

IMMEDIATE EFFECT OF KINESIO TAPING V/S MCCONNELL TAPING IN PATELLOFEMORAL OA KNEE PATIENTS

Mihir N. Mange ^{*1}, Leena Zore ², Ajay Kumar ³.

^{*1} Graduate, DPO's Nett College of Physiotherapy, Thane, India.

² Assistant Professor, DPO's Nett College of Physiotherapy, Thane, India.

³ Principal, DPO's Nett College of Physiotherapy, Thane, India.

ABSTRACT

Background: Patello-femoral joint osteoarthritis is very common and occurs due to loss of cartilage of patella and trochlear groove in approximately half of the patients diagnosed with Osteoarthritis knee. Taping can be used to reduce pain in knee osteoarthritis. Different types of taping are done on Osteoarthritis Knee patients to see their individual effect, but very few studies have been done to compare the effect of 2 different types of tape.

AIM: To compare the immediate effects of Kinesio taping and McConnell taping on patellofemoral joint osteoarthritis knee patients.

Objectives: To compare the effects of Kinesio taping and McConnell taping on Knee flexion and extension Range of motion, pain on Numerical rating scale during Squatting and Descending stairs in patellofemoral joint osteoarthritis patients

Materials and methods: This was an Experimental Pre/Post study. Primary data collection was done using random sampling. 60 Patellofemoral Joint Osteoarthritis knee patients between 45-55 age group were selected and were divided into two groups- Group A-Kinesio Taping and Group B- McConnell Taping group containing 30 each. The Pre and Post Assessment of both the groups was done using Goniometer for Knee ROM and Numerical Rating Scale(NRS) for pain score during Squatting and Descending stairs.



Results: The result of this study by Mann-whitney test showed that Kinesio taping has statistical significant increase in knee range of motion (flexion and extension)(p-value=0.0334). And statistical significant decrease in pain score on NRS during Squatting (p-value=0.0212)

Conclusion: Kinesio taping has shown statistical significant increase in Knee Range of Motion, and statistical significant decrease in pain on Numerical Rating Scale(NRS) during Squatting, while no significant difference on Numerical Rating Scale (NRS) during descending stairs when compared to McConnell taping.

KEY WORDS: McConnell taping, Kinesio taping, Patellofemoral joint Osteoarthritis, Knee ROM, Squatting, Descending stairs.

Address for correspondence: Dr. Mihir N. Mange (P.T), Graduate, DPO's Nett College of Physiotherapy, Thane, India. Phone No: 9699666448.

E-Mail: leenachilgar@gmail.com; dudemihir0503@gmail.com

Access this Article online	Journal Information
Quick Response code  DOI: 10.16965/ijpr.2019.111	International Journal of Physiotherapy and Research ICV for 2016 86.93 ISSN (E) 2321-1822 ISSN (P) 2321-8975 https://www.ijmhr.org/ijpr.html DOI-Prefix: https://dx.doi.org/10.16965/ijpr 
	Article Information
	Received: 19 Feb 2019 Peer Review: 19 Feb 2019 Revised: None
	Accepted: 07 Mar 2019 Published (O): 11 Apr 2019 Published (P): 11 Apr 2019

INTRODUCTION

Osteoarthritis is defined as a heterogeneous group of conditions that lead to joint symptoms and signs associated with a defective articular

cartilage and related changes in bone morphology [1]. It is considered the most common type of arthritis, as well as one of the most significant health problems that pervades our modern

world [2]. It is a chronic degenerative disorder of multifactorial etiology and range of biochemical and morphological alterations of the synovial membrane and joint capsule [3]. Typical clinical symptoms are pain, particularly after prolonged activity and weight-bearing; whereas stiffness is experienced after inactivity [4]. Synovial inflammation also may occur [4,5]. Knee joint osteoarthritis can either be Tibiofemoral type or Patellofemoral type according to the type of compartment involved.

Patello-femoral joint osteoarthritis is very common and occurs due to loss of cartilage of patella and trochlear groove in approximately half of the patients diagnosed with OA knee [6-8]. The symptoms of a patient suffering from Patellofemoral Osteoarthritis include swelling, crepitus, pain while descending stairs, reduced range of motion and weakness of the knee extensors. There are various treatment techniques available for OA knee patients. Kinesio tape, bracing, cupping therapy, adapted physical activity, kinesiotherapy and physiotherapy are interventions that all offer possibilities in the improvement of symptoms and/or reduction of PFJ stress and pain in patients with patellofemoral joint osteoarthritis [6].

Taping can be used to reduce pain in knee osteoarthritis. There are different methods of taping, but the common effect is to exert a medially directed force on the patella to increase the patellofemoral contact area, thereby decreasing joint stress and reducing pain. Taping can be performed by a physiotherapist, but self-taping can be taught, which enhances self-management. Taping for knee osteoarthritis has National Health and Medical Research Council (NHMRC) Level I evidence of efficacy for pain relief and is associated with negligible adverse effects that generally include minor skin irritation [9].

Patellar taping is one of the methods used for treatment of patellofemoral joint osteoarthritis, developed to correct altered patellofemoral kinematics. It was originally developed by Jenny McConnell and is a simple, inexpensive self-management strategy. The aim is to create a mechanical realignment of the patella in the intertrochlear groove and reduce pain [10]. Different types of taping techniques are available

viz.

Kinesio taping, McConnell taping, Mulligan taping etc.

McConnell taping is a bracing or strapping technique using a super-rigid, cotton mesh, highly adhesive tape which is primarily used for neuromuscular re-education as it affects biomechanics of the patient. This taping technique was developed to correct altered patellofemoral kinematics and permit participation in normal daily activity [11] and to allow the patient to engage in physical therapy exercise pain free. McConnell taping is accomplished by way of application of specialized adhesive tape applied across the anterior aspect of the patella, pulling from lateral to medial, to in effect "medialize" the patellofemoral joint (PFJ). As such, the ability of the strapping procedure to maintain the medialized position of the patella is critical for the duration of the physical activity [12].

Kinesio taping which was developed by Dr. Kenzo Kase has become increasingly popular with many proposed benefits like alleviating pain [13,14] and improve the healing in soft tissues [15]. Kinesio taping is a therapeutic taping technique which relieves pain by facilitation of lymph and blood circulation. The theory behind using kinesio taping is that when applied it assists in providing a 'lift' to the skin allowing freer movement of fluid under the tape, this has been shown to be most effective with smaller / thinner strips of the tape [13].

MATERIALS AND METHODS

Study design: Type of study: Comparative study. Duration of study: 1 year. Place of study: Metropolitan city.

Sample design: Sample size: 60. Sample population: Patellofemoral joint osteoarthritis patients. (Age: 45 to 55 years) Sampling: Random sampling.

Materials used: Kinesio tape, McConnell Tape, Scissor, Universal Goniometer

Selection criteria

Inclusion criteria: Patients willing to participate, Patients between 45 to 55 years of age, Patients with diagnosed OA condition >2 months, Patient should have at least one test positive,

Clarke’s test or Patellar grind test, Patients with pain while descending stairs and squatting. NRS > 3/10 on activity - descending stairs and Squatting.

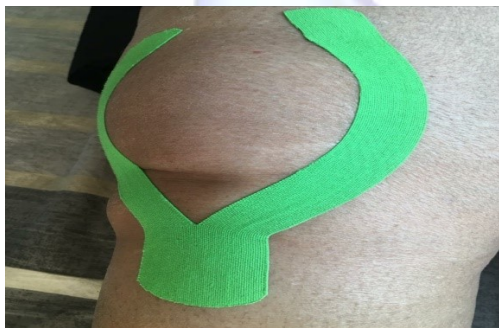
Exclusion criteria: Patient’s with traumatic injury, lower limb fracture, meniscal injury, bursitis or any surgical cases. Patient’s with knee pain, caused due to pathology of lumbar or hip pain. Patient’s with systemic disorder like uncontrolled diabetes. Patients which neurological, rheumatological or cardiovascular problems.

Procedure: A written consent was taken from the subject in the language best understood by them. Selection of the subjects was done as per the inclusion and exclusion criteria.

The subjects were divided into 2 groups, A and B, of 30 each.

Group A- Kinesio taping and Group B- McConnell taping Pre assessment of pain at rest and on activity (descending stairs and squatting) was done using NRS, and ROM using Universal Goniometer was done.

Group A: Kinesio Taping Patella is palpated and shifted medially and a Y shaped kinesio tape is applied around the patella with 50-75% tension.



Group B: McConnell taping

Patella is manually moved medially and maintained in medial tilt and an ‘I’ shaped athletic tape is anchored over the patella.



Immediate post assessment for both the groups was done similar to the pre assessment NRS score and ROM values were noted.

Results were obtained and statistically analysed using unpaired t-test as well as non-parametric tests (Wilcoxon and Man whitney)

RESULTS

Table 1: Comparison of pre and post McConnell taping on pain score on NRS for squatting and descending stairs.

	Mean (pain score /10)		Standard deviation		p value	Significance
	Pre	Post	Pre	Post		
Squatting	5.41	4.22	1.74	2.04	<0.0001	Yes
Descending stairs	5.61	4.25	1.66	1.76	<0.0001	Yes

Table 2: Comparison of pre and post McConnell taping on Knee ROM (Flexion and Extension).

	Mean (Knee ROM)		Standard deviation		p value	Significance
	Pre	Post	pre	Post		
Knee ROM (Flexion)	112.3°	121.13°	15.97	13.35	<0.0001	Yes

Table 3: Comparison of pre and post Kinesio taping on pain score on NRS for squatting and descending stairs.

	Mean (Knee ROM)		Standard deviation		p value	Significance
	pre	post	pre	Post		
KNEE ROM (Flexion)	103.26°	114.4°	19.15	18.14	<0.0001	Yes

Table 4: Comparison of pre and post Kinesio taping on Knee ROM (Flexion and Extension).

	Mean (pain score /10)		Standard deviation		p value	Significance
	pre	Post	Pre	Post		
Squatting	6	4.33	1.31	1.58	<0.0001	Yes
Descending Stairs	6.43	4.9	1.85	2.18	<0.0001	Yes

Table 5: Comparison of mean of Kinesio taping and McConnell taping of pain score on NRS for squatting and descending stairs.

Groups	Kinesio taping	McConnell taping	Standard deviation		P Value	Significance
	mean	mean	k tape	M tape		
Descending stairs	1.533	1.366	0.86	0.889	0.195	No
Squatting	1.666	1.166	0.844	0.912	0.021	Yes

Table 6: Comparison of mean of Kinesio taping and McConnell taping of Knee ROM (flexion and extension).

Groups	McConnell taping	Kinesio taping	P value	Standard deviation		Significance
				K tape	M tape	
Knee ROM (Flexion)	8.83	11.13	0.0334	4.66	5.45	Yes

DISCUSSION

60 subjects diagnosed with Patellofemoral OA knee of age group 45 to 55 years were selected. They were divided into 2 groups of 30 each in a random manner. Comparison of immediate effects of McConnell taping and Kinesio taping on ROM, Pain during Squatting and Descending stairs was done. The data was collected and analysed using parametric (paired t test) and non-parametric tests (Wilcoxon and Man Whitney).

Table 1 shows that there is significant decrease in pain score on NRS, Pre (mean=5.33) and Post (mean=4.16) McConnell taping during Squatting (p value <0.0001) and Pre (mean=5.53) and Post (mean=4.16) McConnell taping during Descending stairs (p value <0.0001). This is also supported by Kay m Crossley et al. in their study, they have concluded that patellar taping may reduce mal-alignment n pain associate with Patello femoral joint OA. As patellar taping resulted in reduction in lateral patellar displacement and tilt, and an immediate reduction in pain [15].

Table 2 shows that there is significant difference in Knee ROM (Flexion) Pre (mean=112.3°) and Post (mean=121.13°) McConnell taping (p value <0.0001). This is also supported with a study stating that patellar taping includes different components which lead to change in the patellofemoral joint contact area hence leading to improving joint mobility and ROM. Also, patellar taping reduces stress on infrapatellar fat pad which might increase the ROM [1].

Studies have also shown effect of McConnell taping on improving ROM and reducing pain in Patellofemoral OA knee patients. The technique used in the present study of medially shifting and medially titling the patella which reduces the lateral shift of patella might also be a big reason for improvement in immediate increase in ROM by reduction in pain.

Table 3 shows that there is significant decrease in pain score on NRS, Pre (mean=6.0) and Post (mean=4.33) Kinesio taping during Squatting and Pre (mean=6.43) and Post (mean=4.90) Descending stairs (p-value <0.0001) as application of Kinesio taping may provide proper sensory

feedback to patients hence reducing the fear of movement associated with pain intensity in patients with knee OA. Also a study by June-sunkim et al. done on 46 OA knee subjects states that KT application on any painful area would lead to increase in action of fast afferent fibres and thereby inhibiting the transmission of pain perception to the brain, which leads to reduction of pain while performing functional activities like squatting and descending stairs [16].

Table 4 shows that there is significant difference in Knee ROM (Flexion) Pre (mean=103.26°) and Post (mean=114.40°) Kinesio taping (p value <0.0001). Ebru kaya mutlu et al. in their study done on 42 knee OA patients have concluded that patients receiving KApplication exhibited short term improvements in VAS and knee flexion ROM after the 1month follow up.¹⁷ As kinesio tape is hypothesized to activate increase in blood circulation in the taped area which increases ROM within the relevant muscles.

Clinical observation and empirical evidence indicate that Kinesio taping improves the ROM which might be due to increased recruitment of muscle motor units and maximal voluntary contraction as per stated in previous studies also K-taping creates space by adhering to the skin layer which reduces pain in functional activities as seen in the present study on squatting and descending stairs.

Upon inter group analysis (McConnell taping v/s Kinesio taping) of ROM shown in Table 5 and squatting shown in Table 6 we found out that Kinesio taping is a better taping technique in immediate increase in knee ROM as well as significant decrease in pain score on NRS than McConnell taping (p value=0.0334, p value=0.0212). Conversely inter group analysis of descending stairs shown in Table 6 we found out that there is no significant difference in pain score on NRS amongst Kinesio taping v/s McConnell taping (p value=0.1955).

On basis of Statistical reference the present study supports previous studies stating that McConnell taping as well as Kinesiotaping both have significant improvement in ROM and reduction in pain scores on NRS of functional activities.

Conversely, arguments on which type of taping

(McConnell taping v/s Kinesiotaping) would be better in observing immediate effect, have been clinically co-related and statistically proven in the present study stating that both types of tapes have significant difference in intra-group analysis but on inter-group analysis we come to a conclusion that Kinesiotaping is better in improving pre and post Knee ROM as well as pre and post pain score on NRS during Squatting. But there is no significant difference on pre and post pain score on NRS during descending stairs hence concluding that both types of tape are equally useful according to the present study.

Clinical implication: Treatment protocol to be modified and application of tape to be used for clinical improvement. Taping can be added as an adjunct to the on-going exercise program. Taping can be used to improve immediate Knee ROM and immediate decrease in pain experienced during functional activities.

Limitations: Only the immediate effect of taping is taken into consideration rather than studying the duration of effect of these types of tapes as they loosen after sometime, reducing their effect. Pain at rest is not taken into consideration. No specific Squatting degree was considered. Small sample size.

CONCLUSION

Thus, in our Study Immediate effect of Kinesio Taping v/s McConnell Taping on Patello-femoral Joint OA Knee Patients concluded that, there was statistically significant increase in Knee Flexion and Extension Range of Motion and statistical significant decrease in Pain score on NRS during Squatting. While during Descending Stairs, there was no such statistically significant difference seen.

ABBREVIATIONS

PFJOA- Patellofemoral OA knee patients

NRS- numeric rating scale

ROM- range of motion

ACKNOWLEDGEMENTS

I take this wonderful opportunity to thank all the "HANDS" which have joined together to make this project a SUCCESS. It's my great pleasure a privilege to express my deep felt gratitude to our respected Principle sir Dr. Ajay Kumar

and Guide-Dr. Leena Zore who immensely helped me and rendered their advice, precious time, Constant encouragement, knowledge and relevant Information regarding my study. And whose suggestion and guidance has enlightened me on this subject. It's my great pleasure to thank all my subjects who have participated in this study, without them this study would not have been possible. I also take this opportunity to thank the statistician (Radhika Shingala), Librarian, all the teaching and the non-teaching staff, all my friends and colleagues for their support and guidance has enlightened me on this subject.

Conflicts of interest: None

REFERENCES

- [1]. Altman R, Asch E, Bloch D, et al. Development of criteria for the classification and reporting of osteoarthritis of the knee. *Arthritis Rheum.* 1986;29:1039–49.
- [2]. Kopec JA, Rahman MM, Berthelot JM, et al. Descriptive epidemiology of osteoarthritis in British Columbia, Canada. *J Rheumatol.* 2007;34:386–93.
- [3]. Silman AJ, Hochberg MC. 2nd ed. Oxford: Epidemiology of the Rheumatic Diseases, Oxford University Press; 2001.
- [4]. Akinpelu AO, Alonge TO, Adekanla BA, Odole AC. Prevalence and pattern of symptomatic knee osteoarthritis in Nigeria: A community-based study. *Internet J Allied Health Sci Pract.* 2009;7:3
- [5]. Symmons D, Mathers C, Pflieger B. Global Burden of Osteoarthritis in year 2000: Global burden of disease 2000 study. *World health report.* 2002;5Version 2
- [6]. Musumeci, G. Effects of exercise on physical limitations and fatigue in rheumatic diseases. *World J. Orthop.* 2015;6:762-769.
- [7]. Kornaat PR, Bloem JL, Ceulemans RY, Riyazi N, Rosendaal FR, Nelissen RG, Carter WO, Hellio Le Graverand MP, Kloppenburg M: Osteoarthritis of the knee: association between clinical features and MR imaging findings. *Radiology* 2006;239:811-817.
- [8]. Lane NE, Brandt K, Hawker G, Peeva E, Schreyer E, Tsuji W, Hochberg MC: OARSI-FDA initiative: defining the disease state of osteoarthritis. *Osteoarthritis Cartilage* 2011;19:478-480.
- [9]. Crossley KM, Marino GP, Macilquham MD, Schache AG, Hinman RS. Can patellar tape reduce the patellar malalignment and pain associated with patellofemoral osteoarthritis? *Arthritis Rheum* 2009;61:1719–25.
- [10]. Aminaka N, Gribble PA. Patellar taping, patellofemoral pain syndrome, lower extremity kinematics, and dynamic postural control. *Journal of Athletic training.* 2008 Jan;43(1):21-8.

- [11]. AdityaDerasari, Timothy J. Brindle, Katharine E. Alter, Frances T. Sheehan., McConnell Taping Shifts the Patella Inferiorly in Patients With Patellofemoral Pain: A Dynamic Magnetic Resonance Imaging Study, *Physical Therapy*, 2010;90(3):411 – 420.
- [12]. Ronald P. Pfeiffer, Mark DeBeliso, Kevin G. Shea, Lorrie Kelley, Bobbie Irmischer and Chad Harris., Kinematic MRI Assessment of McConnell Taping Before and After Exercise, *The American Journal of Sports Medicine*, 2004;32:621-628
- [13]. Jacobsen FT. Kinesio Taping & its effects beneath the skin. *Therapy Expo*. 2016
- [14]. Marc Campolo, JenieBabu, KatarzynaDmochowska, ShijuSCariah, JincyVarughese, A comparison of two taping techniques (Kinesio and McConnell) and their effect on anterior knee pain during functional activities , *The international Journal of Sports Physical Therapy*, 2013.
- [15]. Crossley KM, et al.:Can patellar tape reduce the patellar malalignment and pain associated with patellofemoralosteoarthritis? *Arthritis Rheum*. 2009 Dec 15;61(12):1719-25. doi: 10.1002/art.24872.
- [16]. Junesun Kim et al.:Kinesio Taping Improves Pain, Range of Motion, and Proprioception in Older Patients with Knee Osteoarthritis: A Randomized Controlled Trial. *American Journal of Physical Medicine & Rehabilitation* 2014;94(3).
- [17]. Kaya Mutlu E, et al.:DoesKinesio Taping of the Knee Improve Pain and Functionality in Patients with Knee Osteoarthritis?: A Randomized Controlled Clinical Trial. *Am J Phys Med Rehabil*. 2017 Jan;96(1):25-33.

How to cite this article:

Mihir N. Mange, Leena Zore, Ajay Kumar. IMMEDIATE EFFECT OF KINESIO TAPING v/s McCONNELL TAPING IN PATELLOFEMORAL OA KNEE PATIENTS. *Int J Physiother Res* 2019;7(2):3040-3045. DOI: 10.16965/ijpr.2019.111