ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

Published by JK Welfare & Pharmascope Foundation Journal Home Page: www.ijrps.com

Efficacy of Janda's approach versus bruegger's exercise in pelvic cross syndrome and its impact on quality of life

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Article History:

Received on: 30 Dec 2019
Revised on: 04 Feb 2020
Accepted on: 08 Feb 2020

Keywords:

Pelvic syndrome, Janda's Approach, Muscle imbalance, Bruegger's Exercise

ABSTRACT

The objective of this study is to determine the Efficacy of Janda's Approach Versus Bruegger's Exercise in Pelvic Cross Syndrome and the quality of its impact in Life. Pelvic Cross Syndrome is characterized by tightness of thoracolumbar extensor on the dorsal side crosses with tightness of the Illiopsoas and Rectus femories. Weakness of the deep abdominal muscle ventrally crossed with weakness of the Gluteus maximus and Medius. This was an experimental study design with pre-post type conducted in outpatient physiotherapy department of ACS Medical college and hospital and took nearly 3 months to complete the study (January 2018-April 2018). 30 samples were selected from 45 volunteers based on the inclusion criteria. Group A received the Janda's approach, Group B received the Bruegger's exercise. Pre and post test outcome measures were taken with SF-12 scale,Visual analog scale, Goniometer.Post interventionally, both the groups showed decrease in pain and increase range of motion. However on comparing the results, Group A showed higher mean value and was more effective than Group B. The study concluded that the Group A Janda's approach is an effective approach in reducing the pain and improved the range of motion in Pelvic Cross Syndrome.

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ISSN: 0975-7538

DOI: https://doi.org/10.26452/ijrps.v11i2.2071

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INTRODUCTION

The lower crossed syndrome (LCS) is defined as ''S" shaped posture of the lower back characterized by tight hip flexors and back muscles paired with weak abdominal muscle and gluteus maximus muscle, also referred to as distal or pelvic crossed syndrome. In lower crossed syndrome, tightness of the thoracolumbar extensors on the dorsal side crosses with tightness of the iliopsoas and rectus femoris. Weakness of the deep abdominal muscle ventrally crosses with weakness of the gluteus maximus and medius. This pattern of imbalance creates joint dysfunction, particularly at the L4-L5 and L5-S1 segments, SI joint and hip joint (Das *et al.*, 2017). Patterns of tightness and weakness can be predicted in the sensorimotor system's attempt to reach homeostasis. Prior evidence has shown that these changes in muscular tone create a muscle imbalance, which leads to movement dysfunction. Janda identified two groups of muscles based.

On their phylogenetic development but functionally, muscles can be classified as tonic flexors and phasic or extensors. It was noted that the tonic system muscles were more prone to tightness or shortness and the phasic system muscles would usually undergo weakness or inhibition and that this response depended on the neurological response of nociception in the muscular system (Kage and Putti,

2015). Janda's identified two subtypes of LCS, A and B patients with LCS type A use more hip flexion and extension movement for mobility, their standing posture demonstrates an anterior pelvic tilt with slight hip and knee flexion. This individual compensates with a hyperlordosis limited to the lumbar spine and with a hyperkyphosis in the upper lumbar and thoracolumbar segment (Janda *et al.*, 1996). Janda's LCS type B involves more movement of the low back and abdominal area. There is minimal lumbar lordosis that extends into the thoracolumbar segments, compensatory kyphosis in the thoracic area and head protraction. The postural imbalance can lead to back pain future, the prevalence of lower cross syndrome in young individuals where 85% of young females were affected by lower cross syndrome while comparing males (Dhanani and Shah, 2014). Sherrington's law of reciprocal inhibition which states that when one muscle is contracted, its agonist's muscle becomes automatically inhibited muscle imbalance needs to be considered as a systemic reaction of the whole muscle system and not just an isolated effect of one muscle. Muscle imbalance occurs mostly between major ''tonic" muscles, which are muscles that are prone to developing tightness and major ''phasic" muscles that are prone to inhibition. Bruegger, a Swiss neurologist, stressed on the point that functional impairment always included the whole body. Bruegger's exercise is designed to stretch that tightened muscle, and activate those weakened muscles that occurs as a result of being in a prolonged sitting posture (Waters, 2013). The universal goniometer is the most common assessment tool used to measure passive hip flexion and extension. The universal goniometer was found to be valid and reliable when the same therapist uses the goniometer each time using a strict standard measurement (Bhamare *et al.*, 2019). To evaluate the reliability, validity, and responsiveness of the short form 12-Itemsurvey inpatient with back pain. It is the reliability and validity of the short form of 12-Item physical and mental component summary scale demonstrated consistency and reliability (Luo *et al.*, 2003; Boonstra *et al.*, 2008). The reliability of visual analogue for acute pain (Bijur *et al.*, 2001).

MATERIALS AND METHODS

The study got approved from the IRB (REF.NO .IV A-030/ PHYSIO / IRB /2017-2018). This was an experimental study design with pre-post type. The study was conducted in outpatient physiotherapy department of ACS Medical college and hospital and took nearly 3 months to complete the study (January 2018-April 2018). 30 samples were selected from 45 volunteers based on the inclusion criteria both male and female, age group of 20 to 30, Low back pain, restricted hip range of motion and excluded Pregnant women, Pelvic Disorder, Osteoarthritis. The 30 subjects were divided into two groups by lottery method. Where the even numbers were categorized in Group A and odd numbers were in Group B. Group A received the Janda's approach for sensory motor training (static phase, dynamic phase, functional phase). Duration of the treatment lasted for 30 minutes, each exercise 5 to 10 seconds or less than 2 minutes. Group B received the Brugger's exercise. The samples will be fully explained about the study and asked to fill the questionnaires. And they were asked to fill the consent form in acceptance to participate in the study, which is duly signed by the samples and therapist. Initially demographic data like age, sex, height, weight were collected and assuring the samples' data were confidential. Pre and post test outcome measures were taken with SF-12 scale, Visual analog scale, Goniometer.

Group A Sensiormotor Training-Static phase

Elastic Band To Elicit Weight Shift, Perturbation, Dynamic Phase Theraband Kicking, Back Kick, Anterior Kick, Lateral Kick, Spinal Stabilization, Half Step, Functional Phase.

Group- B

Bruggers Exercise

Patients were asked to sit on the edge of the chair with hips abducted, foot externally rotated, head held up, forearms were supinated, wrists and digits were extended then patients were to slowly exhale through the lips while actively laterally rotating their arms and spread the digits. The patient is to perform this exercise once or twice every 20-30 minutes of duration and position for 30-60 seconds.

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 and Independent t-test (Student t-Test) was adopted to find the statistical difference between the groups.

RESULTS AND DISCUSSION

On comparing VAS score between Group A and Group B, it shows significant difference in post test mean values at $P \leq 0.001$. Both the Groups show significant decrease in the post test Means but (Group-A) has the Higher Mean value which is more effective

Table 1: 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	0.798	5.93	0.883	0.433	28	0.668*
Post test	2.06	0.798	3.20	0.774	-3.94	28	0.000***

Table 2: Comparison Of Hip Range Of Motion Between Group – A And Group - B In Pre Test

#Variable Measurement Levels	#Group - A		#Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
Hip Flexion	57.00	10.65	57.33	5.30	-.108	28	0.914*
Hip Extension	19.20	3.09	20.33	1.98	-1.19	28	0.245*
Hip Abduction	30.86	3.75	29.66	4.46	0.796	28	0.433*
Hip Adduction	21.46	2.77	21.66	2.58	-0.204	28	0.840*

Table 3: Comparison Of Hip Range Of Motion Between Group – A And Group - B In Post Test

#Variable Measurement Levels	#Group - A		#Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
Hip Flexion	81.53	11.12	68.73	10.59	3.22	28	0.000***
Hip Extension	26.60	1.80	23.93	1.98	3.85	28	0.000***
Hip Abduction	39.80	2.00	34.53	3.60	4.94	28	0.000***
Hip Adduction	27.26	1.48	24.80	3.87	0.230	28	0.000***

Table 4: Comparison Of SF-12 (Physical Health Composite Score) Between Group – A And Group- B In Pre Test

#Variable Measurement Levels	#Group - A		#Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
Health	3.40	0.632	3.33	0.617	0.292	28	0.772*
Moderate Activities	2.46	0.639	2.60	0.507	-632	28	0.522*
SeveraL	2.60	0.507	2.66	0.487	-0.367	28	0.716*
Role of Physical	1.13	-0.351	1.20	0.414	-0.475	28	0.638*
Kind	1.06	0.258	1.20	0.414	-1.05	28	0.299*
Body Pain	3.13	0.743	3.33	0.723	-0.474	28	0.461*

Table 5: Comparison Of SF-12 (Physical Health Composite Score) Between Group – A And Group- B In Post Test

#Variable Measurement Levels	#Group - A		#Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
Health	1.73	0.593	2.26	0.593	-2.46	28	0.020**
Moderate Activities	2.00	0.377	1.26	0.457	-.478	28	0.001**
Several	1.86	0.546	1.33	0.487	-2.90	28	0.007**
Role of Physical	1.73	0.457	1.53	0.516	1.12	28	0.049**
Kind	1.80	0.414	1.40	0.507	2.36	28	0.025**
Body Pain	1.93	0.798	1.60	0.632	-1.26	28	.0.47**

Table 6: Comparison Of SF-12 (Mental Health Composite Score) Between Group – A And Group- B In Pre Test

#Variable Measurement Levels	#Group - A		#Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
Vitality	4.13	1.18	3.80	0.861	0.880	28	0.386*
Emotional Accomplished Less	1.13	0.351	1.60	.507	-2.92	28	0.101*
Less Careful Than Usual	1.13	0.351	1.93	.258	-7.09	28	0.051*
Social Function (EmotionalProblems)	2.40	0.507	2.13	.639	1.26	28	0.216*
Mental Health (Peaceul Calm)	1.86	0.516	2.60	1.24	-2.11	28	0.054*
Felt Down Hearted	2.06	0.703	2.07	0.096	-0.002	28	0.999*

Table 7: Comparison Of SF-12 (Mental Health Composite Score) Between Group – A And Group- B In Post Test

#Variable Measurement Levels	#Group - A		#Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
VItality	2.20	0.560	2.46	0.516	-1.53	28	0.048**
Emotional Accomplished Less	1.73	0.457	1.60	0.507	0.756	28	0.046**
Less Careful Than Usual	1.93	0.258	1.46	0.516	3.10	28	0.004**
Social Function (EmotionalProblems)	3.93	0.593	3.33	0.729	2.48	28	0.019**
Mental Health (Peaceul Calm)	4.00	0.755	3.01	0.756	0.526	28	0.049**
FELT DOWN HEARTED	4.46	3.51	3.66	0.723	3.48	28	0.002**

than (Group-B) Table 1.

Table 2 reveals the Mean, Standard Deviation (S.D), t-test, degree of freedom (df) and p-value of the Hip Range of Motion between (Group A) & (Group B) in pre-test. This table shows that there is no significant difference in pre-test values of the Hip Range of Motion between Group A & Group B (*P > 0.05).

On comparing Hip Range of Motion between Group A and Group B, it shows significant difference in post test mean values at P $\leq$ 0.001. Both the Groups show significant decrease in the post test Means but (Group-A) has the Higher Mean value which is more effective than (Group-B) Table 3.

Table 4 reveals the Mean, Standard Deviation (S.D), t-test, degree of freedom(df) and p-value of the SF-12 Health Survey(Physical Health Composite Score) between (Group A) & (Group B) in pre-test. This table shows that there is no significant difference in pre-test values of the SF-12 Health Survey (Physical Health Composite Score) between Group A and Group B (*P > 0.05).

On comparing SF -12 Health Survey (Physical Health Composite Score) between Group A and Group B, It shows significant difference in post test values at P $\leq$ 0.05. Both the Groups show significant difference in the post test Means but (Group-A) has the Lower Mean value in Health and Higher Mean values in other components which are effective than (Group-B) Table 5.

On comparing SF -12 Health Survey (Mental Health Composite Score) between Group A and Group B, it shows significant difference in post test values at P $\leq$ 0.05. Both the Groups show significant difference in the post test Means, but (Group-A) has the Lower Mean value in Vitality and Higher Mean values in other components are effective than (Group-B) Table 6.

Table 7 reveals the Mean, Standard Deviation (S.D), t-test, degree of freedom (df) and p-value of the SF-12 Health Survey (Mental Health Composite Score) between (Group A) & (Group B) in Post Test. This table shows that statistically significant difference in post test values of the SF-12 Health Survey (Mental Health Composite Score) between Group A & Group B (**- P $\leq$ 0.05)

The main objective of this study was to find the efficacy of Janda's approach versus Bruegger's exercise in pelvic cross syndrome and quality of life. The selected subjects were presented with knee hyperextension, lordosis, and anterior pelvic tilt. In Group A Janda's approach, Group B Bruegger's exercise. Janda's approach showed better results and outcomes on comparison with Brugger's exercise.

One of the most important risk factor of musculoskeletal pain in young population is muscular imbalance. Lower crossed syndrome (LCS) is muscular imbalance that includes tightness of the hip flexors lower back muscles and weakness of abdominal, gluteus maximus muscle which alter the biomechanical force distribution in lower back region and that may lead to chronic musculo-skeletal pain. Henry O proposed that in the erect position, weakness of abdominals permits an anterior pelvic tilt and lordotic posture. On considering the result of our study, both the groups showed significant difference, however it was found that Group A Janda's approach was more effective in correction of anterior pelvic tilt. Sil-ah choi et. al. all concluded that theraband as an effective method to facilitate gluteus muscle activity and reduce the anterior pelvic tilt angle. (Mills *et al.*, 2015) suggest that restricted hip flexors muscle length is theorized to decrease neutral drive to hip extensor musculature. By means of thera band, resistance is given to the action of gluteus muscle; this in turn facilitates the muscle activity and helps in correction of lordosis which leads to reduction of anterior pelvic tilt (Kendall and Creary, 1983). Mental, physical and health status was measured by using SF-12 questionnaire, which also used by Koumatakis et. al. who recommends the use of outcome measure for anxiety, depression with the MSPQ.Psychological factors (distress, depressive, mood and somatization) are implicated in the transition to chronic musculoskeletal pain. Early identification of these risk factors may lead to more effective treatment by identifying which patient are likely to benefit from behavioural treatment the psychological component involved in musculoskeletal pain is also important to assess with health related outcome measures like sf-36, sf-12 (Ware and Keller, 1996).

Co-ordinated activity in the related neuromyofascial systems in providing mechanisms of both intrinsic and extrinsic support and control (Key, 2010). The contribution of the trunk compartments to the support of the spine, that the actual force on the spine is much less than that considered to be present when support by the trunk, or the effect of the intra-cavitary pressures, is omitted. The calculated force on the lumbosacral disc is about 30 per cent less, and that on the lower thoracic portion of the spine is about 50 per cent less, than would be present without support by the trunk (Morris *et al.*, 1961).

On comparing the result of both Group A and Group B, both the groups showed improvement in VAS and range of motion, SF but there was better improvement in Group A than Group B. While considering

sensorimotor training it seems to improve, proprioception, strength and postural stability. Janda's approach comprised of wobble board training, theraband exercise, spinal stabilization. Half steps which will help to restore muscle power, balance, and co-ordination and maintain COG.

CONCLUSIONS

This study concludes that the subjects in group-A who performed Janda's Approach shows a great improvement in reducing pain and improving functional activities in pelvic cross syndrome than the group-B who have done Bruegger's exercise. Thus, it can be assumed from this study that group A Janda's Approach is an effective Exercise to Reduce pain and Improving Range of Motion in pelvic cross syndrome.

Authors Contribution

All authors have contributed equally.

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.

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 of both (Institutional and national) on human experimentation and the Helsinki Declaration of 1964 (as revised in 2008).

Conflict of Interest

All contributing authors declare that they have no Conflicts of interest. This study was approved by Institutional Review Board of Physiotherapy, Dr. MGR Educational and Research Institute University, Chennai.

Funding

This is a self-funded study.

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