



P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.38
IJPESH 2024; 11(4): 74-76
© 2024 IJPESH
<https://www.kheljournal.com>
Received: 24-04-2024
Accepted: 02-06-2024

Rajan Balakrishnan
MAHSA University, Malaysia

Selvaraj Sudhakar
Dr. M.G.R. Educational and
Research Institute, Tamil Nadu,
India

Isometric relaxation and isometric exercises on pain and functional activities in non-specific neck pain

Rajan Balakrishnan and Selvaraj Sudhakar

Abstract

The intention of the study was to determine the effects of post isometric relaxation and isometric exercises on pain and functional activities in non-specific neck pain individuals.

Introduction: Neck pain with no known cause is called "non-specific neck pain". Various factors contribute to the development of non-specific neck pain. These might include physical strain at work, Emotional stress, like worries and anxiety about family or work, often plays an important role.

Methodology: A total of 30 subjects, age group between 20-40 years people having nonspecific neck pain were selected based on the inclusion and exclusion criteria. Group A consists of 15 subjects who received post isometric relaxation for alternate sessions for 4 weeks and Group B consists of 15 subjects who received isometric exercises. The data were compared and analyzed within and between groups.

Results: On comparing Pre test and Post test within and in between Group A & Group B on Visual Analogue Scale (VAS) Score & Neck Disability Index (NDI) Score shows significant difference in the mean values at $P \leq 0.05$.

Keywords: Nonspecific neck pain, post isometric relaxation, range of motion, neck pain, neck disability index

Introduction

Neck pain is one of the most common musculoskeletal disorders in the general population. Non-specific neck pain is defined as mechanical pain located anywhere between the occiput and upper thoracic spine and surrounding muscles without any specific etiology [1] the international association for the study of pain (IASP) has defined neck pain as: "pain perceived as arising from anywhere within the region bounded superiorly by superior nuchal line, inferior by an unoriginally transverse line through the tip of first thoracic spinous process, and laterally by sagittal plane tangential to the lateral border of neck. A frequently seen cause of neck pain is awkward occupational postures, heavy lifting and physically demanding words [2]. The pain may arise from any of the structures in the neck. These include the intervertebral discs, ligaments, muscles, facet joints, duramater and nerve roots [3]. There are many potential causes of neck pain. These vary from tumors, trauma (e.g., Fractures), infection, inflammatory disorders (e.g., Rheumatoid arthritis) and congenital disorders. In most cases, however, no systemic disease can be detected as the underlying cause of the complaints. This group consists of patients with mainly mechanical disorders including degenerative changes and could be labelled as non-specific neck pain. Its prevalence ranges from 14.2% to 71% in the general population at some time in their lives. Neck pain was more prevalent among women, and it is peaked in the middle aged people [4, 5]. Non-specific neck pain is the most prevailing musculoskeletal disorder which has a large socioeconomic burden worldwide. It is associated with poor posture and neck strain which may lead to pain and restricted mobility. Non-specific neck pain (NSNP) is the most common and the 4th leading cause of musculoskeletal disorder worldwide. It is estimated that about 70% of the population experiences neck pain throughout life, with an annual incidence of 15% to 50% [6]. It is seen more commonly in middle-aged females [7]. Within a "bio-psycho-social" framework, a number of factors could be considered to contribute to NP. These include non-modifiable risk factors related to patho-anatomical features (e.g., History of trauma, age, gender and genetics) and adjustable risk factors, which are more related to psychosocial features (e.g., Smoking, physical activity and sedentary lifestyle, beliefs, coping style, expectations, and work satisfaction). These factors may also

Corresponding Author:
Rajan Balakrishnan
MAHSA University, Malaysia

contribute to the transition from acute to chronic pain status. It has been well established that NSNP is not only the risk factor for developing severe spinal pathologies and functional disability but that it is also associated with decreasing the quality of life and productivity of workers [8]. According to the global burden of diseases, the statistical prevalence of neck pain shows Asia at 10.14%, Australia at 10.13%, the Caribbean at 9.7%, central Asia at 9.8%, central Europe at 9.9%, east Asia at 11.8%, eastern Europe as 9.9%, Latin America s 10.12%, and southeast Asia as 7.6% [9]. The natural cause of NSNP remains unclear. While it is often self-limiting within a few weeks of onset, it can severely limit daily functioning, induce substantial medical consumption and result in prolonged sick leave and disability [10]. Post isometric relaxation (PIR) is a MET used to relax and lengthen a hypertonic and shortened muscle. This gentle stretching technique is typically used on postural muscles. These muscles often become short and tight and can lead to muscle imbalances. This can limit range of motion and cause joint restrictions. Several muscles in the upper body fall under this category such as the upper trapezius, and levator scapulae. When these muscles become shortened, they can restrict range of motion in the head, neck and shoulder and often become painful [11]. An isometric exercise is a form of exercise involving the static contraction of a muscle without any visible movement in the angle of the joint. The term "isometric" combines the Greek words isos (equal) and metria (measuring), meaning that in these exercises the length of the muscle and the angle of the joint do not change, though contraction strength may be varied [12]. Post isometric relaxation is claimed to be an effective method for acute tension in soft tissue problems that preclude immediate spinal adjustments, reduces muscle spasm that is responsible for spinal fixation, reduces pain and lengthen the tightened neck muscles to normalize gross cervical range of motion [13]. The post isometric relaxation is a form of muscle energy technique (MET) in which the patient's muscles are moved in a particular direction against the counterforce of the therapist, which is mediated by Golgi tendon organ (GTO) when the muscle contracts isometrically. The GTO activates and responds by reflex inhibition and contracting antagonist muscles (by submaximal contraction of the muscles followed by stretching of the same muscles). It is used in the management of various musculoskeletal conditions that work on the principles of restoring biomechanics and reducing the movement restriction and pain [14]. The post isometric relaxation involves the peripheral and central modulating mechanism by activating the muscles and joint mechanoreceptors, like periaqueductal grey in the midbrain or non-opioids noradrenergic descending inhibitory pathways and serotonergic. The VAS is a reliable and validated instrument for pain intensity [15] and neck disability index (NDI) is a condition-specific, or patient completed a questionnaire comprising of 10 items to evaluate pain, and functional status which is mostly used for reporting neck pain.

Methodology

The study design was experimental type with comparison of pre and post test values. The study done at Chennai with 30 samples simple random sampling. The study duration was 4 weeks with 12 sessions. The inclusion criteria consists of age group of 20 to 40 years with both gender. The NDI score between 20 to 30. The moderate pain intensity 5 to 7. The excluded part were trauma related neck pain, temporomandibular disorder, surgery or a fracture in the neck,

severely restricted range of motion in cervical rotation and herniated disc with positive radicular arm pain. The outcome measures are visual analogue scale and neck disability index.

Procedure

A total of 30 subjects were selected and divided into two groups by simple random sampling method. Group A: Consist of 15 subjects who were trained with post isometric relaxation to the neck region. Group B: Consist of 15 subjects who were trained with isometric exercises to the neck region. The subjects were selected based on the inclusion and exclusion criteria. The subjects were instructed in case any subjects discontinued the exercise program if he/she has increase in neck pain during exercise intervention they would be excluded from the study. VAS and NDI scale were used as an outcome measuring tool. A total of 4 weeks (12sessions) consist of 3 sessions per week. Pre and post-test were taken for functional activity using NDI and pain intensity using VAS.

Results

On comparing the Mean Values of Group A & Group B on Visual Analogue Scale (VAS) Score, it shows a significant decrease in the post test mean values in both groups, but (Group A - Post Isometric Relaxation) shows $2.33 \pm .617$ which has the lower mean value is more effective than (Group B - Neck Isometric Exercises) $3.13 \pm .915$ at $P \leq 0.05$. Hence the null hypothesis is rejected. On comparing the Mean Values of Group A & Group B on Neck Disability Index (NDI) score, it shows a significant decrease in the post test mean values in both groups, but (Group A - Post Isometric Relaxation) shows 10.00 ± 1.60 which has the lower mean value is more effective than (Group B - Neck Isometric Exercises) 14.73 ± 2.31 at $P \leq 0.05$. Hence the null hypothesis is rejected. On comparing Pre test and Post test within Group A & Group B on Visual Analogue Scale (VAS) Score & Neck Disability Index (NDI) Score shows significant difference in the mean values at $P \leq 0.05$.

Discussion

This study was conducted to determine the effectiveness of effects of post isometric relaxation and isometric exercises on pain and functional activities in subjects with non-specific neck pain. In this study, result reveals the post isometric relaxation are more effective than Isometric exercises. A total of 30 subject were included in the study. The outcome measures were evaluated using VAS and NDI questionnaire. In many studies it has been proved that post isometric relaxation has the greater impact on the non-specific neck pain. The statistical reports reveals that there is no significant difference in pre-test values of VAS, NDI questionnaire in group A and group B. But there is statistically highly significant difference in post-test values in VAS, NDI questionnaire in both group A and group B. Both the groups show significant decrease in the post-test values group A is more effective than group B. This shows both groups are significant in reducing pain but Group A (post isometric relaxation) is more significant when compared to Group B (isometric exercise). There is no significant difference in pre-test values of VAS, NDI questionnaire between group A and group B. Both the groups show significant decrease in post-test values but group A is more effective than group B. Gupta *et al.* (2008) The post isometric relaxation is more effective in decreasing pain and disability and improving cervical range of motion as compared to isometric exercises over a period of

three weeks in patients having non-specific neck pain. Muhammad Ahmed Shady *et al.* (2021) The study says post isometric relaxation technique is a safe and effective method for treatment of non-specific neck pain patients between the ages of 20-40 years. Either type of treatment can possibly be used to reduce neck pain severity and functional disability as well as to increase neck sagittal, coronal and transverse mobility. However, the post isometric relaxation technique is more effective than the isometric exercises for reduction of neck pain severity. Zainab Khalid Khan *et al.* (2022) The study demonstrated patients with nonspecific neck pain can benefit from the post isometric relaxation with significant improvement in pain, disability, cervical ROM, and Quality of life. On comparing the mean value of group A and group B on non-specific neck pain, both the group shows significant increase in posttest mean value but (Group A post isometric relaxation) which has higher mean value than (Group B isometric exercise).

Conclusion

This study concluded that the post isometric relaxation and isometric exercise has significantly decreases the neck pain and improves the neck functional ability in patient with nonspecific neck pain. Post isometric relaxation is more effective in decreasing pain and improves the functional ability as compared to isometric neck exercises over a period of four weeks in patients having non-specific neck pain.

Acknowledgements

We thankful to all participants, university officials for giving opportunity to complete the research on time.

Conflict of interest

Nil

References

- Gemmel H, Miller P. Comparative effectively of manipulation, mobilization and activator instrument in treatment of non-specific neck pain: A systematic review. *Chiropr Osteopat.* 2006;14:7.
- Douglas AB, Bope ET. Evaluation and treatment of posterior neck pain in family practice. *Am Board Fam Pract;* c2004. p. 17
- Bogduk N. The neck and headaches. 2016;27(1):1-765.
- Binder AI. Cervical spondylosis and neck pain. *BMJ.* 2007;334:527-531.
- Fejer R, Kyvik KO, Hartvigsen J. The prevalence of neck pain in the world population: a systematic critical review of the literature. *Eur Spine J.* 2006;15:834-848.
- Campos T, Maher GC, Steffens D, Fuller Exercise programs may be effective in preventing a new episode of neck pain: a systematic review and meta-analysis. *J Physiother.* 2018;64(3):159-165.
- Hurwitz E, Randhawa K, Yu H, Cote P, Haldeman S. The Global Spine Care Initiative: a summary of the global burden of low back and neck pain studies. *Eur Spine J.* 2018;27(6):796-801.
- Hoy D, March L, Woolf A, Blyth F, Brooks P, Smith E, *et al.* The global burden of neck pain: Estimates from the global burden of disease 2010 study. *Ann Rheum Dis.* 2014;73(7):130.
- Moradi-lakeh M, Forouzanfar MH, Vollset SE, *et al.* Burden of musculoskeletal disorders in the Eastern Mediterranean region, 1990-2013: findings from the global burden of disease study 2013. *Ann Rheum Dis.* 2017;76:1365-1373.
- Borghouts JA, Koes BW, Bouter LM. Cost-of-illness of neck pain in The Netherlands in 1996. *Pain.* 1999;80(3):629-636.
- Gupta S, Jaiswal P, Chhabra D. A comparative study between post isometric relaxation and isometric exercises in non-specific neck pain. *J Exerc Sci Physiother.* 2008;4:88-94.
- Static strength training. *Sport-fitness-advisor.com.* Retrieved 2014-02-26.
- Digiovanna EL, Schiowitz S. *An Osteopathic Approach to Diagnosis and Treatment.* 2nd ed. Lippincott Williams & Wilkins; c1996.
- Franke H, Fryer G, Ostelo RW, Kamper SJ. Muscle energy technique for nonspecific low back pain. *Cochrane Database Syst Rev;* c2015. p. 2
- Hawker GA, Main S, Kendzierski T, French M. Measures of adult pain. *Arthritis Care Res (Hoboken).* 2011;63(Suppl 11).