

Effect Of Core Stabilization Exercise And Tens On Low Back Pain Due To High Heel Wearers

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ABSTRACT

Background and Purpose: After this false redistribution of weight takes place, the toes are forced to move following the shape of the shoes. As a result of improper weight gain in the feet and a compensatory mechanism, the body begins to lean forward. The body then leans back and an arch forms on the back, creating a position in which lower limb stress increases. This study aims to investigate the effect of a core stabilisation exercise programme on women who wear high heels and compare it with core stabilisation exercise programme combined with TENS on women who wear high heels.

Materials & Methods: Subjects were randomly divided into two groups, group A (core stabilization) and group B (TENS + core stabilization). The subjects were instructed and familiarised with the procedure and were made to do exercises under supervision for 6 weeks.. The intensity of the Pain was assessed before& following an exercise programme. Data was collected at 0 week and at 6 week of intervention.

Results: On comparing Group A with Group B, the results of the study show that the effect is greater in Group B. The Oswestry Disability Questionnaire for Low Back Pain Group A's pre-treatment score was 43.711.199, whereas Group B's pre-treatment score was 45.121.561, which was decreased to 11.231. 761. There was a significant reduction in the scores of VAS also for both groups. The difference between the pre- and post-scores for both groups was statistically significant at the $P \leq 0.05$ level.

Conclusion: The study concluded that there was a significant effect in both the intervention but there was a higher effect can be seen in the core stabilization exercise with tens as compared with the only core stabilization exercise. The back can be sufficiently reduced by this intervention for the heels using females.

INTRODUCTION

It is estimated that the sixth most prevalent reason for patients to consult a doctor each year is because of back discomfort. Chronic low back pain affects up to 23% of the world's population at any one moment, according to some research. This group's recurrence rates range from 24% to 80% over a year. Adults are thought to have an 84 percent lifetime prevalence of the condition, according to some estimates. Research has shown that the prevalence of back pain in adolescents ranges from 12.8% to 33% per year. According to some estimates, up to 11% to 13% of the population suffers from lower back pain.(1) Pain that lasts more than three months without improvement is considered chronic low back pain. Patients with persistent low back pain account for more than 80% of all U.S. healthcare costs (LBP) (2). Acute low back pain that lasts more than a year affects more than a third of patients and is very painful.

By activating sensory nerves and the pain gate mechanism or the opioid system, TENS is an electrical stimulation treatment that mainly seeks to offer some symptomatic pain relief.. Research suggests that when used properly, TENS is more efficient than a placebo in relieving pain. However, the efficacy of TENS varies depending on the type of clinical pain being treated. However there are very less evidences to compare the effects of core stabilization and TENS for treating low back pain caused by postural alterations, this study will help in providing an evidence for treatment of chronic non-specific low back pain.

METHODOLOGY

The study is pretest post-test experimental design with a sample of 50 patients' calculated using G power. Subjects were divided in two groups randomly using computerized randomization, group A (n=25) underwent 6 weeks supervised core stabilization program and group-B (n=25) underwent 6 weeks supervised core stabilization program combined with TENS. Subjects were included on the basis of inclusion criteria. Married females, females with systematic illness, female with any neurological disease and females presenting with any gynecological problems were excluded from the study. Inclusion was done using a screening form. Females having age group of 18-28 years wearing heels for more 6 months were included into the study.

PROCEDURE

Groups A and B will be formed when the subjects are selected based on inclusion and exclusion criteria. Random sampling was used to divide the subjects into two groups, i.e., A and B. The participants had been briefed and made comfortable with the technique beforehand. Slow curl up, bird dog, planks and sit-ups were given to Group A as part of the Core Stabilization Exercise Program. Core stabilisation exercises (slow curl up, bird dog, planks & sit-ups coupled with TENS) were given to Group B. It was decided to compare the results of Group A exercises with those of Group B exercises after six weeks of implementation. Further, a comparison was facilitated between the two. Before proceeding with the procedure, the consent form was taken by the subject & their respective parents/guardians. The intensity of the Pain was assessed before& following an exercise programme. Data were collected at 0 weeks and finally 6 weeks.

All participants first filled up the consent form and gave consent for their study and then the demographics which included the name, age, height, weight, gender, and occupation were filled in the demographic part of google forms.



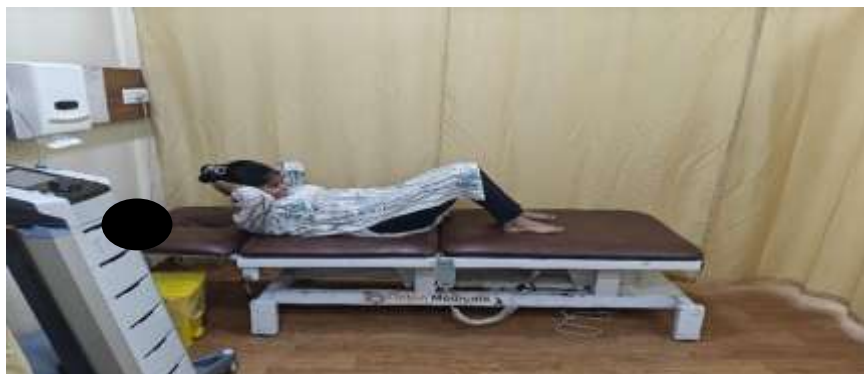


Table-1: Intervention for Group-A and Group-B

Group -A	Group-B
Exercise (duration)	Exercise (duration)
Planks (1 minute)	Planks (1 minute)
Sit-ups (1 minute)	Sit-ups (10 repetitions, 3 sets a day)
Slow curl-ups (10 repetitions, 3 sets a day)	Slow curl-ups (10 repetitions, 3 sets a day)
Bird dog (10 repetitions, 3 sets a day)	Bird dog (10 repetitions, 3 sets a day)
	TENS
	Frequency -80Hz
	Pulse duration-280µs
	Session -30 mins

Data Analysis

The data analysis was carried out using the Social Science Packaging Software (SPSS) 26.0 edition of the software. Readings were analyzed using an independent T-test and a paired t-test. This is a graphical depiction created using Microsoft Word 2016.

RESULTS

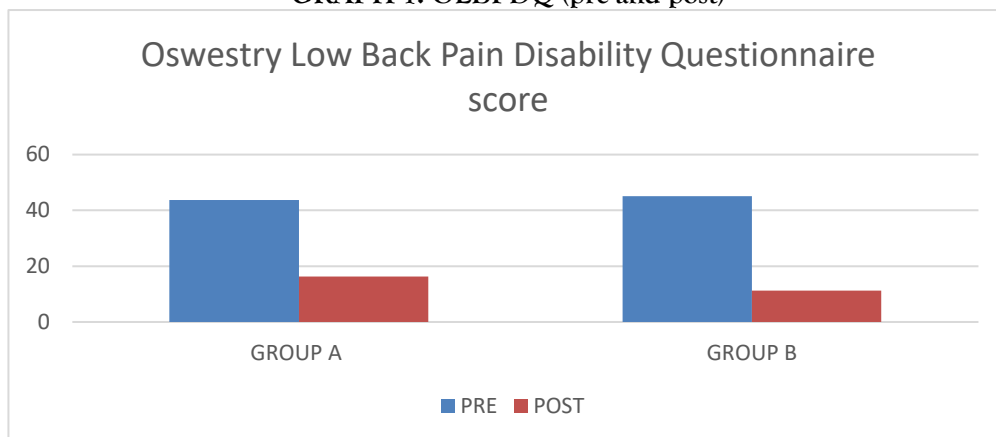
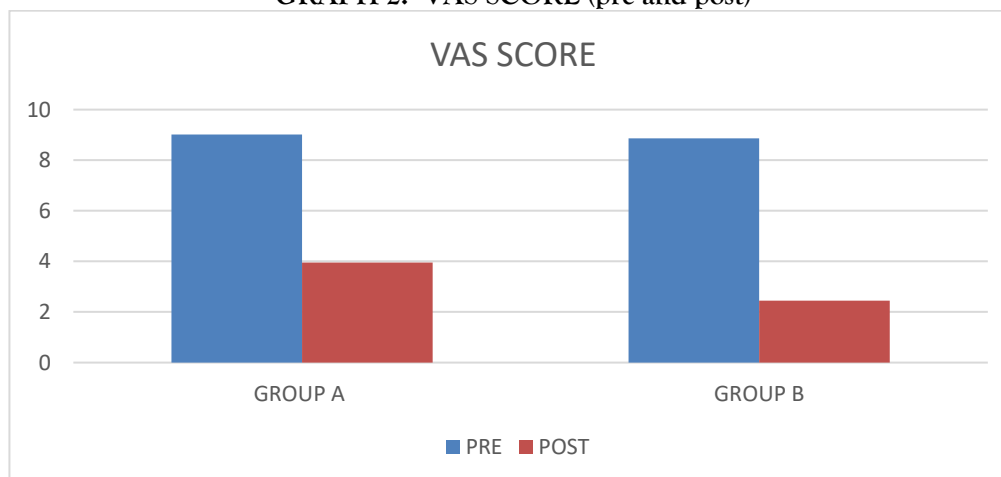
This impact was shown to be larger in Group B when compared to the control groups (A). Group A's pre-treatment Oswestry Low Back Pain Disability Questionnaire score was 43.711.199, whereas Group B's pre-treatment score was 45.121.561, which was decreased to 11.231. 761. Both groups' VAS scores plummeted significantly as a result. Pre- and post-scores for both groups were statistically significant at the $P \leq 0.05$ level.

Table 2: Demographic descriptive statistics.

	Mean (SD) Group A (n=25)	Mean (SD) group-B (n=25)
Age	26.54 (1.942)	25.72(1.8)
Height	5.42(0.3701)	5.01(0.2503)
Weight	61.98 (2.752)	62.01(2.01)

Table 3: Mean, Standard Deviation and T-test scores of group-A and Group-B

Variable	Group-A (Mean $\pm$ SD)	T-test	Group-B (Mean $\pm$ SD)	T-test
OLBPDQ (pre)	43.71 $\pm$ 1.199	18.452	45.12 $\pm$ 1.561	12.651
OLBPDQ (post)	16.32 $\pm$ 2.506		11.23 $\pm$ 1.761	
VAS (pre)	9.01 $\pm$ 0.876	21.032	8.87 $\pm$ 1.865	11.032
VAS (post)	3.95 $\pm$ 1.012		2.45 $\pm$ 1.987	

GRAPH 1: OLBPDQ (pre and post)

GRAPH 2: VAS SCORE (pre and post)


DISCUSSION

The findings of the research indicate that Group B experienced a more significant impact than Group A did when the two groups were compared. The pre-treatment score for Group A on the Oswestry Low Back Pain Disability Questionnaire was 43.711.199, and after therapy, it decreased to 16.322.506. The pre-treatment score for Group B was 45.121.561, and after treatment, it decreased to 11.231.761. Both of the groups had a considerable drop in their VAS ratings, which were much lower than before. At the level of $P < 0.05$, there was a difference that could be considered statistically significant between the pre and post-scores for both groups. The findings were consistent with those found in the investigations carried out by Young-Dae Yoo et al. in 2011. In this particular research, a sling and exercises to strengthen the core were used to treat recurrent discomfort in the lower back. Participants who suffered from persistent low back pain were split into two equal groups and randomly assigned to either do core stabilisation exercises while wearing an arm sling or mat exercises. Both forms of therapy were intended to alleviate the participants' symptoms. A comparison of the two groups' outcomes was carried out. The findings were inconsistent with one another. It was advised that participants dedicate three days each week, for a total of four weeks, to each training session. Pain levels and overall muscle strength were evaluated both before and after surgery. To get an accurate reading of the level of pain, a visual analogue scale and a Tergumed gadget were used. Traditional mat exercises were shown to be less efficient than sling exercises in reducing patients' VAS ratings, treating patients' chronic back pain, and strengthening their muscles. However, sling activities were demonstrated to be more beneficial than traditional mat exercises. Rungthip Puntumetakul et 2018 conducted a study in which participants with non-specific subacute low back pain through a series of exercises meant to enhance their perception of joint position, pain level, and functional

limitations. The 38 participants in this study, ranging in age from 18 to 60, all reported experiencing subacute, nonspecific low back pain for a duration of six to twelve weeks. The athletes put forth extra effort to improve their coordination and balance in addition to working on their core strengths. The Roland-Morris Disability Questionnaire, a lumbar joint position error scale, and a numeric pain scale were used by the researchers to analyze their data (RMDQ). After the intervention had been stopped for four weeks, another four weeks passed, and then seven weeks had passed, and measurements were obtained. When dealing with joint impairment, exercises that emphasise core stabilisation are preferred over heat therapy to increase joint positional clarity and minimise pain. These goals may be accomplished by improving joint positional clarity. According to the findings of one research, patients diagnosed with subacute NSLBP may benefit more from core stability exercises than from heat therapy.

CONCLUSION

From the study, we can conclude that there was a significant effect in both the intervention but there was a higher effect can be seen in the core stabilization exercise with tens as compared with the only core stabilization exercise. The back can be sufficiently reduced by this intervention for the heels using females.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

REFERENCES

1. Blitz NM, Eliot DJ. Anatomical Aspects of the Gastrocnemius Aponeurosis and Its Insertion: A Cadaveric Study. *The Journal of Foot and Ankle Surgery*. 2007 Mar;46(2):101–8.
2. Seif HE, Alenazi A, Hassan SM, Kachanathu SJ, Hafez AR. The Effect of Stretching Hamstring, Gastrocnemius, Iliopsoas and Back Muscles on Pain and Functional Activities in Patients with Chronic Low Back Pain: A Randomized Clinical Trial. *Open Journal of Therapy and Rehabilitation*. 2015;03(04):139–45.
6. Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between obesity and low back pain: A meta-analysis. *American Journal of Epidemiology*. 2010;171(2):135–54.
7. Ibrahimi-Kaçuri D, Murtezani A, Rrecaj S, Martinaj M, Haxhiu B. Low back pain and obesity. *Med Arch*. 2015;69(2):114–6.
8. Khan J, Khan P, Arshad MU, Javed A, Zia W, Iqbal A, et al. Comparative effects of Core Stability Exercises and Endurance Training in Patients with Mechanical Low Back Pain. *Pakistan BioMedical Journal*. 2022 Jan 20;5(1).
9. Saiklang P, Puntumetakul R, Chatprem T. The Effect of Core Stabilization Exercise with the Abdominal Drawing-in Maneuver Technique on Stature Change during Prolonged Sitting in Sedentary Workers with Chronic Low Back Pain. *International Journal of Environmental Research and Public Health*. 2022 Feb 1;19(3).
10. Kim B, Yim J. Core stability and hip exercises improve physical function and activity in patients with non-specific low back pain: A randomized controlled trial. *Tohoku Journal of Experimental Medicine*. 2020;251(3):193–206.
11. Narouei S, Barati A, Hosseini, Akuzawa H, Talebian S, Ghiasi F, Akbari A, et al. Effects of core stabilization exercises on thickness and activity of trunk and hip muscles in subjects with nonspecific chronic low back pain. *Journal of Bodywork and Movement Therapies*. 2020 Oct 1;24(4):138–46.
12. Puntumetakul R, Chalermman R, Hlaing S, Tapanya W, Boucaut R. The effect of core stabilization exercise on lumbar joint position sense in patients with subacute non-specific low back pain: a randomized controlled trial.
13. Noormohammadpour P, Kordi M, Mansournia MA, Akbari-Fakhrabadi M, Kordi R. The role of a multi-step core stability exercise program in the treatment of nurses with chronic low back pain: A single-blinded randomized controlled trial. *Asian Spine Journal*. 2018 Jun 1;12(23):490–502.

14. Bagheri R, Parhampour B, Pourahmadi M, Fazeli SH, Takamjani IE, Akbari M, et al. The Effect of Core Stabilization Exercises on Trunk-Pelvis Three-Dimensional Kinematics during Gait in Non-Specific Chronic Low Back Pain. *Spine (Phila Pa 1976)*. 2019 Jul 1;44(13):927–36.
15. Borujeni GB. The Effect of Six Weeks Core Stability Exercise Training on Balance, Pain and Function in Women with Chronic Low Back Pain. Vol. 18, *Journal of Health and Care*. 2017.
16. Akhtar MW, Karimi H, Gilani SA. Effectiveness of core stabilization exercises and routine exercise therapy in management of pain in chronic nonspecific low back pain: A randomized controlled clinical trial. *Pakistan Journal of Medical Sciences*. 2017 Jul 1;33(4):1002–6.
17. Niederer D, Vogt L, Wippert PM, Puschmann AK, Pfeifer AC, Schiltenswolf M, et al. Medicine in spine exercise (MiSpEx) for nonspecific low back pain patients: Study protocol for a multicentre, single-blind randomized controlled trial. *Trials*. 2016 Oct 20;17(1).
18. Carrie W. Hoppes. The Efficacy of an Eight-week Core Stabilization Program on Core Muscle Function and Endurance: A randomized trial.
19. Kapetanovic A, Jerkovic S, Avdic D. Effect of core stabilization exercises on functional disability in patients with chronic low back pain. *Journal of Health Sciences*. 2016 Apr 8;6(1):59–66.
20. Trampas A, Mpeneka A, Malliou V, Godolias G, Vlachakis P. Immediate effects of Core-Stability exercises and clinical massage on Dynamic-Balance performance of patients with chronic specific low back pain. *Journal of Sport Rehabilitation*. 2015;24(4):373–83.
21. Kliziene I, Sipaviciene S, Klizas S, Imbrasiene D. Effects of core stability exercises on multifidus muscles in healthy women and women with chronic low-back pain. *Journal of Back and Musculoskeletal Rehabilitation*. 2015 Dec 2;28(4):841–7.
22. Javadian Y, Akbari M, Talebi G, Taghipour-Darzi M, Janmohammadi N. Influence of core stability exercise on lumbar vertebral instability in patients presented with chronic low back pain: A randomized clinical trial.
23. Professor A. Efficacy of progressive core strengthening exercise on functional endurance tests and hypertrophy of multifidus, transverses abdominis in healthy female subjects with low core endurance. Vol. 10, *Journal of Exercise Science and Physiotherapy*. 2014.
24. Ahmed R, Shakil-Ur-Rehman S, Sibtain F. Comparison between specific lumbar mobilization and core-stability exercises with core-stability exercises alone in mechanical low back pain. *Pakistan Journal of Medical Sciences*. 2014;30(1):157–60.
25. Chung EJ, Kim JH, Lee BH. The Effects of Core Stabilization Exercise on Dynamic Balance and Gait Function in Stroke Patients.
26. Wang XQ, Zheng JJ, Yu ZW, Bi X, Lou SJ, Liu J, et al. A Meta-Analysis of Core Stability Exercise versus General Exercise for Chronic Low Back Pain. *PLoS ONE*. 2012 Dec 17;7(12).
27. Yoo YD, Lee YS. The Effect of Core Stabilization Exercises Using a Sling on Pain and Muscle Strength of Patients with Chronic Low Back Pain.
28. Muthukrishnan R, Shenoy SD, Jaspal SS, Nellikunja S, Fernandes S. The differential effects of core stabilization exercise regime and conventional physiotherapy regime on postural control parameters during perturbation in patients with movement and control impairment chronic low back pain. Vol. 2, *Therapy & Technology*. 2010.
29. Filipa A, Byrnes R, Paterno M v., Myer GD, Hewett TE. Neuromuscular training improves performance on the star excursion balance test in young female athletes. *Journal of Orthopaedic and Sports Physical Therapy*. 2010;40(9):551–8.
30. Desai I, Marshall PWM. Acute effect of labile surfaces during core stability exercises in people with and without low back pain. *Journal of Electromyography and Kinesiology*. 2010 Dec;20(6):1155–62.
31. Airaksinen O, Brox JI, Cedraschi C, Hildebrandt J, Klaber-Moffett J, Kovacs F, et al. Chapter 4: European guidelines for the management of chronic nonspecific low back pain. Vol. 15, *European Spine Journal*. 2006.
32. Hodges PW. Core stability exercise in chronic low back pain. Vol. 34, *Orthopedic Clinics of North America*. W.B. Saunders; 2003. p. 245–54.
33. Vasseljen O, Unsgaard-Tøndel M, Westad C, Mork PJ. Effect of core stability exercises on feed-forward activation of deep abdominal muscles in chronic low back pain: A randomized controlled trial. *Spine (Phila Pa 1976)*. 2012 Jun 1;37(13):1101–8.