



EFFECT OF KINESIOTAPING ON PAIN, RANGE OF MOTION, PHYSICAL PERFORMANCE AND FUNCTIONAL DISABILITY IN PATIENTS WITH KNEE OSTEOARTHRITIS- A RANDOMIZED CONTROL TRIAL

Physiotherapy

Harsimran Kaur	University College of Physiotherapy, Baba Farid University of Health Sciences, Faridkot, Punjab, INDIA.
Reena Arora	University College of Physiotherapy, Baba Farid University of Health Sciences, Faridkot, Punjab, INDIA.
Lalit Arora*	University College of Physiotherapy, Baba Farid University of Health Sciences, Faridkot, Punjab, INDIA. *Corresponding Author

ABSTRACT

Aim of Study: The aim of the study was to conduct a randomized control study to check the efficiency of kinesiotaping in Knee Osteoarthritis patients. **Material and Method:** 30 subjects both male and female with unilateral / bilateral knee osteoarthritis were included in the study as per inclusion and exclusion criteria. A written informed consent was signed by the subjects in their own language. The subjects were assigned into two groups, Group (A) Experimental Group (n=15): received treatment with kinesiotaping and supervised exercise program. Group (B) Control Group (n=15): received treatment with supervised exercise program only. Outcomes were measured by Numerical Pain Rating Scale (NPRS), modified Western Ontario and McMaster universities OA index (m. WOMAC), Timed Up and Go test (TUG) and Goniometer. Appropriate statistical tool was applied. **Result:** The result showed that there was significant ($p < 0.05$) improvement in NPRS, m. WOMAC, TUG and ROM in both groups A & B after 6 weeks of treatment. But when compared between group A & B; group A showed significant ($p < 0.05$) improvement as compared to group B. **Conclusion:** The Kinesiotaping along with supervised exercise program showed statistically significant improvement in reducing pain, functional disability increasing range of motion and physical performance as compared to the Supervised exercise program alone. Thus, Kinesiotaping along with supervised exercise program was more effective as compared to the supervised exercise program alone.

KEYWORDS

Osteoarthritis, Kinesiotape, Physical Performance, Functional Disability

INTRODUCTION

Osteoarthritis (OA) is a common chronic degenerative synovial joint disease of multi factorial etiology that usually targets specific joints, pathologically characterized by focal loss of articular hyaline cartilage with proliferation of new bone at the margins, sub-chondral sclerosis and remodeling of joint contour^{1,2}. One hundred fifty one million people worldwide experienced OA. The current global prevalence of knee osteoarthritis (OA) is 3.8%, and women are affected more often (4.8%) than men³. About 250 million people (3.6% of population) suffered OA knee world wide in 2010 and it is suspected that it was the fourth cause of disability in 2020⁴. OA is a common condition seen after 40 years of age and is widespread in adults older than 65 years. OA is the second most common rheumatologic problem and it is the most frequent joint disease with the prevalence of 22% to 39% in India.

The most common large joints involved in the disease are the knees, where the disease is particularly disabling because of difficulty in rising from a chair, climbing stairs, kneeling, standing and most important walking. These limitations are partly due to muscle weakness, especially quadriceps femoris muscle^{5,6,7,8}. The biomechanical alignment in the knee joint is the major determinant of load distribution. Even a minor change in this alignment may affect the load distribution considerably. Biomechanical correction strategies like exercise, taping, orthosis, and manual treatment techniques are used in the management of OA⁹.

Osteoarthritis is classified as primary and secondary osteoarthritis. Osteoarthritis having no known cause and are mostly related to aging are known as primary osteoarthritis. Osteoarthritis caused by another disease or condition which may be hereditary, developmental, metabolic and mechanical deficits are known as secondary osteoarthritis¹⁰. Symptoms of knee osteoarthritis may include: joint pain, tenderness, stiffness, locking and sometimes an effusion, deformity, coarse crepitus, instability restricted ability¹¹.

A conservative therapeutic approach for the treatment of musculoskeletal disorders that increasingly gained attention of clinicians and physiotherapists in the last years is kinesio taping. Kinesio taping (KT) was originally developed by Kase et al. and has been used in clinics for pain control and motor function enhancement in patients¹² with sport injuries or musculoskeletal disorders. KT increases muscle flexibility and muscle strength. Kinesio taping (KT) is thin, cotton, porous fabric with acrylic adhesive that is non medicated, latex-free and heat activated. The cotton fibres allows evaporation and quicker drying leading to longer wear time, up to 4-5 days¹³.

METHODOLOGY:

30 subjects were taken from Department of Orthopaedics, Guru Gobind Singh Medical College and Hospital Faridkot and OPD of University College of Physiotherapy, Faridkot. The eligibility for inclusion criteria included 1. Both (males and females) age between 40- 65 years 2. Subjects diagnosed as having OA of knee joint. 3. Unilateral or bilateral cases (in case of bilateral, more painful knee indicated by the subject was considered for data collection) 4. Pain intensity level between 6-8 point of NPRS 5. Radiographic evidence of grade II and III of Kellgren and Lawrence criteria for knee osteoarthritis 6. Subjects are able to walk independently without any assistive devices, ascend and descend at least a flight of stairs 7. Willingness to participate and the exclusion criteria included 1. Allergy to tape 2. Infective condition of the skin of the knee and fragile skin around the knee 3. Uncooperative subjects 4. Surgery of the knee complex or history of joint replacement and steroid injection in knee 5. Unstable Medical condition like hypertension, diabetes 6. Subjects with any fracture or injury 7. Subjects with any carcinoma 8. Underwent any Physiotherapy for the knee (within last 3 months) 9. Patient on any painkiller.

PROCEDURE:

Study was approved by Research and Ethical committee of University College of Physiotherapy (UCOP), Faridkot. 35 patients were screened, 5 were excluded (2 did not meet the inclusion criteria & 3 declined to participate). Informed consent was signed by the patients. After the assessment patients were divided into two groups, Group A and Group B based on randomization. Randomization was done by simple random sampling by chit picking method. The patients were evaluated for pain, range of motion, physical performance and disability by using Numeric Pain Rating Scale (NPRS), Goniometer, The Western Ontario and McMaster Universities Arthritis Index (WOMAC), Time Up and Go Test (TUG) at 0 week, 3rd week and 6th week of the study.

Group A (EXPERIMENTAL GROUP) included kinesiotaping along with supervised exercise program and Group B (CONTROL GROUP) included Supervised Exercise program only. The patients were assessed before starting the intervention, at the end of 3 weeks and after 6 weeks of treatment. Each subject of Group A was given kinesiotaping twice per week for 6 consecutive weeks. All the patients underwent supervised exercise program for 6 days a week for total 6 weeks. Before Kinesio tape application, Patient was asked to shave the treatment area. The area of treatment was cleaned and dried. The Kinesio tape was applied with approximately 40% stretch of its

maximal length on the 2 quadriceps group muscles. Here the direction of taping was applied origin to insertion of the muscles. Kinesiotape was applied on the 2 quadriceps muscles 1) for rectus femoris [RF] 'Y' strip will be applied, 10cm below the anterior inferior iliac spine to the inferior border of the patella and 2) for vastus medialis [VM], the KT was applied 10cm below the intertrochanteric line to the medial border of the patella. Patient was positioned in supine with knee bending^{14,15}. According to Kase Wallis principles of KT, a gap of at least 30 min was given after the tape application to achieve a complete activation of the glue, which is believed to improve the performance of the kinesiotape on the quadriceps muscle. Supervised exercise program included stretching and strengthening exercises along with warm up and cool down exercises¹⁶. Warm up and cool down exercises were given before starting and after the completion of supervised exercise program in both groups. Warm up Exercise were as follows; 1) Active knee Range of motion exercises (within limit of pain) were performed by the subjects in supine & sitting position. 2) Free active movements of hip (abduction-adduction, flexion-extension) in all planes & ankle (dorsiflexion – plantarflexion) × 20 repetitions each × 1 set. Rest interval of 1-2 minutes was given. Cool down period was given following the exercise period. Exercises were similar to those of the warm-up period. Both warm up and cool down period lasted for 8 to 10 minutes. Stretching exercise included 1) Capsular stretching, 2) Quadriceps Stretch, 3) Hamstring Stretch (hold for 30 seconds and repeat 3 times. Between each repetition there was a rest period of 5 seconds. 4) Range of motion exercises; 10 rep.*3 sets with 3 secs hold at the end range were performed by the subjects. Strengthening exercise included 1) Isometric Quadriceps Exercise, 2) Hamstring setting exercise, 3) Vastus Medialis Obliquus strengthening, 4) Straight leg raises exercises (hold for 10 seconds & then is lower, 3 sets of 10 repetitions)¹⁷.

STATISTICAL ANALYSIS: For this, unpaired t-test was applied to analyze the characteristics of the subject using SPSS 20.0. In order to compare the NPRS, m.WOMAC, TUG, ROM of each group at 0, 3rd and 6th week, the level of significance was set as 0.05 for all analysis.

RESULT: The comparison of NPRS, m.WOMAC, TUG, ROM scores of Group A and Group B was made using the unpaired t-test. On comparison of the mean difference of both groups, the mean difference of both groups, the mean difference of NPRS scores between Group A and Group B at 0 week was 7.0 and 6.867, at 3rd week was 5.20 and 6.0 and at 6th week was 3.73 and 5.53 respectively.

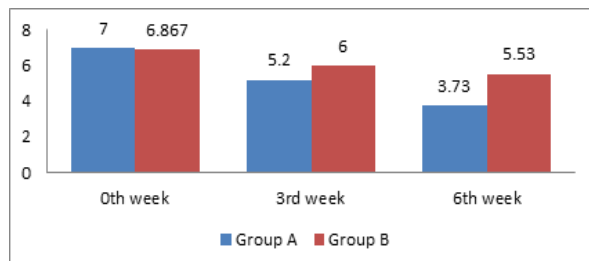


Fig.1.1. Comparison of mean difference of both groups at 0 week, 3rd week and 6th week scores of NPRS

The mean difference of m.WOMAC scores between Group A and Group B at 0 week was 64.40 and 66.06, at 3rd week was 51.0 and 59.2 and at 6th week was 38.06 and 56.20 respectively.

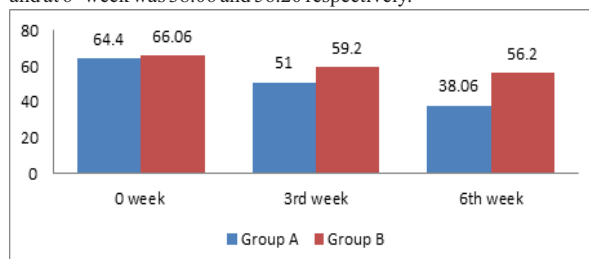


Fig.1.2. Comparison of mean difference of both groups at 0 week, 3rd week and 6th week scores of m.WOMAC

The mean difference of TUG scores between Group A and Group B at 0 week was 21.522 and 23.922, at 3rd week was 15.296 and 21.267 and at 6th week was 8.847 and 18.517 respectively.

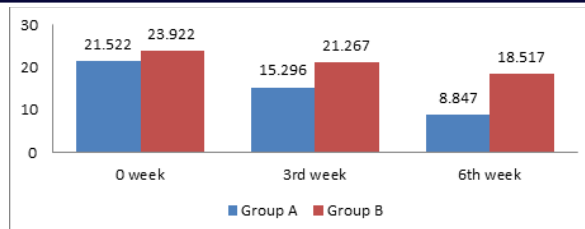


Fig.1.3. Comparison of mean difference of both groups at 0 week, 3rd week and 6th week scores of TUG.

The mean difference of ROM scores between Group A and Group B at 0 week was 104.40 and 103.06, at 3rd week was 114.80 and 110.20 and at 6th week was 127.40 and 112.67 respectively.

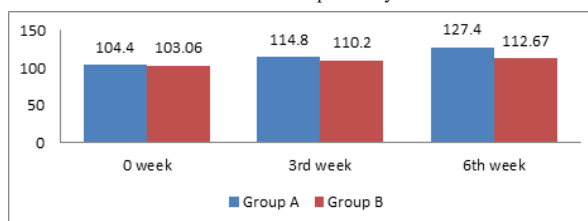


Fig.1.4. Comparison of mean difference of both groups at 0 week, 3rd week and 6th week scores of ROM.

There was significant statistical difference in the effectiveness of both groups since the mean difference in the NPRS, m.WOMAC, TUG and ROM scores was significant with p-value of 0.001* (<0.05). Hence, Group A showed highly significant difference values in reducing pain, disability and increasing physical performance and range of motion as compared to the Group B.

DISCUSSION

Results of the present study concluded that both kinesiotaping along with exercises and exercises alone were effective in reducing pain, increase range of motion, improve physical performance and decrease functional disability in patients with knee osteoarthritis. However, statistically it was concluded that kinesiotaping along with exercises is better than exercises alone. There was statistically significant decrease in pain, increasing range of motion, physical performance and decrease functional disability for group A that was treated by kinesiotaping along with supervised exercise program as compared to those who received only supervised exercise program alone for Group B. The result of present study is in accordance with study Ajeet Kumar Tiwari et al., (2017) who concluded that kinesiotaping along with supervised exercise program is more effective than supervised exercise program alone in relieving pain, increasing range of motion; strength and improving functional capacity in subjects with knee OA. The result of present study is similar to study by Sathiyavani Dhanakotti et al.,¹⁹ (2016) who concluded that 3 weeks of additional KT along with conventional PT exercise is beneficial in treatment of knee OA. The additional KT training shows more effectiveness than that of control group in NPRS, HHD & modified WOMAC score. Knee taping is believed to relieve pain by improving alignment of the patellofemoral joint and/or unloading inflamed soft tissues. Knee taping often allows pain free exercise by decompressing and derotating the patella.

CONCLUSION

This study concluded that both Kinesiotaping along with supervised exercise program and Supervised exercise program alone are effective in reducing pain, decreased functional disability, increased physical performance and range of motion. However, it is concluded that Kinesiotaping along with supervised exercise program is more effective than the Supervised exercise program alone in knee osteoarthritis. Reduction in pain, decreased in functional disability, increased in physical performance and range of motion is more after the treatment of sixth week in subjects who received Kinesiotaping along with supervised exercise program as compared to the subjects who received Supervised exercise program alone. Future studies could include more number of patients with longer follow up. Other outcome measures can also be checked.

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