

Effectiveness of Gross Motor Skills in Chronic Mechanical Low Back Pain

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Abstract

Aims and Objective: Low back pain (LBP) is a common disorder, which involve the muscles, nerves, and bones of the back. Low back pain is one of the most common musculoskeletal conditions and every individual experience low back pain once in his life. Mechanical back pain (MBP) is the general term that refers to any type of back pain caused by placing abnormal stress and strain on muscles of the vertebral column. The objective of this study was to see the effects of exercises induced motor skills in chronic MBP. *Method:* The present study includes 30 subjects with age range of 22-50 years, were divided into two groups. Group A (n=15) and Group B (n=15) respectively. VAS Pain Score and Quebec LBP questionnaire are recorded for pre- intervention in both the group. In group A General Back Exercise was given for 3 weeks. In group B Gross Motor Skills was given for 3 weeks. After 3 weeks VAS Pain Score and Quebec LBP questionnaire were recorded, evaluated and assessed for comparison in both the groups. *Result:* There was a significant difference between pre intervention and post intervention of group A & group B. Post-post intervention for VAS has not shown significant difference but Quebec back pain disability questionnaire shown significant difference. *Conclusion:* Gross motor activities are much more effective in low back pain patients as compared to conventional methods.

Keywords: Mechanical Back Pain; Gross Motor Activities; General Back Exercise; VAS; Quebec Back Pain Disability Questionnaire.

Introduction

Low back pain (LBP) is a common disorder involving the muscles, nerves, and bones of the back. Pain can vary from a dull constant ache to a sudden sharp feeling [1]. Low back pain may be classified by duration as acute (pain lasting less than 6 weeks), sub-chronic (6 to 12 weeks), or chronic (more than 12 weeks) [2]. The condition may be further classified by the underlying cause as either mechanical, non-mechanical, or referred pain [3]. The symptoms of low back pain usually improve within a few weeks from the time they start, with 40-90% of people completely better by six weeks [4].

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Low back pain is one of the most common musculoskeletal conditions. Nearly every individual experience low back pain once in his life. It is an extremely common health problem and has been considered as the 5th common cause to visit a clinician in United States. A number of studies have shown that the incidence of LBP is highest in the 3rd decade of life & its prevalence increases with the age until 60-65 age groups and then gradually decline [5].

Low back pain is defined as a symptom complex consisting of pain & muscle tension or stiffness in the lumbar region localized below the coastal margin & above the inferior glutei folds, with or without pain radiating to the legs. Low back pain is most often due to an incompetence of the soft tissue structure, and the onset of the pain is believed to be caused by a mechanical injury. Back pain is of 2 type's mechanical and chemical (non-mechanical) [5,6,10].

Mechanical pain is the general term that refers to any type of back pain caused by placing abnormal stress and strain on muscles of the vertebral column. Typically, mechanical pain results from bad habits such as poor posture, poorly-designed seating and incorrect bending and lifting motions. Mechanical

back pain is a common medical problem. Mechanical means the source of the pain may be in the spinal joints, discs, vertebrae or soft tissues [9]. The onset & course of LBP is influenced by environmental and personal factors. Other risk factors are low educational status, stress, anxiety, depression and job dissatisfaction. Low back pain has an enormous impact on individuals, families, communities, government and businesses throughout the world [6].

LBP is considered as a health problem in many countries of the world & is among the primary causes of work absence & disability. LBP occurs in professions such as heavy labour, repeated activity & sedentary extended posture. When an individual is subjected to repetitive bending, twisting or compressive loading to the spine it leads to low back pain. The individual neglect their back pain initially, but with due course of time when the symptoms aggravate or enter in to chronic stage they approach for its management [7].

A precise cause of mechanical low back pain can be identified 20 percent of the time. Sometimes, a specific trauma to the back or strenuous activity may cause back pain. However 80 percent of the time, the specific source of the back pain is not found. It implies that the source of the back pain is in the spine or its supporting structure. The surrounding muscles and ligaments may become inflamed and irritated. Any movement or a series of movements which places abnormal stress or loading on the spine leads to low back pain [5,7].

Human being spend most of their time in flexed position therefore today's society is considered as flexion dominated society. Janda divided muscle in to two groups tonic and phasic muscle. These two types of muscles are the key words to understand the common pattern of muscle dysfunction. Poor posture leads to muscle imbalance i.e. inhibition of one muscle group followed by facilitation of other muscle group. This is known as lower crossed syndrome [11].

A stable spine is maintained by high muscular endurance which provide best protection against low back pain. Therefore stability of spine can be achieved by strengthening the core muscles. The 'core' is a group of muscles that surrounds the back and abdomen and is best described as cylinder of muscles. The main function of the core is to stabilize and protect the spine and pelvis when the rest of the body is in motion.

It is also important to maintain the normal curve of the low back. Therefore emphasis should be given on co-contraction of the back extensors & abdominals

through isometric exercise such as bird and dog, cat & camel, bridging exercise, abdominal in drawing & crunches. There is a depth in literature regarding the effect of these exercises. The gross motor skill has significant role in improving chronic mechanical low back pain. Thus, the present study is designed to assess the effectiveness of exercise induced motor skills in chronic mechanical low back pain.

A motor skill is a function, which involves the precise movement of muscles with the intent to perform a specific act. Most purposeful movement requires the ability to "feel" or sense what one's muscles are doing as they perform the act. They are movements and actions of the muscles. Typically, they are categorized into two groups: gross motor skills and fine motor skills. Gross motor skills are involved in movement and coordination of the arms, legs, and other large body parts and movements.

Gross Motor refers to large movements that are driven mostly by the larger muscles groups of the body. Movements of the whole arm, the legs, the trunk, are all gross motor movements. Thus, gross motor skills are skills that develop through using the large muscles of the body in a coordinated and controlled way.

A motor skill is simply an action that involves you to use muscles. Gross motor skills are larger movements of arms, legs, feet, or entire body. So crawling, running, and jumping are gross motor skills. Development of motor skills is considered to follow certain sequences.

There are specific skill sequences that delineate the many steps from developing head control to learning to walk, and from grasping objects with a fist to writing with a pencil. These sequences are often analysed or described in terms of more general patterns of development, which are thought to follow certain progressions: head to foot, gross to fine, weight bearing to non-weight bearing, and proximal to distal (near the body to farther from the body). The "head to foot" pattern reflects the progression of control from the head, to the trunk, and finally to the legs. The "gross to fine" pattern reflects the development of large body movements, such as walking, before refined movements, such as buttoning and writing. The "weight bearing to non-weight bearing" pattern describes that children learn to prop up on their arms before they become skilled at reach and grasp.

Motor control exercise is a popular form of exercise that aims to improve coordination of the muscles that control and support the spine. Patients are initially guided by a therapist to practise normal use of the muscles with simple tasks. As the patient's skill

increases the exercises become more complex and include the functional tasks that the person needs to perform during work and/or leisure activities [13].

Objective of the Study

The objective of the present study is to see the effects of exercises induced motor skills in chronic mechanical low back pain.

Methods

The present study includes 30 subjects after inclusion and exclusion criteria.

Inclusion Criteria

- Middle-aged (22 and 50 years old).
- Chronic mechanical low back pain was the chief complaint without leg pain.
- Patient with the diagnosis of mechanical lower back pain for more than three months by X-Ray/ MRI.

Exclusion Criteria

- Spinal Infection, Tumours and trauma.
- Neurological conditions like balance and coordination

• Diabetic and Pregnancy

These 30 subjects were divided into two groups. Group A (n=15) and Group B (n=15) respectively. VAS Pain Score and Quebec LBP questionnaire are recorded for pre- intervention in both the group. In group A General Back Exercise was given for 3 weeks. In group B Gross Motor Skills was given for 3 weeks. After 3 weeks VAS Pain Score and Quebec LBP questionnaire were recorded for post intervention in both the groups. Data of both the groups was then evaluated and assessed.

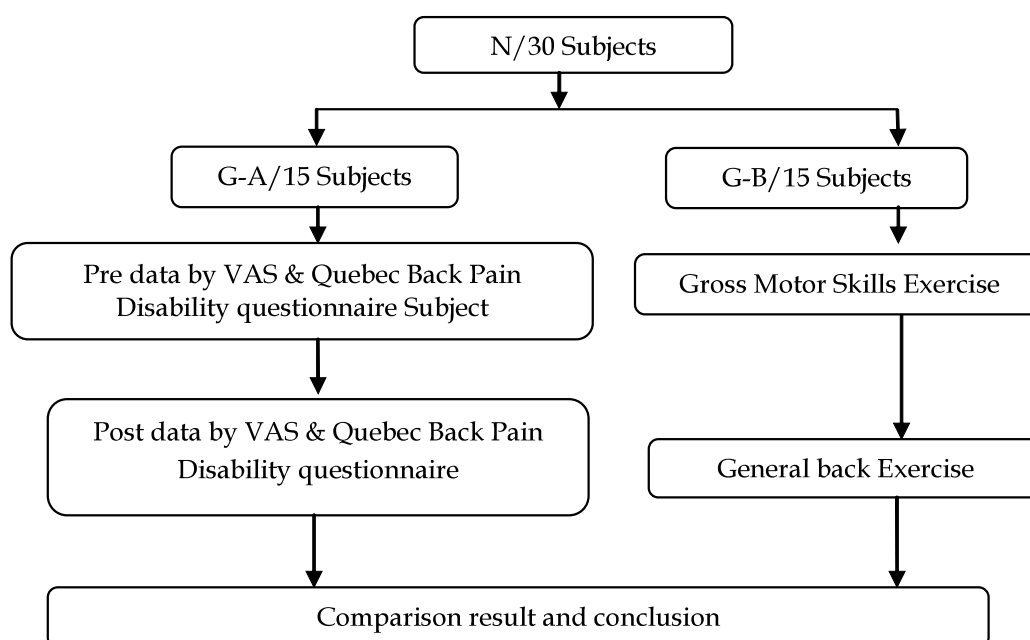
Procedure

A written consent form was signed prior to start the procedure to ensure safety. The subjects were explained about the testing procedure and purpose of the test including the nature of the test, symptoms, signs and possible complications.

The pain was assessed in both the groups with the help of Visual Analogue Scale and the Quebec Back Pain Disability questionnaire for pre intervention.

The subjects of Group A (Control Group) was undergone for General back pain Exercises and Group B (Experimental Group) was undergone for Gross Motor Activities for 3 weeks. After the 3 weeks of given exercise again pain was assessed with help of Visual Analogue Scale and Quebec Back Pain Disability questionnaire for post intervention.

Flow Chart



Data Analysis

Statistics were performed using SPSS and Graph pad. Intra group analysis was done using Wilcoxon Signed Ranks Test and inter group analysis was done Mann-Whitney Test to analyze and compare the intervention scores. Significance level was set at $p \leq 0.05$.

Result

This chapter deals with the results of the data analysis of pre intervention and post intervention values of VAS and Quebec LBP questionnaire. Intra group analysis was done using Wilcoxon Signed Ranks Test and Inter group analysis was done using Mann Whitney Test.

Comparison of pre and post readings of group A(Control) for VAS pre intervention (mean= 7.40, SD=.910), and post intervention (mean= 4.60, SD= 1.325) revealed a significant difference ($p < .001$).

Comparison of pre and post readings of group B (Experimental) for VAS pre intervention (mean =

6.87, SD=.990), and post intervention (mean= 4.2, SD= 1.207) revealed a significant difference ($p < .001$).

Comparison of pre and post readings of group A for Quebec Back Pain Disability pre intervention (mean= 47.750, SD=3.902), and post intervention (mean= 27, SD= 6.084) revealed a significant difference ($p < .001$).

Comparison of pre and post readings of group B for Quebec Back Pain Disability pre intervention (mean= 46.500, SD=4.776), and post intervention (mean= 15.417, SD= 8.847) revealed a significant difference ($p < .001$).

Comparison of Post readings of Group A VAS and Post readings of Group B VAS for VAS Post intervention (mean=4.40, S.D=1.276) revealed a non significance difference.

Comparison of Post readings of Group A Quebec Back Pain Disability and Post readings of Group B Quebec Back Pain Disability for Quebec Back Pain Disability Post intervention (mean=21.2083, S.D=9.506) revealed a significance difference ($p \leq .003$).

Table 1: Comparison of pre and post readings for VAS in Group A

Group A	Pre intervention	VAS	Post intervention
Mean	7.40		4.60
S.D.	.910		1.325
P value		<.001	

Table 2: Comparison of pre and post readings for VAS in Group B

Group B	Pre intervention	VAS	Post intervention
Mean	6.87		4.20
S.D.	.990		1.207
P value		<.001	

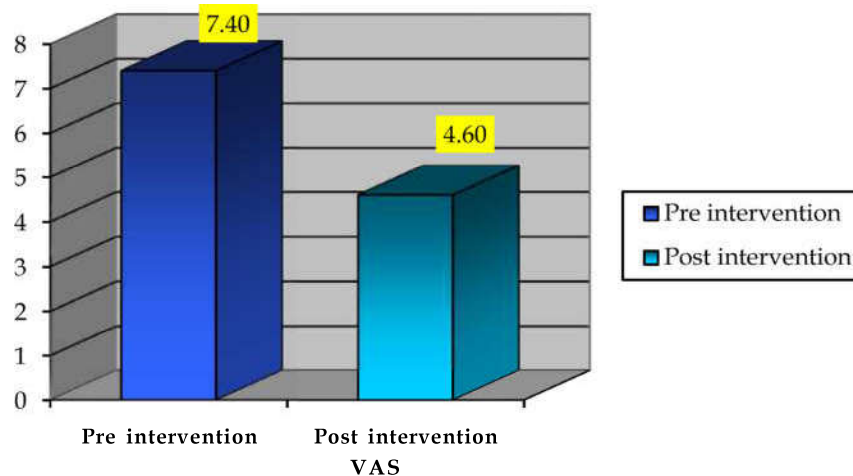


Fig. 1: Pre and Post readings for VAS in Group A

Table 3: Comparison of pre and post readings for Quebec Back Pain Disability in Group A

Group A	Quebec Back Pain Disability	
	Pre intervention	Post intervention
Mean	47.750	27
S.D.	3.902	6.084
P value	<.001	

Table 4: Comparison of pre and post readings for Quebec Back Pain Disability in Group B

Group A	Quebec Back Pain Disability	
	Pre intervention	Post intervention
Mean	46.500	15.417
S.D.	4.776	8.847
P value	<.001	

Table 5: Comparison of post readings for VAS between Group A and Group B

Mann Whitney Test (Non Parametric Test)		VAS
		Post intervention
Mean		4.40
S.D.		1.276
P value		0.358

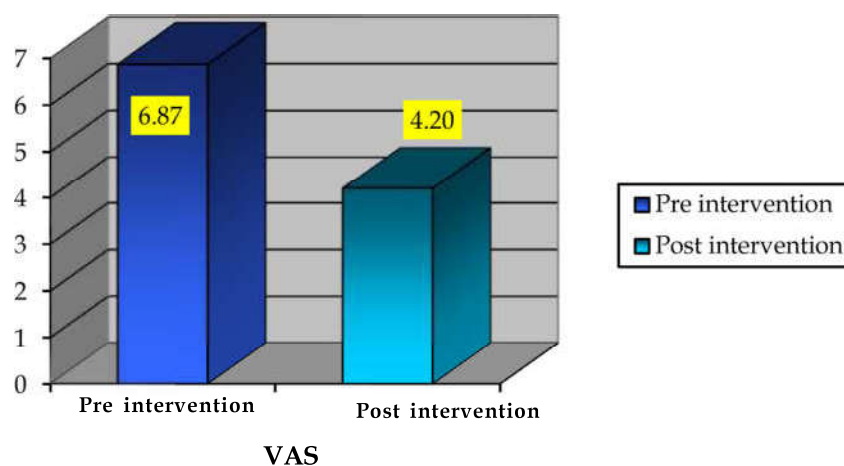


Fig. 2: Pre and Post readings for VAS in Group B

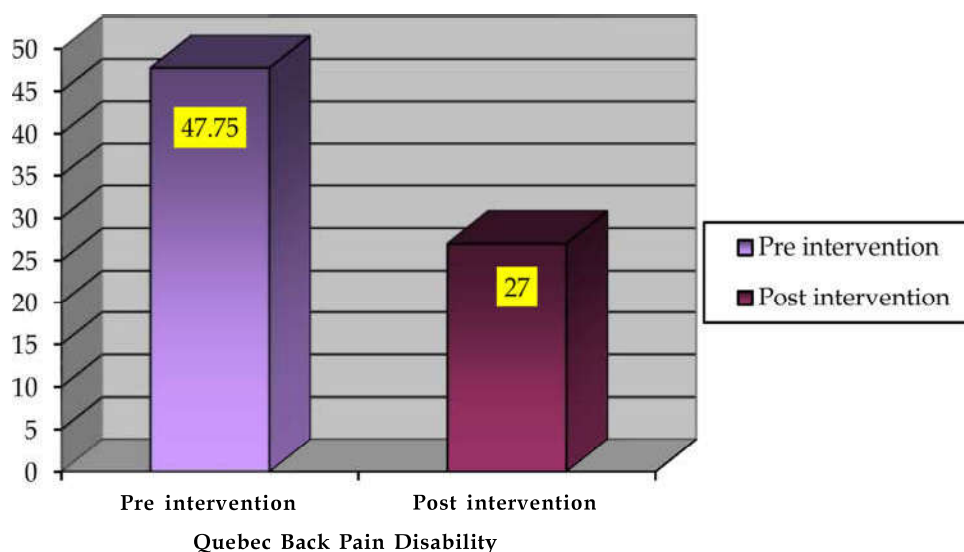


Fig. 3: Pre and Post readings for Quebec Back Pain Disability in Group A

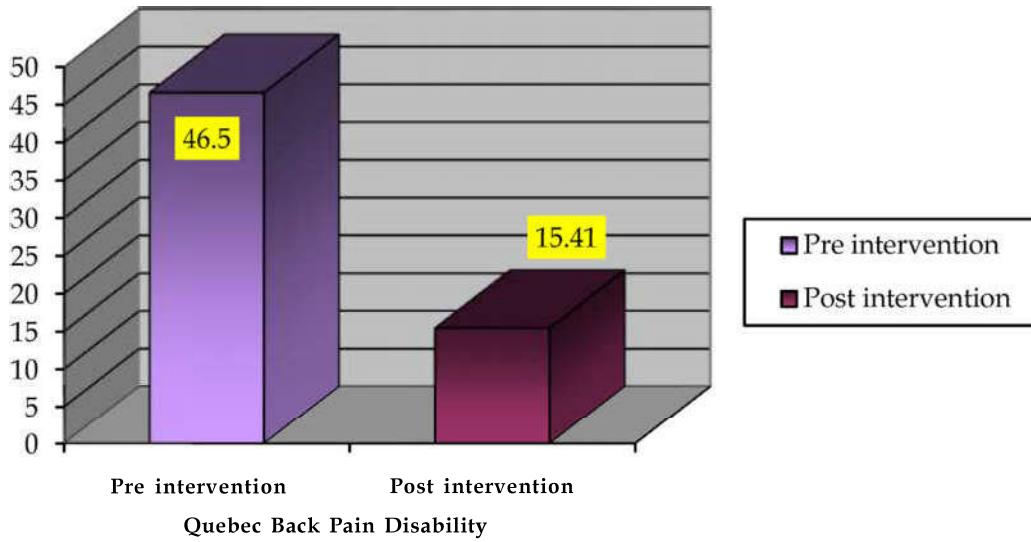


Fig. 4: Pre and Post readings for Quebec Back Pain Disability in Group B

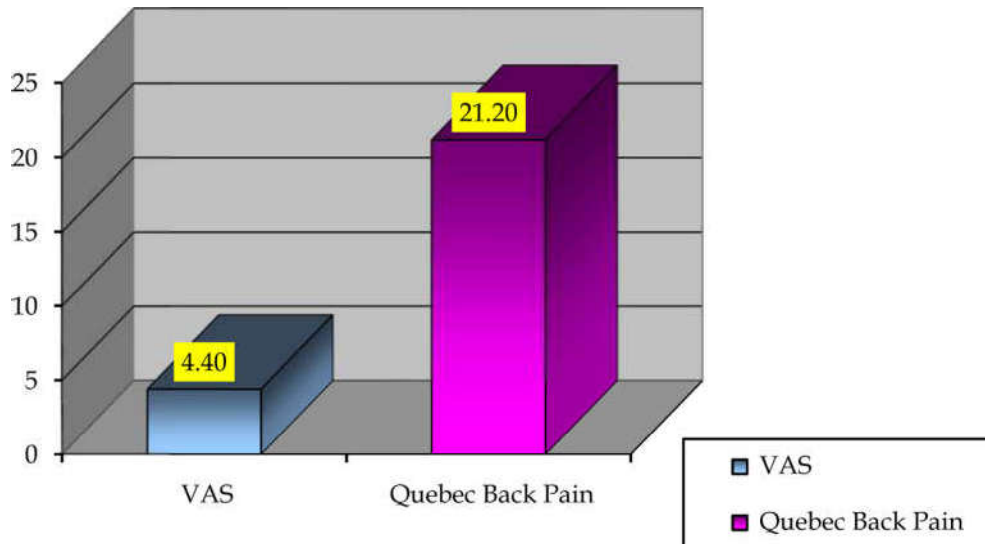


Fig. 5: Post readings for VAS and Quebec Back Pain Disability between Group A and Group B

Table 5: Comparison of and post readings for Quebec Back Pain Disability between Group A and Group B

Mann Whitney Test (Non Parametric Test)	Quebec Back Pain Disability Post intervention
Mean	21.208
S.D.	9.506
P value	0.003

Discussion

Mechanical back pain is leading cause of back problems the annual incidence in the adults

population of 10-15%, and a point prevalence of 15-30%. Back and spine impairments are the most common impairment among young and middle-aged people [17].

Mechanical low back pain is described as any type of back pain caused by placing abnormal stress and strain on muscles of the vertebral column. Typically, mechanical pain results from bad habits such as poor posture, poorly-designed seating and incorrect bending and lifting motions.

Mechanical back pain is a common medical problem. Mechanical means the source of the pain may be in the spinal joints, discs, vertebrae or soft tissues [9]. Mechanical low back pain is aggravated with activity and relieved by rest. The pain may radiate to either iliac crest but does not radiate down to buttocks and legs [19]. This very nature of mechanical back pain restrict individual from performing Activity of Daily Livings effectively which in turn causes muscle weakness.

The current study focuses on the gross motor activity in individuals with mechanical low back pain which will improve pain condition and enhance the Activity of Daily Livings performance.

In this current study focus is on gross motor activities effect on Low back pain and result between post-post of Visual Analogue Scale with Standard Deviation showed there is no significant difference with P values of .358, duration of study being short could be the possible cause for this. there is need to observe long term effect of gross motor activity on Mechanical low back pain, whereas post-post of Quebec showed significance difference of p values .003. Which indicate that gross motor activities if induced in low back pain patients can improve their Activity of Daily Livings as compared to the conventional methods used in the study.

These results of Quebec back pain questionnaire proves the hypothesis that gross motor activity can have positive effect on low back pain scenario.

Taking this into account treatment of mechanical low back pain urges to find new and simple method to treat and reduce disability of individual with Mechanical Low Back Pain as suggested by Bruno Saragiotto, et al. Exercise to improve skill and coordination for lower back pain .

Conclusion

The present study concludes the effectiveness of Gross motor activities on chronic mechanical low back pain. The gross motor activities if induced in low back pain patients can improve their Activity of Daily Livings as compared to the conventional methods used in the study.

Clinical Implications

These Gross motor Activities can effectively treat mechanical low back pain with reduction in disability index of individual of effected with mechanical low back pain and these exercise helpful for individual activities of daily living performance enhancement.

Limitations of the Study

1. Duration of study was short.
2. Procedure of study was done on small population.
3. Patients size specific.

Future Research

The study should conducted larger group size with longer duration to as long term effect and efficacy of the gross motor inclusion in exercise.

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