Effectiveness of Abdominal Drawing in Maneuver with Lumbar Pelvic Exercises on Swiss Ball for Spinal Flexibility Among Patients with Low Back Pain

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Abstract

Background: Patients with nonspecific low back pain have difficulty in their activities of daily living. Spinal flexibility problems are neglected in the patients with low back pain. These problems hampers the activities of daily living. Hence this study will help in improving their flexibility and perform ADL easily. Numerous studies have been done on spinal muscle strengthening, muscle activation to improve muscle endurance and posture in patients with low back pain but less attention has been given to spinal flexibility, which will help them to perform their ADL with ease. Low back pain is a big burden, as it causes more global disability and it is increasing among young individuals. There is paucity of studies as far as abdominal exercises in improving spinal flexibility is concerned.

Aim: To find the effect of abdominal drawing in maneuver and lumbar pelvic exercises on swiss ball among patients with non-specific low back pain.

Methodology: There were 35 participants in the study. The type of study is experimental. The participants involved were assessed for strength, pain and functional mobility. The participants are treated for pain, strength and functional mobility.

Result: There is improvement seen in participants. The results of the participants are calculated by mean and standard deviation. The post mean value of lumbar flexion was 5.926 which was more than pre mean value of lumbar flexion that is 5.558. The post mean value of lumbar extension was 1.378 which was more than pre mean value of lumbar extension that is 1.243. The post mean value of right lumbar lateral flexion was 5.565 which was more than pre mean value of right lumbar lateral flexion that is 5.121. The post mean value of left lumbar lateral flexion was 5.578 which was more than pre mean value of left lumbar lateral flexion that is 5.578.

Conclusion: : Abdominal drawing in maneuver and lumbar pelvic exercises on swiss ball are effective in improving spinal flexibility among patients with non-specific low back pain.

Keywords: *Low back pain, physiotherapy, abdominal drawing in maneuver, spinal flexibility, core.*

Introduction

Low back pain (LBP) is the general problem which influences the majority of adults.[1] Low back pain has been and continues to be, one of the enigmas of the modern medicine.[2] The epidemic of LBP and the disability associated with it has appeared to escalate. Back pain has now become not only a medical problem, but a social, legal and political one as well.[3] Minority of population undergoes LBP recurrence while the others feel constant pain.[4]

The majority of low back pain (LBP) patients are labelled as having non-specific LBP, which is defined

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as symptoms without a clear specific cause (unknown origin).[5] Survey suggests that the lifetime incidence of LBP ranges from 60% to 90% within 5% annual incidence.[6] For younger than 45 years, mechanical LBP represents the most common disability than in person aged older than 45 years.[7] It can be classified as acute (<6 weeks), subacute (between 3 weeks and 6 months), chronic (more than 3 months).[8]

Core is a central and often foundational part. Stability is the property of body that causes it when disturb from a condition of equilibrium or steady motion to develop forces or moments that restore the original condition.[9] Core stability is a generic description for training of abdominal and lumbo-pelvic region.[10] Originally it is associated with the technical change of the surrounding tissues of the spine. Patients with LBP have weak deep muscles.[11]

core stabilization dates back 50 years ago. Today using stability balls and balance boards develops core stabilization.[12] The use of stability ball training for core muscle development has been popular for several years.[13] Multiple studies have examined core muscle recruitment during various types of swiss ball abdominal exercises. These exercises are important for increasing the deep abdominal muscles and improving stability.[14]

A good core conditioning program will decrease the likelihood of back and neck pain. We spend more energy maintaining misalign posture thus creating a situation for muscular and joint pain to arise.[15]

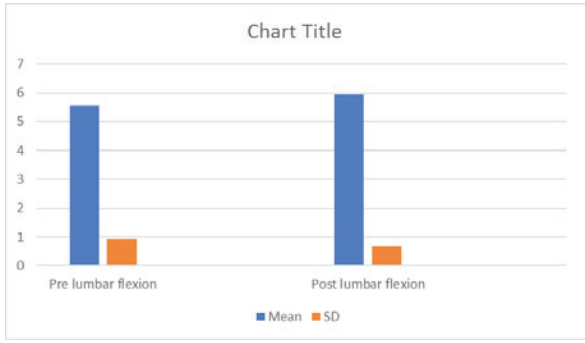
Material and Method

There were 41 participants in the study. The study was taken place in Krishna institute of medical sciences. The study is effectiveness of abdominal drawing in maneuver with lumbar pelvic exercises on swiss ball for spinal flexibility among patients with low back pain. The treatment protocol was of 4 weeks. The participants were assessed for lumbar flexion, extension and lateral right and left flexion at first. The type of the study is experimental study. Sample size was calculated by the formula $4pq/l^2$. Inclusion criteria is both male and female, patients diagnosed with non-specific low back pain, age group between25-45 years, duration = subacute(between 6 weeks and 3 months). Exclusion criteria is any history of recent injury or medical conditions in past 3 months, any systemic illness, malignancy, spinal or disc pathologies, any recent abdominal or spinal surgery. Outcome measure used for assessing spinal flexibility is measuring range of motion using modified Schober's test.

Results

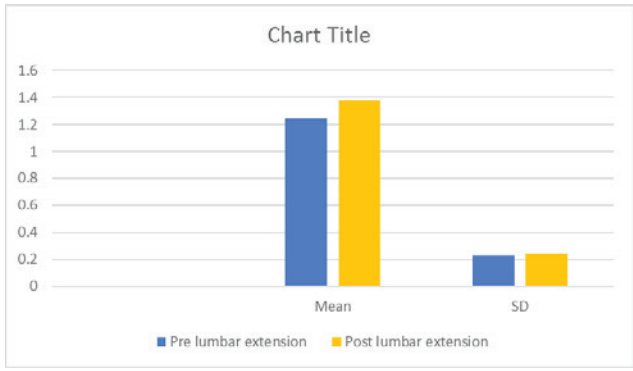
The study was taken place in Krishna institute of medical sciences. The results were calculated by the pre and post assessment. The mean and SD were calculated. The significance of the study was calculated. The instat software was used to calculate all the results. The values are calculated by paired 't' test. The P value for lumbar flexion is 0.044 which is significant, lumbar extension is 0.012 which is significant, right lateral lumbar flexion is 0.077 which is not quite significant, left lateral lumbar flexion is 0.091 which is not quite significant.

Chart no. 1: Pre and post changes in lumbar flexion after treatment.



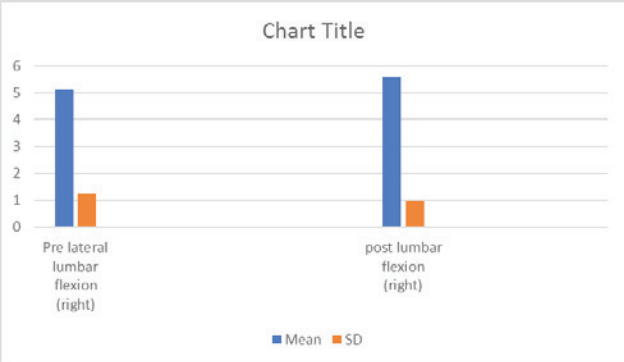
Interpretation: the mean and SD of pre lumbar flexion is less than post lumbar flexion.

Chart no. 2: Pre and post changes in lumbar extension after treatment.



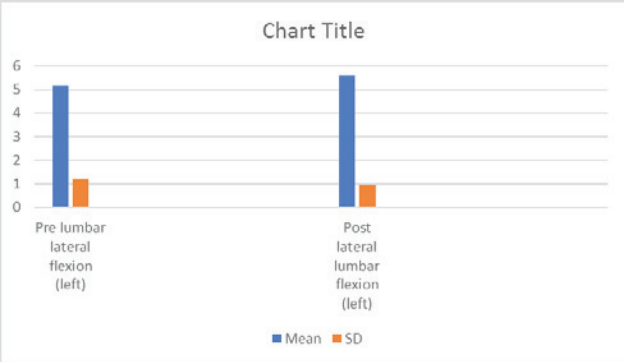
Interpretation: the mean and SD of pre lumbar extension is more than post lumbar extension.

Chart no. 3: Pre and post changes in right lumbar lateral flexion after treatment.



Interpretation: the mean and SD of pre right lumbar lateral flexion is more than post right lumbar lateral flexion.

Chart no.4: Pre and post changes in left lumbar lateral flexion after treatment.



Interpretation: the mean and SD of pre left lumbar lateral flexions is more than post left lumbar lateral flexion.

Discussion

The study topic is on effectiveness of abdominal drawing in maneuver (ADIM) with lumbar pelvic exercises on swiss ball for spinal flexibility among patients with low back pain. The aim of the study is to determine effect of abdominal drawing in maneuver (ADIM) with lumbar pelvic exercises on swiss ball for spinal flexibility among patients with non-specific low back pain. The treatment was given by a fixed protocol. The study was taken place in Krishna institute of medical sciences. The number of participants included were 41. Female included in the study were 20 in number and male included were 21. The participants were taken according to the inclusion and exclusion criteria. The participants were assessed for lumbar flexion, lumbar extension and lateral flexion before the treatment. The appropriate treatment for improving spinal flexibility is given. Treatment protocol was for 4 weeks. A consent was taken by the participants before the treatment. After the treatment again the assessment is taken.

There are various studies on effectiveness of the core stabilization on swiss ball and floor with non-specific low back pain and core muscle activation during swiss ball and traditional abdominal exercises. According to a study by the author Wontae Gong, which was done in republic of Korea on effect of bridge exercise accompanied by the abdominal drawing in maneuver on an unstable support surface on the lumbar stability of normal adults showed that when using bridge exercise to improve static lumbar stability and dynamic lumbar stability, performing the bridge exercise accompanied by ADIM on an uneven surface is more effective than performing the exercise on a stable surface. This study supports the study as the outcome of the study is beneficial for the participants.[6]

Stability exercises is clinically applied as a treatment for patients with low back pain. Bridge exercise is a closed kinetic chain weight bearing exercise applied to improve muscle strength of gluteus maximus and hamstrings in patients with LBP.[7]

ADIM is the main for the strengthening of the deep muscles such as transverse abdominis, internal and external obliques. ADIM is the exercise method which increases the abdominal pressure by pulling the abdominal walls to the inside that transverse abdominis and obliques are contracted. Because of the increased abdominal pressure, lumbar trunk stability training is effectively accomplished.[10]

In this study, physiotherapy protocol consisted of following exercises:

1) Curl-up on swiss ball
2) Bridging with ADIM on swiss ball
3) Front plank on swiss ball
4) Side plank on swiss ball
5) Back extension on swiss ball
6) Side flexion on swiss ball

Individuals were instructed to do warm up exercises for 5 minutes. They were asked to perform these exercises for 4 weeks with 4 times in a week with 30 seconds break after each exercise with a cool down

period of 5 minutes at the end of each session.

- 1st week- 6 reps
- 2nd week- 9 reps
- 3rd week- 12 reps
- 4th week- 15 reps with 5-10 sec hold

Patients with low back pain have weak deep muscles so these exercises will increase the strength of deep muscles and improve lumbar stability.

Conclusion

Abdominal drawing in maneuver and lumbar pelvic exercises on swiss ball are effective in improving spinal flexibility among patients with non-specific low back pain.

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Ethical Clearance: Ethical clearance (protocol number 060/2019-2020) was taken from institutional committee of Krishna institute of medical sciences, deemed to be university, Karad.

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