



## “ROLE OF KINESIOLOGY TAPING & MCCONNELL TAPING IN PATELLOFEMORAL PAIN SYNDROME: A COMPARATIVE ANALYSIS.”

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### KEYWORDS :

Patellofemoral pain syndrome (PFPS) is a common diagnosis in orthopaedic and sports medicine clinics. Long-term consequences of anterior knee pain in adolescence and young adulthood include a predisposition to patellofemoral osteoarthritis in later life<sup>1,2</sup>

PFPS patient has excessive stress on patellofemoral joint in case of structural abnormality of the lower extremities, mainly including the weight bearing axis or mal-rotation due to developmental anomaly<sup>3</sup>. A weak medialis and tight IT band increase lateral shear and patellofemoral joint stress<sup>4,5</sup>. An imbalance in muscle activities & strong impulsive contractions in sporting leads to abnormal patellar tracking<sup>6,9</sup>.

Various conservative treatments have been discussed in literature with role of multi-modality treatment being stressed. Of these taping is a commonly used adjunct, with the McConnell taping technique and the Kinesiology taping method being most popular. The purpose of this study was to evaluate the two methods of taping, Kinesiology and McConnell separately and compare them first to controls and secondly with each other.

#### Material & Methods:

A prospective case control study included 150 patients diagnosed with PFPS after informed written consent. The cases with known ligament/meniscal damage, patellar subluxation or dislocation or bony deformity were excluded. The patients enrolled were examined thoroughly to establish diagnosis. Patients complaining of anterior knee pain during at least two of the following activities; ascending/descending stairs, squatting, running, prolonged sitting, hopping for more than 2 months were included. Patellar mal-tracking was assessed for in the clinical examination under categories of tilt, external rotation & glide.

The participants were divided into three groups of which the first group received home based therapy including an exercise programme. Participants of group 2 were treated with McConnell taping. Third group of patients underwent treatment with Kinesiology taping in addition to the home-based therapy. Acetaminophen was used in patients experiencing severe pain on as required basis.

Functional assessment was done using KUJALA Knee Score<sup>10</sup>. Clinical outcome was assessed using step test<sup>11</sup> and triple jump test<sup>12</sup>.

For all descriptive and statistical analysis, Statistical Package for Social Sciences (SPSS) Version 23 was used.

#### Results:

Amongst the total cohort of 150 patients, there were 66 females and 84 males. In the Home-Based therapy (group A) there were 21 females and 29 males. The McConnell taping (group b) had 25 males and females each, and the Kinesiology taping (group C) had 30

males and 20 females respectively. The mean age of the cohort was  $26.55 \pm 5.172$  years. The mean duration for the pathognomonic symptoms of PFPS in the study cohort enrolled was  $6.22 \pm 2.7$  months. When assessed for site of involvement, 66 people had right sided pain, 54 complained about pain on the left side while 30 had bilateral pain. Patellar maltracking was present in almost 30% (47) patients. They had either patellar tilting (26), patellar gliding (16) or external rotation of the patella (5).

In this study both functional and clinical outcomes were assessed at baseline, 3 week follow up and 6 week follow up. Assessing the functional outcome, the mean VAS and KUJALA score at baseline, and follow up of 3 weeks and 6 weeks were  $7.43 \pm 1.73$  and  $67.87 \pm 7.32$ ,  $5.16 \pm 1.147$  and  $80.52 \pm 5.7$ , and  $2.60 \pm 1.215$  and  $90.77 \pm 9.383$  respectively.

The step test results at these three instances were  $21.53 \pm 5.4$ ,  $33.41 \pm 5.63$ , and  $42.98 \pm 6.38$  respectively. The mean distance jumped in the triple jump test at baseline and two follow ups was  $253.53 \pm 32.95$  cm,  $290.23 \pm 36.317$  cm and  $307.70 \pm 35.88$  cm respectively. At 3 weeks clinical and functional outcomes improved in all the three groups with no statistically significant difference between group 2 and 3. But there was a statistically significant difference in scores between control and both case groups individually suggesting taping to be an effective adjunct to therapy. These findings have been summarized in Table 1.

**Table 1 – Functional and clinical parameters at baseline, and follow up of 3 and 6 weeks**

Parameter (n=150)	Baseline	3 week Follow up	6 week Follow up
VAS Score	$7.43 \pm 1.73$	$5.16 \pm 1.147$	$2.60 \pm 1.215$
KUJALA score	$67.87 \pm 7.32$	$80.52 \pm 5.7$	$90.77 \pm 9.383$
Step Test (no. of steps)	$21.53 \pm 5.4$	$33.41 \pm 5.63$	$42.98 \pm 6.38$
Triple Jump Test (in cm)	$253.53 \pm 32.95$	$290.23 \pm 36.317$	$307.70 \pm 35.88$

At 6 week follow up KUJALA score & step test results continued to be significantly better in patient undergoing McConnell taping & kinesiology taping, while VAS score and triple jump test results were better but insignificant as compared to control group.

The comparative results between home based therapy versus McConnell taping and kinesio taping at 6 week follow-up was as described (Table 2-4)

McConnell Taping versus Kinesiology Taping in patients with Patellar Mal-tracking revealed McConnell's taping had significantly better results as compared to Kinesiology taping. (Table 5). The results of this multivariate analysis are in concordance with results of univariate analysis as described before thus establishing the

presence of minimal confounding variables in the data collected through this study. (Table 6)

**Table 2 – Comparison of Home Based Therapy versus McConnell Taping at 6 weeks**

Parameter	Home Based therapy	McConnell Taping	p-value
VAS Score	2.72 ± 1.4	2.64 ± 1.083	0.750
KUJALA score	85 ± 4.63	92.78 ± 13.515	0.000
Step Test (no. of steps)	39.84 ± 7.736	47.28 ± 4.699	0.000
Triple Jump Test (in cm)	308.20 ± 37.427	308.60 ± 34.76	0.856

**Table 3 – Comparison of Home Based Therapy versus Kinesiology Taping at 6 weeks**

Parameter	Home Based therapy	Kinesiology Taping	p-value
VAS Score	2.72 ± 1.4	2.71 ± 1.146	0.977
KUJALA score	85 ± 4.63	90.52 ± 3.327	0.000
Step Test (no. of steps)	39.84 ± 7.736	41.82 ± 3.415	0.101
Triple Jump Test (in cm)	308.20 ± 37.427	306.30 ± 36.081	0.797

**Table 4 – Comparison of McConnell Taping versus Kinesiology Taping at 6 weeks**

Parameter	McConnell Taping	Kinesiology Taping	p-value
VAS Score	2.64 ± 1.083	2.71 ± 1.146	0.108
KUJALA score	92.78 ± 13.515	90.52 ± 3.327	0.037
Step Test (no. of steps)	47.28 ± 4.699	41.82 ± 3.415	0.000
Triple Jump Test (in cm)	308.60 ± 34.76	306.30 ± 36.081	0.048

**Table 5 – Comparison of McConnell Taping versus Kinesiology Taping at 6 weeks in patients with patellar maltracking**

Parameter	McConnell taping	Kinesiology Taping	p-value
VAS Score	2.36 ± 1.216	2.60 ± 1.237	0.050
KUJALA score	94.44 ± 24.7	89.36 ± 3.5	0.039
Step Test (no. of steps)	48.86 ± 4.622	41.67 ± 3.308	0.000
Triple Jump Test (in cm)	312.86 ± 38.516	304.72 ± 35.125	0.035

**Table 6 – Multivariate analysis of outcomes between McConnell Taping and Kinesiology Taping at 6 week follow up.**

Parameter	β coefficient	p-value	Confidence Interval
VAS Score	-0.224	0.044	0.497 – 0.884
KUJALA score	0.135	0.050	0.296 – 0.915
Step Test (no. of steps)	-0.363	0.000	0.602 – 0.803
Triple Jump Test (in cm)	-0.006	0.456	0.980 – 1.009

**Discussion:**

Taping has been widely discussed adjunct in the multi modality approach to patellofemoral pain syndrome. Although literature exists supporting the role of this therapy, no clear cut superiority of this modality to home based treatment or between the different techniques of taping has not been established. The study is an attempt to clarify the role of taping in patellofemoral pain syndrome and efficacy of different methods of taping.

Taping has been shown to function by stimulation of cutaneous mechanoreceptors thereby increasing sensory feedback to the central nervous system.<sup>13</sup> This is proposed to cause pain to decrease by modulation of pathways of pain. Mc Connell taping also aims to improve patellar mal-alignment thereby correcting the forces across the patellofemoral joint and thus decreasing frictional forces across the joint. Therapeutic exercises in the form of knee and hip muscle strengthening have proved to decrease the muscle imbalance and help alleviate symptoms. Results from Mostamand et. Al<sup>14</sup>, Aminaka et. Al<sup>15</sup> & Kaya et. Al.<sup>16</sup> support the use of Mc Connell

taping to correct patellar mal-alignment. Chang et. Al<sup>13</sup> reported that kinesiology taping of a muscle stimulates the muscle spindles or the golgi tendon organs. Kuru et. Al and abbas et. Al demonstrated that kinesiology taping combined with strengthening exercises improved the training effects of VMO muscle. They inferred that kinesiology taping facilitated quadriceps muscle contraction and the increase muscle strength provided dynamic patellar stability and maintain normal patellar tracking thus reducing pain. The study also provides supportive evidence in favour of a multi modality approach to treatment and proposes mc connel taping to have slightly superior results to kinesiology taping.<sup>17</sup> The major limitation to our study remain small sample size and a short follow-up which warrants a larger multi-centric double blind randomised control trials with a longer follow-up for uniformity of extrapolation of results to a larger population.

**Conclusion:**

Author recommends McConnell taping and Kinesiology taping to have comparable outcomes, however, over a period of time results with McConnell taping are significantly better than those with Kinesiology taping. The clinician should remember that the patellofemoral joint is only one part of the dynamic lower extremity chain and that it is critical to identify the source of the problem and use appropriate techniques to correct that problem to ensure optimal results

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