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COMPARISON OF EFFECTIVENESS OF ISCHEMIC COMPRESSION VERSUS DRY NEEDLING COMBINED WITH LUMBOPELVIC MANIPULATION ON PAIN AND FUNCTIONAL ABILITY IN PATIENTS WITH PATELLOFEMORAL PAIN

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KEYWORDS :

INTRODUCTION

Patellofemoral pain (PFP) is commonly experienced by adults, teenagers, and especially active individuals such as runners. Approximately 22.7% of the general population and 29.9% of teenagers are affected each year. PFP is twice as common in women as it is in men. Depending on their environment and level of activity, adolescent girls are more impacted than boys, with the highest incidence seen in those between the ages of 12 and 19. Young athletes are more likely to experience anterior knee pain, which can hinder their ability to participate in sports[1,2,3].

Among the many causes of PFP include overtraining and improper patellar alignment[4]. Over 50% of instances can develop into chronic discomfort, which manifests as pain behind or around the patella and is exacerbated by running, kneeling, crouching, or ascending stairs. PFP is frequently linked to recurrent usage, weak quadriceps muscles, and patella misalignment. The primary cause of the problem is incorrect patellar tracking across the femoral condyle. The necessity for individualized assessment and therapeutic options is highlighted by emerging research that suggests patellofemoral pain is characterized by variable kinematic patterns driven by individual demographic and anatomical characteristics. The primary cause of the disease is aberrant patellar tracking over the femoral condyle [4,5,6,7,8].

Recent studies have shown that manipulation of the lumbopelvic region can reduce quadriceps inhibition or improve quadriceps activation in patients with PFP. Because of the biomechanical relationships among the hip, knee, and pelvic joints in lower limb movement, a change in any of them also affects the more proximal and distal joints.

There are few studies reporting the efficacy of Ischemic compression as a treatment or in combination with other intervention or therapeutic exercise, to improve the effectiveness of treatments for the management of PFP. Therefore, this study is being conducted to evaluate the effectiveness of ischemic compression combined with LPM compared to dry needling combined with LPM on pain and functional ability in the management of PFP.

Objectives of the Study

- To find the effectiveness of LPM along with drying needling in managing pain and functional ability in patients with PFP.
- To find the effectiveness of LMP along with ischemic compression in managing pain and functional ability in patients with PFP.
- To compare the effectiveness of LPM along with dry needling vs LPM along with ischemic compression in managing pain and functional ability in patients with PFP.

METHODOLOGY

Study Subjects: Patients with PFP
Study Design: Pre-post comparative study
Study Setting and Source of Data: Florence Rehabilitation Centre.
Sampling Method: Computerized Random sampling
Study Duration: 6 months
Sample Size: 54
According to formula $N = 2*([Z\alpha + Z\beta]\ ^\ 2*\sigma\ ^\ 2)/d\ ^\ 2$
sample size is 54
Sample Selection: computerized randomization

Inclusion Criteria[42]:

1. Age between 18 and 45 years
2. Both males and females
3. Anterior knee pain in at least 2 daily activities
4. Pain level at least 3 out of 10 on NPRS

Exclusion Criteria[42]:

1. Bilateral anterior knee pain
2. Marked structural deformity and known pathological condition of back, hip, and ankle
3. Any metabolic or neurologic disease such as diabetes or radicular pain
4. History of any surgery in the lower limb

Methods of Data Collection

Ethical Clearance was obtained from the ethical committee of Florence College of Physiotherapy. All the subjects fulfilling the inclusion and exclusion criteria were informed about the study, and a written consent was taken (Annexure–1) and randomly allocated.

The procedure was explained to the subject. All subjects went through pre-examination. Group A (27 participants) received Lumbopelvic manipulation along with dry needling and Group B (27 participants) received lumbopelvic manipulation and ischemic compression 3 sessions every other day for a week.

Group: A (LPM and Dry Needling)

Dry Needling

- The Glute Medius (GM) ipsilateral and the Quadratus Lumborum (QL) contralateral to the involved knee were selected for Dry needling (DN).
- Dry needling was applied every other day with 0.30*50-mm and 0.30*100-mm needles.
- The duration of each session was approximately 15-30min.
- The procedure of DN techniques Muscle Locating the trigger points (TrPs)

Table 4.1: Trigger Point Presentation in Quadratus Lumbarum and Glute Medius

Lumbopelvic Manipulation (LPM)

The manipulation was performed on the same side as the involved knee for 3 sessions every other day.

Procedure:

Group B (LPM and IC)

Ischemic Compression

- IC is a manual technique defined as the application of a gradually increasing pressure against the MTrP to induce the most tolerable pain.
- The patients were asked to lay relaxed in a supine position with extended knees. The first examiner applied slow and steady increasing pressure to the marked MTrP until the pain perception was reported as seven on the NPRS.
- This pressure was maintained for 90s.
- If the patient reported a reduction in pain, the pressure was gradually increased to restore perceived pain to the previous value.
- Compression was applied three times with a 30-s rest interval in each session.

Statistical Analysis

The collected data were tabulated and analyzed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24, with a significance level of p value less than 0.05 and a 95% confidence interval set for all analysis.

Table 5.2: Comparison of Kujala Score Between Group- A and Group – B in Pre and Post Tests.

Test	Group - A		Group - B		t - Test	df	Significance
	Mean	S.D	Mean	S.D			
Pre Test	61.22	9.85	55.33	13.91	1.79	52	.079*
Post Test	77.51	7.88	67.40	11.30	3.81	52	.001**
Follow Up	84.66	4.94	72.81	8.37	6.33	52	.001**

(*- P > 0.05 - Not Significant) & (**- P ≤ 0.05 - Significant).

The above table reveals the Mean, Standard Deviation (S.D), t-test, degree of freedom (df) and p-value between Group A & Group B in pre test and post tests.

This table shows that there is no significant difference in pre test value between Group A & Group B at P > 0.05

The above table shows that statistically significant difference in post test & Follow Up values between Group A & Group B at P ≤ 0.05.

Table 5.3: Comparison of NPRS Score within Group-A and Group-B Between Pre Test and Post Test.

Test	Group - A		Group - B	
	Mean	S.D	Mean	S.D
Pre Test	7.00	.832	7.03	.807
Post Test	3.59	1.27	4.92	.957
Follow Up	2.18	.557	3.88	.751
F Value	326.31		212.41	
P Value	.001**		.001**	

The above table reveals the Mean, Standard Deviation (S.D), f value and p-value between pre-test, post-tests & follow Up within Group – A & Group – B.

There is a statistically significant difference between the pre-test, post-tests & follow Up value within Group A and Group B at P ≤ 0.05.

There is a statistically significant difference between the pre-test, post-tests & follow Up value within Group A and Group B at P ≤ 0.05.

On comparing the Mean Values of Group A & Group B on NPRS Score, it shows a significant decrease in the post test & follow up mean values in both groups, but (Group A) shows which has the lower mean value is more effective than (Group B) at P ≤ 0.05. Hence the null hypothesis is rejected.

On comparing the Mean Values of Group A & Group B on Kujala Score, it shows a significant increase in the post test & follow up mean values in both groups, but (Group A) shows which has the higher mean value is more effective than (Group B) at P ≤ 0.05. Hence the null hypothesis is rejected.

On comparing Pre test and Post test within Group A & Group B on NPRS Score & Kujala Score shows significant difference in the mean values at P ≤ 0.05.

DISCUSSION

In this study, two therapy modalities for individuals with patellofemoral pain (PFP) were compared: dry needling combined with lumbopelvic manipulation (Group B) and ischemic compression combined with lumbopelvic manipulation (Group A). The ipsilateral gluteus medius (GM) and contralateral quadratus lumborum (QL) trigger sites were the focus of therapy in both groups.

Group A received dry needling to the contralateral QL and ipsilateral GM along with lumbopelvic manipulation. This group showed significant improvement in both pain and functional ability after the intervention. These findings are consistent with those of Shakouri et al., who examined a similar combination of LPM and dry needling targeting the same muscles in physically active PFP patients and discovered that, even after just three sessions, the combined approach outperformed LPM alone in reducing pain and improving function[42].

The present study demonstrated that both Group A (dry needling combined with lumbopelvic manipulation) and Group B (ischemic compression combined with lumbopelvic manipulation), with treatment directed at the contralateral quadratus lumborum and ipsilateral gluteus medius trigger points, were effective in significantly improving pain and functional ability in patients with patellofemoral pain syndrome.

In conclusion, both interventions effectively reduced pain and improved functional ability in PFP patients. However, dry needling combined with lumbopelvic manipulation produced superior outcomes and may be considered the preferred clinical option, while ischemic compression combined with lumbopelvic manipulation remains an effective non-invasive alternative when dry needling is contraindicated or not preferred by the patient.

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