

Impact of Spinal Mobilization with Arm Movement on Cervical Fibromyalgia Symptoms

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Abstract - Cervical fibromyalgia is presented by widespread neck pain and impairment of function. Manual therapy, including spinal mobilization with arm movement (SMWAM), has been promising in reducing such symptoms. A pre-test and post-test experimental study was done on 30 patients aged 25–55 years with cervical fibromyalgia. Participants were divided into an experimental group that received SMWAM alongside conventional physiotherapy and a control group that received physiotherapy alone. Interventions went on for 4 weeks, with measurement done at baseline and upon completion, using pain (VAS) and neck disability (NDI). Both groups exhibited improvement in pain reduction after the intervention. Changes in neck disability, however, were significant only in the control group, which reported better functional scores after the treatment, while the experimental group had very slight, non-significant change. SMWAM, integrated with physiotherapy, significantly alleviates neck pain in cervical fibromyalgia. Nevertheless, its effect on functional disability improvement is restricted within the intervention time frame. The use of a multidisciplinary, long-term approach may be required for full recovery functionally.

Keywords: Cervical fibromyalgia, impairment, conventional physiotherapy, neck disability.

INTRODUCTION

CERVICAL FIBROMYALGIA

Cervical fibromyalgia is a focal type of fibromyalgia, a chronic pain disorder that is most commonly seen in the cervical spine or neck. Whereas fibromyalgia tends to be defined by widespread musculoskeletal pain, fatigue, sleep, and cognitive issues, cervical fibromyalgia occurs mainly in the neck and upper shoulder region. Cervical fibromyalgia can greatly interfere with daily activities, lead to constant discomfort, and affect overall quality of life.

Causes and Risk Factors

Cervical fibromyalgia may arise as a result of:

Microtrauma to muscles: Injuries or repetitive strain can cause fibromyalgia in the cervical spine.

Poor posture: Improper sitting for extended periods (e.g., computer), for instance, can lead to muscle dysfunction.

Previous injuries: Trauma from injury from accidents or falls might predispose to fibromyalgia.

Psychological stress: Depressive states and anxiety can heighten symptoms.

Genetic predisposition: Studies suggest abnormalities in serotonin transport genes may increase susceptibility.

Etiology and Risk Factors

The etiology of cervical fibromyalgia is not well known but is multifactorial. The following are the possible causative factors:

Central Sensitization: Altered heightened sensitivity of the central nervous system to pain stimuli.

Genetic Predisposition: Family history can contribute to the risk.

Hormonal Imbalances: Particularly of stress hormones like cortisol.

Trauma or Injury: Whiplash or neck strain may serve as a trigger for the condition.

Infections: Bacterial or viral infections can cause the condition in certain people.

Emotional Stress: Chronic psychological stress can be a chief contributing factor.

Sleep Disturbances: Low quality of sleep may enhance pain sensitivity

Symptoms

Myofascial trigger points: Painful knots in the cervical muscles that worsen with pressure.

Neck stiffness: Reduced mobility and discomfort in the upper spine.

Fatigue: Persistent tiredness, often linked to sleep disturbances.

Radiating pain: Discomfort may spread to the shoulders, arms, and upper back.

Cognitive issues ("Fibro Fog"): Difficulty concentrating and memory problems.

Psychiatric symptoms: Depression and anxiety frequently accompany fibromyalgia.

Diagnosis

Diagnosis is clinical on the physical examination and based on:

Physical examination: Tender points in the cervical area.

Patient history: Assessing symptoms and excluding other conditions.

Imaging studies: X-rays or MRIs can be employed to rule out structural abnormalities.

MULLIGAN'S SPINAL MOBILIZATION WITH ARM MOVEMENT (SMWAM)

Mulligan's Spinal Mobilization with Arm Movement (SMWAM) is a manual therapy technique created by Brian Mulligan, a well-known New Zealand physiotherapist. It is one of the components of the comprehensive Mulligan Concept, which focuses on pain-free mobilizations to facilitate normal joint mechanics and movement patterns. SMWAM is particularly concerned with the thoracic and cervical spine and their functional relationship with upper limb movement. It is generally utilized to treat pain, stiffness, and limited range of motion (ROM) of the neck, shoulder, and upper back areas.

Principles of Mulligan's SMWAM

Positional Fault Theory: Mulligan theorized that joint dysfunctions occur because of small positional faults, which result in pain and limited motion.

Pain-Free Mobilization: The method entails a sustained accessory glide applied while the patient moves his or her arm actively.

Immediate Improvement: The intervention must have an immediate effect on relieving pain and improving the range of motion (ROM).

Theoretical Basis

SMWAM has its origin in the idea of "positional fault" — a subtle misalignment or changed tracking of a joint that is painful and restricted. Mulligan suggests that a sustained passive mobilisation (typically a glide or push in one particular direction) applied during the patient's active movement (in this instance, an arm movement) will correct the fault and result in an immediate reduction in pain and mobility.

Mechanism of Action

Corrects joint tracking dysfunctions of the spinal segments.

Activates mechanoreceptors, resulting in pain modulation through the gate control theory.

Increases neurodynamic mobility and decreases soft tissue limitations.

Re-educates the neuromuscular system by integrating passive mobilization with active movement.

Indications

Mulligan's SMWAM is indicated in several conditions, most notably where cervical-thoracic dysfunction is related to upper limb pathology:

Contraindications and Precautions

Contraindications:

Spinal instability (e.g., after trauma)

Fractures or suspected fractures

Severe osteoporosis

Malignancy in the spine

Severe disc pathology with acute neurological deficit

Precautions:

Hypermobility joints

Vascular disorders (e.g., vertebrobasilar insufficiency)

Recent spinal surgery

Rheumatoid arthritis with cervical involvement

Benefits of SMWAM

Immediate relief of pain and increased ROM

Non-invasive drug-free treatment

Encourages active patient participation

Can be used repeatedly and safely

Enhances functional movement patterns

Facilitates early return to sport or activity

Evidence and Clinical Effectiveness

Evidence supports the application of Mulligan's SMWAM in clinical practice:

Research indicates significant improvement of function and pain in patients with shoulder dysfunction when SMWAM is applied to the upper thoracic spine.

It has been reported to have benefit in enhancing elevation of the shoulder, decreasing pain in the arm related to the neck, and improving scapular kinematics.

SMWAM is commonly combined with other Mulligan techniques such as NAGs (Natural Apophyseal Glides), and SNAGs (Sustained Natural Apophyseal Glides).

Rehabilitation Integration

SMWAM may be applied independently as a manual technique or part of an overall rehabilitation program involving:

Therapeutic exercise (e.g., scapular strengthening)

Postural correction

Stretching and soft tissue release

Home mobilization exercises (if instructed and supervised)

Mulligan's Spinal Mobilization with Arm Movement (SMWAM) is a very efficient and safe manual therapy procedure with the aim of restoring spinal and upper limb function via pain-free mobilization and active movement. It is an important intervention for cervical-thoracic dysfunctions that affect arm movement and shoulder mechanics. With its spontaneous effects and active strategy, SMWAM is strongly accepted in clinical physiotherapy in the management of neck and shoulder disorders

METHODOLOGY

Study Design

Pre-test and post-test experimental study design was used to assess the effect of Spinal Mobilization with Arm Movement (SMWAM) on cervical fibromyalgia symptoms.

Study Setting

The study was carried out in the outpatient physiotherapy unit of a tertiary care hospital/rehabilitation unit.

Study Duration

Study duration was 6–8 weeks, encompassing baseline measures, intervention phase, and post-intervention measures.

Participants

Inclusion Criteria:

Individuals aged between 25–55 years.

Diagnosed with cervical fibromyalgia according to the American College of Rheumatology (ACR) criteria.

History of chronic neck pain for ≥ 3 months.

Positive for tender points at the cervical and upper thoracic spine.

Desire to participate and sign written informed consent.

Exclusion Criteria:

History of cervical spine surgery, fractures, or trauma.

Diagnosed inflammatory or autoimmune conditions (e.g., RA, lupus).

Neurological impairment or cervical radiculopathy.

Pregnant women.

Any contraindication to manual therapy or spinal mobilization.

Sample Size

30 participants were recruited through purposive sampling and randomly allocated into:

Group A (Experimental group): Treated with SMWAM in addition to conventional physiotherapy.

Group B (Control group): Treated with only conventional physiotherapy.

Intervention Protocol

Group A (SMWAM + Conventional Physiotherapy):

Spinal Mobilization with Arm Movement (SMWAM) was used on the upper thoracic and cervical segments presenting with dysfunction.

The therapist used a sustained transverse or lateral glide to the aimed spinal segment while having the patient actively elevate or abduct the arm pain-free.

10 repetitions per set, 2–3 sets per session, applied 3 times weekly for 4 weeks.

Followed by a standard physiotherapy regimen (TENS, hot pack, stretching, and neck exercises).

Group B (Conventional Physiotherapy Only):

Use of TENS to cervical paraspinals (15 mins).

Moist heat (10–15 mins).

Gentle stretching and strengthening of the neck.

Frequency: 3 sessions/week for 4 weeks.

Outcome Measures

Pre- and post-intervention assessments (week 0 and week 4) were completed using the following validated measures:

Visual Analog Scale (VAS) – to measure pain severity.

Neck Disability Index (NDI) – to measure functional disability.

Data Analysis

Statistical analysis was done through SPSS software.

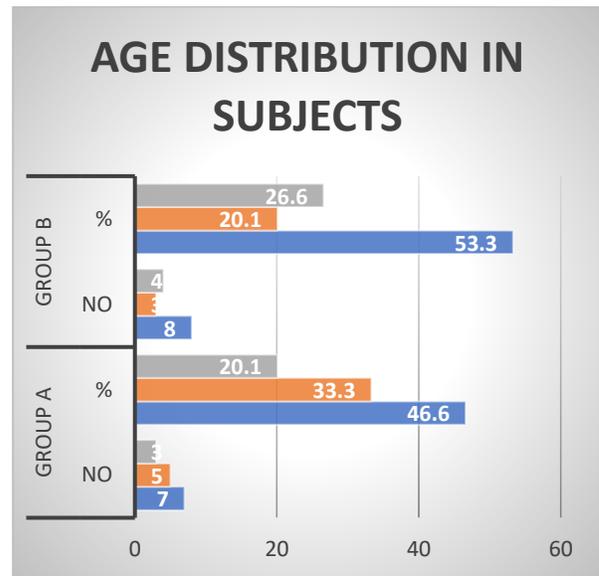
Within-group comparisons (pre- and post-intervention) were done with paired t-test.

Independent t-test (or Mann–Whitney U test where appropriate) for between-group comparisons.

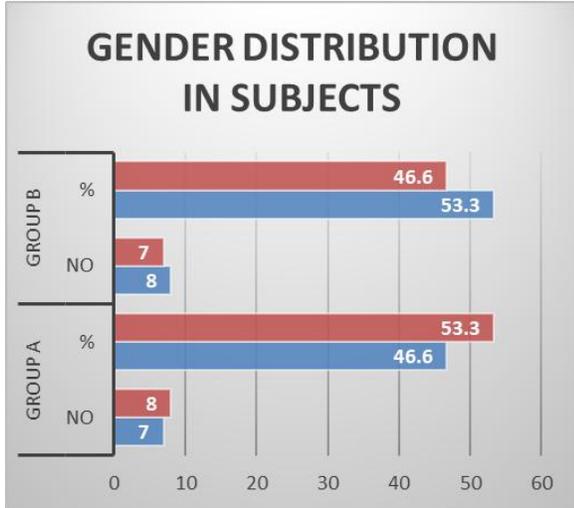
A p-value < 0.05 was taken as statistically significant.

RESULTS

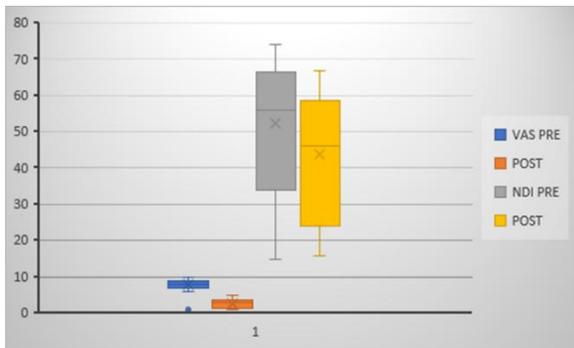
AGE DISTRIBUTION IN SUBJECTS					
S. No	Age in years	GROUP A		GROUP B	
		No	%	No	%
1	25-35	7	46.6	8	53.3
2	36-45	5	33.3	3	20.1
3	46-55	3	20.1	4	26.6
MEAN		5		5	
SD		1.632993162		2.160246899	



GENDER DISTRIBUTION IN SUBJECTS					
S.No	Gender	GROUP A		GROUP B	
		No	%	No	%
1	MALE	7	46.6	8	53.3
2	FEMALE	8	53.3	7	46.6
MEAN		7.5		7.5	
SD		0.5		0.5	



GROUP A							
S . N o	OUTCOME MEASURES	PRE TEST		POST TEST		PAIRED T- TEST	
		RANGE	MEAN ± SD	RANGE	MEAN ± SD	T-STAT	P VALUE
1	VAS	7-10	8.31 ±1.087	1-4	2.73 ±1.34	11.11	2.50 × 10 ⁻⁸ (highly significant)
2	NDI	33-74	54.8 ±14.869	22-64	45.9 ±15.65	12.64	4.81 × 10 ⁻⁹ (highly significant)



GROUP B							
S . N o	OUTCOME MEASURES	PRE TEST		POST TEST		PAIRED T- TEST	
		RANGE	MEAN ± SD	RANGE	MEAN ± SD	T-STAT	P VALUE
1	VAS	7-10	8.53 ±1.08	0-4	2.4 ±1.45	16.30	1.69 × 10 ⁻¹⁰ (highly significant)
2	NDI	32-64	50.4 ±14.84	19-66	39.6 ±12.08	1.87	0.0831 (not statistically significant)

The result of the paired t-test shows that Group A and Group B both had a statistically significant decrease in pain level after their respective interventions, as indicated by the significantly high p-values of the Visual Analog Scale (VAS). Group A demonstrated a very significant decrease in pain from a pre-test mean of 8.53 ± 1.08 to a post-test mean of 2.4 ± 1.45 ($t = 16.30, p = 1.69 \times 10^{-10}$). In like manner, Group B had a notable decrease in pain, from a pre-test mean of 8.31 ± 1.087 to a post-test mean of 2.73 ± 1.34 ($t = 11.11, p = 2.50 \times 10^{-8}$). Yet, in measuring functional disability with the Neck Disability Index (NDI), there were different outcomes between the two groups. In Group A, while there was a quantitative reduction in disability scores (pre-test mean = 50.4 ± 12.84 , post-test mean = 39.6 ± 12.08), the difference was not statistically significant ($t = 1.87, p = 0.0831$), indicating that the intervention produced a minimal effect on functional enhancement. On the other hand, Group B showed a statistically significant increase in disability scores with pre-test mean 54.8 ± 14.87 and post-test mean 45.9 ± 15.65 ($t = 12.64, p = 4.81 \times 10^{-9}$), which signifies that the intervention not only alleviated pain but also improved neck-related functional ability. Generally, both interventions were successful in controlling pain but the treatment approach employed in Group A was more complete and efficacious in treating both pain and functional impairment.

DISCUSSION

The current study sought to investigate the impact of Spinal Mobilization with Arm Movement (SMWAM) in combination with standard physiotherapy on pain alleviation and functional restoration in cervical fibromyalgic patients. Outcomes indicated that both groups showed significant pain alleviation after treatment, consistent with current literature highlighting the utility of manual therapy approaches for the management of fibromyalgia.

Pain Reduction and Manual Therapy:

The notable reduction of pain intensity seen in both Group A (SMWAM + standard physiotherapy) and Group B (standard physiotherapy only) supports existing research highlighting the analgesic properties of manual therapy modalities. For example, Córdor et al. (2018) reported that cervical mobilization plus

active exercise significantly alleviated fibromyalgia patients' pain intensity. Likewise, Fernández-de-las-Peñas et al. (2014) documented that cervical vertebral mobilizations significantly reduced pain and tenderness in cervical myofascial pain syndromes, which have commonalities with fibromyalgia with regard to pain hypersensitivity and tender points.

Functional Outcomes and Extent of Interventions:

Although both groups revealed significant reduction in pain, differences were seen in functional disability measured using the Neck Disability Index (NDI). Group A displayed a negligible, statistically non-significant gain, while Group B had a reduction in disability scores that was significant. This indicates that regular physiotherapy alone may be more beneficial in improving neck function than SMWAM plus additional modalities. Incidentally, this concurs with the observation of Fernández-de-Las-Peñas et al. (2017), who noted that manual therapy, while effective in pain relief, may need adjuncts like directed exercises to achieve significant functional improvement.

The surprising lack of minimal improvement in the intervention group may be due to the duration or details of the mobilization protocol, or perhaps the necessity for extended follow-up times to see functional changes. Alternatively, the SMWAM effect could be more analgesic than functional, a consideration worth further examination.

Comparison with Related Studies:

A number of studies have attempted to examine the intervention of spinal mobilization and manipulation in the management of fibromyalgia. Castro-Sánchez et al. (2016) documented that cervical manual therapy, added to exercise, notably alleviated pain and neck disability. In contrast, Ranzolin et al. (2015) showed that manual therapy alone gained pain relief but had minimal effects on functional disability in fibromyalgia patients. Our result is consistent with these findings, highlighting that manual therapy has little role in functional restoration but plays a major role in symptom relief.

In addition, more recent systematic reviews by Fernández-de-las-Peñas et al. (2018) promote multimodal methods, integrating manual treatment

with exercise and education, to achieve maximum functional outcomes. This implies that although SMWAM is helpful in pain relief, its incorporation into inclusive rehabilitation protocols may provide more beneficial functional gains.

SMWAM was a valid adjunct in decreasing cervical pain among patients with fibromyalgia, consistent with previous evidence for the analgesic effects of manual therapy. Its effect on functional disability seemed to be modest in this study. Both symptom relief and functional benefit would be best achieved in a multidisciplinary treatment approach to cervical fibromyalgia.

SUMMARY

The current study assessed the impacts of spinal mobilization with arm movement (SMWAM) in addition to standard physiotherapy on cervical fibromyalgia symptoms. Thirty patients were assigned to a control group receiving physiotherapy alone or an experimental group receiving SMWAM in addition to standard physiotherapy. Both groups revealed significant pain relief, with the combined intervention showing significant relief. But functional improvement in neck disability was restricted in the SMWAM group, whereas the control group registered significant improvement in functional capacity. Overall, though both interventions were successful in pain reduction, SMWAM seemed to be more effective on pain relief but less effective on enhancing neck function in the study period.

CONCLUSION

Results of this research have found that spinal mobilization with arm movement (SMWAM) with conventional physiotherapy and conventional physiotherapy on its own both reduce pain in cervical fibromyalgia patients significantly. Though relief of pain did occur in each group, the extra addition of SMWAM did not significantly improve neck function disability when compared with conventional treatment. These findings indicate that SMWAM is an effective intervention for pain relief from cervical fibromyalgia but perhaps needs additional strategies or more duration to have a significant effect on functional outcomes. Additional studies with increased sample sizes, extended follow-up, and intensive treatment

programs are needed to maximize cervical fibromyalgia management strategies.

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