COMPARISON OF MULLIGAN MOBILIZATION AND NECK ISOMETRICS ALONG WITH MUSCULOSKELETAL PAIN AND FUNCTIONAL DISABILITY IN CERVICAL RADICULOPATHY

Nida Ilahi[1], Sania Naz[2], Afshan Asad[3], Hamna Maryam[4], Ayesha Ameen[5], Rimsha[6], Muhammad Hasnain[7], Zarlish Yousaf [8], Shamsher Ali[9], Wasif Nazir[10], Nimra Saleem[11]

Government College University Faisalabad, Layyah Campus [1]

Government College University Faisalabad, Layyah Campus [2]

Physiotherapist, THQ Taunsa Sharif [3]

Physiotherapist, THQ Layyah [4]

Physiotherapist, DHQ Layyah [5]

Physiotherapist, Sukoon rehab center and physiotherapy, Lahore [6]

Physiotherapist, DHQ Muzaffargarh [7]

Physiotherapist, DHQ Muzaffargarh [8]

Physiotherapist, THQ Jampur [9]

Physiotherapist, Mumtaz hospital Muzaffargarh [10]

Physiotherapist, DHQ Layyah [11]

ABSTRACT

Background: Cervical radiculopathy (CR) is a disorder of the peripheral nervous system that impairs the normal function of the cervical nerve roots and is frequently linked to chronic pain and limitations in daily activities. Mulligan mobilizations and neck isometric exercise can be used along with conventional treatment for CR and it demonstrated success on someoccasions in relieving marked root pain.

Objective: This study aims to evaluate the efficacy of mulligan mobilization method and neck isometrics to assess for musculoskeletal pain and movement limitations in CR.

Methods: RCT was performed with 14 participants who were randomly assigned to two treatment groups. Over the course of 6 months, each group participated in two treatment sessions. Group A followed a Mulligan mobilization technique protocol, while Group B adhered to a neck isometrics protocol**.**

Result: The mean difference for NDI was 12±0.8 for mulligan group as compared to isometric group 2.9±0.01 which is statistically higher for mulligan group than isometric. OMPQ mean difference for mulligan 26.1+9.24 as compared to isometric 3+1.1 group showed a statistically significant difference.

Conclusion: This study concludes Mulligan Mobilization technique is more effective than neck isometrics in form of treatment for musculoskeletal pain and functional disability in cervical radiculopathy (CR).

Key Words: Mulligan Mobilization, Neck Pain, Neck Isometrics, Musculoskeletal Pain, Functional Disability, Cervical Radiculopathy

INTRODUCTION

Pain can be classified into various types and is defined in different literatures into various definitions. International association of pain has defined the cervical pain as the pain starting from nuchal region and extending towards the first vertebra of thoracic region (1). If the pain is occurring in the cervicothoracic region and no specific reason for pain is found than it may be defined as the Non-specific mechanical neck pain (MNP). It aggravates by movement. The management for this kind of pain requires precise treatment as no guidelines are available. The prevalence rate of this pain in players and sportsmen is 36% (2). According to a study, the neck pain reporting is being increased to the physicians. Almost 10 to 20% of the population is found to be complaining about neck pain and at least 54% have experienced neck pain in the past six months. In women, neck pain occurs in their fifties and the prevalence increases with age (3). The factors has a vital role in developing chronic neck pain may be advancing age (especially above 40), low back pain, stressful behavior, decreased quality of life, reduced energy and vigor, regularly aerobic exercise such as cycling and finally the reduction of strength in hand muscles. Clinically these signs should not be ignored by the physicians. A systemic review conducted to find the risk factors for first onset of neck pain according to McLean et al among diverse population. 13 high quality studies were selected for this review. The results of this review suggested that smoking, job stress, sex, advancing age, occupation and low back pain are the risk factors for developing neck pain (4). Cervical radiculopathy is a condition of the PNS that impacts the normal function of nerve roots in the neck. This disorder often results in chronic pain and can limit daily activities. It is estimated that at least 1 in 1,000 people will experience cervical radiculopathy at some point in their lives. The condition usually arises due to mechanical or inflammatory issues around the cervical nerve roots. Imaging studies have shown that the most common causes are cervical disc herniation and bone spurs, which can compress and inflame the nerve roots. Cervical radiculopathy involves nerve pain and other neurological symptomssuch as weakness, tingling, or numbness that radiate from the neck down into the shoulders, arms, or fingers. This condition often results from nerve compression or irritation in the cervical region, commonly progressive decline, disc protrusion and other spinal abnormalities (5). Cervical radiculopathy primarily occurs due to inflammation of the cervical nerve root caused by a lesion that narrow the spinal canal. This condition often results from nerve compression or irritation in the cervical region, commonly due to progressive decline, disc protrusion and other spinal abnormalities (6). If a serious diagnosis related to pathology and anatomy cannot be made, it can be termed as idiopathic cervical pain as also recommended by Australian Acute Musculoskeletal Pain Guidelines Group (7). Compare the effects of thoracic manipulation (TM) and Mulligan techniques combined with conventional physical therapy on pain levels, neck proprioception, and scapular retraction in individuals with mechanical neck pain (MNP). In treating cervical radiculopathy, Mulligan mobilization techniques may involve: SNAGs: These are gentle mobilizations applied to cervical

vertebrae while the patient engages in active movement. For example, the therapist might apply a posterior to anterior directional mobilization on a specific cervical segment while the patient gently turns their head from side to side or nods. This is intended to alleviate pain and improve mobility by correcting positional faults or enhancing joint mechanics. NAGs: Similar to SNAGs but are typically applied without the active movement component from the patient. NAGs are gentle and repetitive mobilizations aimed at improving range of motion and reducing symptoms by enhancing the gliding motion of joints in cervical spine (8). Sadaf Shafique in 2019 conducted a study on effect of Mulligan spinal mobilization with arm movement along with neurodynamics and manual traction in cervical radiculopathy patients basically a RCT in which the participants were randomly assigned to two groups. The experimental group received treatment involving Spinal Mobilizations with Arm Movement alongside neurodynamics and manual traction, whereas the control group received treatment consisting solely of neurodynamics and manual traction. Pain levels, disability, and cervical range of motion were evaluated before and after a 3-week treatment period using the Numeric Pain Rating Scale, Neck Disability Index, and goniometry. The study concluded that patients treated with spinal mobilization with arm movements in addition to neurodynamics and manual traction experienced more effective management of pain, disability, and range of motion issues compared to those treated with neurodynamics and manual traction alone (9).

The objective of this study is to evaluate mulligan mobilization and neck isometrics in patients with musculoskeletal pain and functional disability in cervical radiculopathy to make treatment more efficacious and affordable in terms of time and finance (as physiotherapy treatment become lengthy and affects the psychology of patients as in our country socioeconomic status of patients is not good. So more accurate and effective treatment for them is which is time and cost effective.) It will assist physiotherapists by providing beneficial result-oriented treatment approach to reduce duration of patient rehab. Treating pain and disability simultaneously in the literatur made this study innovative..

METHODOLOGY

This study took place at District Head Quarter Hospital, Layyah. It employed a single-blinded randomized clinical trial design to assess outcomes. Non-probability purposive sampling was used to select participants, comprising both genders. A total of 14 participants met the inclusion criteria for this study. The inclusion criteria includes;

- Age is between 20 and 60 years
- Limited Cervical Range of Motion
- Both Gender
- Pain and tingling sensations in one-sided upper extremity.

The following criteria led to exclusion from the study:

- Symptoms affecting both upper extremities
- Prior history of cervical or thoracic spinal injury
- Recent shoulder fracture or surgery
- Presence of any systemic disease or unstable spine

DATA COLLECTION TOOL

- Orbero Musculoskeletal pain scale
- Neck disability index
- Universal Goniometer

DATA COLLECTION PROCEDURE

Screening

The Subjects who met the inclusion/exclusion criteria was allocated to this study.

Randomization

Concealed envelope method was used where a sealed opaque envelops with treatment regimen written was provided to the participants. After the patient consent to enter a trial, an envelope was opened to provide the allocated treatment regimen.

Data Assessment:

Data collected at baseline and at the 4th week of follow-up was than assessed by using SPSS software.

Intervention

Conventional treatment

Conventional treatment includes hot pad, stretching exercise and soft tissue release procedure. Before intervention hot pack was applied for 10 minutes along with stretching exercises of neck muscles and soft tissue release where it needed.

Mulligan Mobilization

Mulligan mobilization was given to only Group A patients by maintaining transverse glide (SNAG) with10 repetitions and 3 sets with one minute break in each set.

Isometrics

Isometric exercises were performed in the seated position by resistance applied by the therapist at the forehead (cervical flexion, extension, rotation and side bending) was given to Group B with 10 repetition with the hold of 6 to 10 seconds in each repetition.

DATA ANALYSIS PROCEDURE

The data was entered and analyzed using Statistical Package for Social Science Software (SPSS). The numerical data like age was presented in the form of mean SD. Categorical Data like gender group: male and female was presented in the form of frequency (Percentage). After checking the normality of data, independent sample t test was used to determine mean difference of pain in patients with cervical radiculopathy between both groups.

RESULTS

Table-1: Gender Statistics

VARIABLE	Group 1 Mulligan	Group 2 Isometrics
Males	2(28%)	4(57%)
Females	5(72%)	3(42%)

The findings showed that at baseline, Orebro Musculoskeletal Pain Questionnaire readings baseline mean and after 4th week mean a difference of 25.9 for mulligan group and mean difference of 3 in isometric which showed mulligan group have more improvement as compared to isometric group.

Table-2: Groups Mean and Standard Deviation of age

GROUPS	MEAN± S.D
Group 1 (Mulligans)	32.29±8.180
Group 2(Isometrics)	41.70± 9.013

The above table describes the descriptive of age in isometrics and mulligan groups, the lower limit of age is 20 years and upper limit is 60 years.

Table 3: Test of Normality

Variables	Shapiro-Wilk		
	Statistics	Sig	Df
NDI at baseline	0.93	0.246	7
NDI at 4th week	0.919	0.209	7
OMPQ at baseline	0.951	0.579	7
OMPQ at 4th Week	0.932	0.327	7

The Shapiro wilk test of normality for NDI and OMPQ for baseline and after 4th week follow-up readings which shows p value is **more than 0.005** and data is normally distributed.

Within the Group Comparison

Table-4: The paired sample t-test (within the group analysis) for NDI scale

The above mentioned table shows the statistics after applying the paired sample test within the group, values are mentioned which shows the significant difference between the groups and assessment has been done at baseline and at 4th week. Mulligan group has more significance with the **p value (<0.001)** then isometric group **(p value 0.003).**

Table-5: The paired sample t-test for OMPQ scale

The group A showed the pre-treatment mean 166 while post treatment mean of 140 marking a difference in pre and post treatment readings. The group B showed the pre-treatment mean of 156 and post treatment 153 which showed difference but not as much as group A which showed group A have more improvements than group B.

(Independent sample t-test between group comparisons)

Table 6: NDI scoring at different intervals of time

The findings showed that at baseline mulligan showed mean of 32 with 4.69 standard deviations While after 4th week it is 20 with mean differnec 12 as compared to isometric group which have bbaseline mean of 30.4 and after 4th. Week its 27.5 with mean difference of 2.9 just means mulligan group showed greater improvement as compared to isometric group

Table 7: (Independent sample t-test between group comparisons) Table 7: OMPQ Scale Scoring between the groups comparison

The findings showed that at baseline, Orebro Musculoskeletal Pain Questionnaire readings baseline mean and after 4th week mean a difference of 25.9 for mulligan group and mean difference of 3 in isometric which showed mulligan group have more improvement as compared to isometric group.

DISCUSSION

The current study revealed the effects of isometrics and mulligan techniques in cervical radiculopathy along with musculoskeletal pain and functional disability in cervical radiculopathy. In this study we apply conventional intervention of hot packs was applied for 10 minutes, stretching exercises and ultrasound therapy for 10 mints, along with mulligan mobilization was given to group 1 by Isometric exercise were performed in the seated position by resistance applied by the therapist at the forehead repetitions with the hold of six seconds in each repetition along with conventional interventions as mentioned above. The statistical analysis including independent sample t-test, paired sample t-test and descriptive statistics relevant statistically significant improvement in neck pain measured by neck disability index and Orebro musculoskeletal pain at baseline and 4th week. Sania Naz et al.2023 comparing the effectiveness of mulligan (NAG,SNAG) and McKenzie(Self Stretching) on improving the pain and functional ability in patients with chronic neck pain. The mean difference between pre and post Numeric pain rating scale value in group A was calculated 6.31±0.01and group B was3.46±-0.2. Also the mean difference between pre and post Neck Disability scale value in group A was 6.31±0.01 and group B was 3.46±-0.21 which indicate effectiveness of mulligan mobilizations (SNAG) over Mackenzie in cervical pain hence supporting our study which also showed the effectiveness over isometric exercise.

LIMITATATIONS

- The study sample size is relatively small with only 7 subjects in each group, which may limit the generalizability of the findings.
- The study design lacks a control group, making it difficult to determine the specific effects of Mulligan mobilization and neck isometrics compared to other factors or no intervention

RECOMMENDATIONS

- Further research should be conducted with larger sample sizes to validate and generalize the findings of this study.
- It would be beneficial to explore the long-term effects of Mulligan mobilization and neck isometrics on musculoskeletal pain and disability to assess the sustainability of the observed improvements
- Further studies on other technique in combination with Mulligan Mobilization Technique needed to find the valuable insights in individuals with Cervical Radiculopathy (CR).

CONCLUSION

In conclusion, this study provide evidence that mulligan mobilization may be a promising approach for managing musculoskeletal pain and functional disability in cervical radiculopathy patients, but further research is needed to determine its long term efficacy and underlying mechanism.

Authors

First Author: Nida Ilahi, Government College University Faisalabad, Layyah Campus

Second Author: Sania Naz, Government CollegeUniversity Faisalabad, Layyah Campus

Third Author: Afshan Asad, Physiotherapist, THQ Taunsa Sharif

Fourth Author: Hamna Maryam, Physiotherapist, THQ Layyah

Fifth Author: Ayesha Ameen, Physiotherapist, DHQ Layyah

Sixth Author: Rimsha, Physiotherapist, Sukoon rehab center and physiotherapy, Lahore

Seventh Author: Muhammad Hasnain, Physiotherapist, DHQ Muzaffargarh

Eight Author: Zarlish Yousaf, Physiotherapist, DHQ Muzaffargarh

Nine Author: Shamsher Ali, Physiotherapist, THQ Jampur

Ten Author: Wasif Nazir, Physiotherapist, Mumtaz hospital Muzaffargarh

Eleven Author: Nimra Saleem, Physiotherapist, DHQ Layyah

Correspondence Author

Sania Naz

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