Original Article

ROLE OF ROUTINE PHYSICAL THERAPY WITH AND WITHOUT PAIN RELEASE PHENOMENON IN PATIENTS OF PATELLO-FEMORAL PAIN SYNDROME

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Abstract

Background: *Physical therapy intervention is the mainstay for treating patellofemoral pain syndrome i.e. Retro patellar pain. Despite of the availability of a number of treatment options there is lack of agreement on any specific treatment approach of Patellofemoral pain syndrome.*

Objective: *The objective of this study was to compare the effectiveness of physical therapy treatment with and without Pain Release Phenomenon in patellofemoral pain syndrome.*

Materials and methods: *It was a double blind, randomized controlled trial. 60 participants were randomly assigned to two groups. The treatment was provided for six weeks thrice every week. Group A received conventional/standardized Physical therapy treatment and Group B received conventional/standardized Physical therapy treatment along with pain release phenomenon. The baseline measurements were taken at the beginning and at six weeks post-trial.*

Results: *Patients did not differ in baseline pain and disability level in both groups. Six weeks post intervention group B receiving the physical therapy with pain relief phenomenon showed markedly improved functional status (p-value=0.01, Confidence interval=95%) and reduction in level of pain (p-value=0.02, Confidence interval=95%) as compared to group A.*

Conclusions: *This study concludes that Pain release phenomenon is an effective technique in reducing pain and improving function of knee in patients with patellofemoral pain when combined with conventional treatment and home exercise plan over a period of six weeks.*

Keywords: *Functional Status, Knee Pain, Patellofemoral Pain, Physical Therapy, Visual Analogue Scale*

Introduction

Patellofemoral pain is the retropatellar pain which is the most commonly reported musculoskeletal problem in general practice.(1) A retrospective survey conducted on runners in 2002 has shown that patellofemoral femoral pain syndrome (PFPS) accounted for 19% of the cases of all the injuries reported. Patellofemoral pain is a chronic condition almost 94% of patients present with pain even after four years of initial onset and 25% patients report significant symptoms 20 years later(1). Basic knowledge is lacking and no strong scientific evidence has been presented in the literature on the nature and etiology of Patellofemoral pain syndrome. This could explain why there are so many treatment protocols described in the literature. Different treatment protocols are being used mainly depending upon clinical guidelines of different clinical facilities. (2,6)

PFPS has been linked to weakness of quadricep muscles. Timing errors and length-strength imbalance of knee musculature has been attributed to be an important cause of PFPS in various studies.(7) More recently hip muscle stregth and flexibility has been shown to be correlated with PFPS.(8) Maltracking of patella leading to increased patellofemoral joint contact pressure is a commonly accepted aetiology for Patellofemoral pain syndrome.

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In support of this hypothesis Interventions for PFPS have been focussed on improving the tracking of patella. Strengthening of vastus medialis (oblique fibres) and stretching of hamstrings and illiotibial band have long been used to improve the tracking of patella. Patellar mobilizations, tapping, and foot orthosis are also used as interventions for PFPS.(2) Despite of the entire etiological hypothesis and all the treatment approaches there is lack of agreement on the aetiology and treatment of PFPS. However, a general consensus exists that the preferable approach should be conservative. Rest should be employed during the pain relapses and pain provocative activities should be avoided.(9) Physical interventions are the mainstay of treatment for Patellofemoral pain syndrome (Patellofemoral pain syndrome). Physiotherapy is the most common of all physical interventions and includes specific vastus medialis obliquus or general quadriceps strengthening and/or realignment procedures(10).

The objective of this study was to compare the effectiveness of physical therapy treatment with and without Pain Release Phenomenon in patellofemoral pain syndrome. It was hypothesized that Physical Therapy with Pain Release Phenomenon was more effective than Physical Therapy without Pain Release Phenomenon, in relieving pain in Patello-Femoral Pain Syndrome (PFPS).

Materials And Methods

It was a double blinded, randomized controlled trial, conducted at Fatima Memorial Hospital, Lahore. Sample of size of 60 patients was taken through convenience sampling technique, using a predetermined difference of 2cm pain on VAS between two groups. This was based on the results of previous studies. 30 participants were allocated to each group i.e. Group A and B. Study completed in 6 months of duration.

The participants were randomly assigned into two groups i.e. group A and B. The allocation of the patients to each group was done by generating random numbers on computer software. Six baseline variables were balanced in randomization. The baseline variables included pain and disability scores, age, gender, confidence in physical therapy management and pain relief phenomenon. Concealment of allocation to all groups was ensured, from all study personnel and participants by entry of data into computer randomization program immediately. Patient coordinators assigned patients to groups by a sealed envelope as patient identification, and envelops were placed in patient's clinic file. The allocation of the participants was concealed from the patients, the examiners and the also the physical therapist only until they started treating the patients.

Patients with following characteristics were included; age less than 40 years**,** anterior knee pain or retro-patellar pain and Patellofemoral pain syndrome insidious onset for at least one month reported on at least two of the following: prolonged sitting, ascending or descending stairs, squatting, running, kneeling and hopping/jumping

Patients with following conditions were excluded; Knee surgery within the previous 3 months**,** a history of patellar dislocation/subluxation (non-insidious)**,** Clinical evidence of a current knee condition other than Patellofemoral pain syndrome or were currently taking non-steroidal anti-inflammatory drugs or corticosteroid medication.

The physical therapists that treated the patients were not blinded but data assessor and patients were blinded about the type of intervention they received and their assigned group. The personnel performing the data entry and data analysis on statistical software were also unaware of treatment groups.

Six trained and experienced physical therapists were selected to apply interventions to the patients. The therapists were not-blinded to ensure the quality of care provision. Participants were requested to terminate any other treatments they were taking for their knee pain before starting the trial. Written, informed consent was signed by the participants before commencement. Each session of a physical therapist with a patient lasted around 30 to 45 minutes. Patients had to visit the physical therapy clinic thrice every week for 6 weeks. Home exercise plans were also given to the patients with complete illustrations and descriptions of exercises.

Both group A and B received the standardized treatment used for patellofemoral pain syndrome. The standardized treatment consisted of stretches of hamstrings, calf muscles, rectus femoris and IT band, strengthening of quadriceps and Proximal hip muscles and patellar mobilization. The detail of the standardized exercise plan employed from week 1 through 6 is summed up in Table 1.

Group B, in addition to the above mention standardized treatment, received physical therapy with pain relief phenomenon (PRP) as well. The Pain Release Phenomenon Techniques (PRPS) is a manual therapy technique introduced by Brian Mulligan for management of chronic pain in the extremities. In this technique, joint compression, muscular contraction or stretch is used as the pain provoking stimuli and the stimuli is maintained for 15-20 seconds. If indicated, the pain will reduce in this period and the patient would have gained a new P1. [11]

Pain and functional status of knee were measured at two instances i.e. at baseline and at the end of trial after 6 weeks by an anonymous, blinded examiner.

Pain was measured Using Visual analogue scale on a 0 to 10 cm line and functional status was assessed using the functional index questionnaire.

Data was analyzed using statistical package for social sciences (SPSS version 20). The baseline differences between the two groups were measured using Mann Whitney U Test. For comparisons of categorical variables between the groups Chi-square test was applied considering a p value of less than 0.05 as significant. Friedman ANOVA was applied to calculate differences in baseline and post-trial scores. P-value of less than 0.05 was considered significant.

Table-1: Standardized Exercise Plan For Both Control And Experimental Group

Week 1 to 3
Stretches - Hamstrings (3-5 Repetitions 15 seconds) - Gastro soleus (3-5 Repetitions 15 seconds) - Illiotibial band (3 -5 Repetitions 15 seconds) - Rectus femoris (3 -5 Repetitions 15 seconds) Patellar mobilization combined with soft-tissue mobilization to lateral structures Medial tipping of patella Quadriceps setting focussing on VMO (10 repetitions with 10 seconds hold) Short Arc terminal extension (10 repetitions 3 sets)
Week 3-6
Stretches continued Patellar tapping Quadriceps and Hip muscle strengthening - Isometric hip abduction while standing (4 sets of 30 seconds hold) - Side step-downs (3 sets of 5 repetitions) - Wall squats (40◦ knee flexion) (3 sets of 5 repetitions) - inside leg raise (3 sets of 5 repetitions) - Single leg balance with knee straight and bent (3-5 repetitions 5 seconds hold) - Resisted knee extension with theraband (2 sets of 10 repetitions)
Home-exercise plan: a combination of self-stretches and strengthening exercises.

Results

During the 6 months duration 102 participants were referred to this trial out of which 60 (59%) patients fulfilled the eligibility criteria. Sixty patients were randomly allocated into two groups. Five patients could not give follow-up and hence were dropped out of the study. Participants in group A showed an adherence to exercise for 86% and those in group B showed adherence for 88% of the required days. The comparison of patients in both groups showed no significant differences in mean Age, height, weight and Body Mass index (p-value>0.05). Chi-square tests for comparisons between two groups showed no significant differences in Sex, dominant leg and side with greater pain (p-value>0.05). (Table 2)

Table 2. Comparison Of Sociodemographic Variables Of Two Treatment Groups

	Group A (N=30)		**Group B (N=30)**		
	Mean ± SD	**Range**	**Mean ± SD**	**Range**	**P-value**
Age (years)	29±1.66	19-44	27±1.66	17-41	0.08
Height (meters)	1.68±0.03	1.50-1.90	1.68±0.01	1.53-1.93	0.63
Weight (kgs)	75.6±1.31	52-105	76.1±2.31	53-100	0.28
Body mass Index (kg/m^2)	23.6±3.9	18-35	26.8±3.7	18-32	0.09
Sex (M/F)	11/19		8/22		0.68
Leg Dominance (R/L)	22/8		19/11		0.75
Side with Greater Pain (R/L)	18/12		14/16		0.81

Table 3: Pre and Post treatment differences in pain and functional status between Group A and Group B

Variable	Study Group	Baseline Mean(SD)	Final Mean(SD)	Mean Difference	P value
Pain	**Group A**	6.8(1.7)	5.0(2.5)	1.8	0.04
	Group B	6.4(1.1)	3.0(2.0)	3.4	0.00
FIQ	**Group A**	17(2.9)	21(3.4)	4.0	0.00
	Group B	19(4.2)	34(5.8)	15	0.00

Patients did not differ in baseline pain and disability level in both groups. Six weeks post intervention both group A (receiving the physical therapy) and B receiving the physical therapy with pain relief phenomenon showed markedly improved functional status and reduction in pain level with p value < 0.05, Confidence interval 95%. The mean pain reduction before and at the end of 6 week treatment session was considerably greater in group B (3.4) than group A (1.8). Similarly Group B illustrated marked improvement in functional status measured on FIQ with effect size of 15 in group B compared to group A effect size of 4.0.

Discussion

Despite the availability of a number of treatment options for PFPS there exist fewer consensuses on the effectiveness of a specific set of exercises or treatment technique. More work has been done regarding the biomechanical causative factors of PFPS rather than intervention based studies. In current setting this study would help adding to literature regarding interventions for PFPS. Routine physical therapy treatment for PFPS has been in practice since many years now. There is a need for innovation new treatment approaches in order to improve functional status and improve quality of life of the patients.

It has been proven that exercise has strong pain-minimizing effects, however which specific exercise therapy to use is still questionable.[12] Current study was aimed at testing the effectiveness of an innovative technique combined with the conventional physical therapy practices.

The pain release phenomenon (PRP) (developed by Brian Mulligan) is a relatively new treatment approach. This study has employed and tested this treatment approach for the patients of patellofemoral pain syndrome. Our study has shown markedly improved pain and functional status in six weeks among the group receiving the pain release phenomenon (PRP).The improvement in Pain and functional status in Group B who received both PRP and traditional treatment was much evident as compared to the group receiving standardized/conventional treatment only. Effect size was also larger for both VAS and Functional index questionnaire.

The results of this study are supported by another randomized controlled trial that has concluded that a six-week, six session physical therapy regimen improves the level of function and reduces the level of pain in patients of patellofemoral pain syndrome.[13] The difference however lies in the frequency of physical therapy sessions. Which were greater in our study i.e. thrice per week.

Quadriceps strengthening has been used in improving function and pain in PFPS and literature has shown a strong evidence in support of the use of these exercises either alone or in conjunction with other interventions[14].These suggestions and findings are consistent with the results of our study. Group (A) received only conventional treatment and that did include quadriceps strengthening focusing on VMO. Group B receive both PRP and conventional treatment. The functional status was improved in both groups and pain was also reduced. However, the differences were more marked for Group B.

Conclusion

This study concludes that Pain release phenomenon is an effective technique in reducing pain and improving function of knee in patients with patellofemoral pain when combined with conventional treatment and home exercise plan over a period of six weeks.

Recommendations & Limitation

Based on the results of this study, clinicians are advised to use pain release phenomena in conjunction with routine physical therapy in management of patellofemoral pain for better reduction in pain and improvement in functional status.

However results of this study lack generalizability since subject were selected only from one clinical setting across Lahore. A larger sample size representing different strata of population is required for better generalizability.

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Author's Contribution:

Fariha Shah: Conception and design of the work, drafting the work and revising it critically for final approval.

Usman Riaz: The acquisition, analysis, or interpretation of data for the work, drafting the work and revising it critically for final approval.

Danish Hassan: The acquisition, analysis, or interpretation of data for the work, Drafting the work and revising it critically for final approval.