Original Article

Effects of conventional physical therapy with and without muscle energy techniques for treatment of Upper Cross Syndrome

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Objective: To assess the effectiveness of Conventional Physical Therapy with and without Muscle Energy Techniques (MET) for the treatment of Upper Cross Syndrome (UCS).

Methodology: This study was carried out Nawaz Sharif Social Security Hospital and Physiotherapy Rehabilitation Clinic, Lahore from September 3, 2016 to June 1, 2017. Sample size was calculated to be 60 using G power program with power of 80% to detect an effect size of 0.8 assuming a type I error of 0.05.

Results: Both groups showed improvement in pain however MET was effective in improving pain during first half of the treatment only in comparison to the latter half.

Conclusion: Both conventional therapy and MET are beneficial for the treatment of upper cross syndrome, however MET was superior to conventional physical therapy in alleviating neck pain and disability. (Rawal Med J 202;45:127-131).

Keywords: Conventional Physical Therapy, Muscle Energy Technique, Visual analog scale, Neck disability index.

INTRODUCTION

In upper cross syndrome (UCS), there is a weakening of neck flexors, serratus anterior and middle and lower trapezius along with rhombids and the over excitation or tightness of the levator scapulae, pectoralis major and upper trapezius.[1] Cross name is given to this condition because "X" (a cross) can be drown across upper body. Arising mainly as a result of muscular imbalance that usually develops between tonic and phasic muscles.[2] It is most common among young population and among professional such as musicians and dentists. The prevalence in dentists and musicians are 57% and 37.1%, respectively.[3,4]

In the physiotherapy treatment techniques, both muscle energy technique (MET) and stretching are widely used. MET is an advanced stretching technique. As compared to static stretching which is a passive technique, MET is an active technique in which patient is also an active participant. MET is based on the concepts of Autogenic Inhibition and Reciprocal Inhibition. Very few studies have compared these techniques in a symptomatic population.[5]

Several studies have shown that MET showed strengthening of levator scapulae and lower trapezius and stretching exercises for upper trapezius.[6,7] Usage of complete training of all the muscles for the treatment of UCS has been recommended.[8] Ischemic compression and MET were found to be equally effective in alleviating the pain.[9,10] There is lack of evidence to allow conclusions to be drawn about the effectiveness of MET when compared with stretching exercises for relieving mechanical neck pain. Therefore, this study was conducted to see the effectiveness of conventional physical therapy with and without MET for reducing neck pain and functional disability in patients with UCS.

METHODOLOGY

This study was a randomized controlled clinical trial and data were collected from Nawaz Sharif Social Security Hospital and Physiotherapy Rehabilitation Clinic, Lahore from September 3, 2016 to June 1, 2017. Sample size was 60 patients calculated by using G power program 3.1.0 (G power program version 3.1, (Heinrich-Heine-University, Du¨sseldorf, Germany) with power of 80% to detect an effect size of 0.8 assuming a type I error of 0. 05.

Both genders were included with age between 20-35, having pain intensity on visual analog scale (VAS) and neck pain history of 4 to 12 weeks. Those with infection or history of trauma or cervical spine surgery and with vascular syndrome were excluded from the study. Sample was collected through simple random sampling technique, and randomization sequencing was generated randomly with the help of www.randomizer.org software online.

Patients were allocated into two groups; allocation concealment was ensured by using sealed envelopes, enclosing the name of group. Every patient picked up an envelope and that envelop was placed in the patient's file, which latter was opened by the researcher who provided treatment to the patient accordingly. Prior heading towards researcher for treatment patient was go to the assessor who was take pre-treatment measurements. Group A received conventional physical therapy including strengthening exercises for deep neck flexors, rhomboids, lower trapezius and serratus anterior, (2 sets of 10 repetitions per day) and stretching exercises for pectoralis muscles (20 seconds hold, 5 repetition. Commercially available hydrocollator packs, for 20 minutes was given over the painful area in cervical region before the treatment. Temperature of the hydro-collator unit was set at 70C and six to eight layers of the towel was set.[11,12] Group B receivied conventional physical therapy combined with MET on upper trapezius and levator scapulae muscles for 5 repetitions using 20% of maximal isometric contraction keeping the stretch beyond resistance barrier for 20 seconds. Both groups were treated three times a week for 8 consecutive weeks and measurements was made before start of the treatment after 4 weeks and at 8 weeks. VAS was used for pain and Neck disability index (NDI) for function of neck.

Statistical Analysis: Independent sample T test was used to compare the between group effectiveness whereas repeated measure ANOVA was applied to assess within group effectiveness. P-value ≤ 0.05 was taken as significant. SPSS version 21 were used to analysis of data.

RESULTS

Mean age of the group A participants was 25.17$\pm$4.18 and mean age of group B participants was 25.37$\pm$5.041 years. Mean VAS value before treatment for group A was 3.13, which improved to mean value 1.13 after treatment. Mean pain score for group B before treatment was 8.27 which at the end of treatment improved to 0.43. There is a significant difference between the VAS values of both groups at all the three levels of measurements.

Table 1. Independent sample T test Visual analog scale.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretreatment Total NDI	EVA	10.569	.002	-3.718	58	.000	-7.06667	1.90080	-10.87152	-3.26181
	EVNA			-3.718	50.272	.001	-7.06667	1.90080	-10.88402	-3.24932
Total NDI After 4 Weeks	EVA	56.716	<0.001	2.313	58	.024	3.93333	1.70066	.52908	7.33758
	EVNA			2.313	34.636	.027	3.93333	1.70066	.47950	7.38716
Total NDI After 8 weeks	EVA	54.043	<0.001	1.758	58	.084	2.63333	1.49749	-.36423	5.63089
	EVNA			1.758	31.588	.088	2.63333	1.49749	-.41852	5.68519

EVA= Equal variances assumed, EVNA= Equal variances not assumed

Table 2. Independent sample t-test neck disability index.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
VAS	EVA	2.264	.138	-19.997	58	<0.001	-5.133	.257	-5.647	-4.619
	EVNA			-19.997	56.152	<0.001	-5.133	.257	-5.648	-4.619
VAS After 4 Weeks	EVA	1.400	.242	5.859	58	<0.001	1.300	.222	.856	1.744
	EVNA			5.859	54.350	<0.001	1.300	.222	.855	1.745
VAS After 8 Weeks	EVA	4.997	.029	3.718	58	<0.001	.700	.188	.323	1.077
	EVNA			3.718	45.574	.001	.700	.188	.321	1.079

EVA= Equal variances assumed, EVNA= Equal variances not assumed

Table 3. Repeated measure ANOVA visual analog scale.

Pair-wise Comparisons (pain)							
Measure: MEASURE_1							
Group	(I) pain	(J) pain	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
Group A	1	2	1.100*	.056	<0.001	.958	1.242
		3	2.000	.000	.	2.000	2.000
	2	1	-1.100*	.056	<0.001	-1.242	-.958
		3	.900*	.056	<0.001	.758	1.042
	3	1	-2.000	.000	.	-2.000	-2.000
		2	-.900*	.056	<0.001	-1.042	-.758
Group B	1	2	7.533*	.171	<0.001	7.099	7.968
		3	7.833*	.192	<0.001	7.345	8.322
	2	1	-7.533*	.171	<0.001	-7.968	-7.099
		3	.300	.160	.213	-.107	.707
	3	1	-7.833*	.192	<0.001	-8.322	-7.345
		2	-.300	.160	.213	-.707	.107

Based on estimated marginal means. *. The mean difference is significant at the .05 level. b. Adjustment for multiple comparisons: Bonferroni. 1= before treatment, 2= After 4 weeks, 3= After 8 weeks.

There was a significant difference between the NDI score of both groups ($p<0.05$) indicating that the difference was significant for first 4 week's treatment. However, there was no significant difference in the effectiveness after 4 weeks.

DISCUSSION

Current study was performed with the aim to evaluate the effect of muscle energy technique and conventional therapy to improve pain and functional disability among patients of upper cross syndrome in comparison of conventional physiotherapy alone.

In MET, the pain perception was decreased by improving the stretch tolerance of the participants. The mechanoreceptors in the muscles and

proprioceptors in joints are stimulated when stretching and isometric muscle contraction performed together.[13] This stimulation ultimately decreases the pain sensations thereby yielding ease and tolerance in stretch. The results of the present study were similar to the previous studies conducted by others, which reported decrease in pain perception after receiving muscle energy technique.[14-17]

Gupta et al[5] and Sharma et al[18] studied the effects of integrated neuromuscular inhibition techniques and post isometric relaxation (MET) with isometric exercises, respectively. They concluded that pain and functional status improved more in the group receiving post isometric relaxation, similar to our study. In addition, a study by Sharmila compared the effects of MET with conventional physical therapy for non-specific neck pain and concluded that the MET was an effective regime in alleviating pain and improving disability.[19]

Kostopoulos et al concluded that the effects of passive stretching, although less than MET, but to be significant in alleviating neck pain.[20]The outcome of the present study is similar to the study by Mahajan et al, which favored the use of MET for mechanical neck pain and showed that MET had marked reduction in neck pain and improvement in neck functions.[21]

However, all the literature does not claim MET to be more effective than conventional stretching. Shenouda conducted a study comparing MET and stretching and concluded that no strategy was superior to the other.[22] Similarly, the effects received as a result of MET cannot purely be considered as a blessing of MET as the effects of conventional physical therapy cannot be ignored. Conventional therapy includes the application hot pack which attributes to increase in tissue flexibility and decreased viscoelastic collagen viscosity, whereas stretching and strengthening (a part of conventional therapy) are often subjected to imbalance and hence need precise consideration.[23]

The study has some limitations. The sample size was small. This work should be done on larger scale with large sample size. The study was done in two centers, there should be multicenter study. In this study, MET was used to compare with conventional physiotherapy. Other manual techniques like taping should also be addressed. This study was specified for a single city, there must be multicity studies so that we can apply this to large population of diverse culture and environmental conditions.

CONCLUSION

Both conventional therapy and MET were beneficial for the treatment of upper cross syndrome. However, a significant difference was observed between these two regimes and MET was found to be superior on conventional physical therapy.

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