture or movement, resulting in congestion, reduced mobility, and pain. Spinal mesotherapy, a minimally invasive injection technique, has gained attention for its ability to improve microcirculation, relax tense tissues, enhance range of motion, and, most importantly, alleviate pain. Increasingly, this treatment is being incorporated into a structured "three-step approach" to chronic back pain: risk factor assessment, medical intervention (such as spinal mesotherapy), and subsequent targeted physiotherapy. This narrative review analyzes nine studies involving more than 800 patients with chronic back pain syndrome. Across all included studies, mesotherapy demonstrated a consistent positive impact on both pain reduction and functional improvement, without reports of serious adverse events. The purpose of this review is to assess the current evidence on the efficacy and safety of spinal mesotherapy and to highlight its role within a multimodal treatment strategy for chronic back pain.

Keywords Injection · Spine · Back pain · Pain

Introduction

Currently, back pain syndrome is treated as a disease of civilization [1]. Due to longer life expectancy, the number of patients with musculoskeletal pain, including spinal pain, is increasing [2]. Very often, the problem is related to overload and affects soft tissues (muscles, fascia, ligaments) as a result of their non-ergonomic use, resulting in overload and its symptoms [3]. This leads to muscle congestion, increased muscle tension, limited mobility, and pain [4, 5]. Consequently, this significantly limits functioning—the performance of daily and basic activities of daily living, reduces quality of life, and causes absenteeism from work, which translates into significant financial burdens for healthcare systems and, in many countries, for patients themselves [6]. Therefore, medicine is looking for fast, effective, and minimally invasive therapies for back pain syndrome [7].

One such method is an injection technique called mesotherapy, also known as local intradermal therapy (LIT). It involves the use of multi-point microinjections using specialized needles [8, 9]. Various drugs are used (e.g., lidocaine, piroxicam, diclofenac) [10, 11] and medical devices (e.g., injection collagen type I) [12] are used. The main goal

✉ Kamil Koszela
kamil.aikido@interia.pl

Massimo Mammucari
massimo.mammucari@libero.it

Michał Słupiński
michal.slupin@wp.pl

Marta Woldańska-Okońska
marta.okonska@poczta.onet.pl

1 Department of Neuroorthopedics and Neurology Clinic and Polyclinic, National Institute of Geriatrics, Rheumatology and Rehabilitation in Warsaw, Warsaw 02-637, Poland

2 President of the Polish Society of Mesotherapy, Warsaw, Poland

3 Clinical Pharmacology and General Practice–ASL, Rome, Italy

4 President of the Italian Society of Mesotherapy, Rome, Italy

5 Rehabilika-Centre for Rehabilitation and Adult Age Medicine, Lodz 93-029, Poland

6 Department of Internal Medicine, Rehabilitation and Physical Medicine, Medical University of Lodz, Lodz 90-419, Poland

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of mesotherapy is to restore proper circulation in soft tissues, relax them, improve mobility, and, as a result, reduce pain [7].

Analgesic mechanisms are related to the technique of administering the therapeutic substance, the long-lasting effect of the administered drug, the mechanical and chemical action of the injection, the stimulation of surface trigger points, and the effect on intradermal glial cells. LIT is beneficial because it bypasses the gastrointestinal tract, requires a much lower dose of the administered drug, has a longer duration of action than oral administration, and is expected to reduce side effects [8].

The aim of this narrative review is to analyze the efficacy and safety of mesotherapy in the treatment of chronic back pain syndrome.

Search strategy

A comprehensive literature search was conducted in databases such as Medline/PubMed, Scopus, and Directory of Open Access Journals (DOAJ) using a range of Medical Subject Headings (MeSH) search terms. The following keywords were used in the search: "spinal mesotherapy," "mesotherapy pain," and "chronic back pain." Each article was rigorously evaluated for relevance, and references cited in the article were examined to identify additional relevant sources. Inclusion criteria: (1) peer-reviewed article/review, (2) in English, (3) no time restriction on publication. Exclusion criteria: (1) conference materials, case studies, errata, and retracted articles, (2) articles without abstracts, (3) articles on mesotherapy unrelated to the treatment of back pain. The results are shown in Fig. 1.

Spinal mesotherapy

This is a minimally invasive form of therapy involving intradermal multi-point microinjections to a depth of 3–4 mm using specialized needles 4–12 mm long and 0.3 mm in diameter (30G) [7–9]. The therapeutic effect of mesotherapy is mechanical (related to the injection), irritation of receptors in the skin and subcutaneous tissue, and chemical (related to the administration of a drug, medical device or mixture) [7, 13]. Microinjections and the injected substance can trigger the release of endorphins, both through the stimulation of cell receptors and intradermal nerve structures [14]. In addition, mesodermal modulation occurs [8]. In local analgesic therapy, it may offer the beneficial effect of drug conservation compared to deep parenteral routes, e.g., intramuscular administration, as it has been found to cause several times higher immunogenicity, probably due to the structure and function of subcutaneous tissue [15].

In the course of chronic back pain syndrome, increased soft tissue tension often occurs, causing limited mobility and pain. In addition, passive tissue congestion is observed, causing local circulation disorders [16]. The use of mesotherapy restores normal local circulation, relaxes tense tissues, and as a result improves tissue mobility and joint mobility, reducing pain [7].

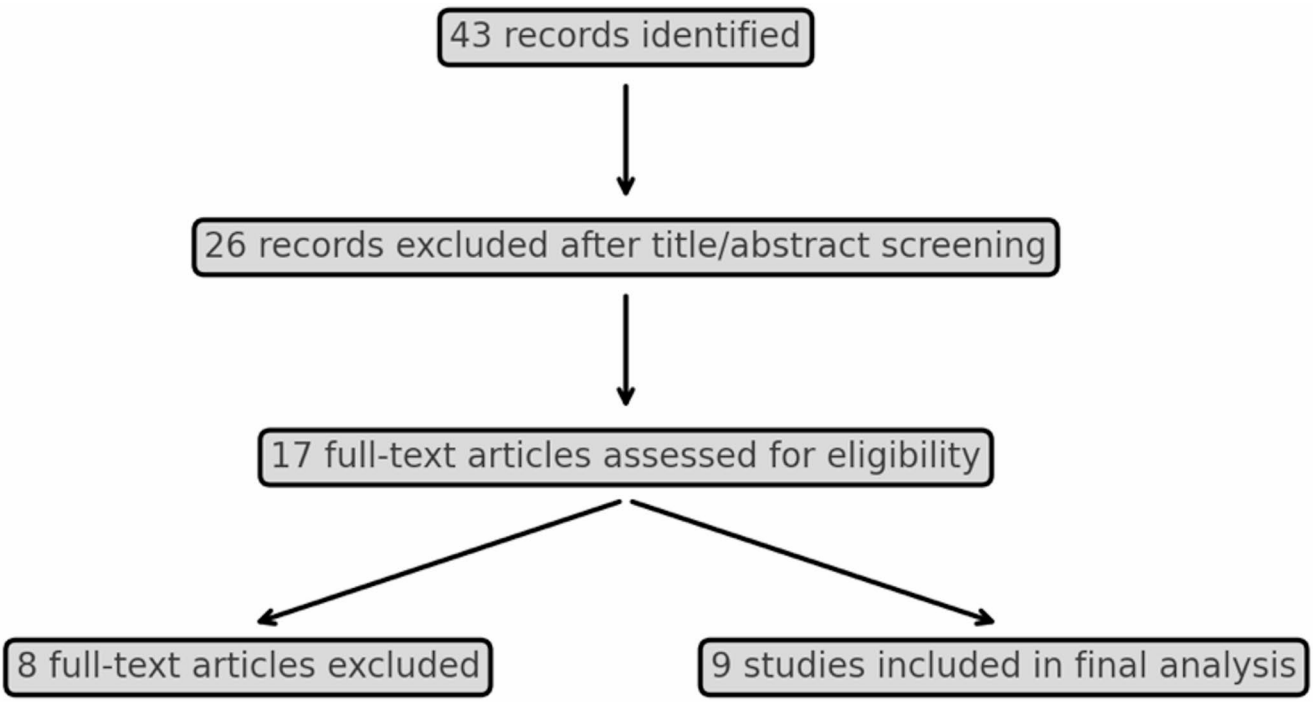

Fig. 1 PRISMA flow diagram

Table 1 Analysis of publications on spinal mesotherapy

Authors	References	Type of study	Number of patients (*n*)	Part of the spine	Preparations used	Number of treatments	Follow-up	Effectiveness	Safety
Koszela et al. (2025)	[17]	Retrospective	130	Thoracic	Collagen type I (*n* = 65) vs. lignocaine 1% (*n* = 65)	5	3-months	Effective	No side effects
Mouhli et al. (2025)	[11]	Randomized	60	Lumbar	Lidocaine 1% + magnesium + piroxicam + thiocholchicoside (*n* = 32) vs. TENS (*n* = 38)	3	1-month	Effective	–
Ranieri et al. (2024)	[10]	Prospective	10	Cervical	Diclofenac + lidocaine + saline	8	1-month	Effective	No side effects
Murat (2024)	[21]	Retrospective	42	Cervical	Lidocaine 2% + tenoxicam the point-by-point technique (*n* = 21) vs. lidocaine 2% + tenoxicam the napaj technique (*n* = 22)	4	3-months	Effective	No side effects
Koszela et al. (2024)	[12]	Retrospective	130	Lumbar	Collagen type I (*n* = 65) vs. lignocaine 1% (*n* = 65)	5	3-months	Effective	No side effects
Brauneis et al. (2023)	[22]	Randomized	141	Cervical, thoracic, lumbar	Ketorolac (*n* = 76) vs. ketorolac + thiocochicoside (*n* = 65) vs. saline solution (*n* = 61)	9	-	Effective	No side effects
Scaturro et al. (2023)	[20]	Observational	78	Cervical	Diclofenac + thiocolchicoside + mepivacaina (*n* = 39) vs. sodium chloride solution (*n* = 39)	7	-	Effective	No side effects
Ronconi et al. (2023)	[18]	Retrospective	101	Lumbar	Diclofenac vs. aspirin-lysine acetylsalicylate	5	3-months	Effective	No side effects
Ferrara et al. (2017)	[23]	Retrospective	220	Cervical, thoracic, lumbar	Lidocaine 2% + lysine acetylsalicylate + saline solution (*n* = 110) vs. saline solution (*n* = 110)	5	3-months	Effective	–
Paolucci et al. (2016)	[19]	Retrospective	42	Cervical	Lidocaine 2% (*n* = 22) vs. dry mesotherapy (*n* = 20)	3	3-months	Effective	No side effects

Medications used in spinal mesotherapy

Based on the analyzed literature (Table 1), mesotherapy of the spine primarily involves the use of nonsteroidal anti-inflammatory drugs (NSAIDs), anesthetics, and, to a much lesser extent, medical devices such as injectable type I collagen. Saline solutions and water for injection are also used [8].

At the time of writing this review, there are no standards in the literature regarding the use of preparations in the course of various pathologies of the musculoskeletal system, including the spine. Some authors use medicinal substances individually, while others combine them. Koszela et al. compare injectable type I collagen with 1% lidocaine in their publications [12, 17], similarly Ronconi et al. administered anti-inflammatory preparations, comparing diclofenac with aspirin-lysine acetylsalicylate [18], and Paolucci et al. used 1% lignocaine [19]. In contrast, Mouhli N. et al. used a multi-component mixture of 1% lidocaine + magnesium sulfate + piroxicam + thiocholchicoside [11]. Similarly, Scaturro et al. administered diclofenac + thiocolchicoside, + mepivacaine using the mesotherapy technique [20]. Based on published results, we know that mesotherapy works, but when using multi-component mixtures, it is not entirely clear which component played a key role and whether there

are any synergistic or antagonistic reactions between the drugs.

Safety of spinal mesotherapy

Based on the analyzed literature, no adverse effects associated with the use of mesotherapy in the course of chronic back pain syndrome were found (Table 1). An important aspect of the treatment process is a medical history check for allergies to the preparation used. As is well known, some people are allergic to NSAIDs or anesthetics such as lignocaine. An alternative for these patients may be the use of type I collagen injections, which are of porcine origin and are safe in this regard, given their similarity to human collagen, which is approximately 95–97% [7, 24, 25]. In addition, it should be remembered that an allergic reaction to intradermal preparations may be delayed by 6–12 h [26]. In doubtful cases, an intradermal allergy test should be performed. Furthermore, the mesotherapy technique, in combination with the use of specialized needles, is a minimally invasive injection technique, and the risk of damage to important anatomical structures, such as nerves or vessels, is practically impossible [7].

Three-step treatment concept

The three-step concept first involves assessing the risk factors causing back pain syndrome. It is often impossible to reduce these factors, so it is necessary to modify them, learn to adopt the correct posture, including the correct use of electronic devices such as mobile phones, and prepare an ergonomic workplace. Next, it is advisable to implement medical therapy, ranging from pharmacotherapy to minimally invasive injection therapy, i.e., spinal mesotherapy, and, in appropriate cases, surgical treatment [27]. The final stage is physiotherapy, which should be applied at the right time. As a rule, after completing a course of mesotherapy, which aims to relax tense soft tissues, improve mobility within the spine, and reduce pain. The patient is then ready for kinesitherapy. Starting kinesitherapy too early may decrease the effectiveness of treatment results due to faster absorption of the administered preparation into the bloodstream or deterioration of the treated tissues [28]. It should be noted that there are studies in which mesotherapy is combined with physical therapy, e.g., laser therapy, ultrasound, electrical or magnetic stimulation [8, 28].

Discussion

This narrative review is the first publication of its kind on the use of mesotherapy in chronic back pain syndrome.

The treatment of musculoskeletal disorders, including spinal disorders, is not easy. An aging population, multimorbidity, and patients' desire for a quick recovery necessitate the use of the least invasive forms of therapy, such as spinal mesotherapy.

Based on the analyzed literature, mesotherapy was mainly used in the course of chronic pain syndrome of the cervical spine, followed by the lumbar spine, and least frequently in the course of chronic pain syndrome of the thoracic spine. The number of mesotherapy treatments for the spine ranges from 3 to 9, but the most common regimen is 5 treatments at weekly intervals (Table 1).

In the published studies by Koszela et al., injectable type I collagen was compared with 1% lignocaine, but it would be worthwhile to conduct studies with a control group using saline [12, 17]. Such studies were conducted by Brauneis et al. [22], Scaturro et al. [20], and Ferrara et al. [23].

In addition, Scaturro et al. [20] used mesotherapy in combination with exercise in the treatment of fibromyalgia, achieving pain reduction, functional recovery, and quality of life. This is a new therapeutic direction in this group of patients.

The limitation of this narrative review is that it primarily analyzes retrospective studies, with the longest observation period being 3 months. More randomized studies comparing other therapeutic techniques in the course of spinal pain syndrome with a longer observation period are needed.

According to current recommendations, mesotherapy should be applied only after a precise diagnosis, from which a scientific rationale for the use of a specific drug can be derived [29]. Our study supports this concept: although the studies included in this review often tested combinations of multiple drugs within the same syringe, it is not currently possible to determine whether a single agent would be sufficient to manage pain. Based on some available data [9, 22], it is plausible that lower doses and fewer drugs may be as effective as higher doses and more complex mixtures. However, dedicated studies are needed to better understand the pharmacokinetic and pharmacodynamic aspects of intradermal administration.

Conclusion

Based on the analyzed literature, mesotherapy is an effective and safe method of treating chronic back pain syndrome. Nevertheless, this issue requires further research on a larger group of patients, with control groups and compliance with EBM conditions, with a longer observation period. This article is also a call to action, in fact robust, methodologically sound randomized controlled trials are warranted to

confirm existing evidence and to establish standardized treatment protocols for clinical application.

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Declarations

Conflict of interest The authors declare no conflicts of interest. The authors declare that no part of this manuscript, including the text and graphics, has been copied or published elsewhere, either in whole or in part. This manuscript is an original work, and all data, analyses, and conclusions presented herein are the result of independent research conducted by the authors. No artificial intelligence (AI) tools were used for writing or generating the content of this manuscript.

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