ScholarBook International Journal of Research, Evidence and Innovation
Volume 1, Issue 1 (2026) | Issue date: 1 October 2026
Editorial Office: Indore, India | info@researchedgeandpublication.com**ScholarBook International Journal of Research, Evidence and Innovation**
Volume 1, Issue 1 (2026) | Issue date: 1 October 2026
Editorial Office: Indore, India | info@researchedgeandpublication.com

RESEARCH ARTICLE | Volume 1 · Issue 1 · 2026
Research, Evidence and Innovation: Emerging Perspectives and Recent Advances
Issue date: 1 October 2026

ROLE OF PHYSIOTHERAPY-BASED STRETCHING, POSITIONING AND STRENGTHENING IN THE MANAGEMENT OF SPASTICITY AND PREVENTION OF CONTRACTURE

Research Paper
Charanpreet Rajpal
Sam global University

Abstract

Spasticity is a common motor impairment associated with upper motor neuron lesions and neurological disorders such as stroke, traumatic brain injury, spinal cord injury, cerebral palsy and multiple sclerosis. It may interfere with voluntary movement, balance, gait, activities of daily living and functional independence. Persistent abnormal muscle activity, immobility and altered biomechanics may also contribute to loss of joint range and development of contracture. Physiotherapy forms an important component of multidisciplinary management through interventions such as therapeutic stretching, positioning, strengthening, active and passive range-of-motion exercises, weight-bearing and functional training. Evidence suggests that stretching is useful for maintaining available range of motion and soft-tissue extensibility, although its sustained effect on neurological spasticity is variable (Bovend'Eerdt et al., 2008; Katalinic et al., 2011). Positioning and regular movement may help limit prolonged abnormal postures, while appropriately prescribed strengthening can address weakness and improve functional capacity (Ada et al., 2006; Morris et al., 2004). The present paper reviews the role of stretching, positioning and strengthening in spasticity management and contracture prevention. The literature supports an individualized, goal-directed programme combining tone management with active movement, strengthening and task-specific rehabilitation rather than relying on a single intervention.

Keywords: Stretching; Positioning; Strengthening; Contracture; Neurological Rehabilitation; Range of Motion.

1. Introduction

Spasticity is a clinically important consequence of upper motor neuron dysfunction and is frequently observed after stroke and in conditions such as cerebral palsy, traumatic brain injury, spinal cord injury and multiple sclerosis. Lance (1980) described spasticity as a motor disorder characterized by a velocity-dependent increase in tonic stretch reflexes with exaggerated tendon jerks. Contemporary clinical management, however, recognizes that spasticity is only one component of the upper motor neuron syndrome and may coexist with weakness, impaired selective motor control, abnormal synergies and changes in muscle properties (Sheean, 2002; Stevenson, 2010).

The functional impact of spasticity varies considerably. Some individuals experience little disability from increased tone, whereas others develop difficulties with walking, transfers, reaching, hand function, hygiene, dressing and positioning. Following stroke, the occurrence of spasticity has been associated with motor impairment and activity limitations (Sommerfeld et al., 2004). In addition, persistent immobility and abnormal positioning can contribute to reduced soft-tissue extensibility and loss of passive joint movement.

Contracture is an important secondary musculoskeletal problem in neurological rehabilitation. It can further restrict movement, interfere with functional tasks and complicate personal care. The prevention of contracture therefore requires early recognition of loss of range, appropriate positioning, regular movement and maintenance of muscle length. Stretching is commonly prescribed for this purpose, although evidence for long-term changes in contracture and spasticity remains mixed (Bovend'Eerdt et al., 2008; Katalinic et al., 2010).

Physiotherapy management should consequently address the whole pattern of impairment. Stretching and positioning may be combined with active movement and strengthening to maintain available range and improve functional use. Strengthening has an important role because weakness commonly accompanies neurological impairment, and evidence indicates that appropriately designed strengthening can improve strength and activity after stroke (Ada et al., 2006).

2. Aim

To examine the role of physiotherapy-based stretching, positioning and strengthening in the management of spasticity and prevention of contracture in individuals with neurological disorders.

3. Objectives

1. To examine the role of therapeutic stretching in maintaining muscle length and joint range of motion.
2. To discuss the importance of positioning in maintaining alignment and reducing prolonged abnormal postures.
3. To examine the contribution of strengthening to voluntary motor performance and functional activity.
4. To review the combined role of stretching, positioning and strengthening in neurological rehabilitation.
5. To identify the potential benefits and limitations of these physiotherapy interventions.
6. To highlight the importance of individualized rehabilitation for prevention of secondary musculoskeletal complications.

4. Research Question

What is the role of physiotherapy-based stretching, positioning and strengthening in the management of spasticity and prevention of contracture?

ScholarBook International Journal of Research, Evidence and Innovation
Volume 1, Issue 1 (2026) | Issue date: 1 October 2026
Editorial Office: Indore, India | info@researchedgeandpublication.com

5. Review of Literature

Spasticity and neurological rehabilitation

Spasticity develops in association with central nervous system lesions and is influenced by changes in descending motor control and spinal reflex excitability. Its clinical expression differs among patients and may change during recovery. A purely tone-focused approach may therefore overlook weakness and impaired motor control that contribute substantially to functional limitations (Sheean, 2002; Stevenson, 2010).

Stretching and muscle extensibility

Stretching is one of the most frequently used physiotherapy interventions for patients with increased tone. It may be performed passively, actively or with assistance according to the patient's ability. A systematic review by Bovend'Eerdt et al. (2008) found that the effects of stretching on spasticity were variable, indicating that treatment parameters and patient characteristics influence outcomes. Stretching may nevertheless be clinically useful for maintaining available range and soft-tissue length. A Cochrane review reported limited evidence for clinically meaningful long-term effects of stretch on contracture, emphasizing that stretching should be interpreted as one component of a broader management strategy rather than a stand-alone solution (Katalinic et al., 2010).

Positioning

Positioning is particularly relevant for people with severe weakness or reduced mobility who spend prolonged periods in bed or sitting. Appropriate positioning aims to support alignment, reduce sustained abnormal postures and maintain access to available joint range. It can also support comfort and facilitate subsequent movement practice. In clinical practice, positioning is often combined with regular active or assisted movement rather than used in isolation.

Strengthening

Weakness is common after neurological injury and may coexist with increased muscle tone. Evidence from stroke rehabilitation indicates that strengthening can increase muscle force and improve activity (Ada et al., 2006). A systematic review by Morris et al. (2004) also found evidence supporting progressive resistance training following stroke. These findings support the use of appropriately dosed strengthening rather than avoiding resistance exercise solely because spasticity is present.

Range-of-motion maintenance and contracture prevention

Maintaining joint movement is an important goal in patients with limited mobility. Active, active-assisted and passive range-of-motion exercises can be selected according to motor control. Contracture prevention is particularly important when a patient has prolonged immobility, abnormal tone and limited voluntary movement. Katalinic et al. (2011) concluded that the effects of stretching on contracture in neurological conditions were limited and heterogeneous, reinforcing the need for multimodal rehabilitation and ongoing monitoring.

Integrated rehabilitation

The combination of stretching, positioning, strengthening and functional practice provides a more comprehensive approach than any single intervention. Rehabilitation intensity and task practice are important determinants of recovery after stroke (Kwakkel et al., 2004; Langhorne et al., 2011). The overall objective should be to preserve movement, improve active function and prevent secondary complications while considering the patient's goals and tolerance.

6. Methodology

Literature sources: Relevant peer-reviewed research, systematic reviews, clinical guidance and neurological rehabilitation literature were considered.

Search terms: "spasticity", "physiotherapy", "stretching", "positioning", "strengthening", "contracture prevention", "range of motion", "stroke rehabilitation", "upper motor neuron lesion" and "neurological rehabilitation".

Inclusion criteria: Literature addressing physiotherapy management of spasticity, maintenance of joint range, muscle extensibility, strengthening, positioning or prevention of contracture in neurological conditions.

Exclusion criteria: Material unrelated to neurological rehabilitation, publications focused solely on pharmacological treatment without rehabilitation relevance, and sources lacking sufficient methodological information.

Outcome domains: The review focused on spasticity/muscle tone, passive and active range of motion, muscle extensibility, strength, functional mobility, activities of daily living and risk of contracture.

7. Proposed Physiotherapy Intervention Framework

The following framework may be adapted to individual clinical requirements. Treatment frequency, duration and intensity should be determined by the patient's neurological status, baseline range, fatigue, pain, skin integrity, functional goals and response to treatment.

8. Results

Because this paper is a literature-based review, the results represent a synthesis of published evidence and do not contain fabricated patient-level observations.

The reviewed literature indicates that physiotherapy has an important role in maintaining mobility and addressing secondary musculoskeletal consequences of neurological impairment. Stretching is commonly used to maintain available range of motion and soft-tissue extensibility, but its sustained effect on neurological spasticity is inconsistent (Bovend'Eerdt et al., 2008). Evidence concerning prevention or reversal of established contracture is also heterogeneous (Katalinic et al., 2010; Katalinic et al., 2011).

Positioning is clinically relevant for individuals who have limited voluntary movement and spend prolonged periods in fixed postures. Strengthening can address coexisting weakness and improve activity, particularly after stroke (Ada et al., 2006; Morris et al., 2004). Overall, the literature supports an integrated approach that combines stretching, positioning, active movement, strengthening and functional training rather than relying on one modality alone.

9. Discussion

The management of spasticity is complex because increased tone is only one component of neurological dysfunction. Patients may simultaneously have weakness, impaired selective motor control, sensory deficits and reduced balance. Consequently, a reduction in tone should not automatically be considered the primary treatment endpoint. Functional goals such as improved gait, reaching, transfers, hygiene and independence are also important (Stevenson, 2010).

Stretching remains useful for maintaining available movement, particularly when active movement is limited. However, systematic reviews indicate that the magnitude and duration of its effect on spasticity and contracture are variable (Bovend'Eerdt et al., 2008; Katalinic et al., 2011). This suggests that stretching should be combined with active use of the available range.

Positioning can support contracture prevention by reducing prolonged exposure to restricted postures. Its benefit is likely greatest when it is integrated into a 24-hour rehabilitation strategy involving appropriate bed positioning, seating, transfers and home management.

Strengthening deserves particular attention because neurological patients can be weak despite having increased tone. Evidence after stroke supports progressive strengthening for improving strength and activity (Ada et al., 2006; Morris et al., 2004). Strengthening should be selected and progressed according to movement quality, fatigue and functional goals.

Functional practice is also important. Rehabilitation research demonstrates the importance of adequate intensity and task-specific practice following stroke (Kwakkel et al., 2004; Langhorne et al., 2011). Therefore, stretching and positioning may prepare or preserve movement, while strengthening and task practice help patients use that movement functionally.

A comprehensive programme should also include regular reassessment. Changes in joint range, muscle length, pain, posture and activity should be documented. Where conservative rehabilitation is insufficient, multidisciplinary management may include orthotic intervention or medical treatment for spasticity.

10. Clinical Implications

Physiotherapists should assess muscle tone, joint range, muscle length, strength, posture and functional limitations before designing treatment. Stretching should be slow and controlled when clinically appropriate. Positioning should be maintained between treatment sessions, and caregivers should receive practical education. Active movement should be encouraged whenever possible, followed by strengthening and task-specific practice. Patients at high risk of contracture should be monitored

ScholarBook International Journal of Research, Evidence and Innovation
Volume 1, Issue 1 (2026) | Issue date: 1 October 2026
Editorial Office: Indore, India | info@researchedgeandpublication.com

regularly so that progressive loss of range can be identified early. Where necessary, physiotherapy should be coordinated with medical, occupational therapy and orthotic services.

11. Limitations

This paper is a literature-based review and does not report a prospective clinical trial or newly collected patient data. The response to physiotherapy varies according to diagnosis, severity, duration of neurological impairment, baseline strength and mobility, treatment dosage and adherence. Because stretching, positioning and strengthening are frequently delivered together, the isolated contribution of each intervention can be difficult to determine. Future research should use controlled clinical designs, standardized treatment parameters and objective outcome measures.

12. Conclusion

Physiotherapy has an important role in the comprehensive management of spasticity and prevention of secondary contracture. Stretching can help maintain available muscle and soft-tissue length, positioning can support alignment and reduce prolonged abnormal postures, and strengthening can address weakness and improve functional capacity. Current evidence does not support viewing any one of these interventions as a universal treatment for spasticity. Instead, an individualized programme combining stretching, positioning, active movement, strengthening and task-specific rehabilitation is more consistent with contemporary neurological rehabilitation principles (Katalinic et al., 2011; Langhorne et al., 2011). Regular assessment and early recognition of loss of range are essential for preventing secondary musculoskeletal complications and supporting long-term functional independence.

Intervention	Primary Purpose	Examples
Stretching	Maintain muscle length and available joint mobility	Passive, active-assisted and active stretching
Positioning	Maintain alignment and reduce prolonged abnormal posture	Supported sitting, bed positioning, limb support
Strengthening	Improve voluntary force production and activity	Resistance bands, weights, functional strengthening
Range-of-motion exercise	Maintain available movement	Active, assisted and passive ROM
Weight-bearing	Support loading, posture and functional control	Supported standing, standing practice
Functional training	Transfer impairment gains into activity	Transfers, gait, reaching and task practice

13. References

Ada, L., Dorsch, S., & Canning, C. G. (2006). Strengthening interventions increase strength and improve activity after stroke: A systematic review. Australian Journal of Physiotherapy, 52(4), 241–248.

Bovend'Eerdt, T. J. H., Newman, M., Barker, K., Dawes, H., Minelli, C., & Wade, D. T. (2008). The effects of stretching in spasticity: A systematic review. Archives of Physical Medicine and Rehabilitation, 89(7), 1395–1406.

Duncan, P. W., Zorowitz, R., Bates, B., Choi, J. Y., Glasberg, J. J., Graham, G. D., Katz, R. C., Lamberty, K., & Reker, D. (2005). Management of adult stroke rehabilitation care: A clinical practice guideline. Stroke, 36(9), e100–e143.

Katalinic, O. M., Harvey, L. A., Herbert, R. D., Moseley, A. M., Lannin, N. A., & Schurr, K. (2010). Stretch for the treatment and prevention of contractures. Cochrane Database of Systematic Reviews, CD007455.

Katalinic, O. M., Harvey, L. A., & Herbert, R. D. (2011). Effectiveness of stretch for the treatment and prevention of contractures in people with neurological conditions: A systematic review. Physical Therapy, 91(1), 11–24.

Kwakkel, G., van Peppen, R., Wagenaar, R. C., Wood Dauphinee, S., Richards, C., Ashburn, A., Miller, K., Lincoln, N., Partridge, C., Wellwood, I., & Langhorne, P. (2004). Effects of intensity of rehabilitation after stroke: A research synthesis. Stroke, 35(11), 2749–2758.

Langhorne, P., Bernhardt, J., & Kwakkel, G. (2011). Stroke rehabilitation. The Lancet, 377(9778), 1693–1702.

Lance, J. W. (1980). The control of muscle tone, reflexes, and movement: Robert Wartenberg Lecture. Neurology, 30(12), 1303–1313.

Malhotra, S., Pandyan, A. D., Rosewilliam, S., Roffe, C., & Hermens, H. (2011). Spasticity and contractures at the wrist after stroke: Time course and associated factors. Journal of Neurology, Neurosurgery & Psychiatry, 82(7), 764–768.

Morris, S. L., Dodd, K. J., & Morris, M. E. (2004). Outcomes of progressive resistance strength training following stroke: A systematic review. Clinical Rehabilitation, 18(1), 27–37.

Pollock, A., Baer, G., Pomeroy, V., & Langhorne, P. (2007). Physiotherapy treatment approaches for the recovery of postural control and lower limb function following stroke. Cochrane Database of Systematic Reviews, CD001920.

Sheean, G. (2002). The pathophysiology of spasticity. European Journal of Neurology, 9(Suppl. 1), 3–9.

Sommerfeld, D. K., Eek, E. U. B., Svensson, A. K., Holmqvist, L. W., & von Arbin, M. H. (2004). Spasticity after stroke: Its occurrence and association with motor impairments and activity limitations. Stroke, 35(1), 134–139.

Stevenson, V. L. (2010). Rehabilitation of spasticity. Journal of Neurology, Neurosurgery & Psychiatry, 81(8), 909–915.

Thilmann, A. F., Fellows, S. J., & Garms, E. (1991). Pathological stretch reflexes on the 'normal' side of hemiparetic patients. Journal of Neurology, Neurosurgery & Psychiatry, 54(10), 974–976.

Wissel, J., Schelosky, L. D., Scott, J., Christe, W., Faiss, J. H., & Mueller, J. (2010). Early development of spasticity following stroke: A prospective, observational trial. Journal of Neurology, 257(7), 1067–1072.

Editable SIJREI template. Replace title, author details, abstract, sections, tables and references as required.