

ORIGINAL ARTICLE

Effectiveness of Battle Rope Exercise Versus Motor Control Exercise for Mechanical Low Back Pain Among Nursing Students

Benitta.V¹, Venkatesh Kaliyamoorthy², Shanmuganath Elaiyaperumal³

¹Under Graduate, Faculty Of Physiotherapy, Sri Balaji Vidyapeeth, (deemed to be university), Pondicherry, India. E-mail: benitta2708@gmail.Com

²Associate Professor, Faculty of Physiotherapy Sri Balaji Vidyapeeth, (deemed to be university), Pondicherry, India. E-mail: venkatesh003@gmail.Com

³Head Of the Department, Faculty Of Physiotherapy, Sri Balaji Vidyapeeth, (deemed to be university), Pondicherry, India. E-mail: shankutty1981@gmail.Com

Correspondence: Shanmuganath Elaiyaperumal

E-mail: shankutty1981@gmail.Com

ABSTRACT

Mechanical low back pain was more commonly (64.5%) among nursing students. The motor control exercise are effective in reducing pain and increasing in mobility whereas the battle rope exercise are strengthen the low back muscles (erector spinae, multifidus) and also exercise the lower portion of the trunk in moving the ropes. The aim of the study to find the effectiveness of battle rope exercise versus motor control exercise among nursing students who are affected by the mechanical low back pain. An experimental study design, 75 subjects with mechanical low back pain were randomized into 3 groups with 25 subjects each in group A, group B and group C. Subject in group A received battle rope exercise and subject in group B received motor control exercise and subject in group C control group were not received any exercise or medication to reduce low back pain. The duration of intervention was given for 4 to 8 weeks. The outcome measurement was numeric pain rating scale were measure before and after intervention. Analysing using numeric pain rating scale, the group B showed significant improvement ($p < 0.05$) in reducing pain and disability. The mean value of motor control exercise (3.32) better than the battle rope exercise (4.04). The motor control exercise is reduce the pain and strengthen the low back compared to battle rope exercise.

Keywords: Mechanical low back pain, battle rope exercise, motor control exercise, numeric pain rating scale.

Received 24.07.2023

Revised 01.09.2023

Accepted 21.11.2023

How to cite this article:

Benitta.V, Venkatesh K, Shanmuganath E. Effectiveness of Battle Rope Exercise Versus Motor Control Exercise for Mechanical Low Back Pain Among Nursing Students. Adv. Biores., Vol 14 (6) November 2023: 452-456.

INTRODUCTION:

Mechanical low back pain is described as a musculoskeletal pain which is based on the work related problem and not involving any spinal disease or root compression. [7] it arises intrinsically from the intervertebral disk, spine or surrounding tissues. [6] the excessive or prolonged posture issues, too much sitting or standing can cause mechanical low back pain. It is common in nursing students because of heavy handling, prolonged bearing of inappropriate posture, working hours stress and psychological high demand are all integral part of daily work. [8] motor control exercise was developed based on the principle that individuals with low back pain have a lack of control of the trunk muscles. It mainly to improve the activation and coordination of deep trunk muscles (eg. Transverse abdominis, multifidus). The intervention involves the training of preactivation of deep trunk muscles, with progression toward more complex static, dynamic and functional task integrating the activation of deep and global trunk muscles. The battle rope exercise is high intensity interval training combining quick burst of exercise with shorter periods of rest. The battle rope exercise strengthen the low back muscles (eg. Erector spinae) by whipping the ropes. Therefore, the purpose of this study, to find the comparative effect of battle rope exercise versus motor control exercise on improvement of pain and disability in subject with mechanical low back pain.

MATERIAL AND METHODS

An experimental study design, 75 subjects with mechanical low back pain were randomized into 3 groups with 25 subjects each in group A and group B and group C. Subject in group A performed battle rope exercise and subject in group B performed motor control exercise and group C control group. As this study performed among nursing students. Subjects are included who were diagnosed with mechanical low back pain, whose age group between 18 to 24 years as both male and female on numeric pain rating scale. Subjects who have any recent fracture, history of abdominal surgery, specific low back pain are excluded. Total subjects 75 (n=75) and the duration of intervention in the study was 4 weeks for motor control exercise and 8 weeks protocols for battle rope exercise. The numeric pain rating scale The numeric pain ratingscale have 11 points (0 to 11) '0' indicates no pain, '5' indicates moderate pain, '10' indicates severe pain.

PROCEDURE OF INTERVENTION

In group A:

Subjects in group A received battle rope exercise involved 8 weeks of intervals training for 3 sessions per week. (Fig 1) The protocol for 1st and 2nd week consisted of 30 minutes of exercise at work to rest ratio of 1:3(15 second exercise; 45second rest), totaling 30 sets; The protocol for 3rd to 5th week consisted of 30 minutes of exercise at a work to rest ratio of 1:2(20 seconds exercise; 40 seconds rest), totaling 30 sets; The protocols for 6th to 8th week consisted of 36 minutes of exercise at a work to rest ratio of 1:2 (20 seconds exercise; 40 seconds rest), totaling 36 sets. There are 6 exercise were performed in circuit format.[1][2][3]

Double arm waves, Side to side waves Alternating waves]n-out waves, Hip toss, Double arm swings.



Fig 1 - Battle rope exercise in group A

In GROUP B

Subjects in group B received motor control exercise involved 4 weeks. There are three stages to perform.[10]

Stage 1(1st-3rd session):

Abdominal drawing -maneuver in supine, standing, sitting, quadruped for 7seconds hold and 10 repetition.

In first stage begun with isometric contraction of the muscles (e.g., lumbar multifidus, transverse abdominis) through an abdominal drawing-in maneuver(ADIM) in different positions of supine, sitting, standing, quadruped) by maintaining neural spine with maintaining normal breathing.

Stage2(4th-9th session)

After ADIM, using upper and lower extremities and trunk movement patterns with the aim of recruiting a variety of trunk muscles

ADIM in supine with heel slide (each leg).ADIM in supine with leg lift (each leg). (Fig 2)

ADIM in supine with bridging(hip bridging).ADIM in supine with single-leg bridge.

ADIM in supine with curl-up (hands over the forehead).ADIM in horizontal side support with knees bent.

ADIM in horizontal side support with knees straight.Side-lying horizontal side support with ADIM ADIM in quadruped with arm raise.

ADIM in quadruped with leg raise.

ADIM in quadruped with alternate arm and leg raise (bird dog).These are all performed in 7seconds hold and 10repetition.

Stage 3(10th to 12th session):

In third stage, addition of functional movement patterns in training program while performing an ADIM and maintaining a lumbar spine in neutral.

Rolling from side to side with ADIM (10repetition).

Wall squatting with ADIM(10repetition and 5 seconds hold).Sit-stand transfer with ADIM(10repetition).

Walking with ADIM(7seconds hold,10second and 10 repetition)



Fig 2 showing Motor control exercise in group B (Straight leg raise)

OUTCOME MEASURES:

Numeric pain rating scale were used. It contains 11 points to determine pain intensity, perceptual qualities, time course of pain.

RESULT

TABLE:1 shows basic characteristics of subjects

Basic characteristics of the subject	Group A	Group B	Group C
Total number of subjects(n)	25	25	25
Age in years	18-24 years	18-24 years	18-24 years

TABLE:2 SHOWS PRE AND POST INTERVENTION OF THREE GROUPS

Numeric pain rating scale	Group A	Group B	Group C
Pre- intervention (Mean)	5.32	5.32	5.56
Post- intervention (Mean)	4.04	3.32	4.72
Standard deviation	2.126	2.20	2.42
P value	<0.05	<0.05	<0.05

The study was completed with total 75 subjects [Table-1]. The comparison of pre and post scores of numeric pain rating scale within 3 groups. It shows, there was significant improvement between pre and post mean scores. The pre score of battle rope exercise 5.32 and post score was. The pre score of motor control exercise 5.32 and post score 3.32. The pre score of control group was 5.56 and post score was 4.72. The mean value of group B was lesser than group A. There is improvement in motor control exercise compared to battle rope exercise.

PRE AND POST INTERVENTION OF THREE GROUPS

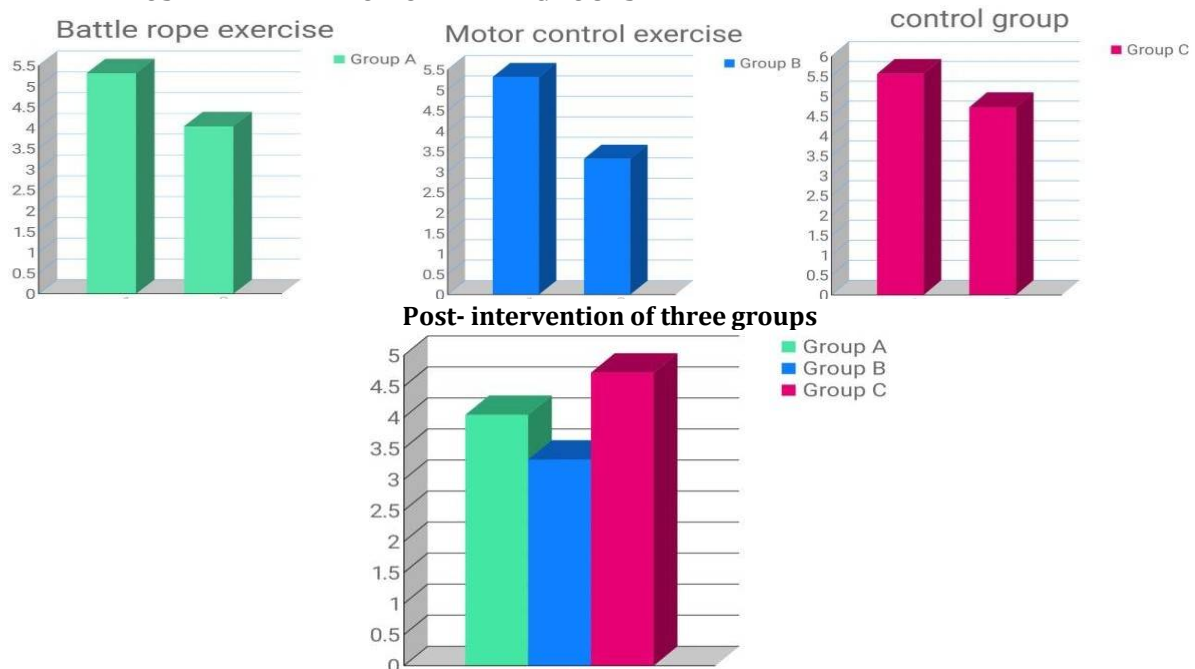


Fig 3 Showing pre and post intervention of exercise

DISCUSSION

In this study is done on 25 samples in each groups. There are two groups performing exercise and other was control group. The group A was battle rope exercise and it improve the lower body power. Some previous studies demonstrated that long term battle rope training improved athletes aerobic capacity, whereas the group B was motor control exercise , it strengthen the specific muscles like transverse abdominis, multifidus, erector spinae and it reduce the pain and disabilities. The motor control exercise training the deep muscles in isolation before progressing to demanding tasks that train coordination of deep and superficial trunk muscles. In contrast with Koumantakis et al., that the pain significantly decrease in motor control exercise. The group B shows better improvement than group A. The battle rope exercise performed in 30 minutes in each day for 1 to 2 weeks in 15 seconds exercise and 45 seconds rest and totaling of 30 sets, In 3 to 5 weeks to perform 6 exercise and totaling of 30 sets in 20 seconds exercise and 40 seconds rest. In 6 to 8 weeks perform 30 minutes in 20 seconds exercise and 40 seconds rest totally 36 sets. In motor control exercise, stage-1 contains 3 session , stage-2 have 6 sessions and stage-3 contains 2 sessions totally 12 session. In control group, not perform any exercise or medication. It is measured by numeric pain rating scale. The intervention performed among nursing students. The nursing student had low back pain because of heavy handling, prolonged bearing of appropriate posture. Both the exercise was effective but group B subjects showed significant decrease in pain and increase in mobility. The limitation of the study was reduce outcome measures and the subjects were not categorized as per age. Further recommendation was to increase the sample size and to added more outcome measures. The subject were categorized asper age.

CONCLUSION

The motor control exercise was more effective compared to battle rope exercise. There was statically proved that the mechanical low back pain is reduced by motor control exercise than the battle rope exercise.

All the authors have contributed significantly.

No conflict of interest: Nil

Ethical issues – Yes

No financial aid

REFERENCES

1. Fountaine, CJ and Schmidt, BJ. (2015). Metabolic cost of rope training. *J strength Cond Res* 29:889-893.
2. Ratamess, NA, JG, Klei, S, Dougherty, BM, Kang, J, Smith, CR, Ross, RE, and Faigenbaum, AD. (2015). Comparison of the acute metabolic responses to traditional resistance, body-weight, and battling rope exercise. *J Strength Cond Res* 29:47-57.
3. Ratamess, NA, Smith, CR, Beller, NA, Kang, J, Faigenbaum, AD, and Bush, JA. (2015). Effects of rest interval length on acute battling rope exercise metabolism. *J Strength cond Res* 29:2375- 2387.
4. Ferreira ML, Ferreira PH, Latimer J , et al. (2007). Comparison of general exercise and spinal manipulative therapy for chronic low back pain: a randomized trial. *Pain.* ;131:31-37 .
5. O'Sullivan PB, phyty GD, Twomey LT, et al. (1997). Evaluation of specific stabilization exercise in the treatment of chronic low back pain with radiologic diagnosis of spondylolysis or spondylolisthesis. *Spine.*;22:2959-2967.
6. Patrick N, Emanski E, Knaub MA, (2014). Acute and chronic low back pain. *Med Clin North Am.*98(4):777-7.
7. Alexandre, N.M.C., Angerami, E.L.S. and Moreira Filho, D.C (1996) Back Pain and Nursing. *Revista da Enfermagem da USP*, 30, 267-285.
8. Costa LO, Maher CG, Latimer J, Hodges PW, Herbert RD, Refshauge KM, McAuley JH, Jennings MD. (2009). Motor control exercise for chronic low back pain: a randomized placebo- controlled trial. *Phys Ther.*89:1275–1286.]

Copyright: © 2023 Author. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.