

Effectiveness of Mulligan Mobilization versus Neural Mobilization in Patients with Cervical Radiculopathy: A Comparative Study

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Abstract: *The goal of individualized program requires analysis of benefits of mulligan mobilization versus neural mobilization in the patients with Cervical Radiculopathy. Neural mobilizations include facilitation of nerve gliding, dispersion of noxious fluids, increase in neurovascularity and axoplasmic flow. Mulligan's mobilization-with-movement (MWM) involving application of accessory passive glide to the cervical vertebrae while patient simultaneously performs active movement. To achieve this purpose 50 patients, diagnosed with cervical radiculopathy recruited from Physiotherapy Department, Sainath Hospital, Ahmedabad were divided into two groups mulligan mobilization and neural mobilization. Outcomes were visual analogue scale (VAS) & Neck Disability Index (NDI). Neural mobilization produces greater comfort and better functional outcome as compared to mulligan mobilization analysed by application of Mann Whitney Test. (P<0.0001).*

Keywords: Neural mobilization, Mulligan mobilization

1. Introduction

With an increasing sedentary population, especially with reliance on computer technology in the workplace, the prevalence rate of neck pain will continue to rise.¹ Cervical radiculopathy is a condition caused by the compression of the nerve root in cervical spine that commonly manifests as neck pain and it may also radiate from the neck into the distribution of the affected nerve root. It is the result of compressive or inflammatory pathology from a space occupying lesion such as a disc herniation, spondylitic spur or cervical osteophyte. It might be unilateral or bilateral. Cervical radiculopathy constitutes 5 to 36% of all radiculopathies.²

Mulligan concept is the mobilization of the spine whilst the spine is in a weight bearing position and directing the mobilization parallel to the spinal facet planes. Mulligan has described a mobilization technique, spinal mobilization with arm movement, for improvement in cervical lesion resulting in pain and other signs below elbow. There is paucity of research evidence supporting its efficacy and are dominated by case report publication.³

Neural mobilization is based on neurodynamics. Neurodynamics is now a more excepted term referring to the integrated biomechanical, physiological & morphological function of nervous system. The benefit of such technique includes facilitation of nerve gliding, reduction of nerve adherence, dispersion of noxious fluids, increase in neurovascularity and axoplasmic flow. Neurodynamic assessment techniques are incorporated into treatment involving passive movement of the nerve relative to its environment.⁴

Many studies have shown effectiveness of mulligan mobilization and neural mobilization. However no study has been conducted to compare the effectiveness of these two approaches in treatment of cervical radiculopathy. So,

this study has been designed mainly to compare the effectiveness of Mulligan mobilization and neural mobilization in patients with cervical radiculopathy.

Materials and Methods

Study Design: Experimental Study

Study Setting: This study was conducted in Physiotherapy Department, Sainath hospital, Ahmedabad

Sample Selection: 50 patients

Group A: 25 patients. Group B: 25 patients.

Study Duration: 5 days per week for 3 weeks, one session daily

Inclusion Criteria:

1. Age group : 25-65 years
2. Both genders are included
3. Radiating pain from neck to upper limb more than 3 weeks with Spurling test positive, Cervical distraction test positive
4. No physical impairment unrelated to the spine that would prevent the subjects from safely participating in any aspect of the study.

Outcome Measures:

1. Visual Analog Scale⁵
2. Neck Disability Index⁶

2. Method

All the subjects were informed in detail about the type and nature of the study. The subjects were divided in to two

groups; Group A and Group B, 25 patients in each group. All the subjects were randomly selected and assigned in to each group. A pretest measurement with the help of two measures - Neck Disability Index (NDI) for disability and Visual Analog Scale (VAS).^{5,6} was done in each group.

Subjects in Group-A will be given Mulligan mobilizations (MWM) for cervical region. Subject will be in sitting position. Therapist places one thumb reinforced over other on the spinous process of the chosen vertebra (C5/C6 vertebra) as palpated with reference to C7 vertebra. The therapist then pushes down on the chosen spinous process. This pressure is sustained and the patient actively performs shoulder abduction supported by the assistant provided there is no pain. If this approach is successful, on subsequent visits, as the patient improves, assistant applies overpressure, provided there is no discomfort. On day one, three repetitions are only applied. On subsequent days three sets of six repetitions will be applied. Six sessions with 48 hr interval between each were given. Mobilization will be given by active movement followed by passive overpressure based on the movement restricted.⁷ The frequency of treatment will be 3 sets of 10 repetitions each.⁸

Subjects in Group-B will receive Neural mobilization. Subject will be in supine position and remains relaxed with the feet uncrossed. The patient is slightly angled obliquely for easier access to the scapula. The therapist position is next to the plinth facing the direction of subject's face. The therapist depresses the scapula with concomitant upper extremity joint positioning as per nerve bias. The wrist will be used as a tension factor and at the point where tension was felt by the therapist and perceived by the subject, grade 3 oscillations will be given rhythmically and slowly to each joint from proximal to distal. A total of 20 oscillations (1 oscillation/1 second) will be given to each joint with a total duration of 15 minutes.^{9,10}

In both groups, Interferential therapy & cervical traction were given followed by either neural mobilization or Mulligan Mobilization. Interferential therapy an amplitude-modulated constant frequency of 100 Hz and pulse duration of 125 μs due to its analgesic effect for 20-minutes. Data was obtained on pre, after 1st week & 3rd week.¹¹

In cervical intermittent traction subject's body weight was measured (Tension up to 1/8th of bodyweight was calculated). The duration of the procedure was for 20 minutes with 20 seconds of hold time and 10 seconds of rest time.¹²

3. Results

Wilcoxon Signed Rank Test¹³ was applied to Group A and in Group B for with-in group analysis and it is as follows: In Group A, results showed significant improvement on VAS score (T = 325, P< 0. 0001). In Group A, results showed significant improvement on NDI score (T = 325, P

< 0. 0001). In Group B, results showed significant improvement on VAS score (T = 325, P< 0. 0001) In Group B, results showed significant improvement on NDI score (T=325, P<0. 0001).

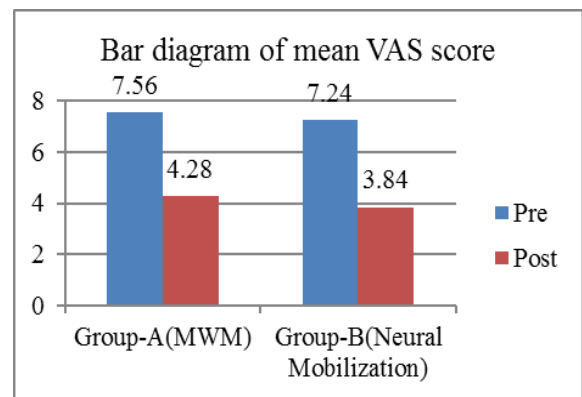


Figure 1

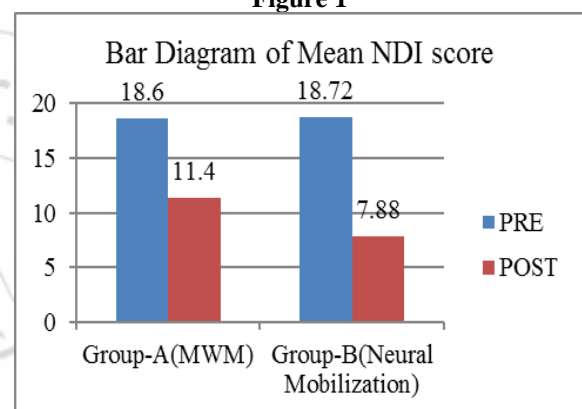


Figure 2

Wilcoxon Sum Rank Test (Mann Whitney 'U' Test)¹³ was applied for between-group comparison of Group A and Group B, and it is as follows:

For VAS, U=190. 50, U'=334. 50, P= 0. 0032. On comparing Group A and Group B for post-treatment VAS score, results showed significant difference in improvement in terms of VAS.

For NDI, U=110. 50, U'=355. 50, P= 0. 056. On comparing Group A and Group B for post-treatment NDI score, results showed significant difference in improvement in terms of NDI.

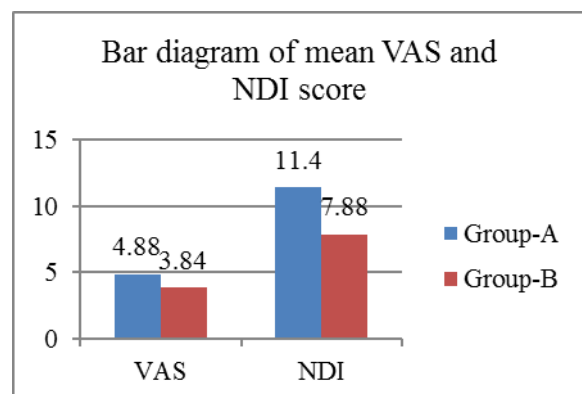


Figure 3

4. Discussion

The overall study proved that both Mulligan mobilization and neural mobilization is effective in improving Pain and decreasing the disability level in cervical radiculopathy subjects.

Vincenzino proposed that Mulligan techniques help in improving patient's symptoms by correcting minor positional fault and by neurophysiologic mechanism.¹⁴ According to paungmali et al MWM produces a hypoalgesia and concurrent sympathoexcitation.¹⁵ It has been previously proposed that the combination sympathoexcitation, non opioid hypoalgesia and improvement in motor function are indirect signs of possible involvement of endogenous pain inhibitory systems in manual therapy treatment effects.¹⁴

Individuals with cervical radiculopathy shows altered neurodynamics so neural mobilisation technique was used to improve altered neurodynamics. Richard et al (2008) did analysis of studies and concluded a positive benefit from using neural mobilization in the treatment of altered neurodynamics. Neural mobilisation restore the dynamic balance between the relative movement of neural tissues and surrounding mechanical interfaces allowing reduced intrinsic pressures on the neural tissue promoting optimum physiologic function. There is facilitation of nerve gliding, reduction of nerve adherence, dispersion of noxious fluids, increased neural vascularity and improvement of axoplasmic flow which reduces disability level and improves range of motion.¹⁶

5. Conclusion

Neural mobilization is better than mulligan mobilization in Cervical radiculopathy. Results supported that neural mobilization was more effective than mulligan mobilization to improve pain and disability in patient with cervical radiculopathy.

6. Future Scope

1. Studies with larger sample size are recommended with longer follow-up period to assess long term benefits.
2. ROM of cervical spine and affected upper extremity should be measured

Reference

- [1] Wainner RS, Gill H. Diagnosis and nonoperative management of cervical radiculopathy. :J Ortho Sports Phys Ther. 2000;30:728-744
- [2] Radhakrishnan K, Litchy WJ, O'Fallon WM, Kurland LT. Epidemiology of cervical radiculopathy: A population-based study from Rochester, Minnesota, 1976 through 1990
- [3] Brain R Mulligan. Manual therapy: 'NAGS', 'SNAGS', 'MWM' etc. 4th edition, New Zealand, Wellington. 1999; 16-24.
- [4] David S. Butler. Mobilization of the nervous system. 1st edition, Elsevier Churchill Livingstone. 1994; 189-

192

- [5] Hendiani JA, Westlund KN, LAwand N, et al. Mechanical sensation and pain thresholds in patients with chronic arthropathies. J Pain 2003;4:203-211. [ISI] [Medline]
- [6] Birgitta Helmersen Ackelman and Urban Lindgren. Validity and reliability of a modified version of the neck disability index. Journal of rehabilitative medicine 2002; 34:284-287
- [7] Gordon McMorland, Esther Suter, Steve Casha. Manipulation or microdiscectomy for Sciatica. A prospective randomized clinical study. Journal of manipulative and physiological therapeutic 2010; 33(8): 576-584
- [8] Mulligan BR. Manual Therapy "Nags", "Snags", and "Mwms" etc. 6th revised edition, 2010
- [9] Ellis RF, Hing WA. Neural mobilization: a systematic review of randomized controlled trials with an analysis of therapeutic efficacy. J Man Manip Ther. 2008; 16(1):8-22
- [10] Jeffrey Alan Schroder. Manual Therapy and Neural Mobilization: Our Approach and Personal Observations. Orthopaedic Practice. 2004; 16(4);23-27
- [11] Fuentes JP, Olivo SA, David J. Magee DJ and Gross DP. Effectiveness of interferential current therapy in the management of musculoskeletal pain: a systematic review and meta analysis. Phys Ther 2010; 90(9): 1219-1238
- [12] Mohammad Taghi joghataei. The effect of cervical traction combined with conventional therapy on grip strength on patients with cervical radiculopathy:clinical rehabilitation 2004;18:879-887
- [13] Basic Biostatistics In Medicine and Epidemiology, Alired A. Rim. Arthur j Hartex
- [14] Bill Vincenzino, Aatit Paungmali, Pamela Teys. Mulligan's mobilization with movement, positional faults and pain relief: current concepts from a critical review of literature. Manual Therapy 2007
- [15] Aatit Paungmali, Shaun O Leary, Tina Soulviv. Hypoalgaesic and sympathoexcitatory effects of mobilization with movement for lateral epicondylalgia. Physical Therapy; 2003; 83: 374 83
- [16] Butler DS. Adverse mechanical tension in the nervous system: a model for assessment and treatment. Aust J Physiother. 1989; 35(4):227-38

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