

“ Effect of Medial Patellar Taping in Individuals with Patellofemoral Pain Syndrome in Rural Areas ”

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Abstract

Background: Patellofemoral pain is characterized by anterior or retropatellar pain associated with activities that load the patellofemoral joint, such as ascending or descending stairs, squatting, running and kneeling. Repetitive contacts at any of patellofemoral areas sometimes combined with maltracking of the patella that is either medially or laterally and that is the likely mechanism of patellofemoral pain syndrome (PFPS). So it is necessary to correct that maltracking and realign the patella into correct position. **Aims and Objectives:** To investigate the effect of medial Patellar Taping in individuals with patellofemoral pain syndrome in rural areas along with the common treatment program that include hot fomentation and Quadriceps exercise. **Methodology:** Ten patients with the history of PFPS with the informed consent, since more than 1 month in AVBRH Hospital were randomly selected through assessment that was done for the diagnosis of P.F.P.S. using assessment proforma. **Result:** This study revealed that Medial taping had the significant effect on 7th day as compared to 1st day. Medial taping significantly decreased pain and improved functional activities [medial glide $P=0.0042$; $P<0.05$]. Medial taping method improved the function activity score significantly ($F=3.8$; $P<0.05$). **Conclusion:** The result of this study indicated that, there is significant reduction in pain levels and Improvement in functional activities.

KEYWORDS: Patellofemoral pain Syndrome, Medial patellar taping, Rural area.

INTRODUCTION:

Patellofemoral pain is characterised by anterior or retropatellar pain associated with activities that load the patellofemoral joint, such as ascending or descending stairs, squatting, running and kneeling.^{1,2} Patellofemoral pain syndrome (PFPS) is the most common complaint affecting the knee. 18.5–31% in young adults complained of knee pain and 50% of the non-specific knee pain accounted PFPS. The factors causing PFPS include weakness and imbalance of Quadriceps muscle, malalignment of lower limb, stiffness of soft tissue, increase in Q-angle of quadriceps muscle, and overuse and abnormal movement of hip joint. Particularly if there is an imbalance of quadriceps muscle of thigh and a shortening of the lateral support attached to the lateral side of knee joint, patellar is an occurrence of tilting to the lateral side in the knee joint, which is a common symptom of PFPS. PFPS has a risk of developing into chronic diseases such as chondromalacia or arthritis and so proper care and treatment is needed.¹

Patellofemoral (PF) pain is one of the most common pathologies involving the knee, affecting 25% of the population.^{3,4} Generalized joint laxity has been associated with PF pain and chondromalacia. Patella alta may be the primary alteration, with increased lateral translation and tilt being secondary, in maltrackers.⁴

Vastus lateralis pulled first in the proximal and second in the lateral directions. The oblique portion of Vastus Medialis Obliquus (VMO) of the Vastus Medialis pulled the patella mainly medially. Medial tilt was the major patellar rotation induced by VMO contraction at full knee extension. VMO changed its main action from extending to flexing the patella.⁵

PFPS is the most prevalent disorder involving the knee, the second most common musculoskeletal complaint.⁶ Many authors have proposed that the primary cause of PFPS is lateral tracking of the patella.^{1,6}

Patellofemoral pain is associated with activities that load the patellofemoral joint, such as stair climbing, squatting, running, and kneeling.¹ Thus, this common condition affects many aspects of daily life. In particular, it interferes with one's ability to participate in regular sport and exercise that require running or walking. Some authors have associated the development of patellofemoral pain with malalignment (abnormal lateral tracking) of the patella within the femoral trochlear groove, leading to areas of increased stress on the patellofemoral joint.²

Altered lower-extremity biomechanics, such as poor hip rotation control excessive foot pronation, femoral anteversion, tibial torsion, bone configuration, or tight muscles are thought to contribute to PFPS by initiating alterations in patellofemoral kinematics. Vastus medialis oblique muscle dysfunction also has been proposed as a contributor to altered patellofemoral kinematics.⁷

Patellar malalignment may cause an aberrant dispersion of PF joint reaction (PFJR) force and through this mechanism potentially predispose to pain and/or structural progression.⁸ Corrective taping of the patella has since become a commonly used treatment for PFPS. McConnell taping has devised a classification to describe abnormal patellar alignment.¹

Patellar taping is widely practiced among clinicians to treat patients with PFPS. This intervention involves pushing the patella medially and securing it in this position with tape on the skin. Although patellar taping has been demonstrated to reduce patellofemoral pain in patients with PFPS.⁷

Nonoperative management for patellofemoral pain syndrome (PFPS) includes patellar taping, stretching, vastus medialis obliquus (VMO) strengthening, activity modification, biofeedback, neuromuscular electric stimulation, ultrasound, thermotherapy, bracing, and foot orthotics.^{7,9}

The rationale behind the use of physical therapy for alleviation of patellofemoral pain includes restoration of patellar alignment through active or passive interventions, including quadriceps muscle-strengthening exercises, stretching, patellar taping or bracing, biofeedback, and use of corrective foot orthoses. Vastus medialis oblique muscle retraining is an essential component of treatment because this muscle can provide active medial stabilization of the patella within the femoral trochlea. This exercise is combined with patellar taping, patellar mobilization, and stretching to improve patellar tracking, reduce pain, and enhance vastus medialis oblique muscle activation.² In view of this evidence, the question remains whether the analgesic effect reported in patients with PFPS post-taping results only from the application of tape medially to the knee.

The aim of this study was to investigate the effect of medial patellar taping on the pain experienced by patients with PFPS during a standard 8-inch (20.3-cm) step-

down test.⁶ along with the common treatment program that include hot fomentation and Quadriceps exercise.

MATERIAL AND METHODOLOGY:

After taking Institutional Ethical Committee approval, the prospective study was carried at AVBRH, in which ten patients with the history of Patellofemoral Pain Syndrome with the informed consent, since more than 1 month were randomly selected through assessment that was done for the diagnosis of P.F.P.S. using assessment proforma.

The patient were selected after they met the inclusion criteria viz. having h/o anterior retro or peripatellar pain that was readily reproducible during at least two of the activities within the last month like Ascending or descending stairs, prolonged sitting & prolonged walking or squatting, male and female both between 30-60 years and they were excluded from the study if they had the ligamentous pathology around knee, meniscal pathology, patellar tendonitis, past history of joint effusion under 30 years of age & previously treated with taping. For this study non allergic tape i.e. Microtape was used.

METHODOLOGY:

Ten patients with the history of Patellofemoral Pain Syndrome with the informed consent, since more than 1 month in AVBRH Hospital were randomly selected through assessment that was done for the diagnosis of P.F.P.S. using assessment proforma.

Procedure:

1. After receiving informed concern patient were assessed by using assessment proforma, Numerical Pain Rating Scale, Step test, Clarke's test and FIQS.
2. Patients were received medial patellar taping along with hot fomentation, quadriceps exercises, and hamstring stretching exercise for the duration of treatment of 7 days.
3. On the 7th day patients were re-assessed by using Numerical Pain Rating Scale, Step test, Clarke's test and FIQS.

Outcome Measures:

Patient was assessed on the basis of -

1. **Numerical pain rating scale¹⁰** – for the assessment of pain.
2. **Step test⁶**- both groups were performed 4 single steps down from a standard 8 inch platform, initially with the patella untaped and then the patella taped.
3. **Functional index questionnaire scale¹¹**- this questionnaire assessed patients reports of their ability to perform 8 different activities using a 3 point rating scale: "no problem" { score2}, "can do with problems" { score1}, "unable to do" { score 0 }.
4. **Clarke's test.¹²**

Data collected was analyzed by using unpaired t-test.

RESULTS:

This study revealed that both methods of medial taping had the significant effect on 7th day as compared to 1st day. This method of taping significantly decreased Pain and improved functional activities [$P= 0.0042$; $P< 0.05$].

The analysis indicated that both medial glide methods produce a significantly greater degree of pain relief (medial glide: $F=2.7$)

Medial taping method improved the function activity score significantly ($F=3.8$; $P<0.05$).

DISCUSSION:

The results of the study indicate that the medial patella taping methods on the 7th day produced the significant average degree of pain relief and Functional activities improvement at the knee compared to the 1st day of Treatment when tested on a standard 8 inch step down test, squatting activities etc. in 10 patients with P.F.P.S. Medial glide Techniques provided a significant analgesic effect [mean pain reduction, 2.7] which is the technique advocated and most widely used in the Treatment of P.F.P.S.

Patellofemoral (PF) pain is one of the most common pathologies involving the knee, affecting 25% of the population.⁴ Patellofemoral pain is associated with activities that load the patellofemoral joint, such as stair climbing, squatting, running, and kneeling.¹ Thus, this common condition affects many aspects of daily life.^{1,2} This study also observed that the patellofemoral pain occurred with stair climbing, squatting, kneeling etc.

Farrar JT., Young JP. (2001) suggested that pain intensity is frequently measured on an 11-point pain intensity numerical rating scale (PI-NRS), where 0= no pain and 10=worst possible pain. However, it is difficult to interpret the clinical importance of changes from baseline on this scale (such as a 1- or 2-point change).¹⁰

Magee DJ. (1987): suggested that Numerical Pain Rating Scale can be used as an assessment tool for pain assessment along with other.¹¹ This study also used Numerical Pain Rating Scale to assess Pain intensity in individuals with patellofemoral pain syndrome.

Jo Nijs et al (2006) demonstrated diagnostic value of five clinical tests which include Clarke's test and step test in patellofemoral pain syndrome.¹² **Tony Wilson (2003)** used 8-inch (20.3-cm) platform for step test.⁶ This study also used step test as assessment tool.

Bockrath K, Wooden C. (1993): demonstrated that patella taping significantly reduced the perceived pain levels during a 0.2-m step-down; however, this reduction in pain was not associated with patella position changes.¹³

Aditya Derasari et al (2010) stated that Patellar taping is widely used clinically to treat patients with patellofemoral pain syndrome (PFPS). Although patellar taping has been demonstrated to reduce patellofemoral pain in patients with PFPS.⁷

SM Cowan et al. (2002) supported the use of patellar taping as an adjunct to rehabilitation in people with PFPS.¹⁴ **Hanafy AF (2016)** indicated that therapeutic patellar taping is effective in improving functional performance and reducing pain in patients with patellofemoral pain syndrome (PFPS).¹⁵ The above studies supported the result of this study, that found a significant pain relief with the patellar taping.

Cowan SM (2002) correctly stated that there is some evidence that medial taping can change patellar position. However, does this mean that "...it is reasonable to assume that patellar taping may alter patellar alignment."¹⁴

The above study and most of the studies (1,3,11,13,19,21,24,25,27,28) showed a significant pain relief and functional activity improvement in PFPS which supported the result of this study.

Aditya Derasari et al(2010) stated that Vastus medialis oblique muscle dysfunction also has been proposed as a contributor to altered patellofemoral kinematics. Interventions for PFPS include patellar taping, patellar bracing, selective strengthening of the vastus medialis muscle, iliotibial band stretching, ankle-foot orthotics, or a combination of these interventions.⁷

There are a number of approaches to the physical therapy management of patellofemoral pain. In 1986, McConnell proposed a regimen that included retraining the vastus medialis oblique muscle through functional weightbearing activities. This exercise is combined with patellar taping, patellar mobilization, and stretching to improve patellar tracking, reduce pain, and enhance vastus medialis oblique muscle activation.²

Van der Heijden RA et al (2015) found consistent evidence that exercise therapy for PFPS may result in clinically important reduction in pain and improvement in functional ability, as well as enhancing long-term recovery.²⁰

Whittingham M (2004) indicated that over a period of 4 weeks a combination of daily patellataping and exercises was successful in improving pain and function in individuals with patellofemoral pain syndrome. The combination of patella taping and exercise was superior to the use of exercise alone.²¹

This study also used quadriceps strengthening techniques and hamstring stretching along with taping to give better relief.

Limitations related to this study include small sample size, short time span for study; long-term follow up of patients were not maintained.

This study suggested that further studies with large sample size and should be carried out in long time span.

CONCLUSION:

The result of this study indicated that, there is significant reduction in pain levels and Improvement in functional activities after giving Taping technique.

Medial patellar taping is effective taping for reduction in pain and improvement of functional activities in rural area.

REFERENCES:

1. Lee SE, Cho SH. The effect of McConnell taping on vastus medialis and lateralis activity during squatting in adults with patellofemoral pain syndrome. *J Exer Rehabil* 2013; 9(2): 326-330.
2. Crossley K, Bennell K, Green S, Cowan S, McConnell J. Physical Therapy for Patellofemoral Pain A Randomized, Double-Blinded, Placebo-Controlled Trial. *The American Journal Of Sports Medicine*, Vol. 30, No. 6 857-865.
3. Fredericson M, Powers CM. Practical management of patellofemoral pain. *Clin J Sport Med*. 2002;12(1):3638.
4. Frances T. Sheehan, Aditya Derasari, Timothy J. Brindle, Katharine E. Alter. Understanding Patellofemoral Pain with Maltracking in the Presence of Joint Laxity: Complete 3D In Vivo Patellofemoral and Tibiofemoral Kinematics. You have free

access to this content. Journal of Orthopaedic Research 13 NOV 2008 Volume 27, Issue 5:561-570.

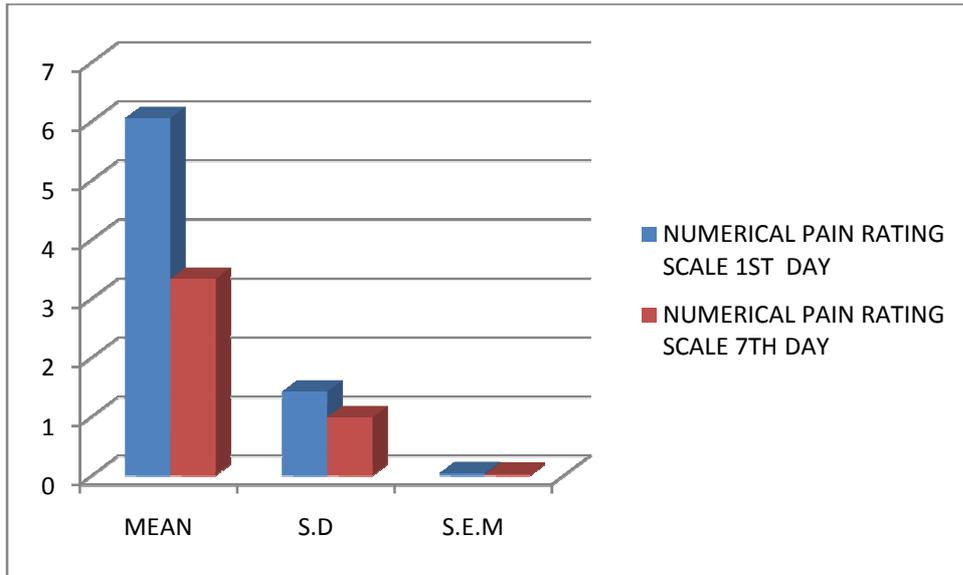
5. Lin F, Wang G, Koh JI, Hendrix RW, Zhang L. In vivo and Noninvasive Three-Dimensional Patellar Tracking Induced by Individual Heads of Quadriceps. The American College of Sports Medicine 2004.93-101.
6. Wilson T., Carter N., Thomas G.: A Multicenter, Single-Masked Study of Medial, Neutral, and Lateral Patellar Taping in Individuals With Patellofemoral Pain Syndrome. J Orthop Sports Phys Ther . 2003; Vol. 33(8): 437-447.
7. Derasari A ,Brindle TJ, Alter KE, Sheehan FT: McConnell Taping Shifts the Patella Inferiorly in Patients With Patellofemoral Pain: A Dynamic Magnetic Resonance Imaging Study. Phys Ther. 2010 Mar; 90(3): 411–419.
8. Hunter DJ, Zhang TQ, Niu JB, Felson DT, Newman A, Kritchevsky S, Harris T, Carbone L, Nevitt M. Patella malalignment, pain and patellofemoral progression: the Health ABC Study. OsteoArthritis and Cartilage (2007) 15, 1120-1127.
9. Aminaka N, Gribble PA: Patellar Taping, Patellofemoral Pain Syndrome, Lower Extremity Kinematics, and Dynamic Postural Control. J Athl Train. 2008 Jan-Feb; 43(1): 21–28. J Athl Train. 2008 Jan-Feb; 43(1): 21–28.
10. Farrar JT, Young JP, Jr., LaMoreaux L, Werth JL, Poole RM. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. Pain. 2001;94(2):149-158.
11. Magee DJ: Numerical Pain Rating Scale and Functional Index Questionnaire. Orthopaedic Physical Assessment. Third Edition 1987,4-5.
12. Nijs J, Geel C, Auwera CV, Velde BV. Diagnostic value of five clinical tests in patellofemoral pain syndrome. Manual Therapy 11 (2006) 69–77.
13. Bockrath K, Wooden C, Worrell T, Ingersoll CD, Farr J. Effects of patella taping on patella position and perceived pain. Med Sci Sports Exerc. 1993;25(9):989-992.
14. Cowan SM, Bennell KL, Hodges PW. Therapeutic patellar taping changes the timing of vasti muscle activation in people with patellofemoral pain syndrome. Clin J Sport Med. 2002;12(6):339-347.
15. Hanafy AF. patellar realignment and functional performance in patients with patellofemoral pain syndrome. Int J Physiother. Vol 3(1), 71-77, February (2016) ISSN: 2348 – 833.
16. Herrington L, Payton CL. Effects of corrective taping of the patella on patients with patellofemoral pain. Physiother. 1997;83:566-572.
17. Tobin S, Robinson G. The effect of McConnell’s vastus lateralis inhibition taping technique on vastus lateralis and vastus medialis obliquus activity. Physiother. 2000;86:173-183.
18. Osorio JA, Vairo GL, Rozea GD, Bosha PJ, Millard RL, Aukerman DF, Sebastianelli WJ. The effects of two therapeutic patellofemoral taping techniques on strength, endurance, and pain responses. Physical Therapy in Sport xxx (2012) 1-8.
19. Verma C, Krishnan V. Comparison between Mc Connell Patellar Taping and Conventional Physiotherapy Treatment in the Management of Patellofemoral Pain Syndrome .A Randomised Controlled Trial. JKIMSU, Vol. 1, No. 2, July-Dec. 2012.
20. van der Heijden RA, Lankhorst NE, van Linschoten R, Bierma-Zeinstra SM, van Middelkoop M. Exercise for treating patellofemoral pain syndrome. 2015 Jan 20;1:CD010387.
21. Whittingham M, Palmer S: Effects of Taping on Pain and Function in Patellofemoral Pain Syndrome: A Randomized Controlled Trial. J Orthop Sports Phys Ther • Volume 34 • Number 9 • September 2004.

22. Aglietti P, Insall JN, Cerulli G. Patellar pain and incongruence.I: Measurements of incongruence. ClinOrthop. 1983;176:217-224.
23. Conway A, Malone TR, Conway P. Patellar alignment/ tracking alteration: effect on force output and perceived pain. IsokinetExerc Sci. 1992;2(1):9-17.
24. Crossley K, Cowan SM, Bennell KL, McConnell J. Patellar taping: is clinical success supported by scientific evidence? Man Ther. 2000;5(3):142-150.
25. Fitzgerald GK, McClure PW. Reliability of measurements obtained with four tests for patellofemoral alignment. Phys Ther. 1995;75(2):84-90; discussion 90-82.
26. Gigante A, Pasquinelli FM, Paladini P, Ulisse S, Greco F. The effects of patellar taping on patellofemoral incongruence.A computed tomography study. Am J Sports Med. 2001;29(1):88-92.
27. Harrison EL, Sheppard MS, McQuarrie AM. A randomized controlled trial of physical therapy treatment programs in patellofemoral pain syndrome. Physiother Can. 1999;Spring:93-100.
28. Thomee R, Renstrom P, Karlsson J, Grimby G. Patellofemoral pain syndrome in young women. I. A clinical analysis of alignment, pain parameters, common symptoms and functional activity level. Scand J Med Sci Sports. 1995;5(4):237-244.
29. Aminaka N, Gribble PA. A systematic review of the effects of therapeutic taping on patellofemoral pain syndrome.J Athl Train. 2005 Oct-Dec;40(4):341-51.
30. Callaghan MJ, Selfe J. Patellar taping for patellofemoral pain syndrome in adults. 2012 Apr 18;(4):CD006717.
31. Witvrouw E, Lysens R, Bellemans J, Cambier D, Vanderstraeten G. Intrinsic risk factors for the development of anterior knee pain in an athletic population. A two-year prospective study. Am J Sports Med 2000;28: 480-9.
32. Thomee R. Patellofemoral Pain Syndrome: A Review of Current Issues Sports Med 28 (4), 245-262. 10 1999.
33. Ng GY, Cheng JM. The effects of patellar taping on pain and neuromuscular performance in subjects with patellofemoral pain syndrome. ClinRehabil. 2002 Dec;16(8):821-7.

TABLES AND GRAPHICAL PRESENTATION:

Medial Patellar Taping:

	NUMERICAL PAIN RATING SCALE	
	1 ST DAY	7 TH DAY
MEAN	6.055	3.3340
S.D	1.4266	0.9896
S.E.M	0.0431	0.0240



	FUNCTIONAL INDEX QUESTIONNAIRE	
	1ST DAY	7TH DAY
MEAN	4.5525	8.3926
S.D	1.202	1.4406
S.E.M	0.0597	0.1987

