

COMPARATIVE ANALYSIS OF THERAPEUTIC TAPING VERSUS STRENGTHENING EXERCISES FOR KNEE OSTEOARTHRITIS.

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ABSTRACT

Introduction: The majority of arthritic patients suffer from osteoarthritis (OA). This degenerative disorder of the articulating joints does not cause inflammation. This illness becomes worse with time, and being older is a major risk factor for it. Osteoarthritis (OA) is a steadily worsening condition affecting one or more joints; its exact origin is unknown. This aim of this study to examine the efficacy of medial patella taping and therapeutic activities for patients with osteoarthritis of the knee.

Methods: 30 subjects (M / F) were selected for the study. They were divided in to 2 groups (group A & group B) with 15- 15 subjects in each group. Pain and physical function were assessed using a design under two experimental conditions: taping and workouts alone. The duration of the intervention in the experiment was three weeks. There was a baseline evaluation done before therapy began, a second exam done 10 days later, and a final assessment done three weeks later.

Results: Group A had less pain compared to group B at the second WOMAC pain scale assessment, and there was a significant difference in the amount of pain reduction between the two groups ($P < 0.05$). However, on the second evaluation for the WOMAC physical function scale, there was no statistically significant difference between groups A and B in terms of improvement in physical function ($P > 0.5$). In the end, there was a highly significant difference ($P < 0.001$) in the WOMAC pain scale between groups A' and B'. However, there was no significant difference ($P > 0.05$) in the WOMAC physical function scale between groups A' and B', suggesting that both groups showed similar improvements in physical function

Conclusion: Results from this research provide credence to the idea that patella tape may alleviate pain and improve functional status in individuals suffering from knee osteoarthritis, as assessed by Womac pain, Womac physical function scores, and VAS (visual analogue scale).

Keywords : OA KNEE , KINESIO TAPING, KNEE STRENGTHENING EXERCISE

INTRODUCTION

The majority of arthritic patients suffer from osteoarthritis (OA). This degenerative disorder of the articulating joints does not cause inflammation. This illness becomes worse with time, and being older is a major risk factor for it. In conclusion, osteoarthritis (OA) is a steadily worsening condition affecting one or more joints; its exact origin is unknown.¹ Since advancing age is the primary risk factor, it disproportionately affects the elderly. Radiological evidence of osteoarthritis (OA) is present in 80% of 65-year-olds, although only around 10% of those individuals would actually exhibit symptoms like pain or limited mobility.¹ Osteoarthritis (OA) is characterised by painful joints that become stiff after being inactive and worsen when weight is applied to them. Even though it usually progresses slowly, there is currently no treatment for it. Depending on the degree and course of the illness, osteoarthritis may cause surrounding muscles to weaken and atrophy, afflicted joints to become unstable, functional restrictions to deteriorate, and impairment. Other symptoms may include a reduced range of motion in the affected joints.³ A varus or bow-legged deformity develops when the bone wears away in 80% of people with medial compartment osteoarthritis of the knee. The knee deformity known as valgus or knock occurs in 5-10% of patients with lateral compartment osteoarthritis.² Pain and physical incapacity are clinical consequences of osteoarthritis (OA) of the knee, particularly in areas where walking and transferring are required.⁴ As a continuation of medical (pharmacological) treatment or after surgical intervention, physiotherapy is often used. Pain relief, muscular strengthening, joint mobilisation, function maintenance or improvement, deformity correction, and so on are all possible outcomes of physiotherapy. Physiotherapists often use a variety of techniques, including ultrasonography, Strenghting exercises, transcutaneous electric nerve stimulation (TENS), taping, hydrotherapy, splintage, and supportive devices.⁵ Multiple research have looked at the effectiveness of these methods together and/or separately and have come to different results.³ The aim of the study is to examine the efficacy of medial patella taping and therapeutic activities for patients with osteoarthritis of the knee.

Good statistical reasoning on the impacts of taping will be provided by this research. This technique's clinical decision-making will be aided by it.

OBJECTIVES

1. To evaluate the effects of taping in osteoarthritic knee condition.

2. To evaluate the effects of Strengthening exercise in osteoarthritic knee condition.
3. To compare the effects of taping and Strengthening exercises in osteoarthritic knee condition.
4. To evaluate the improvement in functional status.
5. To evaluate the improvement in pain while walking and stair climbing.

HYPOTHESIS

NULL HYPOTHESIS

There is no significant differences between the effects of therapeutic taping of patella and Strengthening exercises in the patients of Osteoarthritic knee, when the patellofemoral joint is affected.

ALTERNATE HYPOTHESIS

Therapeutic taping of patella improves pain and functional status in patients with osteoarthritis of the knee, when the patellofemoral joint is affected. Compared to Strengthening exercise.

METHODOLOGY

30 participants were chosen at random from the outpatient physiotherapy and sports injury centre at Safdarjung Hospital in New Delhi; all participants fulfilled the inclusion criteria. They were divided in to 2 groups, (group A & group B) with 15- 15 subjects in each group. Pain and physical function were assessed using a design under two experimental conditions: taping and workouts alone. The duration of the intervention in the experiment was three weeks. There was a baseline evaluation done before therapy began, a second exam done 10 days later, and a final assessment done three weeks later.

INCLUSION CRITERIA

The American College of Rheumatology's clinical and radiological categorization criteria served as the basis for the inclusion criteria.²⁰

1. Age 40 and up to 55 years are the target demographic.
2. Unilateral osteoarthritis.
3. Patients diagnosed on the basis of radiological examination shown in the X- Ray of the knee joint.
4. Subjects satisfying radiological classification by Kellgren and Lawrence (Grade 2 & 3) OA.

EXCLUSION CRITERIA

1. Allergy to tape.
2. History of joint replacement.
3. Traumatic cause of knee pain.
4. Physiotherapy for the knee (previous six months).
5. Body mass index > 38 (owing to difficulties of taping the knee effectively).
6. Rheumatoid arthritis.

Intervention for Group A (Experimental group -taping group)

Taping procedure

No matter the patient's condition, the same investigator consistently applied therapeutic tape in the same way. Before the tape was put, the skin was shaved. Using two pieces of firm tape (Leucoplast), a medial patellar glide was done to rectify the lateral and AP tilt. After positioning two more pieces of tape distal to the patella, the infrapatellar fat pad was freed. To avoid skin irritation, hypoallergenic under tape was put under the stiff tape.⁶
Taping was applied daily for three consecutive weeks.

Intervention for Group B (Control group- exercise group)

Exercises A regimen of moderate-intensity physical activity was defined. There were a total of five exercises:

1. The patient should sit on the floor with their legs outstretched and back supported. After that, they wrap one knee in a towel and push down on the floor to tighten their quadriceps. A five-second holding of the contraction follows.
2. The individual sits in a chair and stays in a slightly extended leg posture for five seconds while performing an isotonic quadriceps contraction.
3. Subjects lay on their front or side and pull their foot closer to their body by bending their knee, which is called isotonic hamstring contraction.
4. Holding the resistance band for five seconds, do an isotonic quadriceps contraction (as in exercise 2).
5. A dynamic stepping workout that involves going up and down a single step or staircase. Following the aforementioned sequence, exercises were progressed to a maximum of 20 repetitions each leg. Regular at-home workouts were carried out.⁷

OUTCOME MEASURES

VAS (visual analog pain scale)

WOMAC osteoarthritis index

DATA ANALYSIS

The SPSS program was used to do the data analysis. All major and secondary outcome variables had their differences from the baseline computed. To get each participant's change scores, we subtracted their baseline scores from the results of the second and final evaluation.

Table Intra Group Comparison (With In Group Comparison) for Group A

	Stage	Mean	SD	95% CI	
				lower	upper
WOMAC- PAIN	Bases Line	8.87	1.642	5.59	12.2
	2nd Assessment	6.4	1.682	3.04	9.76
	Final Assessment	4.27	1.28	1.71	6.83
	2nd Assessment to BL Assessment(P Value)	0.002,significant			
	Final Assessment to BL assessment(P Value)	0.001,highly significant			
	Final Assessment to 2nd Assessment(P Value)	0.001,highly significant			
WOMAC PHY FUNC	Bases Line	27.13	7.492	12.146	42.114
	2nd Assessment	23.4	7.049	9.302	37.498
	Final Assessment	15.27	4.559	6.152	24.388
	2nd Assessment to BL Assessment(P Value)	0.001,highly significant			
	Final Assessment to BL Assessment(P Value)	0.001,highly significant			
	Final Assessment to 2nd Assessment(P Value)	0.001,highly significant			

VAS WALK	Bases Line	4.47	1.125	2.22	6.72
	2nd Assessment	3.27	1.335	0.6	5.94
	Final Assessment	1.33	1.113	-0.896	3.556
	2nd Assessment to BL Assessment(P Value)	0.004,significant			
	Final Assessment to BL Assessment(P Value)	0.001,highly significant			
	Final Assessment to 2nd Assessment(P Value)	0.001,highly significant			

VAS STAIR CLIMB	Bases Line	6.2	1.32	3.56	8.84
	2nd Assessment	5.33	1.397	2.536	8.124
	Final Assessment	3.4	1.502	0.396	6.404
	2nd Assessment to BL Assessment(P Value)	0.003,significant			
	Final Assessment to BL Assessment(P Value)	0.001,highly significant			
	Final Assessment to 2nd Assessment(P Value)	0.001,highly significant			

Table - Intra Group Comparison (With In Group Comparison) for Group B

	Stage	Mean	SD	95% CI	
				lower	upper
WOMAC- PAIN	Bases Line	8.53	1.407	5.716	11.344
	2nd Assessment	7.93	1.335	5.26	10.6
	Final Assessment	5.93	1.1	3.73	8.13
	2nd Assessment to BL Assessment(P Value)	0.028,significant			
	Final Assessment to BL Assessment(P Value)	0.001,highly significant			
	Final Assessment to 2nd Assessment(P Value)	0.001,highly significant			
WOMAC PHY FUNC	Bases Line	25.03	7.75	9.53	40.53
	2nd Assessment	22.13	5.743	10.644	33.616
	Final Assessment	18.33	3.994	10.342	26.318
	2nd Assessment to BL Assessment(P Value)	0.001,highly significant			
	Final Assessment to BL Assessment(P Value)	0.001,highly significant			
	Final Assessment to 2nd Assessment(P Value)	0.001,highly significant			
VAS WALK	Bases Line	4.47	0.915	2.64	6.3
	2nd Assessment	4	0.845	2.31	5.69
	Final Assessment	3.4	0.632	2.136	4.664
	2nd Assessment to BL Assessment (P Value)	0.02,significant			
	Final Assessment to BL Assessment(P Value)	0.002,significant			
	Final Assessment to 2nd Assessment (P Value)	0.014,significant			

VAS STAIR CLIMB	Bases Line	6.13	1.246	3.638	8.622
	2nd Assessment	5.6	0.737	4.126	7.074
	Final Assessment	4.93	0.704	3.522	6.338
	2nd Assessment to BL Assessment(P Value)	0.021,significant			
	Final Assessment to BL Assessment(P Value)	0.01,significant			
	Final assessment to 2nd Assessment(P Value)	0.013,significant			

Table - Comparison of % improvement between the groups Group A and Group B) for Primary outcomes

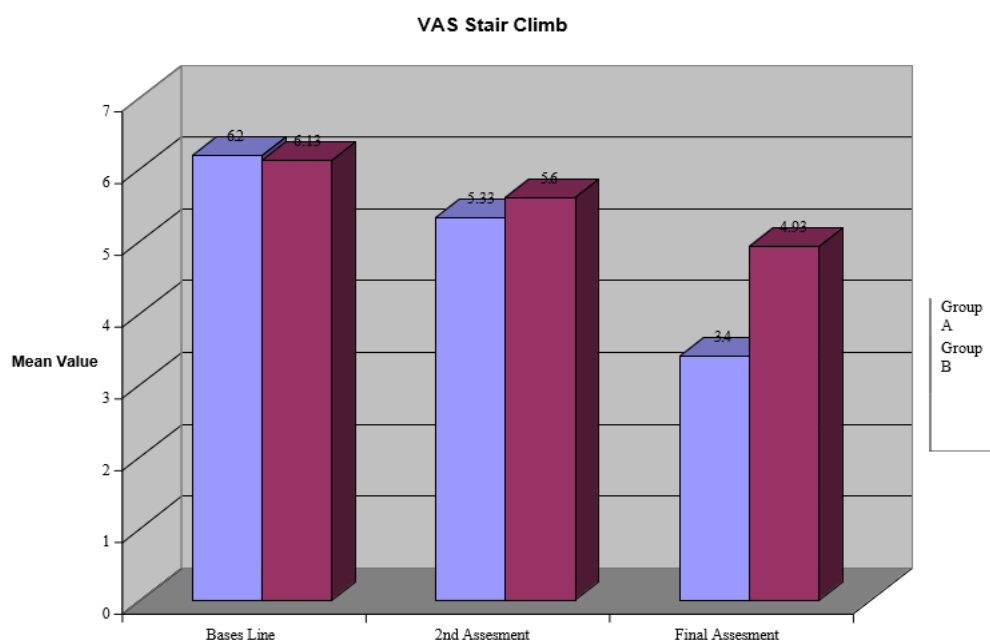
		VAS			
		W		St cli	
GROUP		% Change Base line to 2nd Assessment	% Change from Base line to Final Assessment	% Change from Base line to 2nd Assessment	% Change from Base line to Final Assessment
GROUP A	N	15	15	15	15
	Minimum	-25	0	0	0
	Maximum	75	100	40	75
	Range	100	100	40	75
	Mean	27.0159	70.9206	14.119	45.5556
	Std. Deviation	26.99444	24.86046	13.06837	18.10501
	Median	25	75	14.2857	50
	Std. Error of Mean	6.96994	6.41894	3.37424	4.67469
	N	15	15	15	15
	Minimum	0	0	-25	-50
	Maximum	40	60	25	50
	Range	40	60	50	100
	Mean	9.4444	21.7778	6.8651	16.2143
	Std. Deviation	12.99674	16.92029	12.16315	22.56062
	Median	0	25	12.5	16.6667
	Std. Error of Mean	3.35574	4.3688	3.14051	5.82513
P-Value		0.027	0.000	0.200	0.000

Table - Comparison of % improvement between the groups(Group A and Group B) for Secondary outcomes

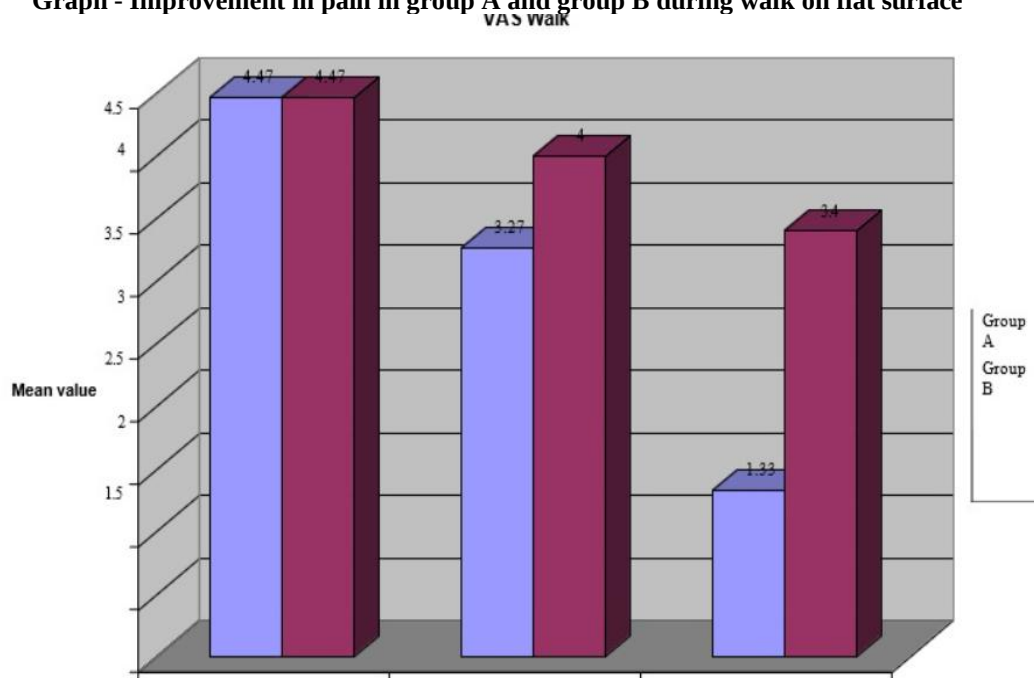
		Womac			
		Pain		Physical Function	
GROUP		% Change from Base line to 2nd Assessment	% Change from Base line to Final Assessment	% Change from Base line to 2nd Assessment	% Change from Base line to Final Assessment
GROUP A	N	15	15	15	15
	Minimum	0	-16.67	0	-13.64
	Maximum	57.14	71.43	20.83	57.14
	Range	57.14	88.1	20.83	70.78
	Mean	27.0149	49.8579	14.0612	42.1302
	Std. Deviation	17.98358	21.81875	6.25631	17.48486
	Median	30	50	17.2414	48
	Std. Error of Mean	4.64334	5.63358	1.61537	4.51457
GROUP B	N	15	15	15	15
	Minimum	-83.33	0	-7.69	7.69
	Maximum	25	44.44	17.78	44
	Range	108.33	44.44	25.47	36.31
	Mean	4.8047	29.7071	10.2896	24.8162
	Std. Deviation	25.39074	12.25863	6.63447	9.26996
	Median	11.1111	30	12.5	22.7273
	Std. Error of Mean	6.55586	3.16516	1.71301	2.39349
	P-Value	0.010	0.000	0.056	0.000

VAS Stair Climb

Graph - Improvement in pain in group A and group B while stairs climbing

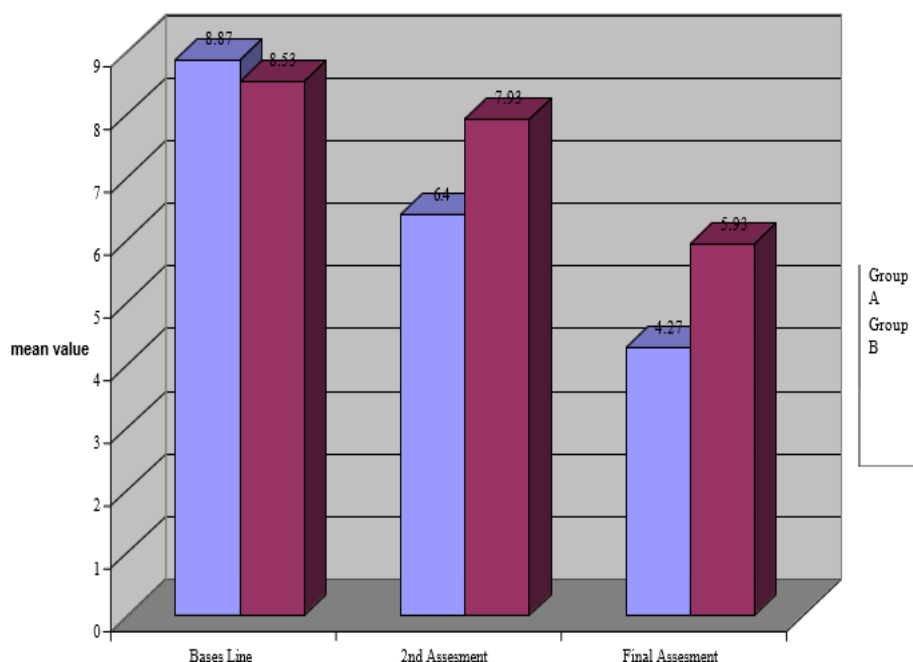


Graph - Improvement in pain in group A and group B during walk on flat surface



Womac pain

Graph Improvement in pain in group A and group B on WOMAC Pain score



Graph is showing gradual improvement in pain for both groups but condition is better in group B.

RESULT

Primary Outcomes

Both groups showed reduce pain on VAS walking on flat surface and VAS stair climbing . For group _A', pain reduction was 27% from baseline to 2nd assessment and up to 70% from baseline to final assessment while walking on flat surface. For group _B', pain was reduced 9.5% from baseline to 2nd assessment and 21.7% from baseline to final assessment on walking on flat surface. Group A had a 14% decrease in pain from baseline to second assessment and a 45.5% reduction from baseline to final evaluation at VAS while ascending stairs. From the first to the second assessment, Group B's pain levels decreased by 6.8%, and from the first to the final evaluation, they decreased by 16.2% There was no statistically significant difference between groups A and B on either of the outcome measures at the second evaluation ($P>0.05$), however there was a difference at the final evaluation.

Secondary Outcomes

Both groups showed reduce pain on WOMAC pain scale and improve physical function on WOMAC physical function scale. On WOMAC pain scale, for group _A', pain reduction was 27.01% from baseline to 2nd assessment and 49.8% from baseline to final assessment. For group _B', pain was reduced 4.8% from baseline to 2nd assessment and 29.7% from baseline to final assessment. On WOMAC Physical Function scale group _A' showed 14.0% improvement in physical function from baseline to 2nd assessment and 42.1% improvement from baseline to final assessment. Group _B' showed 10.2% improvement in physical function from baseline to 2nd assessment and 24.8% improvement from baseline to final assessment.

DISCUSSION

We collected our data on the bases of —VAS pain scale while on walking on plane surface and at the time of stairs climbing, and —WOMAC pain and —WOMAC physical function scale. WOMAC has shown to be very responsive, valid, and reliable in several studies conducted over the years (Bellamy 1988). Results show that WOMAC detects changes in pain or physical function more sensitively and statistically than many unidimensional measurements.⁸The dependability of the visual analogue scale (VAS) was examined by Downie WW, Leatham PA et al. (2001), who came to the conclusion that it is a valid and reliable measure of the intensity of chronic pain.⁷³Both the experimental and control groups had improvements in physical functioning and reductions in pain, which was consistent across all measurements of these outcomes in our research. Since the purpose of tape in the treatment of patellofemoral pain is to realign the patella with respect to the femur, the fact that it alleviated pain in group A is not surprising. While it is believed that tape may improve patellar position and alleviate knee discomfort and stress on the patellofemoral joint (PFJ), there is contradictory research about whether or not taping really causes a change in position.⁹Although researchers have shown that taping the patella

reduces discomfort, they have not yet determined how this effect works. Patients with reduced discomfort after taping their patellas activated the vastus medialis obliquus before the vastus lateralis did on both the up and down steps. The step-down condition had earlier vastus medialis activation compared to the pre-taped condition, and the taped condition had much higher vastus lateralis activation, which led to this result. Higher loading response knee flexion and quadriceps muscle torque have both been linked to patellar tape. Physical functions gradually improved as a result of less discomfort and increased torque in the quadriceps muscles. In control group with exercises, there was also reduction in pain and improvement in disability noticed. Exercise treatment in OA aims at reducing pain and disability ¹⁰. This is accomplished by increasing cardiovascular fitness, flexibility, joint stability, and muscular strength. Furthermore, the direct goal of exercise therapy is the decrease of handicap; for instance, this might be achieved by modifying the patient's gait. ¹¹.

CONCLUSION

Results from this research provide credence to the idea that patella tape may alleviate pain and improve functional status in individuals suffering from knee osteoarthritis, as assessed by Womac pain, Womac physical function scores, and VAS (visual analogue scale).

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