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Research Article

**THE EFFECT OF INTENSIVE EXERCISE PROGRAM AND  
KINESIOTAPING FOLLOWING TOTAL KNEE  
ARTHROPLASTY ON FUNCTIONAL RECOVERY OF  
PATIENTS IN PAKISTAN**Dr. Bilal Ahmad Qureshi<sup>1</sup>, Dr. Muhammad Usman Malik<sup>2</sup>, Dr. Haider Hasnain<sup>3</sup><sup>1</sup>Dow University of Health Sciences<sup>2</sup>King Edward Medical University, Lahore, Pakistan<sup>3</sup>Nishtar Medical College Multan.

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**Abstract:**

**Introduction:** Kinesio tape is an elastic therapeutic tape that finds its application as an adjunct to professional activities in healthcare, rehabilitation, prevention and sports. In circulatory pathologies, kinesio tape has the function to promote the drainage of excess fluid, activating a lymphatic drainage response. **Objectives of the study:** The main objectives of the study is to find the effect of intensive exercise program and kinesiotaping following total knee arthroplasty on functional recovery of patients in Pakistan. **Methodology of the study:** This study was performed in Dow University of health sciences during January 2018 to June 2018. We included 50 patients, 35 males and 15 females, presenting pain and functional impairment with knee OA (PF and TF knee compartments), without concomitant chronic conditions. Patients were of a similar height and weight, had a median age of 63 (54–72 years) and a duration of disease of 5.5 ( $\pm 4.32$ ) years. **Results:** When the groups undergoing and not undergoing TKA were considered, no difference was found between the two groups in terms of age ( $t = -0.123$ ,  $p = 0.903$ ). The gender distribution of the groups is not different ( $p = 1.000$ ). There was no significant difference between the two groups in terms of body mass index (BMI), Lysholm score, and 6-min walk test score ( $p > 0.05$ ). **Conclusion:** It is concluded that a reduction in knee pain, improvement in knee function and also less need for medication following the use of KT in combination with exercise in patients with knee OA.

**Corresponding author:**

Dr. Bilal Ahmad Qureshi,

Dow University of Health Sciences,  
Pakistan.E-mail: [dr.baq\\_92@hotmail.co.uk](mailto:dr.baq_92@hotmail.co.uk)

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**INTRODUCTION:**

Kinesio tape is an elastic therapeutic tape that finds its application as an adjunct to professional activities in healthcare, rehabilitation, prevention and sports. In circulatory pathologies, kinesio tape has the function to promote the drainage of excess fluid, activating a lymphatic drainage response. Kinesio tape application promotes better blood circulation and lymph flow in the treated area, and this principle can be used to drain the swelling in trauma and bruises to speed up the process of the redistribution of the hematoma. Kinesio tape application decreases the surplus heat via friction reduction resulting in the lifting of the skin [1]. It also has a good stabilizing effect. Kinesio tape was also used for treating sports and orthopedic injuries, and a variety of musculoskeletal disorders, like osteoarthritis (OA). OA is a form of progressive arthritis caused by inflammation and degradation of cartilage in the joints. OA is associated with an extremely high economic burden (about 82.4 billion dollars per annum), which is largely attributable to the effects of disability, co-morbid disease and the expense of treatment. Since current treatments for OA give only few benefits, novel ways to treat this disease are urgently needed<sup>2</sup>. Knee OA is a disease with a high incidence and prevalence, with the number of affected individuals expected to increase, particularly due to the aging of the population, but also due to the increasing prevalence of obesity and a sedentary lifestyle.

The knee joint is one of the major joints that take an important place in the functionality of a person in everyday life<sup>3</sup>. Therefore, in the advanced stages of gonarthrosis, the quality of life of an individual considerably decreases. In this direction, total knee arthroplasty (TKA) is used as the gold standard in coping with pain, deformity, and instability, especially in terminal term gonarthrosis patients [4]. The reason for the fact that TKA is a procedure that can be accepted as the gold standard is that postoperative results are quite satisfactory. However, the share of physiotherapy and rehabilitation programs applied only in the postoperative period is rather big in these results in cases in which they are initiated in the preoperative period and continued for a certain time in the postoperative period, and the patient cannot be reached in the preoperative period because it is not possible for the surgery alone to bring especially the lower extremity muscle strength to the level of a healthy population<sup>5</sup>. In patients in the advanced stages of gonarthrosis, the decrease in the lower extremity muscle strength already reaches a certain level in the preoperative period and progresses further in the postoperative period. Thus,

the rehabilitation of the knee joint, of which stabilization is ensured primarily by soft tissues, plays an important role in the improvement of the functional levels of patients. The place of exercise programs in rehabilitation is undoubtedly great. Exercise programs can be applied under the supervision and control of supervisor physiotherapists, as well as in the form of in-home programs, provided that they are taught to the patient before discharge and are revised and updated periodically [5].

**Objectives of the study**

The main objectives of the study are to find the effect of intensive exercise program and kinesiotaping following total knee arthroplasty on functional recovery of patients in Pakistan.

**Methodology of the study**

This study was performed in Dow University of health sciences during January 2018 to June 2018. We included 50 patients, 35 males and 15 females, presenting pain and functional impairment with knee OA (PF and TF knee compartments), without concomitant chronic conditions. Patients were of a similar height and weight, had a median age of 63 (54–72 years) and a duration of disease of 5.5 ( $\pm 4.32$ ) years. The pre-treatment examinations included a complete medical history, physical examination with particular attention to the vital symptom of OA represented by the pain threshold and X-ray and magnetic resonance imaging.

We excluded those with allergic reaction to tape or any skin problem, the presence of any inflammatory arthritis, history of any injection at the knee, surgical intervention in this part within the last six months, suspicion regarding other pathologies in the knee, severe obesity, OA Grade IV, the full instability of the knee joint, trauma to the knee during the study or when patients failed to follow the treatment instructions. The most common symptoms presented at the initial phase of the OA disease and before the treatment were: pain, stiffness, swelling and cracking.

**Protocol of data collection**

The study was performed for 3 months. The management of the patients was multidisciplinary and involved orthopedics, rheumatologists, radiologists, physiatrists, kinesiologists, physical therapists, sports instructors and research assistants. After explaining the objectives and procedures of the study, the 66 patients were randomly allocated to three treatment groups, 22 patients for each group: (1) exercise group; (2) exercise and KT with tension application (stabilizing effect) group; (3) exercise and

KT without tension application (draining effect) group. Patients did not know to which group they were allocated (blinded). As a baseline, patients received a necessary daily drug therapy with similar doses of diclofenac, a non-steroidal anti-inflammatory drug.

#### Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics 21 software. As descriptive statistics, number and percentage were used for qualitative

data, and mean  $\pm$  standard deviation were used for numerical variables.

#### RESULTS:

When the groups undergoing and not undergoing TKA were considered, no difference was found between the two groups in terms of age ( $t = -0.123$ ,  $p = 0.903$ ). The gender distribution of the groups is not different ( $p = 1.000$ ). There was no significant difference between the two groups in terms of body mass index (BMI), Lysholm score, and 6-min walk test score ( $p > 0.05$ ) (table 01).

**Table 1:** Comparison of the patients according to applied treatment (surgery or not)

Variables	Case (n = 18)	Control (n = 17)	Test statistics	P
Age (years)	63.3 $\pm$ 6.9	63.6 $\pm$ 5.2	-0.123	0.903
Gender M/F	2/18	1/17		1.000
Body mass index (kg/m <sup>2</sup> )	28.9 $\pm$ 4	29.7 $\pm$ 4.5	-0.525	0.603
Lysholm score	87.5 $\pm$ 8.6	86.2 $\pm$ 10.2	0.398	0.693
6-min walk test score (meter)	364.8 $\pm$ 63.4	325.2 $\pm$ 73.8	1.704	0.098

The comparison of the two groups undergoing and not undergoing TKA in terms of the age, gender, height, weight, body mass index (BMI), Lysholm score, and 6-min walk test score.

In the patient group which had undergone TKA, a difference was found in the 6-min walk test scores of individuals receiving and not receiving KT treatment only in the postoperative first month ( $p = 0.005$ ) (table 02).

**Table 2:** Comparison of the patients according to kinesiotaping (KT) application

Variables	KT available	KT not available	Z	P
Gender (M/F)	2/10	0/6		0.529
Age	61 (54–75)	67 (53–74)	-0.703	0.482
Body mass index	30.6 (24.3–36)	24.973 (23.4–34.4)	-2.154	0.031
Lysholm score	90.5 (76–99)	89.5 (70–99)	-0.330	0.741
6-min walk test score	408 (280–460)	307.5 (250–345)	-2.777	0.005

The comparison of the patients receiving and not receiving KT treatment in the TKA-applied group in terms of the age, gender, height, weight, body mass index (BMI), Lysholm score, and 6-min walk test score. Only the differences between two groups are statistically significant in terms of BMI and 6-min walk test score

#### DISCUSSION:

Regular exercise has a great importance in maintaining good health. The benefits of regular and moderate exercise include reduced risks for some musculoskeletal disorders, such as OA. Physical exercise can play a crucial role in the treatment of OA in optimizing both physical and mental health, enhancing energy, decreasing fatigue and improving sleep. Biomechanical stimulus generated by dynamic compression during moderate exercise can reduce the synthesis of proteolytic enzymes, regulating the metabolic balance and preventing the progression of the disease [5]. The modalities of exercise recommended for the management of knee OA were aerobic, aquatic, and/or resistance exercises associated with weight loss for overweight patients. Other non-pharmacologic therapies conditionally

recommended for knee OA include knee kinesio taping; medial wedge insoles for valgus knee OA, subtalar strapped lateral insoles for varus knee OA, manual therapy, hydrokinesis therapies, tai chi, walking aids, thermal agents and psychosocial interventions [7]. Treatment of OA is based on a combination of treatment protocols, including physical therapy, medical therapy, exercise-based therapy and even psychological counselling.

In patients with end-stage symptomatic knee osteoarthritis (OA), while TKA improves the physical function based on a personal report, a performance-based physical function such as walking speed improves more slowly. Walking speed limitations can last even for a year or more after the surgery. In a study, by Pua et al., investigating factors affecting walking speed after acute post-TKA, it was

determined that the quadriceps femoris muscle strength and range of knee joint motion are important physical factors affecting walking speed, especially on the contralateral side, and fear-based cognitive factors, which result in activity limitation, also affect this physical parameter. Similarly Christensen et al. underlined the importance of quadriceps muscle strength on gait impairments following TKA [8].

There are some differences in the recovery process of patients following TKA. Most of the patients experience functional deficits in the lower extremity muscles, such as weakness and slower walking speed, difficulty in climbing up and down the stairs, and standing up from a chair, compared with healthy individuals of the same age [9]. Therefore, it is necessary to consider other joints, especially the hip joint as an underlying cause of this functional impairment in the patient group in question [10]. It is once again confirmed that the hip joint has to be examined considering the hip muscle strength and hip joint mechanics required for normal knee joint functioning [11].

### CONCLUSION:

It is concluded that a reduction in knee pain, improvement in knee function and also less need for medication following the use of KT in combination with exercise in patients with knee OA. We can assert that therapeutic knee KT in association with a moderate adapted training program is an effective method for the management of pain and disability limitations in patients with knee OA.

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