Original Article

A Study to Compare the Efectiveness of Tibio Femoral Joint Mobilization Versus Maitland Mobilization in Patellofemoral Pain Syndrome

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Abstract

Background and need of research: Abnormal patellar biomechanics and patellar arrangement result in patello-femoral pain syndrome. The initial course of treatment for non-operative management is physical therapy. Therefore, it is necessary to compare the effectiveness of Tibio femoral joint mobilisation with Maitland mobilisation in treating patellofemoral pain syndrome.

Methods: Sample where collected from YMT college of Physiotherapy. Group A consists of 20 female and 10 Male subjects of age group 30 to 40 years Tibiofemoral mobilization was given while Group B Maitland Mobilization having 17 female and 13 male subjects. The study was conducted during the month of March 2023 to June 2023. Each group attended five therapy sessions a week for a total of 6six weeks. As pre and Post outcome assessments, the NPRS scale, Knee range of motion and KUJALA Score Questionnaire were utilised,both before and after the treatment. patients with patellofemoral pain syndrome, ranging in age from 25 to 40, were both male and female. Tibiofemoral mobilisation was used in Group A's conventional therapy while Maitland mobilisation was used in Group B's conventional therapy. Each group attended five therapy sessions a week for a total of six weeks. As pre- and post-outcome assessments, the visual analogue scale, knee range of motion, and KUJALA score Questionnaire were utilised. both before and after the treatment, in the sixth week.

Result: The intragroup comparison of the NPRS, knee range of motion, and KUJALA patellofemoral scale among the 30 patients in each group was statistically highly significant with p=0.001 for both groups. In contrast to the Maitland mobilisation in Group B, the Tibiofemoral mobilisation in Group A demonstrated a Highly Significant improvement.

Conclusion: Tibiofemoral mobilisation combined with traditional therapy is more effective at reducing pain, enhancing range of motion, and improving functional ability in PFPS after six weeks.

Keywords: Patellofemoral Pain syndrome, KUJALA Patellofemoral scale, Maitland mobilization, Tibiofemoral mobilization.

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Introduction

The patellofemoral pain syndrome (PFPS), which accounts for around 25% of orthopaedic diagnoses, is one of the most common musculoskeletal conditions of the knee. Knee pain is frequently caused by patellofemoral pain syndrome (PFPS), especially in physically active females.[4-5] The patellofemoral joint is loaded by activities including stair climbing or descending, squatting, running, and kneeling, which cause anterior knee discomfort that manifests as stiffness, soreness, or both.

Walking up or down stairs, climbing or descending hills, lunging, squatting, running, biking, and prolonged sitting with the knee bent 90 degrees all serve to increase symptoms.[6,7,8,9] Muscle imbalance between the vastus medialis oblique (VMO) and vastus lateralis (VL) is caused by abnormal biomechanic,which results in patellar maltracking or malfunctioning.In comparison to the VL muscle, the VMO muscle functions. Patellar maltracking results when it malfunctions, such as when recruitment of the VMO relative to the VL is delayed It is quite challenging to cure PFPS[10]

The majority of patients benefit from conservative interventions.[11-15] There is little information on the effects of Maitland and tibiofemoral mobilisation in PFPS patients. To ascertain the effect of TFJ and Maitland mobilisation on pain, the current study was designed in PFPS patients.

When performing a tibiofemoral posterior glide, the patient is lying on their back, flexing their knee as comfortably as possible. The thumb is used as a grade 1 distraction to drive the tibia posteriorly. Posterior glide aids in expanding the range of flexion.

When doing a tibiofemoral anterior glide on a patient who is resting on their stomach, a tiny pad is placed beneath the lower femur to prevent patellar compression. To stabilize one side of the joint, the therapist applies gliding force with the hand on the proximal tibia in an anterior orientation. The force may be delivered to the medial or lateral tibial plateau.

According to Maitland (1985), mobilisation, which is characterised as a passive movement, is a frequent kind of treatment for people with a variety of neuromusculoskeletal problems. It accomplishes two main goals: In addition to easing discomfort and regaining functional mobility, it aims to preserve normal joint range of motion through activities like passive swinging and ongoing stretching.[17,18] The preservation of normal joint range of motion is the second goal.

With the patient's knee flexed, the Maitland-Patellofemoral movement is performed. erapist stands next to patient's knee while they both sit on the edge of the couch. The therapist's right palm is cupped around the patella. The superior margin of the patella is forced up against the heel and ulnar border of the left hand. The force is applied to maintain the patient's lower leg in the desired degree of flexion. From this starting posture, the therapist can develop a variety of oscillatory movement orientations.

Need of Study:

Patellofemoral pain syndrome (PFPS) is a common condition associated with overuse injuries of the lower extremity. It is caused by abnormal biomechanics and abnormal arrangement of patella. Physical therapy (PT) is the first-line treatment program as non-operative management. Therefore, there is increase in need to compare the effectiveness of tibio femoral joint mobilization versus Maitland mobilization in patellofemoral pain syndrome

Material and Methods

An experimental study was performed on 30 patients of Patellofemoral pain syndrome in two groups of both male and female of age between 25-40 years, using convenient sampling method. Patients fulfilling the inclusion criteria are positive findings on doing apprehension test and having complaint for past 30 days. And excluding patients having deformities, soft tissue injuries, fracture, dislocation of patella, Patella alta signs of any intra -articular derangement of the kneejoint such as effusion and meniscal tear.Patients fulfil the inclusion criteria as those Clinical assessment positive on using apprehension test having complaint for past 30 days. Excluding patients having any deformities, any soft tissue injuries, fractures, dislocations of patella, Patella Alta, previous knee surgeries, Symptoms or signs of any intra-articular derangement of the knee joint, such as effusion and meniscal tear.

The patients were sampled into two group Group A received Tibiofemoral Mobilization with Conventional therapy and Group B received Maitland mobilization with conventional therapy Each subject of the study was treated 6 weeks, 5 times a week.

Conventional therapy treatment given to the subjects of both the group was in the form of Hot packs followed by stretching to gastrocnemius soleus, hamstring, tensor fascia lata and Iliotibial band, VMO Muscle Strengthening was done using wall squat with 40^0 -60^0 knee flexion with hip adduction. Hip abductor strengthening, High sitting quadriceps strengthening. Each set consisted of 15 repetitions with 10sec hold.

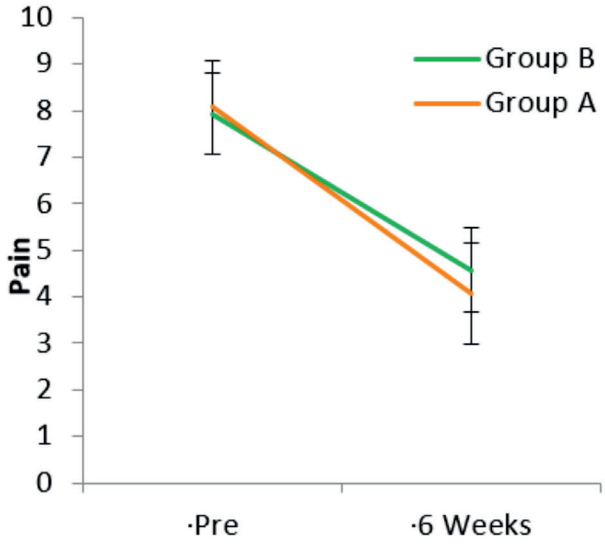
Patient in group A received Tibiofemoral Mobilization Anterior glide done in patient in prone position and Posterior glides in supine position, with grade 1 distraction to push tibia to increase the range. Posterior glide helps in increasing flexion range. Anterior glide helps in increasing extension range

Patient in group B received Maitland mobilization, It is done with patellofemoral movement in knee flexion.

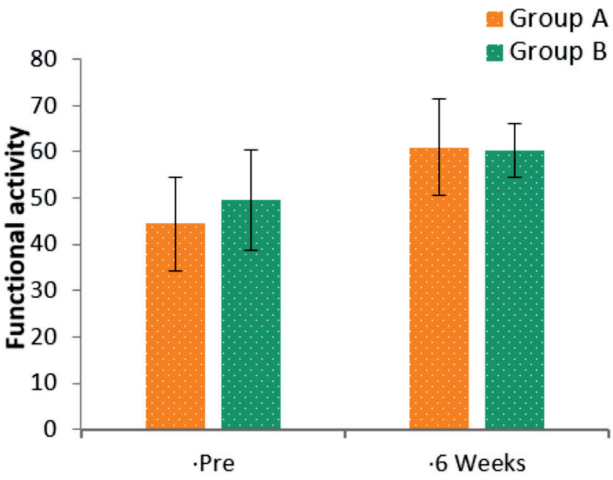
There are three variables used Pain intensity using NPRS score, Range of Motion of knee using Universal Goniometer as tool and Functional activity using Kujala Score questionnaire 13 item with 3-5 options for pain severity, symptoms and specific activities was used. The total sum of the scale's ranges 0-100,0= greatest limitation of the knee function and 100= the greatest ability to perform most knee flexion.

Result

All statistical analysis was done using SPSS 22.0, and R environment ver.3.2.2 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables. Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5% level of significance. Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Leven`s test for homogeneity of variance has been performed to assess the homogeneity of variance.



Graph No.: 1



Graph No.: 2

All the 60 patients were analyzed on the 1st day and completion of training at 6weeks. Graph No 1shows there was significant improvement in terms of NPRS score but on comparing intergroup Group A show significant improvement p<0.001 than group B.Table 1 shows for knee flexion range 1 shows there was significant improvement in terms of VAS score but on comparing intergroup Group A show significant improvement p <0.001 than group B. Table :2& 3 show for knee flexion range & extension range both group A & B show significant improvement but on comparing Group A show significant improvement than Group B Table:4 comparing the functional activity using Kujala scale Group A show strongly significant than group B with p<0.001

Table 1 : Comparison of outcome variables in two groups studied at 6 weeks of assessment

Variables	Group A	Group B	Total	P Value
Pain				
Pre	8.07±1.01	7.93±0.87	8±0.94	0.587
6 Weeks	4.07±1.08	4.57±0.9	4.32±1.02	0.056+
Difference(95%CI)	4.00(3.41-4.58)	3.36(2.96-3.78)	3.68(3.32-4.04)	–
P value	<0.001**	<0.001**	<0.001**	–
Flexion				
Pre	110.23±7.48	116.17±8.78	113.2±8.62	0.007**
6 Weeks	124.23±4.69	125.4±5.49	124.82±5.09	0.380
Difference	14.00(11.98-16.01)	9.23(6.56-11.91)	11.62(9.87-13.36)	–
P value	<0.001**	<0.001**	<0.001**	–
Extension				
Pre	4.7±1.47	5.17±1.74	4.93±1.61	0.266
6 Weeks	3.7±1.39	4.4±1.07	4.05±1.28	0.033*
Difference	1.00(0.56-1.44)	0.77(0.35-1.18)	0.88(0.58-1.18)	–
P value	<0.001**	0.001**	<0.001**	–
Functional activity				
Pre	44.43±10.13	49.63±10.81	47.03±10.71	0.059+
6 Weeks	61±10.44	60.37±5.82	60.68±8.39	0.773
Difference	16.57(13.01-20.12)	10.73(7.25-14.21)	13.65(11.11-16.18)	–
P value	<0.001**	<0.001**	<0.001**	–

Student t test (Unpaired) for Between group and student t test(paired) for within group analysis

Results are presented Mean ±SD (Median)

Discussion

The purpose of the study was to investigate the effectiveness of Tibiofemoral mobilization versus Maitland Mobilization in Patellofemoral Pain syndrome. Current study show that females are affected more than the males.1Both groups showed significant within-group improvement in the pain levels (VAS), Range of motion and KUJALA score. The improvement in pain levels and KUJALA score could be due to strengthening of quadriceps muscle as reported by Palak Ramanial et al **Palak Ramanlal Mistry et al** 29.

The tibiofemoral mobilization technique is low-amplitude passive movements that produce traction and gliding at the joint surface, i.e. joint play movements. According to **Holden et al** 23 stated that , afferent inputs from the surrounding tissues alter motor regulation at joint dysfunction which can be responsible for the weakness of the muscle. Mobilisation of dysfunctional and restricted joint generates arthrokinetic reflex which removes the inhibition and improves the strength of the muscle.

According to Sonya Arshad et al 30 Maitland A patellar mobilization can be used to recover the flexibility of the patellofemoral joint, and passive repetitive gliding to the first resistance is used to improve nutrition, blood flow, and lubrication with in the joint that helps develop mobility.

Hence both Tibiofemoral and Maitland mobilization shows improvements in Intra groups but on comparing in Inter groups Tibiofemoral mobilization is more effective because the findings of Alsulaimani et al shows that repetitive passive joint gliding movement improves nutrition, blood flow, and joint lubrication further restores mobility. It also helps to normalize the joint kinematic, gliding and rolling movement.

Also, according to the **Ishrat Fatimah** et al 25 a study on tibiofemoral mobilization on PFPS and found that TFJ mobilization with hip and knee stretching and strengthening exercises effectively reduced pain intensity, improved ROM in Patellofemoral pain syndrome patients. D4 Juhn et al also states that exercising programs require between 3-6 weeks or more to achieve the goal. These findings are in support of the results of the current study.

The intragroup comparison of the NPRS, knee range of motion, and KUJALA patellofemoral scale among the 30 patients in each group was statistically highly significant with p=0.001 for both groups. In contrast to the Maitland mobilisation in Group B, the Tibiofemoral mobilisation in Group A demonstrated a greater Highly Significant improvement.

Conclusion

This study provide evidence to support the use of 6 weeks of conventional therapy with Tibiofemoral mobilization is more effective than that of Conventional therapy with Maitland mobilization in improving pain, range of motion and functional activity in patients with Patellofemoral pain syndrome.

Clinical Implication: The current study has limitation of finding the effectiveness of conventional therapy. Also controlled studies and long-term observation are necessary.

Source of Funding: Self

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