Educational Administration: Theory and Practice
2024, 30(5), 8139-8143
ISSN: 2148-2403
https://kuey.net/

Research Article

Evaluate The Impact Of Core Exercise And Abdominal Draw-In Maneuver On Oswestry Disability Index In Subjects With Low Back Pain

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Citation: Dr. Kapila Jain[1] *(2024),* Evaluate The Impact Of Core Exercise And Abdominal Draw-In Maneuver On Oswestry Disability Index In Subjects With Low Back Pain *Educational Administration: Theory and Practice, 30(5),* 8139-8143
Doi: 10.53555/kuey.v30i5.4316

INTRODUCTION

A bad back and poor posture go hand in hand. A person with poor posture has a misaligned physique that puts extra pressure on their muscles and bones. Inefficient body alignment over the support structure accelerates disc degeneration by increasing stress on the disc and its surrounding ligaments. The intervertebral disc-facet complex works together to preserve spinal kinematics. Abnormal biomechanics, including a lack of muscle strength, ligament injury, vertebral fracture, and intervertebral disc degeneration, can contribute to chronic back pain. Doctors take a look at your posture since incorrect alignments may throw off your body's mechanics and cause you discomfort and agony. The results of research on the connection between poor posture and back pain have been contradictory. Lower back pain and sciatica are two symptoms, not diagnosis. There are several risk factors for developing sciatica, but it is thought that those with acute or chronic back pain are at a higher risk. The following stretches and exercises can alleviate lower back discomfort, which in turn may lessen sciatica symptoms.
The lifetime prevalence of LBP is estimated to be somewhere between 50 and 85 percent worldwide. Non-specific low back pain (postural back pain) is quite common, with an estimated 60–70% prevalence in developed nations (1-year prevalence 15–45%, adult incidence 5% each year). Nearly 60% of the people in India will have severe back pain at some point in their life, indicating that the prevalence of LBP is at an all-time high. Pain or discomfort felt in the area of the lower back, between the costal margin and the inferior gluteal fold, with or without radiating pain down the legs is considered to be low back pain. Its intensity may range from moderate to excruciating, and it can be described as hurting, burning, stabbing, acute or dull, well-defined or hazy. It's a musculoskeletal pain in the lower lumbar area that may be either axial or para sagittal in orientation. In the beginning of their physical therapy, patients with back problems are taught a variety of core stabilization exercises, including drawing in. Before moving on to more "official" core strengthening exercises, your therapist will likely have you become proficient with core stabilization methods first. Back pain may be alleviated with the use of physiotherapy exercises that focus on strengthening the muscles of the back, stomach, and legs to better support the spine. Strength training, stretching, and aerobic conditioning are all essential components of an exercise regimen for persistent nonspecific back pain. The lumbar spine may benefit from a combination of core muscular strength, flexibility, and aerobic conditioning, all of which work to promote blood flow and nutrition delivery to the soft tissues of the back.

LITERATURE REVIEW

Linek, et al (2017) No studies have been found to date that compare the effects of a sustained abdominal drawing-in maneuver (ADIM) on a) gait pattern and b) stabilometric parameters with opened eyes and closed eyes in a population of adults with and without lower back pain (LBP). Twenty people were recruited for the experiment. Low back pain was evaluated using the Oswestry Disability Index. The ZEBRIS FDM-T treadmill was used for the gait analysis. The ZEBRIS FDM-S stabilometric platform was used to conduct the static

balancing analysis. All tests performed on the stabilometric platform showed no statistically significant deviations. The gait analysis results demonstrated a significant difference between the two groups in terms of the maximum vertical ground reaction force experienced at the end of the terminal stance (GRFts). In comparison to the LBP group, the non-LBP group had a mean GRFts value that was higher by 14.8 N (95% CI 9.55-20.1). Select stabilometric and gait metrics are unaffected by ADIM right away. Neither the presence nor absence of discomfort during the test had any impact on the results.

Mani, Paramasivan (2016) Up to 80% of the general and working populations will experience back pain at some point in their life, making it the most prevalent musculoskeletal ailment. Muscle damage, tiredness, and degeneration of the facet joints and discs may all undermine these stabilizing functions, leading to painful shearing stresses. The abdominal drawing-in motion helps in retraining the local stabilizing muscles' neuromuscular control systems. The purpose of this research is to compare the gait metrics and pain management of patients with persistent mechanical low back pain before and after performing the abdominal drawing in maneuver. The Revised-Oswestry low back pain questionnaire is used to quantify the degree of suffering. Without the abdominal drawing-in movement, alterations in gait metrics were moderate in the group without low back pain, but significant in the group with low back discomfort. The abdominal drawing-in maneuver group was not significantly different from the control group. Training using the abdominal drawing-in motion may improve gait characteristics and pain management, leading to less discomfort and better gait symmetry in those with low back pain.

Saiklang et al (2020) The effects of sitting on a person's height have been studied extensively. Regaining lost height is facilitated by a combination of lumbar spine stabilization and upper-body compensation. Researchers have observed that the deep trunk muscles are the most actively recruited during the abdominal drawing-in maneuver (ADIM). The ADIM approach was used in this research to see whether it might quickly increase standing height recovery after extended sitting. Twenty-four patients with CLBP were randomly assigned to either a control (sitting without ADIM method) or intervention (sitting with ADIM technique) condition. In the second, individuals sat for 41 minutes while doing the ADIM method three times, for a total of one minute. The intervention condition resulted in a 3.292-millimeter increase in height restoration compared to the control condition ($p= 0.001$). Our results showed that the ADIM method aided in the restoration of lost height. Practitioner Sedentary jobs seem to be bad for people's health, especially the lower back. The abdominal drawing-in procedure, which engages deep trunk muscles, helps hasten spinal rehabilitation. Self-management of sitting stature recovery may be encouraged by teaching patients with persistent low back pain the abdominal drawing-in motion approach to stimulate deep trunk muscles.

Saiklang et al (2022) To aid in recovery of height, a technique was developed to stabilize the lumbar spine by activating deep trunk muscles to counteract pressures coming from above. Researchers have shown that the deep trunk muscles are the ones most engaged by the abdominal drawing-in maneuver (ADIM). The present research aimed to ascertain whether or not 5 weeks of deep trunk muscle training utilizing the ADIM approach may aid in the recovery of height, postpone trunk muscle exhaustion, and lessen pain severity during extended sitting. After 5 weeks of training, subjects exhibited substantial improvements in all baseline measures, including (i) recovery of height and decrease in pain intensity during the 41-minute sitting condition, and (ii) reduction in tiredness in the bilateral trunk muscles. Using a controlled laboratory setting, researchers found that the CSE using the ADIM approach protected young volunteers against the negative effects of height change and trunk muscular fatigue during extended sitting. In practical terms, this knowledge might reduce the danger of low back pain caused by extended sitting.

Kim, Dong-Hyun & Kim, Tae-Ho (2019) Regaining lumbopelvic stability and normal mobility is a typical therapeutic goal, and the abdominal drawing-in maneuver (ADIM) is a go-to exercise for doing just that. Many studies have examined its impacts using various approaches, but there is still a need to compare these approaches. The goal of this research was to compare the results of ADIM using a pressure biofeedback device, a foam-roller, and the quadruped position on lumbopelvic rotation and muscle activity. Twenty-five healthy volunteers (11 female, 14 male) were randomly assigned to one of three intervention groups. We used a three-dimensional motion analysis system in addition to a surface electromyography to collect data before and after the operation. There were statistically significant differences ($P < 0.05$) between the ADIM with pressure biofeedback group and the ADIM with foam-roller group, as well as between the ADIM with foam-roller group and the ADIM with quadruped group and the right internal oblique muscle activation. Regaining lumbopelvic stability was facilitated by three distinct types of ADIM. This research demonstrates the need of taking a patient's balance and muscle control skills into account when deciding which ADIM approach to use.

RESEARCH METHODOLOGY

Study Setting

The KOVAI Medical Center and Hospital's Department of Physical Medicine and Rehabilitation and the AL AHSA Hospital

Data Analysis

This study's data analysis was performed in SPSS 12.0. The data were shown to be normally distributed by the application of K-S verification. Parametric pre- and post-exercise comparisons were made using a paired t-

test. The degree to which the groups improved was also compared using an independent t-test. The statistical significance was determined to be significant at the P<0.05 level.

Study Design

The experiment was designed with a pre- and post-test phase. No pregnant women, anyone with obvious neurological symptoms, or people with a history of mental illness were allowed to participate in the research. Right-footedness at the start of a gait cycle and right-footedness when kicking a ball were used as indicators of right-limb dominance. Using the Edinburgh handedness questionnaire, we found that all of our test respondents were right-handed. People without LBP who matched certain criteria were used to populate the control group.

Study Population

Included in the sample are 200 people: 100 people with chronic low back pain and 100 people without low back pain. One hundred people with persistent low back pain make up Group A. Group-B Including 100 people who aren't suffering from back ache

DATA ANALYSIS

The Impact of Core Exercise and Abdominal Draw-in Maneuver on Oswestry Disability Index and Abdominal Muscle Thickness in Subjects with Chronic Low Back Pain

- Alteration to ODI resulting from abdominal drawing-in maneuver and core training

The following (Table 1) is the outcome of assessing the change in ODI after doing the abdominal drawing-in technique and core training for 4 weeks. The ODI decreased significantly from 23.55±3.94 before doing the abdominal drawing-in movement to 14.55±3.53 thereafter. The ODI in the core training group went from 20.25±4.55 to 15.75±4.06, a change that is likewise statistically significant (P<0.05).

Table 1: Pre- post comparison of muscle thickness and ODI

Group	Variable	Muscle	Pre	Post	t
ADIM	Muscle				
	Thickness (cm)	EO	1.28± 0.44	1.34± 0.43	−6.038[a)]
		IO	1.15± 0.22	1.17± 0.21	−3.069[a)]
		Tra	0.43± 0.02	0.46± 0.03	−4.045[a)]
	ODI (point)		23.55± 3.94	14.55± 3.53	12.532[a)]
CE	Muscle	EO	1.12± 0.34	1.15± 0.34	−5.840[a)]
	Thickness (cm)	IO	1.01± 0.14	1.07± 0.34	−4.078[a)]
		Tra	0.41± 0.02	0.42± 0.02	−1.270
	ODI (point)		20.25± 4.55	15.75± 4.06	5.901[a)]

M± SD, mean± standard deviation; ADIM, abdominal drawing-in maneuver; CE, core exercise; EO, external oblique; IO, internal oblique; Tra, transverses abdominis.
[a)]P< 0.05.
Paired‘T’Test

- Paired ‘t’ Test for Pain in Low Back Pain Group

The paired t-test was used to compare the pain scores of the low-back-pain group before and after the study. There is a substantial difference between the pre- and post-test values, therefore the null hypothesis is rejected at the 5% level of significance for 14 degrees of freedom, where the table value is 2.145 and the calculated value is 10.869. As a result, it seems that pain is diminishing [table 2].

Table2:Paired‘t’Test for Pain in Low Back Pain Group(Group–A)

Group	Parameter in percentage(%)	Pre-test Meanvalue	Post-test Meanvalue	Paired– ‘t’value	Table–‘t’ value
Lowback pain	pain	82.0000	67.0000	10.869	2.145

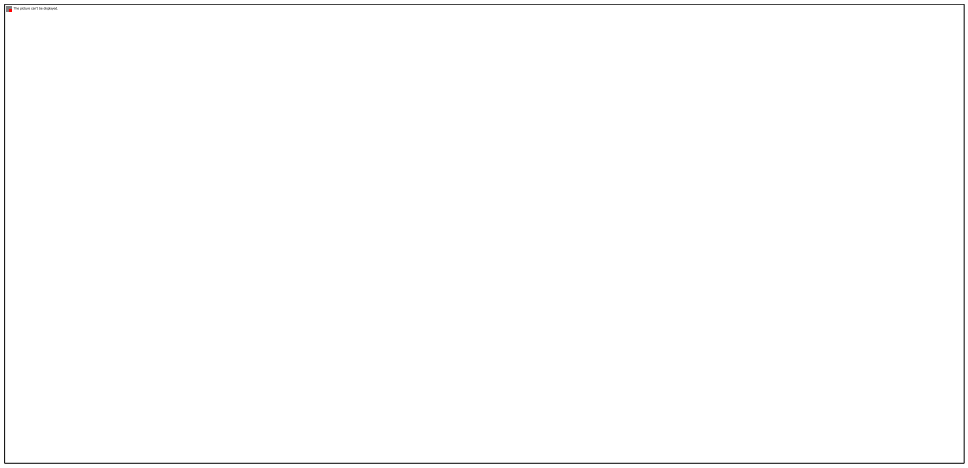

Figure 1: Paired 't' Test for Pain in Group – A

- Paired 't' test for Step Cycle with Abdominal Drawing in Maneuver in (Group-A)

The paired t-test was used to compare the Step Cycle pre- and post-test scores of the low back pain group. Since the calculated "t" value is smaller than the table "t" value (at a 5% level of significance with 14 degrees of freedom, the table value is 2.145 and the calculated "t" value is 1.281), there is no significant difference between pre- and post-test data, and the null hypothesis is accepted. This proves that the Abdominal Drawing in Maneuver effectively shortens the step cycle, which in turn improves gait symmetry [table 3].

Table3:Paired't'testforStepCyclewithAbdominalDrawinginManeuverinLow BackPainGroup (Group-A)

Group	Parameter Cycles/sec	Pre-test Meanvalue	Post-test Meanvalue	Paired–'t' value	Table–'t'value
Group–A	Average stepcycle	0.8993	0.8740	1.281	2.145

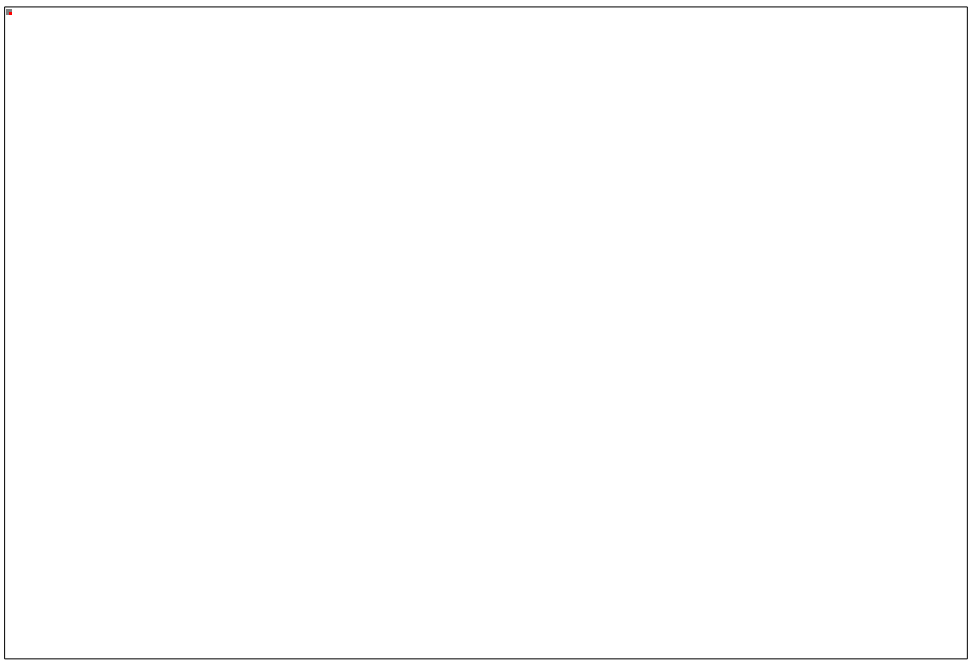

Figure 2: Paired 't' test for Step Cycle with Abdominal Drawing in Maneuver in (Group-A)

This study examined how physiotherapists handle shared decision making and patient collaboration throughout the exercise prescription process for patients with CLBP, as well as the methods utilized to collect and evaluate the resulting data. By analyzing the collected data, we now know more about how physiotherapists decide on the best exercise programs for their patients with chronic low back pain (CLBP) and how those patients perceive their own participation in the decision-making process.

CONCLUSION

This paperis to examine the effects of the Abdominal Drawing in technique on gait quality in populations suffering from mechanical low back pain. The effects of the abdominal drawing-in procedure on lumbar pain were also investigated in this research. One hundred people with mechanical low back pain (group-A) and one hundred healthy people (group-B) were selected at random. For a total of four weeks, both groups practiced the abdominal drawing-in movement as part of their training. The Biodex Gait Trainer 2 is used to take pre- and post-intervention measurements of gait characteristics with and without the abdominal drawing technique.Based on the results, it's clear that keeping tabs on the local stability system necessitates a precise, cost-effective, quantitative measurement and monitoring system as the usage of stabilization regimens and training grows.Differentiating kinematic alterations and showing quantitative similarities in the gait cycle between people with and without LBP are both important for clinical outcome assessments, and the KSI can help with both.

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