

Efficacy of Endurance vs Isometric Neck Exercise in Chronic Non - Specific Neck Pain: A RCT

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Abstract

Objective: The objective of the study was to determine the efficacy endurance exercise in chronic mechanical neck pain patients. **Background:** Neck pain is of the 20 most burdensome chronic musculoskeletal disorder affecting 10-20% of population worldwide. In a relatively recent report on the global burden of disease, where 291 conditions were studied, neck pain was ranked 21st in terms of overall burden and fourth when measured by years lived with disability. Patients with chronic mechanical neck pain showed larger sway areas in standing posture and reduced ability to successfully execute more challenging balance and proprioception tasks. **Methodology:** This was an experimental study design with Pre-Post type conducted in the outpatient department of Physiotherapy at ACS Medical College and Hospital. 120 samples were selected from 150 volunteers based on the inclusion criteria Pre and posttest measurement will be taken and compared by using outcome measures like VAS, Neck Disability Index questionnaire and Jull's technique. **Results:** On comparing the mean value of group A and group B, shows significant difference between group A and group B. Group A seems to be more effective than Group B.

Keywords: Chronic neck pain; Endurance; Disability; VAS; NDI.

How to cite this article:

V. Rajalaxmi, Jibi Paul, M. Manoj Abraham et al. Efficacy of Endurance vs Isometric Neck Exercise in Chronic Non - Specific Neck Pain: A RCT. Indian J Forensic Med Pathol. 2019;12(2):147-151.

Introduction

Neck pain is defined by Global burden of health 2010 study as pain in the neck with or without pain referred into one or both upper limbs that lasts

for at least one day.' Neck pain occurs commonly throughout the world and causes substantial disability, economic cost and has large impact on their lives. Neck pain or Cervicalgia refers to pain in the cervical region. Pain in the neck sometimes radiates down to the nerve course with the arm sometimes due to entrapments, it varies in intensity and may feel and may feel achy or like and electric shock from neck to arm. Neck pain can have causes that aren't due to underlying disease. Examples include prolonged straining (looking up or down), sleeping in an uncomfortable position, stress, chiropractic manipulation or wearing heavy necklaces [1]. With the lack of trauma in neck pain, raise the possibility that the proprioceptive dysfunction in neck pain stems from spinal or supra spinal causes [2].

Neck pain is labelled chronic if it lasts more than six months and the causes are often osteoarthritis or poor professional posture referred to Mechanical neck pain. Therefore

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Received on 17.02.2019, **Accepted on** 14.05.2019

mechanical neck pain refers to neck pain caused by placing abnormal stress and strain on muscles and mostly results from poor posture [3]. Neck pain is a common occurrence with reported lifetime prevalence between 22 and 70% and ranges from 16.7% to 75.1%. Chronic neck pain is estimated to affect 10% to 20% of the population every year with a global point prevalence of 4.9% [4]. In India, since 1990 neck pain has increased by 19.1% by an average of 0.8% a year. Neck pain prevalence is higher in females than in males (41.7 vs 34.4%) [5]. In Tamilnadu, 1.7% of subjects reported neck pain, 6.8% was reported by Joshi et al. among rural population. In Chennai 25% suffer from chronic neck pain. Age group between 50-65 age are prone to be more affected. 20% of neck pain in the age group of 16-24 was affected (2017). For one year prevalence, Scandinavian countries reported more than neck pain than rest of Europe and Asia [6]. Prevalence of neck pain was 20.3% amongst women who were widowers or separated [7].

It has a large personal burden and also significantly economic burden. Chronic mechanical neck pain affects the daily activities of living (ADL) attributed to musculoskeletal conditions. Patients with chronic mechanical neck pain showed larger sway areas in standing posture and reduced ability to successfully execute more challenging balance tasks [10].

Balance and Proprioception has been recommended to be tested in chronic neck pain patients. There exist clinical tests for this population. The Neck Disability Index has been tested for face validity, test-retest reliability, construct validity, concurrent validity and is valid and reliable $r=s$ (0.94-0.99) and found to be reliable, valid and responsive in numerous patient population with acute and chronic neck pain [13]. Visual Analogue scale test-retest reliability in neck pain was excellent ($r=0.91$) and is easy to measure the intensity or frequency of pain. Neck muscle endurance test: JULL'S test, also known as Cranio-cervical flexion test is a test of neuromotor control. To test endurance, we look at the synergy between superficial and deep muscles [15].

Materials and Methods

This was an experimental study design with Pre-Post type. This was conducted in the outpatient department Physiotherapy department of ACS Medical College and Hospital and took nearly 3 months to complete the study (January

2018- April 2018). 120 samples were selected from 150 volunteers based on the inclusion criteria with chronic neck pain, both male and female with age group of 50-65 years, with history of neck pain more than 3 months, patients with VAS score between 4-7 and ability to follow instructions and exclusion criteria with Recent spinal injury, VAS score >4 and <7 , Patient with acute and sub-acute neck pain, chronic medications of steroid and hormonal drugs, whiplash injury, malignancy, pregnant women.

Once the study gets approved from Institutional Review Board (Ref no. IV B 047/ PHYSIO/ IRB/ 2017 - 2018), the 120 Samples were divided into two groups by randomly by computer generated software into 60 samples each in Group A and to Group B. The samples will be fully explained about the study and the questionnaire to be filled. They were then asked to fill the Consent form in acceptance to participate in study, which is duly signed by the samples and therapist. Initially demographic details like age, gender, height, weight were collected assuring confidentiality of the same. The procedure is done by performing endurance exercises for two session per day for 6 days a week and for 12 weeks along with Isometric neck exercises and hot packs for groups A, Isometric neck exercises with hot packs for two session per day for 6 days and for 12 weeks for group B. After the study of three months, the posttest measurement will be taken and compared by using outcome measures of VAS, Neck Disability Index questionnaire, Jull's technique.

Blinding: First, patients were blinded to the group allocation and to the fact that one group would receive conventional treatment as it was recommended, instead they were told that 2 exercises would be tested. Second the investigator assessing the outcomes remained blind to the patient's allocation during the whole study period. Third the statistician who conducted outcome analyses was blinded to the group allocation by renaming the groups with numbers.

Data Analysis

The collected data were tabulated and analyzed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24. Paired t-test was adopted to find the statistical difference within the groups Independent t-test (Student t-Test) was adopted to find the statistical difference between the groups.

Results

On comparing the Mean values of Group A & Group B on Visual Analogue Scale Score, it shows significant decrease in the post test Mean values but (Group A -) shows (1.60) which has the Lower Mean value is more effective than (Group B (3.06) at $p \leq 0.001$. (Table 2)

On comparing the Mean values of Group A & Group B on Neck Disability Index score, it shows significant decrease in the post test Mean values but (Group A) shows (6.80) which has the Lower Mean value is more effective than (Group B (11.33) at $p \leq 0.001$. (Table 3)

On comparing the Mean values of Group A & Group B on Jull's test, it shows significant Increase in the post test Mean values but (Group A - Balance & Proprioception Exercise) shows (40.60) which has the Higher Mean value is more effective than (Group B) (33.53) at ≤ 0.001 . (Table 4). Table 1 shows the demographic details of the samples.

Discussion

Neck pain is a common health problem and is along with low back pain, the world's leading cause of years lived with disability. In combination with lack of trauma in neck pain, raise the possibility that the proprioceptive dysfunction in neck pain stems from spinal or supraspinal causes [16]. It was even found that cervical muscle fatigue produced significant disturbances on balance [17]. For instance, impaired balance during quiet standing has been reported in patients with chronic neck pain of different aetiologies [18].

Chronic neck pain is more common in females than in males [19]. There were trends for the elderly group with neck pain to have poorer balance than the healthy controls across most balance conditions [20]. To be effective, treatment must address not only the symptoms but also the impairments associated with neck pain [21]. Exercises and physical activities are more beneficial

Table 1: Demographic Characteristics

Characteristics	Data - Group-A	Data - Group-B
Male	27%	47%
Female	73%	53%
Age	54.73 \pm 7.72	54.86 \pm 7.42
Height	157.06 \pm 5.01	158.66 \pm 6.25
Weight	69.2 \pm 8.14	69.93 \pm 9.74
Body Mass Index(BMI)	28.07 \pm 3.18	27.71 \pm 5.74

Table 2: Comparison of Vas Score Between Group - A and Group - B in Pre and Post Test

#VAS	#Group - A		#Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
Pre Test	6.06	1.16	6.13	-.180	1.13	28	.858*
Post Test	1.60	.736	3.06	.539	-6.00	28	.000***

Table 3: Comparison of Neck Disability Index (NDI) Between Group - A and Group - B in Pre and Post Test

#NDI	#Group - A		#Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
Pre Test	18.40	2.52	18.26	3.28	.125	28	.902*
Post Test	6.80	1.20	11.33	1.11	-10.69	28	.000***

Table 4: Comparison of Jull's Test Between Group - A and Group - B in Pre and Post Test

#Test (Seconds)	#Group - A		#Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
Pre Test	22.26	2.86	22.73	1.75	-.538	28	.651*
Post Test	4.60	3.68	33.53	2.03	6.51	28	.000***

for the most common musculoskeletal disorders such as chronic neck pain. However, poor adherence to exercise and physical activity may limit long term effectiveness [22].

The study concluded that the Yoga is more effective than the Pilates and Tai chi, Yoga is effective in reducing pain, disability, quality of life and fear of movements in subjects with mechanical neck pain [23]. In this systematic review maximum studies showed that there was some improvement in neck functional abilities and reduction in neck pain in the endurance training group. On the other hand, the long term follow ups failed to show the improvement on neck functional ability and pain [24]. Both the groups (schroth method and yoga) shows improvement in the postural alignment (forward head shift, shoulder protraction) and pulmonary function [25].

Conclusion

The study concludes endurance exercise is an important determinant factor in neck pain. This study is to create awareness among neck pain pupils that endurance is reduced due to neck pain and hence exercises should be added in regular routine schedule. Through this study, we conclude that there seems to be evidence that endurance exercise are more beneficial in general exercise program in reducing neck pain and seems to be advantageous.

Authors Contribution: All authors have contributed equally.

Conflict of Interest: 'Conflicts of interest: none'.

Ethical Considerations: The manuscript is approved by the Institutional Review board of faculty of physiotherapy. All the procedures were performed in accordance with the ethical standards of the responsible ethics committee both (Institutional and national) on human experimentation and the Helsinki Declaration of 1964 (as revised in 2008).

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Acknowledgement

I would like to thank the authorities of Dr. MGR Educational and Research Institute, University and the Principal Faculty of Physiotherapy for providing me with facilities required to conduct the study.

Funding: Nil, This is a self-funded study.

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