JPMHR Journal of Precision Medicine and Health Research

Volume 3, Issue 1, 2026
e-ISSN: 3106-9495
Open Access | CC BY 4.0
Article ID: 55

Original Article

Comparative Effects of Neural Mobilization and Myofascial Release Technique on Pain, Range of Motion and Disability Among Patients With Post Lumbar Spine Fusion

Muhammad Qasim[1], Fariha Ambreen[2], Muhammad Zeeshan[3], Noorjhan[4], Muhammad Talha[5], Areeba Ghouri[6]

[1] Department of Physical Therapy & Rehabilitation Sciences, Superior University Lahore, Punjab, Pakistan
[2] Faculty of Allied Health Sciences, Superior University Lahore, Punjab, Pakistan
[3] Department of Physical Therapy & Rehabilitation Sciences, Superior University Lahore, Punjab, Pakistan
[4] Riphah International University, Pakistan
[5] Al-Beruni Institute of Physiotherapy & Rehabilitation Sciences
[6] Riphah International University, Pakistan

Corresponding Author: Muhammad Qasim
Correspondence: qasimhanif988@gmail.com

Received: 12 May 2026 | Revised: 25 May 2026 | Accepted: 17 June 2026 | Published: 30 June 2026

ARTICLE INFORMATION

Article Type: Original Article
How to Cite: Qasim M, Ambreen F, Zeeshan M, Noorjhan, Talha M, Ghouri A. Comparative Effects of Neural Mobilization and Myofascial Release Technique on Pain, Range of Motion and Disability Among Patients With Post Lumbar Spine Fusion. Journal of Precision Medicine and Health Research. 2026;3(1):1-9.
Article ID: 55
DOI: https://doi.org/10.68279/5vzvny74
Article Link: https://jpmhr.com/index.php/jpmhr/article/view/55
Declarations: See end of article.

OPEN ACCESS
This is an open access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0).

ABSTRACT

Background: Persistent pain and functional disability may continue following lumbar spine fusion and require postoperative rehabilitation. Neural mobilization and myofascial release target different potential contributors to persistent symptoms, but their comparative effects remain uncertain. **Objective:** To compare neural mobilization with myofascial release, each combined with stabilization exercises, for reducing pain and disability following lumbar spine fusion. **Methods:** This randomized clinical trial included 34 participants recruited through convenience sampling from clinical settings in Hyderabad, Sindh, Pakistan, and allocated equally to two groups. Group A received neural mobilization plus stabilization exercises, whereas Group B received myofascial release plus stabilization exercises. Both groups additionally received TENS and hot-pack application three times weekly for six weeks. Pain and disability were assessed using the Numeric Pain Rating Scale (NPRS) and Oswestry Disability Index (ODI) at baseline and Week 6. Paired- and independent-samples t-tests were used for analysis. **Results:** NPRS decreased from 6.30±1.20 to 2.80±1.00 in Group A and from 6.10±1.30 to 3.60±1.10 in Group B. ODI decreased from 42.50±6.80% to 18.60±5.40% and from 41.90±7.10% to 24.20±6.00%, respectively. At Week 6, Group A had lower NPRS (mean difference −0.80; 95% CI −1.53 to −0.07; p=0.034) and ODI scores (−5.60 percentage points; 95% CI −9.59 to −1.61; p=0.007). **Conclusion:** Both rehabilitation approaches were associated with short-term reductions in pain and disability, with greater improvement observed in the neural mobilization group. **Keywords:** Lumbar spine fusion; Neural mobilization; Myofascial release; Stabilization exercises; Low back pain; Disability.

Introduction

Lumbar spine fusion is a commonly used surgical procedure for selected patients with degenerative spinal conditions, instability, deformity, or other structural disorders when conservative management is insufficient and stabilization of the affected spinal segment is required (1). Although lumbar fusion can provide structural stability and symptom relief, recovery after surgery is variable, and some patients continue to experience persistent low back pain, functional limitations, stiffness, or recurrent symptoms that interfere with daily activities and quality of life (2,3). Persistent symptoms following lumbar surgery may arise from several interacting factors, including altered spinal biomechanics, postoperative soft-tissue changes, reduced trunk-muscle function, and residual or recurrent neural involvement (2,3). Consequently, postoperative rehabilitation is an important component of recovery following lumbar fusion.

Physical therapy after lumbar fusion is generally directed toward reducing pain, restoring mobility, improving functional capacity, and progressively re-establishing spinal control. Rehabilitation programs commonly incorporate exercise-based approaches intended to improve trunk stability and functional performance (4). Stabilization exercises are particularly relevant because they target the neuromuscular control of the trunk and the contribution of muscles such as the transversus abdominis and multifidus to spinal stability. Previous work has suggested that structured stabilization-based rehabilitation may contribute to improvements in pain, disability, and physical function after lumbar fusion (5). Nevertheless, exercise alone may not address all sources of persistent postoperative symptoms, particularly when neural mechanosensitivity or soft-tissue restrictions coexist with impaired spinal control.

Neural mobilization is a manual therapy approach intended to facilitate movement of neural tissues relative to surrounding structures and to reduce adverse neurodynamic responses. Evidence from patients with lumbar radiculopathy and other neuromusculoskeletal pain conditions suggests that neural mobilization can reduce pain and disability when used as part of rehabilitation (6,7). Systematic-review evidence has also shown potential beneficial effects of neural mobilization on pain and physical function across musculoskeletal conditions, although treatment effects vary according to the clinical population and intervention protocol (8). These findings provide a rationale for considering neural mobilization in individuals who continue to demonstrate neural mechanosensitivity following lumbar spine surgery; however, evidence from broader radiculopathy and musculoskeletal populations cannot automatically be generalized to patients following lumbar fusion.

Myofascial release represents a different therapeutic approach and focuses primarily on restrictions within muscles, fascia, and other soft tissues. Postoperative tissue changes and reduced mobility may contribute to persistent discomfort and functional restriction after spinal surgery. Myofascial techniques are intended to improve soft-tissue mobility and reduce musculoskeletal symptoms, and previous clinical research has reported improvements in pain and related outcomes when myofascial release is incorporated into rehabilitation for nonspecific low back pain (9). However, much of this evidence comes from nonsurgical populations, and its applicability to patients following lumbar spine fusion remains uncertain. Neural mobilization and myofascial release therefore target different potential contributors to persistent symptoms: the former principally addresses neurodynamic dysfunction, whereas the latter focuses on soft-tissue and fascial restriction.

Despite the clinical use of both techniques, direct evidence comparing neural mobilization with myofascial release when each is added to the same stabilization-based rehabilitation program after lumbar spine fusion remains limited. Determining whether these adjunct approaches produce different effects is clinically relevant because postoperative rehabilitation should be based on interventions that provide measurable improvements in pain and functional disability rather than on theoretical mechanisms alone. Theore, the objective of the present randomized clinical trial was to compare the effects of neural mobilization plus stabilization exercises with myofascial release plus stabilization exercises on pain intensity and functional disability among patients following lumbar spine fusion. It was hypothesized that both interventions would improve pain and disability over the six-week intervention period, while the comparative effectiveness of the two approaches would be determined through between-group analysis.

Materials and Methods

This randomized clinical trial was conducted in clinical settings in Hyderabad, Sindh, Pakistan, from April to September 2026 to compare the effects of neural mobilization and myofascial release when each was combined with a stabilization-exercise program in patients following lumbar spine fusion. Participants were recruited using convenience sampling and were subsequently allocated to two intervention groups. Eligible participants included male and female patients aged 25–40 years who had undergone lumbar spine fusion more than three months previously, continued to experience low back pain, had a Numeric Pain Rating Scale (NPRS) score greater than 5, demonstrated an Oswestry Disability Index (ODI) score of at least 20%, and had positive neural tension testing. All participants provided informed consent before enrollment. The required sample size was calculated using G*Power software. A total sample of 34 participants was selected after incorporating a 10% allowance for participant attrition. Following recruitment, the participants were randomly allocated to two equal treatment groups. Group A received neural mobilization combined with stabilization exercises, whereas Group B received myofascial release combined with stabilization exercises. Both groups additionally received the same electrotherapy regimen consisting of transcutaneous electrical nerve stimulation (TENS) and hot-pack application. TENS was administered for 10 minutes as part of the treatment session. Maintaining stabilization exercises and electrotherapy in both groups allowed the principal therapeutic difference between the groups to be the adjunct manual technique, namely neural mobilization in Group A and myofascial release in Group B. The intervention program was delivered three times per week on alternate days for six consecutive weeks. Each treatment session lasted approximately 30–40 minutes and was delivered according to the stated frequency, intensity, time, and type principles of exercise prescription. The stabilization-exercise component was provided to both groups throughout the intervention period, while the respective neural mobilization or myofascial release technique was incorporated according to group allocation. The treatment frequency, overall intervention duration, stabilization-exercise component, and electrotherapy exposure were maintained consistently between the two groups to facilitate comparison of the two adjunct therapeutic approaches.

Pain intensity and functional disability were assessed before initiation of treatment and again at the completion of the six-week intervention. Pain intensity was measured using the Numeric Pain Rating Scale, whereas disability was evaluated using the Oswestry Disability Index. NPRS and ODI scores constituted the principal clinical outcome measures used for pre- and post-intervention comparisons. Baseline demographic and anthropometric information, including age, sex, body weight, height, body mass index, and occupation, was also recorded for characterization of the study population and comparison of the treatment groups at baseline. Data were analyzed using IBM SPSS Statistics version 27.0. Continuous variables were summarized as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The distribution of continuous outcome data was assessed for normality before inferential analysis and was considered compatible with parametric testing. Within-group changes in NPRS and ODI scores from baseline to the end of the six-week intervention were evaluated using paired-samples t-tests. Independent-samples t-tests were used for between-group comparisons. Statistical significance was determined at a p-value of <0.05.

Ethical approval for the study was obtained from the Institutional Review Board of Superior University. Participation was voluntary, and informed consent was obtained from all participants before their inclusion in the study. Participant information and study procedures were managed in accordance with the approved research protocol and ethical requirements governing human-participant research.

Results

Between-group mean differences, 95% confidence intervals, p-values, and Hedges g were calculated from the reported group means, standard deviations, and n=17 per group using unadjusted independent-samples comparisons. Difference in mean change was calculated descriptively as the Group A change minus the Group B change. Negative Week 6 values indicate lower NPRS or ODI scores in Group A. CI, confidence interval; NPRS, Numeric Pain Rating Scale; ODI, Oswestry Disability Index.

Thirty-four participants were included in the analysis, with 17 participants in each treatment group. Baseline demographic and anthropometric characteristics were broadly comparable between groups. Mean age was 34.80 ± 4.00 years in Group A and 35.14 ± 3.30 years in Group B, while mean BMI was 22.41 ± 2.10 and 23.72 ± 2.40 kg/m², respectively. None of the continuous baseline characteristics demonstrated evidence of a between-group difference, with p-values ranging from 0.100 to 0.789. The distribution of sex, BMI category, and occupation was also similar descriptively between the two groups.

Pain intensity decreased over the six-week intervention period in both groups. Mean NPRS declined from 6.30 ± 1.20 to 2.80 ± 1.00 in Group A, corresponding to a mean reduction of 3.50 points, and from 6.10 ± 1.30 to 3.60 ± 1.10 in Group B, corresponding to a mean reduction of 2.50 points. The reported within-group comparisons were statistically significant in both groups (p<0.001). The descriptive difference in mean change between groups was −1.00 point. At Week 6, the mean NPRS score was 0.80 points lower in Group A than in Group B (mean difference −0.80; 95% CI −1.53 to −0.07; p=0.034), with an unadjusted standardized difference of Hedges g=−0.74.

Table 1. Baseline demographic and anthropometric characteristics of participants

Variable	Group A (n=17), Mean ± SD	Group B (n=17), Mean ± SD	Mean Difference (A−B)	95% CI	p-value
Age (years)	34.80 ± 4.00	35.14 ± 3.30	−0.34	−2.91 to 2.23	0.789
Weight (kg)	64.11 ± 6.20	66.42 ± 5.80	−2.31	−6.51 to 1.89	0.270
Height (cm)	171.80 ± 5.50	169.60 ± 6.10	2.20	−1.86 to 6.26	0.278
BMI (kg/m²)	22.41 ± 2.10	23.72 ± 2.40	−1.31	−2.89 to 0.27	0.100

Values are mean ± standard deviation. Between-group comparisons were calculated using independent-samples t-tests. CI, confidence interval; BMI, body mass index.

Table 2. Baseline categorical characteristics of participants

Variable	Category	Group A (n=17), n (%)	Group B (n=17), n (%)
Sex	Male	10 (58.8)	11 (64.7)
	Female	7 (41.2)	6 (35.3)
BMI category	Normal	13 (76.5)	12 (70.6)
	Overweight	4 (23.5)	5 (29.4)
Occupation	Teacher	4 (23.5)	4 (23.5)
	Banker	3 (17.6)	2 (11.8)
	Office worker	4 (23.5)	3 (17.6)
	Bike rider	3 (17.6)	4 (23.5)
	Student	3 (17.6)	4 (23.5)

BMI, body mass index.

Table 3. Within-group changes in pain and disability from baseline to Week 6

Outcome	Group	Baseline Mean ± SD	Week 6 Mean ± SD	Mean Change	Within-group p-value
NPRS (points)	Group A	6.30 ± 1.20	2.80 ± 1.00	−3.50	<0.001
NPRS (points)	Group B	6.10 ± 1.30	3.60 ± 1.10	−2.50	<0.001
ODI (%)	Group A	42.50 ± 6.80	18.60 ± 5.40	−23.90	<0.001
ODI (%)	Group B	41.90 ± 7.10	24.20 ± 6.00	−17.70	<0.001

Within-group p-values are those reported for paired pre–post comparisons in the manuscript. Mean change was calculated as Week 6 minus baseline. NPRS, Numeric Pain Rating Scale; ODI, Oswestry Disability Index; SD, standard deviation.

Table 4. Between-group comparison of pain and disability outcomes

Outcome	Baseline Difference (A−B)	Baseline 95% CI	Baseline p-value	Difference in Mean Change (A−B)	Week 6 Difference (A−B)	Week 6 95% CI	Week 6 p-value	Hedges g
NPRS (points)	0.20	−0.67 to 1.07	0.644	−1.00	−0.80	−1.53 to −0.07	0.034	−0.74
ODI (percentage points)	0.60	−4.26 to 5.46	0.803	−6.20	−5.60	−9.59 to −1.61	0.007	−0.96

Functional disability also decreased in both treatment groups. Mean ODI decreased from 42.50 ± 6.80% to 18.60 ± 5.40% in Group A and from 41.90 ± 7.10% to 24.20 ± 6.00% in Group B, representing mean reductions of 23.90 and 17.70 percentage points, respectively. The reported within-group comparisons were statistically significant in both groups ($p<0.001$). The descriptive between-group difference in mean change was −6.20 percentage points. At Week 6, Group A had a mean ODI score 5.60 percentage points lower than Group B (95% CI −9.59 to −1.61; $p=0.007$), corresponding to an unadjusted Hedges g of −0.96.

Overall, both groups showed substantial reductions in pain intensity and functional disability during the six-week intervention period. The unadjusted post-treatment comparisons showed lower NPRS and ODI scores in the neural-mobilization group, with larger standardized between-group differences observed for ODI than for NPRS.

Discussion

The present study compared neural mobilization and myofascial release as adjuncts to a common rehabilitation program consisting of stabilization exercises and electrotherapy in patients following lumbar spine fusion. Both groups demonstrated reductions in pain intensity and functional disability over the six-week intervention period. However, the neural mobilization group had lower NPRS and ODI scores at the end of treatment than the myofascial release group. These findings suggest that both rehabilitation approaches were associated with favorable short-term outcomes, while the addition of neural mobilization was associated with a greater improvement in the outcomes evaluated in this study.

Improvement in both treatment groups may partly reflect the rehabilitation components shared by all participants. Stabilization exercises are intended to improve neuromuscular control of the trunk and enhance the contribution of muscles such as the transversus abdominis and multifidus to spinal stability. Rehabilitation following lumbar fusion commonly incorporates progressive exercise to restore function and address postoperative pain and disability, although the available evidence regarding the optimal rehabilitation strategy remains heterogeneous (4). Previous work examining stabilization exercises following lumbar fusion has also suggested potential improvements in pain, disability, and physical function (5). Because stabilization exercises, TENS, and hot-pack application were provided to both groups in the present study, the observed within-group improvements cannot be attributed exclusively to either neural mobilization or myofascial release.

The comparatively lower post-treatment pain score observed in the neural mobilization group is consistent with broader evidence supporting neurodynamic interventions for selected patients with lumbar and neuromusculoskeletal pain. A systematic review and meta-analysis by Lin et al. reported that neural mobilization was associated with reductions in pain and disability among patients with lumbar radiculopathy (10). Similarly, Basson et al. found evidence of beneficial effects of neural mobilization across several neuromusculoskeletal conditions, although the strength and consistency of evidence differed according to the clinical population and outcome examined (11). Baptista et al. also reported favorable effects of neural mobilization on pain intensity and functional outcomes in adults with musculoskeletal pain (12). These studies support the potential therapeutic relevance of neural mobilization but involve broader populations than the postoperative lumbar-fusion population examined in the present trial. Therefore, comparisons should be interpreted cautiously rather than assuming that findings from nonsurgical populations are directly transferable to patients following fusion surgery.

Several mechanisms could plausibly contribute to the observed response to neural mobilization. Neurodynamic techniques are designed to facilitate movement of neural structures relative to surrounding tissues and may influence neural mechanosensitivity and the mechanical

interface between peripheral nerves and adjacent structures. Systematic evidence has examined the effects of neural mobilization on nerve-related function and structure in patients with peripheral neuropathic pain, providing a biological rationale for neurodynamic approaches in appropriately selected patients (13). The present participants were required to demonstrate positive neural tension testing, which may indicate that neural mechanosensitivity was clinically relevant within this study population. Nevertheless, neural excursion, intraneural edema, nerve structure, and other neurophysiological mechanisms were not directly measured in this trial. The greater improvement observed with neural mobilization should therefore not be interpreted as direct evidence that any specific neural mechanism was responsible for the treatment response.

Myofascial release was also associated with reductions in pain and disability during the intervention period. This observation is broadly compatible with previous research evaluating myofascial interventions for musculoskeletal pain. Zhao et al. reported favorable outcomes following a treatment program incorporating myofascial release in patients with chronic nonspecific low back pain (14), while Boff et al. evaluated myofascial release as an adjunct intervention in individuals with nonspecific low back pain and reported improvements in health-related outcomes (15). Myofascial release is proposed to influence soft-tissue mobility, tissue extensibility, and musculoskeletal symptoms; however, these mechanisms were not directly evaluated in the present study. Moreover, evidence obtained from nonspecific low back pain populations should not be considered equivalent to evidence in patients following lumbar spine fusion because postoperative structural and clinical characteristics may differ substantially (16,17).

From a clinical perspective, the findings indicate that neural mobilization may be a useful adjunct to a multimodal rehabilitation program for selected post-lumbar-fusion patients who continue to experience pain, disability, and positive neural tension findings. The magnitude of the between-group differences also provides information beyond statistical significance. At Week 6, the neural mobilization group had an NPRS score approximately 0.8 points lower and an ODI score approximately 5.6 percentage points lower than the myofascial release group. The standardized between-group differences were moderate-to-large for NPRS and large for ODI based on the available aggregate data. Nevertheless, statistical effect size should not automatically be equated with clinically important benefit. The clinical relevance of these differences requires cautious interpretation because individual responder rates and established patient-level thresholds were not evaluated in the present analysis (18,19).

The study has several strengths, including direct comparison of two commonly used adjunct rehabilitation techniques, use of the same stabilization and electrotherapy components in both groups, equal group sizes, and assessment of both pain and functional disability. However, important limitations should be considered when interpreting the findings. The total sample consisted of only 34 participants, limiting precision and generalizability. Participants were recruited through convenience sampling from clinical settings in Hyderabad and were restricted to 25–40 years of age, which limits extrapolation to the broader population undergoing lumbar fusion (20, 21).The study evaluated outcomes only immediately after the six-week intervention and therefore cannot establish whether the observed differences persisted over the medium or long term. In addition, the available study report does not establish the influence of participant or assessor blinding, and the interventions were delivered as components of multimodal rehabilitation rather than in isolation. Clinical characteristics such as fusion level, surgical indication, postoperative duration beyond the minimum eligibility threshold, and other aspects of surgical heterogeneity were not incorporated into the reported comparative analysis. Finally, the analysis did not provide individual responder data or longer-term functional outcomes. These limitations indicate that the observed between-group differences should be interpreted as short-term findings within the studied population rather than definitive evidence of superiority across all patients undergoing lumbar spine fusion (22).

Conclusion

Among patients following lumbar spine fusion who participated in a six-week rehabilitation program, both neural mobilization and myofascial release combined with stabilization exercises and electrotherapy were associated with reductions in pain intensity and functional disability. The neural mobilization group demonstrated lower NPRS and ODI scores at the end of treatment than the myofascial release group, indicating a greater short-term improvement in the outcomes assessed. These findings support the potential use of neural mobilization as an adjunct within postoperative rehabilitation for appropriately selected patients, although the small sample size and absence of longer-term follow-up limit conclusions regarding sustained effects and broader clinical applicability.

DECLARATIONS

Author Contributions:	Concept: MQ, FA; Design: MQ, FA, MZ; Data Collection: MZ, N, AG; Analysis: MQ, MT; Drafting: MQ, FA, AG.
Ethical Approval:	Ethical approval was obtained from Superior University Lahore Pakistan.
Informed Consent:	Written informed consent was obtained from parents or guardians before participant enrolment.
Conflict of Interest:	The authors declare no conflict of interest.
Funding:	No external funding was received for this study.
Data Availability:	Data are available from the corresponding author on reasonable request.
Acknowledgments:	None.
AI Declaration:	Generative AI tools were used solely for language and grammatical refinement. The authors verified the final manuscript and remain fully responsible for its accuracy, integrity, and scientific content.

REFERENCES

1. Izzo R, Guarnieri G, Guglielmi G, Muto M. Biomechanics of the spine. Part I: spinal stability. Eur J Radiol. 2013;82(1):118-126.
2. Gan TJ. Poorly controlled postoperative pain: prevalence, consequences, and prevention. J Pain Res. 2017;10:2287-2298.
3. Cho KJ, Suk SI, Park SR, Kim JH, Kim SS, Choi WK, et al. Complications in posterior fusion and instrumentation for degenerative lumbar scoliosis. Spine. 2007;32(20):2232-2237.
4. Chaitow L. Fascial dysfunction: manual therapy approaches. Jessica Kingsley Publishers; 2018.
5. Reisener MJ, Pumberger M, Shue J, Girardi FP, Hughes AP. Trends in lumbar spinal fusion—a literature review. J Spine Surg. 2020;6(4):752.
6. Helgeson MM, Bevevino MA, Hilibrand MA. Update on the evidence for adjacent segment degeneration and disease. Spine J. 2013;13(3):342-351.
7. DeWald CJ, Stanley T. Instrumentation-related complications of multilevel fusions for adult spinal deformity patients over age 65: surgical considerations and treatment options in patients with poor bone quality. Spine. 2006;31(19 Suppl):S144-S151.

8. Sebaaly A, Lahoud MJ, Rizkallah M, Kreichati G, Kharrat K. Etiology, evaluation, and treatment of failed back surgery syndrome. Asian Spine J. 2018;12(3):574.
9. Umali J, Ghahreman A, Diwan AD. Spinal fusion evaluation in various settings: a summary of human-only studies. In: Handbook of Spine Technology. Cham: Springer International Publishing; 2021. p. 1131-1147.
10. Aly T. Back muscles injury during posterior lumbar spine surgeries: minimally invasive versus open approaches—a review of the literature. Adv Spine J. 2022;41(2):61-72.
11. Sawyer K. The impact of spinal stabilization exercises on pain, disability, and physical function after lumbar spinal fusion. Texas Woman's University; 2019.
12. Khan ZK, Ahmed SI, Baig AA, Farooqui WA. Effect of post-isometric relaxation versus myofascial release therapy on pain, functional disability, ROM and QOL in the management of non-specific neck pain: a randomized controlled trial. BMC Musculoskelet Disord. 2022;23(1):567.
13. Lin LH, Lin TY, Chang KV, Wu WT, Özçakar L. Neural mobilization for reducing pain and disability in patients with lumbar radiculopathy: a systematic review and meta-analysis. Life. 2023;13(12):2255.
14. Shinde AP, Joshi AV, Shinde SB, Thomas MS, Shinde S. Evidence-based conservative treatment strategies for lumbar radiculopathy: a systematic review. Cureus. 2026;18(6).
15. Madera M, Brady J, Deily S, McGinty T, Moroz L, Singh D, et al. The role of physical therapy and rehabilitation after lumbar fusion surgery for degenerative disease: a systematic review. J Neurosurg Spine. 2017;26(6):694-704.
16. Zhao P, Lu Z, Zou H, Wang J, He Y, Li M, et al. Effectiveness of myofascial release combined with capacitive-resistive therapy in patients with chronic nonspecific low back pain: a randomized controlled trial. Pain Res Manag. 2025;2025(1):9309502.
17. Bittencourt JV, Corrêa LA, Pagnez MA, do Rio JP, Telles GF, Mathieson S, et al. Neural mobilisation effects in nerve function and nerve structure of patients with peripheral neuropathic pain: a systematic review with meta-analysis. PLoS One. 2024;19(11):e0313025.
18. Baptista FM, Nery E, Cruz EB, Afreixo V, Silva AG. Effectiveness of neural mobilisation on pain intensity, functional status, and physical performance in adults with musculoskeletal pain: a systematic review with meta-analysis. Clin Rehabil. 2024;38(2):145-183.
19. Mehmood N, Suriyakala Perumal Chandran WA, Bhutto MA, Patafi MA, Alam MS, Asif M, et al. Impact of dry needling with myofascial release: a synergistic approach for pain, mobility and dynamic balance in cervical myofascial pain syndrome: a randomized controlled trial. TPM Test Psychom Methodol Appl Psychol. 2025;32(S7):2148-2155.
20. Papacharalambous C, Savva C, Karagiannis C, Paraskevopoulos E, Pamboris GM. Comparative effects of neurodynamic slider and tensioner mobilization techniques on sympathetic nervous system function: a randomized controlled trial. J Clin Med. 2024;13(17):5098.
21. Basson A, Olivier B, Ellis R, Coppieters M, Stewart A, Mudzi W. The effectiveness of neural mobilization for neuromusculoskeletal conditions: a systematic review and meta-analysis. J Orthop Sports Phys Ther. 2017;47(9):593-615.
22. Boff TA, Pasinato F, Ben ÂJ, Bosmans JE, van Tulder M, Carregaro RL. Effectiveness of spinal manipulation and myofascial release compared with spinal manipulation alone on health-related outcomes in individuals with non-specific low back pain: randomized controlled trial. Physiotherapy. 2020;107:71-80.