FACILITATED POSITIONAL RELEASE TECHNIQUE VERSUS FOAM ROLLING IN PIRIFORMIS SYNDROME

A Dissertation Submitted to

Department of Physiotherapy

In Partial Fulfilment of the Requirements for the

Award of the Degree of

Master of Physiotherapy in Orthopaedics

(Registration no-11309553)

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APRIL, 2015

CERTIFICATE

This is to certify that the dissertation work entitled **"FACILITATED POSITIONAL RELEASE TECHNIQUE VERSUS FOAM ROLLING IN PIRIFORMIS SYNDROME"** has been carried out by **Ms. Ramanpreet Kaur Doad, Registration No. 11309553,** Department of Physiotherapy, Lovely Professional University, towards partial fulfillment of the requirements of **Master of Physiotherapy (Orthopaedics) degree programme.**

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CERTIFICATE

This is to certify that Ms. Ramanpreet Kaur Doad, Registration No: 11309553, has completed MPT Dissertation titled **"FACILITATED POSITIONAL RELEASE TECHNIQUE VERSUS FOAM ROLLING IN PIRIFORMIS SYNDROME"** under my guidance and supervision. I certify that this is her bonafide work. To the best of my knowledge, the present work is the result of her original investigation and study and has not been submitted for any degree to this or any other university.

The dissertation is fit for the submission and the partial fulfillment of the conditions for the award of MPT (Orthopaedics).

Supervisor:

Dr. Harpreet Kaur (PT)

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Lovely Professional University

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DECLARATION

I hereby declare that the dissertation entitled **"FACILITATED POSITIONAL RELEASE TECHNIQUE VERSUS FOAM ROLLING INPIRIFORMIS SYNDROME"**submitted forthe **MPT Degree** is entirely my original work and all ideas and references have been duly acknowledged. I have adequately cited and referenced the original sources. I also declare that I have stick to the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea, data, fact or source in my submission. I understand that any violation of the above will be cause for disciplinary action by the school and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed. It does not contain any work for the award of any other degree or diploma.

This thesis encompasses the information generated by me based on experiment work carried out in the institute. I assure and hold full responsibility for its genuineness.

Ramanpreet Kaur Doad

Date: Investigator

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ACKNOWLEDGEMENT

My sincere Gratitude to Lord Almighty, to my parents **Mr. Satwant Singh Doad** and **Mrs. Amarjit Kaur** and my family members who have supported me through the good and bad times and guiding me throughout my life and has instilled in me the love for Physiotherapy and shown me, what a privilege it is to help others.

I express my heartfelt thanks to **Mr. Ashok Mittal,** Honorable Chancellor of Lovely Professional University, **Mrs. Rashmi Mittal,** Worthy Pro Chancellor, **Dr. Ramesh Kanwar,** Worthy Vice Chancellor and **Dr. Monica Gulati,** Senior Dean, LFAMS for providing all the facilities to carry out the project work.

I would like to express my deep and sincere gratitude to **Dr. Jasobanta Sethi**, Professor and Head of School of physiotherapy, Lovely Professional University, for giving me the opportunity to work on this project. I am deeply grateful to him for his detailed and constructive comments, and for his important support throughout this work.

With extreme gratitude and in debtness, I wish to express my acknowledgement to **Dr. Harpreet Kaur (PT)** for helping me as my guide throughout and making this research possible. You have helped me to have faith in this topic, was all ‘open arms’ about participating, helped with resources and helped in initial steps of brainstorming to conduct this study and then putting it all on paper. I could not imagine going through this work without your kind help and support.

I am thankful to all my faculty members **Dr. Sarvanan** (MPT Cardiology), **Dr. S. Micheal Raj** (MPT Neurology), **Dr. Ajay** (MPT Cardiology, PhD), **Dr. Sridhar** (MPT Neurology), **Dr. Rati** (MPT Orthopaedics), **Dr. Manpreet** (MPT Sports), **Dr. Gayathri** (MPT Orthopaedics), **Dr. Himani** (MPT Neurology), **Dr. Bhanu** (MPT Paedriatics), **Dr. Biswajeet** (MPT Orthopaedics) and **Dr. Priyanka** (MPT Neurology).

My special thanks to **Mr. B. K Aneja** who helped me in carrying out statistical analysis of the data and without whose support and inspiration, the completion of this research work would not have been possible.

To all my friends who have helped me during my thesis and encouraged me to carry out this project. They supported me through the tough times and all the many laughs we have shared.

Last but not the least I would like to thank all the subjects who volunteered to participate in the study.

Ramanpreet Kaur Doad

DEDICATION

This dissertation is dedicated to my family members, who have been supportive throughout my life and acted as a source of inspiration, motivation, and encouragement at every phase of my career. To my teachers, who taught me at every required accession and without whom it would never have been possible for me to reach this stage. To all my subjects and colleagues who made me learn through experience. Last but not the least to my friends who have been helpful and stimulating in my personal and professional growth.

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CHAPTER - 1

INTRODUCTION

1.1 INTRODUCTION

Piriformis syndrome is the peripheral neuritis of the sciatic nerve, which is caused due to abnormal condition of piriformis muscle in the person. This syndrome frequently goes diagnosed wrongly or unrecognized [1]. It causes hip and buttock pain, the pain is usually referred down the back of the leg and occasionally into the medial foot .It is often related with numbness in the posterior medial lower limbs[2]. This causes tingling, pain and numbness along the course of sciatica[3].Sciatica, is the musculoskeletal pain which is felt in the leg all along its distribution and is also accompanied by low back pain sometimes[4].Piriformis syndrome is painful but rarely dangerous and sometimes need surgery[3]. Physical therapy is one of the easiest methods that help to reduce pain and manage problem with the piriformis condition. Sciatic nerve splits through piriformis muscle in 20% of population[5,7].

The tightness of Piriformis muscle put pressure on the sciatic nerve causing irritation and cause radiating pain down the back of the leg[5]. The piriformis muscle is functioning in elongated position or when it is placed to high eccentric loads during activities. Piriformis syndrome is also known as pseudo sciatica , wallet sciatica and hip socket neuropathy[6].There has been added 16% of adult work disability examinations and evaluations which rate the patient's disability that is linked with chronic low back pain. Atleast 6% of patient with low back pain are in certainty having piriformis syndrome[8].Many researchers have done studies on sciatica such as, Mixter and Barr's work correlates the clinical features with operative and histological findings that from so many times the reason of sciatica was the compression of nerve root by herniated intervertebral disc[14]. Then another cause was purposed by Freiberg and Vinke that nerve trunk compression occurs by the piriformis muscle and it was developed by Robinson, he created the term Piriformis Syndrome[8].

Sciatica arise from the lumbar canal and the pelvis[16]. Electromyography findings was demonstrated by Fishman along with others that with the symptoms showed interruption in the H reflex in the patients with FAIR position, when comparison was done between Piriformis syndrome patients and asymptomatic subjects[9].prevalence rates for piriformis syndrome between those who have low back pain vary from 5% to 36% generally[6,15].Biomechanically due to the wider quadriceps femoris muscle angle i.e. Q angle in the pelvis of women, piriformis syndrome is more common in them than in men[10].

ANATOMICAL CHARACTERISITCS

Piriformis muscle is a flat pyramidal shape muscle, that acts as a strong external rotator, but weak abductor and hip flexor of the hip. It provides postural stability to the hip during standing and ambulation[8,11]. This muscle has its origin from Anterior surface of the sacrum,largely from the levels of vertebrae S2 to S4 and at the sacroiliac joint capsule[11]. It forms a round tendon when it attaches to the superior aspect of the greater trochanter, which is combined with the tendons of obturator internus and gemelli muscle in many individuals.[1] . The piriformis muscle is also supplied by S1 and S2 spinal nerves and rarely by S5[11]. To understand the relationship between sciatic nerve and piriformis muscle is very important. In 96% of people the sciatic nerve exists in the greater sciatic foramen all along the inferior surface of the piriformis muscle. In almost 22% of people the nerve pierce through the piriformis muscle, splits or does equally in people with piriformis syndrome[12,13]. The sciatic nerve pass in the course of the muscle belly of piriformis muscle or it may divide with one branch in fibular portion and other branch by tibial portion and runs both inferiorly or superiorly[11,12].

ETIOLOGICAL CONSIDERATIONS

Piriformis syndrome is of two types- Primary type and Secondary type. The piriformis syndrome is due to anatomic causes such as due to split of the piriformis muscle, split sciatic nerve or due to the different path way of sciatic nerve[16]. There are two divisions of the sciatic nerve, the peroneal and tibial[5].

Secondary piriformis syndrome has a precipitating cause, which includes microtrauma, macrotrauma, ischemic mass effect and local ischemia[1,15]. Patients with piriformis syndrome, only fewer than 15% are cases of primary type[8,11].In the total world population who cause piriformis syndrome, only 20% are caused by anatomical nerve abnormalities[13]. In almost 50% of cases the patient presents with symptoms of sciatica which may be spontaneous, but the most common cause is due to energetic activities. And the left behind 50% are associated to sudden blow to pelvic region, contusions, surgery, nerve abnormalities ,muscle imbalance and due to hyperlordosis[6].

Piriformis syndrome not often occurs due to direct blow to the buttock area[4]. Micro trauma may be result from overdo of the piriformis muscle such as walking for prolonged period or repetitive trauma or direct compression, also called as "wallet neuritis"[1]. Myofascial trigger points that take place in piriformis muscle or in gluteal muscle can cause hypertonicity and lead to nerve compression[10] .

CLINICAL DIAGNOSIS

The common symptom in patient is rising pain after sitting constantly for more than 15 to 20 minutes. Patients complains of pain in the buttocks, over sacrum and medial greater trochanter. The symptoms onset can be rapid or slow and is usually associated with the spasm of the piriformis muscle due to compression of the sciatic nerve[1]. Patient have difficulty in walking and pain with internal rotation of ipsilateral leg like in cross legged sitting[11,15,17,].

The Stress on the sacrotuberous ligament occur due to the spasm of the piriformis muscle and sacral dysfunction like torsion. The strain may result into the compression of the pudendal nerves or mechanical stress on pelvic bone and pelvic pain occurs. Fibular branch compression of sciatic nerve cause pain or paresthesia in the posterior thigh[11,17,41]. The piriformis syndrome may cause cervical, thoracic and lumbosacral pain and headache[11].The patient presents with some signs like tenderness in SI joint, greater sciatic notch and piriformis muscle, There is presence of palpable mass in ipsilateral buttock and asymmetrical weakness in affected limb. Some tests which helps in the diagnosis are piriformis sign positive, Lasegue sign positive, Freiberg sign positive, Pace sign positive. In the syndrome the medial rotation is limited of ipsilateral lower limb[1,11,17].

The symptoms patient presents are pain or paresthesia from sacrum down to posterior aspect of the thigh, pain improves usually with walking and worsens with rest or no movement. Patient have difficulty in walking and complain of contralateral SI pain and also have numbness in the foot. Headache, neck pain and abdominal and inguinal pain are also common[1]. In one of the study, it was stated that trendelenburg gait may occur due to somatic dysfunction and is corrected by the osteopathic manipulative treatment[18]. Regular exercise and performance can cause microtrauma which causes small damage to the muscle, therefore to prevent this Self myofascial release technique is used[12].

Myofascial release term was first coined in 1981, and has become wide mixture of techniques which includes osteopathic soft tissue techniques, structural integration and trigger point release[19]. This technique tackle to the localized tightness in the fascia. Myofascial trigger points can be present due to severe trauma, overuse or overstress and joint dysfunction. Some recent studies are done, and they say that pathophysiology of myofascial pain syndrome and formation of myofascial trigger point are outcome from the injured muscle or fiber or due to overloaded muscle fibres,this leads to involuntary shortening and cause loss of oxygen and the nutrient supply with increase in metabolic demand on the local tissues[20,21,22,23].

Many researchers have told that performing myofascial release technique can improve the sensations of pain and recover the poor blood flow circulation that can be due to inflamed fascia[24]. For the management of piriformis syndrome, Physical therapy is the treatment of choice. It includes techniques like facilitated positional release, which is the modification of indirect myofascial release technique which is enhanced by placing the body part in the neutral position or comfort position and then add a compression or torsion to remove the tension from the tissue[11].Positional release technique or strain counterstain is the technique, they work onthe passive intervention which intend at relieving musculoskeletal pain and dysfunction[20]. When the position of ease/pain reduction is attain,it will causelesseningof the stressed tissues and tone tissues.

The position of ease is achieved, by placing the joint in limited or dysfunctional state into a comfort state which always comprises ‘indirect’ approach which help to ease the constraint barrier[27].In positional release a point of ease or comfort is achieve, without questioning feedback from the patient rather than by the palpation of the tissues from hypertonic state to relaxing state is seen carefully by the therapist or examiner.[26]FPR present motion into the course of freedom of movement, by placing the joint in neutral position and a facilitating force is applied at that time. This technique is applied easily and isefficient[25].

Solomonow provided the evidence that a facilitated version or component also exists and suggestions tells that the various hypothesis that presently exist as to the mechanism involved which improve circulatory enhancement to neurological reset in it.[28]

Schiowtiz in 1990 developed the facilitated position release model which added some a variety of modifications to the protocols, in this the position of ease was held for 5 second

only, where as in traditional positional release the position of ease was held for 90 second[25,29].

Wong et all in 1994 reported that strain counterstrain has reduced the sensitivity to palpation and has increased the strength in subjects who have the tender points in the hip musculature[20.]

Another form of technique used in relieving TPs is Foam rolling. It is also a myofascial technique ,but it is a self myofascial release technique that inhibits the overactive muscles. This is also a form of stretching and it depends upon the concept of autogenic inhibition, which improves the soft tissue extensibility by relaxing the tighten muscle and allows the activation of the antagonist muscle.[30]Foam rolling uses a cylindrical roller to perform a self massage or myofascial release, to crack the trigger points and to ease the tight fascia, this improve the circulation and increase the blood flow to the soft tissues. Foam rollers are made of light weighted polyethylene foam and are useful in enhancing balance reactions and muscle re-education.There are two types of foam roller, standard Foam roller which is 36"*6" (firm, deep tissue massage) and Pro roller soft which is 36"*6"(soft and gentle)[31].

Regular use of the foam roller is beneficial to the person,this improve and enhance the performance and prevent injuries and also improves the recovery. It's a way to warm up the cold deep muscles and also to warm up the muscles before activity. The roller acts as an indicator of when the muscles begin to tighten up even though some tightness is felt during the activity[31]. A tender area is found and the rolling is done by foam roller under each muscle and the pressure is maintained on the tender area for atleast 30 to 60 seconds[33] .

Foam rolling technique results in softening and lengthen the fascia and break the scar tissues or adhesions between skin,muscles and bones[30,33]. There are some indications for myofascial release like, improving mobility and range of motion, reduction of scar tissue and adhesions, decrease in the tone of overactive muscles and improve the quality of movement. Some contra indications are circulatory problem, chronic pain conditions ,recent injuries and bony prominences or joints[34]. A careful look should be taken on these things before giving the treatment.

1.2 NEED OF THE STUDY

Taking in the account the increasing number of piriformis syndrome whose cause and precise treatment are still baffling, inspite of many researchers and work done for effective management of piriformis syndrome, an effective treatment is still inconclusive.

No study has done the comparison of these techniques of treatment, therefore this study is placed to investigate to compare the effect of facilitated positional release technique and foam rolling in piriformis syndrome.

1.3 SIGNIFICANCE OF THE STUDY

The significance of this study is to provide baseline information to physiotherapy community a new insight in creating a non invasive cost/time effective treatment for piriformis syndrome.

1.4 AIMS AND OBJECTIVES

To assess the effectiveness of Facilitated positional release technique in reducing pain, improving range of motion and functional disability in piriformis syndrome.

To assess the effectiveness of Foam rolling in reducing pain, improving range of motion and functional disability in piriformis syndrome.

To compare the effect of Facilitated positional release technique and Foam rolling in reducing pain, improving range of motion and functional disability in piriformis syndrome.

1.5 HYPOTHESIS

NULL HYPOTHESIS(H0)

There is no significant difference between Facilitated positional release technique and Foam rolling in reducing pain, improving Range of motion and functional disability.

ALTERNATIVE HYPOTHESIS (H1)

There is significant difference between Facilitated positional release technique and Foam rolling in reducing pain, improving Range of motion and functional disability.

1.6 OPERATIONAL DEFINITIONS

Piriformis syndrome: It is a abnormal condition and is peripheral neuritis of the sciatic nerve caused due to its compression of piriformis muscle[1].

Positional release technique: A passive positional procedure in which the body is placed in a position of greatest ease and comfort, resulting in relieving pain and seizes of inappropriate proprioceptive activity that maintains somatic dysfunction[35].

Facilitated positional release technique (FPR):This introduce motion into the direction of freedom of the movement and achievement of neutral position is made easier added by modifying the sagittal posture and facilitating force is then applied[25].

Foam roller (FR): A foam roller is an exercise tool that is used for rehab purpose and to break up the soft tissue which has been overworked and to increase the circulation to improve the body movement efficiently [36].

Trigger points (TPs): Trigger points are small and localize muscle cramps with a multiplicity of causes, most markedly excessive loads, direct trauma, or repetitive or prolonged muscle contractions[37].

Myofasical release technique(MFR): It is a collection of different approaches and techniques that focuses on release of restrictive movements that originate in the soft tissues of the body which includes indirect release technique and direct release technique[38].

Comfort zone (CZ): The body is taken into a position of ease i.e. away from the resistance obstacle and the painful and restricted position is avoided[39].

CHAPTER – 2

REVIEW OF LITERATURE

David J.Bardbury-Squires et al (2015)[63]studied Roller-Massager Application to the quadriceps and Knee-Joint Range of motion and neuromuscular efficiency during a lunge. The conclusion of the study was that roller massage was painful and induced muscle activity but it increased knee joint ROM and neuromuscular efficiency during a lunge.

Pearcey et al (2015)[51]studied on Foam Rolling for Delayed-onset muscle soreness and recovery of dynamic performance measures. The conclusion was that Foam rolling effective reduced DOMS and associated decrements in the most dynamic performance measures.

Sakina vohra et al (2014)[55] studied the effectiveness of strain counterstrain technique on quadrates lumborum trigger point in low back pain. The conclusion of the study was that it improved the functional capacity and reduce pain and can be effectively used in the physiotherapy management of low back pain.

Sweety Charles Carvalho et al (2014)[54] studied the effect of positional release technique in subjects with subacute trapezitis. The conclusion was that the positional release technique with trapezius stretching found to be significantly more effective than stretching alone in improving pain, functional disability and cervical movements for patients with subacute trapezitis.

Corey A.Peacock et al (2014)[64] studies on An acute Bout of Self Myofascial Release in the form of Foam Rolling improves performance testing . The inclusion of Foam rolling with a dynamic warm up may be a beneficial method in improving physical performance .Foam rolling could also be considered the efficient training routines ,was the conclusion of the study.

Rahul Krishnan kutty et al (2014)[5] studied neural mobilization a therapeutic efficacy in a piriformis syndrome syndrome model .42 samples were taken VAS, goniometry measurement for diagnosis are used. One group received conventional physical therapy and neural mobilization and other group received only conventional therapy. The conclusion was that neural mobilization along with conventional therapy is effective in piriformis syndrome.

Kathleen M.sullivan et al (2013)[45] studied on Roller massager application to the hamstrings increases sit-and-reach range of motion within five to ten seconds without performance

impairments. The conclusion was that the use of roller massagers had no significant effect on muscle strength, and can provide statistically significant increase in ROM , when especially used for longer duration.

Amany Waheed Ebrahim et al (2013)[65] studied the effect of foam roller exercise and nanoparticle in speeding of healing of sports injuries. The results showed a significant increase of GH and flexibility tests a significant decrease of CD34+ in experimental groups. It is concluded that foam roller exercise and use of nanopracticle affect all parameters in positive manner.

Doley et al (2013)[20] studied the comparison of the effectiveness of positional release therapy and deep transverse friction massage on gluteus medius trigger point. 30 subjects were randomly included in the study and two groups were made, PRT was given in group A and DTFM in group B, pressure pain threshold was the tool used. Paired t-test was applied to compare PRT within the groups and independent t-test to compare PRT between the groups. Therefore the conclusion was both were effective in treating the gluteus medius trigger point but deep friction massage was more effective.

John W et al(2012)[2] studied Diagnosis and management of piriformis syndrome .Patient was treated with activity modification to prevent over training while maintaining a stretching program, corticosteroid injection relief pain. In conclusion piriformis syndrome is a neuromuscular condition, and often misdiagnosed. Further research into the epidemiology and treatment is warranted.

M.Miernik et al (2012)[24] studied, massage therapy in myofascial TMD pain management . The aim of this paper was to show the physiological effect and different massage techniques applied in myofascial pain treatment . A positive change in the patient's mental health and is easy to apply in everyday medical practice.

A.Kumaresan et al (2012)[52] studied the effectiveness if positional release therapy in treatment of trapezitis in 30 patients with unilateral trapezitis and divided them into 2 groups and treated with therapeutic ultrasound and isometrics which were common in both groups. The study concluded that there was improvement in lateral flexion, rotation, and reduction in pain intensity and improvement in functional ability .

Dr Waqar Ahmed Awan et al (2011)[59] studied the effectiveness of deep fricition massage and stretching exercises in patient with piriformis syndrome along with home education and home exercises in a 41 year old male. The study concluded that there was decreased in the level of pain and discomfort during ADLs and also educated the patient about postures and daily stretching regimen which reduced the compression on sciatic nerve.

Healey,K et al (2011)[61] studies the effects of myofascial release with foam rolling on performance on 26 healthy subjects with use of height, weight, BMI and body composition. The results show significant difference in genders on all the athletic test and increase from pre to post during trails of soreness, fatigue and exertion.

Su-Jung Kim et al (2011)[62] studied the comparison of abdominal muscle activity during a single-legged hold activity in hook –lying position on the floor and on a Round Foam Roll. The conclusion was that the single legged hold exercise in the hook-lying position on a unstable supporting surface induced greater abdominal muscle EMG amplitude than other, thus performing single legged hold exercise while in the hook-lying position on a round foam roll is useful for abdominal muscles activity.

Brain J. Fama et al (2011)[67]studied the acute effect of Self myofascial release on lower extremity plyometric performance. The purpose of the study was to evaluate the acute effect of a Foam Roller (FR) warm up routine and a dynamic warm up routine on strength,power and reactive power. The conclusion was that FR warms ups are not recommended prior to physical activity requiring increased neurological activation as the FR warms up was shown to decrease jump performance as neurological demands of jumps increased. Foam Roller may be beneficial for the injured athlete prior to activity but should be followed by a dynamic warm up before activity.

Cynan Lewis et al (2011)[66] studied the Strain –Counterstrain therapy combined with exercise is not more effective than exercise alone on pain and disability in people with acute low back pain. The outcome measures were questionnaire, oswestry low back pain disability. The conclusion was that there is no advantage in providing strain counterstrain to patients with acute low back, although further studies should be done to see the benefit from the treatment.

Kevok hopayian et al (2010)[4] studied the clinical features of the piriformis syndrome, the aim was to make the best use of the existing evidence to estimate the frequencies of clinical features in patients having PS , data was extracted independently by two reviewers and 55 patients were included in the study, frequencies and collaborating data was used and have extracted data according to criteria to cover symptoms , physical signs and signs routinely tested in PS and sciatica.

Jason C. Tonley et al (2010)[60]objective of the study was to describe the alternative treatment approach for piriformis syndrome using hip muscle strengthening program with movement re education. Therefore, strengthening exercises to the hip muscles were given to reduce the excessive hip motions. The conclusion was that there was no pain in the buttock or back and the patient returned to his sport easily and no pain was felt during or after his game.

Gillis et al (2010)[18] studied the use of osteopathic manipulative treatment to manage compensated trendelenburg gait caused by SI somatic dysfunction in patient with multiple sclerosis with a complaint of back and hip pain. The study concluded that there was a significant increase in mean step length, stride length and velocity after OMT and decrease in compensated gluteus medius pattern.

Boyajian–O' Neill et al (2008)[11]article reviewed the diagnosis and management of piriformis syndrome and use of non pharmacological treatment approach for its management. The study concluded that more knowledge regarding piriformis syndrome should be searched more and the studies should be done further. Proper diagnosis and physical assessment is essential and the study said that osteopathic manipulated treatment can also be used as one the beneficial non pharmacological therapy for these patients to avoid surgical intervention.

Elias C.Papadopoulos et al (2004)[8] studied Piriformis syndrome and low back pain: a new classification and review of the literature. In the study he presented two cases and described the cardinal features of the piriformis syndrome. He concluded that it is necessary to rule out the pathological conditions of the lumbar spine, the hip and sacroiliac joint by examination and imaging studies.

Fishman et al (2002)[9] studied as the diagnosis, treatment, and outcome of piriformis syndrome-10 year study. Consecutive sample of 918 patients was taken and significant FAIR tests receive injection, physical therapy and reported pain and disability assessments. Forty three patients had surgery. The FAIR test correlated well and all the three interventions

CHAPTER – 3

MATERIALS and METHODS

3.1 STUDY DESIGN:

The research design of present study was experimental study in comparative nature.

3.2 STUDY SETTING:

The Study was conducted in the Department of Physiotherapy,Sh. Baldev Raj Mittal Hospital ,Lovely Professional University, Chehru, Phagwara (Punjab) .

3.3 Population and sampling:

Adult population age ranging (20-40 years)

Both male and female participate in the study.

50 Samples were taken by convenient sampling.

Subjects were divided into two groups, Group 1 consisting of 25 subjects and Group 2 of 25 subjects.

Population of study was patients with piriformis syndrome .

3.4 SELECTION CRITERIA:

3.4.1. Inclusion criteria :

- Age group: 20 -40 years.
- Both genders are included.
- Symptoms related to piriformis syndrome .
- Co-operative.
- Buttock and hip pain

3.4.2. Exclusion criteria:

- Congenital deformities.
- Disc pathology and facet pathology .
- Foot deformities.
- Mental incapacity.
- Pregnancy.
- Patients who is taking NSAIDS.
- Any infectious disease.
- Lower limb deformities.
- Hip Fractures .

3.5 Parameters:

- Pain
- Range of motion of hip joint
- Functional disability.

3.6 Instruments and Tools :

Numeric pain rating scale: NPRS. It is a scale in which instructions are given to the patient to choose a number ranging from 0-10 that best describe their current pain , 0 means no pain and 10 mean worst possible pain. It is based on self-report ,observational and psychological data . The Reliability for numerical pain scale is 0.81[56] .

Universal Goniometer : An instrument used in physiotherapy to measure the range of motion around a joint in body. The inter test reliability as 0.90[57].

Lower extremity functional scale (LEFS) :- It is a questionnaire containing 20 questions about a person's ability to perform everyday task. The reliability is 0.94[58] .

3.7Procedure:

3.7.1. Intervention periods: The duration of the study was for 3 days a week for 6 weeks.

3.7.2. Baseline assessment:

Patients with piriformis syndrome are assessed for level of pain by using numerical pain rating scale, functional disability , range of motion using goniometry.

3.7.3. Protocol

Interested subjects were informed about the aims and procedure of the study. A general physiotherapy assessment was taken with inclusion and exclusion criteria and baseline data was taken on the reporting date.

Subjects were divided into two groups each group of 25 subjects i.e Group A (Facilitated positional release group) and Group B (Foam rolling group).

The intervention was given for 3 days a week for 6weeks. Pain score, range of motion and functional disability was recorded in the beginning of the treatment session and after 6 weeks of intervention.

Group A: Received facilitated positional release technique.

The nature of the treatment was properly described to the patient. The session was administered by a physical therapist. Each session was focused to reduce pain and improve the range of motion and functional disability. Three sessions were given in a week for 6 weeks.

Position of the patient was in prone lying and pillow was kept under the abdomen to keep the lordotic curve straight. The therapist monitors the affected side and sits beside the table. Then the piriformis muscle is palpated and tender point is felt. One finger is kept over the tender point and then therapist drops the patients flexed knee and thigh off the table and keep it on her thigh to support. The therapist holds the patients affected knee with another hand and gently flexes the hip. The therapist then pushes the knee towards the table inwards and

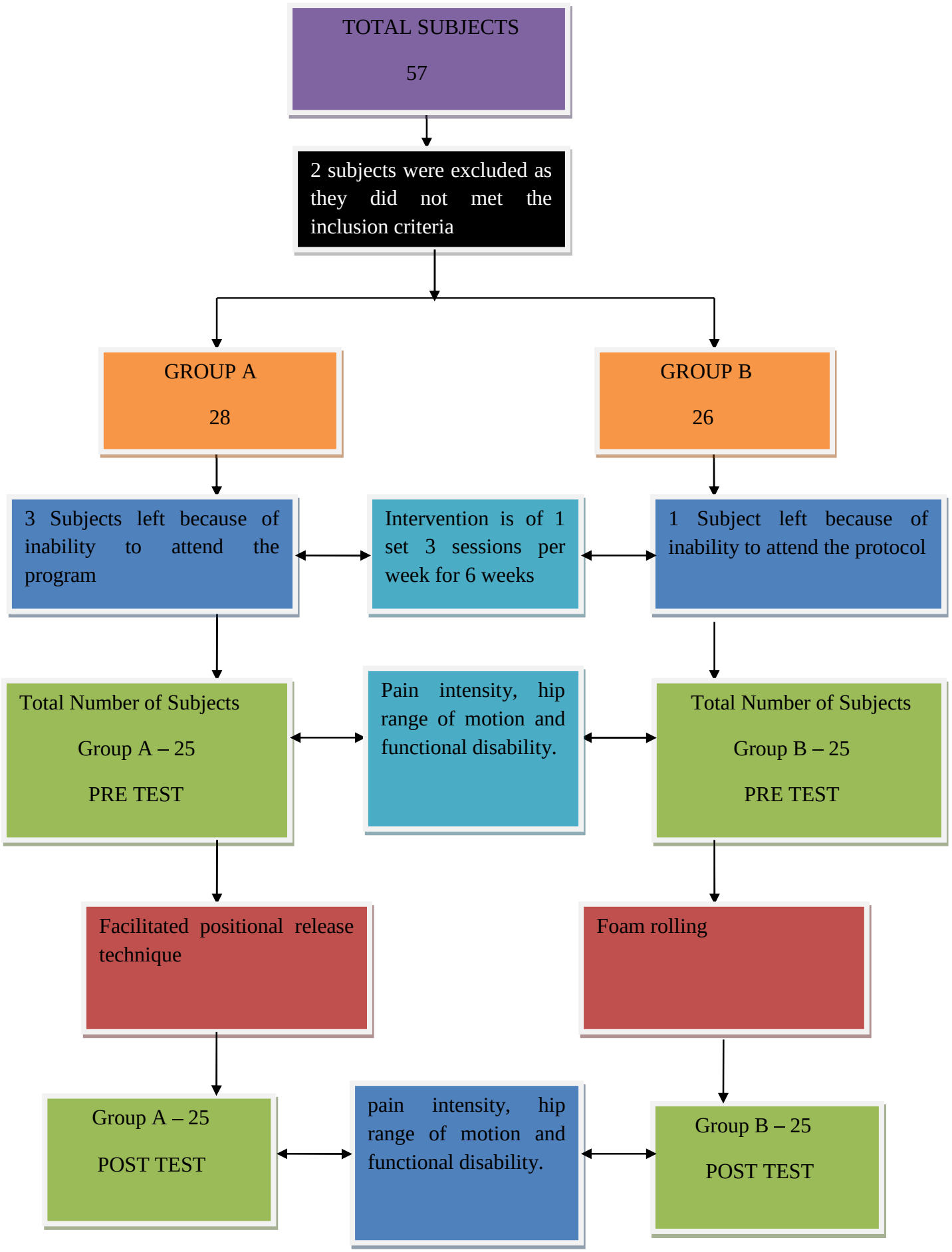
external rotation of the hip is done. With the hand therapist pushes the knee up i.e dorsally towards the muscle, producing a compressive force. Hold the position for 5 seconds and then slowly release. The intervention was 1 set with 5 repetitions given 3 days per week for 6 weeks.

Group B: Received Foam rolling

Therapist explains the whole procedure to the patient. The patient is asked to wear loose clothes for the treatment purpose. The foam roller is placed on the floor and patient is asked to sit on the foam roller with the affected side. Then bring the affected side foot on top of the unaffected knee. Hand at back on the floor (affected side) and then ask patient to shift the weight on affected hip/buttock, then roll forward and backwards. Do it for 30 seconds and the intervention was 1 set with 5 repetitions given 3 days per week for 6 weeks.

Figure3.7.1: GROUP A (FACILITATED POSITIONAL RELEASE TECHNIQUE)

Figure3.7.2: GROUP B (FOAM ROLLING)


TOTAL SUBJECTS
57
2 subjects were excluded as they did not met the inclusion criteria
GROUP A
28
GROUP B
26
3 Subjects left because of inability to attend the program
Intervention is of 1 set 3 sessions per week for 6 weeks
1 Subject left because of inability to attend the protocol
Total Number of Subjects
Group A – 25
PRE TEST
Pain intensity, hip range of motion and functional disability.
Total Number of Subjects
Group B – 25
PRE TEST
Facilitated positional release technique
Foam rolling
Group A – 25
POST TEST
pain intensity, hip range of motion and functional disability.
Group B – 25
POST TEST

3.8 Statistical Tool

Paired t-test: A paired t-test measures whether means from a within subjects test group vary over 2 test conditions. The paired t-test is commonly used to compare a sample group's score before and after an intervention.

Unpaired t-test: An unpaired t-test is using to compare two populations means.

Statistics were performed using SPSS 19 software. A student's t-test will be used to analyze the difference between the range of motion , muscle strength, pain improvement and physical functionin group 1 and group 2. Intra-group analysis between pre intervention scores and post intervention scores will also be done for both the groups. A significance level of $p < 0.05$ was fixed.

Mean : Using statistical formula for the mean, for a given number of subjects, mean of different age groups and parameters were calculated by:

$\bar{X}=\sum X/n$

Where, n= number of subjects

X=each subjects value

Standard deviation (σ)

$s= \sqrt{\sum x^2}/N$

x = deviation of score from mean

N= number of subjects

Paired t-test: For within group comparison

Formula :

$t=(\bar{X}_D-\mu_0)/(s_D/\sqrt{n})$

X_D= average

s_D= standard deviation

μ_0=constant

Unpaired t-test : for between group analysis

Formula :

$t= \bar{X}_1- \bar{X}_2/S_{X1X2} \cdot \sqrt{1}/n_1+1/n_2$

S_{X1X2}=standard deviation

n_1 = number of participants in group 1

n_2 = number of participants in group 2

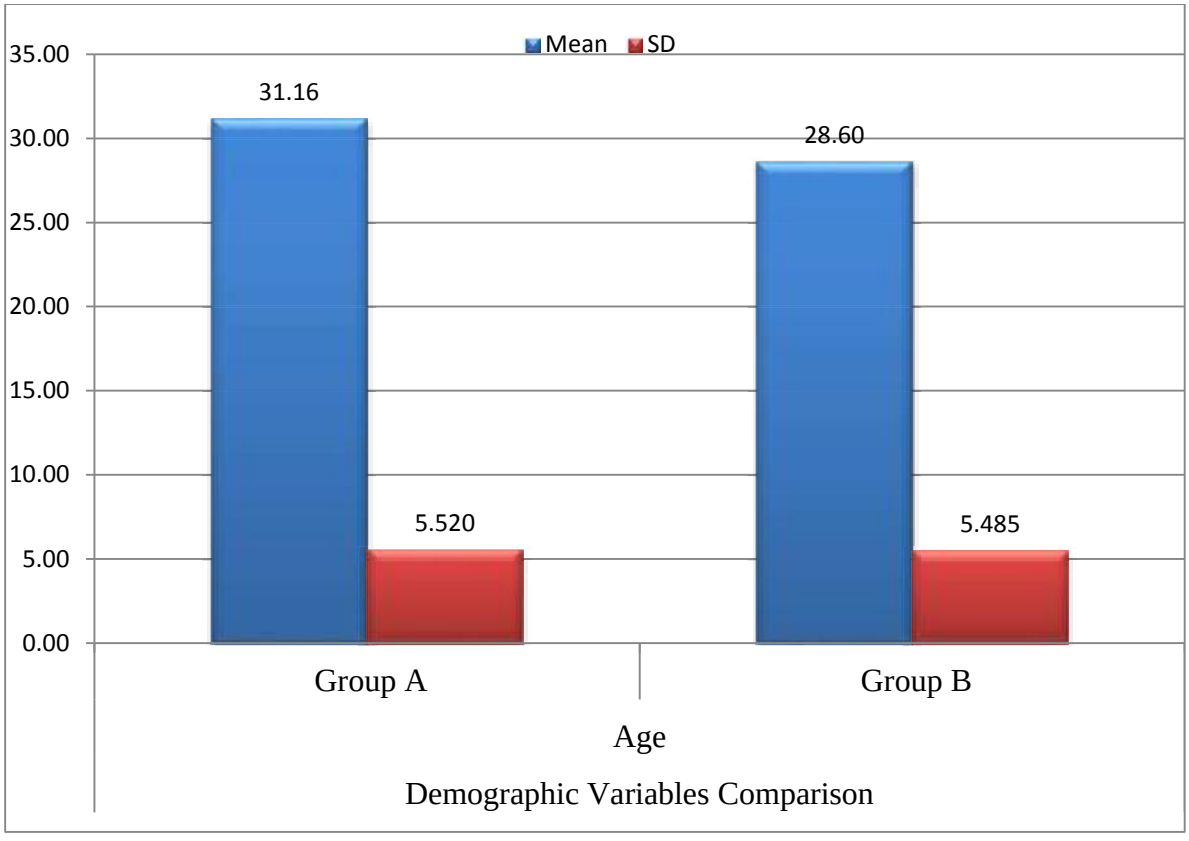
CHAPTER – 4

DATA ANALYSIS AND RESULTS

Table 4.1: Mean and SD of age of the subjects for Group A and Group B

Variable	Groups	Mean	S.D.	T Test	P value	Table Value at 0.05	Level of Significance
Age	Group A	31.16	5.520	1.640	0.1065	2.01	Not-Significant
	Group B	28.60	5.485				

Comparison of mean and standard deviation of subject's age between group A (FPR) and Group B (FR). The mean age of group was 31.16±5.520 and that of Group B was 28.60±5.485. The unpaired t test was 1.640(p>0.05). There was no significant difference in the age group.

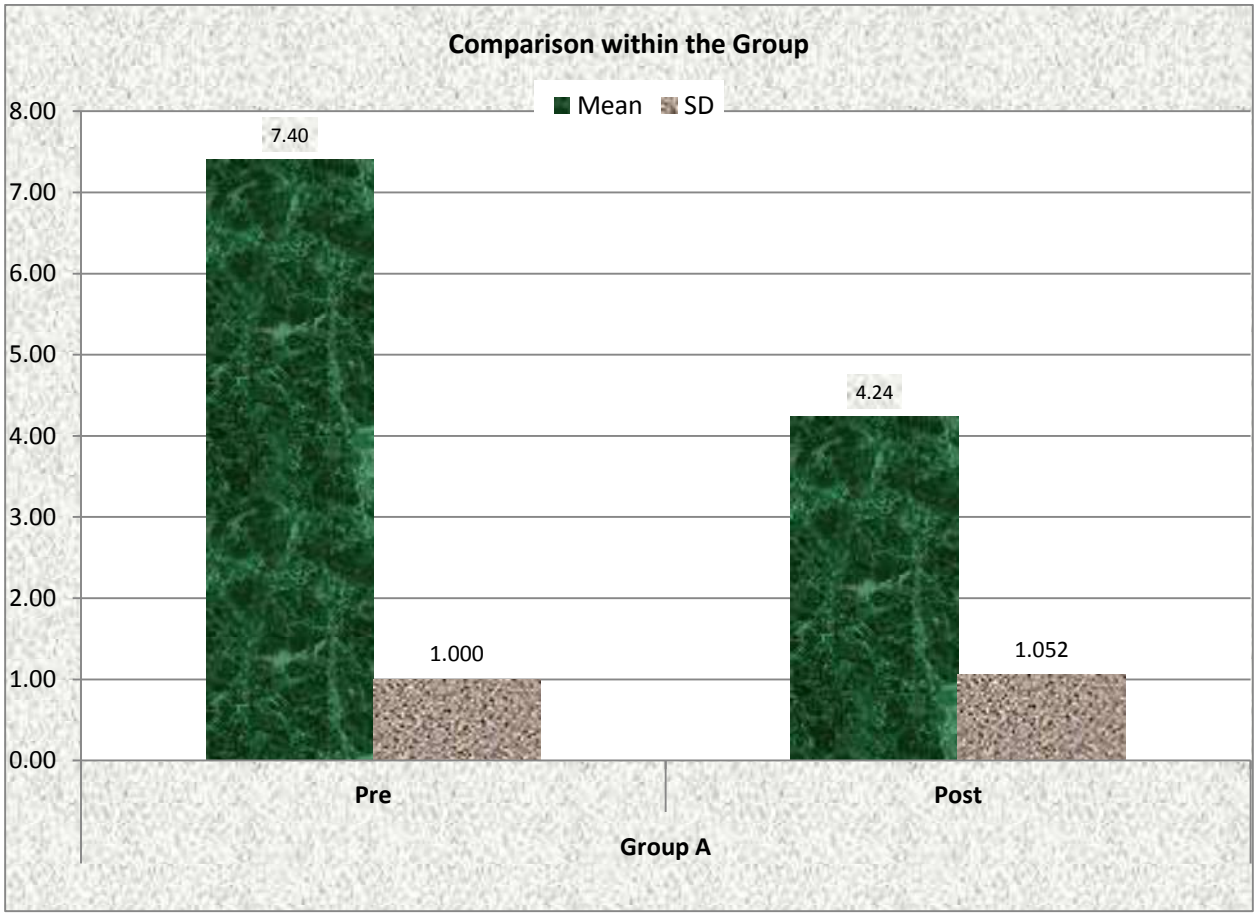


Graph4.1: showing Mean and SD of AGE of the subjects for the Group A and Group B.

Table 4.2: Comparison of Mean and SD for the variable NPRS within Group A

NPRS		Mean±SD	t-value	Level of significance
	Pre	7.40± 1.000	18.580	0.0000
	Post	4.24±1.052		Significant

Table 4.2 shows the Mean and Standard deviation of variable NPRS within Group A was 7.40± 1.000 and 4.24±1.052 respectively . Paired t-test was done within Group A to check the changes within the group. The t-value was 18.580($p<0.05$). The result for variable NPRS was significant which showed that there was significant improvement within the group.

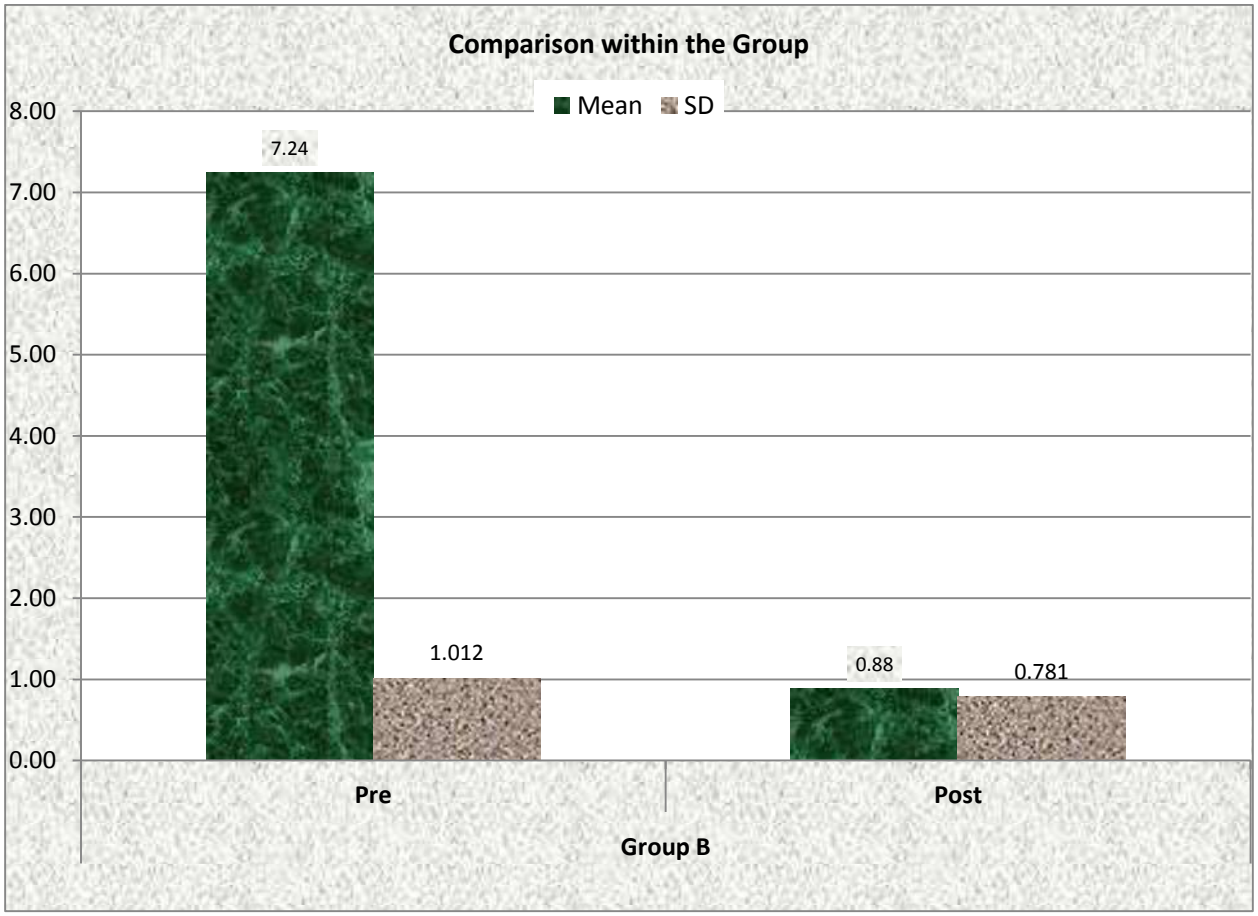


Graph 4.2: Comparison of Mean and SD for the variable NPRS within Group A

Table 4.3: Comparison of Mean and SD for the variable NPRS within Group B

NPRS		Mean±SD	t-value	Level of significance
	Pre	7.240± 1.012	30.690	0.0000
	Post	0.88±0.781		Significant

Table 4.3 shows the Mean and Standard deviation of variable NPRS within Group B was 7.240± 1.012 and 0.88±0.781 respectively. Paired t-test was done within Group B to check the changes within the group. The t-value was 30.690($p<0.05$). The result for variable NPRS was significant which showed that there was significant improvement within the group.

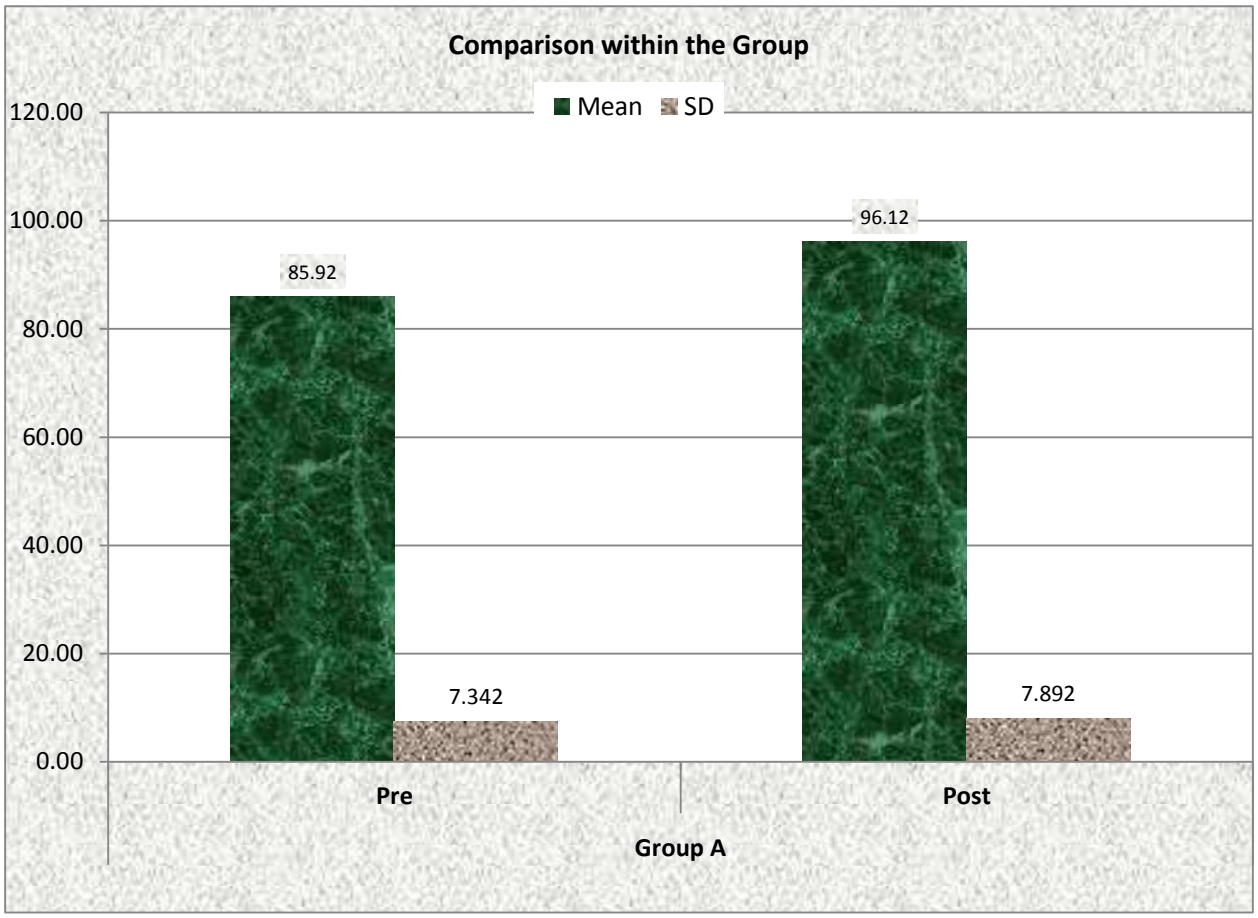


Graph 4.3:Comparison of Mean and SD for the variable NPRS within Group B

Table 4.4:Comparison of Mean and SD for the variable Hip FLEXION within Group A

FLEXION		Mean±SD	t-value	Level of significance
	Pre	85.92±7.342	17.850	0.000
	Post	96.12±7.892		Significant

Table 4.4 shows the Mean and Standard deviation of variable HIP FLEXION within Group A was 85.92±7.342 and 96.12±7.892 respectively. Paired t-test was done within Group A to check the changes within the group. The t-value was 17.850($p<0.05$). The result for variable FLEXION was significant which showed that there was significant improvement within the group.

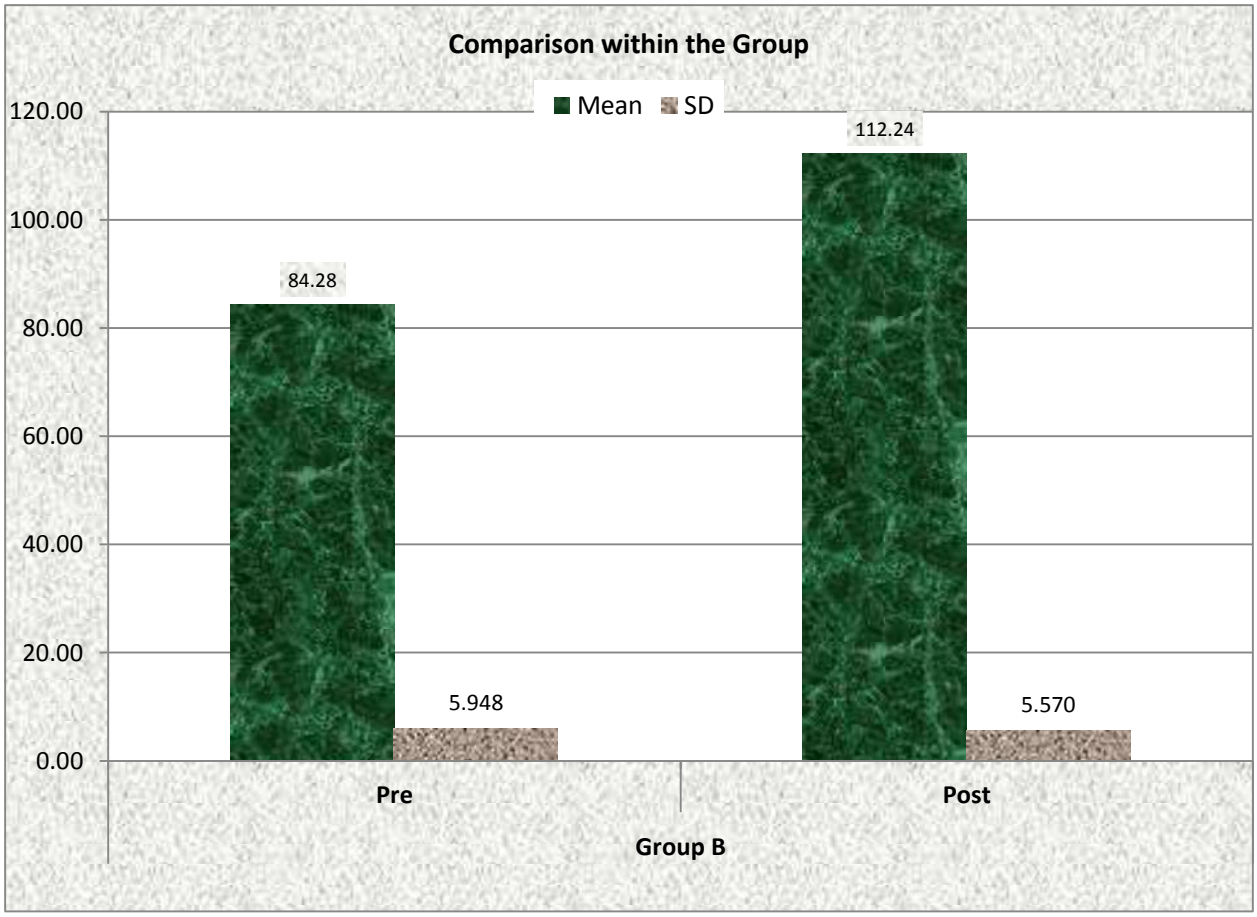


Graph 4.4: Comparison of Mean and SD for the variable Hip FLEXION within Group A

Table 4.5: Comparison of Mean and SD for the variable Hip FLEXION within Group B

FLEXION		Mean±SD	t-value	Level of significance
	Pre	84.28±5.948	22.890	0.000
	Post	112.24±5.570		Significant

Table 4.5 shows the Mean and Standard deviation of variable HIP FLEXION within Group B was 85.92±7.342 and 96.12±7.892 respectively. Paired t-test was done within Group B to check the changes within the group. The t-value was 22.890($p<0.05$). The result for variable FLEXION was significant which showed that there was significant improvement within the group.

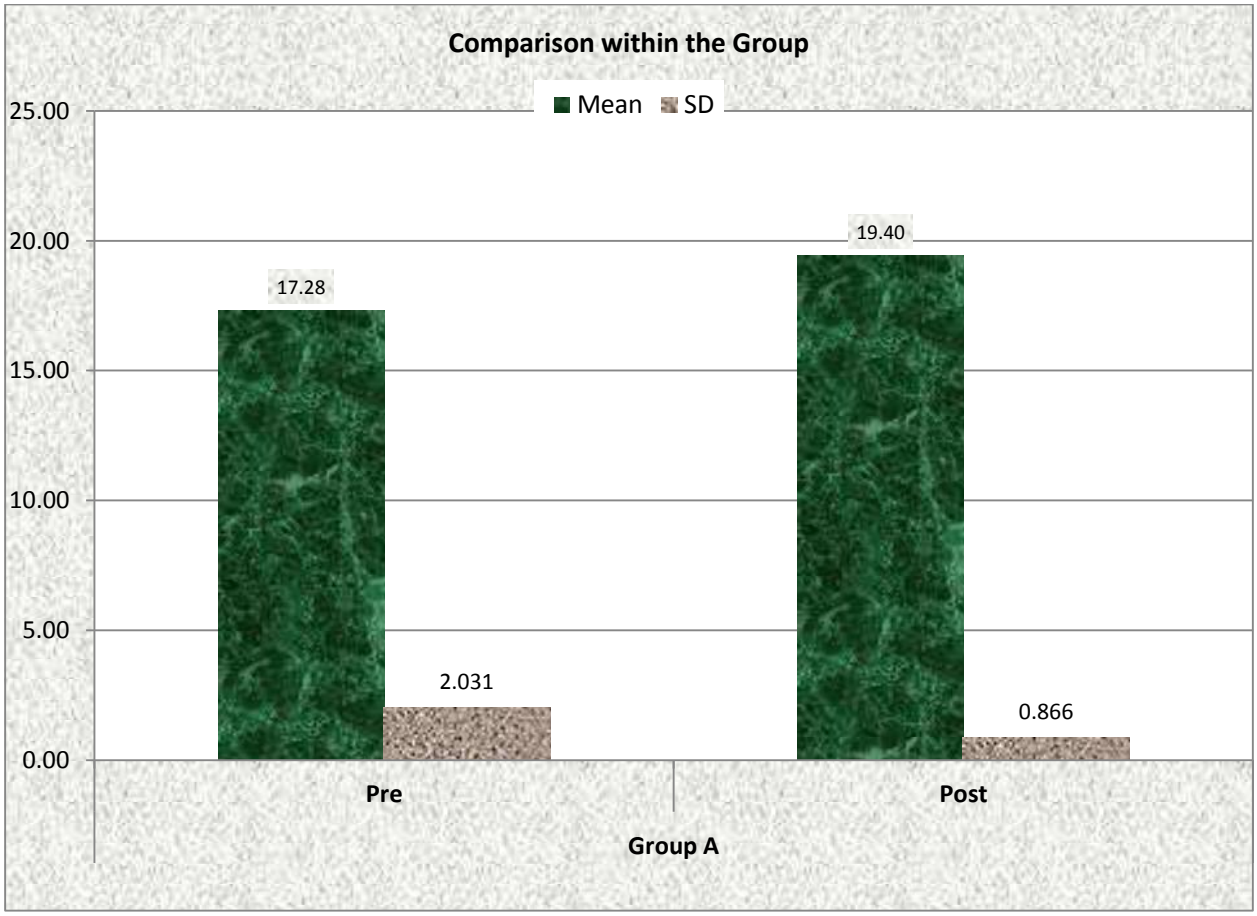


Graph 4.5:Comparison of Mean and SD for the variable Hip FLEXION within Group B.

Table 4.6: Comparison of Mean and SD for the variable Hip EXTENSION within Group A

EXTENSION		Mean±SD	t-value	Level of significance
	Pre	17.28±19.40	6.56	0.000
	Post	2.031±0.866		Significant

Table 4.6 shows the Mean and Standard deviation of variable HIP EXTENSION within Group A was 17.28±19.40 and 2.031±0.866 respectively. Paired t-test was done within Group A to check the changes within the group. The t-value was 6.560($p<0.05$). The result for variable EXTENSION was significant which showed that there was significant improvement within the group.

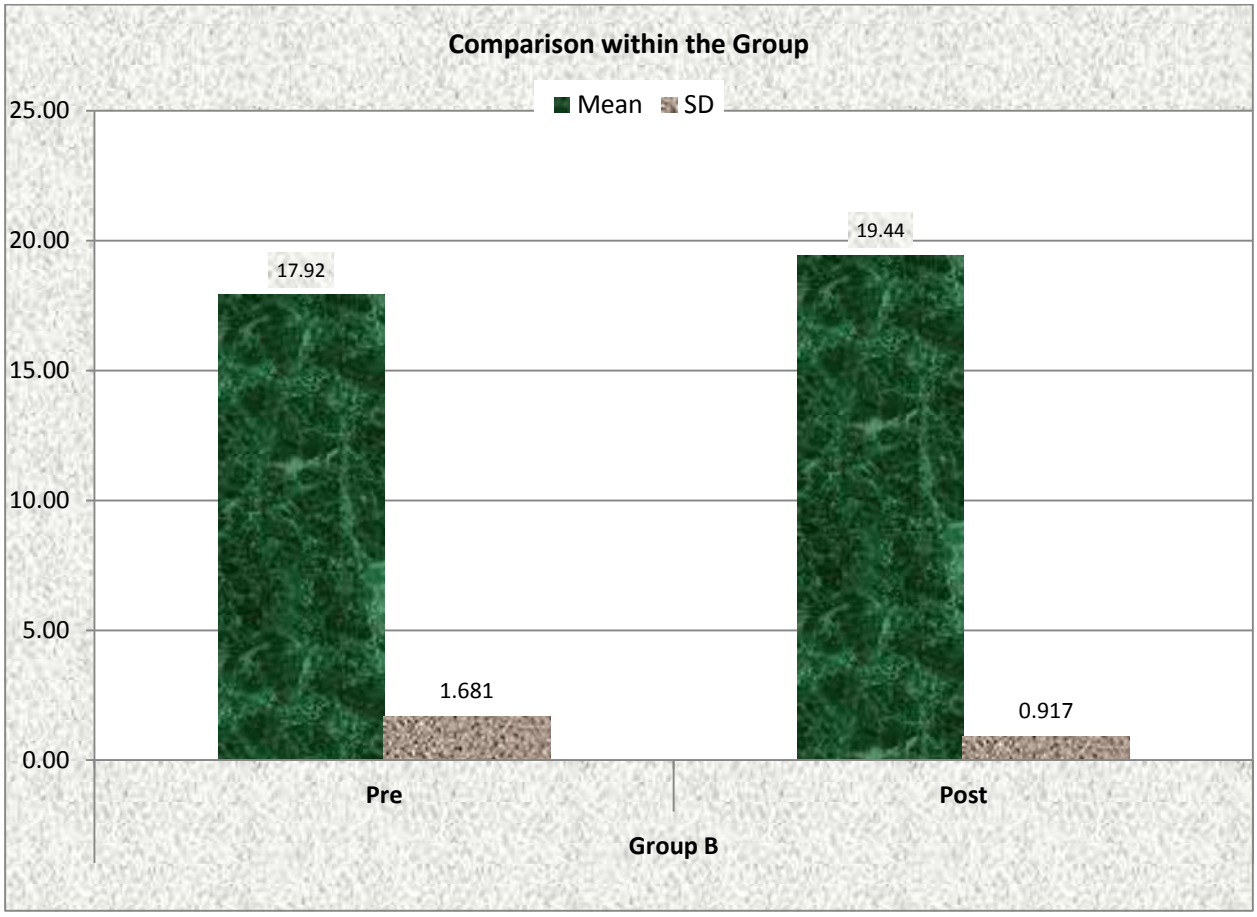


Graph 4.6: Comparison of Mean and SD for the variable Hip EXTENSION within Group A

Table 4.7: Comparison of Mean and SD for the variable Hip EXTENSION within Group B

EXTENSION		Mean±SD	t-value	Level of significance
	Pre	17.92±1.681	5.600	0.000
	Post	19.44±0.917		Significant

Table 4.7 shows the Mean and Standard deviation of variable HIP EXTENSION within Group B was 17.92±1.681 and 19.44±0.917 respectively. Paired t-test was done within Group B to check the changes within the group. The t-value was 5.600($p<0.05$). The result for variable EXTENSION was significant which showed that there was significant improvement within the group.

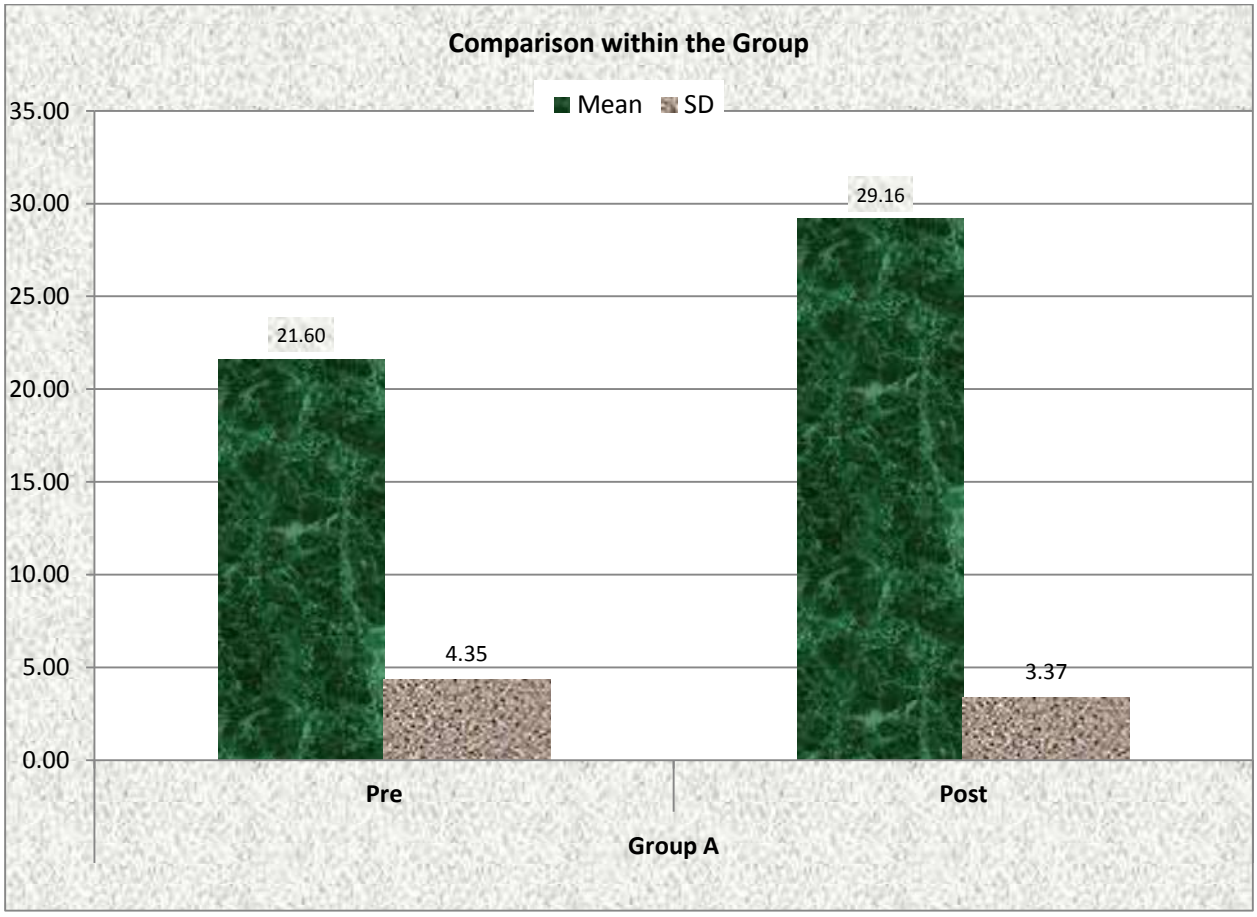


Graph 4.7: Comparison of Mean and SD for the variable Hip EXTENSION within Group B

Table 4.8: Comparison of Mean and SD for the variable Hip ABDUCTION within Group A

ABDUCTION		Mean±SD	t-value	Level of significance
	Pre	21.60±4.35	17.810	0.000
	Post	29.16±3.37		Significant

Table 4.8 shows the Mean and Standard deviation of variable HIP ABDUCTION within Group A was 21.60±4.35 and 29.16±3.37 respectively. Paired t-test was done within Group A to check the changes within the group. The t-value was 17.810($p<0.05$). The result for variable ABDUCTION was significant which showed that there was significant improvement within the group.

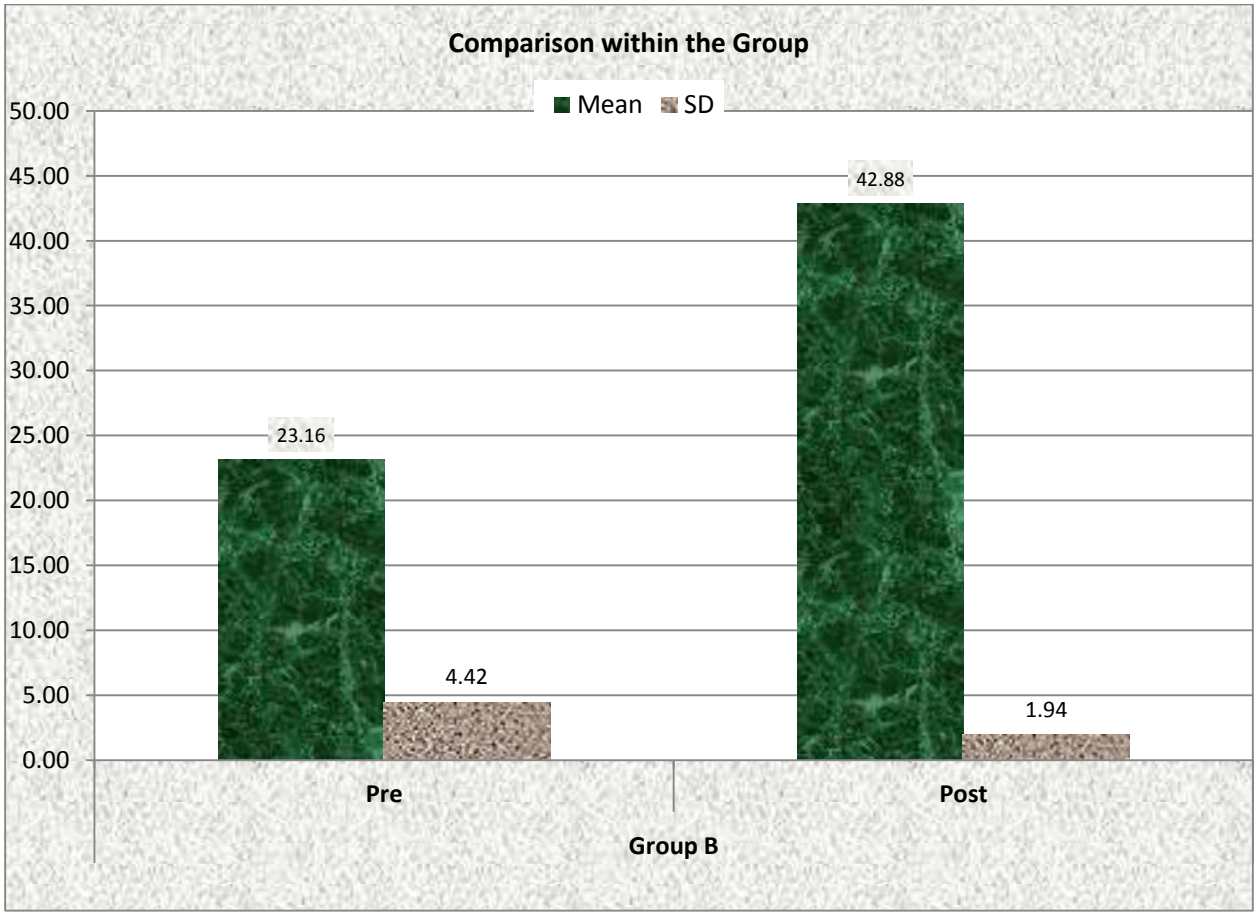


Graph 4.8: Comparison of Mean and SD for the variable Hip ABDUCTION within Group A

Table 4.9: Comparison of Mean and SD for the variable Hip ABDUCTION within Group B

ABDUCTION		Mean±SD	t-value	Level of significance
	Pre	23.16±4.42	25.930	0.000 Significant
	Post	42.88±1.94		

Table 4.9 shows the Mean and Standard deviation of variable HIP ABDUCTION within Group B was 23.16±4.42 and 42.88±1.94 respectively. Paired t-test was done within Group B to check the changes within the group. The t-value was 25.930($p<0.05$). The result for variable ABDUCTION was significant which showed that there was significant improvement within the group.

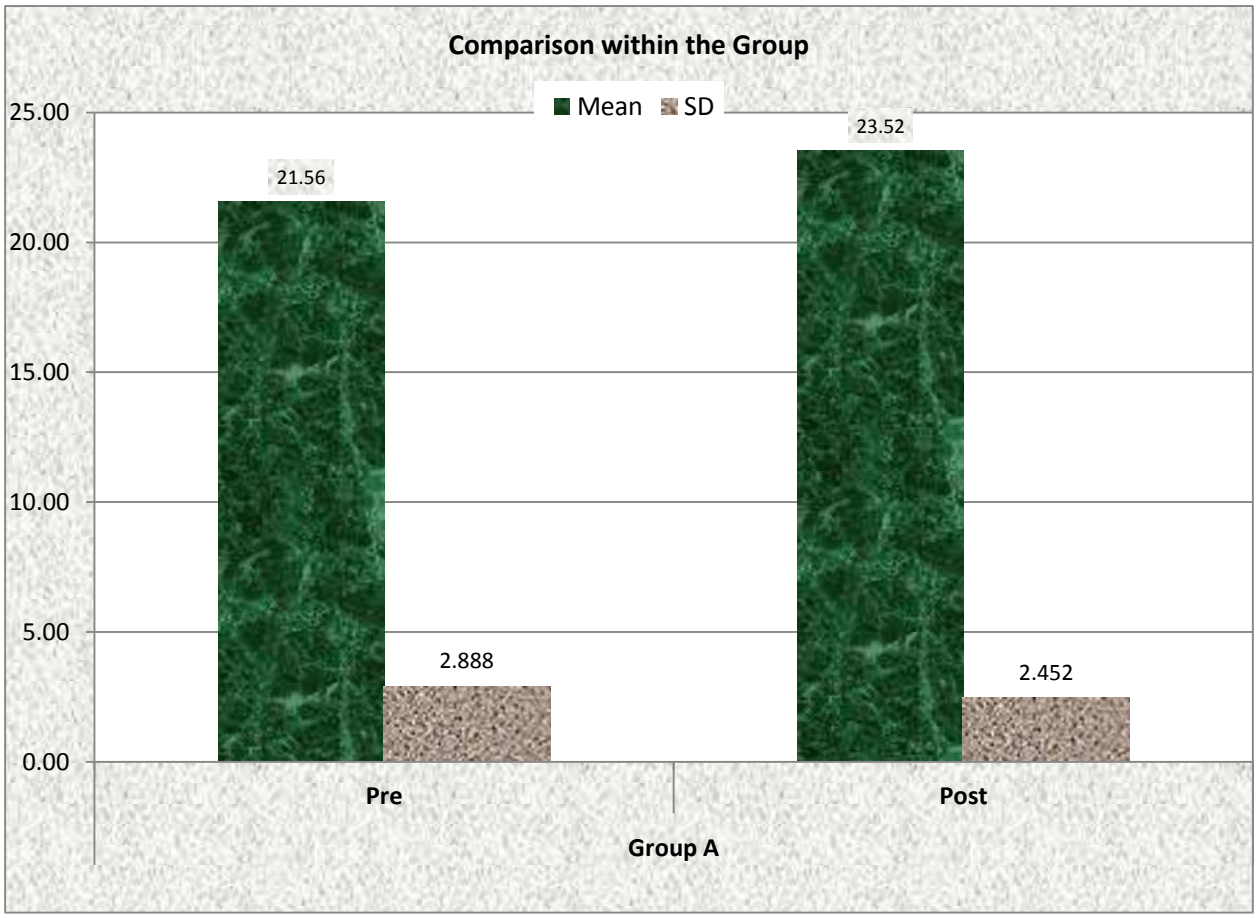


Graph 4.9: Comparison of Mean and SD for the variable Hip ABDUCTION within Group B

Table 4.10: Comparison of Mean and SD for the variable Hip ADDUCTION within Group A

ADDUCTION		Mean±SD	t-value	Level of significance
	Pre	21.56±2.888	4.930	0.000
	Post	23.52±2.452		Significant

Table 4.10 shows the Mean and Standard deviation of variable HIP ADDUCTION within Group A was 21.56±2.888 and 23.52±2.452 respectively. Paired t-test was done within Group A to check the changes within the group. The t-value was 4.930($p<0.05$). The result for variable ADDUCTION was significant which showed that there was significant improvement within the group.

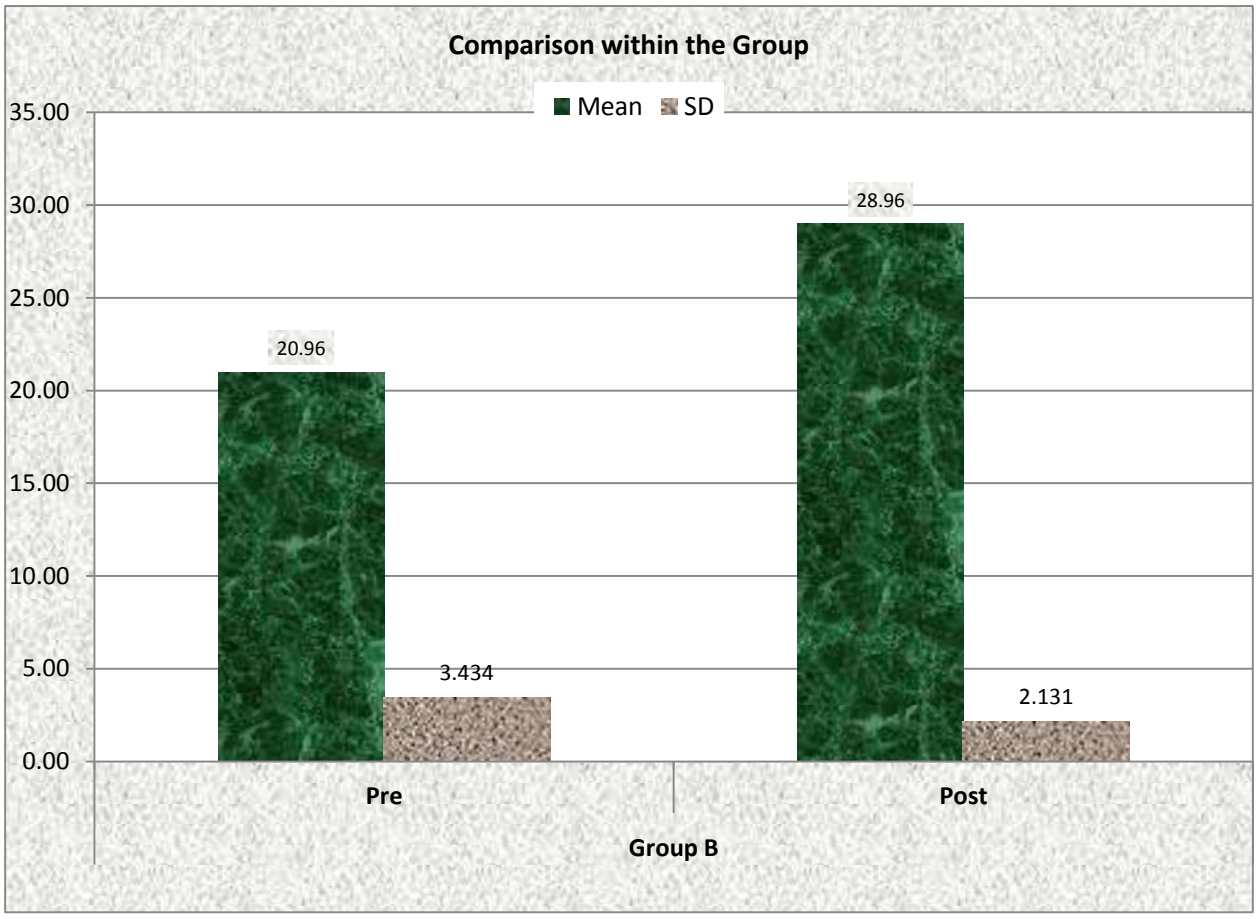


Graph 4.10: Comparison of Mean and SD for the variable Hip ADDUCTION within Group A

Table 4.11: Comparison of Mean and SD for the variable Hip ADDUCTION within Group B

ADDUCTION		Mean±SD	t-value	Level of significance
	Pre	20.96±3.434	11.550	0.000
	Post	28.96±2.131		Significant

Table 4.11 shows the Mean and Standard deviation of variable HIP ADDUCTION within Group B was 20.96±4.35 and 28.96±2.452 respectively. Paired t-test was done within Group B to check the changes within the group. The t-value was 11.550($p<0.05$). The result for variable ADDUCTION was significant which showed that there was significant improvement within the group.

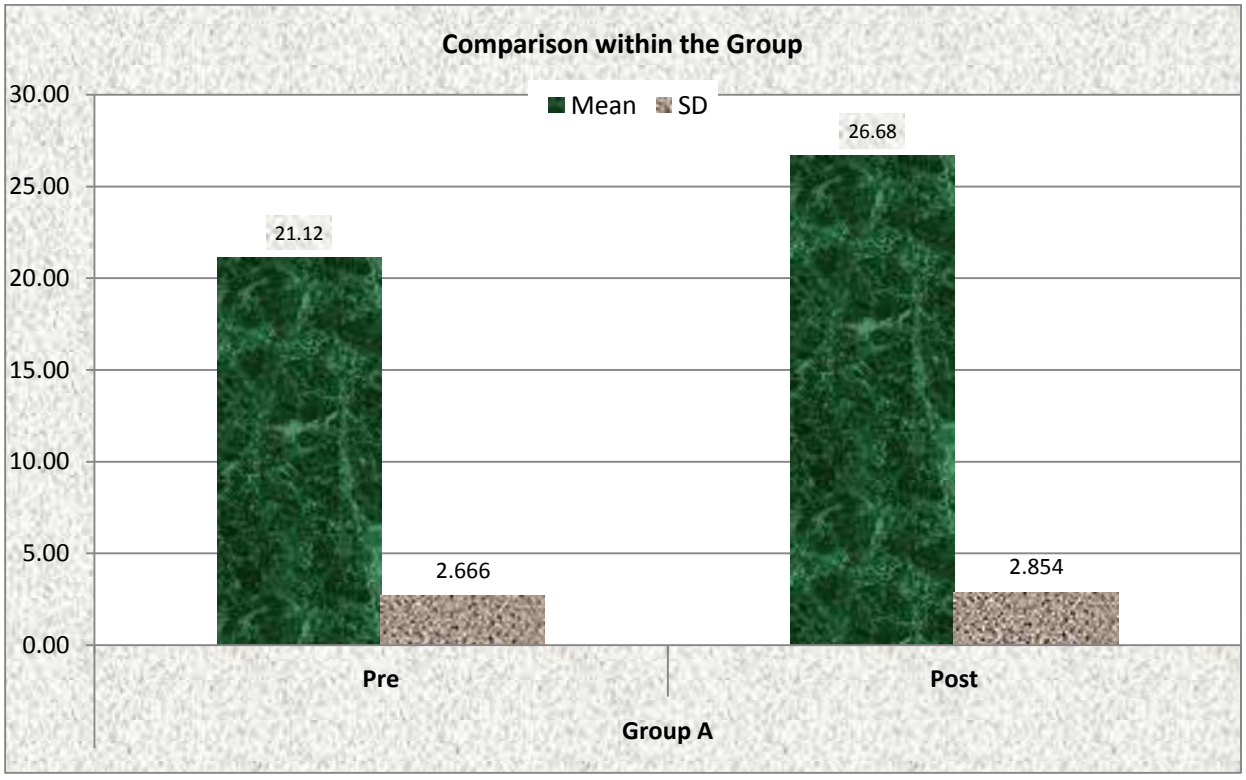


Graph 4.11: Comparison of Mean and SD for the variable Hip ADDUCTION within Group B.

Table 4.12: Comparison of Mean and SD for the variable Hip INTERNAL ROTATION within Group A

INTERNAL ROTATION		Mean±SD	t-value	Level of significance
	Pre	21.12±2.666	9.670	0.000
	Post	26.68±2.854		Significant

Table 4.12 shows the Mean and Standard deviation of variable HIP INTERNAL ROTATION within Group A was 21.12±2.666 and 26.68±2.854 respectively. Paired t-test was done within Group A to check the changes within the group. The t-value was 9.670($p<0.05$). The result for variable INTERNAL ROTATION was significant which showed that there was significant improvement within the group.

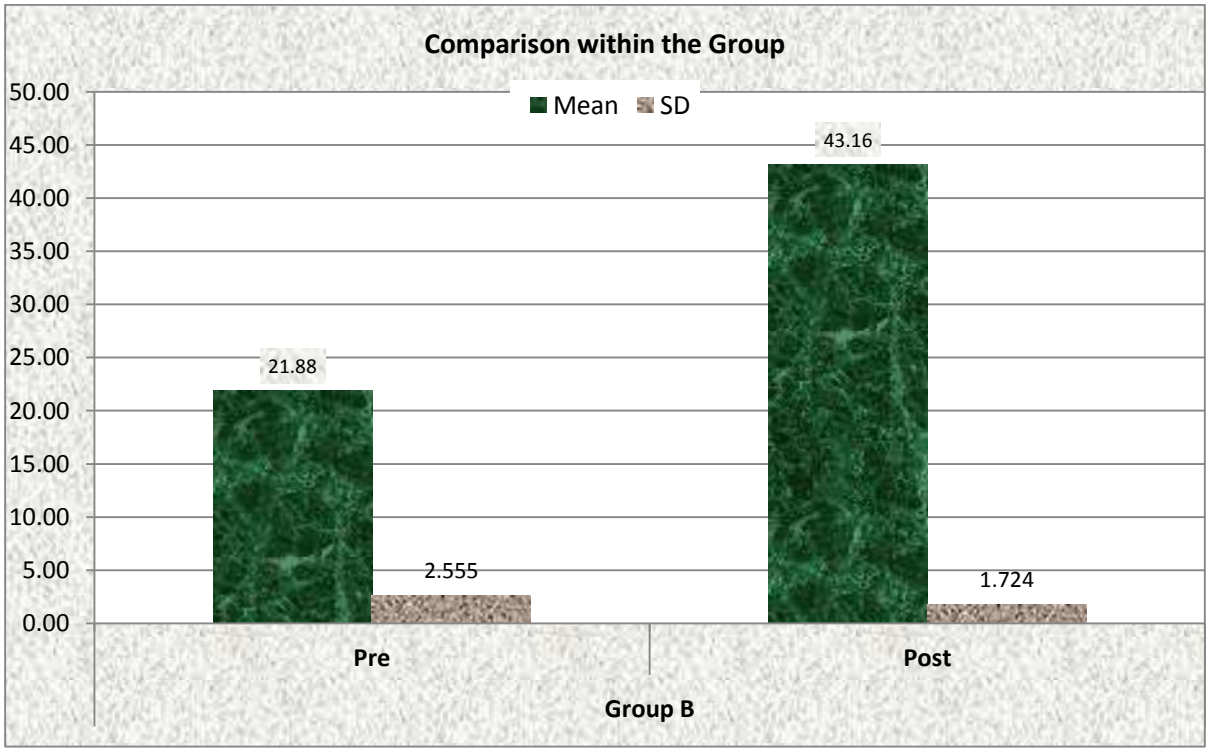


Graph 4.12: Comparison of Mean and SD for the variable Hip INTERNAL ROTATION within Group A

Table 4.13: Comparison of Mean and SD for the variable Hip INTERNAL ROTATION within Group B

INTERNAL ROTATION		Mean±SD	t-value	Level of significance
	Pre	21.88±2.555	36.400	0.000
	Post	42.16±1.724		Significant

Table 4.13 shows the Mean and Standard deviation of variable HIP INTERNAL ROTATION within Group B was 21.88±2.555 and 42.16±1.724 respectively. Paired t-test was done within Group B to check the changes within the group. The t-value was 36.400($p<0.05$). The result for variable INTERNAL ROTATION was significant which showed that there was significant improvement within the group.

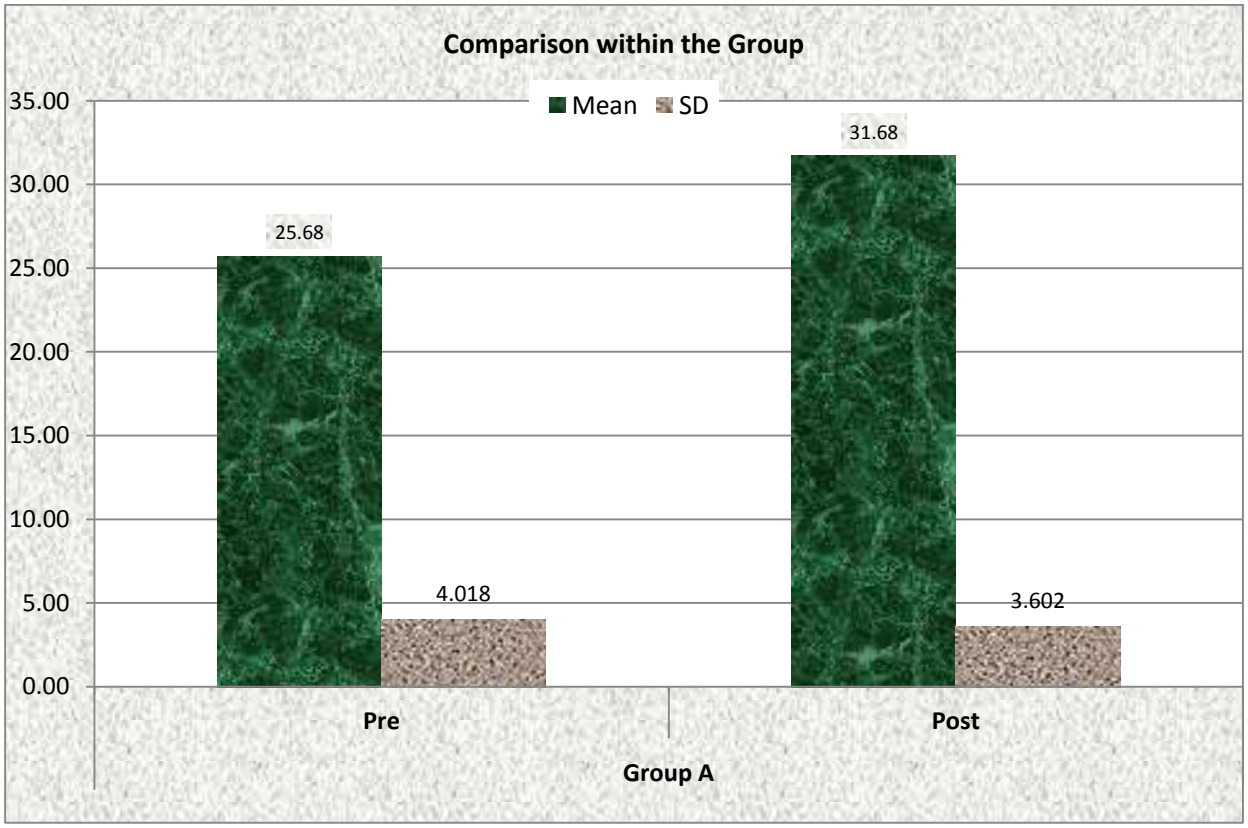


Graph 4.13: Comparison of Mean and SD for the variable Hip INTERNAL ROTATION within Group B

Table 4.14: Comparison of Mean and SD for the variable Hip EXTERNAL ROTATION within Group A

EXTERNAL ROTATION		Mean±SD	t-value	Level of significance
	Pre	25.68±4.018	10.890	0.000
	Post	31.68±3.602		Significant

Table 4.14 shows the Mean and Standard deviation of variable HIP EXTERNAL ROTATION within Group A was 25.68±4.018 and 31.68±3.602 respectively. Paired t-test was done within Group A to check the changes within the group. The t-value was 10.890($p<0.05$). The result for variable EXTERNAL ROTATION was significant which showed that there was significant improvement within the group.

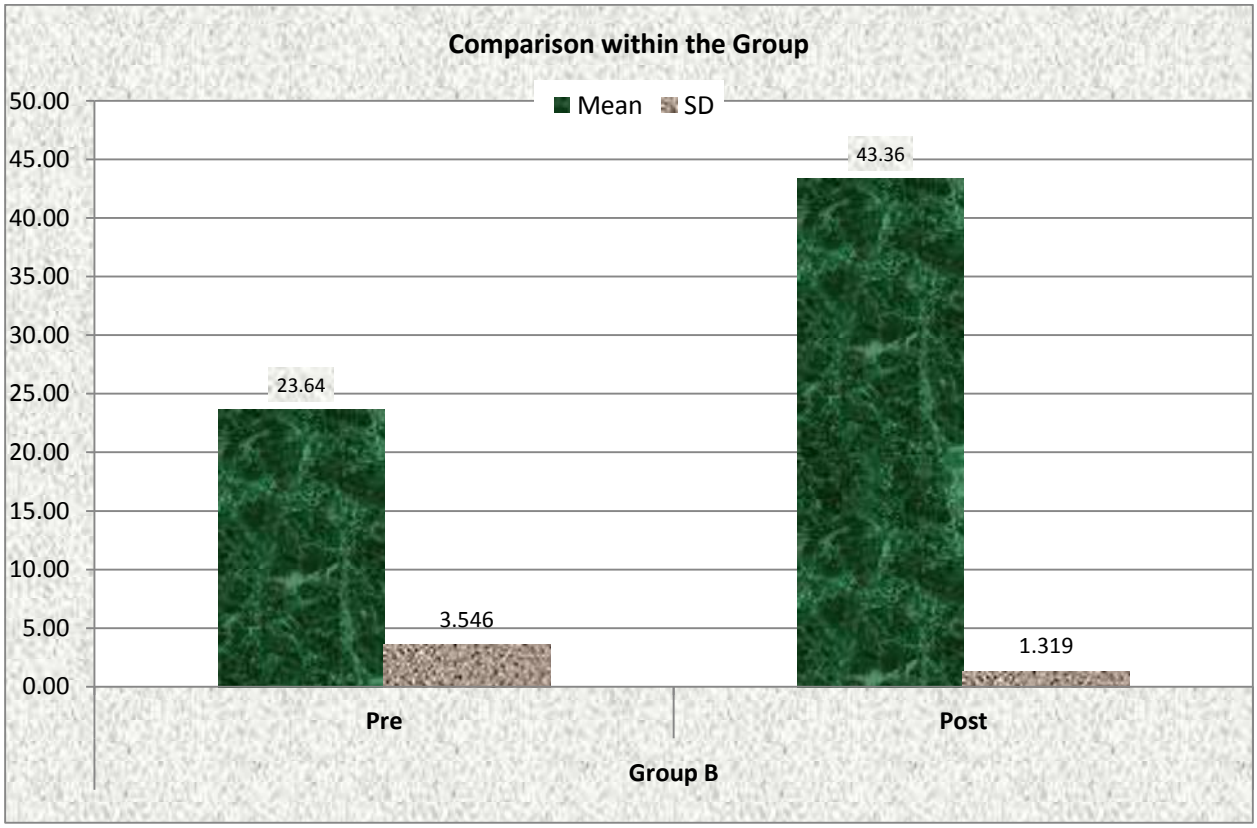


Graph 4.14: Comparison of Mean and SD for the variable Hip EXTERNAL ROTATION within Group A

Table 4.15: Comparison of Mean and SD for the variable Hip EXTERNAL ROTATION within Group B

EXTERNAL ROTATION		Mean±SD	t-value	Level of significance
	Pre	23.64±4.018	29.139	0.000
	Post	43.36±3.602		Significant

Table 4.15 shows the Mean and Standard deviation of variable HIP EXTERNAL ROTATION within Group B was 23.64±3.546 and 43.36±1.319 respectively. Paired t-test was done within Group B to check the changes within the group. The t-value was 29.139($p<0.05$). The result for variable EXTERNAL ROTATION was significant which showed that there was significant improvement within the group.

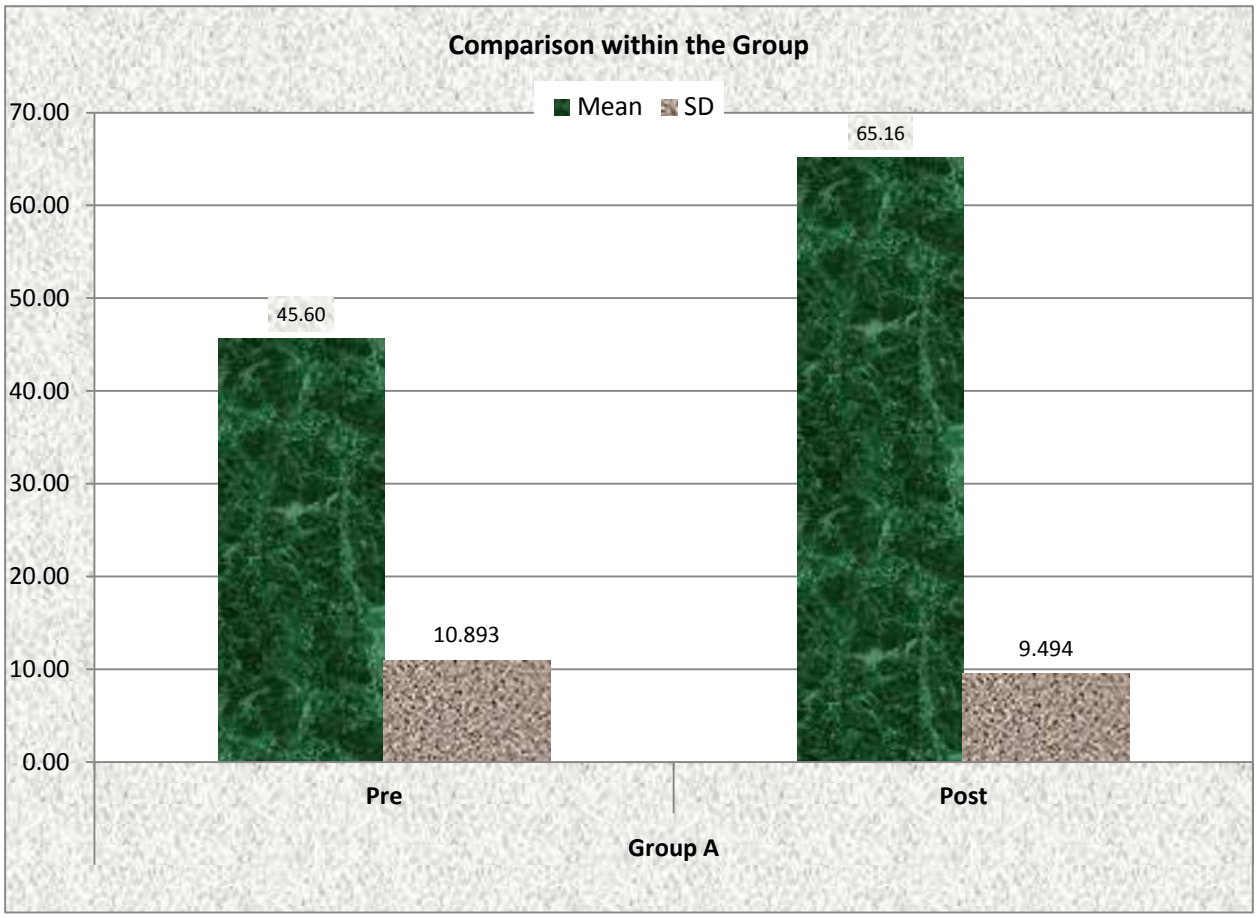


Graph 4.15: Comparison of Mean and SD for the variable Hip EXTERNAL ROTATION within Group B

Table 4.16: Comparison of Mean and SD for the variable LEFS within Group A

LEFS		Mean±SD	t-value	Level of significance
	Pre	45.60±10.893	11.490	0.000
	Post	65.16±9.949		Significant

Table 4.16 shows the Mean and Standard deviation of variable LEFS within Group A was 45.60±10.893 and 65.16±9.949 respectively. Paired t-test was done within Group A to check the changes within the group. The t-value was 11.490($p<0.05$). The result for variable LEFS was significant which showed that there was significant improvement within the group.

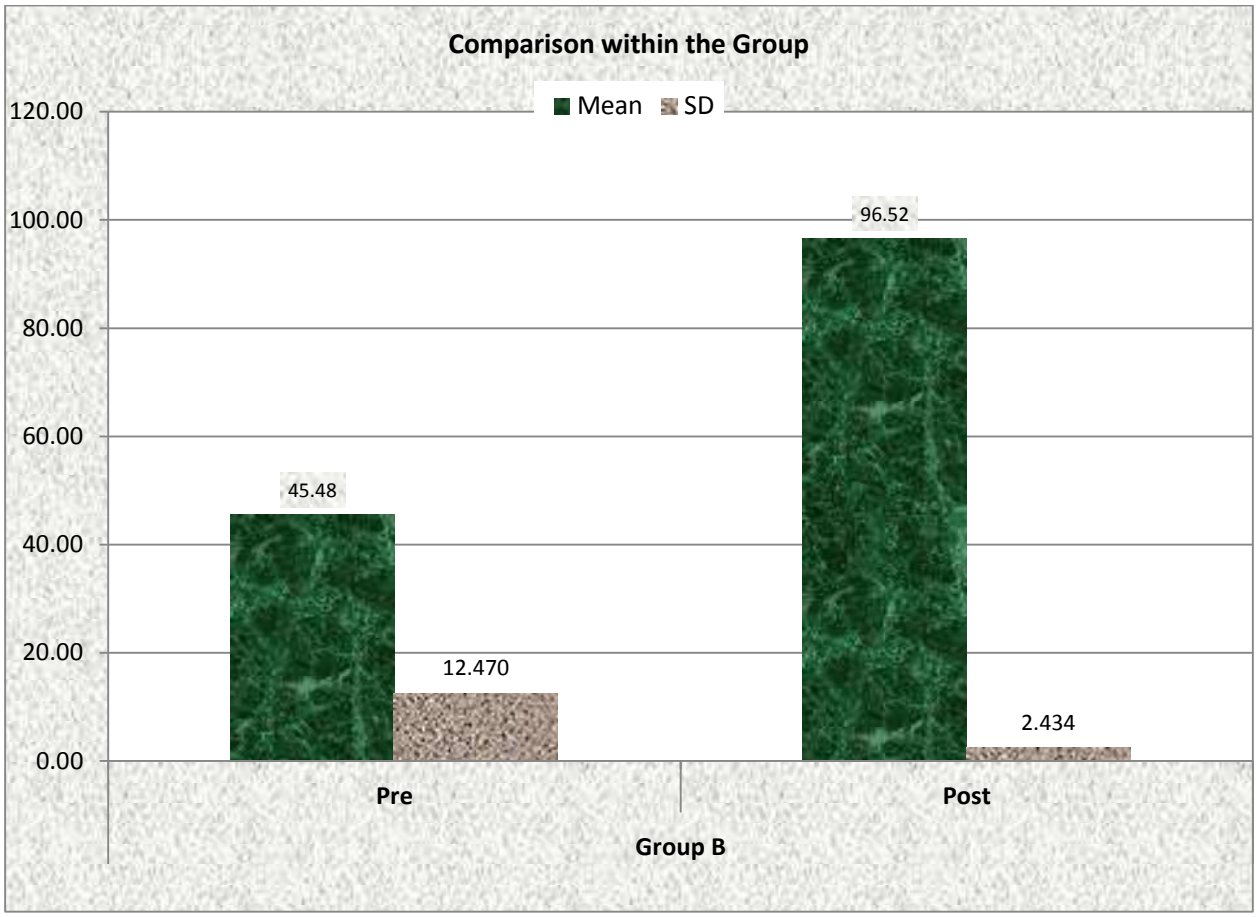


Graph 4.16: Comparison of Mean and SD for the variable LEFS within Group A

Table 4.17: Comparison of Mean and SD for the variable LEFS within Group B

LEFS		Mean±SD	t-value	Level of significance
	Pre	45.60±10.893	22.080	0.000
	Post	65.16±9.949		Significant

Table 4.17 shows the Mean and Standard deviation of variable LEFS within Group B was 45.48±12.470 and 96.52±2.434 respectively. Paired t-test was done within Group B to check the changes within the group. The t-value was 22.080($p<0.05$). The result for variable LEFS was significant which showed that there was significant improvement within the group.

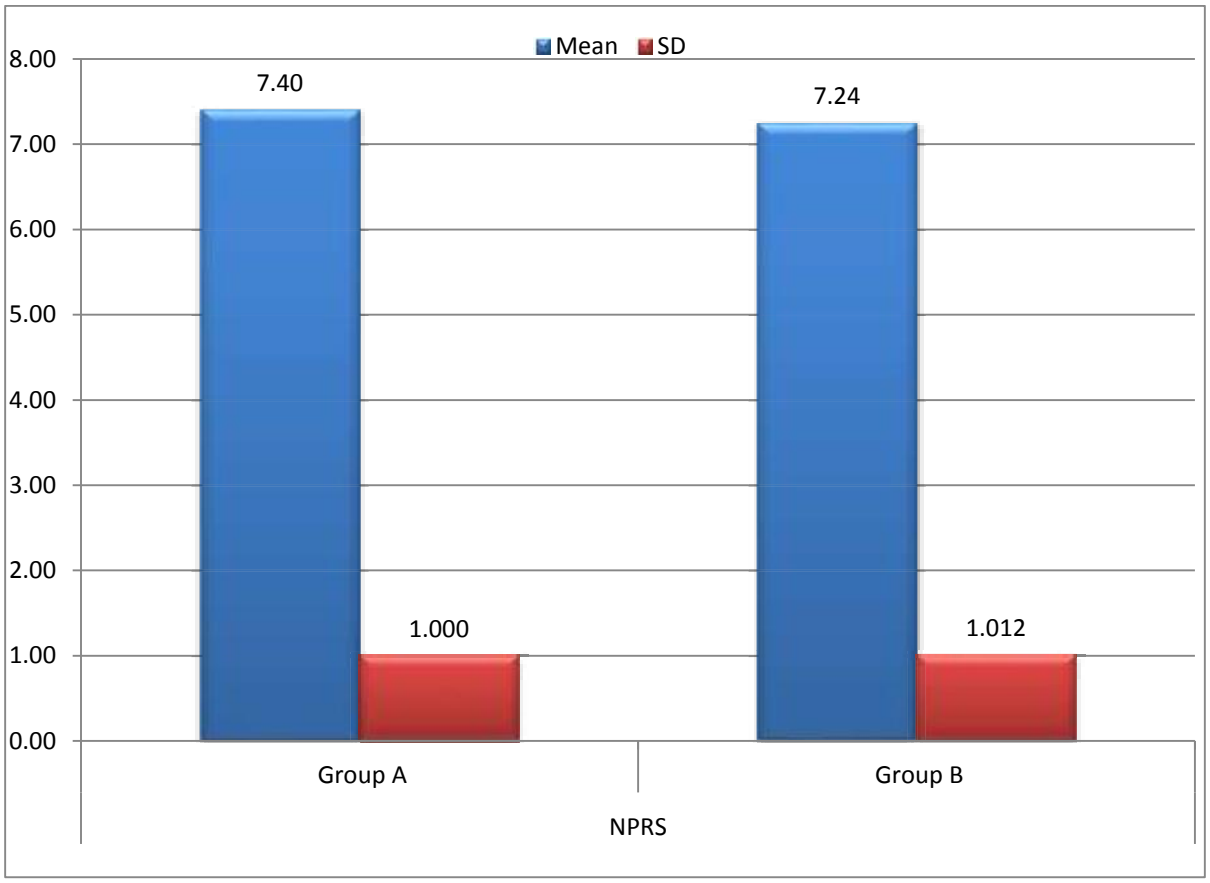


Graph 4.17 Comparison of Mean and SD for the variable LEFS within Group B

Table 4.18: Mean and SD of comparison of variable NPRS of the subjects for the Group A and Group B (PRE-READINGS)

Variable	Groups	Mean	S.D.	T value	P value	Level of significant
NPRS	Group A	7.40	1.000	0.560	0.5765	Not-Significant
	Group B	7.24	1.012			

(Pre-readings) Comparison of mean and standard deviation of subject's NPRS between Group A and Group B.The means NPRS of Group A was 7.40 ± 1.000 and that of Group B was 7.24 ±1.012. The unpaired t- test value was 0.560(p>0.05). There was no significant difference in NPRS between groups.

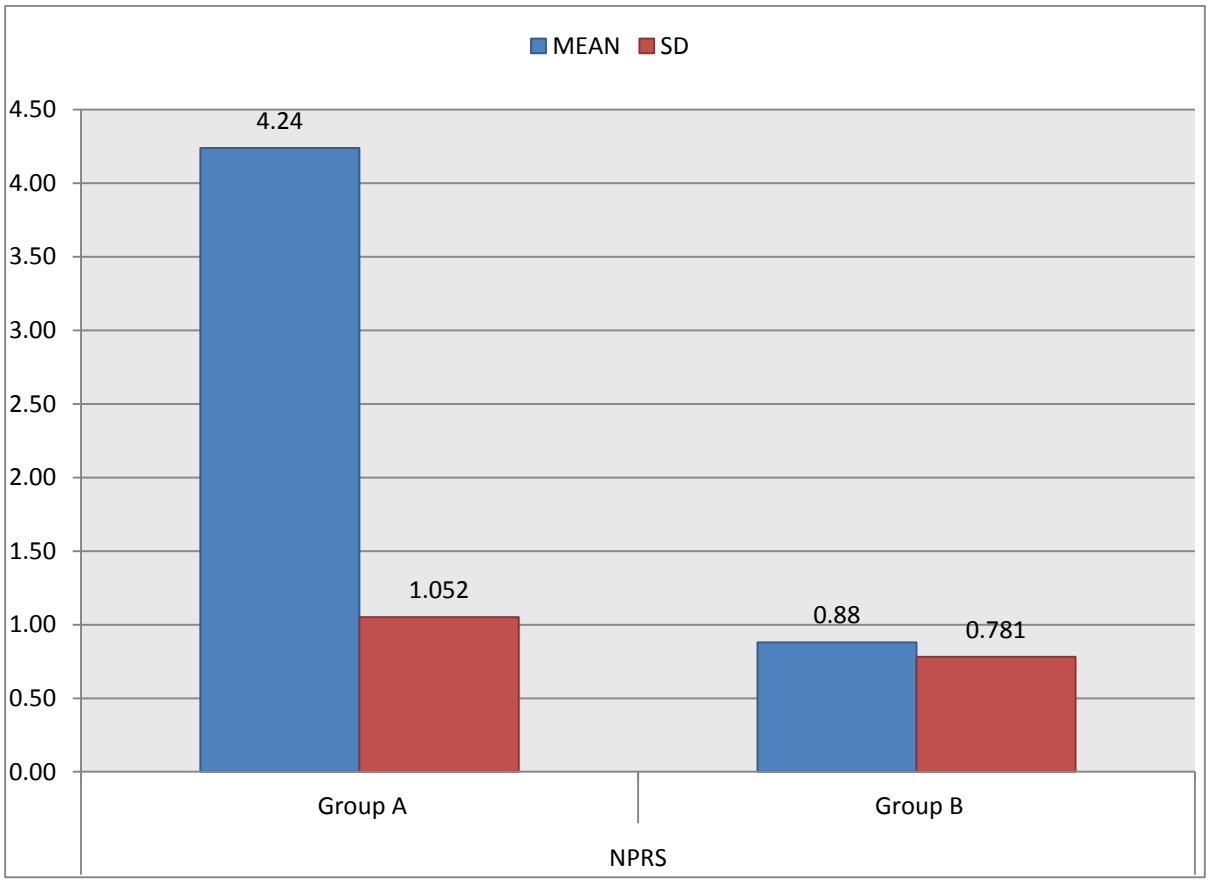


Graph 4.18: Mean and SD of comparison of variable NPRS of the subjects for the Group A and Group B (PRE-READINGS)

Table 4.19: Mean and SD of comparison of variable NPRS of the subjects for the Group A and Group B (POST-READINGS)

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
NPRS	Group A	4.24	1.052	12.820	0.0000	Significant
	Group B	0.88	0.781			

(Post-readings) Comparison of mean and standard deviation of subject's NPRS between Group A and Group B. The means NPRS of Group A was 4.24 ± 1.052 and that of Group B was 0.88 ±0.781. The unpaired t- test value was 12.820($p<0.05$).There was significant difference in NPRS between groups.

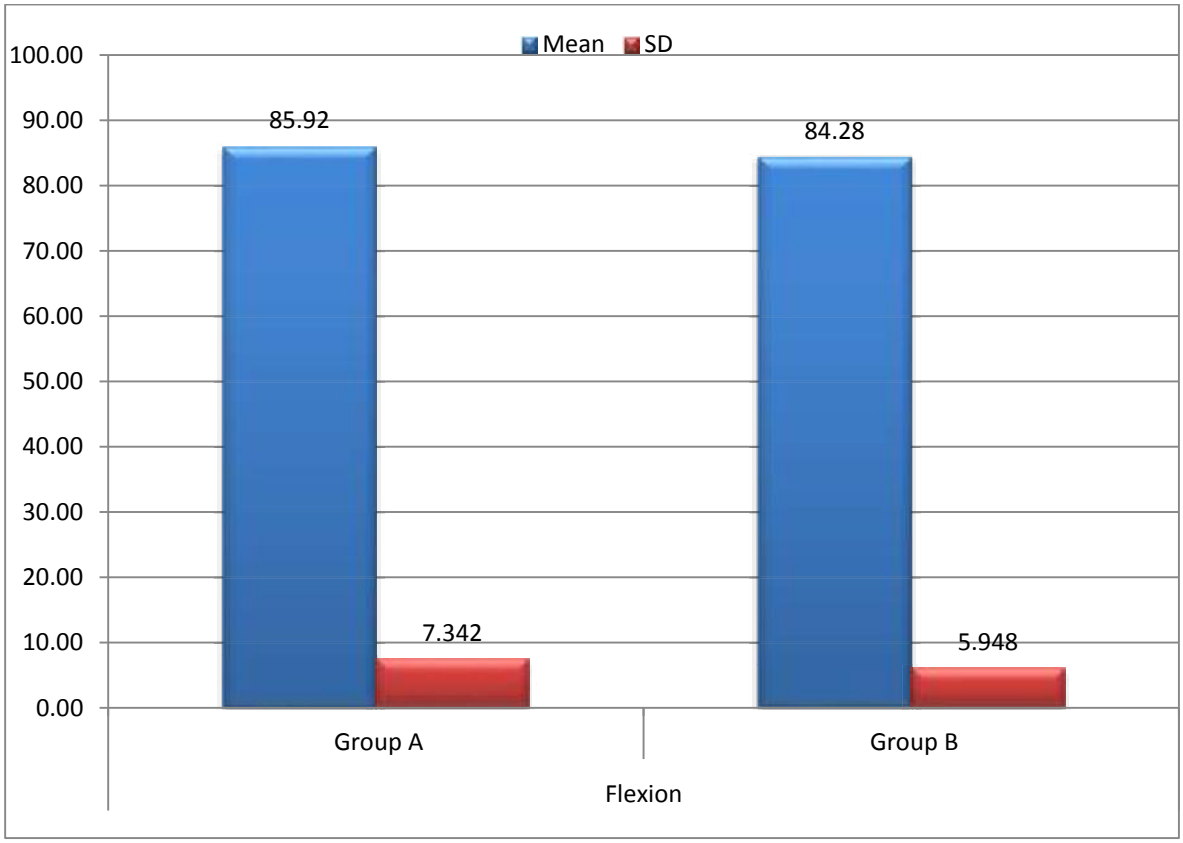


Graph 4.19: Mean and SD of comparison of variable NPRS of the subjects for the Group A and Group B (POST-READINGS)

Table 4.20: Mean and SD of comparison of variable hip FLEXION of the subjects for the Group A and Group B (PRE-READINGS)

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
Flexion	Group A	85.92	7.342	0.870	0.3898	Not-Significant
	Group B	84.28	5.948			

(Pre-readings) Comparison of mean and standard deviation of subject's FLEXION between Group A and Group B. The means FLEXION of Group A was 85.92 ± 7.342 and that of Group B was 84.28 ±5.948. The unpaired t- test value was 0.870 (p>0.05) .There was no significant difference in FLEXION between groups.

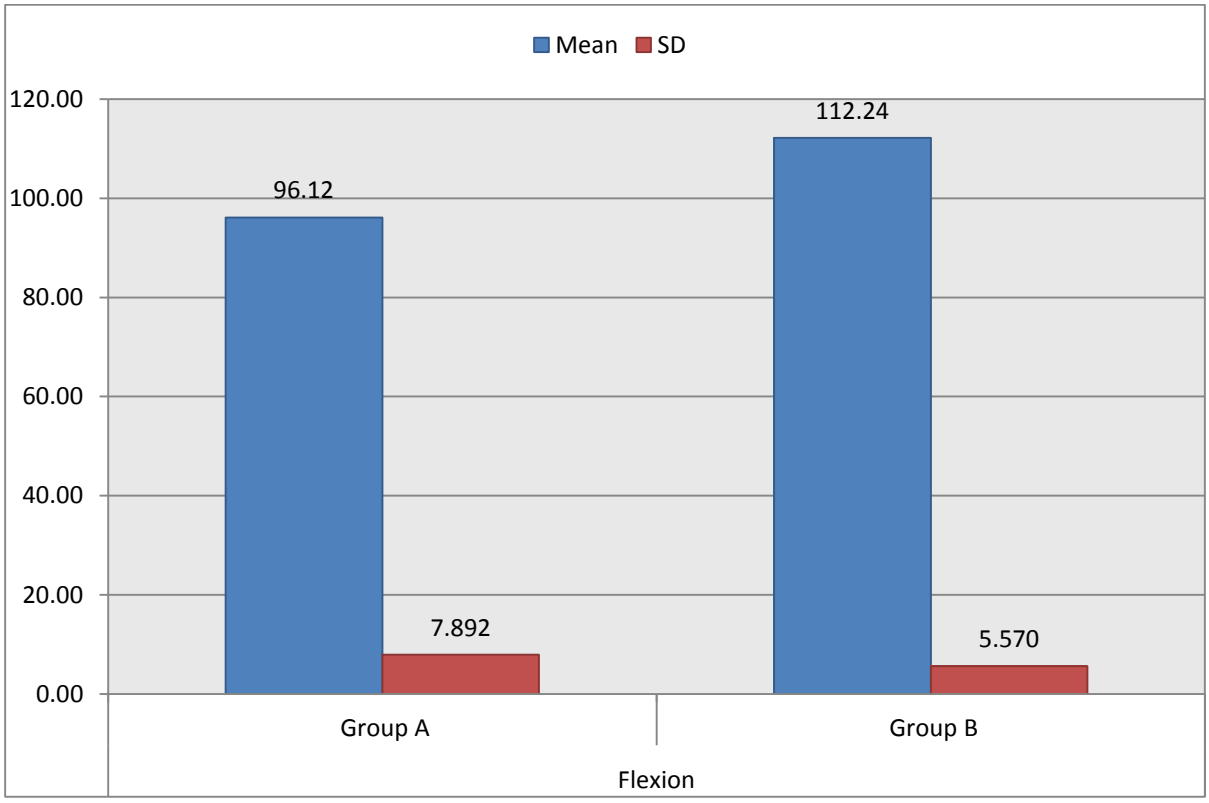


Graph 4.20: Mean and SD of comparison of variable hip FLEXION of the subjects for the Group A and Group B (PRE-READINGS)

Table 4.21: Mean and SD of comparison of variable hip FLEXION of the subjects for the Group A and Group B (POST-READINGS)

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
Flexion	Group A	96.12	7.892	8.340	0.0000	Significant
	Group B	112.24	5.570			

(Post-readings) Comparison of mean and standard deviation of subject's FLEXION between Group A and Group B. The means FLEXION of Group A was 96.12 ± 7.892 and that of Group B was 112.24 ±5.570. The unpaired t- test value was 8.340($p<0.05$).There was significant difference in FLEXION between groups.

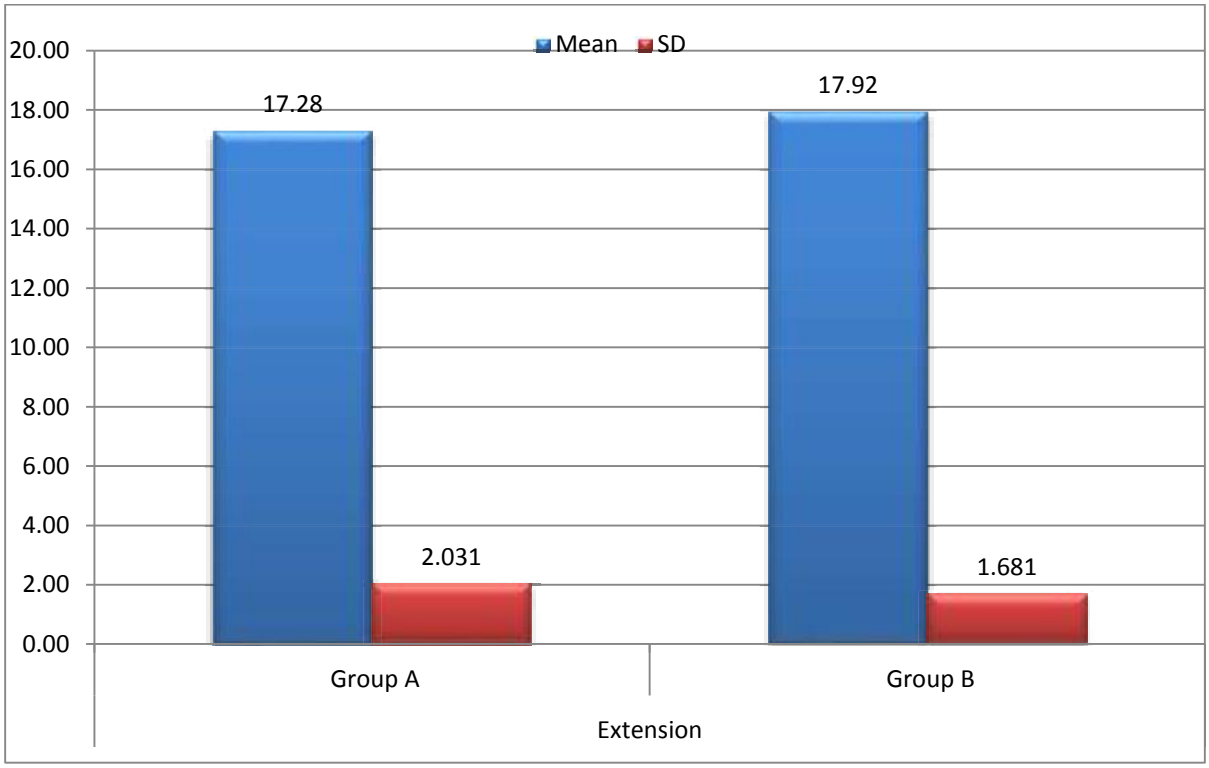


Graph 4.21: Mean and SD of comparison of variable hip FLEXION of the subjects for the Group A and Group B (POST-READINGS)

Table 4.22: Mean and SD of comparison of variable hip EXTENSION of the subjects for the Group A and Group B (PRE-READINGS)

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
Extension	Group A	17.28	2.031	1.210	0.2309	Not-Significant
	Group B	17.92	1.681			

(Pre-readings) Comparison of mean and standard deviation of subject's EXTENSION between Group A and Group B. The means EXTENSION of Group A was 17.28 ± 2.031 and that of Group B was 17.92 ±1.681. The unpaired t- test value was 1.210.There was no significant difference in EXTENSION between groups.

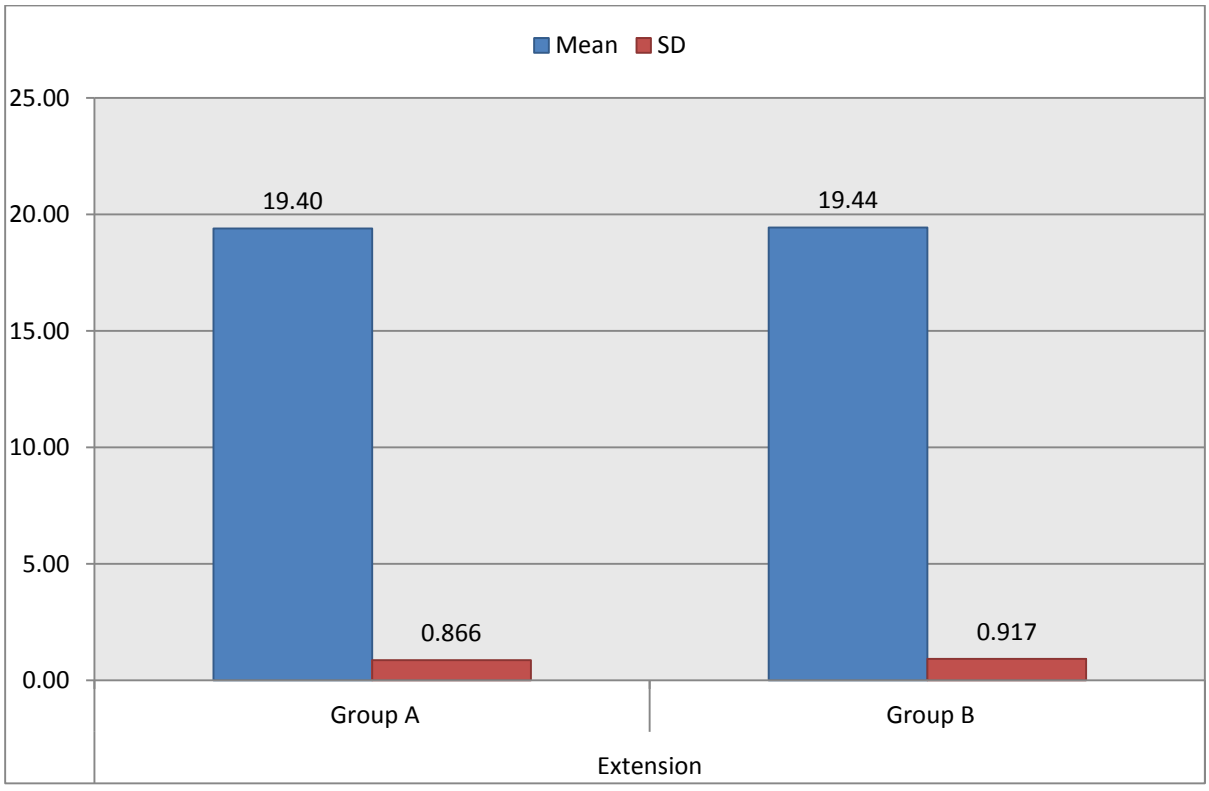


Graph 4.22: Mean and SD of comparison of variable hip EXTENSION of the subjects for the Group A and Group B (PRE-READINGS)

Table 4.23: Mean and SD of comparison of variable hip EXTENSION of the subjects for the Group A and Group B (POST-READINGS)

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
Extension	Group A	19.40	0.866	0.160	0.8746	Not-Significant
	Group B	19.44	0.917			

(Post-readings) Comparison of mean and standard deviation of subject's EXTENSION between Group A and Group B. The means EXTENSION of Group A was 19.40 ± 0.866 and that of Group B was 19.44 ±0.917. The unpaired t- test value was 0.160($p>0.05$) .There was no significant difference in EXTENSION between groups.

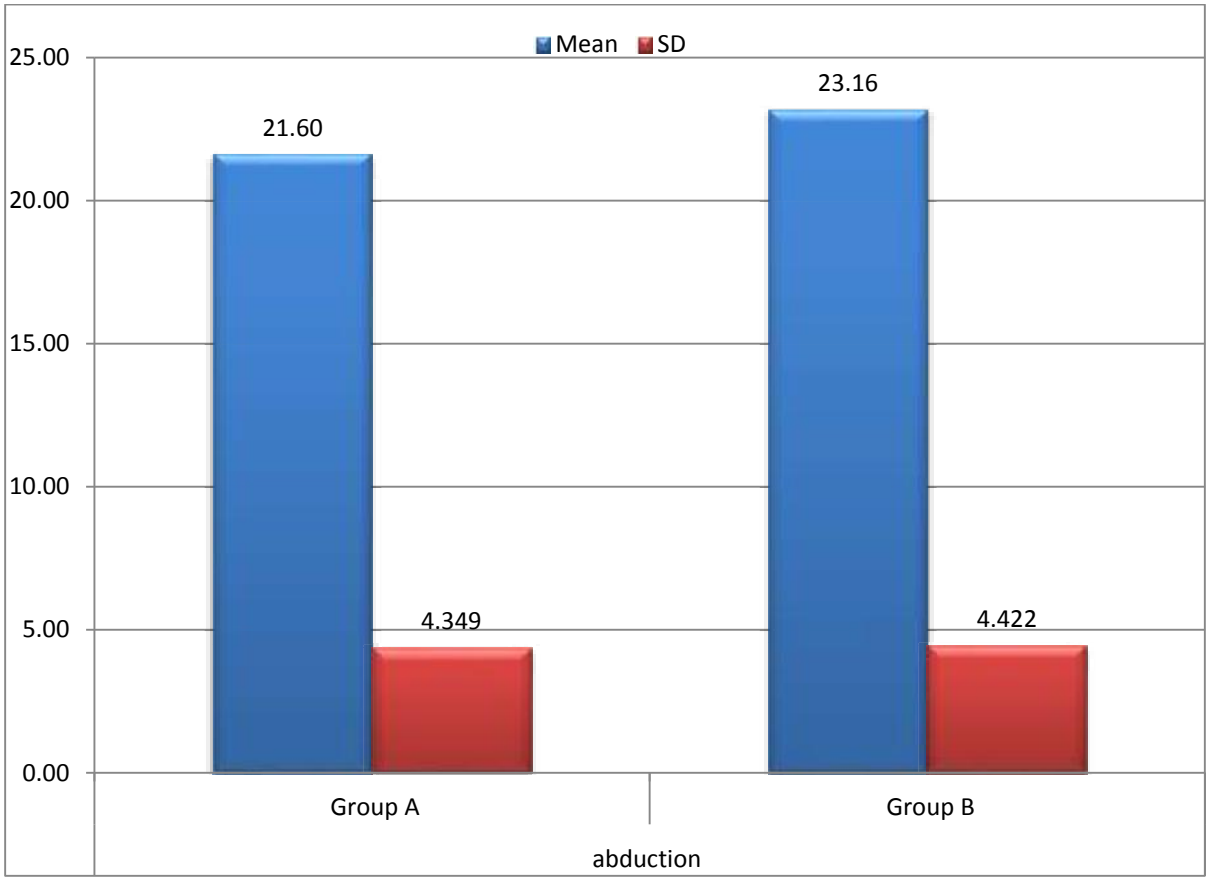


Graph 4.23: Mean and SD of comparison of variable hip EXTENSION of the subjects for the Group A and Group B (POST-READINGS)

Table 4.24: Mean and SD of comparison of variable hip ABDUCTION of the subjects for the Group A and Group B (PRE-READINGS)

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
Abduction	Group A	21.60	4.349	1.260	0.2146	Not-Significant
	Group B	23.16	4.422			

(Pre-readings) Comparison of mean and standard deviation of subject's ABDUCTION between Group A and Group B. The means ABDUCTION of Group A was 21.60 ± 4.349 and that of Group B was 23.16 ±1.681. The unpaired t- test value was 1.260(p>0.05). There was no significant difference in ABDUCTION between groups.

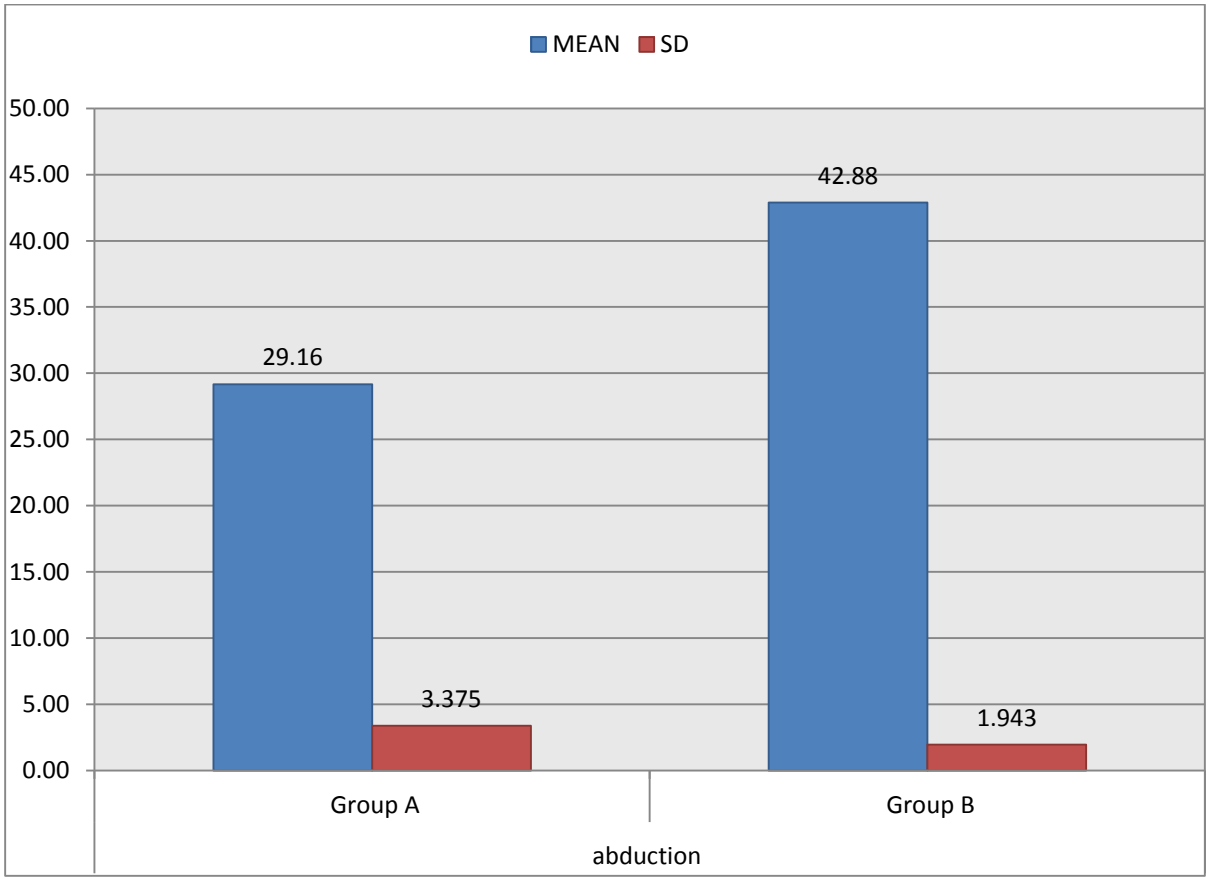


Graph 4.24: Mean and SD of comparison of variable hip ABDUCTION of the subjects for the Group A and Group B (PRE-READINGS)

Table 4.25: Mean and SD of comparison of variable hip ABDUCTION of the subjects for the Group A and Group B (POST-READINGS)

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
Abduction	Group A	29.16	3.375	17.610	0.000	Significant
	Group B	42.88	1.943			

(Post-readings) Comparison of mean and standard deviation of subject's ABDUCTION between Group A and Group B. The means ABDUCTION of Group A was 29.16 ± 3.375 and that of Group B was 42.88 ±1.943 The unpaired t- test value was 17.610($p<0.05$). There was significant difference in ABDUCTION between groups.

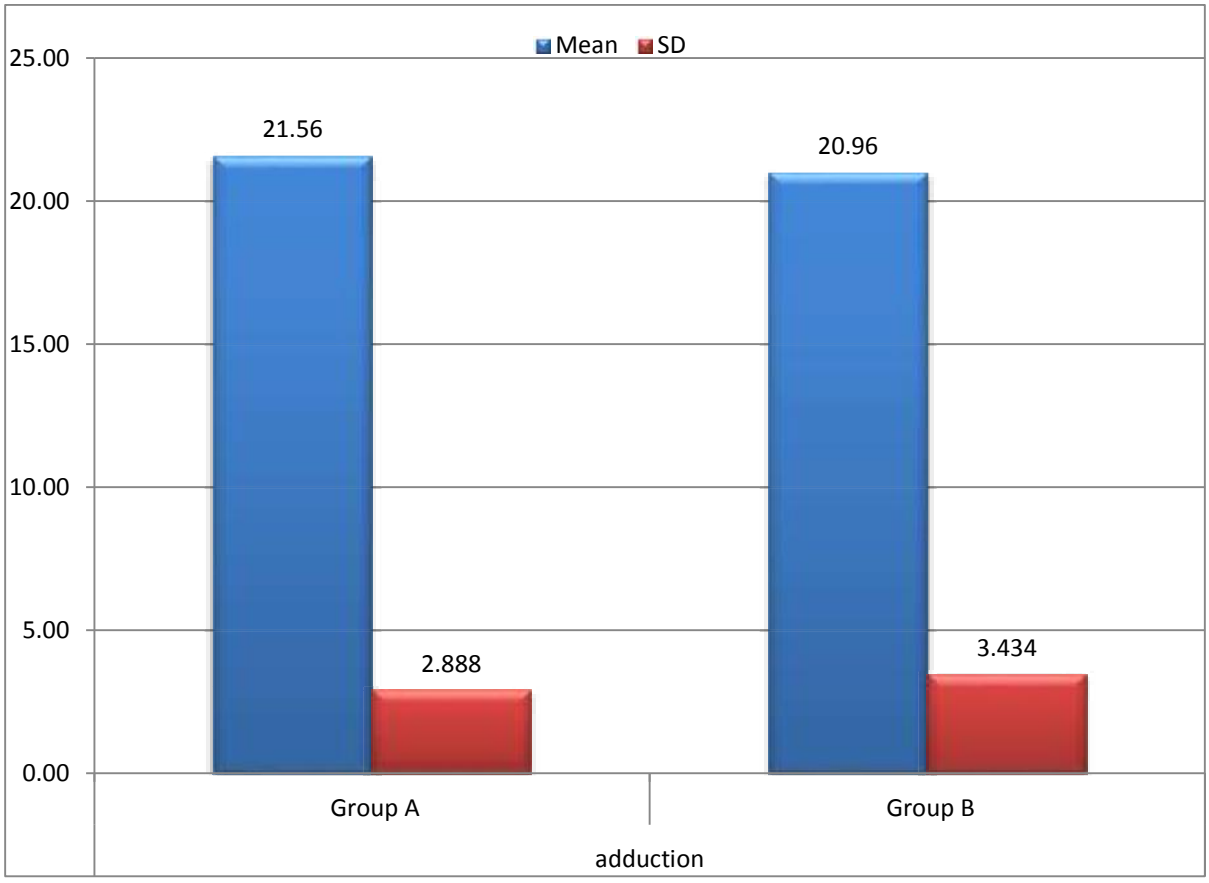


Graph 4.25: Mean and SD of comparison of variable hip ABDUCTION of the subjects for the Group A and Group B (POST-READINGS)

Table 4.26: Mean and SD of comparison of variable hip ADDUCTION of the subjects for the Group A and Group B(PRE-READINGS).

Variable	Groups	Mean	S.D.	T variable	P value	Level of significance
Adduction	Group A	21.56	2.888	0.670	0.5069	Not-Significant
	Group B	20.96	3.434			

(Pre-readings) Comparison of mean and standard deviation of subject's ADDUCTION between Group A and Group B. The means ADDUCTION of Group A was 21.56 ± 2.888 and that of Group B was 20.96 ±3.434. The unpaired t- test value was .0670(P>0.05). There was no significant difference in ADDUCTION between groups.

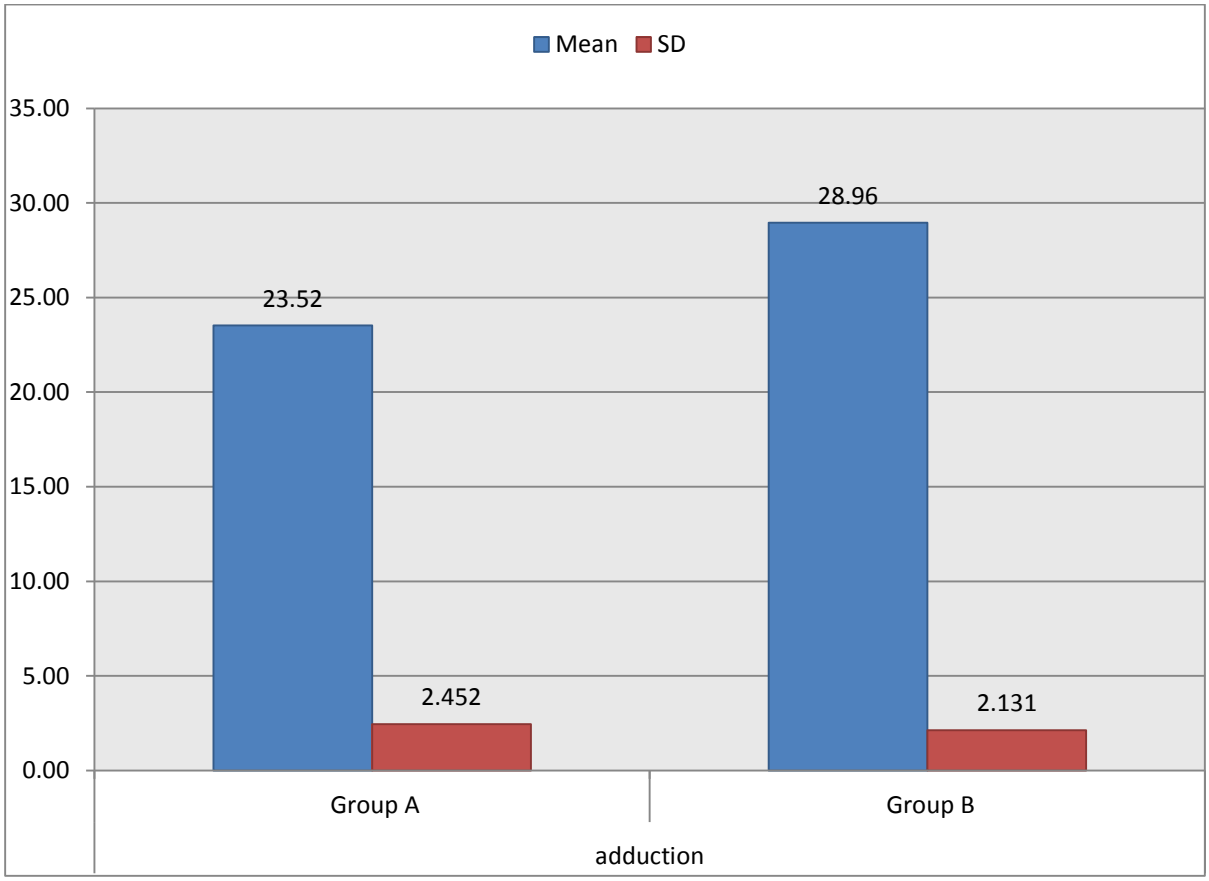


Graph 4.26: Mean and SD of comparison of variable hip ADDUCTION of the subjects for the Group A and Group B (PRE-READINGS).

Table 4.27: Mean and SD of comparison of variable hip ADDUCTION of the subjects for the Group A and Group B (POST-READINGS).

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
Adduction	Group A	23.52	2.452	8.370	0.000	Significant
	Group B	28.96	2.131			

(Post-readings) Comparison of mean and standard deviation of subject's ADDUCTION between Group A and Group B. The means ADDUCTION of Group A was 23.52 ± 2.452 and that of Group B was 28.96 ±2.131.The unpaired t- test value was 8.370($p<0.05$). There was significant difference in ADDUCTION between groups.

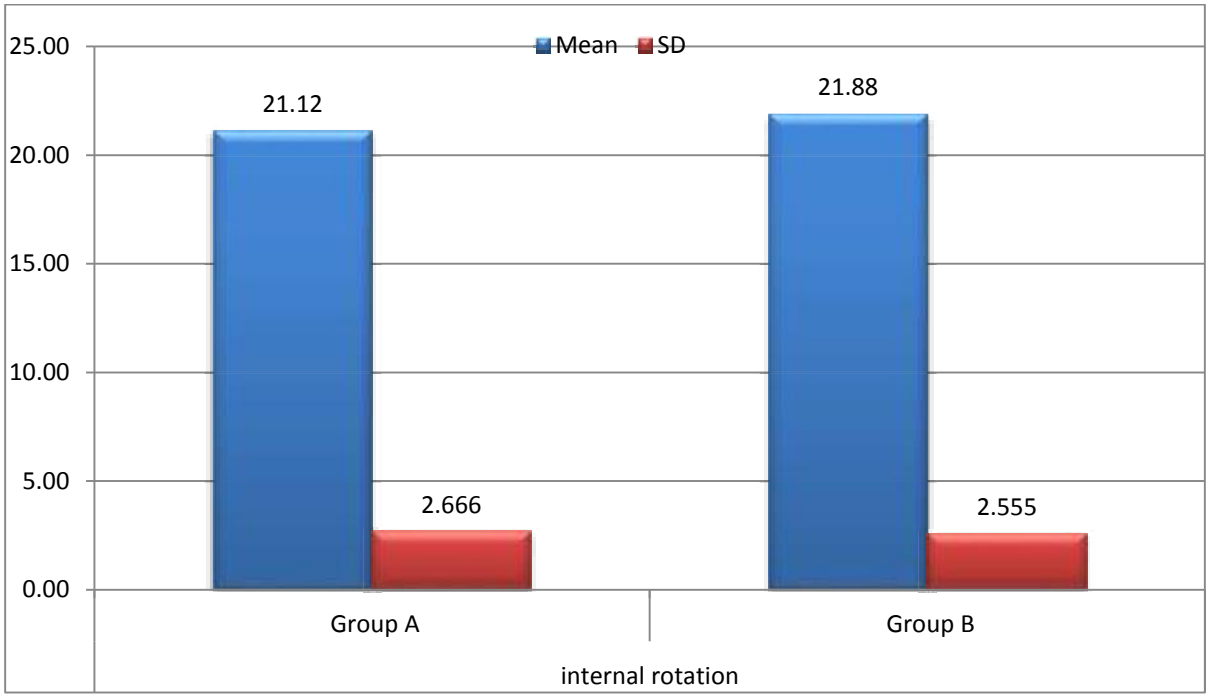


Graph 4.27: Mean and SD of comparison of variable hip ADDUCTION of the subjects for the Group A and Group B (POST-READINGS).

Table 4.28: Mean and SD of comparison of variable hip INTERNAL ROTATION of the subjects for the Group A and Group B (PRE-READINGS).

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
Internal rotation	Group A	21.12	2.666	1.030	0.3086	Not-Significant
	Group B	21.88	2.555			

(Pre-readings) Comparison of mean and standard deviation of subject's INTERNAL ROTATION between Group A and Group B. The means INTERNAL ROTATION of Group A was 21.12 ± 2.666 and that of Group B was 21.88 ±2.555 .The unpaired t- test value was 1.030(p>0.05). There was no significant difference in INTERNAL ROTATION between groups.

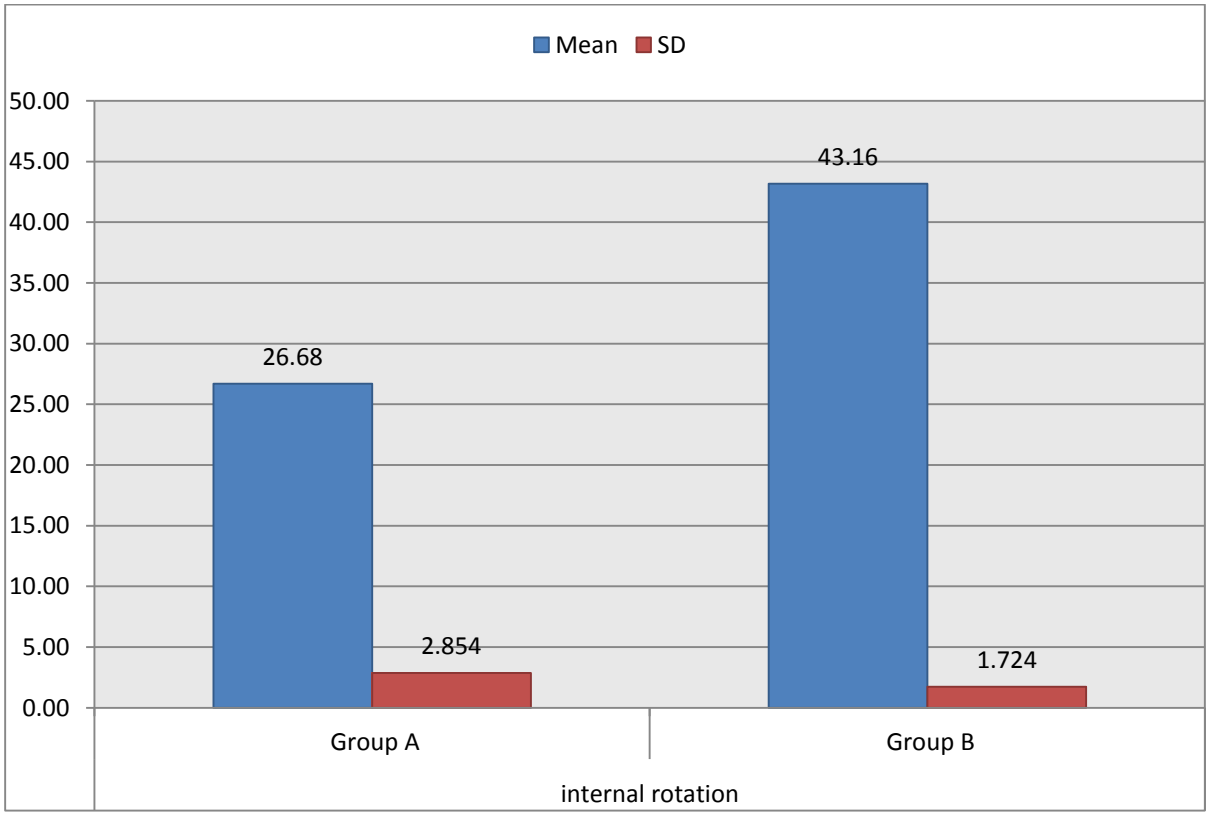


Graph 4.28: Mean and SD of comparison of variable hip INTERNAL ROTATION of the subjects for the Group A and Group B (PRE-READINGS).

Table 4.29: Mean and SD of comparison of variable hip INTERNAL ROTATION of the subjects for the Group A and Group B (POST-READINGS).

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
Internal rotation	Group A	26.68	2.854	24.710	0.000	Significant
	Group B	43.16	1.724			

(Post-readings) Comparison of mean and standard deviation of subject's INTERNAL ROTATION between Group A and Group B . The means INTERNAL ROTATION of Group A was 26.68 ± 2.854 and that of Group B was 43.16 ±1.724 .The unpaired t- test value was 24.710($p<0.05$).There was significant difference in INTERNAL ROTATION between groups.

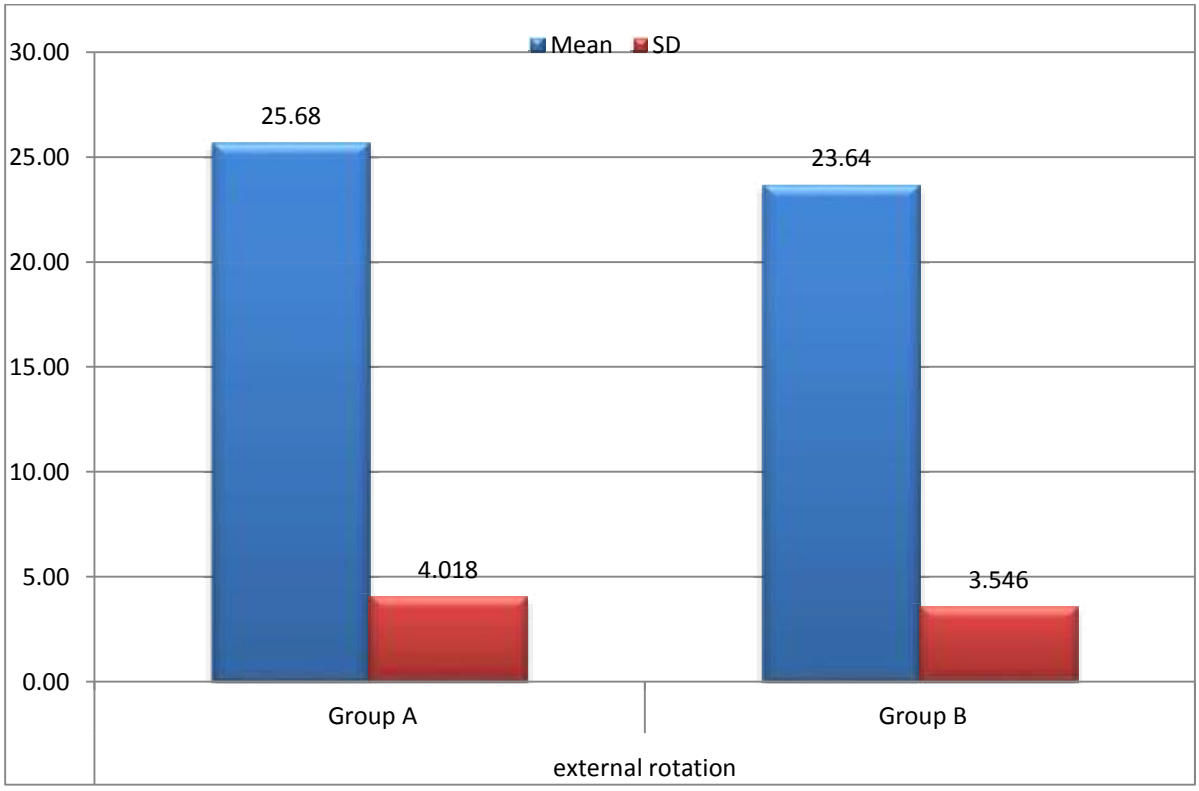


Graph 4.29: Mean and SD of comparison of variable hip INTERNAL ROTATION of the subjects for the Group A and Group B (POST-READINGS)

Table 4.30: Mean and SD of comparison of variable hip EXTERNAL ROTATION of the subjects for the Group A and Group B (PRE-READINGS).

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
External rotation	Group A	25.68	4.018	1.900	0.0630	Not-Significant
	Group B	23.64	3.546			

(Pre-readings) Comparison of mean and standard deviation of subject's EXTERNAL ROTATION between Group A and Group B. The means EXTERNAL ROTATION of Group A was 25.68 ± 4.018 and that of Group B was 23.64 ±3.546 .The unpaired t- test value was 1.900(p>0.05). There was no significant difference in EXTERNAL ROTATION between groups.

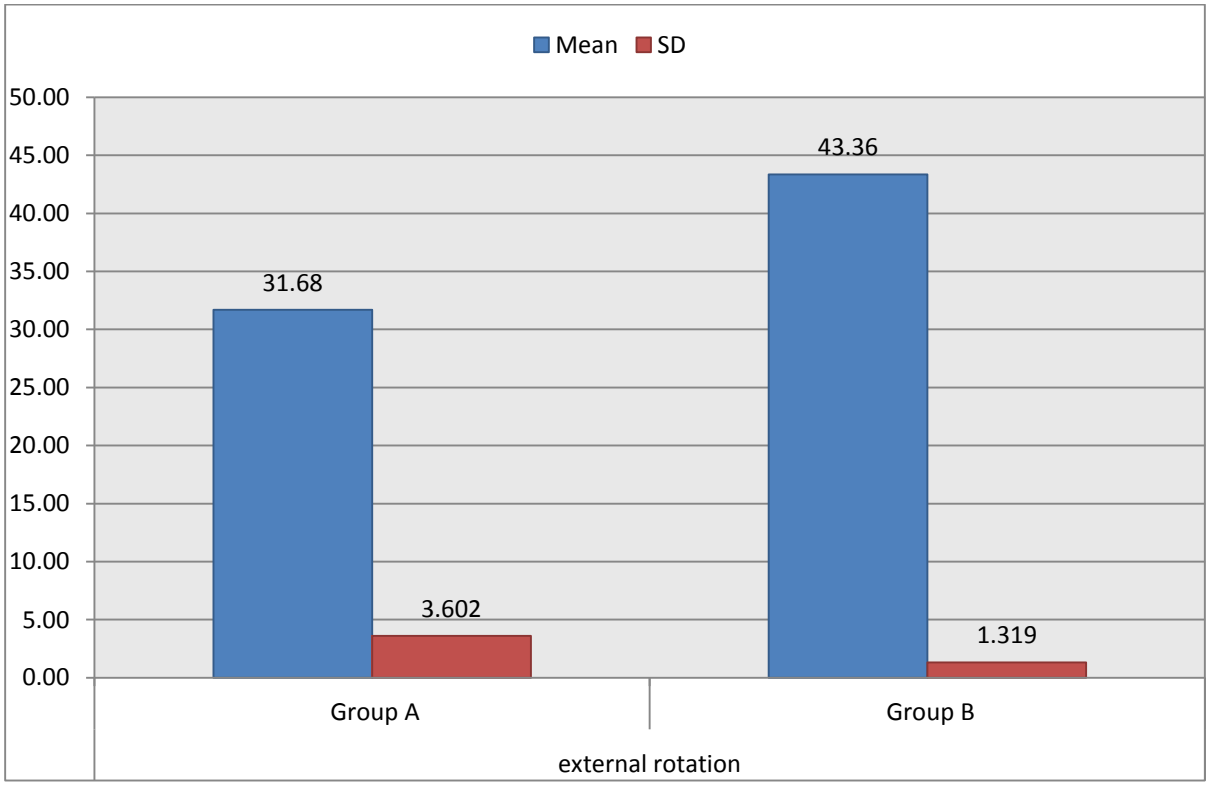


Graph 4.30: Mean and SD of comparison of variable hip EXTERNAL ROTATION of the subjects for the Group A and Group B (PRE-READINGS).

Table 4.31: Mean and SD of comparison of variable hip EXTERNAL ROTATION of the subjects for the Group A and Group B (POST-READINGS).

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
External rotation	Group A	31.68	3.602	15.220	0.0000	Significant
	Group B	43.36	1.319			

(Post-readings) Comparison of mean and standard deviation of subject's EXTERNAL ROTATION between Group A and Group B. The means EXTERNAL ROTATION of Group A was 31.68± 3.602 and that of Group B was 43.36 ±1.319 .The unpaired t- test value was 15.220($p<0.05$). There was significant difference in EXTERNAL ROTATION between groups.

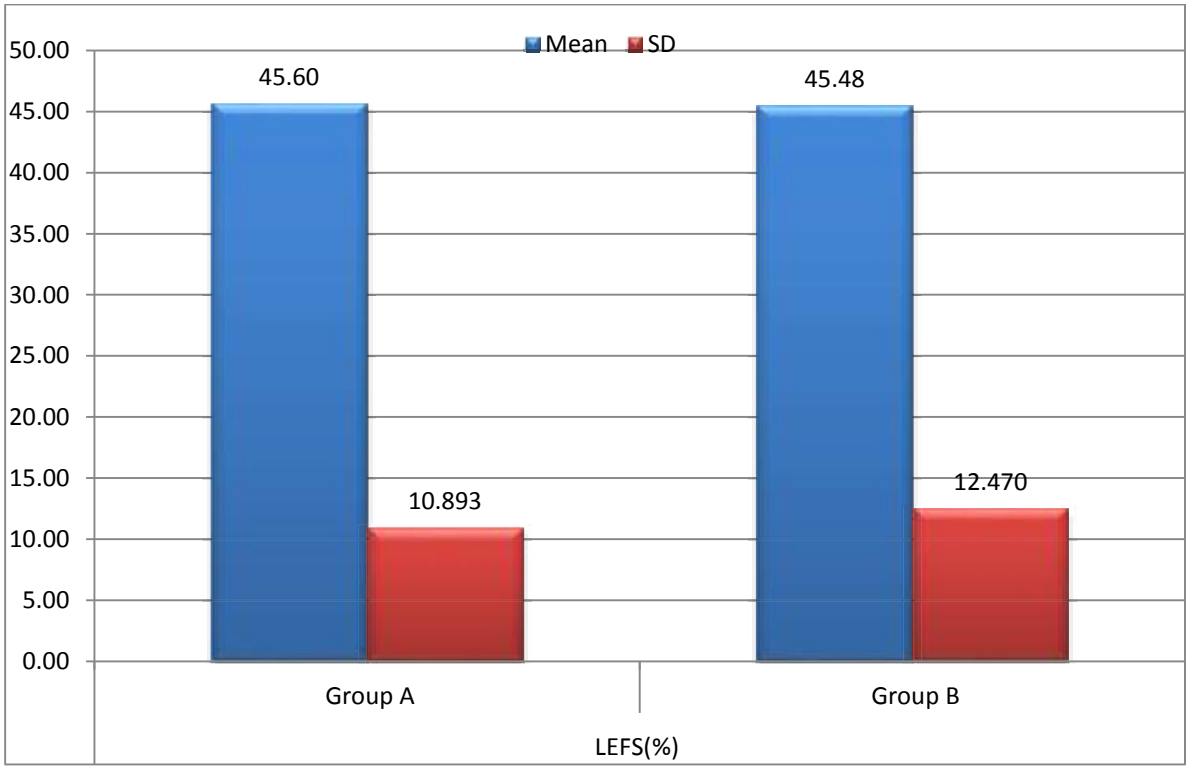


Graph 4.31: Mean and SD of comparison of variable hip EXTERNAL ROTATION of the subjects for the Group A and Group B (POST-READINGS).

Table 4.32: Mean and SD of comparison of variableLEFS of the subjects for the Group A and Group B (PRE-READINGS).

Variable	Groups	Mean	S.D.	T value	P value	Result
LEFS (%)	Group A	45.60	10.893	0.040	0.9712	Not-Significant
	Group B	45.48	12.470			

(Pre-readings) Comparison of mean and standard deviation of subject's LEFS between Group A and Group B. The means LEFS of Group A was 45.60± 10.893 and that of Group B was 45.48 ±12.470.The unpaired t- test value was 0.040(p>0.05). There was no significant difference in LEFS between groups.

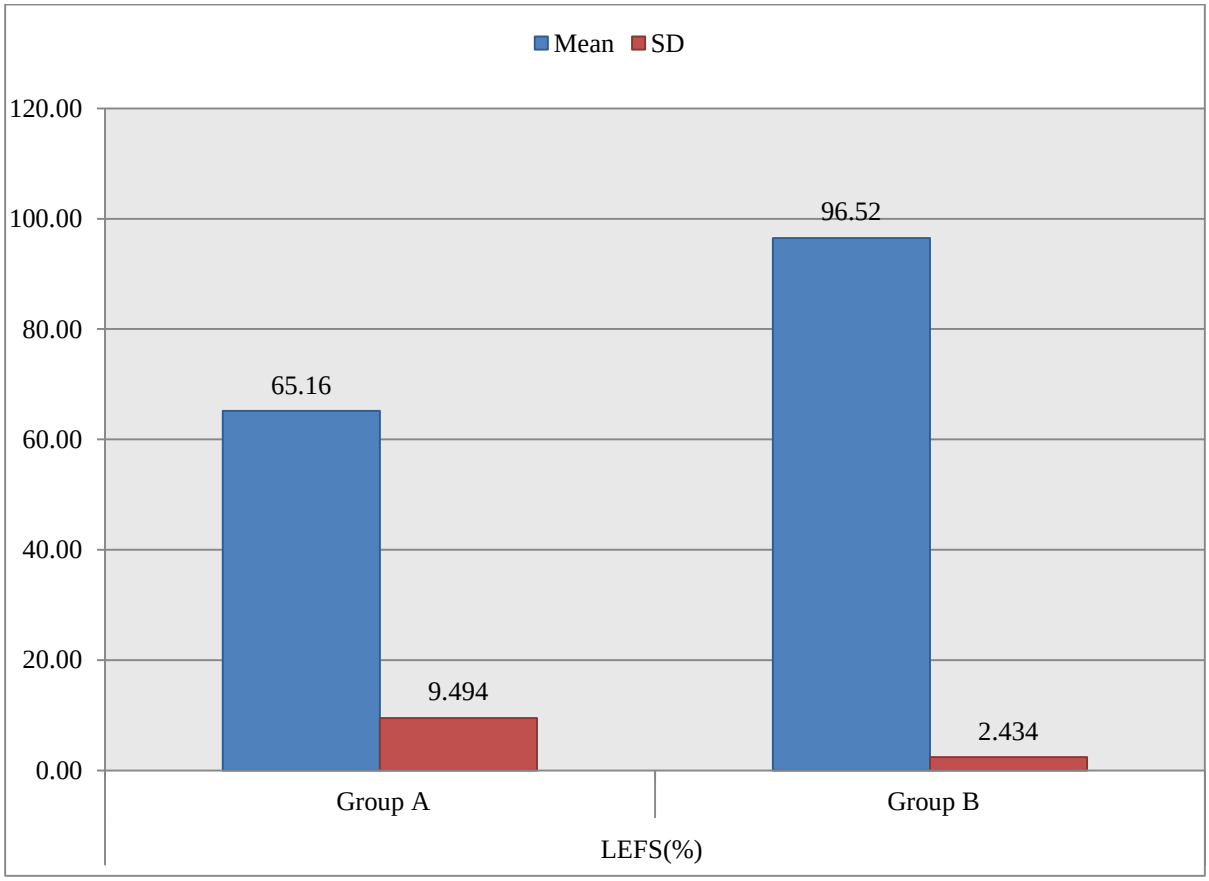


Graph 4.32: Mean and SD of comparison of variable LEFS of the subjects for the Group A and Group B (PRE-READINGS).

Table 4.33: Mean and SD of comparison of variable LEFS of the subjects for the Group A and Group B (POST-READINGS).

Variable	Groups	Mean	S.D.	T value	P value	Level of significance
LEFS(%)	Group A	65.16	9.494	16.000	0.000	Significant
	Group B	96.52	2.434			

(Post-readings) Comparison of mean and standard deviation of subject's LEFS between Group A and Group B. The means LEFS of Group A was 65.16± 9.949 and that of Group B was 96.52 ±2.434.The unpaired t- test value was 16.000($p<0.05$). There was significant difference in LEFS between groups.



Graph 4.34: Mean and SD of comparison of variable LEFS of the subjects for the Group A and Group B (POST-READINGS).

RESULTS

The study aims to evaluate the comparison of facilitated positional release technique and foam rolling in piriformis syndrome. 50 subjects were selected both male and female and were divided into two groups. Group A, 25 subjects was given Facilitated positional release technique and Group B, 25 subjects were given Foam rolling. The selected measures variables were NPRS, hip ROM and LEFS. The data obtained was analysed using paired t test and unpaired t test.

The intervention was given for 6 weeks and after that no intervention was given for the groups. The readings were taken at 0^{th} day and then after intervention of 6^{th} week.

Paired t test was done within the group for group A and Group B for the variables NPRS, hip ROM, LEFS(0^{th} day 42^{nd} day) to check the changes within the group. There was significant difference within the groups.

Unpaired t test was done between the Group A and Group B for the variables NPRS, hip ROM, LEFS(0^{th} day 42^{nd} day) to check the changes between the groups. There was significant difference between the groups.

When unpaired t test was done for the variables NPRS, hip ROM, LEFS, at 42^{nd} day showed that there order of superiority of groups were Group B> Group A.

CHAPTER - 5

DISCUSSION

The study was designed to evaluate the comparative effect of facilitated positional release technique (FPR) and Foam rolling (FR) in piriformis syndrome. 50 subjects were taken and divided into 2 groups, 25 patients in each group. Group A received FPR for piriformis muscle (3 times per week) and Group B received FR for piriformis muscle (3times per week), for total 6 weeks.

The selected parameters were NPRS for pain, hip range of motion and LEFS for functional disability. Data was collected at baseline (day 0) and after 6 week of treatment to evaluate the changes in the mentioned parameters.

The findings of the present study show that FPR and FR significantly reduced pain, improve range of motion of hip (flexion, extension, abduction, adduction, external rotation, internal rotation) and functional disability within the groups. There was significant difference between the groups on the 6^{th} week of protocol in all the parameters except for hip extension. But appreciably more significant difference in the Foam rolling (FR) group than facilitated positional release technique (FPR) group.

Piriformis syndrome is caused by the compression of the sciatic nerve in the piriformis muscle[12]. The abnormal compression of the sciatic nerve causes tenderness over the piriformis muscle. Tenderness is the subjective sensation of pain or soreness that is reported by the patient in response to the tissues by the therapist. The compression of sciatica causes sensation in almost in the tissues surrounding a somatic dysfunction when a normal pressure is exerted. Pressing too firmly on soft tissues will cause pain and tenderness. Tenderness is a subjective finding at site of somatic dysfunction[40].

Tender points arise in any of the somatic tissues like fascia, muscle, ligaments and bone. Myofascial pain syndrome is a hyperirritable spot or trigger point within a taut band of skeletal muscle or muscle fascia. The tender point is palpable as a small nodule (0.25-1.0cm). Sedentary lifestyle and repetitive limit of the muscle activity on regular basis causes its formation. Postural stress, trauma, articular strain and mechanical factors may excessively load myofascial tissues, leading to production of trigger points. Inflammation caused by the initiating injury releases the proinflammatory and prostaglandins such as histamine and prostaglandines . Acute trauma or injury may result in the rupturing of the sacroplasmic

reticulum. The ensuming flood of calcium ions into the interstitial compartment leads to controlled actin and myosin interaction and palpable tauts bands of muscles are formed. The results are the hypertonicity, inflammation, ischemia and increased concentration of metabolic active chemical mediators. The vicious cycle is further perpetuated by repetitive trauma is thought to be responsible for the hyperirritable, constrictive focal areas of inflammation(TPs) within the tissues. Sensitization of nociceptive and mechanoreceptive organs within the affected tissues appears to have a role in mediating the formation TPs. It reveals the presence of the mast cells and platelets[39].

Facilitated positional release is a method of total body evaluation and treatment using the tender points(TPs) and a position of comfort(POC) to resolve the associated dysfunction.FPR is the indirect technique which employ the application of force away from the resistance barrier i.e. towards the direction of ease or comfort. It causes normalization of hypertonic muscle both deep and superficial , fasical tension, reduction of joint hypomobility, increased circulation and reduce swelling, decrease pain and increase strength[39] .In the study we have used FPR for deep muscle i.e. piriformis muscle. Precision is required in positioning the patient as the range within which the maximal relaxation of the tissues occurs is usually small – 2 to 3 degrees. It may be speculated that positioning beyond this ideal range places the anatagonist muscles under increased stretch which in turn causes a proprioceptive effect resulting in reactivation of the facilitated segment[39].

Muscle spindles are connected to the spinal segment by gamma and alpha motor neurons which supply the intrafusal and extrafusal fibers, respectively. The velocity of change of length has great significant on the stimulus for potential injury to the muscle and tissues. The reason that reduced pain is due to decrease in the intrafusal and extrafusal fiber disparity and reset of the inappropriate proprioceptive activity[39].

The proprioceptive organs are located in the three major areas. The ruffini receptors are found in the joint capsule. The golgi tendon organs , which are on the musculotendondinous junction. The muscle spindles are located between the muscle fibers of all strained muscle. They are the most sensitive of the proprioceptive organs to moment to moment change in the

body's position. This could be the reason that pain was reduced, functional disability was improved and range of motion was improved in this group significantly[39].

The FPR causes the position of comfort to relax the muscle spasm by reducing the aberrant afferent flow from the muscle spindles. This is accomplished by mimicking the original strain position or applying an counter strain. By doing this the joint is positioned into direction of ease or comfort and maximally shortens the involved muscle[42].FPR is associated with reflex mechanism to promote normal firing of the the spindle and a normal level of tension in the muscle, which results in a normal relationship within the tissues. Facilitated positional release technique reduces the hyperactivity of myotatic reflex arc and to reduce the overwhelming afferent nerve impulses that may lead to overflow of neurotransmitters. This segment is known as "facilitated segments" within the CNS[43].

Flexibility may be hindered for a number of reasons like fascial restrictions. Fascia becomes restricted due to injury, disease, inactivity. These restrictions can cause physical pain and decrease strength and flexibility[44]. An array of myofascial release technique are used to alleviate the effects of fascia restrictions. They are performed and held for 90-120 seconds. There are devices that currently used to replicate myofascial release techniques and individuals can do on their own. One such device has been shown to increase the flexibility is Foam roller. During rolling, direct and sweeping pressure is exerted on the soft tissue and causes the fascia to stretch and increase the ROM[45].

A recent study was able to determine that foam rollers exert pressure on soft tissue in proportionate to the foam roller density. The foam rollers are of firmer foams or solid materials. The pressure applied to the subjects via bio-foam roller and multilevel rigid roller. The multilevel rigid foam roller causes pressure over a small surface and since its shape was retained during foam rolling. The softer more compressible bio-foam roller deformed used and force was disturbed over a larger surface area. As a result, observed that pressure exerted on the soft tissue increased with the density of the roller[46].

Autogenic inhibition via foam roller stretching is caused by the pressure exuded onto the roller by the person. The pressure causes stimulation of the golgi tendon organs. The GTO

stimulation past a certain threshold inhibits muscle spindle activity and decreases muscular tension[47].

The GTO are located at musculotendinous junction and is sensitive to tension and rate of tension change. The phenomenon is referred to as autogenic because the contracting agonist is inhibited by its own receptors[48]. This can be the reason that causes more improvement in the foam rolling group in all three parameters.

Also, It was determine that an acute bout of foam rolling is an effective method of increasing range of motion to the knee joint by MacDonald in his study[49]. It was also recently studied that direct application of rolling techniques on the hamstrings improved sit-and-reach results without impairing performance[45]. Brain J. Famain their study the acute effect of a Foam Roller (FR) warm up routine and a dynamic warm up routine on strength, power and reactive power. The conclusion was that FR warms ups are not recommended prior to physical activity requiring increased neurological activation as the FR warms up was shown to decrease jump performance as neurological demands of jumps increased. Foam Roller may be beneficial for the injured athlete prior to activity but should be followed by a dynamic warm up before activity[67].

Andrew Robert mohr in his study determine if a foam rolling protocol performed before static stretching would influence hip flexion ROM. The static stretching improved hip ROM and foam rolling improved flexibility which would increase hip flexion ROM more. The 6 minute of foam rolling may have increased intramuscular tissue temperature and blood flow thus increasing the viscoelastic properties of muscle. Another explanation possible can be due to the thixotropic property reported in muscle and fascia. Thixotrophy allows muscles and fascia to have less viscosity when exposed to some stress making the tissues less stretch resistant[50]. Amany Waheed Ebrahim in their study, studied the effect of foam roller exercise and nanoparticle in speeding of healing of sports injuries. The results showed a significant increase of GH and flexibility tests a significant decrease of CD34+ in experimental groups[65].

Gregory E.P. Pearcey in their study examined the effects of foam rolling for delayed DOMS and recovery of dynamic performance measures i.e. pressure pain threshold, sprint time,

change of direction speed, power and dynamic strength-endurance. They concluded that foam rolling substantially improved quadriceps muscle tenderness[51].

This finding is in the agreement with the previous findings that it is possible to significantly improve pain, range of motion and functional disability.

A.Kumaresan stated in their study concluded that both positional release technique and the conventional treatment showed significant difference in the intensity of pain within the groups and between the groups on 7th day of the treatment protocol. Reduction of pain was more in the positional release group[52]. Carlos Alberto Kelencz studied the trapezius upper position trigger points with EMG analysis and showed that all the patients had a gradual decrease in the pain after each session and it is due to decreased in the musculoskeletal pain with improvement in the posture and daily life activities[53]. Cynan Lewis studied the Strain – Counterstrain therapy combined with exercise is not more effective than exercise alone on pain and disability in people with acute low back pain. The outcome measures were questionnaire ,oswestry low back pain disability[66].

Sweety Charles Carvalho studied the effect of PRT in subacute trapezitis and showed significant improvement in pain intensity reduction and improving Range of motion and NDI after the 2 weeks of treatment protocol and the difference was significant within and between the Groups[54]. Sakina Vohra in the study said that PRT quadratus lumborum is effective in treating trigger point in low back pain. There was significant improvement in pain intensity and functional outcome in patients within the groups and between the groups. Thus these results support our study where there is improvement in ROM , functional disability and reducing pain[55].

These results further support this study that foam rolling is more effective in reducing Pain, improving ROM and functional disability. Thus in the present study the foam rolling might suggest that the mechanisms underlying its effects are related to self myofascial release techniques i.e friction or viscoelasticity effects and neural mobilization or fasical release.

5.1 LIMITATIONS

- Convenient sampling was used.
- No Control Group was taken.
- Any improvement may not be permanent .There was no follow-up of the patients after the treatment. This study did not monitor the long term effects of the treatment protocol.

CHAPTER – 6

CONCLUSION

CONCLUSION

The present study concluded that there is a significant difference in the reduction of pain, improving hip range of motion (flexion, abduction, adduction, external rotation, internal rotation) and functional disability but no significant difference has been seen in hip extension between Group A and Group B.

FUTURE SCOPE OF THE STUDY

- Gender specific study can be done to see the effect of intervention protocol.
- A long term follow up is recommended for a more comprehensive analysis of recovery.
- The improvement can also be investigated through electromyography.

Chapter 7

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CHAPTER – 8

APPENDICES

8.1 INFORM CONSENT

I, _____ (name of the patient) willingly and voluntarily agree to participate in the research study under the directions of the Ramanpreet Kaur Doad I understand that the purpose of the study is to see the "**Facilitated positional release technique versus Foam rolling in piriformis syndrome**". I understand there is no risk involvement to my health and if any, it is being explained to me. I understand that I have the right to seek information regarding the study and can contact Ramanpreet Kaur Doad. I understand that my confidentiality and anonymity is protected and further I have the right to terminate my participation at any time.

Signature of the subject

Name:

Address:

Date:

I have explained the procedure with details to which the subject has consented to participate.

Signature of the researcher

Name: **Ramanpreet Kaur Doad** **Residence address:**

MPT Orthopaedic

8.2 ASSESSMENT FORM

- Date: Code & Serial no.
- Name:
- Age:
- Gender:
- Occupation:
- Address:
- Chief complaint:

- History of Present illness:

- Past history/Medical history:

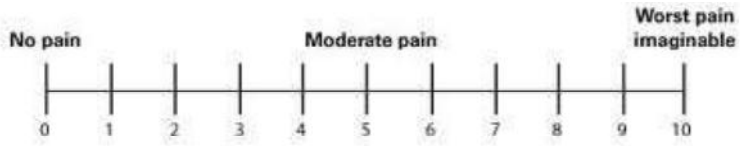
- Pain evaluation:-
  - Site: Localized to buttock/Generalized/other
  - Side: Right/Left/other
  - Onset: Sudden/Gradual
  - Duration: less than 6 months/more than 6 months
  - Type: Superficial/Deep/Dull/Sharp/Shooting

  - Aggravating Factors:

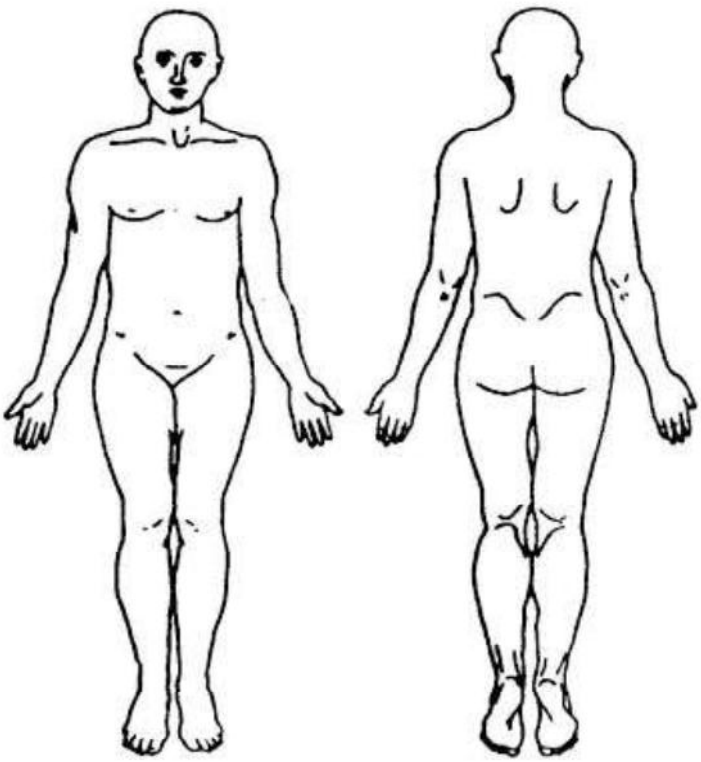
  - Relieving Factors:

- Pain intensity on NPRS:

  Pain score 0 -10 Numerical Rating



- Body chart: Anterior Posterior



- On observation:
- Built:
- Posture:
- Deformity:

- Gait:
- Scar:

- On palpation:
- Tenderness:
- Muscle tone:
- Temperature:

- On Examination:
- HIP Range of motion:-

	Flexion	Extension	Abduction	Adduction	External rotation	Internal rotation
Right						
Left						

- HIP MMT:-

	Flexors	Extensors	Abductors	Adductors	Ext.rotators.	Int.rotators
Right						
Left						

- Lower Extremity functional scale:-
- Investigations:

- Special tests:
  - FAIR test:
  - Lasegue sign:
  - FABER test:
  - SLR test:

8.3 MASTER CHART

GROUP A (FACILITATED POSITIONAL RELEASE TECHNIQUE)

S.no	Age	Gender	Flexion(in degrees)		Extension (in degrees)		Abduction (in degrees)		Adduction (in degrees)		Internal rotation (in degrees)		External rotation (in degrees)	
			pre	post	Pre	Post	pre	post	pre	Post	pre	post	pre	post
A1	25	F	85	92	15	18	22	30	23	26	22	27	28	35
A2	28	F	93	100	18	20	24	32	20	25	23	28	30	36
A3	26	M	83	95	20	20	23	29	25	25	22	29	28	32
A4	31	M	80	93	17	19	20	28	21	22	19	26	29	36
A5	38	F	73	86	14	18	18	26	28	22	22	22	25	33
A6	35	M	95	105	20	20	28	35	24	26	20	29	21	38
A7	36	F	92	107	18	20	30	34	23	25	22	30	27	34
A8	29	M	75	88	16	19	17	25	20	23	18	25	23	30
A9	30	F	90	100	17	20	28	35	25	24	23	28	31	35
A10	28	M	80	92	16	19	20	32	21	24	20	28	29	32
A11	25	M	92	108	18	20	23	28	25	26	25	31	23	29
A12	40	F	85	95	17	20	20	31	24	24	22	30	30	35
A13	37	F	90	104	20	20	24	30	25	26	24	29	26	31
A14	36	F	100	110	20	20	28	34	25	22	25	30	30	35
A15	33	M	75	83	15	18	15	25	18	17	16	23	32	36
A16	23	M	72	80	16	20	18	28	15	20	23	21	19	25
A17	21	M	86	95	16	19	20	29	19	24	18	25	18	27
A18	32	F	92	105	20	20	25	29	22	25	24	26	24	28
A19	24	F	90	100	19	20	25	30	24	26	21	25	28	32
A20	29	M	88	96	15	17	16	25	20	22	18	25	27	30
A21	27	F	78	85	18	20	15	22	16	18	19	24	21	28
A22	35	F	87	95	20	19	15	25	21	22	17	22	25	30
A23	34	F	90	96	18	20	23	28	23	26	22	26	27	32
A24	37	M	92	98	15	20	22	30	20	24	25	28	20	26
A25	40	M	85	95	14	19	21	29	22	24	18	30	21	27

GROUP A (FACILITATED POSITIONAL RELEASE TECHNIQUE)

S.no	Age	Gender	NPRS		LEFS (%)	
			Pre	Post	Pre	Post
A1	25	F	7	4	55	64
A2	28	F	6	3	60	86
A3	26	M	8	5	33	59
A4	31	M	8	6	33	62
A5	38	F	7	4	55	80
A6	35	M	6	3	61	78
A7	36	F	7	3	51	81
A8	29	M	8	5	35	61
A9	30	F	8	4	55	60
A10	28	M	9	6	19	49
A11	25	M	7	4	41	79
A12	40	F	8	4	36	63
A13	37	F	6	3	55	69
A14	36	F	5	3	65	73
A15	33	M	9	4	33	60
A16	23	M	7	4	50	65
A17	21	M	9	4	36	58
A18	32	F	7	3	45	56
A19	24	F	7	3	53	64
A20	29	M	8	5	44	63
A21	27	F	8	6	44	61
A22	35	F	8	6	46	65
A23	34	F	7	5	51	65
A24	37	M	7	4	44	58
A25	40	M	8	5	40	50

GROUP B (FOAM ROLLING)

S.no	Age	Gender	Flexion(in degrees)		Extension (in degrees)		Abduction (in degrees)		Adduction (in degrees)		Internal rotation (in degrees)		External rotation (in degrees)	
			pre	post	Pre	Post	Pre	post	pre	Post	pre	post	pre	post
B1	23	F	86	110	15	19	22	43	26	30	21	43	31	44
B2	24	F	76	113	18	20	19	41	21	28	19	45	25	45
B3	35	F	78	109	18	20	24	43	19	27	20	44	22	43
B4	33	M	90	115	17	20	32	45	25	30	24	45	26	43
B5	21	M	88	104	16	18	30	42	22	29	20	42	22	41
B6	27	M	92	120	20	20	29	46	26	29	23	46	29	45
B7	38	M	85	115	18	20	20	45	23	30	24	45	25	44
B8	32	F	92	108	20	20	25	42	25	29	23	43	29	42
B9	23	F	75	115	17	18	24	43	19	20	18	44	20	42
B10	40	F	89	110	18	20	20	44	22	30	21	42	25	43
B11	27	M	83	105	18	20	23	40	20	29	23	43	26	43
B12	28	F	75	100	16	20	18	41	15	30	20	44	20	42
B13	22	M	79	109	17	19	16	41	18	28	20	40	21	41
B14	23	M	82	115	18	20	25	42	21	30	29	45	24	44
B15	33	M	85	120	18	20	29	44	23	30	22	45	23	45
B16	27	F	75	110	15	18	20	41	15	29	18	43	19	44
B17	22	M	91	120	20	20	25	45	22	30	25	42	22	45
B18	26	F	90	117	19	20	28	44	25	31	23	45	24	42
B19	32	F	92	120	20	20	27	45	24	30	25	42	23	45
B20	30	F	85	105	17	19	20	40	18	28	22	44	18	43
B21	35	F	78	110	15	18	18	42	15	28	19	43	20	43
B22	36	M	80	114	18	18	19	39	16	30	20	43	22	45
B23	24	F	85	112	20	20	18	44	20	28	21	40	21	43
B24	26	M	84	110	20	20	21	45	21	31	23	41	23	42
B25	28	F	92	120	20	20	27	45	23	30	24	40	31	45

GROUP B (FOAM ROLLING)

S.no	Age	Gender	NPRS		LEFS (%)	
			Pre	Post	Pre	Post
B1	23	F	7	2	41	96
B2	24	F	9	1	19	95
B3	35	F	7	2	50	94
B4	33	M	6	0	44	99
B5	21	M	8	2	36	98
B6	27	M	6	0	69	98
B7	38	M	8	2	41	91
B8	32	F	7	1	53	98
B9	23	F	9	1	20	96
B10	40	F	6	1	64	99
B11	27	M	7	2	50	98
B12	28	F	8	2	33	93
B13	22	M	7	1	50	95
B14	23	M	7	0	50	99
B15	33	M	8	0	41	95
B16	27	F	8	1	33	98
B17	22	M	6	0	61	99
B18	26	F	7	0	61	95
B19	32	F	8	0	40	96
B20	30	F	8	1	38	96
B21	35	F	8	1	47	98
B22	36	M	7	0	53	99
B23	24	F	8	1	35	91
B24	26	M	6	1	55	98
B25	28	F	5	0	53	99

8.4 TREATMENT PROTOCOL

GROUP	INTERVENTION	REPETITON	HOLD TIME	WORKS ON
A	Facilitated positional release technique	5	5 SECONDS	PIRIFORMIS
B	Foam rolling	5	30 SECONDS	PIRIFORMIS

8.5 ASSESSMENT TOOLS

- Universal Goniometer
- Lower extremity functional scale
- Numerical pain rating scale

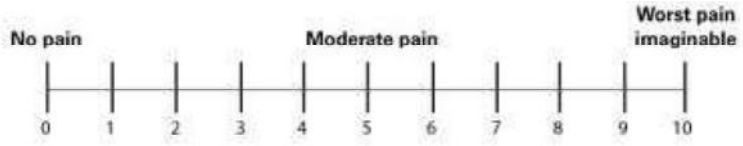


Figure 8.5.1: Numerical pain rating scale

Figure 8.5.2: Universal Goniometer

Annexure-1

Today, do you or would you have any difficulty at all with: Activities	Extreme difficulty or unable to perform activity	Quite a bit of difficulty	Moderate difficulty	A little bit of difficulty	No difficulty
1. Any of your usual work, housework or school activities.	0	1	2	3	4
2. Your usual hobbies, recreational or sporting activities.	0	1	2	3	4
3. Getting into or out of the bath.	0	1	2	3	4
4. Walking between rooms.	0	1	2	3	4
5. Putting on your shoes or socks.	0	1	2	3	4
6. Squatting.	0	1	2	3	4
7. Lifting an object, like a bag of groceries from the floor.	0	1	2	3	4
8. Performing light activities around your home.	0	1	2	3	4
9. Performing heavy activities around your home.	0	1	2	3	4
10. Getting into or out of a car.	0	1	2	3	4
11. Walking 2 blocks.	0	1	2	3	4
12. Walking a mile.	0	1	2	3	4
13. Going up or down 10 stairs (about 1 flight of stairs).	0	1	2	3	4

14. Standing for 1 hour.	0	1	2	3	4
15. Sitting for 1 hour.	0	1	2	3	4
16. Running on even ground.	0	1	2	3	4
17. Running on uneven ground.	0	1	2	3	4
18. Making sharp turns while running fast.	0	1	2	3	4
19. Hopping.	0	1	2	3	4
20. Rolling over in bed.	0	1	2	3	4
Column Totals:	0	1	2	3	4

ABSTRACT

FACILITATED POSITIONAL RELEASE TECHNIQUE VERSUS FOAM ROLLING IN PIRIFORMIS SYNDROME

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Background : Piriformis syndrome is the peripheral neuritis of the sciatic nerve caused by abnormal condition of piriformis muscle. It has seen that myofascial release techniques helps in reducing pain and improving the function of the muscles.

Purpose: Taking in the account the increasing number of piriformis syndrome whose precise treatment is still baffling, inspite of many researches and work done for it, an effective treatment is still inconclusive. So this study is planned to investigate the effect of Facilitated positional release technique and Foam rolling in piriformis syndrome.

Materials and methods: Fifty subjects (20-40 years) participated in the study. The parameters used to evaluate the study were pain (NPRS), range of motion (ROM) and functional disability (LEFS).Group A (n=25) was administrated with Facilitated positional release technique and Group B (n=25) was administrated with Foam rolling.

Results: The Mean (SD) age is 31.16±5.520 years for Group A and the Mean (SD) age is 28.60±5.485 years for Group B. There was significant difference between Group A and Group B for the reduction of Pain, improvement in hip range of motion (flexion, abduction, adduction, external rotation and internal rotation) and functional disability ($p<0.05$) but there was no significant difference between Group A and Group B for hip Extension in posttest($p>0.05$).

Conclusion: There was significant difference in the reduction of Pain, improvement in hip range of motion (flexion, abduction, adduction, external rotation and internal rotation) and functional disability but there was no significant difference between Group A and Group B for hip Extension between Group A and Group B.

Keywords: Facilitated positional release technique, foam rolling, piriformis syndrome.