

Effect Of Tfl(Tensor Fascia Lata) Muscle Stretching In Medial Compartment Osteoarthritis Knee Patients: A Randomized Control Trial

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Abstract:

Background:-

Osteoarthritis is a chronic, localized joint disease affecting approximately one-third of adults, with the disease prevalence increasing with advancing age. OA affects many joints including the large, weight bearing joints of the hips and knees and also the spine, hands, feet and shoulders. The knee is the most common weight bearing joint affected by OA, with the disease predominantly affecting the medial compartment of the tibio-femoral joint. Patients with knee OA frequently report symptoms of knee pain and stiffness as well as difficulty with activities of daily living such as walking, stair-climbing and house keeping.

Objectives:-

To compare the effectiveness of TFL muscle stretching exercises and conventional physiotherapy treatment with conventional physiotherapy treatment alone in people with unilateral medial compartment knee osteoarthritis.

Materials and Methodology:-

Study included 30 (Thirty) subjects with unilateral medial compartment knee OA, aged 45 years or above. The subjects were randomly divided into 2 groups: Group -A and Group -B. The subjects were treated for a period of 6 weeks, 6 days a week, once daily. Pain was assessed by VAS score and physical function was assessed by WOMAC Index of Osteoarthritis.

Results:-

The results were analyzed by **Wilcoxon Signed Rank Test**. Group A showed significant improvement in pain ($T=120, p<0.05$) and physical function ($T=120, p<0.05$). In Group B, results showed significant improvement in pain ($T=91, p<0.05$) and physical function ($T=120, p<0.05$).

Comparison of Group A and Group B was done with **Wilcoxon Sum Rank Test (Mann Whitney U Test)**, Group A showed significant improvement in pain ($z = -2.82, p<0.0052$) and physical function ($z = -3.56, p<0.0004$).

Conclusion:-

TFL muscle stretching exercises showed over all improvement in pain and physical function and is a useful adjunct exercise therapy in treating patients with unilateral medial compartment knee osteoarthritis.

Key words: Shortwave diathermy (SWD), visual analogue scale (VAS), WOMAC

I. Introduction:

The term arthritis literally means inflammation of a joint, but is generally used to describe any condition in which there is damage to the cartilage. The cartilage coats the joint surfaces to absorb stress, and allow smooth joint movement. The proportion of cartilage damage and synovial inflammation (the lining and fluid in the joint capsule) varies with the type and stage of arthritis. Usually the early pain is due to inflammation. Later in the disease, pain is from the irritation of the worn joint structures and inability of the joint to move properly.

Osteoarthritis (OA) is a chronic, localized joint disease affecting approximately one-third of adults, with the disease prevalence increasing with advancing age^[1]. Concomitant with this high prevalence is a large economic cost, with direct and indirect costs estimated to be \$23.9 billion in Australia in 2007^[2]. Indeed, given the changing demographics of the adult population^[3], expectations are for the prevalence of disease and its burden on the health care system to increase in coming decades^[4].

The knee is the most common weight bearing joint affected by OA, with the disease predominantly affecting the medial compartment of the tibio-femoral joint^[5,6]. Patients with knee OA frequently report symptoms of knee pain and stiffness as well as difficulty with activities of daily living such as walking, stair-climbing and house-keeping^[7].

To date, most knee OA research examining treatment for knee OA has focused on surgical or pharmacological strategies. Although effective, these types of interventions have many potential side effects and are expensive^[8]. Thus, recent knee OA clinical guidelines reinforce the importance of non-pharmacological

strategies in the management of the condition ^[9, 10]. However, there is an absence of high quality evidence to support the use of such therapies ^[9].

There are several reasons for the development of OA including age, being overweight, heredity factors, and joint damage from a previous injury or during early development of a joint. Increased loading across the joint has been implicated in the progression of knee OA severity ^[11]. In knee OA, the medial tibiofemoral compartment is the most common site of disease. The susceptibility of the medial compartment to OA development may relate to greater load distribution (i.e., 60–80%) to the medial than the lateral compartment, even in healthy knees, during gait. Excessive medial compartment loading is widely believed to contribute to medial OA progression. Because direct measurement of knee load is invasive, external knee adduction moment during gait, a correlate of medial load, has been used in knee OA studies ^[12]. The role of gait analysis in the quantification of dynamic joint load has received much attention in the literature in light of the difficulty in performing *in vivo* measurement of joint loading during movement ^[13, 14, 15]. From the research, the external knee adduction moment, an indirect measure of load in the medial compartment of the tibio-femoral joint ^[16], has emerged as an important and widely accepted biomechanical marker of knee load.

Cross-sectional studies demonstrate that patients with knee OA have a higher peak knee adduction moment during walking when compared to healthy age-matched controls ^[17, 18]. It is also likely that the higher prevalence of medial compared with lateral tibiofemoral joint OA is the result of differences in the relative loading within the tibiofemoral joint. The external knee adduction moment determines load distribution across the medial and lateral tibial plateaus ^[12, 19, 20], with force across the medial compartment almost 2.5 times that of the lateral ^[16]. It has also been reported that for patients with knee OA, the magnitude of the adduction moment is predictive of clinical outcomes such as severity of knee pain and radiographic disease ^[21, 22].

A variety of exercise programs for knee OA have been described in the literature. These have included general aerobic exercise programs such as walking or cycling as well as more specific programs involving strengthening of particular muscle groups and/or flexibility exercises.

The primary aim of this study is to determine whether stretching of TFL muscle in people with medial compartment knee OA can reduce knee pain and improve physical function. It is hypothesized that a 6-week programme of stretching of TFL muscle(tensor fascia lata muscle) will improve pain and physical function in people with medial compartment knee OA.

Aims And Objective:

- 1) To determine the effectiveness of TFL muscle stretching in people with medial compartment knee osteoarthritis.
- 2) To compare the effectiveness of TFL muscle stretching and conventional treatment with conventional treatment in people with medial compartment knee osteoarthritis.

II. Study Design And Materials:

Study Design

An Experimental study was conducted to study the effects of TFL muscle stretching exercises in patients with osteoarthritic knee joints.

Study Setting

All patients were referred from Orthopaedic Out-patient Department, Civil Hospital, rajkot to Physiotherapy Department, Civil Hospital, Rajkot where they all were treated during study period.

Sample Selection

The sample size consisted of 30 (thirty) patients, who were diagnosed with unilateral medial compartment tibiofemoral OA, as per the Inclusion Criteria and the Exclusion Criteria.

Study Duration

The total duration of the study was 6 months. The subjects were treated for a period of 6 weeks, 6 days a week, one session daily.

Sample Size

The sample size of 30 (thirty) patients was divided in to two groups.

Group A: 15 patients.

Group B: 15 patients.

Age Group

45 years or older.

Gender: Both sexes

Male: 14

Female: 16

Selection Criteria:

Inclusion Criteria:-

1. Age greater than or equal to 45 years.
2. Unilateral medial compartment tibiofemoral OA without involvement of any other compartment of knee joint.
3. Duration of symptoms: Chronic according to IASP classification.
4. At least some difficulty in daily function due to knee OA.
5. Both genders are included.
6. Kellgren-Lawrence radiographic grade I, II and III.
7. Patients who are able to comprehend commands.
8. Willingness to participate in the study.

Exclusion Criteria:-

1. History of trauma within one year to affected knee joint.
2. Associated with any other pathological condition such as neoplasm, osteomyelitis, vascular problem etc.
3. Low back pain radiating to knee joint.
4. Knee surgery or intra articular corticosteroid injection within 6 months to affected knee joint.

Materials Used In The Study:-

Consent form, universal goniometer, vas scale, weight cuffs, WOMAC Index of Osteoarthritis, Examination Table, Short-wave Diathermy Machine, Kodak C875 Zoom Digital Camera, Paper, Pencil, Scale, Pins.

Description Of The Tools:-

Visual Analog Scale (VAS):

WOMAC Index of Osteoarthritis:

III. Methodology:

Ethical clearance was obtained from the Ethical Clearance Committee of civil hospital ,rajkot prior to the study. Those who fulfilled the inclusion criteria were taken up for the study. The whole procedure of the study was explained to all the subjects. A written informed consent of all the subjects was taken prior to the study. All the subjects were assessed as per the assessment form.

30 (thirty) subjects were taken for the study with diagnosis of unilateral medial compartment knee OA; 14 male and 16 female. They were randomly divided in to two groups for the study. Each subject of the study was treated for a period of 6 weeks, 6 days a week, one session daily. An assessment was done prior to starting of treatment and weekly assessment was taken for these subjects.

Exercise Protocol

All the subjects were informed in detail about the type and nature of the study. The subjects were divided in to two groups; Group A and Group B, 15 patients in each group. All the subjects were randomly selected and assigned in to each group.

Group A:

The subjects in Group A were given TFL muscle stretching exercises and conventional physiotherapy treatment.

Group B:

The subjects in Group B were given conventional physiotherapy treatment.

CONVENTIONAL PHYSIOTHERAPY TREATMENT FOR BOTH GROUP -A & GROUP -B: - (ref)

A. SHORT WAVE DIATHERMY:

B. STRETCHING EXERCISES:

- 1) Standing calf stretch
- 2) Supine hamstring stretch
- 3) Prone quadriceps stretch

C. RANGE OF MOTION EXERCISES:

- 1) In long sitting position, knee mid-flexion to end range extension
- 2) In long sitting position, knee mid-flexion to end range flexion
- 3) Stationary bicycle

D. STRENGTHENING EXERCISE:

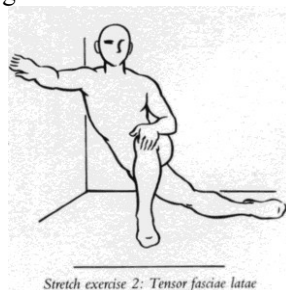
- 1) Static quadriceps sets in knee extension
- 2) In high sitting position knee mid-flexion to end range extension with weight cuff
- 3) In prone position knee end range extension to mid-flexion with weight cuff

TFL MUSCLE STRETCHING EXERCISES FOR GROUP -A:-

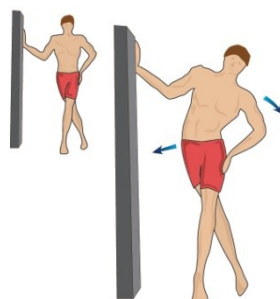
Subjects in Group A were given a series of three exercises designed to stretch TFL muscles, 6 days a week for 6 weeks.

Type of exercise

- 1) In side lying position therapist will do flexion at knee joint, adduction and external rotation at hip joint And other two methods of self stretching exercise:
- 2) In supine lying cross leg stretching



- 3) In standing cross leg stratching



The whole study was extended for a period of 6 months. The duration of treatment programme for each subject was 6 weeks. All the thirty (30) subjects completed the whole treatment programme of 6 weeks with out any discomfort.

IV. Results:

Table 1 show the gender distribution of the 30 subjects who participated in the study. In the Group A where the subjects underwent hip abductor muscle strengthening exercises and conventional physiotherapy treatment had 8 males and 7 females and in the Group B where the subjects underwent conventional physiotherapy treatment alone had 6 males and 9 females. There was no significant predominance of sex.

Table 1 Gender Distribution of the Subjects:

Gender	Group A	Group B
Male count	8	6
%	53.33%	40%
Female count	7	9
%	46.66%	60%
Total	15	15

Table 2 displays the statistics of age distribution of the 30 subjects. Among the 30 subjects, the mean age of 15 subjects in Group A was 51.33 with a standard deviation (SD) of 5.2326, and the mean age of 15 subjects in Group B was 52 with a standard deviation of 5.0142. No significant age difference was seen across the two groups.

Table 2 Age Distribution of the Subjects:

Group	N	Mean	SD
Group A	15	51.33	5.2326
Group B	15	52	5.0142

Wilcoxon Signed Rank Test (1,2) was applied in Group A and in Group B for with-in group analysis and it is as follows:

In Group A, results showed significant improvement on VAS score (T = 120 > 95, p < 0.05).

In Group A, results showed significant improvement on WOMAC score (T = 120 > 95, p < 0.05).

In Group B, results showed significant improvement on VAS score (T = 91 > 74, p < 0.05).

In Group B, results showed significant improvement on WOMAC score (T = 120 > 95, p < 0.05).

Wilcoxon Sum Rank Test (Mann Whitney ‘U’ Test) (1,2) was applied for between-group comparison of Group A and Group B, and it is as follows:

On comparing Group A and Group B for post-treatment VAS score, results showed significant difference in improvement (z = -2.82, p = 0.0052).

On comparing Group A and Group B for post-treatment WOMAC score, results showed significant difference in improvement (z = -3.56, p = 0.0004).

For Group A:

Score	Pre Mean + SD	Post Mean + SD	T	p <
VAS	7 + 1.690	2 + 1.463	120	0.05
WOMAC	66.66 + 6.986	27.66 + 4.237	120	0.05

For Group B:

Score	Pre Mean + SD	Post Mean + SD	T	p <
VAS	6.93 + 1.387	4.066 + 1.907	91	0.05
WOMAC	67.13 + 6.577	37.46 + 6.356	120	0.05

On comparing Group A and Group B:

Score	z Value	p Value
VAS	-2.82	0.0052
WOMAC	-3.56	0.0004

The ‘z’ values (corresponding to ‘p’) are highly significant which suggest that TFL muscle stretching exercises are effective in reduction of pain and improvement of physical function along with conventional physiotherapy treatment.

V. Conclusion:

There was an experimental study comparing effectiveness of TFL muscle stretching and conventional physiotherapy treatment in osteoarthritis knee patients.

There was a statically significant difference in both experimental and conventional groups.

Hence, Null Hypothesis of no significant effect of TFL muscle stretching exercises can be rejected and Alternative Hypothesis of , there is an additive effect of TFL muscle stretching exercises on reduction of pain and improvement of physical function can be accepted.

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Interest Of Conflict:

The authors perceive no conflict of interest in this study.

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