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Original Article

Comparison of The Effectiveness of Maitland Manipulation of Thoracic Spine Versus Grade I and II Maitland Mobilization of Cervical Spine on Pain Intensity and Functional Status In Patients of Cervical Radiculopathy

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ABSTRACT

Cervical radiculopathy **(CR)** is a most reported pathological problem mainly due to herniated disc material causing nerve compression or the formation of osteophytes. This impingement specifically causes cervical pain radiating to arm, numbness, and sensory deficit. It also affects the motor function of the neck and upper extremities. **Objectives:** To evaluate the comparative effectiveness of Maitland manipulation of thoracic spine versus grade I and II Maitland mobilization of cervical spine on Pain, intensity, and functional status in patients of cervical radiculopathy. **Methods:** Total 32 patients suffering from cervical radiculopathy were randomly assigned to receive Maitland manipulation on thoracic spine along with Conventional Physiotherapy (intermittent cervical traction, strengthening exercises) in Group A(n=16) and Maitland mobilization on cervical spines along with Conventional Physiotherapy in Group B (n=16). Total treatment sessions given to each group was 9 (3 sessions per week). To measure outcome numeric pain rating scale (NPRS) and neck disability index (NDI) questionnaire was used. Data collection was done at the beginning and post-treatment. **Results:** The study revealed that the mean age of patients was 47.59 with a range minimum of 27 years to a maximum of 59 years. Comparison of post-treatment of both groups showed mean NPRS score in group A (Maitland thoracic spine manipulation) was 4.56± 1.031 and group B (Maitland cervical spine mobilization) was 6.12± 0.50, while post-treatment NDI score group A was 22.44± 10.09 and group B was 36.88± 8.437 with p=0.000 that was p<0.05. **Conclusion:** The study concluded that both Maitland thoracic spine manipulation and Maitland cervical spine mobilization techniques have similar effects in reducing cervical radiculopathy and increasing active range of motion. However, Maitland thoracic spine manipulation showed better results in neck pain reduction and improved functional status on the comparison.

INTRODUCTION

Musculoskeletal pain is most common in our society that including neck, shoulder, and back pain [1]. Cervical pain is the second most common pathology in our society [2]. Cervical radiculopathy occurs with such pathologies that have a direct effect on the nerve root, that can be compression traction, irritation, foraminal narrowing, or degenerative spondylitis changes such as arthritic changes [3,5]. C7 is the most common level of root compression (43.6-69%)followed by C6(17.6-19%), C5 is (2-6.6%)while C8 is least common (6.2-10%)[6]. A study from Salemi reported the prevalence of cervical radiculopathy was 3.5 cases per 1000 population [7]. Cervical radiculopathy (CR) is a serious pathological process mainly due to nerve compression from disc herniation, arthritic bone spur formation, tumor, or trauma that cause nerve root rupture [8-10]. It leads toward neck pain, radiating

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pain in the arm, and numbness in the specific nerve root irritation area. Mostly this radicular pain along with the motor or sensory disturbances [11,12]. Cervical radiculopathy occurs with such pathologies that have a direct effect on the nerve root, that can be compression traction, irritation, foraminal narrowing, or degenerative spondylitis changes such as osteoarthritic changes [13]. C7 is the most common level of root compression (43.6-69%)followed by C6(17.6-19%), C5 is (2-6.6%)while C8 is least common (6.2-10%) [6]. Cervical radiculopathy's typical symptoms are neck pain, dermatomes pattern irradiating arm pain [14]. Myotome pattern muscle weakness, numbness, impaired reflexes, headaches, scapular pain, upper extremities motor and sensory dysfunction [15]. The pattern of symptoms and location vary from person to person depending upon the level of nerve root affected [16]. A study by Hurwitz et.al, manipulation treatment and mobilization exercises play a great role in long term improvement of neck pain but manipulation has a better effect on reducing the pain [17]. RXodine and Vernon in 2012, conducted a study on the effects of cervical spine manipulation on radiculopathy of cervical spine and neck disability index was used as measuring tool. The study showed that for cervical radiculopathy treatment spinal manipulation can be used but need precautionary measurements [18]. Kaur Interdeep et.al., done study on the effect of Maitland mobilization compare with mulligan mobilization at upper thoracic spine in the patient with non-specific neck pain [19]. There are multidimensional risk factors for developing cervical radiculopathy as general medical health, occupation environment, physical attributes, socioeconomic, status, physiological status [20]. To confirm the diagnosis of CR, electrophysiological tests (nerve conduction velocity, electromyography), Diagnostic imaging (magnetic resonance imaging) most commonly used [21-22]. Manually diagnosing the CR includes specific tests as the Spurling test, the Upper-Limb Tension Test (ULLT), and the distraction test [23].

The study was done to discovery the research-based selection of the most reliable treatment regimes that is MTSM and MCSM for the patients with cervical spine radiculopathy. So, this study will be beneficial equally for physical therapists as well as patients.

METHODS

Single Blinded Simple Random Sampling technique was used for this study. The study was done from August 2017 to January 2018 with total time of 6 months. The sample size was 32 with 95% confidence interval. Total 32 patients were divided into two groups. Treatment given to Group 1 with Maitland thoracic spine manipulation, strengthening exercises, cervical traction and group 2 with Maitland grade I and II mobilization of the cervical spine, intermittent, and strengthening exercise). Both male and female patients of 20 years having cervical radiculopathy (due to disc herniation at cervical spine, bone spur formation)and patients with Spurling test positive, cervical distraction test, upper limb tension test (ULTT), was included in the study. All other patients who had osteoporosis, any tumor, fracture history, TOS and cervical rib formation, patients with CNS involvement were excluded. Total 32 patients who have complaints of cervical radiculopathy were selected. The patient's examination including Assessment, History, Palpation and Observation was carried out to rule out any active pathology or other causes of included systemic illness. All the subjects were observed from the front, back and lateral view to see the change in the alignment of the cervical spine and upper limb and to see in contour changes. Palpation of soft tissue structures around the cervical spine, shoulder, upper back, and arm to see the tenderness and temperature difference around these areas. Demographics data such as age, gender, marital status, occupation history were recorded by the predesigned Performa. Patients were allocated to the two treatment groups using computer-generated randomization. Patients of Group A (n=16) were treated with Maitland thoracic spine manipulation besides conventional Physiotherapy. Patients of Group B (n=16) were treated with Maitland Grade I and II cervical mobilization along with conventional physiotherapy. The Conventional Physiotherapy Protocol that was given to every patient was a hot pack for 10 minutes, Intermittent cervical traction (CT), Cervical muscle strengthening exercises (2 sets of 5 repetitions each). Each patient was given 9 sessions in 3 weeks (3 sessions per week). Outcome measures used for data collection were Numerical pain rating scale (NPRS)Neck disability index (NDI) questioner. A use of goniometer to measure cervical spine Ranges of motion. Data were entered and analyzed through SPSS version 16.0. All the qualitative variables were presented as frequency tables and percentages. All the quantitative variables were presented as mean ± SD along with its (max-min). To compare the mean differences of quantitative variables T-test was applied. p-value <0.05 was taken as significant values.

RESULTS

From 32 patients, group A having 7 males and 9 females and group B having 9 males and 7 females. In 32 patients total 50% of males and 50% of females contributed to the study.

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It shows that the minimum age was 27 years and the maximum age was 56 years, while in group B minimum age was 35 and the maximum age was 60 years

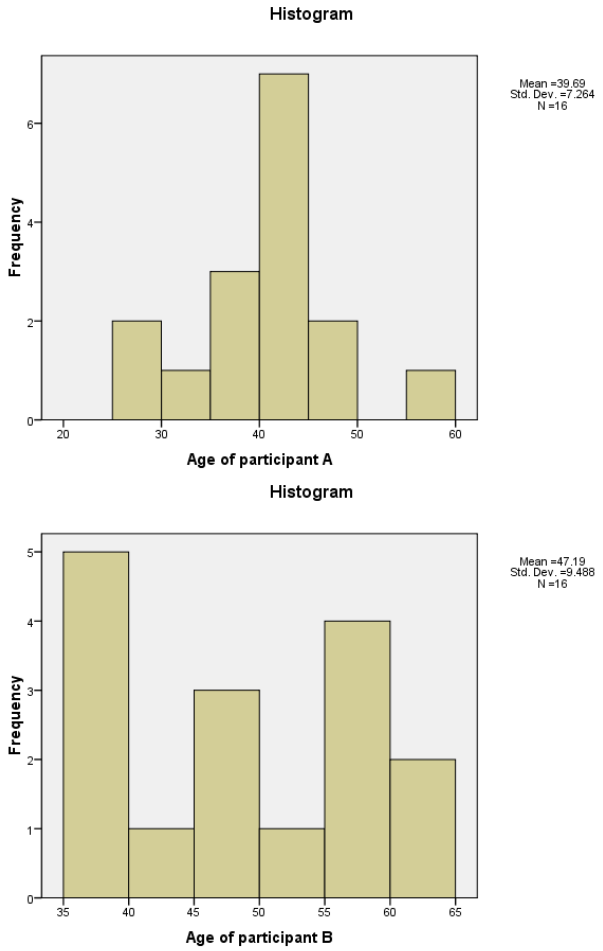

Figure 1: Age of participants

Group Statistics		N	Mean+SD	Std. Error Mean
Post numeric pain rating scale	A	16	4.56+1	.258
	B	16	6.12+0.5	.125
Post neck disability index	C	16	22.44+10.1	2.525
	D	16	36.88+8.4	2.109

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	Df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
NPS score (numeric pain rating scale)	7.607	.010	-5.455	30	.000	-1.562	.286	-2.147	-.978
			-5.455	21.689	.000	-1.562	.286	-2.157	-.968
NDI score (neck disability index)	.294	.591	-4.388	30	.000	-14.438	3.290	-21.156	-7.719
			-4.388	29.079	.000	-14.438	3.290	-21.165	-7.710

Independent Samples Test: Comparison of post-treatment of both groups has shown mean NPRS score in group A (Maitland thoracic spine manipulation) was 4.56± 1.031 and group B (Maitland cervical spine mobilization) was 6.12± 0.50, while post-treatment NDI score group A was 22.44± 10.09 and group B was 36.88± 8.437 with p=0.000 that was less than p=0.05. The results after statistical analysis showed that there is significant difference in mean value of Numeric Pain Rating Scale pretreatment score and Numeric Pain Rating Scale post treatment score (t = -5.455, p =.000). The both two groups showed significant levels of improvement in pain intensity (P < 0.000), at post treatment value (P < 0.000). As p = 0.000 is less than 0.05 so on the basis of these values null hypothesis will be rejected and research hypothesis will be accepted. Maitland manipulation of thoracic spine treatment protocol prove to be more effective than Maitland grade I and II cervical spine mobilization.

DISCUSSION

Treatment of cervical radiculopathy by several physiotherapy techniques. This study aimed to compare the effect of Maitland manipulation of thoracic spine and Maitland Grade I and II mobilization of cervical spine along with conventional physical therapy in decreasing pain and improved functionally, and cervical ranges of motion in patients of cervical radiculopathy. Within-group analysis showed that there was a marked reduction in patient-reported pain scores when pre intervention and post-intervention values were compared in both groups. Comparison of post-treatment of both groups showed mean NPRS score in group A (Maitland thoracic spine manipulation) was 4.56± 1.031 and group B (Maitland cervical spine mobilization) was 6.12± 0.50, while post-treatment NDI score group A was 22.44± 10.09 and group B was 36.88± 8.437 with p=0.000 that is less than p=0.05. So, post-treatment results showed that Maitland Manipulation of Thoracic spine is more beneficial than Maitland grade I and II mobilization of cervical spine in pain reduction and improving functional status in cervical radiculopathy. The limitations were that the Patients of this study were obtained from the Male and female department of Physiotherapy, Mayo Hospital, Lahore. So, the research may not give a larger perspective concerning the prevalence of the disease. There was a limitation of Sample size. Recommendations were that study can be improved by maximizing sample size and by using different hospital settings, follow-up should be more than 3 weeks to get better results.

CONCLUSION

This research concluded that both Maitland thoracic spine manipulation and Maitland cervical spine mobilization techniques are effective in reducing pain, functional status and better active range of motion outcome as p=0.000 that p<0.005 showed both techniques are statistically

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significant but the mean value of Study group A was more than control group B, However, Maitland thoracic spine manipulation treatment showed better results in neck pain reduction and also improved functional status on comparison with group B.

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