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Exploring Neurokinetic Therapy on Core Muscle Endurance, Lateral Pelvic Tilt, and Quadratus Lumborum Flexibility for subjects with Chronic Non-Specific Low Back Pain

Mohammed Luqman Sulaiman, Kamalakannan Mohanan, Kotteeswaran Kandaswami, Durga Nagaraj

Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu India

CORRESPONDING AUTHOR:
Kamalakannan Mohanan
Saveetha College of Physiotherapy, SIMATS
Saveetha Nagar, Thandalam, Chennai
Tamil Nadu, 602105 India
E-mail: Kamal1712@gmail.com

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SUMMARY

Background. More than 90 percent of the population undergo nonspecific low back pain at least once in their lifetime. Based on the concept of hip spine syndrome dysfunction in the hip may cause dysfunction in the lower back. Quadratus lumborum muscle flexibility causes lateral pelvic tilt during prolonged sitting which contributes to nonspecific low back pain. Neurokinetic therapy technique shows importance to the motor control theory along with significant changes in movement patterns.

Objective. To evaluate the effectiveness of neurokinetic therapy in enhancing core muscle endurance, lateral pelvic tilt, and QL flexibility in individuals with CNSLBP.

Methods. An experimental study design was conducted at Saveetha Medical College and Hospital which includes participants of both genders with the age of 20-40 years with chronic nonspecific low back pain for more than 3 months. 60 participants in each group, *i.e.*, the experimental group and control group, underwent neurokinetic therapy and core stability exercise.

Results. The post-test values of the prone bridge test, lateral pelvic tilt, and QL flexibility were statistically significant in both groups with a P-value < 0.0001 but more significant improvement in the neurokinetic therapy group.

Conclusions. Neurokinetic therapy was effective in improving core muscle endurance, lateral pelvic tilt, and QL flexibility in CNSLBP subjects.

KEY WORDS

Neurokinetic therapy; quadratus lumborum flexibility; lateral pelvic tilt; nonspecific low back pain.

INTRODUCTION

Pain in the lower back and buttocks that do not have a pathological anatomical cause that can be identified by different medical tests is referred to as non-specific low-back pain (1). Over 90% of people will at some point in their lives experience low back discomfort (2). Numerous characteristics have been linked to an increased risk of non-specific low-back discomfort, including sex, age, muscle strength, flexibility, physique, and body weight (3). It has been shown that low back pain is significantly influenced by several risk factors, including hip-joint-muscle strength, trunk-muscle function, lower extremity range of motion, and pelvic alignment (4). Hip-spine syndrome is a term coined by Offierski and MacNab (1983) to describe a condition in which malfunction in one area might have an impact on a nearby location. According to this theory, treating one area may lessen the discomfort and incapacity in the untreated or other area. The hip and spine work together to accomplish a single task, although having different functions. Musculoskeletal problems can impact the neighboring joint directly or indirectly as a result of this association (5). Furthermore, low back discomfort is caused by micro trauma to the lumbar vertebrae and compensatory movements in the lumbopelvic region when the hip joint is not flexible (6). The structure known as the pelvis, which joins the trunk and lower limbs, helps regulate the distribution of power among the upper and lower limbs (7). The length of the muscles near the spine and hip joint is impacted by this shift in pelvic tilt (8).

Hip joint dysfunction is one of the possible contributing reasons to low back pain (LBP), which is a complex disorder. Because the thigh and lumbopelvic region are so close together anatomically, there has been speculation that hip function and low back pain (LBP) are linked. Because a restriction in hip motion may change the mechanical stresses on the lumbopelvic region and hence aggravate LBP, hip range of motion has been examined in individuals with LBP (9). A lack of activity can cause several issues, such as muscle tightness, reduced joint range of motion, and decreased flexibility, which can interfere with day-to-day tasks (10). A person's hip muscles may shorten if they spend their entire day sitting down, such as a student or desk worker. The risk of damage is increased by prolonged sitting, which puts a high amount of force on the muscle (11). In addition to preserving the proper top and bottom body postures, a correct position of the body's segments also helps to avoid pain that might arise from poor posture (12). On the other hand, poor postural alignment leads to a variety of musculoskeletal and neurological system disorders when poor posture is sustained over time. According to Snijders *et al.* (13), sitting postures cause the internal and external oblique abdominal muscles to contract less than standing postures, while sitting with one's knees crossed causes the external oblique abdominal muscle to contract less. It is possible to distinguish differences in muscle activity when sitting with your legs crossed. Due to advancements in science, technology, and automation, individuals now spend longer sitting than standing. According to studies, sitting with crossed legs might change the stresses and weight-bearing on the tissues and muscles, which can lead to unstable postures (14). If a person assumes certain postures on a regular basis, some parts of the body will misalign and become more deformed to account for the state of instability (15), which can lead to issues with the musculoskeletal system. But crossing one's legs can rotate the pelvis (16), which can lead to issues in the lumbar area. Research indicates that weakening of the hip abductors may lead to lateral pelvic tilt (17). When one is seated with their legs crossed, they are in an abduction position, with one leg folded over the supporting leg. As a result, the abduction-related gluteus medius is strained and weakened over time, which causes the pelvis to tilt laterally (18). Research has also indicated that if the legs cross, the lumbar spine bends to compensate for the limited range of hip flexion, potentially increasing the lumbar spine's rotational moment (16).

During lateral tilt, movement dysfunction and lateral instability occurs as bent of lumbar spine (19). Lower back discomfort is frequently caused by the quadratus lumborum (20). The two QLs take up the slack, so to speak, when the lower fibers of the erector spinae are weak or inhibited, because of its attachment, and it is therefore able to extend the lower back when contracting bilaterally (21). The muscles that provide support and stability to the low back are primarily the Iliopsoas and Quadratus Lumborum. The main cause of low back discomfort is these muscles' involvement. Back pain can be caused by tightened muscles in the pelvic and lumbar regions, as well as the thoracic and cervical vertebrae, as a result of injuries, bad posture, prolonged sitting or stress (22, 23). In a prone bridge exam, the subject must remain on their forearms and toes with their hips and back in a neutral position. Validity of the lying bridge performance has been determined by the degree of abdominal muscular activation. The average duration spent on the prone bridge was 145.3 ± 71.5 s. It showed a positive correlation with engagement in physical activity ($p \leq 0.001$) and a negative correlation with waist circumference and BMI ($p < 0.003$). Plank times were substantially greater for younger participants than for the elderly ($p = 0.003$). 0.915 was the ICC in between testing sessions (24). Using a side bending test, the quadratus lumborum's flexibility was determined. Online software called Kinovea, a free program for movement analysis, comparison, and evaluation, is used to measure lateral pelvic tilt (25). This annotation tool for videos was created with sports analysis in mind. It has tools for measuring, capturing, comparing, slowing down, and annotating motion in videos. In addition to acknowledging the value of motor control theory, neurokinetic treatment uses it to significantly alter movement patterns (26). The brain needs to get rid of a faulty movement pattern and retrain how to execute a functional one. Motor Control Theory, as presented in Vernon Brooks' book The Neural Basis of Motor Control, served as the foundation for neurokinetic treatment. Information comes from the limbic system, cerebral cortex, and finally the Motor Control Center (MCC) in the cerebellum. From there, it is sent to the musculoskeletal system and the spine. An impairment of a muscle or activity activates the MCC, which coordinates all patterns and movements of the body. It can pick up new, effective routines or, in reaction to trauma, develop maladaptive habits that are stored (27). The source of the issue may not always be felt in a sore, uncomfortable, or constricted spot. The NKT procedure helps you assess and care for its synergistic muscles instead of just relieving a tight muscle (26). This will assist you in identifying the problem and implementing a successful treatment plan.

MATERIALS AND METHODS

Study design

The study was designed as a randomized controlled trail. Ethical approval was obtained by Ethical Committee-Saveetha College of Physiotherapy (01/002/2023/ISRB/PGSR/SCPT – date of approval: April 17, 2023).

Participants

The chronic nonspecific low back pain (CNSLBP) participants were chosen for the study from the integrated clinic in Saveetha Medical College and Hospital.

The 120 eligible participants were randomly allocated into two groups, *i.e.*, the control group (n = 60) and experimental group (n = 60). The inclusion criteria of participants both male and female with age group 20-40 years. Participants with chronic specific low back pain for more than 6 months. Individuals with lack of core stability and quadratus lumborum flexibility will be included. The exclusion criteria were individuals with any type of hip and spine surgery, and participants who were undergoing pharmacological interventions. Participants with spinal fracture, any disc involvement, spondylolisthesis, spinal stenosis, TB spine, radicular pain, any recent injuries and any type of infection, tumor, structural deformity, inflammatory disorder, or cauda equina syndrome were excluded.

Randomization and blinding

After baseline assessment, the participants were allocated to study groups at random by concealed envelope methods. The experimental group participated in the neurokinetic therapy program for 8 weeks. The control group received core stabilization exercise for 8 weeks. The outcomes at baseline and week 8 were blinded to the group allocation.

Procedure

120 CNSLBP participants who have undergone screening with the outcome measures – VAS, ODI, Prone bridge test, Quadratus lumborum muscle flexibility testing, and pelvic tilt using Kinovea software – were included in the study. The detailed study procedure was explained to the participants and informed consent was obtained.

Measurement of VAS and ODI

Both an ODI questionnaire and a visual analog scale were used to gauge the degree of back discomfort. The outcome measure was given to the patients to complete. The VAS, which has 10 points that go from 0 (no pain) to 10 (severe pain), was asked to be used by the patient to rate their level of pain. VAS pain scale validity and reliability range from fair to good. The ODI questionnaire yields a percentage that represents the degree of disability, ranging from very low (0-20%) to very high (80-100%). An effective and trustworthy outcome measure for assessing back pain is the ODI.

Measurement of prone bridge test

The prone bridge test requires the individual to maintain a prone position on the forearms and toes while maintaining a neutral back and hips for at least 30 seconds. Performance of the prone bridge has been found to have validity based on the level of activation of the abdominal muscles.

Measurement of quadratus lumborum flexibility

The side bending test was used to measure quadratus lumborum muscle flexibility. The patient was made to stand against the wall, head and shoulders touching, feet approximately the length of one of their feet apart and palms on thighs. The patients were made them to side bend to one side, keeping their head on the wall and hips in place. The amount lateral flexion angle is measured using Kinovea software.

Measurement of lateral pelvic tilt

The lateral pelvic tilt was measured by using the angle between a line connecting both the anterior superior iliac spines and a horizontal line. The hiked side of the pelvis indicates the side of lateral pelvic tilt.

Intervention

Experimental group

The participants in the experimental group performed neurokinetic exercises for the muscles called Quadratus lumborum along with its synergistic muscles Ipsilateral Obliques, Lumbar erectors, Gluteus medius and minimus, Tensor fascia lata, Peroneus (26). Exercises comprise Plank crawl, skydiver, banded pelvic bridging, banded squat, kick-back, single leg bridge, lateral squat walk, clamshell, lateral step up, lateral step down, band dorsiflexion, band eversion three days a week for eight weeks (28). Do 3 sets of 15-20 reps with min. 10 seconds hold of each exercise.

Plank crawl

Lie on your side, position your elbow underneath your shoulder, stack your feet, and use your trunk muscles to lift your hips. Keeping your core tight and your back as flat as possible, roll toward your stomach, placing your elbow on the floor below your opposite hand. Shift your weight onto your other arm and get into a side plank-start position on the opposite side.

Skydiver
With your arms at your sides, use your low back extensors to lift your lower and upper body segments off the floor. As you arch, squeeze your glutes and pull your shoulders back while maintaining a neutral neck position.

Banded pelvic bridging
To increase glute activation and make the exercise more challenging, position a resistance loop just above your knees. Perform a bridge – drive your heels into the floor and extend your hips – while driving your knees out into the band. Maintain abduction resistance (knees out) throughout the entire range of the movement.

Banded squat
With the loop above your knees, stand with your feet roughly shoulder width apart. When it comes to foot flare, you can orient your feet straight or turn them out slightly – whichever feels better and allows you to reach the lowest depth without discomfort. To perform the movement, reach your hips back slightly and sit straight down. As you lower into the bottom position, drive your knees outward into the band, keep your spine neutral (not excessively arching or rounding), and keep your knees aligned over your toes. Lower as far as you can while maintaining good form.

Kickback
Get into the quadruped position with your shoulders aligned over your wrists and hips over your knees. Keeping your knee bent to roughly 90 degrees, raise your foot toward the ceiling. Squeeze your glutes in the top position. Try to keep your back flat (core tight), get your thigh parallel to the floor, and reach full hip extension. Reduce the range of motion if you arch your back excessively. Place a resistance loop above your knees to make the exercise more challenging.

Single-leg bridge
Get into the bridge start position and elevate one leg – you can either straighten it or keep it bent at about 90 degrees. Push into the floor and extend your hips. Focus on squeezing your glutes as you reach full hip extension, holding the contraction for 1-2 seconds. Add a resistance loop above your knees or do the single-leg hip thrust (here) to make the exercise more challenging.

Lateral squat walk
Wrap a resistance loop above your knees and above ankles. Position your feet shoulder width apart and bend your hips and knees slightly. Take a wide lateral step so there is a full stretch in the band. You can either walk along a line and then switch after a given number of steps or stay in one area by switching back and forth between legs. Choose a distance or rep range that is challenging – usually 15-20 steps in each direction. Don't pause between steps and keep tension in the band during the entire movement.

Clamshell
Lie on your side with your hips bent to about 45 degrees, your knees bent to about 90 degrees, and your feet and legs stacked. Lift your top knee as far as you can without rotating your spine.

Lateral step-up
Stand next to a plyo box. Step onto the box, positioning your entire foot on the box. Your feet should be roughly shoulder-width apart. Shifting your weight onto your elevated leg, extend your hips and knee in one fluid motion. Don't push off the floor with your supporting leg. Increase the height of the box to make the exercise more challenging. The taller the box, the more you have to lean forward and at an angle over your elevated foot. You can extend your arms in front of you to counterbalance your weight.

Lateral step-down
Stand next to a plyo box or small step. Perform a lateral step-up by placing your entire foot on the edge of the box and standing tall. Move your free leg forward slightly. Keeping your free leg straight, reach your heel toward the floor by slowly sitting back and bending your grounded knee. As soon as your heel contacts the floor, straighten your knee, extend your hips, and return to the start position. Keep your knee aligned over your foot: don't let it move in or out.

Band dorsiflexion
With the band still looped around your foot, attach the other end to a fixed object or have a partner hold it to create tension. Pull your ankle as far as you can into dorsiflexion with no more than mild pain. Slowly return to the start position: don't let the band snap your ankle back down. Do 3 sets of 20 reps.

Band eversion
Apply tension to the band by pulling it around your other foot with your opposite-side arm. Start with your foot turned in (inversion), then turn your ankle out (eversion)

without moving the rest of your leg – your kneecap should point up the entire time. Do 3 sets of 15 reps.

Control group

The participants in the control group undergone core stabilization exercises like Prone bridge, side bridge, supine extension bridge, straight leg raises from prone, pelvic bridge with adduction with ball, dead bug, side lying hip abduction, superman, bird dog, dumb bell dead lift three days a week for eight weeks (28, 29). Do 3 sets of 15 - 20 reps with min 10 seconds hold of each exercise.

Prone bridge

The participant adopts a prone elbow position. The participant raises his/her body onto the forearms, placed below the shoulders and toes. The participant maintains his/her hips and back in a parallel straight-line posture.

Side bridge

The participant's left forearm is placed on the ground below the shoulder. The participant lifts his/her body to form a side bridge, or "plank" position. This position is maintained using the forearm and foot to support the body. The exercise is repeated for the right side.

Supine extension bridge

The participant adopts a hook-lying position with both feet below the knees. The participant slowly lifts his/her hips until their knees and shoulders are aligned in a straight line, taking care to support the weight of the body with shoulders rather than neck. After holding this static position, the participant slowly lowers his/her hips to the ground.

Straight leg raises from prone

The participant adopts a prone position with his/her head on the arms. The participant contracts the gluteus and hamstring muscles of the right leg and raises his/her leg as high as possible towards the ceiling. After holding this static position, the participant slowly lowers his/her leg. The exercise is repeated for the left side.

Pelvic bridge with adduction with ball

Position a volleyball, soccer ball, or basketball between your knees. Perform a bridge while squeezing your knees into the ball and contracting your glutes. Maintain pressure on the ball during the entire movement.

Dead bug

Lie on your back, bend your knees and hips to about 90 degrees, and straighten your arms above your body. Extend one leg and reach overhead with the opposite arm while keeping your abs tight and your low back flat on the floor. Stop if your low back arches. Repeat on the opposite side. If this version is too hard, move only your legs.

Side lying hip abduction

Lie on your side, rotate your hips toward the floor slightly, and internally rotate your top leg so that your big toe is angled toward the arch of your bottom foot. Lift your top leg up and at a backward angle. Keep your spine neutral and pause in the top position for 1-2 seconds. Reduce the range of motion if you start to arch your back excessively. Add a resistance loop above your knees to increase glute activation and make the exercise more challenging.

Superman

Lie on your stomach with your arms reaching overhead. Use your low back extensors to lift your lower and upper body segments off the floor. Keep your neck neutral (don't look up), keep your arms straight, and squeeze your glutes as you elevate your legs.

Bird dog

Get into the quadruped position with your shoulders aligned over your wrists and hips over your knees. Extend one arm while extending the opposite leg. Keep your spine neutral and avoid arching your back during the movement. Repeat on the opposite arm and leg.

Dumb bell dead lift

Hold dumbbells in front of your thighs with your palms facing your body, or with the dumbbells at a 45-degree angle relative to your body. Position your feet underneath your hips or just inside shoulder width. Keeping your back flat and arms relaxed, sit your hips back, bend your knees, and allow your torso to tilt forward – you should feel tension in your hips, hamstrings, and back. Keep the dumbbells close to your body (aligned over the centers of your feet), keep your tibial shins as vertical as possible, and go as low as you can without rounding your back. To perform the upward movement, drive through your heels while extending your hips and knees.

Statistical analysis

Data analysis was done using SPSS version 19 software at a significance level of 0.05, involving paired tests for pre and post-test values of within group and post-test values of between groups, demonstrates a notable enhancement in the prone bridge test, lateral pelvic tilt, and QL flexibility of both groups. Data analysis was performed by using paired and unpaired t-tests for inter-group and intra-group comparison respectively.

RESULTS

The results strongly imply the efficacy of neurokinetic therapy in improving core muscle stability, lateral pelvic tilt, and QL flexibility in subjects with chronic nonspecific low back pain.

Total number of participants

120 of mean age group 25 (2.25) for experimental and 24.98 (2.21) for control group. Participants with mean BMI of 25.73 (2.24) for experimental and 25.69 (2.19) for control group. A mean and standard deviations of VAD and ODI for experimental and control group were mentioned in **table I**.

Neurokinetic Therapy Group – pre and post intervention values (Paired T-test)

Within group analysis of neurokinetic therapy group post-test values showed better improvement from baseline to the end of the 8th week (**table II**). The prone bridge test values improved from 16.05 (2.69) to 42.53 (13.07) with a T-value of 17.87, lateral pelvic tilt from 11.65 (1.26) to 5.48(0.99) with a T-value of 39.58, and QL flexibility from 16.52 (1.47) to 28.14 (2.29) with a T-value of 33.39. This shows better improvement and is statistically significant.

Core Stability Group – pre and post intervention values (Paired T-test)

Within group analysis of core stability group post-test values showed better improvement from baseline to the end of the 8th week (**table II**). The prone bridge test values improved from 16.03 (2.66) to 38.26 (11.29) with a T-value of 15.96, lateral pelvic tilt from 11.70 (1.29) to 6.5 (1.48) with a T-value of 24.02, and QL flexibility from 16.37 (1.59) to 26.78 (2.96) with a T-value of 28.15. This shows better improvement and is statistically significant.

Post-test comparison between groups by Unpaired Test

The post-test values of the prone bridge test of the neurokinetic group were 42.53 (13.07) and the core stability group was 38.26 (11.29) with a T-value of 1.91. The post-test values of lateral pelvic tilt of the neurokinetic group were

Table I. General characteristics of participants.

Characteristic	Experimental group Mean (SD)	Control group Mean (SD)
Number of patients	60	60
Sex (Male/Female)	34/26	32/28
Age	25 (2.25)	24.98 (2.21)
Height	160.65 (4.88)	160.88 (5.05)
Weight	66.4 (5.82)	66.5 (5.86)
BMI	25.73 (2.24)	25.69 (2.19)
VAS	6 (0.71)	6.08 (0.72)
ODI	50.41 (4.92)	51.1 (4.98)
Prone bridge test	16.05 (2.69)	16.03 (2.66)
Lateral pelvic tilt	11.65 (1.26)	11.70 (1.29)
QL flexibility	16.52 (1.47)	16.37 (1.59)

Table II. Comparison of baseline and 8-weeks exercise outcome measures of physical function within groups.

Variables	Groups	Baseline Mean (SD)	8-weeks Mean (SD)	T-value
Prone bridge test	Experimental	16.05 (2.69)	42.53 (13.07)	17.87
	Control	16.03 (2.66)	38.26 (11.29)	15.96
Lateral pelvic tilt	Experimental	11.65 (1.26)	5.48 (0.99)	39.58
	Control	11.70 (1.29)	6.5 (1.48)	24.02
QL flexibility	Experimental	16.52 (1.47)	28.14 (2.29)	33.39
	Control	16.37 (1.59)	26.78 (2.96)	28.15

Table III. Comparison and 8-weeks exercise outcome measures of physical function between groups.

Variables	Groups	8-weeks Mean (SD)	T-value
Prone bridge test	Experimental	42.53 (13.07)	1.91
	Control	38.26 (11.29)	
Lateral pelvic tilt	Experimental	5.48 (0.99)	4.43
	Control	6.5 (1.48)	
QL flexibility	Experimental	28.14 (2.29)	2.81
	Control	26.78 (2.96)	

5.48 (0.99) and the core stability group was 6.5 (1.48) with a T-value of 4.43. The post-test values of QL flexibility of the neurokinetic group were 28.14 (2.29) and the core stability group was 26.78 (2.96) with a T-value of 2.81 (**table III**). The statistical analysis, involving paired tests for pre and post-test values, demonstrates a significant improvement in prone bridge test, lateral pelvic tilt, and QL flexibility after implementing the neurokinetic therapy technique. The study promises the potential of neurokinetic therapy as a valuable intervention for managing this complex condition, providing the way for additional investigations and practical applications in clinical settings.

DISCUSSION

The overall objective of this study was to determine whether neurokinetic therapy intervention would result in greater improvements in outcomes than core stabilization exercise. We hypothesized that the neurokinetic therapy would show improved outcomes for both physical function and activity after 8 weeks of intervention. We observed greater differences in the pain intensity, disability level, core muscles endurance, quadratus lumborum flexibility and lateral pelvic tilt after 8 weeks for the neurokinetic therapy group than control group. While we strengthen the synergistic muscles along with quadratus lumborum, we observed greater differences in lateral pelvic tilt and quadratus lumborum flexibility than in the core stabilization group. To the best of our knowledge, this is the first randomized controlled trial to assess the effectiveness of neurokinetic therapy on patients with chronic nonspecific low back pain.

Reduced strength in the abdominal and superficial trunk muscles, as well as poor motor control in the multifidus and transversus abdominus, are the main causes of low back pain (30, 31). According to several studies, people with low back pain have weaker gluteal muscles than people in good health (32). Research has indicated that activities aimed at improving hip range of motion and strength as well as core stability can lessen low back pain and enhance illness, low back muscle power, and balance (33). Significant improvements in both physical and psychological functioning have been demonstrated by the combination of lumbar spinal therapy with hip exercise and joint mobility training (34). Stretching exercises for the tensor fasciae latae increase hip joint and pelvic motion and can reduce low back pain and impairment, according to Kasunich's research (35). The primary causes of CNSLBP include weaknesses of the gluteal and core muscles, which causes hamstring, iliopsoas, tensor fascia latae, piriformis, and quadratus lumborum muscles to be overactivated (36). Research has demonstrated that in patients with nonspecific low back pain, workouts that isolate the QL muscle, such as the muscular energy technique (MET) of QL, can dramatically enhance QL function and reduce pain (37).

Low back discomfort or lumbopelvic instability can also be avoided by keeping good lumbar posture and personal flexibility, which can affect the back muscular flexion-relaxation phenomenon when sitting (38, 39). Weakness in the muscles of the abdomen, the superficial trunk muscles, and the motor control or delayed activation of the deep muscles are the main causes of low back pain (40). A corrective movement technique called neurokinetic therapy (NKT) can be used to treat non-specific low back pain. This kind of pain is frequently brought on by inadequate posture, poor ergonomics, obesity, very heavy lifting, and constipation. Usually, weak abdominal muscles are compensated for by rigidity in the lower back muscles. Muscle imbalances can cause the hips to occasionally become twisted or of a different height. By evaluating muscle function and treating any disorders discovered, NKT can assist in identifying and resolving these imbalances. Through the correction of these abnormalities, NKT can help reduce low back discomfort and enhance function in general. According to one study, NKT helped those with nonspecific low back pain by lowering pain and enhancing function.

Twenty patients were enrolled in the trial and split into two groups. While the other group had motor controlling exercises (MCE) based on NKT principles, the first group underwent traditional physiotherapy treatment (CPT) (41). The study's findings demonstrated that while both therapies were successful in lowering pain, the MCE was more so than the CPT – even after just one treatment session. Comparing the MCE group to the CPT group, the MCE group had higher improvements in terms of general enhancement and return to work. NKT can also lessen the consequences of repetitive stress injuries and assist the get rid of persistent dysfunctional patterns from previous injuries. By rapidly enhancing muscle coordination and raising body-wide energy, strength, endurance, and range of motion, it can improve athletic performance. NKT is a hands-on, non-invasive therapy that can address the underlying cause of low back pain and provide long-term relief.

CONCLUSIONS

Therefore, according to the findings, it can be concluded that the neurokinetic therapy technique leads to significant changes in core muscle endurance, lateral pelvic tilt, and QL flexibility in subjects with chronic nonspecific low back pain. This study also contributes to the understanding that addressing the adjacent area along with the affected area can give ultimate results in outcomes and provide valuable insights into intervention effectiveness for challenging conditions.

FUNDINGS

None.

DATA AVAILABILITY

Data are available under reasonable request to the corresponding author.

CONTRIBUTIONS

MLS, KK: methodology, investigation, formal analysis, writing – original draft. KK: supervision. KM: writing – original draft, conceptualization, methodology, supervision, writing – reviewing & editing. DN: methodology, investigation, formal analysis, writing - reviewing -& editing

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

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