International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2020): 7.803

Immediate Effects of Mobilization with Movement versus Kinesio Taping on Pain, Range of Motion and Disability among Individuals with Osteoarthritis of Knee

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Abstract: ***Background: Mobilization with Movement and Kinesio Taping treatment techniques were found to be effective on improving pain, range of motion and disability for osteoarthritis of knee. Hence the purpose is to compare the effects of Mobilization with movement and Kinesio taping on improvement of pain, range of motion and disability in individuals with osteoarthritis of knee. Aims: Aim of the study was Immediate effects of mobilization with movement versus Kinesio taping on pain, range of motion and disability among individuals with osteoarthritis of knee. Methods: The study was done after obtaining approval from institutional ethical committee. Subjects who were fulfilling inclusion criteria were selected from the population.58 subjects were included and were divided into 2 groups experimental group and control group. Total duration of the study was for 6 days. Subjects in the experimental group were treated with Mobilization with movement and Subjects in control group were treated with Kinesio taping. Outcome measures used were Visual analogue scale, goniometry and Time up and go test. Data was analysed at pre and post treatment (Immediate effect) using non-parametric tests at 5% level of significance. Results: Analysis using Wilcoxon signed rank test within group analysis and at pre test and post test showed significant improvement in both the outcome measures in experimental and control group. Between group analysis using Mann Whitney U test showed no significant improvement in pre test and post test (Immediate effect). Conclusion: Mobilization with movement and Kinesio taping both the techniques were equally effective in improving pain, range of motion and disability among individuals with osteoarthritis of knee***

Keywords: Osteoarthritis, Knee, Mobilization with Movement, Therapeutic Kinesio Taping, Pain, Range of motion, Time up and go Test

1. Introduction

Osteoarthritis (OA) is a chronic degenerative disorder of multifactorial etiology characterized by loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis and range of biomechanical and morphological alteration of the synovial membrane and joint capsule.1It is the second most common rheumatological problem and is most frequent joint disease with a prevalence of 22% to 39% in India.2Worldwide estimates indicate that 9.6% of men & 18% of women aged ≥ 60 years have symptomatic osteoarthritis. According to WHO 2003, increase in life expectancy and ageing populations are expected to make Osteoarthritis (OA) the fourth leading cause of disability by the year 2020.3 Symptoms of Osteoarthritis of knee may include joint pain, tenderness, stiffness, locking and sometimes an effusion, deformity, coarse crepitus, instability and restricted ability.[4]

Mulligan's Movement with Mobilization (MWM) is a manual therapy technique in which a manual force usually in the form of a therapist-applied pain-free accessory joint glide is applied with active movement of the gilding segment and sustained while a previously impaired action (e. g. painful reduced movement, painful muscle contraction) is performed.5It is related to correct minor positional faults that occur secondary to the injury and leads to maltracking of the joint, resulting in symptoms such as pain, stiffness, or weakness.[6] The mechanisms by which MWM achieves pain relief in osteoarthritis knee are due to biomechanical effect correcting positional fault and neurophysiological effects in which these are changes in central and descending pain processing mechanisms.[7]Kinesio Taping (KT) is a therapeutic technique that corrects and treats many musculoskeletal disorders which is based on natural healing process.8Among the conservative interventions available, the use of various kinds of taping approaches in clinics for the management of degenerative disorders of the knee joint is increasing. Among them, Kinesio Taping (KT) was originally developed by Kase et al (2003).[9] Kinesio tape is a thin, cotton, porous fabric with acrylic adhesive that is non medicated and latex-free.[10] In circulatory pathologies, Kinesio tape has the function to promote the drainage of excess fluid, activating a lymphatic drainage response.[11] Kinesio Tape application has good stabilizing effect. Kinesio taping is a technique that is now increasingly considered for the management of Osteoarthritis of Knee.[12]

Studies have proved both Mobilization with Movement and Kinesio Taping techniques to be effective in improving pain, range of motion and disability in Osteoarthritis of Knee.[13, 14] But there is lack of evidence to compare the Immediate effects of Mobilization with Movement versus Kinesio Taping on pain, range of motion and disability in Osteoarthritis of Knee.

2. Materials and Methodology

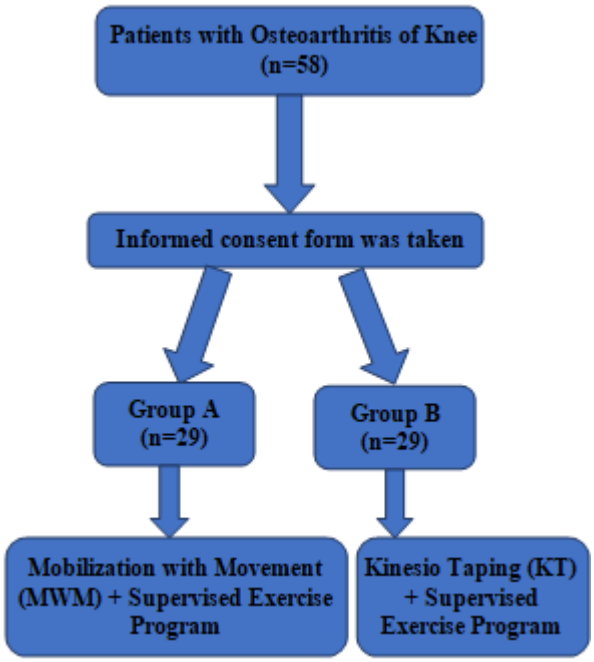
An experimental study design with two group Mobilization with movement and Kinesio taping group. As this study involved human subjects the Ethical Approval was obtained for the study by Institutional Review Board (IRB) with proposal number: PPC/OW/1676D/2020. The study was conducted at Various Physiotherapy OPD (Out patient's department) of Vadodara. Total 58 Subject (n=29) with Osteoarthritis of knee were recruited by Convenient sampling method.

The participants were divided into two groups i. e. Group A and Group B

Group A received Mobilization with Movement (MWM)
Group B received Kinesio Taping (KT)

Subjects included were clinically diagnosed as Osteoarthritis of Knee with age 45 years & above. Patient's from both the genders. Visual Analog Scale (VAS) score >5. Subjects diagnosed as osteoarthritis of knee by radiograph, grade (1-3) according to the Kellgren and Lawrence (1957) scale. Subjects willing to participate in the study. Subjects who were willing to participate. Subjects excluded were with Any recurrent injury to knee. Uncontrolled Systemic Metabolic Disease. Subject giving history of hyper sensitive skin allergy or other skin condition. Intra articular corticosteroid or hyaluronic injection during past six months. Subjects with inflammatory joint disease of lower limb, neurological disorder, cardiac or metabolic condition. Peripheral vascular disease. Subject who had undergone any lower limb surgery.

Total duration of treatment was carried for 6 days/week for 5 weeks, 2 session/day.



Procedure for intervention for GROUP A: Mobilization with Movement (MWM)
MWM consisted of a sustained manual glide of the tibia (medial, lateral) during active knee flexion.

Each subject was treated with sustained manual glides in each direction during active knee flexion in supine lying.

Medial and Lateral glide were tested. The direction of glide which reduced pain and improve affected knee range of motion most was chosen as the glide for the MWM treatment technique.

Overpressure was included at end range if range of motion was pain-free. If glide in supine lying is pain free then the glide direction for the MWM treatment technique was assessed in a weight-bearing position in a similar manner. If in supine lying more than one glide had similar beneficial effects, then these assessments were repeated in weight-bearing to identify the most effective glide direction for the treatment technique.
Application of MWM: At the first intervention, a MWM was applied (3 sets of 10 repetitions) during active knee flexion. Initially the pain-free manual glide force on the tibia was applied with the knee resting in a mid range position. The glide force was sustained while the subject performed 10 repetitions of active full range knee flexion. Either of the two protocols was used depending on the assessment of the subject's pain during active knee flexion supine in lying[15]

1) For subjects with pain during active knee flexion in lying, the technique was performed initially in lying. The technique was progressed to weight bearing positions when the movement in lying becomes pain-free. The subject was taught a self applied MWM in weight-bearing position.
2) For subjects without pain during active knee flexion in lying, MWM was performed in the weight-bearing position. Subjects were similarly instructed for the self-applied MWM in the weight bearing position. The self-management regime involved at least 20 movement repetitions, performed every 3 hours was advised to do compulsorily.

Subjects could perform the MWM exercise more frequently if they experience any increase in pain with daily activities. They were also advised to stop the self-applied MWM if this exercise cause pain or their knee showed signs of increasing inflammation such as swelling, heat or redness greater than pre-treatment levels. On the subsequent reviews, MWM intervention was repeated for 3 sets of 10 repetitions with one-minute rest in between each set. Subjects were treated in lying if they continued to have pain during movement in the non-weight-bearing position. Otherwise, MWM was applied in the weight bearing position. The glide direction was again checked prior to application of the intervention. Subjects self-applied MWM were checked for their correctness at during session.[16]

The Supervise Exercise program consisted of the following[17]

1) Isometric Exercise for Quadriceps each set of exercise consist of 10 repetitions
   [1rep=5sec hold, 10repX3sets].
2) Straight Leg Raising [SLR]
   [10rep, 3sets].
3) Hip Abductors Strengthening
   [10rep, 3set].
4) Last degree extension board exercise training
   [10rep, 3sets].

The progression was done when the patient could easily do the exercise either by increasing repetitions or frequency of exercise.

MWM medial glide in supine lying

MWM lateral glide in supine lying

Procedure for Intervention for Group B: Kinesio Taping

The Kinesio Taping (KT) method is as follows.

The Kinesio tape was applied from origin to insertion for the facilitation of quadriceps muscle. Superior 'Y' technique was done. Subject was sitting with affected leg out of the bed and thigh was in 90-degree flexed position. The application of tape was begun with the kinesio"Y" strip approximately mid-thigh over the vastus medialis muscle and bisected at the junction between quadriceps tendon and the patella.

It was applied light with (25% of available) or paper off tension until "Y" in kinesio strip reaches the superior pole of the patella. Glue activation was initiated prior to any further patient movement. Then subject was instructed to flex the knee to maximum flexion. The tails of the kinesio strip was applied around the medial and lateral border of the patella.

The tails were applied with light (25% of available) or paper off tension. The tip of the tail ended with no tension over the patella, and circled around the patella, ending at its inferior side.

The portion between the first part of tape and superior patella was stretched. The portion between the first part of tape and superior patella was stretched to 50-70%. The remaining tape around the patella remained un-stretched.

All subjects were instructed to wear tape for two days and return for review after 24 hours removing tape. Subjects were also instructed to remove the tape if they experience any itching sensation, heat redness or discomfort.[18, 19]

Supervised Exercise Program was similar as group A:

The Supervise Exercise program consisted of

1) Isometric Exercise for Quadriceps each set of exercise consist of 10 repetitions
   [1rep=5sec hold, 10repX3sets].
2) Straight Leg Raising
   [SLR] [10rep, 3sets].
3) Hip Abductors Strengthening
   [10rep, 3set].
4) Last degree extension board exercise training
   [10rep, 3sets].

The progression was done when patient could easily do exercise either by increasing repetitions or frequency of exercise.

Kinesio Taping

Outcome Measures

Visual Analogue Scale (VAS):
The VAS is a simple and frequently used method for the assessment of variations in intensity of pain. The main advantage of VAS has been claimed to be a high degree of

sensitivity i. e; discriminative capacity superior to that of other scales. Respondents mark the location on the 10cm line corresponding to the amount of pain they experienced, anchored by verbal descriptors, usually 0 means 'no pain' and 10 means 'worst imaginable pain'. This gives them the greatest freedom to choose their pain's exact intensity. It also gives the maximum opportunity for each respondent to express a personal response style. Reliability: 0.96 and 0.95; Validity: 0.86 – 0.95.[20]

Range of Motion

By the use of universal goniometer knee flexion range of motion was measured with the patient in supine lying position with the knee in extension. Position the hip in 0 degree of extension, abduction and adduction. keep goniometer alignment in the center, other fulcrum of goniometer over the lateral epicondyle of the femur.

Align the proximal arm with the lateral midline of the femur using the greater trochanter for reference. Align the distal arm with the lateral midline of the fibula, by using the lateral malleolus and fibular head for reference. In the starting position for measuring knee flexion range of motion the patient was supine lying with upper right exposed so that the greater trochanter can be visualized and palpated. The therapist either kneels or sits on stool to align and read the goniometer at eye level.

At the end of the knee flexion range of motion, the therapist used on hand to maintain knee flexion and also to keep the distal arm of the goniometer aligned with the lateral midline of the leg.

The universal goniometer (r=0.87). The universal goniometer was found to be reliable instruments for measuring knee flexion active and passive ROM_ ICCs for the universal goniometer were 0.97.2[1]

Time Up and Go Test (TUG)

The Time Up and Go test is a simple test used to assess a person's mobility and requires both static and dynamic balance. The TUG measures (in seconds) the time taken to stand up from a standard arm chair (approximate seat height of 46 cm, arm height of 65cm), walk distance of 3m, turn around, walk back to the chair and sit down. A walking aid can be used if recommended and the better of two trials is recommended and the better of the two trials is scored. The TUG has high inter-rater reliability Intra-rater and inter-rater reliability were 0.97 (95 % confidence interval 0.95 – 0.98) and 0.96 (95 % confidence interval 0.94 – 0.97).2[2]

3. Result

Total 58 patients were recruited in the study, 29 in each group. Data was entered in excel sheet and analysis was done using SPSS software version 20.0. Descriptive statistics were calculated in the form of mean age and BMI for both the groups. Prior to the statistical analysis data was screened for normal distribution using Shapiro Wilk test.

Data was not normally distributed for all the outcome measures So; Non-parametric tests were applied for within group and between group analysis. Data was analysed at 5% level of significance with confidence interval (CI) at 95%. Within group analysis was done by Wilcoxon signed Rank test and between groups analysis was done by Mann-Whitney U test.

Baseline Data

In this study Immediate effects of Mobilization with Movement versus Kinesio Taping on Pain, Range of motion and Disability among individuals with Osteoarthritis of Knee was done. Pain, Range of motion and Disability was measured by VAS Scale, Goniometry and Time up and go test respectively. Total 58 patients were recruited in this study, 29 in each group. Group A was treated with Mobilization with Movement and Group B was treated with Kinesio Taping. The descriptive characteristics of all variables is as shown in table 2

Table 1: Base Line Data

Categories	Mobilization with Movement (n=29) Mean ± SD	Kinesiotaping (n=29) Mean ± SD
Age	58.48 ± 8.14	56.34 ± 8.40
BMI	29.9 ± 4.45	29.16 ± 2.79
Gender	Female: 20	Female: 18
	Male: 9	Male: 11

4. Data Analysis

Normality of data for both the groups was done using Shapiro-Wilk's test at 5% level of significance.
For Shapiro Wilk Test, the hypothesis is:

Null Hypothesis (H0): The data is normally distributed.
Alternative Hypothesis (H1): The data is not normally distributed.

Table 2: Testing Normality Group: A (MWM)

	Shapiro-Wilk		
	Statistic	Df	P-value
Pre-VAS	.921	29	.032
Post VAS	.902	29	.011
Pre ROM	.761	29	.000
Pre-TUG	.843	29	.001
Post TUG	.893	29	.007
Post ROM	.837	29	.000

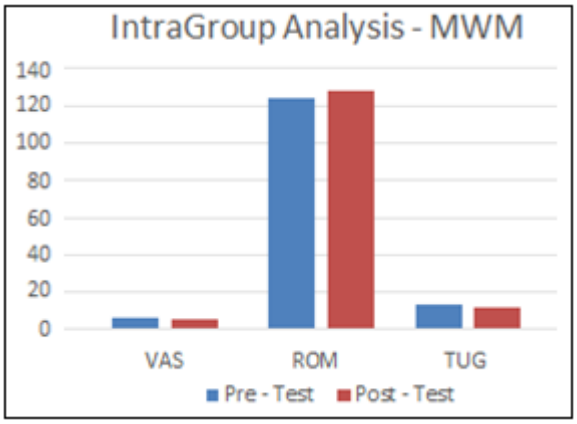
Table 3: Testing Normality Group: B (KT)

	Shapiro-Wilk		
	Statistic	Df	P-value
Pre-VAS	.943	29	.121
Post VAS	.877	29	.003
Post TUG	.876	29	.003
Pre-TUG	.781	29	.000
Post ROM	.787	29	.000
Pre ROM	.778	29	.000

Table 4: Intra Group Analysis (Group: A)

Group A					
Outcome Measures	Pre-Test (Mean ± SD)	Post-Test (Immediate Effects) (Mean±SD)	W Value	P Value	Remarks
VAS	6.486 ± 0.6435	5.272±0.8387	-4.72	<0.001	Significant
ROM	123.97 ±7.72	127.66±7.296	-4.787	<0.001	Significant
TUG	13.48 ± 1.353	11.59±1.24	-4.809	<0.001	Significant

Wilcoxon's rank test was used for within group comparison showed in Table: 4for pre-test and post-test immediate effects are showed in the above table. For Group A there was a significant improvement in VAS, ROM and TUG and this difference was statistically significant (p< 0.05). This improvement in all the outcome measures were clearly seen in the Graph 1.

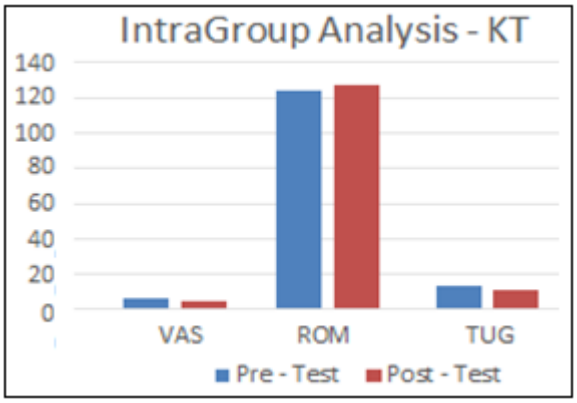


Graph 1: Within Group Comparison of Group A

Table 5: Intra Group Analysis Group B

Group B					
Outcome Measures	PRE-TEST (Mean ± SD)	Post-Test (Immediate Effect) (Mean ± SD)	W Value	P Value	Remarks
VAS	6.079 ± 0.5348	4.8 ± 0.6330	-4.71	<0.001	Significant
ROM	124.03 ± 6.483	127.41 ± 5.779	-4.687	<0.001	Significant
TUG	13.28 ± 0.751	11.38 ± 1.049	-4.903	<0.001	Significant

Wilcoxon's rank test was used for within group comparison showed in table: 5 for pre-test and post-test immediate effects are as shown in the above table. For Group B there was an improvement in VAS, ROM and TUG and this difference was statistically significant (p< 0.05). This improvement in all the outcome measures are clearly seen in the Graph 2.

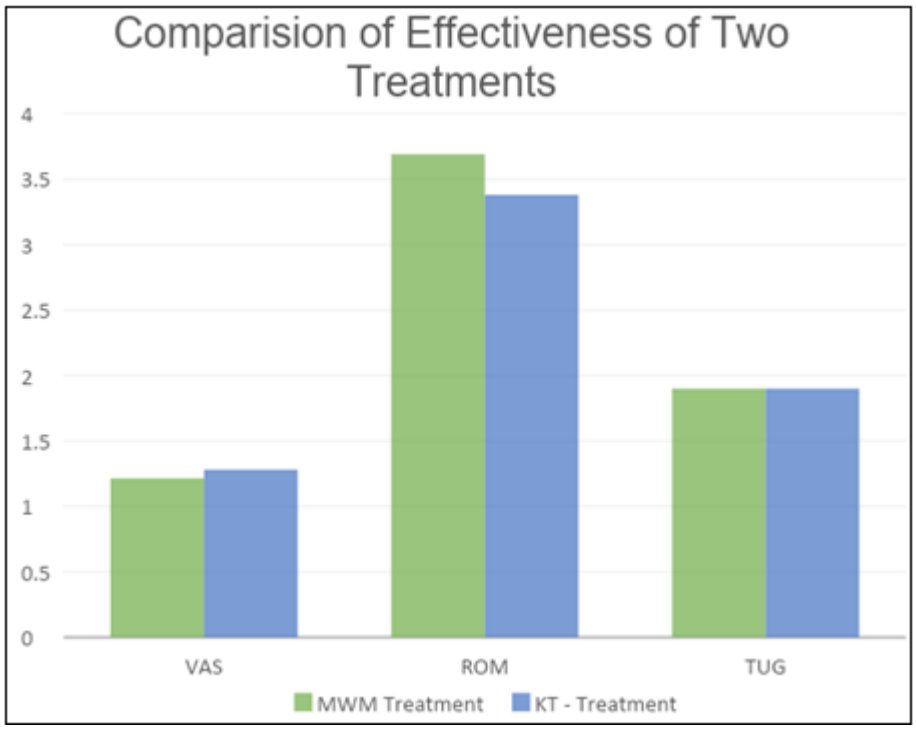


Graph 2: Within Group Comparison of Group B

Table 6: Between Both Group Comparision analysis

Outcome Measures	Mobilization With Movement Treatment (Mean ± SD)	Kinesiotaping- Treatment (Mean ± SD)	U Value	P Value	Remarks
VAS	-1.213 ± 0.428	-1.279 ± 0.398	388.500	0.616	Not Significant
ROM	3.69 ± 1.339	3.38 ± 1.425	377.500	0.475	Not Significant
TUG	-1.9 ± 0.673	-1.9 ± 0.557	412.000	0.873	Not Significant

Table 6 shows between group comparison. Here the difference of pre test and Post test (Immediate effects) was taken and between group comparison of VAS, ROM and TUG was statistically not significant i.e. Immediate effect of both the techniques were equally effective as shown in graph 3.



Graph 3: Mean difference between both the groups (Prevs Post)

5. Discussion

Osteoarthritis of knee is a common painful and chronic condition that affects a large proportion of the older population due to excessive loading of the articular cartilage mainly the medial compartment. The forces transmitted across the knee joint are greater in medial compartment compared to the lateral compartment, during walking; and increased medial compartment loading has been observed in patients with osteoarthritis of knee.[23]

A frequent cause of knee pain which can be successfully managed by physiotherapy, techniques is Osteoarthritis of knee. Kinesio Taping has been used in clinics for pain control and motor function enhancement in patient with musculoskeletal disorders. Losina E et al, suggested that women are more likely to experience joint pain, aching and stiffness caused by osteoarthritis Women are 40% more likely to develop knee osteoarthritis than men.[24]

The purpose of this study was to compare the Immediate effects of Mobilization with Movement versus Kinesio Taping on Pain, Range of motion and Disability among individuals with Osteoarthritis of knee.

This study was conducted on 58 patients (29 in each group). Out of total participants 31% were males and 69% were females in Group A (Mobilization with Movement) whereas 38% were males and 62% were females in Group B (Kinesio Taping) with an age group above 45 years were selected according to inclusion criteria and were randomly divided in to 2 groups. Visual analogue scale for Pain, Goniometry for Range of motion measurement, Time up and Go test for Disability were taken Before and after Treatment.
Patients of Group A treated with Mobilization with Movement; Group B treated with Kinesio Taping Techniques. Post treatment data was collected at the end of session. The results showed improvement in Visual analogue scale (VAS), Range of Motion (ROM) and TUG after the treatment.

Mean age in Group A and Group B was 58.48 and 56.34 years respectively. Mean BMI in Group A and Group B was 29.9 and 29.16 respectively.

The first objective of this study was to study the Immediate effects of Mobilization with movement on Pain, Range of Motion and Disability among individuals with Osteoarthritis of Knee. In Mobilization Group, there was significant improvement because of biomechanical and neurophysiological mechanism of MWM. Biomechanically it was proposed that MWM may address joint partner bone alignment like patellofemoral and tibiofemoral joint and correct the positional fault.2[5] Neurophysiologically changes in central and descending pain processing mechanism are probably involved. In addition, the large range of motion used in the application might alter concentration of inflammatory mediators and result in deactivation of nociceptors activated by such inflammatory mediators, while the pain relief offered by MWM would be associated with improvement of disability level.

The MWM is largely conducted in weight bearing position and patient receives simultaneous feedback of painless joint movements resulting in increased activity level. Mobilization with Movement in weight bearing position requires muscle activity, which might have resulted in improved motor performance, which would position the patients well to gain long term benefits from a formal exercise program. In present study, application of knee MWM resulted in significantly positive changes in the knee pin similar to previous studies.[26]

Hiroshi takasaki, et al. conducted a study which states that Mulligan's Mobilization with movement is associated with

immediate pain relief and improves knee function suggesting its potential component in the early management of osteoarthritis of knee.[14]

According to our study Mean Baseline Value for Pain that is VAS in Group A (Mobilization with Movement) was 6.486 and immediately after intervention was 5.272 and the mean value of Range of Motion in Group A was 123.97 and immediately after intervention was 127.97. The Mean value of Time up and Go (TUG) test was 13.48 and immediately after intervention was 11.59.

The second objective of this study was to study the Immediate effects of Kinesio Taping on Pain, Range of motion and Disability among individuals with osteoarthritis of knee.

According the founder of Kinesio Taping KenzoKase, Kinesio Tapingrelieve pain and facilitates lymphatic drainage by microscopically lifting the skin. The taped portion forms convulsions in the skin, thereby increasing interstitial space. So, result is that pressure and irritation are taken off the sensory and neural receptors, alleviating pain. Pressure is gradually taken off the lymphatic system, allowing it to drain more freely. As a result, it reduces pain and swelling in injured areas. It also helps to improve blood flow circulation, increased blood flow to and from the muscle increases the presence of oxygen and nutrients to assist with repair of damaged tissues and accelerates the breakdown and removal of waste product when muscles are tired.

Kinesio tape application and positioning of tape align the knee in more stable position and this reduce stress and strain on the soft tissues that surrounds the knee and improved osteoarthritis symptoms. Kinesio Taping is also believed to have several functions; restoring correct muscle function by supporting weakened muscle by facilitation of quadriceps muscle and vastus medialis muscle, reducing congestion by improving flow of the blood and lymphatic fluid, decreasing pain by stimulating the neurological system and correcting malaligned joints, by relieving muscle spasm. It is also pointed out that Kinesio Taping improves proprioception by the normalization of muscle tone, a reduction in pain, correction of inappropriate position and the stimulating effect on skin receptors.

The findings of Kinesio Taping group have shown similar effects compare to previous studies. Rana S Hinaman, et al. found that therapeutic knee taping is an efficacious treatment for management of pain and disability in patients with knee osteoarthritis. Ebru Kaya Mutlu et al (2017) reported that Kinesio Taping resulted in superior short-term effects on walking task, pain, and knee-flexion ROM compared with placebo taping in patients with knee osteoarthritis.[27]

According to our study Mean Baseline value for Pain that is VAS in Group B (Kinesio Taping) was 6.079 and immediate after treatment was 4.8. The mean value of Range of motion in Group B was 124.03 and immediately after intervention was 127.41. and the Mean value of Time up and Go test (TUG) in Group B was 13.28 and immediately after intervention was 11.38.

The third objective of this study was to study the Immediate effects of mobilization with movement versus Kinesio Taping on Pain, Range of motion and Disability among individuals with Osteoarthritis of knee. When the comparison was done between the groups the difference of mean baseline value of Visual analogue scale was-1.213 for Group A and-1.279 for Group B. for Range of motion 3.69 for Group A and 3.38 for Group B and for Time up and Go test-1.9 for Group A and-1.9 for Group B respectively.

In this study both treatment group showed statistically significant improvement in Pain, Range of motion and Disability in pre test and post test (Immediate effects) but when compared between both group no significant difference was found which supports null hypothesis. Immediate effects of both the techniques were equally effective.

Hani A. Alkhawajah et al.2019 studied the effect of mobilization with movement on pain and function in patients with knee osteoarthritis. It was concluded that MWM provided superior benefits over sham MWM in terms of local and widespread pain, physical function (walking), knee flexion and extension muscle strength and knee flexion ROM for at least 2days in patients with knee OA.[28]

Ji-Su Park et al, 2019 studied the Immediate effects of kinesiology tape on the pain and gait function in older adults with knee osteoarthritis. The study concluded that knee KT has a positive effect on pain reduction and walking and balance ability of the older adults with osteoarthritis.[29]

Dr. Shilpa Khandare et al, 2018 studied the Comparison of Mulligan's Mobilisation with movement and TENS along with Kinesio taping for Osteoarthritis of Knee joint. The study concluded that TENS along with KT group showed statistically significant reduction in VAS and marked improvement in timed covered by TUG post treatment compared to Mulligan's MWM group.[30]

Venta Donec and Raimondas kubilius 2019 studied the effectiveness of Kinesio Taping for pain management in knee osteoarthritis: a randomized, double-blind, controlled clinical trial. The study concluded that Elastic taping can safely relieve knee pain and reduce the need for pharmacological management in KO. A specific Kinesio Taping technique is clinically more beneficial for knee-pain alleviation in comparison with nonspecific taping.[31]

Shalvi V. Verma et al.2018 studied the Effect of Kinesio Taping Versus Mulligan's Mobilization with Movement on Pain and Function in Subjects with Osteoarthritis of Knee. The study concluded that Mobilization with Movement and Kinesio Taping both reduce pain and improve function but better improvement was seen in mobilization with movement group.[32]

Hulya Altmis et al.2017 studied the Mobilization with Movement and Kinesio Taping in knee arthritis—evaluation and outcomes. The study concluded that MWM accompanied by taping improves pain during functional activities as well as the performance. MWM without taping

may also improve pain intensity; however, it may be inadequate in increasing the performance

6. Conclusion

The study concluded that both mobilization with Movement and Kinesio Taping techniques had significantly shown improvement in immediate effects of pain, range of motion and disability for among individuals with osteoarthritis of knee joint. However, there is no statistically significant difference in Immediate effects when comparison was done between Mobilization with Movement and Kinesio Taping.

7. Limitations

- Gender distribution was unequal
- Long term follows up was not taken

8. Future Recommendation

1) Intervention can be done with large sample size
2) Future study needs to examine the Long-term effects of Mobilization with Movement and Kinesio taping.

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