International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

A Literature Review on Effectiveness of Available Physiotherapy Interventions on Somatic Dysfunction of Upper Back

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ABSTRACT

Objective: To explore the effectiveness of various physiotherapy interventions on somatic dysfunction associated with upper back pain.

Methods: Searches were conducted using databases such as Google Scholar and PubMed. A literature review was performed including only randomized controlled trials that reported extractable data relevant to the study objective. The search included studies published between 2017 and 2025. Out of numerous articles screened, a total of 12 randomized controlled trial studies were selected that investigated the role of physiotherapy interventions in the management of upper back pain related to somatic dysfunction.

Results: After detailed screening, 13 studies were compiled in tabular form, and the overall search process was represented through a flowchart. All selected studies were randomized controlled trials focusing on physiotherapy interventions techniques applied among individuals presenting with upper back somatic dysfunction.

Conclusion: From the reviewed studies, it can be concluded that physiotherapy interventions are highly effective in managing somatic dysfunction of the upper back. Techniques such as Muscle Energy Technique (MET), Myofascial Release (MFR), Articulatory Techniques, and Soft Tissue Manipulation. play a crucial role in restoring muscle balance, relieving pain, and enhancing quality of life in individuals suffering from upper back pain due to prolonged postural stress.

Keywords: Physiotherapy, Interventions, Somatic Dysfunction, Upper Back Pain, Thoracic Mobility, Manual Therapy.

INTRODUCTION

The upper back refers to the region extending from the cervical to the thoracic spine, encompassing vertebrae from T1 to T12. Pain arising from this area is commonly referred to as Upper Back Pain (UBP) or Thoracic Spine Pain (TSP)[4]**.** According to available literature, there is no universally accepted definition for UBP. Thoracic spine pain is less frequently reported compared to neck and low back pain, possibly due to the stabilizing anatomy of the rib cage and the thoracic spine, which are closely interconnected. However, TSP should be regarded as a serious condition since vital organs such as the heart and lungs are located within its anatomical region. Despite this, current evidence suggests that thoracic spine pain has received considerably less research attention compared to cervical and lumbar spine disorders.[9,4]

Somatic dysfunction is characterized by positional asymmetry, restricted range of motion, altered tissue

texture, and tenderness, often presenting as pain upon palpation. Upper back pain arising from such dysfunctions is a prevalent musculoskeletal condition that can significantly affect an individual's daily activities and overall quality of life, as the thoracic spine and its surrounding structures play a crucial role in maintaining posture and spinal stability.[2]

A recent study revealed that approximately 79% of individuals aged 18–44 years keep their smartphones with them almost constantly, spending only about two hours of their waking day without the device in hand. Smartphones are now extensively used among university students, replacing traditional educational tools. The rapid advancement of digital technology, normalization of portable smart devices, and dependence on internet-based communication have led to significant changes in spinal posture. Maintaining improper posture for prolonged periods can contribute to postural syndromes such as increased thoracic kyphosis and forward head posture, which in turn may cause fatigue, weaken postural muscles, and lead to inefficient muscular contractions. As a result, individuals often experience pain, stiffness, and discomfort due to overuse of mobilizer muscles and reduced activation of stabilizing postural musculature caused by poor posture maintenance.[1,2]

This behavioural pattern has been associated with the rising prevalence of upper back and neck pain, commonly attributed to somatic dysfunctions of the thoracic spine—a condition often referred to as "tech neck" or "text neck." Since the thoracic spine lies between the cervical and lumbar regions, dysfunctions in this area can influence adjacent spinal segments.[9,4]

According to existing research, mechanical upper back pain is particularly prevalent among individuals who spend extended hours studying or working in sustained sitting postures. The thoracic spine plays a vital role in maintaining overall spinal balance, and reduced mobility in this region can significantly impact postural control and daily activities. Specifically, upper thoracic dysfunction can restrict cervical mobility, resulting in pain and compensatory postural adaptations. Such dysfunctions may originate from altered biomechanics within the vertebrae or from disturbances in the autonomic nervous system, eventually leading to chronic pain and increased morbidity. Despite its prevalence, there remains a scarcity of literature exploring the effectiveness of physiotherapy-based interventions in managing upper back somatic dysfunction.[12,9]

Chronic upper back pain can adversely affect not only physical health but also psychological and academic performance, leading to decreased concentration, reduced productivity, and diminished quality of life. Therefore, it is crucial to explore effective therapeutic strategies for managing this condition. Physiotherapy offers a vital, evidence-based approach for addressing upper back pain and somatic dysfunction through targeted interventions such as manual therapy, stretching, strengthening, postural retraining, and ergonomic education. These interventions aim to relieve pain, restore spinal mobility, and improve posture and function.[4,9]

Hence, the present study aims to evaluate the impact of physiotherapy interventions on somatic dysfunction of the upper back, providing evidence-based insights to guide clinical practice and improve patient outcomes. Understanding the effectiveness of these interventions will help optimize treatment strategies and enhance overall management of upper back dysfunction.

NEED OF THE STUDY

Upper back pain related to somatic dysfunction has become increasingly common, prolonged poor posture leads to muscular imbalance, restricted thoracic mobility, and postural fatigue, which in turn contribute to pain and functional limitations. Physiotherapy offers an effective approach for managing such

dysfunctions; hence, this study aims to explore different physiotherapy interventions that can help alleviate symptoms and restore optimal function in individuals with upper back somatic dysfunction.

OBJECTIVE

This literature review will specifically examine the existing evidence regarding the effectiveness of physiotherapy interventions on somatic dysfunction of the upper back.

MATERIALS AND METHODS

Inclusion Criteria

- This study includes randomized controlled trial publications that specifically investigate the effects of various physiotherapy interventions on individuals with somatic dysfunction of the upper back.
- Only articles published in the English language will be considered.
- Articles published between 2017 and 2025 will be included.
- Studies involving participants aged between 18 and 65 years will be considered.
- Both male and female participants will be included.

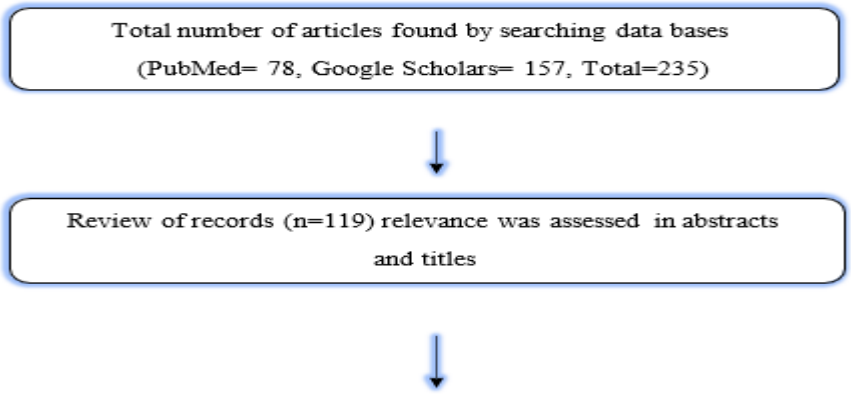
Exclusion Criteria

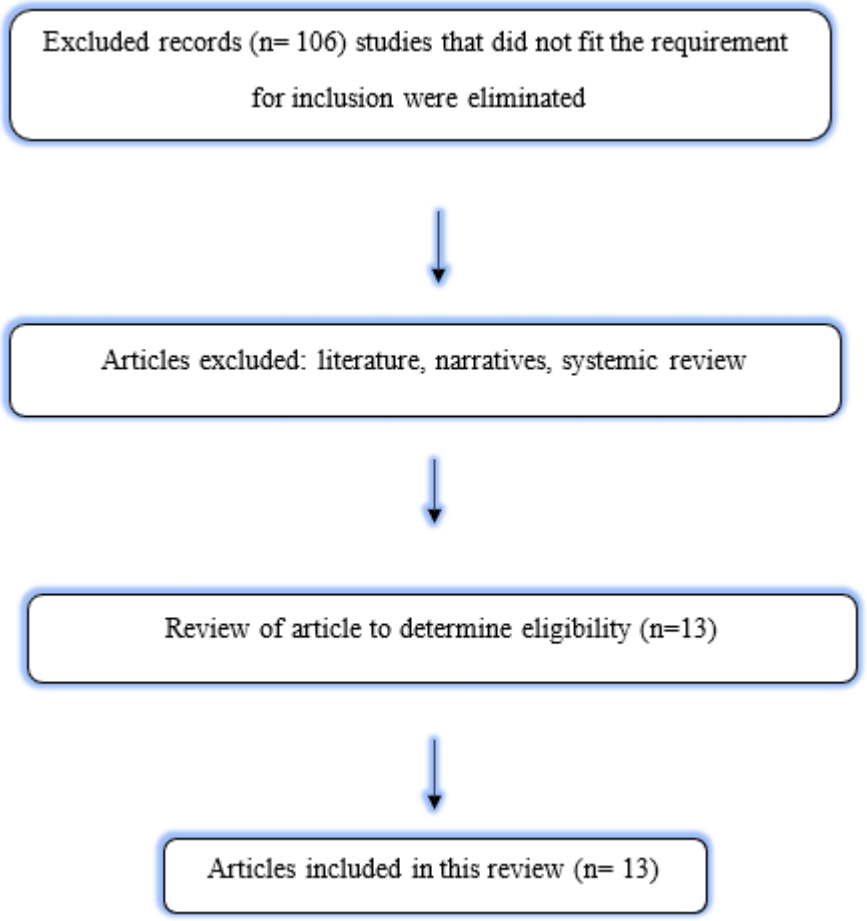
- Articles published in languages other than English will be excluded.
- Narrative reviews, case reports, and non-systematic reviews will not be considered.
- Articles published prior to 2017 will be excluded.
- Studies not relevant to the specified keywords or topic will be omitted.

METHODOLOGY

The evidence for the present study was systematically collected from reputable online databases and search engines, including Google Scholar and PubMed. A comprehensive search strategy was employed using specific keywords such as “somatic dysfunction,” “upper back pain,” and “physiotherapy interventions” to identify relevant scholarly publications. The search was limited to studies published between 2019 and 2025 to ensure the inclusion of recent and high-quality evidence from the past decade. Based on the predefined inclusion and exclusion criteria, a total of thirteen randomized controlled trial articles were identified as suitable for analysis. All selected studies were obtained in full text and critically reviewed. The extracted data were systematically analysed, and the results were organized and presented in a tabular format to ensure clarity and facilitate comparative interpretation.

FLOW CHART





Author, Year	Total No. of Samples	Duration of the Study	Intervention	Outcome Measures	Significant Findings
Buse Sezerel et al., 2024	96	4 weeks	ET (Control); ET + (MET); ET + CM	VAS, CROM	MET and CM both significantly improved pain and disability in patients with cervical spondylosis.
John M. Popovich et al., 2024	80	4–6 weeks	OMT – Immediate vs Delayed (Waiting Period) Group	PROMIS-29 v1.0, ODI	OMT significantly reduced pain and improved physical function, sleep, and anxiety in chronic low back pain patients.
Amna Naseer, et al., 2024	44	3weeks	Cervical and Thoracic mobilization	NPRS, ODI and goniometer	Cervicothoracic mobilization was more effective in patients with chronic low back pain.
Vithursha Sivakumar et al., 2024	60	2weeks	TMT and MFR	MMT scale, Active ROM, Self Efficacy	Thoracic mobility exercises with breathing is effective exercises in managing

				(PSEQ questionnaire)	upper back pain than manual release technique

Jacek Cholewicki et al., 2022	97	4–6 weeks	OMT– 3–4 sessions; compared OMT group vs waiting period group	NDI, Sleep, Fatigue, Depression	OMT was effective in reducing pain and disability, in patients with chronic neck pain.
Luis Martín-Sacristán et al., 2022	65	1week+1month follow-up	Deep dry needling in active or latent trigger point in patients with neck pain	VAS, PPT and NDI	The active-MTrP-DDN-group reduced pain than non-MTrP-DDN-group after a week but after a month both were associated with the reproduction of pain.
Maryam Ziaeifar et al., 2019	33	2weeks + 3month follow-up	trigger point compression and dry needling	NPRS, DASH	There was no significant difference in the tested variables after two-week or three-month as compared to after treatment sessions between the two groups.
Yolanda Noguera- Iturbe et al., 2019	97	72hour	short-term efficacy of the space correction KT technique in patients with latent or	PPT, CROM	This study does not support the use of the space correction KT technique

			active MTrPs in the upper trapezius muscle.		to treat patients with latent or active myofascial trigger points in the upper trapezius muscle
García-Pérez Juana et al., 2018	54	1 week	Group 1: Cervical manipulation Group 2: Fictitious	JPSE, PPT, NPRS, NDI	Significant group × time interaction favored cervical thrust manipulation for JPSE on rotation and extension. Improved PPT between C5–C6 and anterior tibial sites.

			manipulation		
Griswold et al., 2018	103	Not specified	Comparison between NTM and TM for cervical and thoracic mechanical neck pain.	ND, PSFS, NPRS, DCF, GROC, number of visits, and duration of care.	NTM and TM produced equivalent outcomes for mechanical neck pain in terms of pain, function, and overall improvement.
Juchul Cho et al., 2017	32	4-6 weeks	cervical group and the thoracic group	CVA, CROM, NPRS, PPT, NDI, and GRC	The combination of upper thoracic group demonstrated better outcomes compared with upper cervical group
Douglas S. Creighton et al., 2017	123	Not specified	UC traction-based mobilization	Active ROM, NPRS, VA blood flow velocity	UC traction-based mobilization improved active cervical rotation, end range rotation pain response.

DISCUSSION

The aim of this literature review was to gather and categorize research studies focused on reducing or managing somatic dysfunction of the upper back through physiotherapy interventions. This review was conducted to gain a deeper understanding of the different physiotherapy techniques available to effectively address upper back pain and dysfunction arising from postural and musculoskeletal imbalances.

A wide range of articles from reputable journals was identified that matched the search keywords. After carefully applying the inclusion and exclusion criteria, a total of 13 randomized controlled trials (RCTs) published between 2017 and 2025 were selected for analysis.

After analyzing the 13 studies, it was observed that all demonstrated beneficial outcomes in reducing pain, improving posture, and restoring mobility in individuals with upper back somatic dysfunction. Furthermore, the results indicated that a combination of physiotherapy interventions—such as Myofascial Release (MFR), Muscle Energy Technique (MET), Thoracic Mobilization, soft tissue mobilization, postural retraining—produced more significant and sustained improvements compared to the application of a single intervention alone. Several studies also incorporated ergonomic education and breathing exercises to enhance postural awareness and thoracic expansion.

The duration of the interventions across studies ranged from 1 weeks to 6months, which was considered adequate to elicit measurable improvements in pain relief, posture correction, and thoracic mobility. However, findings also suggested that longer-duration intervention programs may lead to more substantial and lasting functional recovery.

The commonly used outcome measures across studies included the Visual Analogue Scale (VAS), Numerical Pain Rating Scale (NPRS), Neck Disability Index (NDI), Thoracic Mobility Tests, Oswestry Disability Index (ODI), Joint Position Sensing Error (JPSE), Pressure Pain Threshold (PPT) Cervical and Thoracic Range of Motion (CROM), and Postural Assessment Tools. These measures effectively captured pain intensity, disability levels, and mobility improvements.

Jacek Cholewicki et al., 2022, conducted a single blinded cross-sectional study to evaluate the efficacy of osteopathic manipulative treatment (OMT) reducing pain and disability in patients with chronic NP. 97

participants were randomized as OMT and waiting period groups for 3–4 OMT sessions over 4–6 weeks. Pain intensity and Neck Disability Index outcome measures relatively evidenced to be safer and effective in reducing pain and disability along with improving sleep, fatigue, and depression in patients with chronic NP.

Buse Sezerel et al., 2024 conducted a randomized control trail to evaluate the efficacy of Osteopathic Muscle Energy techniques and Cervical mobilization on pain, disability, and proprioception in Cervical Spondylosis patients. 96 participants with CS were randomized into an electro-thermal therapy (ET) group (control group, n=32), ET+MET group (experiment I, n=32), and ET+CM group (experiment II, n=32) with 3 treatment sessions per week for 4 consecutive weeks. Based on Visual analog scale (VAS), and cervical range of motion (CROM), the study concluded that MET and CM have similar effects on improving pain and disability in individuals with CS and chronic neck pain.

In 2017, Juchul Cho et al., did research study to compare the effectiveness of cervical spine mobilization and stabilization exercise with that of thoracic spine mobilization and mobility exercise in individuals with 32 FHP participants. The trail lasted for 4weeks and were randomized into the cervical group or the thoracic group with the outcome measures CVA, CROM, NPRS, NDI and GRC and concluded that combination of upper thoracic spine mobilization and mobility exercise demonstrated better overall short-term outcomes in CVA (standing position), cervical extension, NPRS, NDI, and GRC compared with upper cervical spine mobilization and stabilization exercise in individuals with FHP.

In the research study Douglas S. Creighton et al., 2017 documented the effects of an upper cervical (UC) traction-based mobilization on participants with restricted and painful cervical rotation in relation to blood flow velocity through the vertebral artery. Pre- and post- mobilization active cervical rotation, pain intensity levels, and VA blood flow velocity during mobilization showed the application of UC traction-based mobilization improved active cervical rotation, end range rotation pain response, did not cause pain during its application and did not alter blood flow through the VA during application

Randomized clinical trial conducted by David Griswold et al., 2018 compared the effectiveness between non-thrust manipulation (NTM) and thrust manipulation (TM) for mechanical neck pain with NDI, PSFS, NPRS, DCF, GROC. After evaluating 103 participants both NTM and TM produce equivalent outcomes for patients with mechanical neck pain.

Although the primary focus of this review was on somatic dysfunction of the upper back (thoracic region), the majority of included randomized controlled trials addressed cervical and lumbar conditions. This can be attributed to the relative scarcity of high-quality randomized controlled trials specifically targeting thoracic spine dysfunction.

However, this inclusion is clinically justified due to the concept of **regional interdependence**, where impairments in one region of the spine may contribute to dysfunction and symptoms in adjacent regions.[13] The thoracic spine plays a crucial biomechanical role in influencing both cervical and lumbar spine mobility, posture, and load distribution. Therefore, interventions applied to cervical and lumbar regions may indirectly improve thoracic spine function and upper back pain.[14]

Previous studies have highlighted that thoracic mobility significantly affects cervical mechanics and pain, and similarly, lumbar-pelvic stability influences thoracic posture and movement patterns. Hence, the inclusion of cervical and lumbar studies provides supportive evidence for the effectiveness of physiotherapy interventions in managing upper back somatic dysfunction.

Nevertheless, this highlights a significant gap in the literature, emphasizing the need for more randomized controlled trials specifically focused on thoracic spine dysfunction.

LIMITATION AND RECOMMENDATION

The main limitation of this study is that the reviewed articles were restricted to the period between 2017 and 2025, which may have limited the inclusion of earlier relevant studies. It is recommended that future work include large-scale randomized controlled trials (RCTs) and systematic reviews to strengthen the existing evidence base and provide more comprehensive insights into long-term outcomes.

A major limitation of this review is the limited number of randomized controlled trials specifically addressing thoracic spine dysfunction, resulting in the inclusion of studies focusing on cervical and lumbar regions.[13,14]

However, despite the encouraging results across multiple studies, there remains a lack of consensus regarding the most effective intervention or combination of techniques for treating upper back somatic dysfunction. Differences in study design, treatment duration, outcome measures, and sample populations limit the ability to generalize findings. Therefore, future research should focus on high-quality randomized controlled trials, systematic reviews, and scoping studies that directly compare various physiotherapy approaches. Establishing standardized assessment tools and evidence-based treatment protocols will help clinicians apply the most effective strategies in clinical practice and ensure consistent patient outcomes

CONCLUSION

Based on the findings from this literature review, a variety of physiotherapy interventions—including manual therapy, myofascial release, mobilization techniques, ergonomic education—have demonstrated positive outcomes in reducing pain, improving mobility, and restoring functional activity in individuals with somatic dysfunction of the upper back. These interventions contribute to improved muscular balance, joint alignment, and overall spinal health, which are crucial for maintaining optimal function and preventing recurrence. Overall, physiotherapy plays a vital role in the multidisciplinary management of upper back somatic dysfunction, and continued research will enhance the understanding of its mechanisms and optimize therapeutic approaches for long-term benefits. However, due to the limited availability of thoracic-specific randomized controlled trials, many findings are extrapolated from cervical and lumbar studies, which should be interpreted with caution.[14]

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