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Immediate effect of mcconnell taping in females with patellofemoral osteoarthritis knee: An experimental study

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Abstract
Objective: To study the immediate effect of McConnell taping on pain and knee flexion range of motion in females with patellofemoral osteoarthritis knee
Background: There is limited study available that supports that McConnell taping can be used in treatment of patellofemoral osteoarthritis knee in females.
Study Design: Experimental Study
Methods: The ethical clearance was taken from the college and consent was taken from the 60 subjects diagnosed with patellofemoral osteoarthritis knee. Pre and post outcome measures used were NPRS (Numerical Pain Rating Scale) and knee range of motion. The subjects were assessed immediately for change in pain and knee range of motion after McConnell taping.
Results: Pre and post mean values for NPRS were 6.7 ± 1.53 and 3.91 ± 1.29 respectively. Pre and post mean values for Active ROM knee flexion were 79.83 ± 18.62 and 92.08 ± 17.81 respectively.
Conclusion: In the present study, it was found that that there was an immediate effect of McConnell taping on pain and knee flexion ROM in females with Patellofemoral Osteoarthritis Knee.

Keywords: McConnell taping, patellofemoral osteoarthritis knee, immediate effect

1. Introduction

- Osteoarthritis (OA), a major health problem, is one of the most common chronic degenerative joint disorder; it is characterized by increasing joint pain, stiffness, and limitations in Range of Motion (ROM) [1]. Osteoarthritis (OA) of knee is a common disease affecting thousands of Indian citizens.
- It is a prevalent musculoskeletal condition in older age group, causing pain, physical disability, and decreased quality of life too [2]. Patellofemoral arthritis occurs due to the loss of the cartilage of the patella and the trochlear groove in approximately half of the patients diagnosed with degenerative arthritis of the knee [3].
- The patellofemoral joint (PFJ) is one compartment of the knee that is usually affected by OA and is a source of symptoms. Within the PFJ, the lateral compartment is more frequently affected by the OA process than the medial. In current Indian scenario, patellofemoral osteoarthritis (PFOA) is on a rise and is early form of knee Osteoarthritis in middle and old age, associated with pain and functional limitation of daily activities. [4]
- Risk factors such as activities that increase load on the patellofemoral joint (ascending, descending stairs, squatting), quadriceps weakness, and patella malalignment increase the likelihood of developing patellofemoral OA. These risk factors can be used to design specifically tailored interventions to prevent incidence and progression of disease. Patellofemoral pain syndrome (PFPS) is one of the most common knee problems, predominantly in women. It appeared that amongst females, the prevalence of patellofemoral OA was (41%)
- 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.

- Patellar taping is one of the method 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.

Mcconnell Taping

- McConnell taping, first presented by Jenny McConnell in 1984, has been used to correct patellar medial glide or tilt and revealed positive effects in pain for PFPS relief and revealed positive effects in pain for PFPS.It is a simple, inexpensive.
- 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 [5].

Image 1: McConnell Taping for patellofemoral Osteoarthritis knee

2. Need of Study

- Patellofemeoral osteoarthritis is common in females accordingly with higher prevalence of 41%. Taping is useful for reducing pain and improving functional activities.
- Various types of taping techniques are available like Kinesiotaping, Mulligan taping, McConnell taping, sham taping etc. McConnell taping was developed by Jenny McConnell, it is simple and inexpensive.
- There are few literatures available on the effect of McConnell taping in patellofemoral pain syndrome.
- Hence the present study has been conducted to study the immediate of McConnell taping in females with knee osteoarthritis

3. Aim

To find the immediate effect of McConnell taping on pain and knee flexion range of motion (ROM) in females with patellofemoral Osteoarthritis knee.

4. Objectives

To study the immediate effect of McConnell taping on pain and knee flexion range of motion in females with patellofemoral osteoarthritis knee.

5. Hypothesis

Null Hypothesis: There is nosignificant difference in the effect of McConnell taping on pain and range of motion in females with patellofemoral osteoarthritis knee.

Alternative Hypothesis: There is significant effect of McConnell taping on pain and range of motion in females with patellofemoral osteoarthritis knee.

6. Materials

- Pen. Paper.
- Rigid tape.
- Universal Goniometer – To measure the range of motion.
- Consent form.

7. Methodology

- Study Type - Experimental study.
- Sample Size -60.
- Sampling Method - Convenient sampling.
- Study Population - Females of age group 44-55 years.
- Study Setting - In and around Pune city.

8. Inclusion Criteria

- Age group- 45-55years.
- Patient should have the test positive - Clarke's test.
- Patients with pain while ascending, descending stairs and squatting. NPRS > 3/10 on activity**.**

9. Exclusion Criteria

- Patient's with traumatic injury.
- History of any lower limb fracture.
- Any operative or surgical cases.
- Patient's with knee pain, caused due to pathology of lumbar or hip pain.

10. Procedure

Ethical clearance was taken from college, subjects were from clinics in and around Pune city selected according to the inclusion and exclusion criteria.

Consent was taken from the subjects and they were informed about the study.

The subjects, pretreatment were assessed of pain and knee range of motion by using NPRS (Numerical Pain Rating Scale) and knee range of motion.

Image 2, 3: Knee ROM Using Goniometry

Preparing to Tape

- Before applying tape it may be necessary to shave the skin. Ensure the skin is thoroughly cleaned and dried before applying tap.
- Ask the patient to perform a symptom-provoking activity such as a step down before applying the tape so that the level of pain can be reassessed following tape application. Better results will be obtained if immediate reductions in pain can be obtained with tape.
- Apply the tape with the patient either lying or sitting on the edge of a chair with the leg extended and the thigh muscles relaxed.

The Taping Method Consist of The Following Step
Medial tilt and medial glide
The tape was started in the middle of the patella, at the level of the superior aspect, the skin was lifted on the medial side of the knee towards the patella and the tape was pulled medially. This tilted the lateral patellar border away from the femur.

Image 3 and 4: McConnell Taping for patellofemoral OA knee

11. Outcome Measures
- Numerical Pain Rating Scale (NPRS)
  Reliabilty and Validity Of NPRS:
  Reliabilty = 0.96 and 0.95
  Validity = 0.86 to 0.95
- Goniometry for knee flexion

12. Literature Review
1. Ahmed r. omar, m. sc.; Ragia m. kamel, *et al* studied that – 'Kinesiotaping versus McConnell Taping in Management of Knee Osteoarthritis' There was a significance difference between Group A and B in symptoms, pain and Quality of Life (QOL) parts of KOOS (p=0.003, 0.012 and 0.031 respectively) and active ROM of knee flexion (p=0.008). There was a significance difference between Group A and C in pain severity, Activities of Daily Living (ADL), sport/recreation and QOL parts of KOOS (p=0.0001, 0.004, 0.002, 0.0001 respectively) and active ROM of knee flexion (p=0.019).
2. S. Kobayashi, E. Pappas, M. Fransen, *et al*: These findings confirm the substantial prevalence of patellofemoral OA, demonstrating the need to specifically consider the patellofemoral joint in knee OA research and clinical settings.
3. Young-Mo Kim, MD, PhD and Yong-Bum Joo, MD, PhD: Patellofemoral Osteoarthritis Patellofemoral arthritis is a fairly common disease, and it has been gaining interest with increasing number of studies due to its diverse treatment methods. Patellofemoral arthritis has a broad range of management options according to the characteristics of individual diseases. Identifying whether patellofemoral arthritis is the primary cause of knee pain and is compartment arthritis is necessary for establishing an adequate treatment method. Through investigation of the literature, the issues of recent knowledge of femoropatella arthritis and the diagnosis and treatment of which were studied.
4. Riddhi Shroff, Vrushali Panhale: Effect of Anterior Knee Pain on Lower Extremity Functions in Young Adults. Maximally affected activities are difficulty in using stairs, squatting, sitting with knee flexed and maximally affected lower limb functions are going up and down the stairs, squatting and standing for 1 hour, sitting for 1 hour. There is very less awareness of physical therapy as management for anterior knee pain. There was a high positive correlation between anterior knee pain scale and lower extremity functional scale.

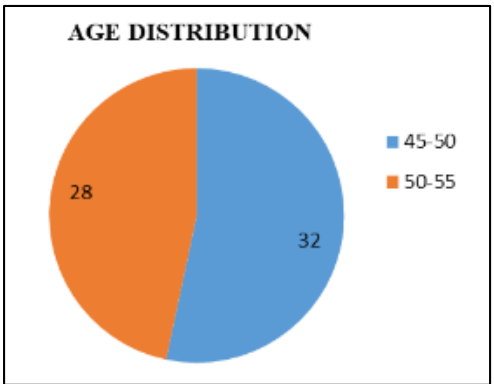
13. Discussion
- The objective of this study was to see the immediate effect of McConnell taping on patellofemoral osteoarthritis knee on pain and knee flexion range of motion.
- Study included 60 subjects diagnosed with Patellofemoral OA knee of age group 45 to 55 years of females were selected. Mean age group was 50.
- Pre and post assessment was done for pain and knee flexion ROM, using NPRS and goniometry. Pain was assessed only in ascending and descending stairs.
- It was observed through NPRS that pain significantly reduced after McConnell taping. It was observed through goniometry that there was significant increase in knee range of motion.
- According to studies, McConnell taping includes different components who cause changes in the patellofemoral joint contact area, which leads to improving joint mobility and range of motion. It also reduces stress on infrapatellar fat pad which might increase the range of motion.
- Studies have also shown that medially shifting and medially tilting of patella reduces the lateral shift of patella which might be a reason for immediate reduction of pain and increase in knee flexion range of motion.
- Statistical analysis of NPRS was done using Wilcoxon test. Pre and post mean values for NPRS were 6.7 ± 1.53 and 3.91 ± 1.29 respectively. P value obtained was <0.0001 which is highly significant.
- Statistical analysis of knee flexion ROM was done by using paired t test. Pre and post mean values for Active ROM knee flexion were 79.83 ± 18.62 and 92.08 ± 17.81 respectively. P value obtained was <0.0001 which is highly significant.
- McConnell taping was found to be effective in treatment of patellofemoral OA knee.
- In this study it was found that McConnell taping is highly effective immediately in reducing pain and improving knee range of motion in patients with patellofemoral OA knee.

14. Conclusion
In the present study, it was concluded that McConnell taping has immediate effect on pain and knee range of motion reducing pain and improving knee flexion in females with patellofemoral osteoarthritis knee.

15. Statistical Analysis
Age Wise Distribution:

Table 1: Age Wise Distribution

Age	Number
45-50	32
51-55	28

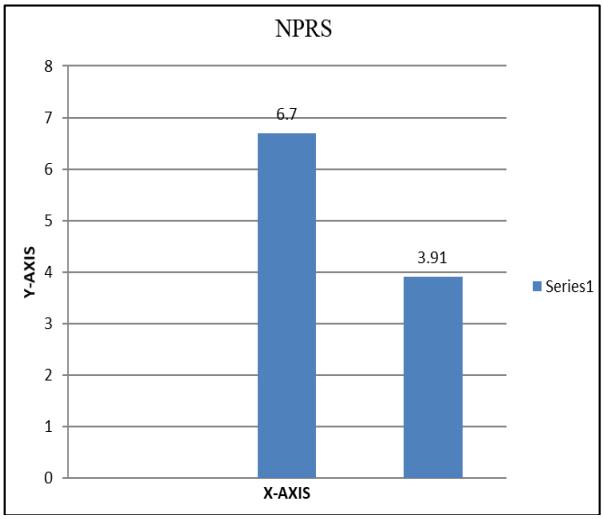


Pie Chart 1: showing age wise distribution

Pre and post values of NPRS

Table 2: Pre and post values of NPRS

	Pre	Post
Mean	6.7	3.91
SD	1.53	1.29
P- Value	<0.0001	

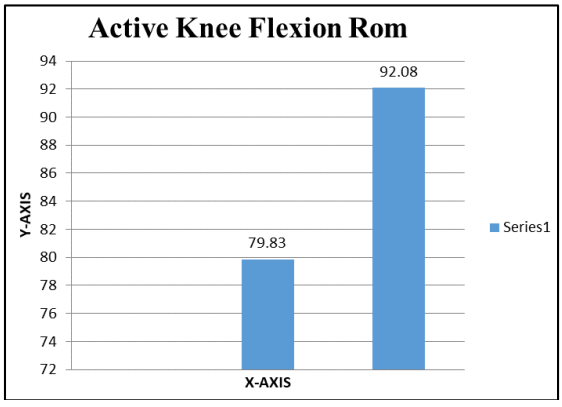


Graph 1: Graph showing pre and post scores of NPRS

Pre and Post values of Knee Flexion Range of Motion

Table 3: Pre and Post values of knee flexion ROM

	PRE	POST
Mean	79.83	92.08
SD	18.62	17.81
P- Value	<0.0001	



Graph 2: Graph showing Pre and post values of Knee ROM

16. Result

The present study was conducted to study the immediate effect of McConnell taping on pain and knee range of motion in females with patellofemoral osteoarthritis knee.

Statistical analysis was done using Primer of Biostatistics version 7.0 and the outcome measures used were NPRS and knee ROM.

The Pre and post mean values for NPRS were 6.7 ± 1.53 and 3.91 ± 1.29 respectively. It was done using Wilcoxon Test. The p value obtained was <0.0001, which is highly significant.

The Pre and post mean values for Active ROM knee flexion were 79.83 ± 18.62 and 92.08 ± 17.81 respectively. It was done using paired t test. The p value obtained was <0.0001, which is highly significant.

17. Limitations

- Sample size was small.
- Only knee flexion range of motion was taken into consideration.

18. Future Scope of The Study

- Long term effect of McConnell taping on patellofemoral osteoarthritis can be seen in males with sitting jobs.
- McConnell taping can be done in patients with patellar instability at young age athletes.

19. References

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