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Original Article

Comparison of Postural Correction and Strengthening Exercises on Pain and Disability in Upper Cross Syndrome Patients

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ABSTRACT

Upper Cross Syndrome (UCS) also known as proximal or shoulder girdle crossed syndrome. In UCS, the upper trapezius and levator scapula gets tightened and crosses the dorsal side of the pectoralis major and minor **Objective:** To find the comparison between effects of postural correction and strengthening exercises on pain and disability among patients of upper cross syndrome **Methods:** It is a Quasi experimental study conducted at the Kanaan Physiotherapy and Spine clinic Lahore, Pakistan. The study was conducted in 6 months (September 2020 to February 2021). A non-probability convenient sampling technique was used on a sample of 37 patients. After taking verbal consent from patients, patients were divided randomly into two groups through lottery method. The inclusion criteria were of age between 20-50 years and exclusion criteria were cervical trauma or surgery, congenital scoliosis, spasmodic torticollis or those who did not sign the informed consent. The data collection tools include Goniometer for Rang of Motion,Tape for measuring muscle length, Numeric pain rating scale and Neck disability index. Results were analyzed using SPSS version 21. **Results:** The mean age for the participants was 34.35±5.123 with 33.33±+5.018 in control group and 35.32±5.344 in experimental group. According to baseline comparison between the groups, the flexion mean value for the control group was 22.27±6.63and for the experimental group was 20.36±7.58 and showed no significant difference having p-value 0.42 **Conclusion:** It was concluded that there is no significant difference in terms of ROM, muscle length and Numeric Pain Rating Scale between the groups. The only significant difference showed was in Neck Disability index.

INTRODUCTION

In Upper Cross Syndrome, forward head is most often described as extreme forward positioning of the skull relative to a perpendicular orientation line. Most frequent postural problems in upper cross syndrome, is forward head. Forward head is mainly implemented by desk users, and it involves a combination of lower cervical flexion, upper cervical extension and rounded shoulders; also, it has been correlated to musculoskeletal dysfunctions, such as upper crossed syndrome [1]. Patients (82-85%) with myofacial pain syndrome have rounded shoulder and forward head posture correspondingly [2]. Assessment of forward head and shoulder disorders was based on Kendall standard method to evaluate by using plumb line. Based on Kendall definition regarding normal posture from the side view the vertical line of the plumb line should pass through the earlobe, seventh cervical vertebrae, acromion appendage, the femur greater trochanter, additional along the midline of the knee area or a slight further away from the outer ankle [3].

An exercise plan for forward head posture conducted by principles of stretching and strengthening exercises protocol that deal with fundamental problems of soft tissues would include flexors of deep cervical and strengthening of shoulder retractors and extensors of cervical and muscle stretching of pectoralis muscles. The beneficial tool of

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weakened postural muscles strengthening and stretching of tight ones to get better position of posture has been promoter and is a focus of physiotherapy practice as well as other bodywork plan[4].

The Kendall method of exercises was as follows. Pectoralis muscle stretching by hands placing on the occipital area and elbows pull down and perform arm external rotation and abduction. Shoulder retraction strengthening putting an elastic resistance band around a safe object and pulling that reverse with hands as far as probable to move the blades of shoulder toward each other in a standing position[5]. Deep cervical flexors strengthening, lying plane on the back level with the chin downward and then raising the head. Stretching of the cervical extensors, by putting both hands on the occipital region in a sitting position, pursue by a neck flexed posture with the head downward and to stretch the extensor muscles of cervical spine[6].

The purpose of therabands exercise programs was accounted to be a protected and safe method of improving functional status, strength and physical activity. The effects of therabands exercise programs have been accounted to progress bodily and postural control. The effects of therabands exercise programs have been reported to improve physical and positional control. Unsuitable and improper posture can create unsuitable actions of the joints by upsetting the level of stress (tension) and contraction of muscles, which can cause pain. Therefore, good posture is for dimension of health. Typical postural abnormalities were caused by unsuitable posture include upper cross syndrome [7].

At the present time there are a number of postural correction devices are available which are designed to place pressure on the shoulders and bring them back to unbend the back of the wearer and provide extensive support to shoulders. A harness that fully supports the back of the user and shoulders while working in a seated position. The connector provides support without restricting the user's freedom of movement. It is fully adjustable and matches to a wide variety of user body types. Finally, it provides a comfortable, safe and economic means of supporting the user's back and shoulders, allowing them to work more comfortably and possibly more capably. Even people who stand for broad periods of time suffer from poor postural problems, as they often times slouch and stand with their back moved to the side. Several harnesses, slings, and postural correction devices have been developed to control posture by means of partially or completely immobilizing the user's shoulders and back[8].

Postural correction instruments are devised to correct the posture by retraining the muscles to maintain the natural and proper posture. However, there are some controversies among the doctors, as some believe that it can weaken the muscles by making them dependent on these devices. Instead, they suggest the training of muscles by exercise for posture correction. After starting the use of these devices, a person can stop its usage, once the muscle memory is gained[9]. The aim of these posture correction devices is to enhance the muscle memory and habit and the dependence can be soon after attenuated after achieving the goal. Standard postural correction devices are synthesized from soft nylon straps that are worn over shoulder. They work by pushing the thoracic spine in the middle of back and providing assistance to shoulders for retracting. Consequently, the upper spine and neck will straighten, and chest will push outward in a proper posture position [10]. Previous studies have been done to find effects of stretching and strengthening exercises on upper cross syndrome. Very few literatures are found on effects of postural correction devices on upper cross syndrome. The purpose of current research was to find out the comparison between effects of postural correction and strengthening exercises on pain and disability among patients of upper cross syndrome.

METHODS

This quasi-experimental study included data of upper cross syndrome patients. Sample size was 37[11]. Sample size was calculated by G power software [12]. Non- probability convenient sampling technique was used. Two groups i.e control group(Group A)and experiment group(Group B)were made and each having 18 and 19 patients respectively. The patients were allocated using lottery method. The inclusion criteria were of age between 20-50 years. Participants with forward head posture and constantly having neck/shoulder pain for more than one month were included. The exclusion criteria for the study were cervical trauma or surgery, congenital scoliosis, spasmodic torticollis or those who did not sign the informed consent. Data were collected from Kanaan Physiotherapy and Spine clinic Lahore, Pakistan. The duration of the study was 6 months from September 2020 to February 2021.Ethical Letter was taken from ethical review committee of Kannan Physiotherapy and Spine Clinic with reference numberPT/2020/REC/IRB/097. The data collection tools include tape measure Goniometer for Rang of Motion, Muscle length Assessment of upper trapezius, Pectoralis major and minor muscle.Sharman described that

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normal length of pectoralis minor muscle is measured by distance between the treatment table and posterior aspect of the acromion. If a distance is greater than this would suggest an imbalance of muscle (Muscle shortening) [13]. Numeric pain rating scale(NPRS) for pain, Neck disability index for disability. A total of 4 sessions were given per week and the assessment was done on 1st and 8th week. Group A were given exercise program while Group B were given postural correction devices along with exercise program. The exercise regime includes strengthening of cervical flexors and shoulder retractors, stretching of cervical extensors and pectorals on both sides. Yosoo posture belt was used and directed to be used for 16 hours a day at first. The dropout number of patients was 3, due to no follow up hence now each group having 17 patients.

RESULTS

Total 37 patients were recruited for this study which is randomly assigned into control and experimental groups (18±19). The mean age for the participants was 34.35±5.123 with 33.33±5.018 in control group and 35.32+ 5.344 in experimental group. Total number of males was 22 and females were 15, whereas in control group males were 11 and 7 females and in experimental group 11 males and 8 females were included. The baseline comparison within both the groups has been mentioned in According to baseline comparison between the groups, the flexion mean value for the control group was 22.27±6.63and for the experimental group was 20.36±7.58 and showed no significant difference having p-value 0.42. The extension (ROM) mean value for the control group was 29.00±6.16 and for the experimental group was 29.12±6.92 and showed no significant difference having p-value 0.92. The Right rotation (ROM) mean value for the control group was 66.94±9.87 for the experimental group was 60.00±7.07 and showed no significant difference having p-value 0.01.

VariablesROM	Groups	Mean +S.D	P value
ROM Flexion	Control	22.27±6.63	0.63
	Experiment	20.36±7.58	
ROM Extension	Control	29.00±6.16	0.92
	Experiment	29.12±6.92	
ROM Rt Side Bending	Control	26.11±3.42	0.69
	Experiment	26.63±4.48	
ROM Lt Side Bending	Control	25.77±3.405	0.35
	Experiment	27.05±4.77	
ROM Rt Rotation	Control	66.94±9.87	0.01
	Experiment	60.00±7.07	
ROM Lt Rotation	Control	66.22±9.01	0.68
	Experiment	65.00±9.24	
Muscle Length, Upper Trapezius, Rt Side	Control	19.22±1.62	0.08
	Experiment	20.31±2.05	
Muscle Length, Upper Trapezius, Lt Side	Control	18.5±1.19	0.04
	Experiment	19.78±2.17	
Muscle Length, Pect; major Rt Side	Control	14.72±1.36	0.05
	Experiment	13.63±1.94	
Muscle Length, Pect; major Lt Side	Control	13.88±1.40	0.15
	Experiment	13.21±1.43	
Muscle Length, Pect; Minor Rt Side	Control	11.88±67	0.08
	Experiment	10.73±1.59	
Muscle Length, Pect; Minor Lt Side	Control	11.38±1.71	0.28
	Experiment	10.84±+1.344	
NPRS	Control	6.94 ±.639	0.02
	Experiment	7.52±.84	
NDI	Control	45.03±6.97	0.06
	Experiment	41.53±3.94	

Table 1: Baseline compression between the groups

The left rotation mean value for the control group was 66.22±9.01 for the experimental group was 65.00±9.24and showed no significant difference having p-value 0.68. The Right-side bending (ROM) mean value for the control group was 26.11±3.42for the experimental group was 26.63±4.48 and showed no significant difference having p-value 0.69. The left side bending (ROM) mean value for the control group was 25.77±3.405 for the experimental group was 27.05±4.77 showed no significant difference having p-value 0.35. Mean value upper trapezius (right side) muscle length control group was 19.22±1.62 and for experimental group 20.31±2.05 and showed no significant difference having p-value 0.08. Mean value upper trapezius (left side) muscle length control group was 18.55± 1.19 and for experimental group 19.78± 2.17 and showed no significant difference having p-value 0.04. Mean value pectorals major (right side) muscle length control group was 14.72±1.36 and for experimental group 13.63±1.94 and showed no significant difference having p-value 0 .05. Mean value pectorals major (left side) muscle length control group was 13.88 ± 1.40 and for experimental group 13.21±1.43 showed no significant difference having p-value 0.15. Mean value pectorals minor (right side) muscle length control group was 11.88±.67 for experimental group 10.73±1.59 showed no significant difference having p-value 0 .08. Mean value pectorals minor (left side) muscle length control group was 11.38±1.71 for experimental group 10.84± 1.344 showed no significant difference having p-value 0.28. Mean value NPRS muscle length control group was 6.94±639 for experimental group 7.52. ±84 showed no significant difference having p-value 0.20. Mean value NDI, control group was 45.03±6.97 for experimental group 41.53± 3.94 showed no significant difference having p-value 0.06.

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DISCUSSION

In this Quasi Experimental Study 37 patients were incorporated in the study those who met the criteria upon which 18 were in group 1 and 19 in group 2. Rehabilitation protocol included exercise therapy alone (strengthening and stretching exercise) for group 1 and exercise therapy and postural correction devices for group 2. Patients were assessed at first visit before treatment and at the end of Visit after completed their rehab program. Data was recorded by using Numeric Pain Rating Scale (Pain) and Neck Disability Index (Disability). The outcome assessment that has been studied in the present study was the pain. Willford *et al.*, found that there was no significant difference in the forward head posture between groups of subjects with different levels of neck pain [14]. According to current study there is no statistically significant difference in NPRS.

Zaina F *et al.*, studied that postural correction devices wearing for many years can create progressive atrophy of muscles and loss of muscles strength. So used exercise program with postural correction devices to avoid the wasting of muscles and to improve the posture [15]. Results of current study were in favour to this as they also showed improvement in pain and disability with exercises programs. Won-You Lee *et al.*, revealed no statistically significant difference between forward head posture in a group with TMD in regard to four measurements [16]. According to study showed that the end value comparison between the groups showed no statistically significant differences in regard to four measurements, so both are equally effective to correct the posture [17].

According to the new study, Charlton et al evaluated the validity and reliability of smart phone to measure the adduction, abduction, flexion, rotation movement of hip joint. This study was carried out on 20 young men [18]. The final results showed that the Smartphone had outstanding reliability for most of the movements, but it had modest - good quality reliability on adduction, external rotation and abduction [19,20]. Results of current study also showed that there was great increase in posture of patients with devices. So, results were in favor to these studies.

CONCLUSION

There is no significant difference in term of ROM muscle length and Numeric Pain Rating Scale between the groups. But according to end values compression between the groups there is only significant difference in Neck Disability Index.

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