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Comparing the Effect of Triple Osteopathic Manipulative Technique and Open Kinematic Chain Exercises for Improving Range of Motion and Reducing the Pain in Pes Anserinus Bursitis

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Abstract:-

- ***Objective:*** **The aim of the study was to evaluate the efficacy of triple osteopathic manipulative method and open kinematic chain exercises in individuals with pes anserine bursitis.**
- ***Methodology:*** **Two groups of 30 patients each received 30 patients were randomly assigned. 15 patients make up Group-A (open kinematic exercises). There are 15 patients in Group-B (triple osteopathic manipulative treatment). Pre-assessment was completed for both groups before to the start of the intervention programme using the outcome measures of VAS and KNEE ROM (GONIOMETER).**
- ***Procedure*****: Group-A underwent open kinematic chain exercises during the course of a 6-week intervention programme, while Group-B received triple osteopathic manipulative therapy. Assessments were done following the 6-week intervention.**
- ***Results:*** **Both groups A and B did not exhibit any statistically significant differences between pre- and post-intervention, according to the data analysis. Comparing the mean values of Group A and B reveals that both are efficient in treating pes anserine bursitis.**
- ***Conclusion:*** **These results show that triple osteopathic manipulative treatment and open kinematic chain exercises are equally beneficial at easing pain and restoring range of motion in people with pes anserine bursitis.**

I. INTRODUCTION

The inflammation of pes anserine bursa is called pes anserinus bursitis.

The conjoined insertion of the sartorius, gracilis, and semitendinosus muscles along the proximal medial portion of the tibia is known as the Pes anserinus, also known as the "goose foot" in Latin. Its purpose is to prevent rotatory and valgus stress in the knee and to impact the tibia's internal rotation.

Due to a short hamstring, pes anserinus bursitis can develop, which can lead to frictional bursal irritation, direct trauma, degeneration, inflammatory knee diseases, obesity, diabetes mellitus, bone exotosis, suprapatellar plica irritation, pes planus, genu valgum irritation, medial meniscus damage, and infection.

The anteromedial side of the knee should be painful and tender, especially when going upstairs and downstairs. Morning pain, trouble rising from a chair, difficulty getting out of the automobile, and edoema and sensitivity in the pes anserinus bursa should also be present as diagnostic criteria for this ailment.[8]

Exercises known as open kinematic chains (OKCs) have a distal part that is mobile or not fixed, unlike isolated joint exercises like seated leg extensions. For athletes who have Pes anserine bursitis, it is beneficial to increase hamstring strength, flexibility, and endurance.[11]

The Triple Technique is a collection of osteopathic manipulative methods for treating knee somatic dysfunctions. The Muscle Energy (ME), Counterstrain (CS), and Balanced Ligamentous Tension (BLT) osteopathic manipulative treatment methods are the foundation of the Triple Technique.

II. METHODOLOGY

A. Study Design :-

- Sample size :- 30 (15 in each group)
- Sample method:- Randomized sampling
- Study type:- Comparative study
- Study population:- Both women and men diagnose with PAB
- Study duration:- 6 weeks
- Study period:- 1 year
- Study area:- Physiotherapy outpatient department, MNR Hospital, Sangareddy

B. Inclusion Criteria

- Both males and female patients aged between 40 to 80 years.
- Patients with knee pain
- Patients with obesity and type 2 diabetes mellitus.
- Ability to participate in 30-min physiotherapy sessions.

C. Exclusion Criteria

- Patient with septic joint, fracture or torn ligament in the knee area.
- Acute congestive heart failure
- Recent myocardial infarction
- Severe Osteoporosis

D. Materials Used :- Treatment couch, Goniometer, Towel

E. Procedure

Participants will be randomly allocated to 15 in each group to 2 groups. The treatment intervention in each group will be follow.

- Group A- KINEMATIC CHAIN EXERCISES
- Group B- TRIPLE OSTEOPATHIC MANIPULATIVE TECHNIQUE

- *Group A: - Open Kinematic Chain Exercises*

- *Hamstring Wall Stretch*
  10 repetitions are done with 10secs hold.

- *Single Leg Hip Extension*
  10 repetitions with 10secs hold.

- *Seated Knee Extension*
  10 repetitions with 10secs hold.

- *Straight Leg Raising*
  10 repetitions with 10secs hold.

- *Group B: - Triple Osteopathic Manipulative Technique*

This technique is based on three Osteopathic Manipulative Treatment :-

- *Muscle Energy (MT)*

Procedure:- With the patient's leg extended, the therapist should grip the lateral ankle with one hand and the medial side of the knee with the other. The patient is told to press their ankle lateral to the therapist's hand as the therapist exerts a medial force. Isometric method used here. After 3–5 seconds, the patient completely relaxes his leg. 3-5 times should be performed. Then, the therapist will reposition themselves into the barrier and repeat the process three to five times. To influence the other side, the therapist adjusts their hand position. Just above the joint line, one hand is placed on the lateral side of the knee and the other on the lateral side of the ankle. The patient is instructed to apply pressure on the foot and ankle while the therapist provides counter pressure for 3-5 seconds. 3-5 times, the therapist picks up the joint's slack again, moves into the barrier, and repeats.

- *Counterstain*

In this method, the patient is lying on their back with the afflicted knee flexed 90 degrees and their foot resting on a table. The therapist uses the foot to stabilise themselves while interlocking their fingers behind the knee and applying a light anterior force to stretch the ACL and shorten the PCL. Following a 90-second hold, the position is gradually relaxed.

- *Balance Ligamentous Tension*

The patient is lying face down, and the therapist raises and supports the leg and ankle joint with both hands before rotating the leg in both internal and exterior rotation while watching the end points in each direction. After holding the midpoint position and adding a slight distraction, the midpoint between the sites of tension is palpated. Hold the position until the therapist notices a shift in the tissue's tension and release, passive stretching, or laxity, and then gently place the patient's leg back on the table. Do it two to three times.

III. STATISTICAL ANALYSIS

SPSS version 16.0 was used for all statistical analyses in this study. Using descriptive analysis, the participants' overall characteristics were reported in terms of mean and standard deviation. To compare for the group as a whole between paired t-tests were conducted before and after the intervention. The differences between the groups were compared using an independent t-test. For all tests, the statistical significance level was set at 0.05 or less.

- *Crosstabs*

Table 1 Group * Gender Cross Tabulation

			Gender		Total
			M	F	
Group	Group-A	F	7	8	15
		%	46.70%	53.30%	100.00%
	Group-B	F	9	6	15
		%	60.00%	40.00%	100.00%
Total		F	16	14	30
		%	53.30%	46.70%	100.00%

Table 2 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.536	1	0.464

	M	F
Group-A	46.70%	53.30%
Group-B	60.00%	40.00%

- *T-Test*

Table 3 Group Statistics

Group		N	Mean	Std. Deviation	Std. Error Mean
Age	Group-A	15	58	13.601	3.512
	Group-B	15	55.67	12.081	3.119

Table 4 Independent Samples Test

		t-test for Equality of Means		
		t	Df	Sig. (2-tailed)
Age	Equal variances assumed	0.497	28	0.623

- *T-Test*

Table 5 Paired Samples Statistics

Group	VAS	Mean	N	Std. Deviation	Std. Error Mean
Group-A	Pre Test	6.47	15	1.457	0.376
	Post Test	3	15	1.195	0.309
Group-B	Pre Test	6.33	15	1.345	0.347
	Post Test	3.93	15	1.624	0.419

Table 6 Paired Samples Test

Group		Paired Differences	t	df	Sig. (2-tailed)
Group-A	VAS Pre Test - VAS Post Test	3.467	13.556	14	0
Group-B	VAS Pre Test - VAS Post Test	2.4	7.483	14	0

- *T-Test*

Table 7 Paired Samples Statistics

Group	Motion - Flexion	Mean	N	Std. Deviation	Std. Error Mean
Group-A	Pre Test	63.67	15	16.526	4.267
	Post Test	81	15	17.444	4.504
Group-B	Pre Test	64.33	15	13.998	3.614
	Post Test	80.33	15	16.952	4.377

Table 8 Paired Samples Test

Group		Paired Differences	t	df	Sig. (2-tailed)
Group-A	Motion - Flexion Pre Test - Motion - Flexion Post Test	-17.333	10.312	14	0
Group-B	Motion - Flexion Pre Test - Motion - Flexion Post Test	-16	7.483	14	0

➢ *T-Test*

Table 9 Group Statistics

VAS	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre Test	Group-A	15	6.47	1.457	0.376
	Group-B	15	6.33	1.345	0.347
Post Test	Group-A	15	3	1.195	0.309
	Group-B	15	3.93	1.624	0.419

Table 10 Independent Samples Test

		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
VAS Pre Test	Equal variances assumed	0.26	28	0.796	0.133
VAS Post Test	Equal variances assumed	1.793	28	0.084	-0.933

➢ *T-Test*

Table 11 Group Statistics

Motion - Flexion	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre Test	Group-A	15	63.67	16.526	4.267
	Group-B	15	64.33	13.998	3.614
Post Test	Group-A	15	81	17.444	4.504
	Group-B	15	80.33	16.952	4.377

Table 12 Independent Samples Test

		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
Motion - Flexion Pre Test	Equal variances assumed	0.119	28	0.906	0.667
Motion - Flexion Post Test	Equal variances assumed	0.106	28	0.916	0.667

IV. RESULTS

When comparing the mean values of Group A and B, it was evident that there was no statistically significant difference between them from before and after the intervention. Both groups also demonstrated progress in lowering discomfort and enhancing range of motion.

V. DISCUSSION

An inflammatory condition of the bursa of the conjoined insertion of the sartorius, gracilis, and semitendinosus is known as pes anserine bursitis, also known as intertendinous bursa. This is located two inches below the medial knee joint line between the pes anserinus tendons on the proximal medial part of the knee.

The goal of this study is to examine the efficacy of triple osteopathic manipulative method with open kinematic chain exercises for improving knee range of motion and reducing discomfort. In terms of pain levels and knee ROM, both groups showed statistically significant group engagement.

According to the study's findings, open kinematic chain exercises combined with the triple osteopathic manipulative technique help patients with pes anserine bursitis feel less discomfort and have more range of motion. Therefore, both methods are equally effective because there were no discernible differences between the two groups.

VI. CONCLUSION

The study found that both groups, open kinematic chain exercises and triple osteopathic manipulative technique, showed statistically significant effects on improvement of pain and knee ROM (KROM) in subjects with pes anserine bursitis when analysed within groups before and after the treatment.

Both groups have a pain reduction and a notable improvement in range of motion.

When group A and group B's pain levels were compared, the results revealed a less stark difference.

When group A and group B's knee ROMs were examined, the results revealed a less stark difference.

Therefore, this study comes to the conclusion that there is not a highly significant difference between the effects of triple osteopathic manipulative techniques and open kinematic chain exercises. Although both groups have had improvements in terms of discomfort and range of motion.

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