Original Article

Effect of Proprioceptive Exercises on Pain and Function in Non-Specific Chronic Neck Pain

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ABSTRACT

Objective: To determine the effect of proprioceptive exercises on pain and function in Non-specific chronic neck pain.

Study Design: Randomized control trial

Place and Duration of Study: This study was conducted at the Muhammad physical therapy clinic and rehabilitation center, Multan from June 2020 to January 2021 for a period of one and a half year.

Materials and Methods: Through non-probability convenient sampling technique 34 participants with chronic Non-specific neck pain were randomized in two groups through lottery method. Group A received conventional treatment with proprioception exercises while Group B received conventional treatment only. Pain and disability were measured by using numeric rating pain scale and Neck disability index scales were respectively. Exercise regime distributed in six weeks period alternate session in week exercise, 10-12 repetitions with 1-minute rest interval, and lasted 45 minutes in both groups. Pre-treatment and post-treatment measurements were taken.

Results: Mean age for treatment group and control group was 31.85±4.94 and 30.85±6.93 years respectively**.** Mean of numeric rating pain scale in treatment group before treatment was 2.71±0.48 and post treatment mean was 0.85±0.37, p value was 0.00. In control group pretreatment mean of numeric rating pain scale was 2.71±0.48 and post treatment mean 1.85±0.37, p value was 0.001. For treatment group pretreatment mean for neck disability score was 4.28±0.75 and post treatment mean was 1.57±0.53, p value was 0.00. In control group pretreatment means neck disability score was 4.28±0.75 and post treatment was 3.28±0.75, p value was 0.04.

Conclusion: Proprioceptive exercises were effective on improving pain and function in non-specific chronic neck pain.

Key Words: Neck disability index, Numerical pain rating scale, proprioceptive exercise

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INTRODUCTION

Neck pain is an illness that most individuals endure. As a consequence, in the spinal parts, instability increases, resulting in failure towards the neutral position is maintained.(1) chronic neck pain which is caused by damage and loss of neck muscles functions like a proprioceptive damage in such kind of pain.(2)

Active Joint Position Sense can be tested by using a laser pointer in neck region.(3)

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It can be tested by using a laser pointer in neck region by attaching a laser pointer to head of patients and instruct a patient to relocate head from right rotation to initial neutral position with closed eyes.(3) Most nonspecific pain in the neck is not associated with a major illness or with neurological symptoms of compression of the nerve. (4) people who have neck pain oculomotor and eye head coordination assessment is necessary for neck region vertebrae ,because cervical spine sensory neuron have important role in maintaining eye head movement.(3) Strengthening exercises in individuals with joint pain can improve joint stability and power due to the ability of the muscle to generate Higher strength by enhanced strength of the muscle control.(9) The muscles of body are strengthen by strengthening exercises, reduce stress on joint during movement. clinical outcomes such as pain relief ,physical function ,and quality of life improved by strengthening exercises.(9) (4) The aim of the proprioceptive insole is to activate correction reflexes with an immediate response to stabilization and equilibrium parameters affecting muscular proprioception in the feet.(10) highlighting shifts in the

lateral location of the pressure core, the pressure surface and the anteroposterior oscillations of the pressure Centre.[11]The plant pressure proprioceptive sensitivity enables the organization of an Optimum kinesthetic response and optimizes postural techniques in combination with the other sensory inputs.[12] Beom-Ryong Kim et al 2017 conducted a study to see the effect of proprioceptive exercises on pain, respiratory function and neck disability scale, muscle strength in people who have chronic low back pain. Result showed that proprioceptive exercises were effective in improving in pain by reduction its severity, reduction in functional disability index and enhance pulmonary functions.[5] Michael A McCaskey et al 2014 conducted a study on chronic neck pain to assess pain and function of cervical region proprioceptive exercises were used for assessment of neck muscle function. It suggests that proprioceptive is no more effective than conservative physiotherapy.[6]Tomas Gallego izquierdo, PT, PhD et all 2016 conducted a study to compare on neuromuscular control, pressure pain sensitivity and perceived pain and disability in patients with chronic neck pain to compare the effects of cranio-cervical flexion training and proprioceptive training. The result indicates that proprioception training have positive effect on function of deep cervical flexor.[7]Exercises were seen to boost efficiency in tasks with sensor motors, relieving neck pain and decreasing postural sway.[8] Soon-young Bong et all, 2016 conducted a study to assess the effect of proprioceptive exercises in people who have chronic low back pain to evaluate the pain and functional disability index. Result showed that proprioceptive exercises were effective in reduction of pain and functional disability scale.[13]Kim jin et all 2015 conducted a study to check pain and balance in people who have low back pain. Patients were treated with proprioceptive exercises and swiss ball training. Result showed that proprioceptive exercises were effective in improving pain and balance as compared to swiss ball training.[14]

MATERIALS AND METHODS

This Randomized controlled trial was conducted at Muhammad physical therapy clinic and rehabilitation center, Multan from June 2020 to January 2021. Through non-probability convenient sampling technique 34 participants with chronic Non-specific neck pain were randomized in two groups through lottery method. **Group A** received conventional treatment with proprioception exercises while **Group B** received conventional treatment only. Patients with the age 20 to 45 years with non-specific neck pain for more than three months of both gender were included in the study. Patients with any systemic or congenital disease were excluded. NPRS and NDI were used as data collection tool. 34 patients were assessed at the end of the sixth treatment weeks. Patients were assessed by performing spurling test and neck distraction test, excluding red flags. Group A received proprioception exercises plus conventional treatment of strengthening exercise which were performed with prone and supine position by placing a towel under head, press towel for 5 seconds with 10-12 repetition. Proprioception exercises were performed as A) Head relocation which involves the relocation of head back to natural head posture and to predetermine positions in range first with eyes open and closed with all cervical movements. b) Gaze stability coulometer exercises with stationary head and movement of eye balls progressing to movement of head with visual fixation on a target. (c) Eye head coordination exercises which include rotation of eyes and head to the same side in right and left directions. Then progressed with in opposite direction. While **Group B** received conventional treatment only. NPRS for pain and NDI for disability was used .Pre and post measurements were taken after six weeks. The data was analyzed using SPSS Independent sample t- test was used to compare the effects between two groups. Paired sample t test was used to compare within groups. Descriptive statistics were used.

RESULTS

Normality of data was calculated Shapiro-wilk test showed p value greater than 0.05, Parametric test were used.

Mean change of NDI scale of treatment group was 2.71 with a p value 0.000.pre-treatment mean of NDI scale of control group was 4.28 and post-treatment mean 3.28.

Table No.1: Descriptive Statistics of Demographics

Demographic characters	Treatment group	Control group
Age	31.85±4.94	30.85±6.93
Gender	1.71±0.48	1.57±0.53

This table shows descriptive statistics of demographics.

Table No.2: NPRS Paired sample statistics

Measure	Group	Pre-treatment Mean ± SD	Post-treatment Mean ± SD	Mean change Mean ± SD	P value
NPRS	Treatment control	2.71±0.48 2.71±0.48	0.85±0.37 1.85±0.37	1.85±0.69 0.85±0.37	0.000 0.001
NDI	Treatment control	4.28±0.75 4.28±0.75	1.57±0.53 3.28±0.75	2.71±0.48 1.00±0.57	0.000 0.045

Table No.3: Independent sample t-test

	Levene Test For Equality of Variances		**t test for equality of means**			
	F	SIG	t	df	Sig(2-tailed)	Mean difference
NPRS						
equal variances assumed			-4.95	12	0.000	-1.00
equal variances not assumed	0.000	1.000	-4.95	12.00	0.000	-1.00
NDI						
Equal variances assumed			-4.15	12	0.001	-1.71
Equal variances not assumed	0.046	.834	-4.15	11.98	0.001	-1.71

This table showed mean difference of NPRS is 1.00, with a significant 2-tailed value 0.000, and mean difference of NDI was 1.71 with a significant 2-tailed value 0.01.

DISCUSSION

The current study was performed on 34 subjects with aim to know the individual effects of proprioceptive exercises on pain and function in chronic nonspecific neck pain A characteristic of some patients with neck pain is compromised proprioception and postural function, and many therapeutic measures have been proposed to impairments, such as head-neck recognition exercises, oculomotor exercises or equilibrium training exercises, are discussed specifically.[7]

In previous study proprioceptive exercises were used in low back pain individuals for pain, pulmonary function and disability function. The result of this study showed that pain and disability decreases with VAS score and disability score. In current study proprioceptive exercises were used for chronic non-specific neck pain. Result showed that pain, disability decrease, NPRS score (p=0.000) and disability score (p=0.000) in chronic Non-specific neck pain. NPRS pre-treatment value was 2.71±0.48 and post-treatment was 0.85±0.37 in treatment group.[5]

Tae-woo-king et all, studied an effect of proprioceptive exercises on patients of whiplash injury and measured the neck disability index, endurance of deep neck flexor muscles. The result of this study showed marked improvement in functional activities. and pain decrease with a NPRS score (0.000) in chronic non-specific neck pain.[15] In current study proprioceptive exercises proved to improve pain among patients with chronic non-specific neck pain. IZQUIERDO TG et all carried a study on proprioceptive training in patients of chronic non-specific neck pain. Results showed that disability decreases and improvement in function in chronic non-specific neck pain. In recent study disability decrease with a NDI score. Pre-treatment value in treatment group was 4.28±0.75 of NDI , while post treatment value was 1.57±0.53 [7]

ojoawo et all, carried a study on pain intensity, disability of knee. Proprioceptive exercises and isometric strengthening exercises were used. Pain was reduced due to increase in joint lubrication, decreased stiffness and muscle strength increased.it was seen proprioceptive exercises significantly reduced pain intensity and disability. The result showed that pain score (p=0.001) and disability score (p≥0.01).[16] In current study proprioceptive exercises were found to reduce pain.

In previous study cupping massage was used for non-specific neck pain. Fifty patients were included in study. Participants were divided into two groups' treatment and control. Treatment group received 5 cupping session per week for three weeks. Outcome measures VAS was used for pain. The result of this study was found that pain reduced significantly (p=0.019) functional disability (p≥0.001) quality of life subscales for pain (p=0.002). It was found that cupping massage improve functional activities of daily life and pain. [17] In current study pain reduced (p=0.000) functional activities like driving improved significantly (0.002), lifting (0.001).Disability reduced (0.000).proprioceptive exercises were found effective in pain, functional activities, neck pain·

On neurophysiological substrates, Proprioceptive Neuromuscular Facilitation (PNF) functions. It improves proper neuromuscular activation through the use of neurophysiological techniques, resulting in the regulation of sensory-motor conduction stimulation and proprioceptive stimulation[18]

In previous study proprioceptive exercises were used in muscle strength, range of motion, stability of joints and function of upper limb and pain of adhesive capsulitis.it improves strength of muscles of upper extremity. proprioceptive exercises were found in improving pain and functional activities with a pain score and disability (p=0.01).In current study quality of life, functional activities and pain improve with a NPRS score (p=0.000) and NDI score (p=0.000).[19] The system activates proprioceptors inside the nerves and the muscles Tendons, thus enhancing their roles and increasing Muscle power, endurance, balance and synchronization, optimizing the motor units' responses efficiently.[20]

CONCLUSION

Proprioceptive exercises were effective in reducing pain and disability and improving function in Non-specific chronic neck pain.

Author's Contribution:

Concept & Design of Study:	Noshaba Kanwal
Drafting:	Sidra Faisal, Atiya Fatima
Data Analysis:	Qurat ul Ain
Revisiting Critically:	Tasneem Shehzadi
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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