

Effect Of Kinesthetic Balance Exercises Along With Core Stabilization Exercises On Knee Pain And Balance Among Elderly People With Osteoarthritis Knee

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ABSTRACT

BACKGROUND: Osteoarthritis is one among the most common condition which occurs in geriatric population which is one of the major causes for the decline in physical activities. This degenerative arthritis damages the articular cartilages that protect the articular surface over a period of time. Osteoarthritis predominantly affects the sensory components of a joint in which balance sense is very much affected in comparison with a normal person of same age group. Objective of the study was to find out the effect of kinesthetic balance exercises along with core stabilization exercises on knee pain and balance among elderly people with OA knee.

METHOD: 10 elderly people with OA knee patients were selected. The outcomes were measured by using NPRS for pain and Y-Balance test for balance. The 10 subjects were treated with kinesthetic balance exercise along with core stabilization exercise, the total treatment duration of 12 weeks.

RESULTS: These results demonstrate the significant improvement in reducing knee pain and improvement in balance among elderly people with OA knee.

CONCLUSION: The kinesthetic balance exercises in combination with core stabilization exercises reduce the knee pain and improve the balance in elderly population with knee osteoarthritis

KEYWORDS: Elderly population, kinesthetic balance exercise, core stabilization exercise, knee pain, balance, NPRS, Y-Balance test.

INTRODUCTION

The most prevalent type of arthritis is OA. Radiographic OA alterations can be found in the knees of more than 50% of those over the age of 65, and its prevalence rises progressively with age. Almost everyone develops OA in one joint by the time they are 75 years old. Before the age of 45, both men and women are equally impacted, but after that point, women are more likely to experience it. Osteoarthritis affects 56.6% of elderly people. Data from community surveys in India's rural and urban areas indicate that 17.6% to 60.6% of people there have osteoarthritis.

The damaging process is thought to begin very much early but prominent wear and tear occurs only in the middle age. By the time people are 55 to 65 years old, over 85% exhibit radiological evidence of disease, to varying degrees. Obesity doubles the prevalence of the condition.

Despite being a disease of the joints, osteoarthritis has repercussions that go beyond the physical. Depression, anxiety, feelings of powerlessness, restrictions on daily activities, employment limitations, and trouble engaging in day-to-day joys and obligations for one's family and self are some examples of lifestyle consequences. As this degenerative changes in the knee joint are not reversible and the patient have the only option for undergoing surgery. However, the addition of

physical therapy helps lessen the persistent OA symptoms and facilitate the patient's better functioning capacities.

Combining non-medical and medical treatments, as well as surgical surgery when necessary, are recommended strategies for individuals with knee OA⁴. The goal of non-medical methods including therapeutic exercise, lifestyle modifications, activity pacing, and weight loss is to relieve the stress on the injured joint.

Rest, external assistance, salicylate administration, intra-articular steroid injections, and exercise therapy are all examples of conservative treatment⁴. People with knee OA have worse proprioceptive impairments than people of the same age who are healthy. Patients with OA in one knee is more likely to get their opposite knee also involved in some part of their life and exhibit the same abnormalities. Deficits in proprioception may cause poorly managed, excessive knee loading during locomotion, starting or hastening joint deterioration.

Recent research raised the possibility of a connection between poor knee proprioception and early-stage pathologic knee OA alterations. Proprioceptors in skeletal muscles, tendons, and the fibrous capsules in joints offer proprioception.

Proprioceptive feeling may lessen in knee OA patients as their knee muscles, tendons, ligaments, and joint capsules deteriorate and suffer injury. Additionally, patients with knee OA may be more prone to discomfort or disability due to proprioceptive deficits.

According to Smith et al and Knoop et al, Impaired proprioception occurs in patients with knee OA is due to internal derangement of structures like receptors, muscles and ligaments due to trauma. These authors did, however, recognize the limitations of the evidence that was at hand and the lack of agreement on these issues.

Kinaesthesia, Balance & Agility Exercise (KBA) approaches are intended to enhance the dynamic stability by a chain of activities which in turn examines a person's ability to maintain the coordination and balance while also challenging their neuromuscular system. KBA is most frequently used by athletes to treat and prevent ankle sprains and ruptures of the anterior cruciate ligament. By using agility and balancing activities to engage, test, and modify the nervous system's proprioceptors, KBA is intended to lessen proprioceptive dysfunction. An increase in Proprioception would improve the dynamic stability of the knee joint and enhance the activities of daily living. People with knee osteoarthritis with its signs of cartilage destruction have the potential cause of stability deficits along with laxity of the knee joint.

The control of muscular structure required for a functional stability around knee joint is referred to as core stability. Exercises that improve core stability will aid in maintaining excellent posture when moving, and serve as the foundation for all arm and leg motions. This demonstrates that effective movement in the upper and lower extremities is possible with appropriate postural control.

Exercises for core stability are those intended to enhance neuromuscular function. The goal of this exercise is to improve lumbopelvic control. The two strategies to achieve this increase in lumbopelvic are to first improve the control and coordination of the surrounding muscles and secondly improving the strength of these muscles. Depending on the involvement of muscles, the spinal stability is the foundation of the core stability exercise paradigm. Correct posture is attained by the activation of proper. The lumbopelvic region contains a variety of muscles that support and stabilize the spine.

Y Balance Test (YBT) is a tool used to evaluate a person's injury risk. This test is appropriate to both the quarters. The Lower Quarter YBT (LQYBT) evaluates a person's performance during single leg stance with reaching in 3 directions.

The Numeric Rating Scale (NRS) is a tool used to rate the severity of pain. Pain severity rated from 0 (no pain) to 10 (worst pain).

The current study is to evaluate the effect of kinesthetic balance exercise along with core stabilization exercises in treating elderly people with OA knee.

METHODS

This study was conducted in M.M Hospital after obtaining consent from the patient and under the supervision of the competent authority of the hospital. 10 elderly individuals with knee OA who were older than 50 years old were included in the study based on the inclusion criteria. Three months were spent conducting the investigation, which used a quasi-experimental study design. The Y-Balance test and the Numerical Pain Rating Scale (NPRS) were used to collect the pre-test pain and balance scores from all 10 subjects. Exercises for core stabilisation and kinaesthetic balance were performed on all 10 participants. All 10 patients' post-test pain and balance results were collected after three months for statistical analysis.

PROCEDURE

1. KINAESTHETIC BALANCE EXERCISES:

- Modified Romberg exercise (with eyes closed)
 - a) Standing on stable surface
 - b) Standing on unstable surface
 - Reverse walking
 - Heel walking
 - Standing on Rocker-bottom board
 - Sitting and standing from a low height chair
 - Minitrampoline training
 - Carioca crossover manoeuvre
 - BAPS board training
 - a) Double leg stance with eyes open in different directions
 - b) Double leg stance with eyes closed in different directions
 - c) Single leg stance with eyes open in one direction
 - d) Single leg stance with eyes closed in one direction
 - e) Single leg stance with eyes open in different directions
 - f) Single leg stance with eyes closed in different directions
- Walking through six boxes marked on the unstable surface on one foot

2. CORE STABILIZATION EXERCISES:

- Abdominal contraction in sitting
- Oblique twisting in sitting
- Arm and leg lifting
- Partial and full bridging
- Side to side spinal rotating

The total treatment duration was 5 times a week and each time for 45 minutes for 3 months.

RESULTS

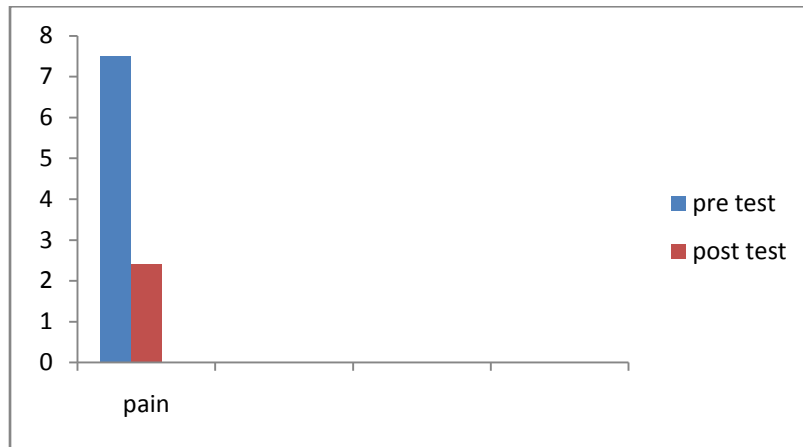
Pre- and post-test comparisons of the mean, SD, and T value for pain and balance

TABLE NO-1PRE AND POST VALUES OF NPRS FOR KNEE PAIN

COMPONENT	TEST	MEAN	SD	T Value	PValue
PAIN	PRE	7.5	0.816	15.5	<0.05
	POST	3.5			

The 't' value is 15.5 and is much higher than the table value (2.262) when the pre- and post-test results were compared. The standard deviation's SD value is 0.816. The outcome revealed that there has been a significant decrease in pain.

GRAPH NO-1PRE AND POST VALUES OF NPRS FOR KNEE PAIN



Y- BALANCE TEST PRE AND POST SCORES FOR BALANCE

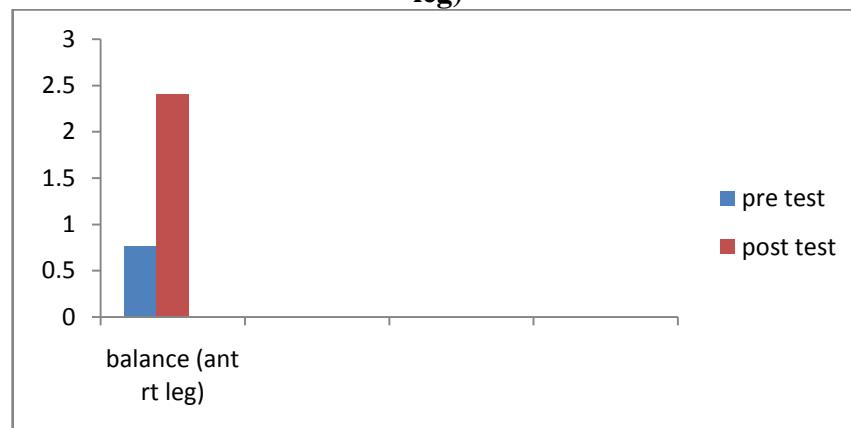
TABEL NO-2

1. ANTERIOR: RIGHT LEG

COMPONENT	TEST	MEAN	SD	T Value	PValue
BALANCE	PRE	0.76	0.119	8.237	<0.05
	POST	0.45			

The outcome indicates that the anterior right leg's pre and post-test values have a "t" value of 15.98, which is significantly higher than the table value of 2.262. The standard deviation is 0.36 and the mean difference is 1.82. The outcome indicated that there has been a significant improvement.

GRAPH NO-2PRE AND POST VALUES OF Y- BALANCE TEST FOR BALANCE(ant right leg)

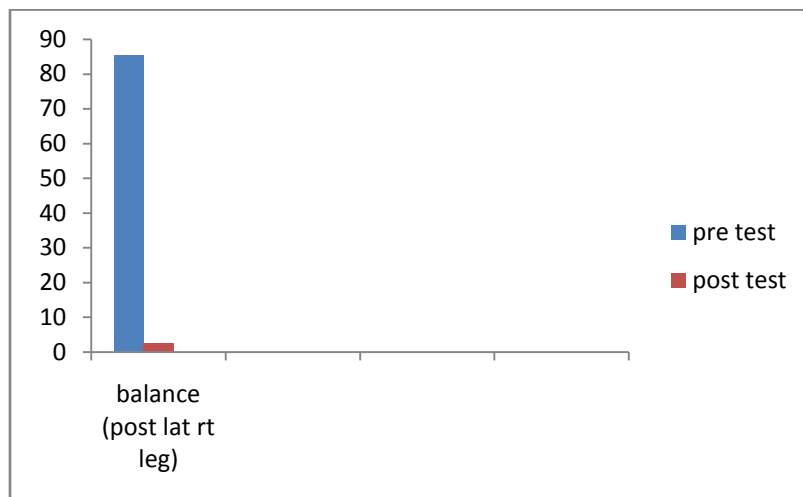


2. POSTERO LATERAL: RIGHT LEG

COMPONENT	TEST	MEAN	SD	T Value	PValue
BALANCE	PRE	85.33	0.53	9.486	<0.05
	POST	86.92			

The result shows that pre test and post test values of Postero Lateral right leg shows that 't' value 9.486 which is significantly greater than the table value 2.262. The mean difference is 1.59 and the value of standard deviation is 0.53. The result showed that there is a significant improvement.

GRAPH NO-3PRE AND POST VALUES OF Y- BALANCE TEST FOR BALANCE (post lat right leg)

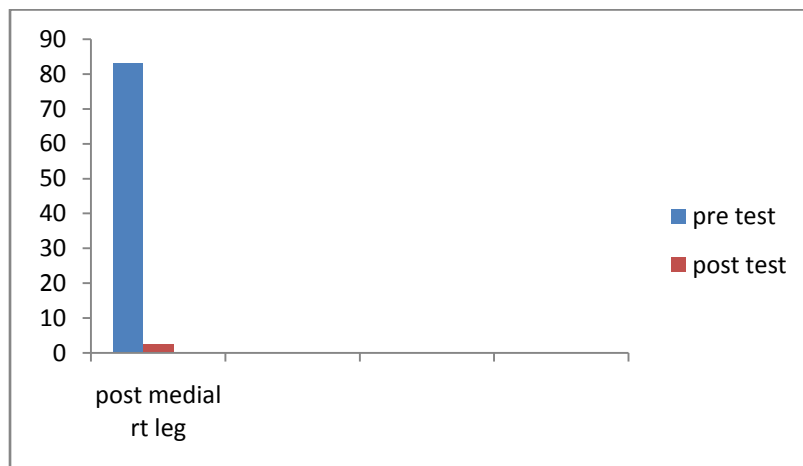


3. POSTERO MEDIAL: RIGHT LEG

COMPONENT	TEST	MEAN	SD	T Value	PValue
BALANCE	PRE	82.97	0.4	8.22	<0.05
	POST	84.01			

The outcome indicates that the difference between the pre- and post-test values for the Postero Medial right leg is 8.22, which is significantly higher than the table value of 2.262. The standard deviation is 0.4 while the mean difference is 1.047. The outcome revealed that there has been a significant improvement.

GRAPH NO-4PRE AND POST VALUES OF Y- BALANCE TEST FOR BALANCE (post medial right leg)

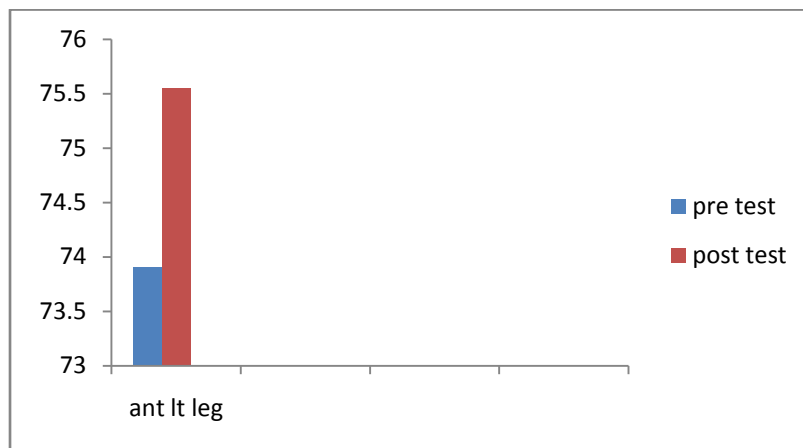


4. ANTERIOR: LEFT LEG

COMPONENT	TEST	MEAN	SD	T Value	P Value
BALANCE	PRE	73.91	0.97	5.345	<0.05
	POST	75.55			

The outcome indicates that the anterior left leg's pre- and post-test values have a "t" value of -5.345, which is significantly higher than the table value of 2.262. The standard deviation is 0.97 and the mean difference is 1.643. The outcome indicated that there has been a significant improvement.

GRAPH NO-5PRE AND POST VALUES OF Y- BALANCE TEST FOR BALANCE (ant left leg)

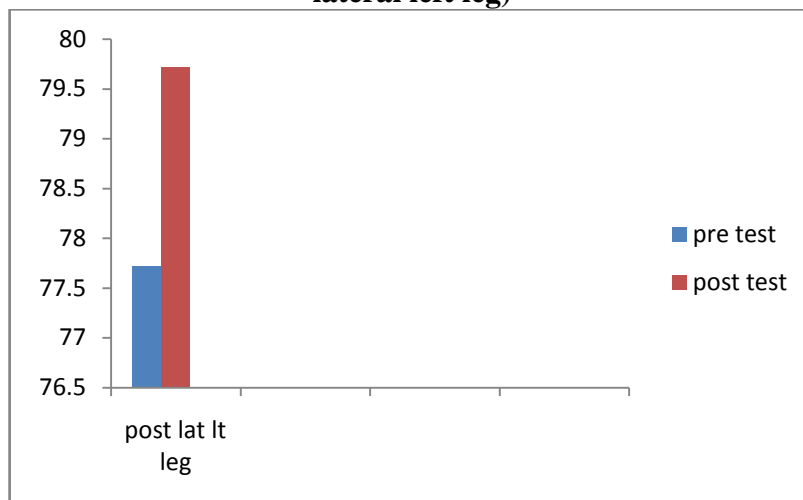


5. POSTERO LATERAL: LEFT LEG

COMPONENT	TEST	MEAN	SD	T Value	P Value
BALANCE	PRE	77.72	0.56	11.29	<0.05
	POST	79.72			

The outcome reveals that the difference between the table value of 2.262 and the "t" value of 11.29 for the Postero Lateral left leg. The standard deviation is 0.56 and the mean difference is 2. The outcome revealed that there has been a significant improvement.

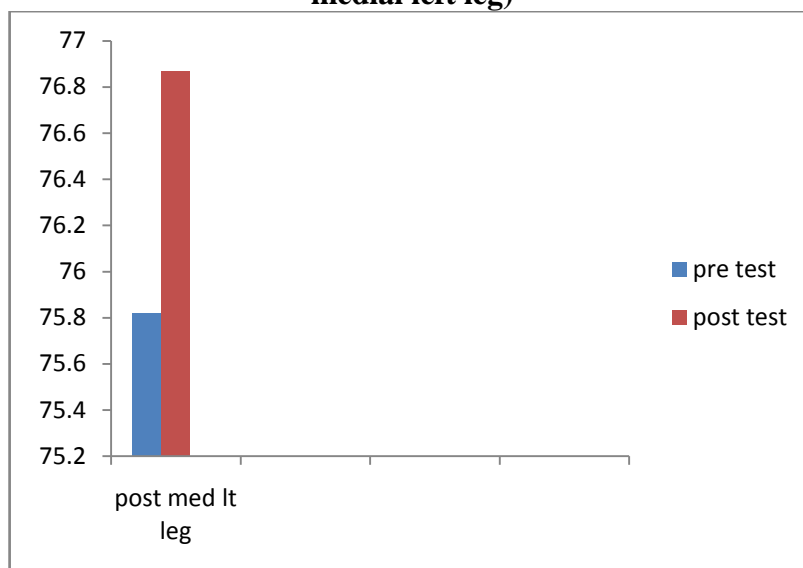
GRAPH NO-6PRE AND POST VALUES OF Y- BALANCE TEST FOR BALANCE(post lateral left leg)



6. POSTERO MEDIAL: LEFT LEG

COMPONENT	TEST	MEAN	SD	T Value	P Value
BALANCE	PRE	75.82	0.38	8.73	<0.05
	POST	76.87			

The outcome indicates that the difference between the pre- and post-test values for the posterior medial left leg is 8.73, which is substantially higher than the table value of 2.262. The standard deviation is 0.38 and the mean difference is 1.05. The outcome revealed that there has been a significant improvement.

GRAPH NO-7PRE AND POST VALUES OF Y- BALANCE TEST FOR BALANCE (post medial left leg)

The statistical report states that there is significant reduction in knee pain and improvement in balance in application of kinesthetic balance exercise along with core stabilization exercises among elderly people with osteoarthritis.

DISCUSSION

Among all the degenerative disorders, osteoarthritis is the most common degenerative joint disease with high incidence. In elderly population the frequent causes of pain, functional impairment and disability is by osteoarthritis. With increase in age there is more chance of developing osteoarthritis. Various studies have shown that knee osteoarthritis most commonly affect the elderly men compared to women with more involvement of right side than that of the left side.

We explored the significance of balance training on knee osteoarthritis which is a specialized training programme designed to restore static alignment, voluntary movement execution, and stress responsiveness by recovering motor control in the lower extremities.

Using this balance training to engage, test, and modify the neural system's receptors, kinesthetic balance exercises are intended to reduce proprioceptive dysfunction. A decrease in joint sensory defect may boost the moving component of knee and enhance the strength and daily living tasks. Additionally, it has been suggested that the unsteadiness and joint slackness are potential causes of the onset of arthritis and followed by the repeated destruction of the structures in those who already have the condition. ^(5,6,7)

Exercises for core stability focus on the need to stretch and improve the integrity of structures in between the pelvic region and vertebrae. This exercise is also crucial for supplying localized strength and balance, which maximizes activities and makes them more efficient.

Core stabilization is considered to work out the structures in relation to the balance of our body's core. In order to build the stability, this type of regular and structured training to be adopted in the treatment of knee osteoarthritis. This training is more beneficial when done with the position of the body is in line with proper body mechanics.

The Numeric Rating Scale (NRS) is a tool used to rate the severity of pain. Pain severity rated from 0 (no pain) to 10 (worst pain). Instructions given to the patients to indicate the severity of pain by marking the number from 0 to 10 that suits them.

Y-balance test, a simple test which is conducted by a range of medical practitioners, reasonably affordable, and portable. The Y-balance test is practicable and safe over a wide range of ages and in

both genders, according to a number of prior published studies that used older people as an outcome measure. In older adults, the Y-balance test is a robust and accurate evaluation tool. Our premise that the Y-balancing test is a reliable measure is supported by the study's major finding, which showed that older people' test results had a substantial correlation with several measures of lower body strength and balance. The Y-balance test is quite dependable in older persons, which is a secondary finding.

CONCLUSION:

According to the study's findings, 12 weeks of therapies involving kinesthetic balance exercises and core stabilisation exercises significantly decreased pain and improved balance in elderly patients with OA knees. This suggests that the kinesthetic balancing exercise and core stabilisation exercises may be advised for elderly people with OA knees since they are advantageous, safe, and effective for lowering knee discomfort and enhancing balance.

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