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Original Article

Comparison of Effectiveness of Mechanical Hold Versus Kinesio Taping in Managing Patellofemoral Pain Syndrome

Sidra Syed[1], Bazal Bukhari[1*], Saba Afzal[1], Maham Nasir[1], Sarwat Ali[2]

[1]University Institute of Physical Therapy, The University of Lahore, Lahore, Pakistan
[2]Bajwa Hospital, Lahore, Pakistan

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Corresponding Author:
Bazal Bukhari,
University Institute of Physical Therapy, The University of Lahore, Lahore, Pakistan
bazal.bukhari@uipt.uol.edu.pk

ABSTRACT

Patellofemoral pain syndrome (PFPS) is a common problem of runners leading to pain and functional limitation in athletes. Patellar taping is an increasingly popular method of treatment for PFPS but comparative effectiveness especially McConnell's taping (MT) and Kinesio taping (KT) techniques is unknown. **Objective:** To compare the effects of McConnell's taping (MT) and Kinesio taping (KT) in the management of PFPS. **Methods:** A quasi-experimental study was conducted by recruiting 60 patients of PFPS using the convenience sampling technique. Participants were randomly divided into two groups MT and KT group and received patellar taping on daily basis for MT and on alternate days for KT group. The assessment was done using numeric rating pains scale and range of motion before treatment, immediately after 1st session, after 1 week and after 2 weeks of rehabilitation. After 2 weeks data was entered on SPSS v.21 and Analysis was done. **Results:** Mean Age in Kinesio taping (KT) was 28.40±4.74 and in McConnell's taping (MT) group was 28.17.70± 4.684. Within the group analysis showed that both techniques were effective in reducing pain intensity, improving range of motion and improving anterior knee pain scale scores (p-value < 0.05). However, independent sample t-test analysis determined that there was not any particular difference between the results of both aping techniques and p-value > 0.05 that proves our null that there is no difference between the effects of KT and MT in treating PFPS. **Conclusions:** KT and MT both are equally effective techniques for the management of PFPS and are important in decreasing pain and disability. However further studies are required with control groups to measure additional effects of exercise therapy.

INTRODUCTION

Patellofemoral pain syndrome (PFPS) is characterized as knee pain fluctuating from unbearable to minor confrontation initiating abrasion between femur and patella. It is an illness in which dull pain is sensed below patella. It is frequently increased by going downstairs or down the hills [1]. The onset of this condition is slow more often, although some cases may appear abruptly after trauma [2]. The incidence of PFPS is higher and out of 1000, 22 persons per year suffer from this condition. Its incidence rate is high in females as compared to males. In sports medicine & during basic military training 25%-43% incidence rate has been reported. It is claimed by many authors that among the very common musculoskeletal disorders one is PFPS [3]. In athletes, symptoms can occur frequently due to elevated intra-articular pressure on the joint (patellofemoral joint) and also because of poor biomechanics of player especially [4]. Retro-patellar pain and diffuse peri-patellar pain are the highly reported issues when sitting for long period with knee flexed, running and climbing stairs up and down. Crepitation is also a frequent symptom [5]. In case of weakness of Vastus medialis oblique (VMO) or tightness of illiotibial band along with VMO when correlating anatomical position of patella it induces the stress on patellofemoral joint and is also cause of lateral force vector [6]. Patella can be tracked laterally when there is a gap between the activity of VMO and Vastus Lateralis (VL) in straightening or extending knee [7]. Active females and athletes suffer more with this condition. In a given population, with several authors reporting its occurrence in one-fourth of the general or sporting [8].

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There can be a restriction in performing some functions due to the PFPS [9]. Many treatments have failed to treat this [10]. In patients with PFPS, Body Mass Index has the high values and this shows the higher prevalence of Obesity [11]. Many orthodox techniques are known to treat the PFPS like stretching, strengthening, electrotherapy, therapeutic exercises Tapping etc [4]. Main goal of treatment is to align the patella in trochlear groove to reduce the severity of pain. The treatment comprises the stretching of tighten muscles (IT band, tensor fascia latae) and strengthening exercises for weakened muscles to enhance the stability of patella to medial side while patella wearing [12]. Earlier researches explain the facilitating results of orthodox treatments but more deep inspection of orthodox treatment is needed [13,14]. Arthroscopy that is useful for treating the mal-alignment of patella. Postoperative healing time can affect the sportsman choice to rejoin the sport and team. However, there is no particular effect of surgery and conservative treatment about recovery to sports [4]. In MT taping technique a rigid, highly acceptable in preventing the injury during race. It is noticed to have a slight effect on hip and knee kinematics in asymptomatic female and has lowest effect on the adjacent lead mechanisms of PFPS [15]. MT has the noticeable results on proprioception of knee joint. There is increase in the stimulation of sensory signals that are going to brain for processing through mechanoreceptors when we apply taping [16].The basic purpose of current study was to evaluate the comparative effectiveness of mechanical hold through McConnell taping and kinesiotaping among PFPS.

METHODS

A single blinded quasi experimental study was conducted. Total 60 patients were selected according to inclusion and exclusion criteria. The sample size was calculated using mean post treatment pain scores 4±1.0 for MT group and 5±2.0 for KT group keeping α=0.95 using G.power v3.1.9.2. This gave us the sample size of 55 participants. Each group consisted of 30 patients of PFPS selected randomly using coin toss method. Participants were included who were female, had Retro-patellar pain for more than 6 months, had patellar tenderness on physical examination and presented with unbearable pain above 30 mm on a 100 mm Numeric Rating Pain Scale (NRPS) in last week. The exclusion criteria was patients with past knee surgical history, fluctuation in patellofemoral joint and patients who were mentally and physically challenged. Common treatment given to both groups, twice daily which included 10 minutes icing plus on alternate days 3X 30 seconds stretching of knee flexors and extensors along with 3X 15 repetitions of straight leg raising, pelvic bridging, inner and out hip raises. Treatment was given for two weeks. Patients were assessed before treatment, after 1st session, after one week and at the end of 2 weeks. The final assessment which was done at the end of 2nd week was done after removing tape. Medial glide to patella was given with 75-100% stretched Kinesio tape. Patients in Group II received Mechanical hold by using taping technique described by McConnell. Patient was positioned in supine position and knee flexed about 20 degree. Pain was assessed using Numeric Pain Rating Scale and Range assessment was done using Goniometer. After collection data was entered in SPSS version 21. For continuous variables means were drawn. For categorical variables frequency tables and bar charts were drawn.

RESULTS

A total number of 60 patients were selected in the study i.e. 30 patients in each group. Mean Age in Kinesio taping group was 28.40±4.74 and in MT group was 28.17.70± 4.684(Table 1).For within the group analysis, repeated measure ANOVA and for between the groups analysis independent sample t-test was used. Within the group analysis showed that both techniques were effective in reducing pain intensity, improving range of motion and improving anterior knee pain scale scores (p-value < 0.05). However, independent sample t-test analysis determined that there was not any particular difference between the results of both taping techniques and p-value > 0.05 that proves our null hypothesis which tells that there is no difference between the effects of KT and MT in treating PFPS.

Variables	Study group	Mean	Std. Deviation	P-value
Age of the participants	Kinesio Tape	28.40	4.746	0.849
	McConnell's Tape	28.17	4.684	
Weight of the participant	Kinesio Tape	56.37	9.003	0.859
	McConnell's Tape	56.74	6.783	
Height of the participants	Kinesio Tape	159.7820	6.50660	0.47
	McConnell's Tape	160.7973	4.01086	
BMI	Kinesio Tape	22.2045	4.09119	0.817
	McConnell's Tape	21.9918	2.91726	
Pre Treatment knee flexion	Kinesio Tape	106.03	9.186	0.960
	McConnell's Tape	105.90	7.237	
Pre Treatment knee extension lag	Kinesio Tape	-9.97	7.175	0.843
	McConnell's Tape	-9.63	5.750	
Pretreatment Pain at numeric rating pain scale	Kinesio Tape	7.23	.817	0.888
	McConnell's Tape	7.20	.997	
Pretreatment anterior knee pain score	Kinesio Tape	48.54	8.302	0.696
	McConnell's Tape	47.54	11.097	

Table 1: Pretreatment comparison of baselines characteristics of

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both groups

Study group		Mean	Std. Deviation	P-value
Kinesio Tape	Pre Treatment knee flexion	106.03	9.186	0.006
	Knee flexion after 1st session	110.86	5.245	
	Knee flexion after one week of treatment	115.31	6.264	
	Knee flexion after two weeks of treatment	123.97	7.359	
McConnell's Tape	Pre Treatment knee flexion	105.90	7.237	0.045
	Knee flexion after 1st session	111.55	7.017	
	Knee flexion after one week of treatment	115.27	7.036	
	Knee flexion after two weeks of treatment	119.62	7.231	

Table 2: Within the group analysis for change in knee flexion over the treatment duration

Study group		Mean	Std. Deviation	P-value
Kinesio Tape	Pre Treatment knee extension lag	-9.97	7.175	0.002
	Knee extension lag after 1st session	-5.83	5.370	
	Knee extension lag after one week of treatment	-3.73	4.025	
	Knee extension lag after two weeks of treatment	-2.80	3.134	
McConnell's Tape	Pre Treatment knee extension lag	-9.63	5.750	0.001
	Knee extension lag after 1st session	-6.13	4.470	
	Knee extension lag after one week of treatment	-3.97	4.038	
	Knee extension lag after two weeks of treatment	-2.33	2.771	

Table 3: Within the group analysis for change in knee extension over the treatment duration

Study group		Mean	Std. Deviation	P value
Kinesio Tape	Pretreatment Pain at numeric rating pain scale	7.23	.817	0.000
	Pain after 1st session	4.50	1.009	
	Pain after one week	3.67	.479	
	Pain after two weeks	3.20	.664	
McConnell's Tape	Pretreatment Pain at numeric rating pain scale	7.20	.997	0.055
	Pain after 1st session	4.73	1.081	
	Pain after one week	3.63	.765	
	Pain after two weeks	2.87	.730	

Table 4: Within the group analysis for change in pain intensity over the treatment duration

Group Statistics				
	Study group	Mean	Std. Deviation	P value
Knee flexion after two weeks of treatment	Kinesio Tape	123.97	7.359	0.025
	McConnell's Tape	119.62	7.231	
Knee extension lag after two weeks of treatment	Kinesio Tape	-2.80	3.134	0.004
	McConnell's Tape	-2.33	2.771	

Table 5: Post-treatment between the groups comparison for Knee Range of Motion

DISCUSSION

There are various types of taping techniques used for PFPS including Kinesio taping, McConnell's taping, Mulligan's taping and other custom taping techniques [17]. However, Taping along with other measures including exercise etc. can give superior results [18]. The same was found in our study as our regime including taping and exercise therapy gave significant results leading to a decrease in pain, improvement in ROM and function in the short time period of two weeks only. The results of this study reported that taping either Kinesio or McConnell's both is effective in treating PFPS. In our study MT group received daily taping and KT group received taping on alternate days while performing exercise at home. The results showed significant changes in 2 weeks instead of three weeks. MT taping technique in patients with PFPS has the ability to suppress the pain in PFPS [19]. McConnell taping leads to immediate and clinically better results in PFPS as found in our study it may be due to the reason that mechanical hold immediately stabilizes the patella and corrects its tracking with medial glide. A study concluded that patellar taping results in improved velocity and functional status same was seen in our study as the anterior knee pain scale score significantly improved [20]. However, in this, we used exercise as a common treatment in both groups but we did not specifically observe the effects of exercise and used MT and KT as additional treatment [21]. The reason for this high adherence was maybe that cost of treatment was low and treatment session time was convenient for patients [23]. The same was the result in this study as more than 50% of participants presented to us with PFPS were regularly doing jogging. Research stated that KT is not helpful to enhance the functioning and neuromuscular activities of the lower extremity of a healthy patient [22]. A study stated that in a population who has no pain, KT is helpful and had no relation with ground reaction force (GRF) while doing the activity of climbing stairs [24]. This study also exposed that taping has a statistically considerable influence on peak knee flexion angles this effect was more significant in the mechanical hold as compared to Kinesio taping. These results were also supported by the results of a study [4].

CONCLUSION

effective in treating PFPS. Both taping techniques improved range of motion, decreased pain and increased anterior knee pain scale scores. When comparing the effects both techniques were equally effective and between groups no considerable conflict was found except about flexion in which mechanical hold was more effective and increased flexion more as compared to KT tape.

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