Effectiveness of Strengthening Vs Strengthening with Stretching in Individuals with Nonspecific Low Back Pain

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Abstract

Objectives:- To assess and compare the effectiveness of strengthening and strengthening with stretching in patients with nonspecific low back pain

Methodology:- There were total 40 patients with low back pain in the study. This study was done to find and compare the effect of strengthening and strengthening with stretching in patients with nonspecific low back pain. The patients were assessed with Visual Analogue Scale for pain and Manual Muscle Testing for the strength before and after 12 weeks of treatment.

Result: Strengthening and stretching of the muscles has effect on the pain reduction as well as strength of the muscles in patients with nonspecific low back pain.

Conclusion: On the basis of the result of this study, it was concluded that the strengthening and stretching of the muscles has effect on the pain reduction as well as strength of the muscles in patients with nonspecific low back pain

Keywords: *Nonspecific Low Back Pain, Visual Analogue Scale, Manual Muscle Testing, Strengthening, Stretching*

Introduction

Low Back Pain is one of the most commonest musculoskeletal condition affecting the adult population with a prevalence of about 84%[1]. It affects both the genders, but most commonly seen in women than the men[2]. Low Back Pain is the pain which is localized between the 12th rib and the inferior gluteal folds, with or without any radiating pain to the legs[2]. Low Back Pain can be due to degeneration of the spine and discs, trunk stabilizers, jobs that requires repetitive heavy lifting, excessive mechanical stress on the intervertebral disc, along with psychological factors of the patients[2]. Patients complaining of low back pain for almost 3 months may present with decreased muscle strength. Impaired motor control, decreased Co-ordination and Postural Control that interferes with the functional activities of the patients[2].

Age: Children usually do not complain of low back pain, and if they complain that may be because of some Organic disease[12]. Traumatic back pain and postural back pain is the common cause in the adolescent age group[12]. In adults the pain may be due to various conditions such as Ankylosing Spondylitis, Disc Prolapse etc. Degenerative Arthritis or osteoporosis is the main cause of low back pain in elderly[12].

Sex: Women who had multiple pregnancies are mostly affected. Poor Muscle Tone due to Lack of Exercises are the contributory factors in these women. Obesity during the pregnancy can also lead to Mechanical Back Pain[12].

Occupation: Occupation gives us the clues of the risk factors which are responsible for the low back pain people with the sedentary jobs are most likely prone for the low back pain[12].

Physical activity to Increase the Muscle strength as well as the aerobic capacity of the lumbar extensors is an important factor of the patients with chronic low back pain in assisting the patients to complete the activities of daily living[3]. Abnormal habitual posture can lead to tightness in the lumbo-pelvic Hip complex muscles that can cause abnormal stresses which can increase the shear or the compressive forces on the joints that can lead to excessive stress on the articular surface and further develops mechanical low back pain[4].

If the Tensor Fascia Lata which helps the hip joint in flexion, adduction and the internal rotation and helps the knee joint for extension shortens then the Hip joint will be internally rotated more which leads to rotation of the pelvis and that excessive rotation of the hip joint will cause an abnormal alignment of the lumbar spine and the hip joint further leading to pain in the lumbar region[4]. Shortening of the Tensor Fascia Lata can increase the iliotibial band tightness which leads to anterior inclination of the pelvis[5] . In addition due to shortening and muscle spasm of the hamstring muscle results in a posterior inclination of the pelvis[5]. Therefore simultaneous contraction of these two muscles can decrease the flexibility of the pelvis and increase the lumbar stress during the functional activities[5].

The related muscle involved are the trunk extensors which become tightened due to prolonged overstretching of the innervated soft tissue, but whereas the abdominal and the gluteal muscle undergo weakness and atrophy[5].

Some studies have found that passive and active stretching of the muscles help to improve the flexibility and also increases the Range of Motion in low back pain individuals. Weaker muscles often act as tight muscles, owing to the Neurological changes within the particular muscles which are weak[6]. If the muscles are not strong enough to perform the particular action, then it can seize up to protect itself which may further lead to a feeling of tightness[6].

The core muscles are the primary muscle group responsible for maintaining the spinal stability[7,8]. These muscle includes the transversus Abdominis, lumbar Multifidus, Internal Oblique muscle and the Quadratus Lumborum[6,7,8]. The lumbar Multifidus is the muscle which is directly connected to each lumbar vertebral segment and transversus Abdominis and the lumbar Multifidus activate a co-contraction mechanism[4,5]. These muscles provides a precise motor control and are thus primarily responsible for the spinal stability[5,8].

Most of the low back pain patients experiences fear of pain therefore they tends to avoid the physical activity which can result in tissue and structural changes. Ultimately continuous back pain persists during the lifetime and consequently this can cause secondary damage and followed by recurrence of back pain[5,7,9].

Methodology

Prior to the commencement of the study the ethical clearance was taken from the Institutional ethical committee. Individuals with Low Back Pain were selected as subjects. The subjects were selected as per the inclusion and exclusion criteria. They were given a detailed instruction about the study. The consent was taken from the subjects. The study was taken place in Satara District.

The duration of the study was 3 months. The sample size for this study was 40 irrespective of caste, religion and gender. After selecting the sample the subjects were divided into two groups randomly. The age group was between 20-40 and both the gender was selected.

The study was conducted in Karad. Demographic Data including name, age, gender, address was collected. Prior to the treatment the pre-treatment assessment was taken. Pain was assessed with the help of visual analogue scale and muscle strength with the help of manual muscle testing.

A detailed instructions were given to the participants about the treatment protocol. Group A was given only the Strengthening program, and Group B was given Strengthening and Stretching program. Group A was given strengthening program for the back muscles. Group B was given strengthening of the back muscles as well as stretching of three muscles.

All the subjects from both the group performed the exercises twice in a week for around 50min per session with the instructor for 12 weeks. Pain assessment and Muscle strength was taken before and after 12 weeks of the exercise program. The score were calculated and data was recorded. Later statistical analysis was done.

Result

Table no:-1- VAS at Rest (Pre Treatment)

	Mean±SD
Group A	6.470 ± 1.055
Group B	6.400 ± 0.9531

The baseline mean VAS score pre treatment at rest was found to be 6.470 ± 1.055 for Group A patients and 6.400 ± 0.953 for Group B patients.

Table no:- 2 - VAS at Rest (Post Treatment)

	Mean	SD	Paired t Value	p-Value	95% CI
Group A	5.375	0.9678	6.897	<0.0001	-2.684 to -1.466
Group B	3.300	0.9347			

The mean VAS score post intervention at rest was found to be 5.375 ± 0.968 for Group A patients and 3.300 ± 0.935 for Group B patients. A statistically significant reduction in Mean VAS score at rest was found for Group B patients when compared to Group A patients where the P value is <0.0001

Table:- 3- VAS on Activity (Pre Treatment)

	Mean ± SD
Group A	8.385 ± 1.177
Group B	8.515 ± 1.075

The baseline mean VAS score pre treatment on activity was found to be 8.385 ± 1.177 for Group A patients and 8.515 ± 1.075 for Group B patients.

Table:- 4- VAS on Activity (Post Treatment)

	Mean	SD	Paired t Value	p-Value	95% CI
Group A	6.925	0.8949	8.979	<0.0001	-3.045 to -1.925
Group B	4.440	0.8550			

The mean VAS score post Intervention on activity was found to be 6.925 ± 0.8949 for Group A patients and 4.440 ± 0.8550 for Group B patients. A statistically significant reduction in Mean VAS score on activity was found for Group B patients when compared to Group A patients where P value is <0.0001.

Table:- 5- MMT (Pre Treatment)

	Mean ± SD
Group A	3.450 ± 0.5104
Group B	3.400 ± 0.5026

The baseline mean MMT score pre treatment was found to be 3.450 ± 0.5104 for Group A patients and 3.400 ± 0.5026 for Group B patients.

Table:- 6- MMT (Post Treatment)

	Mean	SD	Paired t Value	p-Value	95% CI
Group A	4.500	0.5130	1.285	0.2064	-0.5150 to 0.1150
Group B	4.700	0.4702			

The MMT post Intervention was found to be 4.500 ± 0.5130 for Group A patients and 4.700 ± 0.4702 for Group B patients. A statistically significant increase in MMT score was found in Group B patients when compared to Group A patients where P value is (<0.0001)

Discussion

Low Back Pain is one of the most common musculoskeletal condition affecting the adult population with a prevalence of about 84%. It affects both the genders, but most commonly observed in women than the men. Low Back Pain is the pain which is localized between the 12th rib and the inferior gluteal folds, with or without any radiating pain to the legs. Low Back Pain can be due to degeneration of the spine and discs, trunk stabilizers, jobs that requires repetitive heavy lifting, excessive mechanical stress on the intervertebral disc, along with psychological factors of the patients. Patients complaining of low back pain for almost 3 months may present with decreased muscle strength, Impaired motor control, decreased Co-ordination and Postural Control that interferes with the functional activities of the patients.

This research was undertaken with the aim to study and compare the Effect of Strengthening and Strengthening with Stretching in Nonspecific Low Back Pain patients.

A total of 40 Patients with nonspecific low back pain coming in the age group 20-40 years were included in the study out of which 25 were females and 15 were males. The patients were randomly divided into two Groups. The patients were assessed on the basis of Visual Analogue Scale for the pain and Manual Muscle Testing for Strength. Group A was given Strength training and Group B was given Strengthening as well as Stretching.

The pain intensity score of the patients belonging to Group A and Group B was assessed using Visual Analogue Scale (VAS). The scoring range of this scale is in the range of 0-10, where 0 indicates low intense pain and 10 indicates extremely intense pain. The pain score was assessed at rest and on activity pre and post treatment. The baseline mean VAS score pre treatment at rest was found to be 6.470 ± 1.055 for Group A patients and 6.400 ± 0.953 for Group B patients. The treatment Strengthening was given to Group A patients Twice in a week and Group B patients Strengthening and Stretching was given for the same duration. The VAS score was reassessed after 3 months in both Group of patients. The mean VAS score post intervention at rest was found to be 5.375 ± 0.968 for Group A patients and 3.300 ± 0.935 for Group B patients. A statistically significant reduction in Mean VAS score at rest was found for Group B patients when compared to Group A patients where the P value is <0.0001. The study conducted by Khwairakpam proved stretching as an effective treatment intervention for patients with chronic mechanical lower back pain whereas this study proves that the combination treatment intervention is superior than single treatment intervention in patients with nonspecific chronic low back pain.

The baseline mean VAS score pre treatment on activity was found to be 8.385 ± 1.177 for Group A patients and 8.515 ± 1.075 for Group B patients. The treatment Strengthening was given to Group A patients twice in a week and Group B patients Strengthening and Stretching was given for the same duration. The VAS score was reassessed after 3 months in both Group of Patients. The mean VAS score post Intervention on activity was found to be 6.925 ± 0.8949 for Group A patients and 4.440 ± 0.8550 for Group B patients. A statistically significant reduction in Mean VAS score on activity was found for Group B patients when compared to Group A patients where P value is <0.0001. The study conduction by Khwairakpam proved stretching as an Effective treatment intervention for patients with chronic mechanical lower back pain whereas this study proves that the combination treatment intervention is superior than single treatment intervention in patients with nonspecific chronic low back pain.

The Muscle strength of the patients belonging to Group A and Group B was assessed using Manual Muscle Testing (MMT). The scoring range of this scale is in the range of 0-5, where 0 means no contraction and 5 means full range of motion against gravity with maximal resistance. The strength of the back extensors was assessed pre and post treatment. The baseline mean MMT score pre treatment was found to be 3.450 ± 0.5104 for Group A patients and 3.400 ± 0.5026 for Group B patients. The treatment Strengthening was given to Group A patients Twice in a week and Group B patients Strengthening and Stretching was given for the same duration. The MMT post Intervention was found to be 4.500 ± 0.5130 for Group A patients and 4.700 ± 0.4702 for Group B patients. A statistically significant increase in MMT score was found in Group B patients when compared to Group A patients where P value is (<0.0001) as the strength of the back extensors was found to be increased as Group B patients where given a combination treatment Strengthening and Stretching. This study proves that the combination treatment intervention is effective for the increase in the strength of the muscles.

Conclusion

On the basis of the result of this study, it was concluded that the strengthening and stretching of the muscles has effect on the pain reduction as well as strength of the muscles in patients with nonspecific low back pain.

Conflicts of Interest: There were no conflicts of interest in this study

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.

Funding: This study was self funded.

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