A STUDY ON THE EFFECTIVENESS OF FASCIAL MANUPLATION IN REDUCING PAIN AND IMPROVING KNEEFUNCTION AMONG ATHLETES WITHPATELLOFEMORAL PAIN SYNDROME

A dissertation submitted in partial fulfillment of the requirement for the degree of

MASTER OF PHYSIOTHERAPY

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A STUDY ON THE EFFECTIVENESS OF FASCIAL MAIPULATION IN REDUCING PAIN AND IMPROVING KNEE FUNCTION AMONG ATHLETES WITH PATELLOFEMORAL PAIN SYNDROME

INTERNAL EXAMINER

EXTERNAL EXAMINER

A dissertation submitted in the partial fulfillment of the requirement for the degree of **Master of Physiotherapy- May 2019** to The Tamilnadu Dr. MGR Medical University, Chennai.

CERTIFICATE

Certified that this is Bonafide work of **Miss. MUGAVIYA. N** of R.V.S. College of Physiotherapy, Sulur, Coimbatore submitted in partial fulfillment of requirements for Master of Physiotherapy Degree course from the TamilNadu Dr. M.G.R Medical University under the Registration No. 271750025

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MUGAVIYA. N

DECLARATION

I hereby declare and present my project work entitled **"A STUDY ON EFFECTIVENESS OF FASCIAL MANIPULATION IN REDUCING PAIN AND IMPROVING FUNCTION AMONG ATHLETES WITH PATELLOFEMORAL PAIN SYNDROME"** The outcome of the original research work undertaken and carried out by me under the guidance of **Mr. G.S.Thirumoorthi, M.P.T** Professor, R.V.S College of Physiotherapy, Sulur, Coimbatore, Tamil Nadu.

I also declare that the material of this project has not formed in anyway the basis for the award of any other degree previously from the Tamil Nadu Dr. M.G.R Medical University, Chennai.

Place: Signature
Date:

(N.Mugaviya)

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Introduction

CHAPTER I
INTRODUCTION

Patellofemoral pain syndrome is charecterized as pain in retropatellar or peripatellar regions. It is a common complaint in young adults and adolescent athletes. The pain gradually aggravates when the patellofemoral joint is loaded with weight bearing activities on a flexed knee like squatting and running. Pain and stiffness increases with prolonged sitting with flexed knees (theatre or moviegoer sign). It may lead to limitation or cessation of sports or physical activity. Patellofemoral pain syndrome affects athletes who engage in running, basket ball and high impact sports. Due to repetitive or overuse stress to the knee joint, muscle imbalance, physical trauma or malalignment of the knee.**(Farzin et al 2017**)

Patellofemoral pain syndrome is due to an insidious compressive dysfunction. The pain is evident during periods of rapid growth spurt. Typically the onset is like anterior knee pain associated with increased patellofemoral joint compression in activities involving knee flexion and quadriceps loading. Crepitus during knee flexion activities like squatting, hiking, running and a little knee effusion is evident. **(Michael J et al 2016)**

Patellofemoral pain syndrome (Anterior knee pain syndrome) is a condition of both anatomical mal-alignment and muscular dysfunction. The anatomical mal-alignment includes the shape and size of the patella, the trochlear groove. The patella, largest sesamoid bone functions to improve flexion efficiency and protects tibiofemoral joint. In mal-alignment the subchondral bone stress increases and attributes to stress of articulation or from the cartilaginous lesions on the patella or the distal femur. **(Gregory et al 2008)**

Wiberg attempted to classify patellae according to shape of the articular facets: type 1 - patellae have equal sized concave facets; type 2 and 3 have larger lateral facet, with the former associated with a concave medial articular surface and profile to type 3 being more convex **(Sandow et al 1985)**

The muscular dysfunction includes IT band tightness which increases the lateral force vector, quadriceps weakness which creates an imbalance in strength and leads to improper patellar mal-alignment. The biomechanics of the patellofemoral joint involves dynamic and static stabilizers which control the movement of the patella within the trochlea referred to as 'patellar tracking'. Patellar tracking due to muscular dysfunction causes increased

lateralization and lateral tilt of patella during squatting. It correlates with delayed activation of vastus medialis. An imbalance in the activation of Vastus medialis and Vastus lateralis. In Patellofemoral pain syndrome, Vastus lateralis was activated earlier than Vastus medialis which lead to atrophy causing imbalance in patellar alignment in joint biomechanics

(Wolf et al 2013).

Patella Alta or high riding patella, may be associated with subluxation, possibly due to the pull of vastus lateralis producing lateral shift of patella before it is firmly seated in rhe femoral groove. The evidence for a relation to retropatellar chondromalacia is much more tenous**. (Insall 1971)**

Fascial manipulation is a manual therapy technique that has been developed by LUIGI STECCO an Italian physiotherapist. It works on movement dysfunction and pain. Fascia influences our understanding of musculoskeletal dysfunction. Fascia a soft tissue component od connective tissue system. A three dimensional viscoelastic matrix of structural support, which envelopes muscles, bones and organs. Fascia transmits mechanical forces between muscles. Manipulation on fascia reduces pain, improves function, balance and posture. **(Julie et al 2009)**

A continous repetitive movement causes densification in the muscular fascia, which decreases the efficiency of muscular contraction. Fascia is a malleable and a plastic tissue which adjusts itself to thermal, mechanical and metabolic stresses and can be restored to its physiological condition through fascial manipulation. Myofascial units(MFU)- includes motor unit responsible for moving a joint specific direction. Myofascial unit is a combination of portions of muscles their fascia and their joint components that the move the joint when the muscle contracts. Movements of the single body segment is governed by 6 MFU. All the forces generated by MFU is considered to converge to one point called Centre of Coordination (CC) a precise anatomical location within muscular fascia. the area where the patient perceives pain is called Centre of Perception(CP). For each MFU – myofascial unit one CP is described **(Alessandro pedrelli et al 2008)**

Fascial manipulation aims to restore the gliding between intrafascial fibers and reduces pain, increases the joint function via manual pressure. it works on the centre of coordnination – a point of vectorial convergence for muscular forces which allows the transformation of ground substance by altering the pathological status of dense fascia into a physiological status of fluid fascia by manipulation this occurs by two mechanisms –

intrafascial free nerve endings get activated and slides easily reducing pain in the area. Secondly it enhances the fluidity within the fascia during muscular contraction.

The anterior knee pain scale also called as kujala scale. It is well recognized highly recommended tool in the field of sports medicine. A 13 item knee specific self reported questionnaire. It was designed to assess patellofemoral pain syndrome. (Richard F et al 2016)

Visual analogue scale is a measurement tool that measures the characteristic or attitude that is believed to range across a continuum of values and cannot be easily measured. It is a unidimensional measure of pain intensity. It is a straight horizontal line of fixed length usually 100 mm. the ends are defined as the extreme limits of parameter one end – no pain and to the other end – no pain. **(Gillian *et al* 2011)**

1.1 Statement of the study

A Study on the effectiveness of fascial manipulation in reducing pain and improving knee function among athletes with patellofemoral pain syndrome.

1.2 Objectives of the study

To find out the effectiveness of fascial manipulation in reducing pain among athletes with patellofemoral pain syndrome.

To find out the effectiveness of fascial manipulation in improving function among athletes with patellofemoral pain syndrome.

1.3 Need of the study

To popularize the effectiveness of fascial manipulation as a useful intervention method to reduce pain and to improve knee function among athletes with patellofemoral pain syndrome

1.4 Hypothesis

1. It is hypothesized that there may be a significant difference in reducing pain and improving knee function following fascial manipulation among athletes with patellofemoral pain syndrome.
2. It is hypothesized that there may not be a significant difference in reducing pain and improving knee function following fascial manipulation among athletes with patellofemoral pain syndrome.

1.5 Operational definition

Pain

Pain is a volatile complex sensation that is completely tuned by brain and over protectively exaggerated. It is a unpleasant sensation and emotional experience linked to tissue damage. It reacts and prevents body from further damage **(Paul et al 2018).**

Patellofemoral Pain Syndrome

Patellofemoral pain syndrome is characterized by pain or discomfort in or around patella. Dysfunction in the joint is the result of patellofemoral joint compression due to repetitive movements occurring in the joint **(Fukuda et al 2000).**

Fascial Manipulation

It is a manual technique, which aims to restore the gliding between the intrafascial fibres. The temperature of the fascia increases with manipulation technique, which allows the transformation of the ground substance of the fascia and transforming it from a pathological status of dense fascia (sol) to physiological status of fluid fascia (gel) **(Luigistecco 2004) .**

Review of Literature

CHAPTER II

REVIEW OF LITERATURE

SECTION A : Studies related to fascial manipulation.

SECTION B : Studies related to patellofemoral pain syndrome.

SECTION C : Studies on the reliability and validity of Visual analogue scale.

SECTION D : Studies on the reliability and validity of Anterior knee pain scale.

SECTION A : STUDIES RELATED TO FASCIAL MANIPULATION

Alessandro pedrelli et al .., 2008 According to this pilot study 18 patients were treated for patellar tendon pain with fascial manipulation and there was a substantial decrease in pain after one session of fascial manipulation. According to the fascial manipulation model, the area were the patient perceives pain is called centre of perception. MFU of knee extension is ANTE GENU, centre of coordination is over vastus intermedius muscle. The aim of the fascial manipulation therapy is to restore gliding between the intrafascial fibres. Pain was assessed before and after the treatment with VAS with a followup evaluation after one month. The result showed a substantial decrease in pain.

Robert et al.., 2002 The study concludes that, after fascial manipulation an immediate release is felt on the working area, fascial plasticity occurs. It works on the mechano and sensory receptors of the fascia. Fascia is richly innervated by mechanoreceptors which is responsible for the permanent viscoelastic deformation of the fascia by manual pressure. The sensory receptors lowers the sympathetic tonus and lowers the local tissue velocity.

Julie et al.., 2005 conducted a study on the human fascial anatomy. Fascial connection with human biomechanical model. The architechture of the deep muscular fascia its myofascial force transmission mechanism. The role of fascia in agonist and antagonist muscle interaction. The study also states about the role of fascia in proprioception and motor coordination. This study concluded that fascial manipulation showed a substantial decrease in muscular dysfunction.

Sannasi rajasekar et al conducted a study to investigate the effectiveness of fascial manipulation for persistent knee pain. A two year followup was done and the subjects

showed significant improvement following fascial manipulation. The pain substantially reduced and there was a significant improvement in knee function. The treatment intervention was done with a duration of 4 weeks. A teo year followup programme was done.

SECTION B : STUDIES RELATED TO PATELLOFEMORAL PAIN SYNDROME

Arazpour et al.., 2016 conducted a study related tp patellofemoral pain syndrome one of the most frequent cause of anterior knee pain adolescents and adults. This disorder can have a big effect on patients ability and quality of life and gait. This review included all articles published during 1990 to 2016. An extensive literature search was performed in databases of science direct, google scholar, pubmed and ISI web of knowledge using OR, NOT, AND between selected words. Finally 16 articles were selected from final evaluation. In PFPS subjects, there was a lower gait velocity, decreased cadence and reduced knee extensor moment in the loading response and terminal stance, delayed peak rear foot eversion during gait and greater hip adduction compared to healthy subjects, while for hip rotation there was a controversy in studies. Changes in the walking pattern of PFPS subjects may be associated with the strategy used for the reduction of patellofemoral joint reaction force and pain.

Pablo et al ..,2015 conducted a study to analyse the effectiveness of physical exercise for patellofemoral pain syndrome. The findings of ten clinical trials of moderate to high quality studies were evaluated to determine the effectiveness of physical exercise as a management for patellofemoral pain syndrome. The intervention programs were the most effective in relieving pain and improving function in patellofemoral pain syndrome including strengthening exercise for the hip external rotators, abductors and knee extensor.

Peterson et al ..., 2013 conducted a study relating patellofemoral pain syndrome as a possible leading cause for anterior knee pain which predominantly affects young female patients with any structural changes such as increased Q angle or significant chondral damage. The literature review has shown that PFPS development is probably multifactorial with various functional disorders of the lower extremity. Biomechanical studies described patellar maltracking and dynamic valgus in PFPS patients(functional malalignment). PFPS is further associated with vastus lateralis and vastus medialis imbalance, hamstring or iliotibial band tightness. This literature provides evidence for a multimodel non operative therapy concept

with short terms use of NSAIDs, short term use of a medially directed tape and exercise programs with the inclusion of lower extremity, hip and trunk muscles. Patients with anterior knee pain have to be examined carefully with regard to functional cause for a PFPS. The treatment for PFPS patients is non operative and addresses the functional causes

SECTION C : STUDIES ON THE RELIABILTY AND VALIDITY OF VISUAL ANALOGUE SCALE

Hawker et al .., 2011 According to this study, visual analogue scale for pain assessment is a uni dimensional single item scale that provides an estimation of patients with pain intensity. The scale is to administer, rate and score. It gives a comprehensive evaluation of pain in patients. It is a generic unidimensional pain questionnaire,

Silver et al.., 2008 According to this study 90 subjects were taken for acute pain measurement on visual analogue scale. VAS is generally regarded as a valid and reliable tool for chronic pain measurement. Although it appears to be equally valid in acute pain measurement and atlast the study concluded that VAS is a highly reliable instrument for acute pain.

Bijur et al .., 2008 conducted a study on patellofemoral pain syndrome on adults with acute pain. Reliability of VAS for acute pain measurement was assessed by the interclass correlation and appears to be high. 90% of pain rating were reproducible within 9mm. Hence the study concluded that VAS was a sufficiently reliable scale to assess acute pain.

John et al .., 2001 According to this study, visual analogue scale provides a smooth continuum of choices and allows patients to record small changes in pain severity. So the sensitivity and reliability of the scale increases. 96 patients were included in the study. The study concluded that VAS is highly reliable and valid scale for pain measurement.

SECTION D : STUDIES ON THE RELIABILITY AND VALIDITY OF ANTERIOR KNEE PAIN SCALE

Richard *et al* **.., (2016)** The study was conducted with high school female athletes to report on the reliability and validity of Anterior knee pain scale. The study concluded that it has a high internal consistency irrespective of response format. Both the longer 13 item and the shorter 6 item form either ordinal or dichotomized had a similar reliability.

Konstantious D *et al***.., (2013)** The aim of the study was to report the general test retest reliability of the anterior knee pain scale in addition with test retest, internal consistency and meaningfulness of each question. 20 patients were included in the study. The study reports high test retest reliability for the total scores of AKPS in patellofemoral pain syndrome patients. The AKPS focuses on pain, function and self assessment questionnaire.

Barby *et al***.., (2007)** The anterior knee pain scale is a 13 item knee specific questionnaire. It documents response to 6 activities associated with patellofemoral pain syndrome. The study concluded that it has a good test retest reliability. The sensitivity and detectable changes for the AKPS is variously reported as 7 points, 10 points and 14 points.

Cynthia *et al* **..,** (**2005)** did a study to determine the test retest reliability and responsiveness of anterior knee pain scale and lower extremity functional scale in patients with anterior knee pain. 30 patients with the chief complaints of patellofemoral pain syndrome was taken for study. The study indicates that the test retest reliability was high for both questionnaire to assess the anterior knee pain accurately.

Methodology

CHAPTER III

MATERIALS AND METHODOLOGY

3.1 study setting

The study was conducted in outpatient department of RVS college of Physiotherapy Sulur Coimbatore.

3.2 Selection of subjects

20 Patients were selected who fulfilled the inclusion and exclusion criteria

3.3 VARIABLES

3.3.1 Dependent Variable

> Pain

> Knee function

3.3.2 Independent Variable

> Fascial manipulation

3.4 Measurment tools

VARIABLES	TOOLS
PAIN	Visual Analogue Scale
Knee function	Anterior Knee Pain Scale

3.5 Study design

The study was a pre test and post test experimental study.

3.6 Duration of the study

Duration – 3 sessions for 3 weeks

3.7 Inclusion criteria

- Age 18 – 30 yrs
- Sex – both
- Clinically diagnosed with patellofemoral pain syndrome
- Duration of symptoms – 3 months
- Clarks test
- Mc Conell test

3.8 Exclusion criteria

- Previous injury to hip or ankle
- Recent fractures
- Patellar dislocation
- Patellar subluxation
- Knee surgeries
- Limb length discrepancy

3.9 Orientation to the subjects

Before the collection of data all the participants were explained about the purpose study, a detailed orientation about the treatment technique. The concern and full cooperation of each patient was sought after complete examination of the condition and demonstration of the procedures in the study was explained.

3.10 Materials used

- Couch
- Pillow

3.11 Test administration

The study was tested with visual analogue scale and anterior knee pain scale to estimate the pain severity and knee function respectively.

a. Visual analogue scale

The visual analogue scale is a subjective measure of pain. It consists of a 10 cm line with two end points representing no pain and worst pain unimaginable. During the visit, patients were asked to rate the pain by marking on the line corresponding tp their current pain status.
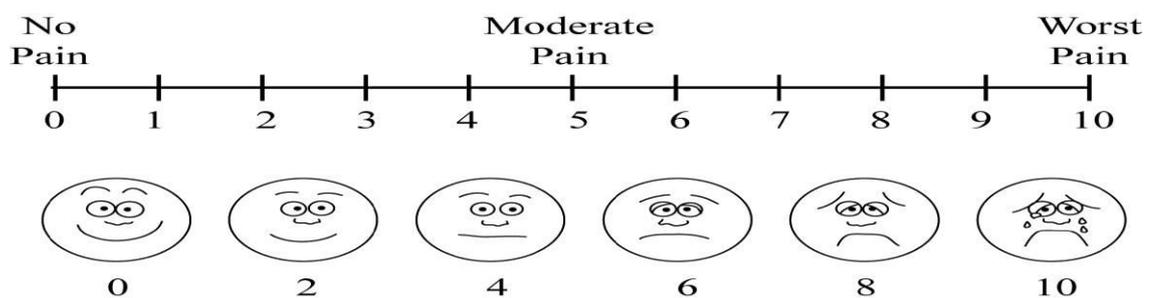
b.) Anterior knee pain scale

Anterior knee pain scale is 13 item knee specific self report questionnaire. It documents response to six activities thought to be associated with anterior knee pain syndrome. The scale asks about the duration of symptoms and the limb affected.

3.12 Treatment procedure

20 Patients were selected who fulfilled the inclusion and exclusion criteria. All subjects underwent a pre and post test assessment for patellofemoral pain syndrome prior to the treatment using VAS and Anterior knee pain scale for patellofemoral pain syndrome.

These tests were taken before and after completion of 3 treatment session for 3 weeks. The treatment sessions were organized with the gap of one week and the pain was evaluated after 3 sessions of treatment

EXPERIMENTAL GROUP

TECHNIQUE

Fascial manipulation for patellofemoral pain syndrome

MOVEMENT VERIFICATION

In supine ask the patient to lift the knee against a manual resistance by the therapists hand placed at thigh. The difference in strength and pain during lifting the knee is noted.

MYOFASCIAL UNIT OF ANTE GENU

CENTRE OF COORDINATION

Over the vastus intermedius muscle, lateral to the rectus femoris, midway on the thigh

TREATMENT
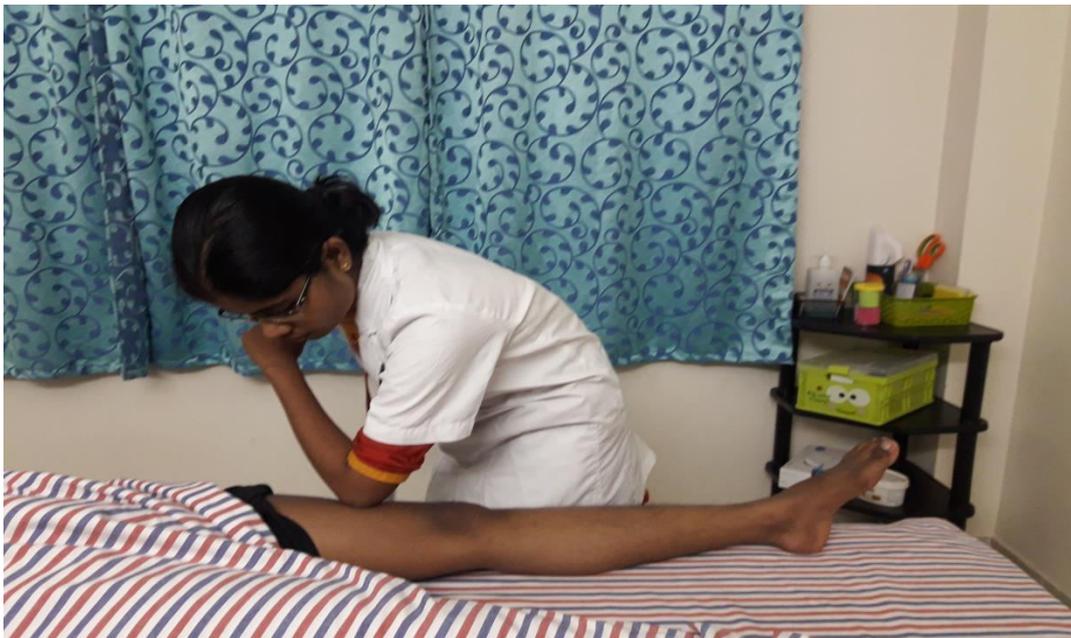
The patient is positioned in supine lying, the therapist stands on the same the side of the patients limb to be treated. The therapist places the knuckles\ elbow, over the mid thigh on vastus intermedius and starts moving in uphill direction for 3 minutes

MYOFASCIAL UNIT OF ANTE LATERO GENU I

CENTRE OF FUSION

Distal part of vastus lateralis, above and beside the patella.

TREATMENT

The patient is positioned in supine lying, and the hips are rotated laterally. the therapist stands on the same side of the patients limb to be treated. The therapist places the elbow \ knuckle over the lateral aspect of the knee joint and starts moving uphill direction for 3 minutes.

MYOFASCIAL UNIT OF ANTE TALUS

CENTRE OF COORDINATION

The centre of coordination of these forces is over the tibialis anterior muscle, midway on the leg.

TREATMENT

The patient is positioned in supine lying, the therapist stands on the same side of the patients limb to be treated. The therapist places the elbow\ knuckle over the tibialis anterior and starts moving in uphill direction for 3 minutes.

3.13 Collection of data

The 20 patellofemoral pain syndrome patients were taken and given fascial manuplation treatment for 3 sessions with a total treatment period of 3 weeks. Before and after the course of treatment, the pain and knee function was evaluated by visual analogue scale and anterior knee pain scale respectively.

3.14 Statistical technique

The collection data were analysed by paired 't' test to find out the significant difference between pretest and post test value of the experimental group.

Data Analysis & Result

CHAPTER IV

DATA ANALYSIS AND RESULTS

4.1 DATA ANALYSIS AND RESULTS

This chapter deals with the systematic presentation of the analysed data followed by the interpretation of the data

a. Paired 't' test

$$\bar{d} = \frac{\sum d}{n}$$

$$s = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

where,

d= difference between pre-test and post test value

$\bar{d} = \frac{\sum d}{n}$ calculated mean difference between pretest and post test values

n= sample size

SD= standard deviation

TABLE 1

Mean value, mean difference, standard deviation and paired 't' value between pretest and post test scores of pain.

Measurement	Mean	Mean difference	Standard Deviation	Paired 't' value
Pre test	5.4	2.6	0.58	20.41
Post test	2.8			

0.005 significance level

The calculated paired 't' value for pain is 20.41 and the table 't' value is 3.250 at 0.005 Significance level. Hence the calculated 't' value is greater than the table 't' value, so there is a significant difference in pain severity following fascial manipulation among athletes with patellofemoral pain syndrome.

Figure 1 : Graphical representation pf pre test post test mean value and mean difference value for pain

TABLE 2

Mean value, mean difference, standard deviation and paired 't' value between pretest and Post test scores for knee function

Measurement	Mean	Mean difference	Standard Deviation	Paired 't' value
Pretest	78.8			
	81.7	3.3	0.87	17.20
Post test				

0.005 significance level

The calculated paired 't' value for knee function is 17.20 and the table 't' value is 3.250 at 0.005 Significance level. Hence the calculated 't' value is greater than the table 't' value, so there is a significant difference in knee function following fascial manipulation among athletes with patellofemoral pain syndrome
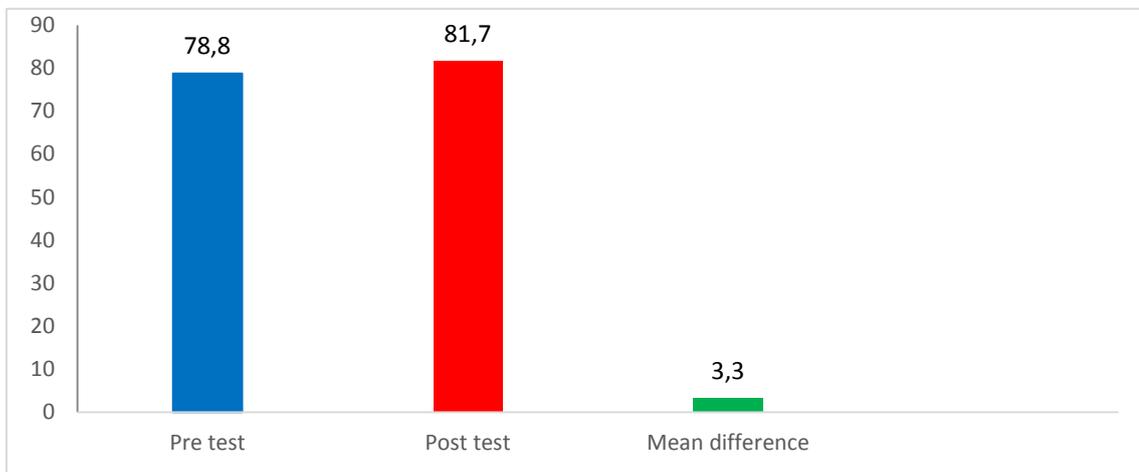
Figure 2; Graphical representation of pre test mean value post test mean value]and mean difference value for anterior knee pain scale.

4.2 RESULTS

20 Patellofemoral pain syndrome patients were selected for the study who fulfilled the inclusion and exclusion criteria. The patients were treated with fascial manipulation for a period of 3 sessions for 3 weeks. Before and after the treatment, pain and knee function was assessed by visual analogue scale and anterior pain scale respectively.

Analysis of dependent variable – pain in the experimental group :

The calculated paired 'tt value for pain is 20.41 and the table 't' value is 3.250 at 0.005 level of significance. Hence, the calculated 't' value is greater than the table 't' value so there is significant difference in pain following fascial manipulation among athletes with patellofemoral pain syndrome.

Analysis of dependent variable – knee function in the experimental group :

The calculated paired 't' value for knee function is 17.20 and the table 't' value is 3.250 at 0.005 level of significance. Hence, the calculated 't' value is greater than table 't' value there is a significant difference in knee function following fascial manipulation among athletes with patellofemoral pain syndrome.

Discussion

CHAPTER V

DISCUSSION

The study was conducted with the purpose to evaluate the effectiveness of fascial manipulation in patients with patellofemoral pain syndrome. Patellofemoral pain syndrome is due to the muscular dysfunction which changes the force vector and causes imbalance in the muscular force governing patellar tracking.

The aim of the study is to find out the effectiveness of fascial manipulation in reducing pain and improving knee function among athletes with patellofemoral pain syndrome. 20 patients were selected for the study and they were treated with fascial manipulation. Fascial manipulation works on the fascia by working on the sensory and mechanoreceptors, eventually reducing the sympathetic tonus and tissue velocity, fascial plasticity occurs, which restores gliding between the fibers. Fascial manipulation restores aims to restore the gliding between intrafascial fibres and reduces pain and increases the joint function via manual pressure. it works on the centre of coordination point – a point of vectorial convergence for muscular forces, which allows the transformation of ground substance by altering the pathological status of dense fascia into a physiological status of fluid fascia by manipulation this occurs by two mechanisms – intrafascial fibres free nerve endings gets activated and slides easily reducing the pain , secondly it enhances the fluidity within the fascia during muscular contraction

Alessandro pedrelli et al .., 2008 According to this pilot study 18 patients were treated for patellar tendon pain with fascial manipulation and there was a substantial decrease in pain after one session of fascial manipulation. According to the fascial manipulation model, the area were the patient perceives pain is called centre of perception. MFU of knee extension is ANTE GENU, centre of coordination is over vastus intermedius muscle. The aim of the fascial manipulation therapy is to restore gliding between the intrafascial fibres. Pain was assessed before and after the treatment with VAS with a followup evaluation after one month. The result showed a substantial decrease in pain.

Julie et al.., 2005 conducted a study on the human fascial anatomy. Fascial connection with human biomechanical model. The architechture of the deep muscular fascia its myofascial force transmission mechanism. The role of fascia in agonist and antagonist muscle interaction. The study also states about the role of fascia in proprioception and motor

coordination. This study concluded that fascial manipulation showed a substantial decrease in muscular dysfunction.

Results of the present study shows that there is a significant difference in pain and knee function following fascial manipulation among athletes with patellofemoral pain syndrome.

Hence, hypothesis 1 was accepted and hypothesis 2 was rejected.

Conclusion

CHAPTER VI

CONCLUSION

The study was conducted to investigate the effectiveness of fascial manipulation in reducing pain and improving knee function among athletes with patellofemoral pain syndrome

20 patients were included in the study and they were treated with fascial manipulation.

Pain and knee function was assessed before and after the intervention by visual analogue scale and anterior knee pain respectively.

From the statistical results, it is concluded that fascial manipulation is effective in reducing pain and improving knee function among athletes with patellofemoral pain syndrome.

6.1 LIMITATION

- Sample size of the study was small
- No followup exercise programme was done.
- A short term study

6.2 SUGGESTION

- Sample size can be increased
- A long term study can be done
- A followup exercise protocol can be added

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CHAPTER VII

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Annexure

ANNEXURES

ANNEXURE I

PHYSIOTHERAPY ASSESSMENT

Subjective assessment

Name

Age

Sex

Chief complaints

Medical history

Associated problems

Pain assessment

Site of pain

Type of pain

Duration of pain

Nature of pain

Relieving factors

Other

Objective assessment

Built

Posture

Skin changes

Bony and soft tissue contours

Attitude of limb

Muscle wasting

Skin changes

Edema

Gait

Deformity

On palpation

Tenderness

Swelling

Muscle spasm

Warmth

Other if any

On examination

Range of motion for knee

Movement	AROM	PROM
FLEXION		
EXTENSION		

Muscle strength

Clarks test

Mc Conell test for patellofemoral pain syndrome

Diagnosis

ANNEXURE II

Table 3: pre-test and post-test values of visual analogue scale for patients .

SL NO.	PRE TEST	POST TEST
1	4	2
2	3	1
3	5	3
4	6	2
5	7	4
6	8	5
7	3	1
8	5	2
9	6	3
10	4	2
11	7	4
12	8	5
13	4	2
14	5	2
15	3	1
16	8	5
17	7	4
18	5	2
19	4	2
20	7	4

ANNEXURE III

a. **Anterior knee pain scale**

1. **Limp**

   None

   Slight or periodical

   Constant

2. **Support**

   Full support without pain

   Painful

   Weight bearing impossible

3. **Walking**

   Unlimited

   More than 2 km

   1-2 km

   Unable

4. **Stair climbing**

   No difficulty

   Slight pain when descending

   Pain both when ascending and descending

   Unable

5. **Running**

   No difficulty

   Pain more than 2 km

   Slight pain from start

   Severe pain

   Unable

6. **Squatting**

   No difficulty

   Repeated squatting painful

   Painful each time

   Possible with partial weightbearing

   Unable

7. **Jumping**

   No difficulty

   Slight difficulty

   Constant pain

   Unable

8. **Prolonged sitting with knee flexed**

   No difficulty

   Pain after exercises

   Constant pain

   Severe pain

   Unable

9. **Pain**

   None

   Slight or occasional

   Interferes with sleep

   Occasionally severe

   Constant severe

10. **Swelling**

    None

    After severe exertion

    After daily activities

    Every morning

    Constant

11. **Painful knee cap movements**

    None

    Occasionally in sports activities

    Occasionally in daily activities

    Atleast one dislocation

    More than 2 dislocations

12. **Atrophy of thigh muscles**

    None

    Slight

    Severe

13. Knee flexion deformity

None

Slight

Severe

Table 4: pre test post test values of anterior knee pain scale for knee function

S NO.	PRE TEST	POST TEST
1	80	84
2	84	88
3	77	80
4	88	92
5	78	80
6	80	84
7	73	76
8	76	80
9	73	76
10	82	84
11	78	82
12	88	91
13	75	79
14	83	88
15	81	84
16	76	78
17	74	77
18	77	81
19	74	76
20	82	84

ANNEXURE IV

SPECIAL TEST

- **Clarks test**

    Patient postion - side lying

    Therapist position - standing by the side of the patient.

    Procedure

    The examiner places the web space of hand just superior to the patella while applying pressure. the patient is instructed to gently and gradually contract the quadriceps muscle

    Implication - the positive sign on this test indicates pain on the patellofemoral joint

- **Mc Conell test for patellofemoral pain syndrome**

    Patient position – high sitting with leg laterally rotated

    Therapist position – Standing by the side of the patient

    Procedure

    Isometric quadriceps contractions are performed at 0, 30, 60, 90and 120degrees of knee flexion foe 10 seconds. If pain is produced with any of this movement, repeat test with patella pushed medially.

    Implications – The sign os this test is decrease in symptoms with medial glide

ANNEXURE V

PATIENT CONSENT FORM

I…………………………………………….Voluntarily consent to participate in the research named on **"A STUDY ON THE EFFECTIVENESS OF FASCIAL MANIPULATION IN REDUCING PAIN AND IMPROVING KNEE FUNCTION AMONG ATHLETES WITH PATELLOFEMORAL PAIN SYNDROME."**

The researcher has explained me the treatment approach in brief, risk of participation and has answered the questions related to the study to my satisfaction.

Signature of Patient   **Signature of Researcher**

Signature of Witness

Place:

Date: