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ORIGINAL ARTICLE

Efficacy of Kinesio Tapping vs Mulligan Tapping in Reducing Pain and Improving Hamstring Flexibility, Cadence, and Physical Performance in Individuals with Patellofemoral Pain Syndrome

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ABSTRACT

Pain in the kneecap (patellofemoral joint) or the surrounding soft tissues (ligaments, tendons, etc.) might be grouped together under the umbrella term patellofemoral pain syndrome. Squatting, sit-to-stand exercise, stair climbing activity, jogging, and running are all associated with a worsening of patellofemoral pain syndrome, a chronic disease (2).

Objective and Methodology: The purpose of this study is to evaluate the efficacy of kinesio tapping vs Mulligan tapping in reducing pain and improving hamstring flexibility, cadence, and physical performance in individuals with patellofemoral pain syndrome. It was a randomized control experimental trial study with total 20 participants randomly allocated into group A (kinesio taping) and group B (Mulligan tapping). Outcomes included were pain, cadence, physical performance of lower limb and hamstring flexibility. Outcomes were assessed and compared at baseline, after 24 hour, after 48 hour and after 72 hours of tapping application. Data was analyzed with SPSS 21, Shapiro-wilk test for calculating the normality+ of data and two-way mixed ANOVA was applied for outcome comparison.

Results: In all, the sample had a mean age of 26.85 + 3.63 years. The average age of those in Group A was 26. + 3.47 years, while those in Group B were 27. + 3.78 years. There were 60% women and 40% men in group A, and 30% men and 70% women in group B. After the treatment period ended, all outcome variables had improved significantly in both groups (P0.05), and there was no significant group difference except for cadence scores (F (3, 54) = 8.039, P = 0.007, 2 = 0.309).

Conclusion: The study concluded that Kinesio tapping and Mulligan tapping both are effective in improving cadence, hamstring flexibility, lowering pain, patellofemoral pain severity and physical performance.

Keywords: Anterior knee pain, Hamstring, Knee pain, Kinesio tapping, Pain, Patellofemoral pain, Tapping.

INTRODUCTION

Adults, teenagers, young men and women in the military, and athletes are all susceptible to developing patellofemoral pain syndrome (PFPS) (1). Pain in the kneecap (patellofemoral joint) or the surrounding soft tissues (ligaments, tendons, etc.) might be grouped together under the umbrella term patellofemoral pain syndrome. Squatting, sit-to-stand exercise, stair climbing activity, jogging, and running are all associated with a worsening of patellofemoral pain syndrome, a chronic disease (2).

Although the pain is often described as being at the front of the knee, it really radiates to both the front and the back of the knee. Runner's knee, or anterior knee discomfort, is a real thing that may happen to anyone (3). Pain at the front of the knee is a primary symptom, while other structural abnormalities, such as those affecting the patella and retinaculum, may also contribute. People who suffer from patellofemoral pain syndrome typically show greater laxity in the patellofemoral joint, along with outward tracking during common tasks such transitioning from a standing to squatting posture. Ultimately, patellar maltracking leads to an aberrant distribution of biomechanical loads, which in turn leads to amplified cartilage and subchondral bone stress and severe discomfort. Patellofemoral pain syndrome is more common among females, and among younger people, who are thought to be two times more likely to have it (4).

This study aimed to evaluate the efficacy of kinesio knee taping against mulligan taping for the treatment of patellofemoral pain. To evaluate the differences in hamstring flexibility between kinesio knee taping and mulligan taping. In order to evaluate the differences in cadence between kinesio knee taping and mulligan taping. Examining the differences between Kinesio Taping and Mulligan Taping on Lower-Body Athletic Performance.

OBJECTIVE AND METHODOLOGY

A randomized clinical trial was used for the research. Open Epitool was used to determine the necessary sample size for the investigation. The non-probability convenience sampling was used and the randomization was done through sealed enveloped method. Study was done at Riphah Rehabilitation Center Potohar Rawalpindi, Allama Iqbal Hospital Rawalpindi, Private clinics of twin cities. Duration of Study was 1 year after the approval of the research board. Selection and Inclusion in Samples Intense discomfort in the front of the knee that has persisted for more than two months (especially while climbing or descending stairs, kneeling, or sitting for lengthy periods of time), Three or higher on the numeric pain rating scale (NPRS) for at least two activities, Males and females between the ages of 20 and 35 are included. Neglection in Sample Selection Patellofemoral dislocation and/or recurrent subluxation, bursitis, torn meniscus(es), inflamed patellar tendon(s), sprained or torn ligament(s), arthritic alterations in the joint, had surgery on their lower limbs, Knee discomfort from hip, lumbar spine, or ankle joints; patients with Dermatitis or any other skin condition.

Tools would be used for the assessment of patellofemoral pain syndrome. To measure the intensity of pain in the participant's numeric pain rating scale is used. It is a valid and reliable scale to measure pain intensity (ICC = 0.67 (53)). When evaluating hamstring flexibility, the patient lies supine with the affected hip flexed to a ninety-degree angle. The doctor wants the patient to bend their knee. When it comes to the Active knee extension test, the true cutoff number is 160. In a healthy person, the hamstring angle should be greater than or equal to 160 degrees (=160), and any angle less than 160 degrees indicates tightness (Pearson's R = 0.71 (54). Participants in a TUG are told to stand up, walk three metres, and then return to a sitting position. Participants should walk at their normal pace for the exam. The TUG cut off scores ranges from 8 – 11.5 seconds. If a patient lies in 14 seconds or longer then he or she was classify as high-risk for falling. Time up and go test has shown good to excellent concurrent validity (Spearman rank correlation, r_s=0.71–0.90 (56)). Measure patellofemoral pain in young people using this 13-item measure. Quantitative ratings might be anything from 0 to 100. None (5), slight/periodic (3), and consistent (0) would make up a 'Limp'

score. Excellent internal consistency (coef = 0.83 to 0.91) and validity (r = 0.98) have been demonstrated for the measure (58).

After taking approval from Riphah ethical committee and hospital settings, the patients were enrolled through non-probability convenience sampling. The patients who fulfils the inclusion criteria were randomly allocated through sealed envelope method into 2 groups. Group A and B. Group A received KT and B received mulligan taping. Both groups had conventional treatment. Both groups received treatment for total of 72 hours but the assessment was done at 24, 48 and 72 hours. Total 3 days of treatment. Two groups participated in this research; Group A received KT in addition to standard care, whereas Group B had mulligan taping instead. The treatment period for both groups was 72 hours, with evaluations taking place at 24, 48, and 72 hours. Three full days of therapy.

Outcome Measures: in terms of Pain (NPRS), Hamstring flexibility (Knee Extension test)

Cadence, Physical performance of lower limb (Time up and go test), Kujala Pain scale for patellofemoral syndrome. Percentages were used to organize the data. Descriptive measures including mean, median, and mode were used to examine the data, and a bar chart was used to display the results visually. Before the formal study analysis the variables were investigated for the normality of the data via Shapiro-Wilk test, parametric test two way mixed ANOVA was used for within and between group analyses. Data will be analyzed using SPSS version 21.

RESULTS

Twenty people participated in the study; ten from each of two groups (A and B) were counted. There were about as many males as females in the entire sample for this investigation. There were 60% women and 40% men in group A, and 30% men and 70% women in group B. The overall sample had a mean age of 26.85+ 3.63. The average age of that in group A was 26.0 + 3.47 years, while those in group B were 27.70 + 3.78 years old on average.

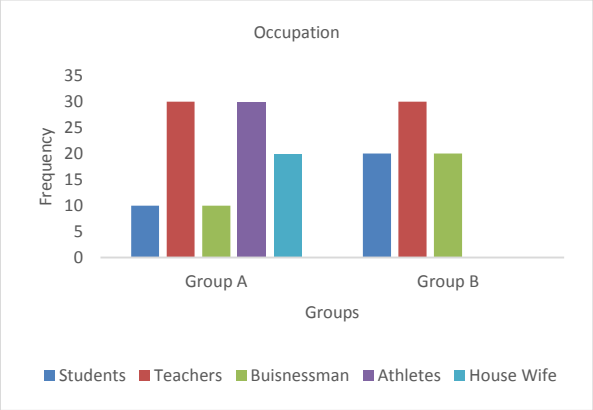


Figure 1: Occupation

The two-way mixed ANOVA was applied for the groups' comparison on 4 time points including the baseline, after 24 hour, after 48 hour, and after 72 hour. There was homogeneity of variances (p>0.05) and covariance's (p>0.001) assessed by Levine's and box M test respectively. While the equality of variance was checked with Mauchly's sphericity test and assumption of equal variance was met for all variables (P<0.05).

The descriptive data of variables presented in Mean + Std error on each time point and F value, P value and ETA (η^2) were recorded (Table 4).

Table 1: Interaction Effects Between Kinesiotaping And Mulligan Tapinan On Cadence, Hamstring Flexibility, Pain And Physical Performance

		Baseline (Mean + Std error)	24 Hours (Mean + Std error)	48 Hours (Mean + Std error)	72 Hours (Mean + Std error)	F Value	P Value	η^2
Cadence	Group A	94.3 + 1.83	96.10 + 1.78	96.80 + 1.76	108.00 + 1.3	8.039 (3, 54)	0.488	0.309
	Group B	96.20 + 1.83	98.80 + 1.78	99.90 + 1.76	103 + 1.3			
KET	Group A	150.2 + 3.79	151.4 + 3.48	152.6 + 3.79	155.3 +3.65	2.95 (1.7, 54)	0.073	0.141
	Group B	146.7 + 3.79	153.6 +3.48	154.1 + 3.79	159.2 + 3.65			
KUJALA	Group A	52.9 + 2.12	56.2 + 2.13	65.9 + 3.43	75.6 + 3.10	0.101 (1.1, 54)	0.793	0.006
	Group B	55.0 + 2.12	59.2 + 2.13	70.2 + 3.43	78.2 + 3.10			
NPRS	Group A	5.8 + 0.26	5.2 + 0.33	3.9 + 0.29	2.00 + 0.28	1.147 (1.98, 54)	0.329	0.06
	Group B	5.9 + 0.26	5.4 + 0.33	3.6 + 0.29	1.9 + 0.28			
TUG	Group A	9.3 + 0.33	9.2 + 0.36	7.9 + 0.31	6.5 + 0.28	0.104 (2.74, 54)	0.947	0.006
	Group B	9.0 + 0.33	8.8 + 0.36	7.6 + 0.31	6.0 ± 0.28			

The following graphs showed p values within groups (p = 0.001) significant improvement and p values between groups from baseline up to 72 hours in all outcomes i.e. cadence, NPRS, Kujala pain rating scale, hamstring flexibility and for physical performance measure.

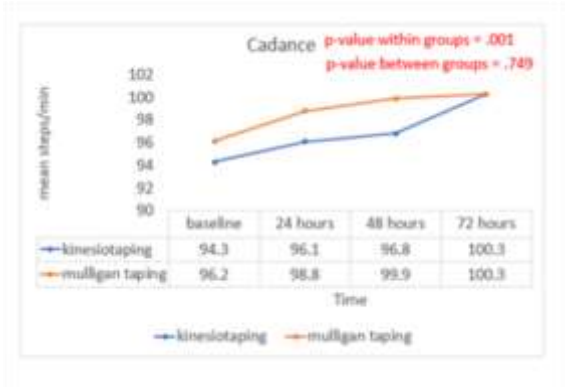
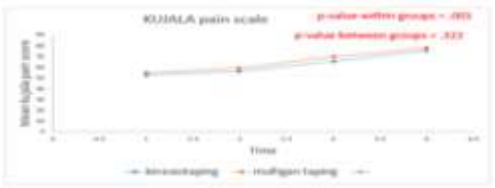


Figure 4: Cadence

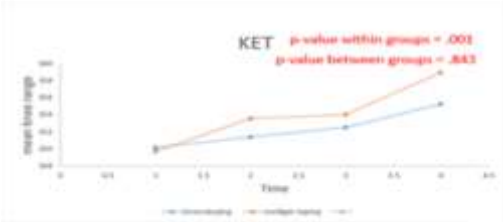
	Kinesiotaping	Mulligan taping
Baseline	5.8	5.9
24 hours	5.2	5.4
48 hours	3.9	3.6
72 hours	2	1.9

Figure 3: NPRS



	Kinesiotaping	Mulligan taping
baseline	52.9	53
24 hours	36.2	39.2
48 hours	65.9	70
72 hours	73.6	78

Figure 1: KUJALA pain scale



	Kinesiotaping	Mulligan taping
Baseline	150.2	149.7
24 hours	151.4	153.6
48 hours	152.6	154.1
72 hours	155.3	159

Figure 2: KET

DISCUSSION

The current study aimed towards the effectiveness of two tapping techniques in various outcomes related to pain, patellofemoral pain syndrome severity, muscle flexibility, and functional performance in patellofemoral pain patients. Up to current literature searching this is the first study that compared the tapping technique of kinesio tapping and Mulligan tapping in patellofemoral pain population.

Regarding the intensity of pain; the study findings and the interpretation revealed that both tapping techniques were found effective in reducing the pain scores from baseline up to 72 hours of assessment. Kinesio tapping was effective to reduce NPRS and Mulligan tapping was also effective to reduce NPRS. However no between group differences was found suggesting that both treatment were equally effective to reduce pain intensity in patellofemoral pain syndrome. The results are supported by various previous studies such as a study by Kellish et al (2020) reported significant effect of kinesio tapping in reducing the pain scores on visual analogue scale in patellofemoral pain syndrome patients (7). Similarly a recent study by Mubarrah and Huma (2021) declared that Mulligan tapping significantly lowered the NPRS scores in patients with anterior knee pain patients (5).

Regarding the variable of cadence, the both tapping techniques proved their efficacy to improve the number of steps taken in one minute however, the groups were statistically different in improving the cadence with no superior effects. The results regarding the efficacy of tapping method is supported by the study of Dongyun et al (2021) where kinesio tapping had significant results in improving cadence in PFPS population. (9). KH Hyun et al (2015) determine effects of mulligan taping on balance and gait in stroke patients. The study concluded that mulligan tape is effective for improving both outcomes in experimental group (6).

Hamstring flexibility measured with knee extension test was improved in participants of both groups received either kinesio tapping or Mulligan tapping and no statistical group difference was observed suggesting both the tapping techniques were equally effective in improving the hamstring flexibility in patellofemoral pain syndrome. Various previous studies supports the findings of our study related to the hamstring flexibility outcomes. Such as study by Mubarrah and Huma (2021) found statistical improvement in hamstring flexibility after application of Mulligan tapping in anterior knee pain patients. (5). However, regarding the kinesio tapping the findings of study by N Arjang et al (2018) did not support the current study results, the participants in which received kinesio taping treatment didn't demonstrate significant difference in the knee extension scores when compared with PNF stretching technique (10).

The Kujala anterior knee pain scale scores considered to gauge the severity of patellofemoral pain syndrome also demonstrated no statistical difference between the groups suggesting kinesio tapping and Mulligan tapping both remained equally effective in improving the Kujala scale scores at the end of treatment. In previous literature efficacy of tapping is well established related to Kujala anterior knee pain scores, for instance the study by Divya M Gohil et al (2021) found that kinesio tapping was effective in improving in the Kujala scores in patients with patellofemoral pain syndrome (11). Previous study of Mubara et al (2021) found statistical improvement in Kujala scale score after application of mulligan taping in anterior knee pain patients (5).

The last outcome variable of the study was about the functional performance and time up and go test was considered for it. In both the treatment groups' participants the time in seconds was reduced presenting efficacy of both the taping techniques in functional mobility, but, both the groups were remained statistically similar to each other, no superior effect was found in favor of any treatment group. The study results are similar to findings of the study by Mubarrah & Huma (2021) where Mulligan tapping improved the physical functional performance measure with TUG (5). Similarly the study Dongyun Lee et al (2021) also showed that kinesio tapping significantly improved the TUG scores (9).

CONCLUSION

The study concluded that both the treatment groups showed improvement suggesting that both treatments are equally effective in improving the outcomes related to pain intensity, disease severity, physical performance and the gait parameter of cadence. No significant difference was observed between Mulligan tapping and kinesio tapping in terms of knee pain, physical performance, and the patellofemoral pain syndrome severity.

REFERENCES

1. Gaitonde DY, Ericksen A, Robbins RC. Patellofemoral pain syndrome. American family physician. 2019;99(2):88-94.
2. van der Heijden RA, Lankhorst NE, van Linschoten R, Bierma-Zeinstra SM, van Middelkoop M. Exercise for treating patellofemoral pain syndrome. Cochrane database of systematic reviews. 2015(1).
3. Alba-Martín P, Gallego-Izquierdo T, Plaza-Manzano G, Romero-Franco N, Núñez-Nagy S, Pecos-Martín D. Effectiveness of therapeutic physical exercise in the treatment of patellofemoral pain syndrome: a systematic review. Journal of physical therapy science. 2015;27(7):2387-90.
4. Vora M, Curry E, Chipman A, Matzkin E, Li X. Patellofemoral pain syndrome in female athletes: a review of diagnoses, etiology and treatment options. Orthopedic reviews. 2017;9(4).
5. Rehman M, Riaz H. Comparison of mobilization with movement and Mulligan knee taping on Patellofemoral pain syndrome. Journal of the Pakistan Medical Association. 2021;71(9):1-14.
6. Hyun K-H, Cho H-y, Lim C-g. The effect of knee joint Mulligan taping on balance and gait in subacute stroke patients. Journal of Physical Therapy Science. 2015;27(11):3545-7.
7. Kellish AS, Kellish P, Hakim A, Miskiel S, Shahi A, Kellish A. What Is the Effect on Kinesio Taping on Pain and Gait in Patients With Patellofemoral Pain Syndrome? Cureus. 2020;12(7).
8. Rehman N, Kashif M, Sajjad A, Hassan HMJ, Iram H. Immediate Effects of Kinesio Taping on pain in Athletes with Patellofemoral Pain Syndrome. Physikalische Medizin, Rehabilitationsmedizin, Kurortmedizin. 2020;23.
9. Lee D, Bae Y. Short-Term Effect of Kinesio Taping of Lower-Leg Proprioceptive Neuromuscular Facilitation Pattern on Gait Parameter and Dynamic Balance in Chronic Stroke with Foot Drop. Healthcare. 2021;9(3):271.
10. Arjang N, Mohsenifar H, Amiri A, Dadgoo M, Rasaeifar G. The immediate effects of static versus proprioceptive neuromuscular facilitation stretching with kinesiology taping on hamstring flexibility in teenage taekwondo players. Journal of Clinical Physiotherapy Research. 2018;3(4):132-8.
11. Gohil DM, Khose P, Patra C, Baxi G, Palekar TJ. Combined effect of Kinesio taping and exercises on pain and function in individuals having patellofemoral pain syndrome with different grades of obesity. BLDE University Journal of Health Sciences. 2021;6(1):31.