Original Article

Compare the Effectiveness of Mulligan (Nags & Snags) and McKenzie (Self-Stretching) On Improving the Pain and Functional Ability in Patient with Chronic Neck Pain

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A R T I C L E  I N F O

Key Words: Mulligan, NAGs, SNAGs, McKenzie, Functional Ability, Chronic Neck Pain


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A B S T R A C T

Neck pain is Consider the major problems and the prevalence of this musculoskeletal disorders are very common in people. Objective: To compare the effectiveness of mulligan and McKenzie on improving pain and functional ability in chronic neck patient. Methods: This trial was registered with Iranian trail registry with reference no: IRTC20220414054537N4. It’s a Double-Blind Randomized Clinical Trial that was conducted in DHQ Hospital Shadrah a affiliated teaching hospital attached with Afro-Asia University Lahore from 1May 2022 to 30 June 2022. The sample size was calculated and total 26 patients were divided into two groups. The ages of the patients were around 20-55 years old. The entire patient having the mechanical neck pain was included in this study. Patients were selected from DHQ hospital in May to June 2022 duration. In group A we applied the mulligan technique of manual therapy treatment that included the Natural apophyseal glides, sustained natural apophyseal glides and Self SNAGs in sitting position of the patient. The second group of 13 patients had applied the Mackenzie exercises in seven motions like 4 movement of neck extension,2 movements in lateral flexion and rotation and one movement in flexion direction. Results: Overall the post Numeric pain rating scale and Neck Disability index was significantly improved in group A which received the NAGs & SNAGs Mobilization technique. Conclusion: Mulligan (NAGs SNAGS) is effective than Mackenzie (self-stretching) treatment technique to improve the functional ability and reducing pain in chronic neck patient.

I N T R O D U C T I O N

Neck pain is Consider the major problems and the prevalence of this musculoskeletal disorders are very common in people. Due to technology and differential professional job role it is considered that a lot of people spend their maximum time in sitting position now a days at work It is estimated that out of 3.1 person is affected by this neck problem now a day's specifically in middle age [1]. Total burden of the neck pain was calculated by available statistics, and it was concluded that it ranks among the 4th position in worldwide disease 4th highest in terms of disability as measured by years lived with disability (YLD), and 21st in terms of overall burden. Cervical pain that is originated from mechanical in nature relatively different from the pain due to anatomical and structural cause. Patient with mechanical neck pain or chronic neck pain having no specific reason in disturbance of structure like...
Muscle activity and neck alignment in patients with chronic neck pain accompanied by analyze the factors affecting the function and verify the effect related to functional recovery and to provide clinical basic data for this [11]. Our focus in this study was to analyze the best way to treat the neck pain due to abnormal posture of the neck. The aim of the study to understand the effectiveness of the SNAGs versus self-stretching.

**METHODS**

This is double-blind randomized controlled trial. This trial was registered with Iranian trail registry with reference no: IRCT2022041405437N4. The sample size was calculated by the mean value of the referenced article using the epitool method for sample size calculation and total 26 patients were divided into two groups [12]. The ages of the patients were around 20-55 years old. The entire patient having the mechanical neck pain and pain due abnormal posture of neck like forward head posture were included in this study. Patients were selected from DHO hospital in May to June 2022 duration. All the patients that were included for the study should base on Biondi questionnaire [13]. All the patients should have greater than 20% neck disability index score and the score of Numeric pain rating will be more than 2-3 points. All participants were excluded from this study if they had any hearing problem, vision disorder, smell issues or any kind of taste related problem. All participant those were having any systematic problems, like tension headache, Rheumatic arthritis, several viral and bacterial infection, inflammatory disease, migraine, any neurological problem, and fracture in neck region were excluded from this study [12, 14]. The examiner of the study was also blind. The consent form from the patient were taken at the start of the study and patient after reading the form showed their availability and consent for this trail study [12]. The Experimental group applied with the mulligan technique of manual therapy treatment that included the Natural apophyseal glides, sustained natural mobilizations and Self SNAGs in sitting position of the patient. NAGs movements are the oscillatory Movement and these mobilizations tend to be provided in anterolateral direction of the selected cervical joint. The movement of the force is in parallel direction toward the restricted cervical facet joints. We have applied 3 sets of 6 repetitions each and the intensity of dosage was maintained in 2-3 hertz. The procedure of the movement as per the following instruction of the mulligan in which we had applied the sustained glide and asked the patient to move its neck in several direction like Flexion, Extension, Side flexion and rotation and these movement was maintained in pain free direction and range [15]. The second group of 13 patients with chronic neck pain was...
given the following treatment strategies in which we had applied the Mackenzie exercises in seven motions like 4 movement of neck extension, 2 movements in lateral flexion and rotation and one movement in flexion direction. The pre and post value was monitored by performing the Mackenzie technique in the patient and its effect on the body was also monitored as well especially in soft tissue area of the neck in the body. Both sides of the body were measured and compared with each other. The time to take the new reading is 10 second. The Body skin of the neck area was pushed by 0.18 N force and after the pre-load a force of 0.58N was applied to the neck skin at the interval of 15 ms. Thereafter, the vibration on the skin surface was triggered by Myoton PRO (Myoton AS, Estonia), a muscle tone measurer, which was used to examine the bio mechanical indices [16,17]. The Numeric pain rating scale and Neck disability Index as an outcome measuring tools. Statistical analysis was performed to analyze the effect of the treatment applied to the subjects of both control and experimental groups. It was done by using the IBM SPSS Inc.25.0 version. For this, the data were incorporated in MS excels spreadsheet. Out of 26 subjects 13 were randomized into Group 1 and 13 are randomized into Group 2. All the 26 subjects complete the entire protocol as defined by 2 months of treatment and pre and post value were taken by using the Numeric pain rating scale and Neck disability scale. The outcomes of the study were neck pain and Functional Ability. The following treatment applies with the frequency of 4 times a week and the whole treatment session was continued for 8 weeks. Total 32 sessions were given to both groups and the follow-up were taken after the 8 weeks and evaluated after this. Statistical tools were applied, and data were normally distributed to between group comparison calculated by paired t-test and for the in between groups and independent sample t-test for between both groups post value. Descriptive measures like mean, the standard deviation was reported along with the p-value.

**RESULTS**

The study was conducted on 26 subjects. The diagnose Chronic Neck Pain from both genders included in this study. Overall, 26 populations were divided into two groups of 13, 13. Out of 26 patient 16 were the male patient and 10 were the female. Out of 26 the 6 patients where BMI underweight and 20 were containing the normal BMI. All the subjects were a mean age of 25.27±3.29 of experimental group and conventional group. Mean and standard deviation of BMI for experimental group and conventional group was 1.77 ±0.43. Table 1 Showed the mean and standard deviation of Numeric pain value in Experimental group and control in between group (independent sample t-test value). The mean and standard deviation of Numeric Pain rating scale in pre value in group A was 7.38±0.65 and Group B this 7.46±0.8. The post value of Numeric pain rating scale in group A was 1.07±0.64 and in group B was this 4.00±1.08. The mean difference between pre and post Numeric pain rating scale value in group A was calculated 6.31±0.01 and group B was 3.46±0.21. The p value between pre and post value within group (<0.05) show significant difference.

**Table 1:** Showed the mean and standard deviation of Numeric pain value in Experimental group and control in between group (independent sample t-test value)

<table>
<thead>
<tr>
<th>Numeric Pain Rating scale</th>
<th>Experimental Group</th>
<th>Control Group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Numeric Pain rating scale</td>
<td>7.38±0.65</td>
<td>7.46±0.87</td>
<td>0.802</td>
</tr>
<tr>
<td>Post Numeric Pain rating scale</td>
<td>1.07±0.64</td>
<td>4.00±1.08</td>
<td>0.000</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>6.31±0.01</td>
<td>3.46±0.21</td>
<td></td>
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</tbody>
</table>

Table 2 Showed the mean and standard deviation of Neck disability index in Experimental group and control in between group (independent sample t-test value) The mean and standard deviation of Neck Disability scale in pre value in group A was 7.38±0.65 and Group B was 7.46±0.87. The post value of Neck Disability scale group A was 1.07±0.64 group B was 7.46±0.87. 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. The p value between pre and post value within group (<0.05) show significant difference.

**Table 2:** Showed the mean and standard deviation of Neck disability index in Experimental group and control in between group (independent sample t-test value).

<table>
<thead>
<tr>
<th>Neck Disability Index</th>
<th>Experimental Group</th>
<th>Control Group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Neck-Disability Index</td>
<td>37.15±4.23</td>
<td>36.84±3.80</td>
<td>0.847</td>
</tr>
<tr>
<td>Post Neck Disability Index</td>
<td>13.53±6.32</td>
<td>23.69±7.50</td>
<td>0.001</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>23.62±-2.09</td>
<td>13.15±-3.70</td>
<td></td>
</tr>
</tbody>
</table>

**DISCUSSION**

There was no significant difference between the pre-treatment values of two groups according to numeric pain rating scale and neck disability index (p value <0.05) Overall the post Numeric pain rating scale and Neck Disability index was significantly improved in group A which received the NAGs & SNAGs Mobilization technique. The p value while comparing the post value of group A and group B was significant. The Overall post Numeric rating scale and disability index values improved in both groups and the p value had been significant. It had observed that significant improvement had seen because the p value was significant while comparing the post value in Numeric Pain rating and neck disability index of both groups A and B. The result of our study has shown the improvement in the neck disability score and pain scale but when we compare the effect it has showed that SNAGs has given better result as compared to
the mulligan techniques. But in group A Both the Pain scale and the neck disability in chronic neck pain showed the improvement in the symptoms and other Activities by applying the mulligan techniques these result has given the same result as we received in some previous result by Ali et al. They concluded that Patient with chronic neck pain has given the better outcomes and improvement in the neck disability scale and pain scale by Applying The NAGS & SNAGs [18]. The result of our study has shown the improvement in the neck disability score and pain scale but when we compare the effect it has showed that SNAGs has given better result as compared to the mulligan techniques. Our study result is coherent with the result we received by the study of Lopez et al. He Concluded that SNAGs Showed better result as compare to other Manual therapy techniques [19]. We have applied both SNAGs NAGs combined to received better outcomes in term of improving neck function, Range of motion, Pain and other neck related functional movement.IN group A we have received the better significant outcomes in improving neck disability scale and pain scale. This study is coherent with the result of study conducted by Put et al. The concluded the result in their study that Mulligan technique showed superior result in improving the Range of motion, pain and neck function as compared to the other group which received multimodal therapy which included the Massage in cervical spine area, Ultrasound and electrotherapy [20]. We have received the significant improvement in Group A in the neck function and improvement in all aspect of neck movement because when we calculated the result of both group A(Mulligan) and Group B(Mackenzie). This study is coherent because one of the study of few year back also has done the same procedure by applying Mulligan technique and Maitland technique to compare these techniques. They received that after applying the 1-month period of treatment in both groups Maitland and mulligan that NAGs & SNAgs showed the better clinically significant improvement as compared to the Maitland technique. Gautum concluded that Mulligan is better treatment protocol than other treatment techniques [21]. In group A Both the Pain scale and the neck disability in chronic neck pain showed the improvement in the symptoms and other Activities by applying the mulligan techniques these result has coherent with the Ahmad et al in 2013 concluded the same result after taking the measurement in pre and post value in both groups applying the mulligan and Kaltenborn. They found that after giving the mulligan techniques in patient with neck pain showed the better result as compare to the Kaltenborn mobilization group [22]. There was no significant difference between the pre-treatment values of two groups according to numeric pain rating scale and neck disability index (p value <0.05) Overall the post Numeric pain rating scale and Neck Disability index was significantly improve in group A which received the NAGS & SNAGs Mobilization technique. The P value while comparing the post value of group A and group B was significant. The study result is coherent with the study of abdelgalil et al in which he concluded that mulligan with exercise showed better result but when we compare the Mulligan with exercise and without exercise this showed non-significant result. But as we have received the clue that both groups show same level of improvement hence, we found the significant improvement has seen in SNAGs & NAGs (Mulligan technique)[23]. The result of our study has shown the improvement in the neck disability score and pain scale but when we compare the effect it has showed that SNAGs have given better result as compared to the mulligan techniques. This study has given the same research base result we found in the study of EI Sodany et al in 2014 in which he explained the application of mulligan techniques, exercises and mobilization with exercises and alone exercise. They concluded that SNAGs Group has given the better result as compared to the others group [24].

CONCLUSIONS

Mulligan (NAGs SNAGS) is effective than Mackenzie (self-stretching) treatment technique to improve the functional ability and reducing pain in chronic neck patient. Limitation of this research was low sample size and extensive scale that was unable to fill appropriate.

Authors Contribution

Conceptualization: SN, NJ
Methodology: SN, AJ
Writing-review and editing: SN, TI, FG

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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REFERENCES


