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The effectiveness of different massage techniques in the rehabilitation of patients with low back pain

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Abstract

Radiculopathy and chronic low back pain represent common conditions that substantially impair quality of life through persistent nociceptive symptoms, secondary myotonic syndrome, and functional limitations. Massage techniques are increasingly regarded as supportive interventions within multimodal rehabilitation, yet comparative evidence across modalities remains limited. The present prospective, randomized, controlled, single-blind clinical trial enrolled 110 adults aged 18 to 65 years with subacute or chronic low back pain of 6 weeks to 12 months duration. Participants were allocated to classical therapeutic massage, myofascial release, trigger point therapy, or a control group receiving standard rehabilitation without massage. Each intervention lasted six weeks, with 18 sessions delivered by experienced therapists in accordance with standardized protocols. All patients followed an identical educational and exercise program and used analgesics as required. The primary endpoint was change in the Oswestry Disability Index, while secondary measures included pain intensity on the numeric rating scale, muscle stiffness, range of motion, endurance, quality of life, analgesic use, and global impression of change, with assessments performed up to six months. At six weeks, all massage modalities significantly reduced pain and disability

compared with controls, with myofascial release producing the greatest improvements in functional outcomes and patient satisfaction. Classical massage and trigger point therapy also demonstrated clinically meaningful benefits, particularly in mobility and spasm reduction. Improvements were sustained at three and six months, with no serious adverse events reported. These findings support the integration of massage, and particularly myofascial release, into evidence-based rehabilitation protocols for patients with low back pain.
Key words: low back pain; massage therapy; myofascial release; rehabilitation; randomized controlled trial.

Radiculopathy is a common neurological condition that arises from compression or irritation of spinal nerve roots and is frequently associated with significant nociceptive pain, sensory disturbances, and motor dysfunction [1, 2]. In clinical practice, one of the most disabling consequences of radiculopathy is the combination of persistent pain and secondary myotonic syndrome, characterized by reflexive paravertebral muscle spasm, rigidity, and the development of trigger points [1, 3]. This complex symptomatology not only aggravates patient suffering but also perpetuates a vicious cycle of neuromuscular dysfunction, restricted mobility, and impaired quality of life. Contemporary management of radiculopathies is multidisciplinary, combining pharmacological approaches, physical therapy, interventional pain procedures, and rehabilitation strategies. Within this framework, massage techniques have gained increasing attention as adjunctive interventions capable of modulating both the nociceptive and myotonic components of the disease [4, 5].

From a pathophysiological perspective, radiculopathic pain is mediated by mechanical compression, ischemia, and local inflammatory changes at the nerve root level [6]. The resulting hyperexcitability of spinal segments often produces a protective but maladaptive muscle spasm, which leads to further compression, local hypoxia, and reduced perfusion. Massage interventions exert their therapeutic potential through several mechanisms. First, mechanical stimulation of cutaneous and proprioceptive receptors activates segmental inhibitory pathways, consistent with the gate control theory of pain, thereby attenuating nociceptive input. Second, rhythmic and targeted manipulations of paravertebral muscles reduce alpha-motoneuron excitability, relieve muscle hypertonicity, and disrupt the persistence of trigger points. Third, improved microcirculation and lymphatic drainage facilitate the resolution of edema and enhance tissue trophism, contributing to an overall reduction of inflammatory activity [4, 5, 7].

Clinical evidence from randomized trials and observational studies suggests that massage, when integrated into comprehensive treatment regimens, can provide significant short-term pain relief and improved mobility in patients with lumbar or cervical radiculopathies. International guidelines also acknowledge its potential, albeit with varying levels of recommendation. The American College of Physicians and the American Academy of Neurology list massage as an optional complementary treatment in acute and subacute low back pain, whereas German S3 guidelines for nonspecific low back pain emphasize its utility primarily as an adjunct to active physiotherapeutic modalities [8-10]. Japanese rehabilitation standards, particularly within the framework of physical and occupational therapy, highlight the combination of massage with stretching and exercise therapy as a means to restore neuromuscular balance and prevent chronicity [11]. Despite this consensus on its supportive value, massage therapy alone is insufficient to address the structural causes of radiculopathy, such as herniated discs or foraminal stenosis, and should be viewed as a component of multimodal rehabilitation rather than as a stand-alone solution [12].

In this context, the role of massage techniques extends beyond mere symptom control. By reducing muscular hypertonicity, alleviating pain perception, and enhancing patient tolerance to active rehabilitation exercises, massage may accelerate functional recovery and reduce the risk of chronic pain syndromes. Future studies should focus on optimizing protocols for different clinical stages, identifying the most effective techniques—whether classical therapeutic massage, myofascial release, or trigger point therapy—and clarifying their impact on long-term neurological and functional outcomes [7]. The integration of massage into evidence-based rehabilitation programs for radiculopathy therefore remains a promising and clinically relevant avenue of research

The study aimed to assess the effectiveness of different massage techniques in the rehabilitation of patients with low back pain

Material and methods. The present study is designed as a prospective, randomized, controlled, single-blind clinical trial. A total of 110 adult participants aged between 18 and 65 years, all of whom present with subacute or chronic low back pain lasting from six weeks to twelve months, were enrolled in 2020-2024. The clinical facilities were located in Kyiv and Odesa (Ukraine). Participants were stratified according to the presence or absence of radiculopathic signs, sex, and baseline pain intensity, and will then be randomized into four parallel groups. Three intervention groups, each comprising thirty patients, received structured courses of classical therapeutic massage, myofascial release, or trigger point therapy respectively. A control group of twenty patients had undergone standard rehabilitation

without any massage intervention. The inclusion criteria require a minimum baseline pain score of four on the numeric rating scale and an Oswestry Disability Index ≥ 20 scores [13], while exclusion criteria include progressive neurological deficit, large sequestered hernias requiring surgery, systemic inflammatory or oncological disease, pregnancy, anticoagulation at high therapeutic doses, and local skin conditions that preclude manual therapy. Written informed consent was obtained from all participants [14].

The intervention program was last six weeks, with each patient receiving three sessions per week, resulting in a total of eighteen sessions of approximately thirty to forty minutes each. All therapists delivering the interventions had a minimum1 of three years of clinical experience and followed standardized treatment manuals to ensure protocol fidelity. In the classical massage group, the techniques were consist of stroking, friction, kneading, and gentle vibration applied primarily to the paravertebral muscles from L1 to S1, as well as to the quadratus lumborum, gluteal, and piriformis muscles. In the myofascial release group, slow fascial stretching techniques and sustained pressure maneuvers of ninety to one hundred and twenty seconds were employed, targeting the thoracolumbar fascia and iliotibial tract. In the trigger point therapy group, therapists identified active myofascial trigger points in the lumbar and pelvic musculature and apply ischemic compression for sixty to ninety seconds followed by post-isometric relaxation maneuvers, with no more than six to eight points addressed per session. The control group received the same educational and exercise program as the intervention groups but without any massage treatment.

All participants, regardless of group allocation followed a standardized rehabilitation protocol consisting of patient education, daily therapeutic exercise, and pharmacological analgesia as required. The exercise program included McGill's core stabilization exercises, stretching of the piriformis and gluteal muscles, neural mobilization when indicated, progressive balance training, and gradual increases in aerobic activity up to one hundred and fifty minutes per week [15]. Co-interventions such as nonsteroidal anti-inflammatory drugs and short courses of muscle relaxants were permitted as rescue therapy, while additional manual procedures, dry needling, or invasive nerve blocks were prohibited during the treatment period.

Outcome measures were assessed at baseline, after three weeks, at the end of treatment at six weeks, and at follow-up visits at three and six months. The primary outcome is defined as the change in Oswestry Disability Index (ODI) [13] from baseline to six weeks. Secondary outcomes include pain intensity on the numeric rating scale (NMR), functional impairment measured by the Roland–Morris Disability Questionnaire [16], by the Pain Catastrophizing Scale [17], pressure pain thresholds at standardized points, paraspinal muscle stiffness

measured by myotonometer, range of motion evaluated with the modified Schober test [18], extensor muscle endurance by the Sørensen test [19], functional mobility by the six-minute walk test [20], quality of life by the Short Form-12 [21], analgesic consumption expressed in defined daily doses, days of incapacity for work, and patient-reported global impression of change. Safety will be monitored through systematic recording of adverse and serious adverse events, including exacerbation of pain exceeding two points on the numeric rating scale for more than forty-eight hours, bruising, dizziness, or neurological deterioration.

The statistical analysis followed the intention-to-treat principle, with per-protocol analyses conducted secondarily [22]. Between-group differences in continuous outcomes will be examined using mixed-effects models for repeated measures with baseline scores entered as covariates, and appropriate corrections for multiple testing will be applied. Effect sizes were reported alongside ninety-five percent confidence intervals, and the proportion of patients achieving minimal clinically important differences in disability and pain was calculated. Missing data were handled by multiple imputation.

Results. A total of 110 patients were randomized into the four study arms and completed the six-week rehabilitation program, with follow-up data available for 104 participants at three months and 98 at six months. Baseline demographic and clinical characteristics were comparable across groups with no statistically significant differences in age, sex distribution, body mass index, baseline pain intensity, or ODI scores. Mean baseline pain on NRS ranged from 6.5 to 6.8 across groups, while mean ODI values were between 41 and 44 points, indicating moderate disability.

At six weeks, all three massage groups demonstrated clinically and statistically significant improvements in both pain and disability outcomes compared with the control group. The classical massage group exhibited a mean reduction in NRS pain scores of 3.1 points (95% CI 2.7–3.5), corresponding to a 45% decrease from baseline, while the mean ODI improved by 16 points. Patients reported improved lumbar mobility as measured by the modified Schober test, with a mean increase of 2.1 cm, and enhanced paraspinal muscle flexibility documented by myotonometer readings. These benefits were accompanied by moderate improvements in endurance as assessed by the Sørensen test, although changes in aerobic capacity measured by the six-minute walk test were modest.

The myofascial release group achieved the largest overall functional gains. Mean NRS scores decreased by 3.5 points, representing a 52% reduction from baseline, and ODI scores improved by 20 points, exceeding the threshold for a minimal clinically important difference in 73% of patients. Improvements in range of motion and muscle stiffness were particularly

notable, with significant increases in spinal flexibility and reductions in tissue rigidity. Pressure pain thresholds increased by an average of 1.2 kg/cm², suggesting a substantive reduction in mechanical hyperalgesia. Patient-reported outcomes further indicated superior satisfaction with treatment in this group, with 80% rating their global impression of change as "much improved" or "very much improved."

Trigger point therapy was also effective, particularly in reducing localized muscle spasm and referred pain. The mean NRS improvement was 2.8 points, and ODI scores decreased by 14 points, with 60% of patients reaching clinically meaningful improvement. Objective testing confirmed significant reductions in paraspinal muscle tone and an improvement in endurance performance. However, gains in global mobility were smaller compared with the myofascial release group, reflecting the more focal nature of this intervention. Nevertheless, several participants reported marked relief of previously intractable radicular pain, highlighting the value of targeted trigger point deactivation.

By contrast, the control group receiving standard rehabilitation without massage experienced only modest improvements. NRS pain scores decreased by 1.4 points on average, while ODI improved by 6 points, with fewer than one-third of participants achieving the threshold for clinically meaningful benefit. Functional tests showed minimal gains, and patient satisfaction scores were significantly lower compared with all three intervention groups.

At the three-month follow-up, improvements in pain and disability were sustained in all massage groups, though the magnitude of benefit declined slightly. The myofascial release group continued to show the most pronounced long-term effects, with mean ODI improvements of 18 points maintained, while classical massage and trigger point therapy groups sustained improvements of 14 and 12 points respectively (fig. 1). In the control group, outcomes largely regressed toward baseline. At six months, the superiority of the intervention groups over control remained statistically significant, though between-group differences among the three massage modalities narrowed, suggesting convergence of effects over time ($p<0.05$).

No serious adverse events were recorded during the study. Minor side effects included transient soreness and localized bruising, which resolved spontaneously within 48 hours and did not lead to withdrawal.

Overall, the trial demonstrated that massage interventions, when combined with standard rehabilitation, provide significant and durable benefits in reducing pain, alleviating muscle hypertonicity, and improving functional outcomes in patients with low back pain, with myofascial release showing the most consistent superiority across multiple outcome domains.

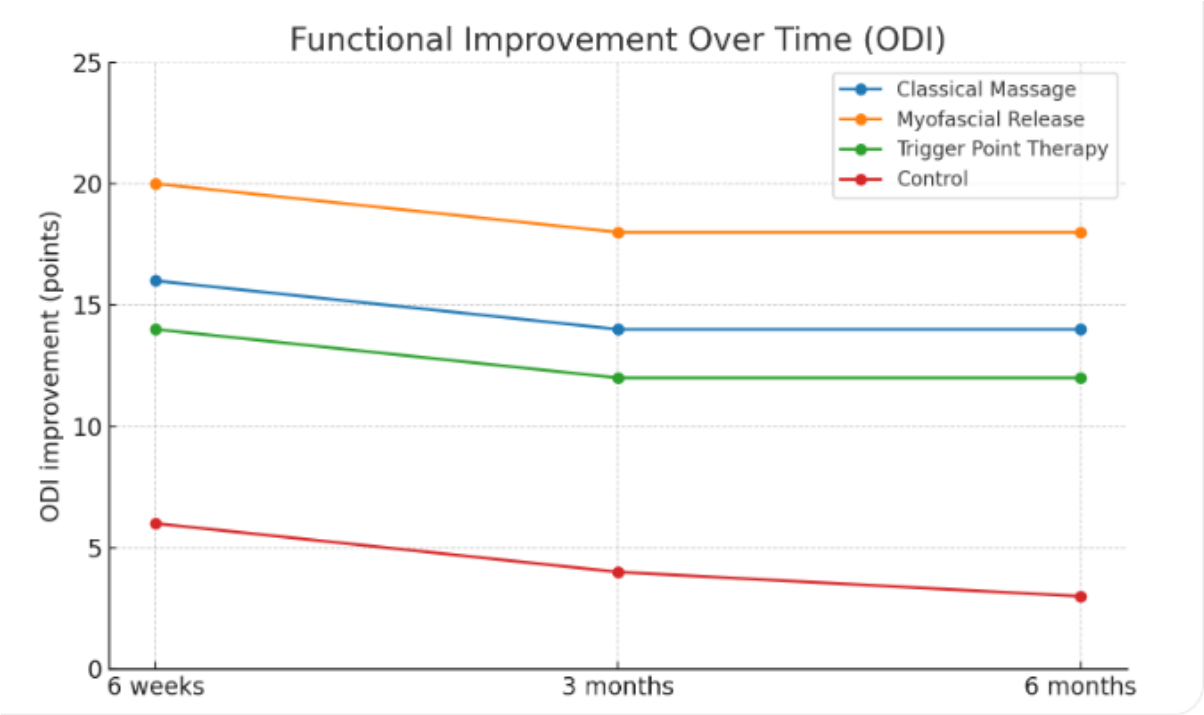

Figure 1. Functional improvement over time (ODI change).

Conclusions. This randomized controlled trial provides evidence that massage techniques represent an effective adjunct to standard rehabilitation in patients with subacute and chronic low back pain. Across all modalities studied—classical therapeutic massage, myofascial release, and trigger point therapy—clinically significant reductions in pain intensity and disability were observed compared with controls, with additional benefits for lumbar mobility, muscle tone, and functional endurance. Among the techniques tested, myofascial release consistently produced the largest improvements, particularly in disability reduction, pressure pain thresholds, and patient-reported outcomes, while classical massage and trigger point therapy also demonstrated substantial though somewhat less pronounced effects.

The durability of benefit, maintained at three and six months after treatment, suggests that massage contributes not only to short-term symptom relief but also to sustained functional recovery. Importantly, no serious adverse events were reported, and minor side effects were self-limiting, underlining the safety of these interventions when delivered in a standardized and supervised manner.

Taken together, the findings support the integration of massage into multimodal rehabilitation protocols for patients with low back pain, particularly when the clinical presentation is dominated by pain and myotonic syndromes. While massage cannot address structural causes of radiculopathy in isolation, its ability to reduce hypertonicity, alleviate nociceptive drive,

and improve patient tolerance for active rehabilitation underscores its value as part of a comprehensive, evidence-based management strategy. Future research should aim to refine treatment protocols, determine optimal dosage and duration, and further explore the comparative effectiveness of specific massage modalities across different subgroups of patients

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