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Drawing the Effectiveness of Scapular Proprioceptive Neuromuscular Facilitation Techniques in Rectification of Scapular Dyskinesis in Chronic Neck Pain: A Randomized Controlled Trial

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ABSTRACT:

Background: Chronic non-specific neck pain affects 30-50% of adults, causing significant disability and ranking fourth globally in terms of disabilities. Scapular dyskinesis, characterized by altered scapular movement and positioning, is a common contributor to this pain. Proprioceptive Neuromuscular Facilitation (PNF) techniques have shown promise in improving scapular function and alleviating chronic neck pain.
Objectives: To assess the impact of scapular proprioceptive neuromuscular facilitation techniques on scapular dyskinesis in individuals with chronic neck pain.
Methods: In this clinical trial, 42 participants diagnosed with scapular dyskinesis along chronic neck pain are been selected which are divided into two different group. The experimental group will undergo proprioceptive neuromuscular facilitation technique like thymic stabilization and slow reversal and stretching exercises of neck muscles on the other side the control group will receive hot fomentation, stretching's of neck muscles for 4 weeks.
Results: Data will be entered in MS Excel for the purpose of master chart and pre and post findings will be compared and the result will be documented.
Conclusion: The study shown how scapular proprioceptive neuromuscular facilitation techniques are effective in rectification of scapular dyskinesis in pain the chronic neck.

1. Introduction

With a 12-month prevalence of 30-50% in the adult population, chronic non-specific neck pain is one of the most incapacitating musculoskeletal complaints. Nearly 50% of patients with neck pain display significant disability during long-term follow-up. In the world, neck pain ranks fourth in terms of disabilities, contributing to 22% of musculoskeletal disorders. Conservative approaches have been recommended as the best course of action for treating chronic neck discomfort; telerehabilitation offers an alternative for treating musculoskeletal issues. People of all ages experience chronic neck discomfort, a common musculoskeletal disorder that significantly lowers quality of life. Scapular dyskinesis, or incorrect movement and alignment of the scapulae, is one condition that contributes to chronic neck pain.
Since persistent neck discomfort is relatively common in the Indian population, it's critical to look into efficient treatment alternatives for this ailment.[1]
One typical anomaly seen in people with persistent neck pain is scapular dyskinesia. It is distinguished by modified scapular mobility and posture, which may lead to a reduction in stability and an increase in the amount of strain on the musculature surrounding it. Chronic neck pain can arise and persist due to changed joint mechanics, diminished proprioception, and muscle imbalances brought on by scapular dyskinesis. Scapular proprioceptive neuromuscular facilitation approaches have been shown to be important in treating scapular dyskinesis and improving results for patients with chronic neck discomfort, according to recent literature.[2]
Herman Kabat introduced Proprioceptive Neuromuscular Facilitation (PNF) in the 1940s as a therapeutic strategy that establishes voluntary control through the proprioceptors. PNF aids in maximizing range of motion, strength, stability, endurance, and flexibility. Depending on the intended use, PNF can be administered over the neck, scapula, upper limbs, trunk, pelvis, and ankle.[3]

2. Methodology

Study Setting: Musculoskeletal OPD, MGM Physiotherapy Rehabilitation and Fitness Centre, Aurangabad, Maharashtra

Study Design And Sample Size: Randomized Controlled Trial. The subjects enrolled in the experimental study is 42 (no= 42)

Study Population: Subjects with Scapular Dyskinesis along with nonspecific chronic neck pain

Sample Size Calculation: (For calculation of sample size for present study, G. Power software is used. Alpha = α = 0.05, Power =0.80, Large effect was considered =0.8.Using G*Power software sample size will be found to be 21samples / patients in each group)
Sampling Technique: Simple Random Sampling
Sample Size: 42
Inclusion Criteria:
1. Individuals aged 20 to 50 years.
2. Diagnosed with chronic non-specific neck pain, which has persisted for at least 12 weeks.
3. Participants with documented scapular dyskinesia, assessed using standardized grading scales (e.g., scapular dyskinesia grading scales such as the Subjective Scapular Dyskinesis Test).

Exclusion Criteria:

1. Individuals younger than 20 or older than 50 years.
2. Participants with specific neck pain etiologies (e.g., cervical spine fractures, tumors, infections) or severe neurological deficits.
3. Individuals with neurological conditions or any other medical conditions that may affect their ability to participate in the study would be excluded.

Participant Timeline: Including a four-week intervention, the study will last six months. To guarantee that the four-week intervention is completed successfully, participants will be enrolled within the first four months of the experiment.

Implementation: The procedure of randomization will be supervised by the principal investigator and research coordinator. The recruiting process for either group will require participants to manually choose the sealed envelope group allocation**.**

Blinding: The assessor should remain anonymous while allocating the subjects to the groups. It will be mandatory for individuals to withhold any information about their therapy from the assessor in order to guarantee blindness.

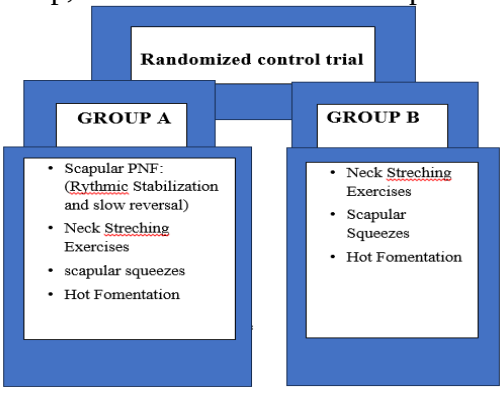
Sample Size Consideration:

The Purpose of this Randomized Clinical Trial is to assess the effects of Scapular PNF Techniques in patients having scapular dyskinesis who are suffering from chronic neck pain using an experimental two-group design. 42 participants in total will be recruited, and they will then be randomly assigned.

Procedure

The data gathering process will start as soon as the Institutional Ethical Committee of MGMIHS issues the ethical certificate. All participants will be asked to sign an informed consent form prior to the start of therapy, and the complete sample will be randomly assigned to two groups, group A and group B. The experimental group, known as Group A, will get scapular PNF techniques such as Rhythmic Stabilization and Slow Reversals for 20 minutes on each side. Additionally, the group will receive neck stretching exercises and scapular squeezes for 15 minutes on each side Group B, on the other hand, will just perform scapular squeezes and neck stretching exercises for a duration of 15 minutes on each side. Using the Neck Disability Index, Numeric Pain Rating Scale, and Scapular Reposition Test, the assessment will be recorded twice (at baseline and after 4 weeks of treatment). Based on the baseline and post-treatment assessments, a conclusion will be made.

GROUP A: Experimental Group, GROUP B: Control Group



Outcome Measures
Numeric Pain Rating Scale:
Neck Disability Index
Manual Muscle Testing
Scapular Reposition Test

Data Collection and Management:
The individuals' data will be gathered using the Numeric pain rating scale, Neck disability index and manual muscle testing of upper trapezius , serratus anterior , lower trapezius muscle both before and after the intervention.

Statistical Analysis:
Microsoft Excel will be used to enter data, and SPSS version 24.0 will be used for analysis. For quantitative variables, the mean and standard deviation will be determined, and for categorical variables, the proportions. Additionally, data will be shown visually using bar diagrams and other similar formats. To determine whether there is a significant difference between the two groups, an unpaired test will be used. The chi-square test will be utilized to examine the correlation between various qualities. A P-value of less than 0.07 will be regarded as statistically significant.

3. Discussion

This randomized controlled trial investigates the effectiveness of scapular proprioceptive neuromuscular facilitation (PNF) techniques in treating scapular dyskinesis in individuals suffering from chronic non-specific neck pain. With a significant prevalence of 30-50% in the adult population, chronic neck pain is a major source of disability, ranking fourth in terms of global disabilities. The study focuses on the potential benefits of scapular PNF techniques in improving outcomes for these patients.

Study Findings and Implications: The results of this study are expected to provide insights into whether PNF techniques can effectively address scapular dyskinesis and alleviate chronic neck pain. Previous research has indicated that PNF can enhance range of motion, strength, stability, endurance, and flexibility, all of which are critical for the management of musculoskeletal disorders like scapular dyskinesis. By comparing the outcomes of the experimental group (receiving PNF techniques along with neck stretching and scapular squeezes) and the control group (receiving only neck stretching and scapular squeezes), this study aims to determine the specific contributions of PNF to patient improvement.

Potential Mechanisms
Scapular dyskinesis involves altered movement and positioning of the scapula, which can lead to reduced stability and increased stress on surrounding musculature. This condition can perpetuate chronic neck pain through disrupted joint mechanics, diminished proprioception, and muscle imbalances. PNF techniques, such as Rhythmic Stabilization and Slow Reversals, are designed to address these issues by enhancing neuromuscular control and proprioceptive feedback. Improved scapular function can subsequently lead to better neck stability and reduced pain.

Clinical Relevance
Given the high prevalence and significant impact of chronic neck pain, particularly in the Indian population, identifying effective treatments is crucial. The incorporation of scapular

PNF techniques into rehabilitation protocols could provide a valuable tool for clinicians. If the study demonstrates significant improvements in the experimental group, it could lead to wider adoption of these techniques in clinical practice, potentially improving quality of life for many patients.

Strengths and Limitations

One of the strengths of this study is its rigorous design, including randomization and blinding, which minimizes bias and enhances the validity of the findings. The use of validated assessment tools, such as the Neck Disability Index and Numeric Pain Rating Scale, ensures reliable measurement of outcomes.

However, there are also limitations to consider. The relatively small sample size of 42 participants may limit the generalizability of the results. Additionally, the study's duration of four weeks may not capture long-term effects of the intervention. Future research could benefit from larger sample sizes and longer follow-up periods to better understand the sustained impact of PNF techniques on chronic neck pain.

Future Directions

Based on the findings of this study, future research could explore several avenues. Studies with larger and more diverse populations could validate and expand upon the results. Additionally, investigating the long-term effects of PNF techniques and their integration with other therapeutic modalities could provide a more comprehensive understanding of their benefits. Exploring the underlying physiological mechanisms through which PNF impacts scapular dyskinesis and neck pain could also offer valuable insights.

4. Conclusion

This study aims to contribute to the growing body of evidence supporting conservative approaches, including telerehabilitation, for managing chronic neck pain. By focusing on scapular PNF techniques, the research addresses a specific and potentially modifiable factor in the persistence of chronic neck pain. The findings are expected to have important implications for clinical practice, highlighting the potential of targeted neuromuscular interventions in improving patient outcomes and enhancing quality of life.

Confidentiality

The primary investigator will record any subjective data and provide an explanation of the research program to the participant. Witnesses, the patient, and the principal investigator will all sign the consent form and the confidentiality statement. If the patient has to provide any information for the study, consent will be taken with complete guarantee of his privacy.

Funding: The MGM School of Physiotherapy in Aurangabad, a constituent unit of MGMIHS in Navi Mumbai, Maharashtra, India, will supply funding through the Research Cell.

Consent: The principal investigator will get the participants' signed written informed consent and accent forms on a printed form in the local language, together with the participants' evidence of confidentially. Data will be kept once the study is over and the results are published

Ethical Approval: The study has been continued after the MGM School of Physiotherapy, Aurangabad, an affiliate of MGMIHS, Navi Mumbai, Maharashtra, India, has given its institutional ethical committee clearance.

Conflict of Intrests: - No conflicting interests are stated by the authors.

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