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ORIGINAL ARTICLE

Effectiveness of Force Closure Stability Exercises with Core Stability Exercises in patients with Mechanical Low Back Pain

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ABSTRACT

Background: Strengthening of core muscles has a key role in the physical therapy management of mechanical back pain and current study was designed to compare two types of core muscles strengthening exercises, including forced closure and core stability.

Objective: The objective of the study is to compare the effectiveness of forced closure and core stability exercises for the strengthening of core muscles in patient with mechanical back pain.

Methodology: This Randomized control trial (RCT) was conducted in department Rehabilitation Fauji foundation hospital, Rawalpindi from July 2014 to January 2015. A total 30 patients with mechanical low back pain were selected and placed into two groups i.e. group A and B. Group A were treated with forced closure exercises, while group B with core stability exercises for 6 weeks at 5 days per week. Visual analogue scale (VAS) and function on Oswestry Disability questionnaire (ODQ) were used as assessment toll and measured at baseline and at completion of 6 weeks intervention.

Results: Results showed that clinically both exercise regimes improve pain and function, but the patient in group A improve pain (mean VAS score from 3.73 to 1.47) and function (mean ODQ score from 48% to 22%) more than patients in group B with (mean VAS score from 3.67 to 2.73 and mean ODQ score from 43% to 36%). Statistically result of patients treated with force closure exercises were more significant (p value for pain and ODQ score =0.000, and p-value for ODQ 0.000) than group of patient treated with core stability exercises (p value for pain= 0.002, and p-value for ODQ score 0.003).

Conclusion: It is concluded that the forced closure exercises improves pain and function more than core stability exercises along with routine physical therapy management in patient with mechanical low back pain.

Keywords: Abdominal Strengthening Exercises, Core Stability Exercise, Forced Closure Stability Exercises, Low Back Pain.

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INTRODUCTION

Low back pain is one of the most common causes of disability in all over the world. The prevalence of low back is 80% at some stage in our lives [(1)]. Core stability exercises has important role in fitness and rehabilitation program [(2)]. There are several studies which showed that core stability exercise is an important component in treatment of low back pain [(3)].

Core stability exercises are usually used to strengthen the muscles of abdomen, lumber and pelvic [(4)]. The muscles related to core stability are multifidus, transverses abdominis, external/internal oblique abdominis, paraspinalis, gluteus, diaphragm in rear part, and hip muscles [(5)]. The prevalence of back pain in developing countries among farmer was 72% in Nigeria, 56% in Thailand and 64% in China [(6)]. Exercise therapy is best option for the management of low back pain [(7)].

There are different exercise approaches for management of low back pain ranges from simple strengthening and endurance exercises to specific muscle coordination and control. It is suggested that improving control and stability reduce mechanical irritation and this cause pain relief [(8)].

Recently the focus of core stability training is on transverses abdominis and lumber multifidus. The co contraction of these muscles increases individual trunk stiffness and intra-abdominal pressure with minimum load on spine. Force closure exercises are used to increase closure and hence increasing stability and therefore called self bracing or self locking of the joint. This suggests that such exercises are more effective chronic low back pain

[9]. The purpose of the current study was to determine effectiveness of force closure stability exercises with core stability exercises in patients with mechanical Back Pain.

METHODOLOGY

This is a randomized control trial (RCT) study which was conducted from July 2014 to January 2015 at Out Patient Department of Physical Therapy and Rehabilitation, Fauji Foundation Hospital Rawalpindi. A total 30 diagnosed patients of mechanical low back pain were selected and randomly placed into two groups A and B. Group A consist of 15 patients and were given force closure exercises and group B also consist of 15 patients were given core stability exercises. The inclusion criteria were patients of both genders with mechanical low back pain of age ranged from 11 to 60 years, while patients with postoperative, trauma, scoliosis, and lesthesis were excluded.

All the patient were assessed at the baseline before intervention and at the completion of 6 weeks intervention period for pain on visual analogue scale (VAS) and function on Oswestry Disability questionnaire (ODQ). The title was approved from Research Ethical Committee of Riphah International University. Data was analyzed with SPSS version 20 and paired test was applied at 95% level of significance to determine the statistical results for both the techniques.

RESULTS

A total thirty patients with mechanical back pain were included in this study and were placed randomly into two groups. The baseline characteristics were similar in both groups. Results showed that clinically both the types of core strengthening exercise improve pain and function, but the patient in group A treated with forced closure exercises improve pain (mean VAS score from 3.73 to 1.47) and function (mean ODQ score from 48% to 22%) more than patients treated with core stability exercises with (mean VAS score from 3.67 to 2.73 and mean ODQ score from 43% to 36%). Both treatment techniques improve function from severe disability to moderate disability. Independent t test between the groups and paired t test within the group were applied to analyze the treatment effect. Statistically the results of both the groups were significant with minor difference.

Table I: Frequency Distribution of Gender

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	18	60.0	60.0	60.0
Female	12	40.0	40.0	100.0
Total	30	100.0	100.0	

The patients group treated with force closure exercises were more significant (p value for pain and ODQ score =0.000, and p-value for ODQ 0.000) than group of patient treated with core stability exercises (p value for pain= 0.002, and p-value for ODQ score 0.003).

Table-II: Paired Sample Statistics for VAS and ODQ scale.

Study Group (N=30)	**Group A** (n=15)		**Group B** (n=15)	
	Pre treatment	Pro treatment	Pre treatment	Pro treatment
Mean ± SD score for VAS on 0-10	3.73±0.458	1.47±0.516	3.67±0.488	2.73±0.594
Mean score for ODQ scale on (percentage)	48%±10%	22%±6%	43%±11%	36%±4%
P Value pain	0.000		0.000	
P value for ODQ	0.000		0.000	

DISCUSSION

In this study, the variables were compared after the 6 weeks of physical therapy intervention, including Force closure exercises in group A and core stability exercises in group B. The patients in group A showed significant and more rapid improvement in pain and function as compared to group B. According to Willard et al force closure reduces the joint's 'neutral zone' thereby facilitating stabilization [10].

This study showed that both types of exercises improve pain and function. Kibler and colleagues conducted a study on the importance of core muscles and its stability in athletes. They con-

cluded that during rehabilitation of back problems in athletes core muscles restoration should be taken as a component and also considered it as a base for extremity function [11].

Another study conducted by Han and group on the effects of lumber stabilization exercises on pain and range of motion in shoulder. They concluded that shoulder pain and range of motion improved in patients treated with core stability exercises group. The core muscle strengthening exercise not only improved lumber stability but also improve upper and lower extremity function [12]. In our study not only pain decrease with exercises but also function improved.

Rafiq et al. conducted a randomized control trial on patients with mechanical low back pain and concluded that specific lumber mobilization combined with core stability exercises improves pain and function while applied in patients with mechanical low back pain [13]. Our study also revealed that both types of exercises improve function and decrease disability.

A study conducted by Rathod and colleagues on the effectiveness of core stability exercise in clerks with low back pain while compared with routine physical therapy management. They concluded that core stability exercises are more effective in treating clerks with low back pain [14].

CONCLUSION

It is concluded that the forced closure exercises improve pain and function more than core stability exercises along with routine physical therapy management in patient with mechanical low back pain. It is further recommended for study on the topic with large sample size and duration of intervention more than 6 weeks.

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