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## Effect of proprioceptive exercises and reinforcing exercises on utilitarian capacities of patients with knee osteoarthritis

**Amandeep Singh and Vidhi Singh**

### Abstract

**Background:** Globally, osteoarthritis is quite frequent among the elderly and has a very high incidence. It is a degenerative joint condition that results in changes to the bone as well as thinning or loss of the smooth cartilage that covers the ends of bones. Surgery, medication therapy, and exercise therapy are now used as osteoarthritis treatments.

**Objective:** To differentiate the effect of proprioceptive exercises and sustaining movement and strengthening exercise alone on valuable limit in patients with knee osteoarthritis.

**Material and Method:** According to inclusion and exclusion criteria, 50 patients with knee osteoarthritis were selected from department of physiotherapy, Sanskriti University, Mathura. Functional disability, functional mobility and balance were measured by using WOMAC scale, timed up and go test as operational tools.

**Results:** In individuals with knee osteoarthritis, proprioceptive exercises in addition to strengthening activities significantly improve practical ability when compared to strengthening exercise alone.

**Conclusion:** Based on findings of the study, proprioceptive exercises, when combined with strengthening exercises, help patients with knee osteoarthritis improve their perception of joint position and practical capacity more than strengthening treatments alone.

**Keywords:** Knee osteoarthritic, proprioception, proprioceptive exercises, strengthening exercise

### Introduction

The social insurance system includes osteoarthritis (OA) as one of its weights. Over 60% of those over 40 have this illness, which is one of the most common rheumatic diseases<sup>[1]</sup>. It is the most well-known kind of joint inflammation and a major contributor to recurrent musculoskeletal pain and mobility-related impairments in the elderly. As the population continues to age, it is occurring more frequently. Before the age of 45, men are smaller than women. The prevalence of the illnesses rises steadily with age.

When compared to the rural network in India, the prevalence of clinically diagnosed knee OA was greater in the urban network. According to a research from 2007, the prevalence of OA was 32.6% in rural areas and 60.3% in urban areas. The prevalence of OA was 50.2% in the population between the ages of 65 and 74, whereas it was 97.7% in those who were 84 years or older<sup>[2]</sup>. More than 15 million people are regularly impacted by this. It is the most generally acknowledged cause of locomotor impairment in the elderly<sup>[3]</sup>.

Osteoarthritis is a degenerative joint disease that affects the ligament and many of the tissues that surround it. Generally, illness progression is mild, but it can result in joint pain, suffering, and impairment<sup>[4]</sup>. The articular ligament is seriously damaged and lost. Despite this, there will be remodeling of the subarticular bone, osteophyte growth, ligamentous laxity, a cut off of the weakening of the per articular muscles, and synovial aggravation<sup>[5]</sup>.

Although OA may develop in any joint, it often affects the knees, hips, wrists, and side joints of the spine. The hip and knee joints will typically carry most of the weight since they are both weight-bearing joints that have an impact on society by causing pain and serious incapacity. The most well-known joint affected by osteoarthritis is the knee joint. Joint pain, stiffness, and developmental hindrance are all symptoms of OA. Although illness progression is often slow, it might eventually result in joint disappointment with pain and disability<sup>[4]</sup>.

The pain, muscular weakness, and physical dysfunctions caused by osteoarthritis in the knee create a continual cycle. When a muscle is weak, it is associated with pain and brokenness and works to influence how the diseases move. In order to treat these concerns and prepare for the deterioration in OA Knee, fortifying activities are crucial [6-7]. Combining pharmaceutical and non-pharmacological therapy is the best course of action for people with OA of the knee. Traditionalist management is the best method for managing the mild to moderate OA of the knee. In light of the muscular weakness associated with physical pain and brokenness in individuals with OA Knee [8]. In the orthodox approach to treating patients with knee OA, activities are seen as the most crucial intercessions are two examples [6-7].

In OA knee participants, quadriceps weakness is a considerable alteration, and lower appendage exercises are largely used [6]. Few studies have found that kinesthesia and equalisation exercises (proprioceptive activities) have a substantial influence on reducing symptoms and promoting beneficial improvement when compared to traditional therapeutic activities [9-10]. Proprioceptive exercises use a series of physical movements that push the neuromuscular system of the participant to maintain balance and coordination in order to enhance dynamic soundness. These procedures are typically used to treat tendon injuries, such as those to the ACL or lower leg tendons [11-12]. Recent literary works demonstrate the beneficial effects of proprioceptive training on OA knees. Rarely any contextual investigations have pointed out these activities' extra influence in addition to regular strengthening exercise [9].

### Methodology

**Study Design:** Pre test and post test experimental study design.

WOMAC scale, timed up and go test were selected as operational tool.

**Setting:** Data was collected from Department of Physiotherapy, Sanskriti University, Mathura. Total study duration was one year and each patient received treatment for a duration of 8 weeks.

**Sample Size:** Systematic random sampling method, 50 patients with knee osteoarthritis, who fulfilled the predetermined inclusive and exclusive criteria were selected and divided in to two groups each consisted of 25 patients.

### Inclusion Criteria

- Children Patient diagnosed with primary osteoarthritis of the knee by orthopaedic physician.
- Patients with unilateral osteoarthritis of knee.
- WOMAC pain score greater than 5.
- Both sexes were included
- Age group 45-65 years
- Patients who are able to perform the exercises.
- Patients who are willing to participate in the study.

### Exclusion Criteria

Children or primary caregiver with history of any other neurological and cardiovascular disorders.

Chronic disease to any other family member.

**Procedure:** The study's participants were people with osteoarthritis of the knee who visited the physiotherapy department at Sanskriti University in Mathura. 40 patients were chosen out of the whole population that met the

inclusive and exclusive criteria. A professional physiotherapist and orthopedician assessed each patient individually. Every patient received an in-depth description of the operations, and their signed agreement was secured before any work was done.

Two groups were randomly assigned to each of the 40 patients. Subjects were picked at random from a list of participant names, and every second person was included in the experimental group and every first person in the control group. All of the names were placed into the list. As a result, there were an equal number of participants in each group. Twenty patients made up each group, and everyone stayed in the group they were first placed in.

**Group A:** Patients underwent proprioceptive exercise along with strengthening exercise for thrice a week of thirty minutes per session for eight weeks.

**Group B:** Patients underwent reinforcing exercise alone thrice a week of thirty minutes per session for eight weeks.

**Study Variables:** Proprioceptive exercises, strengthening exercises are independent variables for this study and functional disability, Functional mobility, balance are dependent variables.

**Statistical Methods:** The descriptive analysis is used to calculate mean, median, standard deviation, standard error and Skewness Kurtosis, and range for all study variables i.e., sleep quality and quality of life. Spearman's rho is used to calculate the correlation between study variables. SPSS software version 21.0 is used to determine the results and to interpret all readings. The level of significance is 95% and the p value is .004 which is considered highly significant.

### Results and Discussion

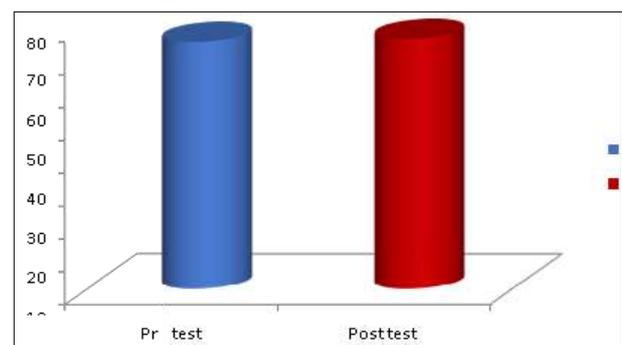
#### Unpaired t test-comparison of pre-test WOMAC scale values of group A and group B

The comparative mean values, mean difference, standard deviation and unpaired 't' test values of Group A and Group B.

**Table 1:** Comparative pretest values of Group A and B on WOMAC scale

S.N	Group-B Test	Mean	Mean Difference	S.D	Paired 't' value
1.	Pre	75.26	0.8	1.63	1.66
2.	Post	76.16		1.86	

The table 1 shows analysis of WOMAC on unpaired t-test. The pre-test value of Group A and Group B was 1.66 at 0.05% level of significance, which was lesser than the tabulated t value 1.960. The results show that there was marked difference between Group A and Group B.



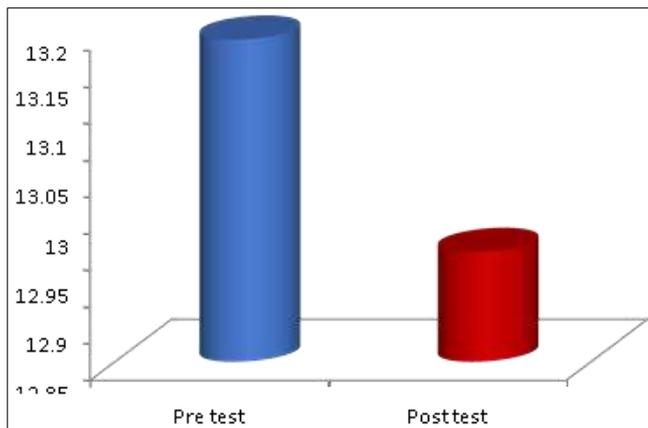
**Fig 1:** Unpaired t test on pre-test values of Group A and Group B on WOMAC scale

**Unpaired t test – comparison of pre test TUG test values of group A and group B**

**Table 2:** Comparative pretest values of Group A and B on TUG scale

S.N	Group	Mean	Mean Difference	S.D	Paired 't' value
1.	Group A	13.19	0.33	1.45	0.637
2.	Group B	12.90		1.44	

The table 2 shows analysis of TUG test on unpaired t test. The pretest value of Group A and Group B was 0.637 at 0.05% level of significance, which was lesser than the tabulated t value 1.960. The results show that there was marked difference between Group A and Group B.



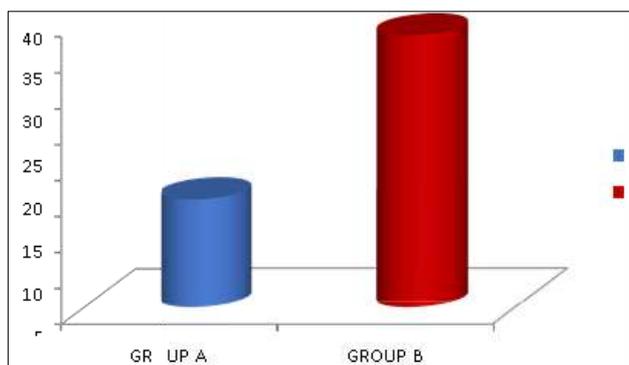
**Fig 2:** Unpaired t test on pretest values of Group A and Group B on TUG scale

**Unpaired t test – comparison of posttest WOMAC test values of group A and group B-**

**Table 3:** Comparative t test on posttest values of Group A and Group B on WOMAC scale

S.N	Group	Mean	Mean Difference	S.D	Paired 't' value
1.	Group A	14.92	22.6	2.50	19.182
2.	Group B	37.73		4.67	

The table 3 shows analysis of WOMAC test on unpaired t test. The post test value of Group A and Group B was 19.182 at 0.05% level of significance, which was greater than the tabulated t value 1.960. The results show that there was marked difference between Group A and Group B.



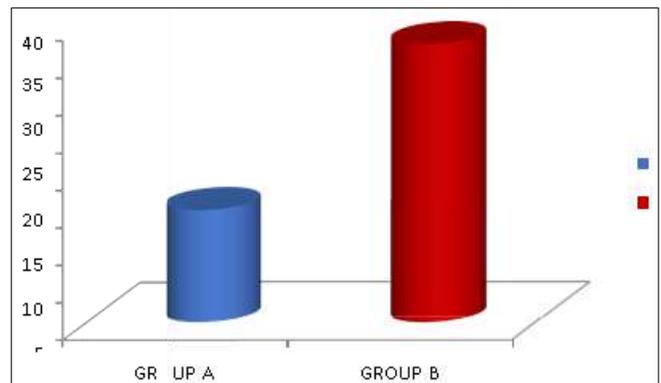
**Fig 3:** Unpaired t test on posttest values of Group A and Group B on WOMAC scale

**Unpaired t test – comparison of posttest values of group A and group B TUG test-**

**Table 4:** Comparative t test on posttest values of Group A and Group B on TUG scale

S. N	Group	Mean	Mean Difference	S.D	Paired 't' value
1.	Group A	14.93	22.5	2.50	19.195
2.	Group B	37.07		4.67	

The table 4 shows analysis of TUG test on unpaired t test. The post test value of Group A and Group B was 19.195 at 0.05% level of significance, which was greater than the tabulated t value 1.960. The results show that there was marked difference between Group A and Group B.



**Fig 4:** Unpaired t test on posttest values of Group A and Group B on TUG scale

The results of the unpaired "t" test analysis for the pre test factors of the two groups on practical handicap using the WOMAC scale are shown in table 1. A significant difference between the Groups emerged. Group A subjects have unmatched mean differentiation from Group B. The pre test factors for the two groups have a 't' value of 1.66.

In table 3, the unpaired 't' test analysis for the post test variables of the two groups on utilitarian handicap using the WOMAC scale is presented. A significant disparity between the Groups emerged. Group A subject's exhibit more pronounced mean contrast than Group B subjects. The post test factors for the two groups' "t" values are 19.182 and 19.181.

Table 2 shows the results of the unpaired 't' test analysis of the pre test variables for the parity and utilitarian versatility groupings using the TUG test. A significant disparity between the Groups emerged. Group A subjects have a stronger mean contrast than Group B subjects. The pre test factors for the two groups had a 't' value of 0.64.

The unpaired "t" test inquiry using the TUG test is shown in 4 for the post test factors of both the collection on useful portability and parity. A significant disparity between the Groups emerged. Group A subjects have a more pronounced mean differentiation than Group B subjects. The post test factors for the two groups have a 't' value of 19.195.

**Conclusion**

The improvement in utilitarian capacity of Group B (control group) is less pronounced as compared to Group A (experimental group).

As a result, this study concludes that in individuals with knee osteoarthritis, proprioceptive exercises in addition to

strengthening activities significantly improve practical ability when compared to strengthening exercise alone.

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