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Research Article

TO COMPARE THE EFFECTIVNESS OF NEUROMUSCULAR ELECTRICAL STIMULATION COMBINED WITH CONVENTIONAL PHYSIOTHERAPY VERSES CONVENTIONAL PHYSIOTHERAPY ALONE IN POST ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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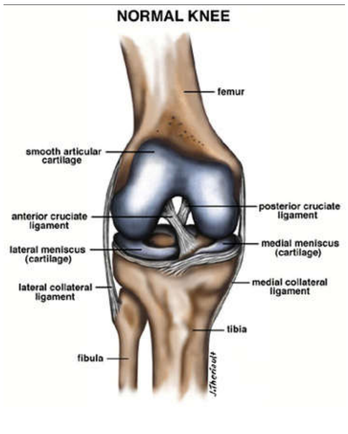
ABSTRACT

The purpose of the study is to compare the effectiveness of neuromuscularelectrical stimulation combined with conventional physiotherapy versus Conventional physiotherapy alone in post anterior cruciate ligament reconstruction.Randomised control trial was carried out among 60 patients at physiotherapy department of tertiary care hospital for duration of $1\frac{1}{2}$ years.60 patients were selected which were divided in two groups i.e. Group A: Experimental group and Group B: control group. Experimental group was containing 30 peoples and control group was containing 30 peoples. In experimental Group: Electrical muscle stimulation&Conventional rehabilitationprotocol which include 3 phases. In control group: The conventional physiotherapy protocol is divided into 3 phases and each phase includes various exercises.The Lower Extremity Functional Scale (LEFS), Numeric pain Rating scale (NPRS), Manual Muscle Testing (MMT) was used as outcome measure. The hypothesis was tested statistically with pre test and post test mean score. Significance of difference at 5% level of significance was tested with paired't' test. Unpaired't' test was used to test the significant difference after the post test of both the treatments.Paired t test results for the experimental group, concludes that, treatment Electrical muscle stimulation with Conventional physiotherapy was effective.Paired t test results for the control group concludes that treatment, with only conventional physiotherapy was also effective.Unpaired t test results conclude that treatment Electrical muscle stimulation with Conventional physiotherapy was significantly more effective than the use of only conventional physiotherapy was effective.

INTRODUCTION

The anterior cruciate ligament (ACL) is a band of dense connective tissue which courses from the femur to the tibia. The ACL is a key structure in the knee joint, as it resists anterior tibial translation and rotational loads.

Arises from the posteromedial corner of medial aspect of lateral femoral condyle in the intercondylarnotch.[1]This femoral attachment of ACL is on posterior part of medial surface of lateral condyle well posterior to longitudinal axis of the femoral shaft. The attachment is actually an interdigitation of collagen fibers& rigid bone thru transitional zone of fibrocartilage and mineralized fibrocartilage.[2]It runs inferiorly, medially and anteriorly.Inserted to Anterior to the intercondyloid eminence of the tibia, being blended with the anterior horn of the medial meniscus. The tibial attachment is in a fossa in front of and lateral to anterior spine, a rather wide area from 11 mm in width to 17 mm in AP direction.



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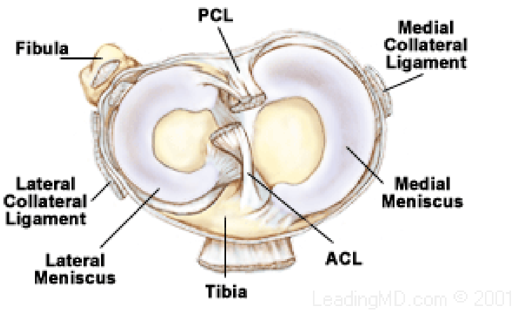

The femoral attachment is in the form of a segment of a circle, with its anterior border straight and its posterior border convex. Its long axis is tilted slightly forward from the vertical, and the posterior convexity is parallel to the posterior articular margin of the lateral femoral condyle.[3] From its femoral attachment, the ACL runs anteriorly, medially, and distally to the tibia. Its length ranges from 22 to 41 mm (mean, 32 mm) and its width from 7 to 12 mm.

The ACL is attached to a fossa in front of and lateral to the anterior tibial spine. At this attachment the ACL passes beneath the transverse meniscal ligament, and a few fascicles of the ACL may blend with the anterior attachment of the lateral meniscus. The tibial attachment of the ACL is somewhat wider and stronger than the femoral attachment. [3]

Acl tear

ACL tear is a relatively common sporting injury affecting the knee and is characterized by tearing of the Anterior Cruciate Ligament (ACL), an important stabilizing structure of the knee. A ligament is a strong band of connective tissue which attaches bone to bone. The ACL is situated within the knee joint and is responsible for joining the back of the distal femur (lower aspect of the thigh bone just above the knee joint) to the front of the proximal tibia (upper aspect of the shin bone just below the knee joint) (figure 1).

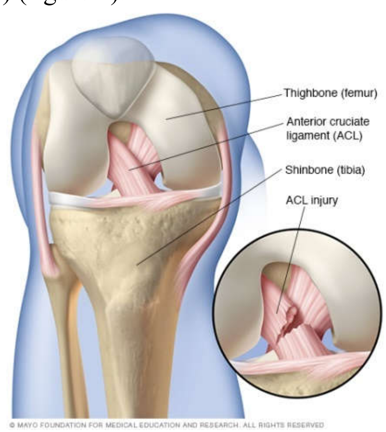

Figure 1 – The Knee and ACL (rear view)

The ACL is one of the most important ligaments of the knee, giving it stability. The ACL achieves this role by preventing excessive twisting, straightening of the knee (hyperextension) and forward movement of the tibia on the femur. When these movements are excessive and beyond what the ACL can withstand, tearing to the ACL occurs. This condition is known as an ACL tear and may range from a small partial tear resulting in minimal pain, to a complete rupture of the ACL resulting in significant pain and disability, requiring comprehensive rehabilitation and potentially surgery.

An ACL injury is classified as a grade I, II, or III sprain.[4]

Grade I Sprain

- The fibres of the ligament are stretched, but there is no tear.
- There is a little tenderness and swelling.
- The knee does not feel unstable or give out during activity.
- No increased laxity and there is a firm end feel.

Grade II Sprain

- The fibres of the ligament are partially torn or incomplete tear with haemorrhage.
- There is a little tenderness and moderate swelling with some loss of function.
- The joint may feel unstable or give out during activity.
- Increased anterior translation yet there is still a firm end point.
- Painful and pain increase with Lachman's and anterior drawer stress tests.

Grade III Sprain

- The fibres of the ligament are completely torn (ruptured); the ligament itself is torn completely into two parts.
- There is tenderness, but limited pain, especially when compared to the seriousness of the injury.
- There may be a little swelling or a lot of swelling.
- The ligament cannot control knee movements. The knee feels unstable or gives out at certain times.
- There is also rotational instability as indicated by a positive pivot shift test.
- No end point is evident.
- Haemarthrosis occurs within 1-2 hours.

Causes

Anterior cruciate ligament (ACL) injuries are caused when theknee is straightened beyond its normal limits (hyperextended), twisted, or bent side to side.

Typical situations that can lead to ACL injuries include:

- Changing direction quickly or cutting around an obstacle or another player with one foot solidly planted on the ground. (This can happen in sports that put high demand on the ACL, such as basketball, football, soccer, skiing, and gymnastics.)
- Landing after a jump with a sudden slowing down, especially if the leg is straight or slightly bent (such as in basketball).
- Falling off a ladder, stepping off a curb, jumping from a moderate or extreme height, stepping into a hole, or missing a step when walking down a staircase. Injuries like these tend to be caused by stopping suddenly, with the leg straight or slightly bent.

Mechanisms of Injury / Pathological Process

Three major types of ACL injuries are described:[5]

- Direct Contact: 30% of the cases [6,7]
- Indirect Contact

- Non-Contact: 70% of the cases: by doing a wrong movement [6,7]
- Smaller size and different shape of the intercondylar notch. A narrow intercondylar notch and a plateau environment are risk factors of predisposing female non-athletes with knee OA to ACL injury aged 41-65 years. [8]
- Wider pelvis and greater Q angle. A wider pelvis requires the femur to have a greater angle towards the knee, lesser muscle strength provides less knee support, and hormonal variations may alter the laxity of ligaments[9,10]
- Greater ligament laxity. Young athletes with nonmodifiable risk factors like ligament laxity are at a particularly increased risk of recurrent injury following ACL reconstruction (ACLR). [11]
- Shoe surface interface. The pooled data from the three studies suggest that the chances of injury are approximately 2.5 times higher when higher levels of rotational traction are present at the shoe-surfaceinterface. [12]
- Neuromuscular factors

Risk factors for ACL injuries include environmental factors (e.g. high level of friction between shoes and the playing surface) and anatomical factors (e.g. narrow femoral intercondylar notch).

Biomechanics of Injury

As 60-80% of ACL injuries occur in non-contact situations, it seems likely that appropriate prevention efforts are warranted. Cutting or sidestep manoeuvres are associated with dramatic increases in the varus-valgus and internal rotation moments. The ACL is placed at greater risk with both varus and internal rotation moments. The typical ACL injury occurs with the knee externally rotated and in 10-30° of flexion when the knee is placed in a valgus position as the athlete takes off from the planted foot and internally rotates with the aim of suddenly changing direction (as shown by the figure below)[13,14]The ground reaction force falls medial to the knee joint during a cutting maneuver and this added force may tax an already tensioned ACL and lead to failure.

Similarly, in landing injuries, the knee is close to full extension. High-speed activities such as cutting or landing maneuvers require eccentric muscle action of the quadriceps to resist further flexion. It may be hypothesized that vigorous eccentric quadriceps muscle action may play a role in disruption of the ACL. Although this normally would be insufficient to tear the ACL, it may be that the addition of valgus knee position and/or rotation could trigger an ACL rupture[15]

Clinical Presentation[16,17,18]

- A feeling of initial instability
- trick knee and predictable instability
- extremely painful
- Swelling of the knee, usually immediate and extensive, but can be minimal
- Restricted movement
- an inability to fully extend the knee
- Possible widespread mild tenderness
- Tenderness at the medial side

Methods of management

Surgical management[19,20,21]

Anterior cruciate ligament (ACL) injuries involves reconstructing or repairing the ACL. ACL surgery is usually done by making small incisions in the knee and inserting instruments for surgery through these incisions (arthroscopic surgery). In some cases, it is done by cutting a large incision in the knee (open surgery).

Conventional management

Phase I: (1–14 days)

Exercises

- Continuous Passive Motion (CPM) machine – 2 hour sessions, 3 times a day at slow, comfortable speed. Start at 50° of flexion, and increase 10° per day up to 90°.
- ROM exercises

Extension – no active terminal extension from 40° to 0°

- Passive extension –
- Heel props –
- Prone hangs –

Flexion – limit to 90°

- Passive flexion –
- Wall slides –
- Heel slides – .
- Quadriceps sets in full extension
- Straight leg raises in brace locked in extension
- Hamstring sets
- Patella mobilization
- Isometric hip abduction, adduction
- Ankle ROM and gastosoleus strengthening with tubin g/therabands

Phase II: (Weeks 3–6)

Exercises

- Continue as above, maintaining full extension and progressing to 125°
- No active terminal extension from 40° to 0°
- Begin closed kinetic chain exercises Stationary bicycling, stairmaster: slow, progressing to low resistance
- Hamstring curls
- Hip abduction, adduction, extension
- At 4to 6 weeks, ¼ partial squats, use table for support

Phase III: (Week 6–12)

Exercises

- Stationary bicycling, stairmaster, elliptical: increases resistance
- Treadmill walking
- Balance and proprioceptive training
- Closed chain quad strengthening: no knee flexion greater than 90°with leg press

Electrical muscle stimulation (EMS), also known as neuromuscular electrical stimulation (NMES) or electromyostimulation, is the elicitation of muscle contraction using electric impulses. EMS has received an increasing amount of attention in the last few years for many reasons: it can be utilized as a strength training tool for healthy subjects and athletes; it could be used as a rehabilitation and preventive tool for partially or totally immobilized patients; it could be utilized as a testing tool for evaluating the neural and/or muscular function in vivo; it could be used as a post-exercise recovery tool for athletes.[22] The impulses are generated by a device and are delivered through electrodes on the skin near to the muscles being stimulated. The electrodes are generally pads that adhere to the skin. The impulses mimic the action potential that comes from the central nervous system, causing the muscles to contract. The use of EMS has been cited by sports scientists[23] as a complementary technique for sports training, EMS is used for rehabilitation purposes, for instance in physical therapy in the prevention of disuse muscle atrophy which can occur for example after musculoskeletal injuries, such as damage to bones, joints, muscles, ligaments and tendons.

Strength training by NMES does promote neural and muscular adaptations that are complementary to the well-known effects of voluntary resistance training" the following uses:

1. Relaxation of muscle spasms;
2. Prevention or retardation of disuse atrophy;
3. Increasing local blood circulation;
4. Muscle re-education;
5. Immediate post-surgical stimulation of calf muscles to prevent venous thrombosis;
6. Maintaining or increasing range of motion.

METHODOLOGY

Randomised control trial was carried out among 60 patients at physiotherapy department of tertiary care hospital for duration of $1\frac{1}{2}$ years. 60 patients were selected which were divided in two groups i.e. Group A: Experimental group and Group B: control group. Experimental group was containing 30 peoples and control group was containing 30 peoples. In experimental Group: Electrical muscle stimulation &Conventional rehabilitation, Neuromuscular electrical stimulation with surged faradic current to Quadriceps muscle once a day in 2 sets and each set lasts for 90 contractions

1. Conventional rehabilitation protocol which include 3 phases:

Phase I: (1–14 days)

Exercises

- Continuous Passive Motion (CPM) machine – 2 hour sessions, 3 times a day at slow, comfortable speed. Start at 50° of flexion, and increase 10° per day up to 90°.
- ROM exercises

Extension – no active terminal extension from 40° to 0°

- Passive extension –
- Heel props –
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Flexion – limit to 90°

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- Hamstring sets
- Patella mobilization
- Isometric hip abduction, adduction
- Ankle ROM and gastosoleus strengthening with tubin g/therabands

Phase II: (Weeks 3–6)

Exercises

- Continue as above, maintaining full extension and progressing to 125°
- No active terminal extension from 40° to 0°
- Begin closed kinetic chain exercises Stationary bicycling, stairmaster: slow, progressing to low resistance
- Hamstring curls
- Hip abduction, adduction, extension
- At 4to 6 weeks, ¼ partial squats, use table for support

Phase III: (Week 6–12)

Exercises

- Stationary bicycling, stairmaster, elliptical: increases resistance
- Treadmill walking
- Balance and proprioceptive training
- Closed chain quad strengthening: no knee flexion greater than 90°with leg press protocol which include 3 phases. In control group: The conventional physiotherapy protocol is divided into 3 phases and each phase includes various exercises.

In control group: The conventional physiotherapy protocol is divided into 3 phases and each phase includes various exerciseswhich as follows :

Phase I: (1–14 days)

Exercises

- Continuous Passive Motion (CPM) machine – 2 hour sessions, 3 times a day at slow, comfortable speed. Start at 50° of flexion, and increase 10° per day up to 90°.
- ROM exercises

Extension – no active terminal extension from 40° to 0°

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- At 4to 6 weeks, ¼ partial squats, use table for support

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Exercises

- Stationary bicycling, stairmaster, elliptical: increases resistance
- Treadmill walking
- Balance and proprioceptive training
- Closed chain quad strengthening: no knee flexion greater than 90°with leg press

The patients of both groups underwent 12 weeks rehabilitation protocol on daily basis and assessed with specific scale at 8 to 12 weeks interval.[3]

Data Analysis

This section deals with percentage wise distribution of subjects according to their demographic variables. Purposive sample of 60 subjects were drawn from the study population.

The data were collected to describe the sample characteristics with demographic variables like age and gender.

The sample was divided in to two groups, one experimental group of 30 subjects given Electrical muscle stimulation with Conventional physiotherapy treatment. Other control group of 30 subjects treated with only conventional physiotherapy protocol.

The hypothesis was tested statistically with pre test and post test mean score. Significance of difference at 5% level of significance was tested with paired't' test.

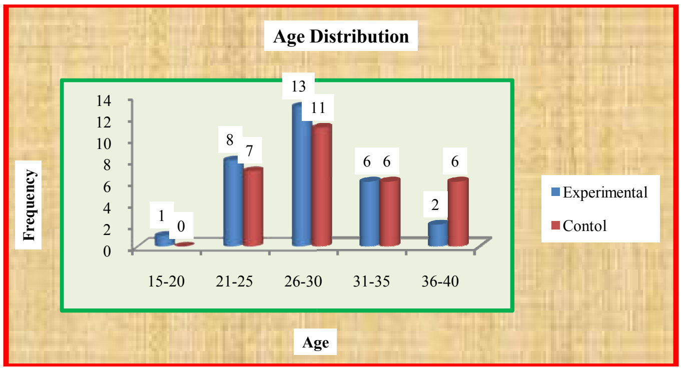
Unpaired't' test was used to test the significant difference after the post test of both the treatments.

TABLES & RESULTS

Table 1 Frequency and percentage wise distribution of subjects according to Age

Variable	Groups	Experimental		Control	
		Frequency	Percentage	Frequency	Percentage
Age	15-20	1	3.33	0	0.00
	21-25	8	26.67	7	23.33
	26-30	13	43.33	11	36.67
	31-35	6	20.00	6	20.00
	36-40	2	6.67	6	20.00

Above table and following figure depicts that, In case of experimental group most of them 43.33% were between 26-30 years of age group, 26.67% between 21-25 years, 20% belonged to 31-35 age group and 6.67% between 36-40 age group and remaining 3.33% in age group 15-20 years. In case of control group most of them 36.67% were between 26-30 years of age group, 23.33% between 21-25 years, 20% belonged to 31-35 and 36-40 age groups.

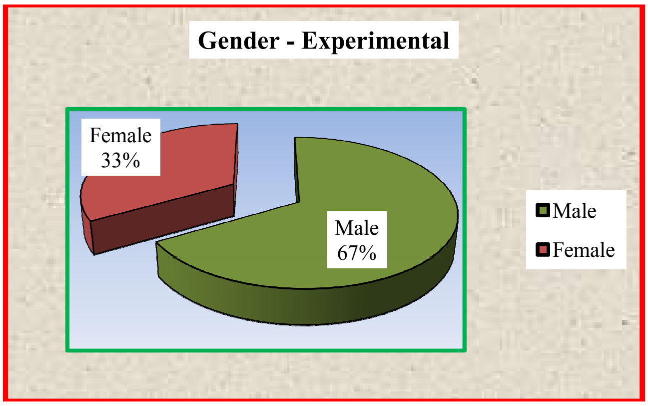


Graph 1 Distribution of subjects according to age (yrs)

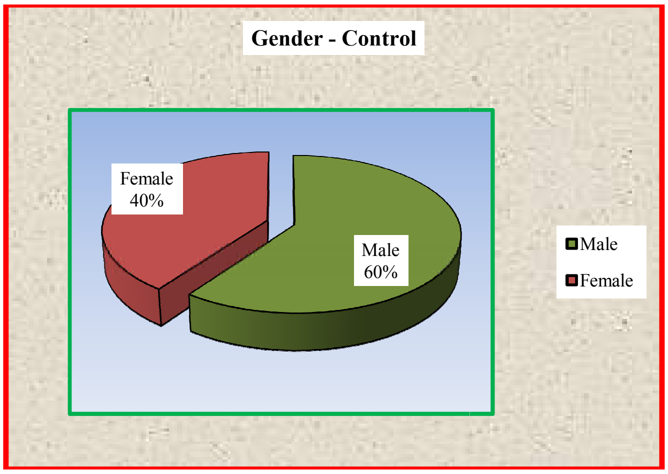
Table 2 Frequency and percentage wise distribution of subjects according to the gender

Variable	Groups	Experimental		Control	
		Frequency	Percentage	Frequency	Percentage
Sex	Male	20	66.67	18	60.00
	Female	10	33.33	12	40.00

Above table and following figure depicts that in case of experimental group most of them 66.67% were male and remaining 33.33% were female. In case of control group also most of them 60.00% were male and remaining 40.00% were female.



Graph 2 A Distribution of subjects according to Gender (Experimental Group)



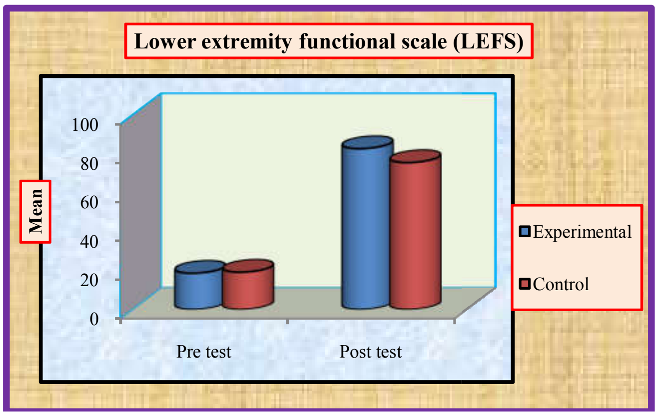
Graph 2 B Distribution of subjects according to Gender (Control Group)

Table 3 Comparison of Pre and post test average with Lower extremity functional scale (LEFS)

Lower extremity functional scale (LEFS)		Experimental	Control
Pre test	**Mean**	18.63	19.17
Post test		82.58	75.42

The average pre test score with the Lower extremity functional scale (LEFS) in case of experimental group was 18.63 and in case of post testwas 82.58.

The average pre test score with the Lower extremity functional scale (LEFS) in case of control group was 19.17 and in case of post testwas 75.42.



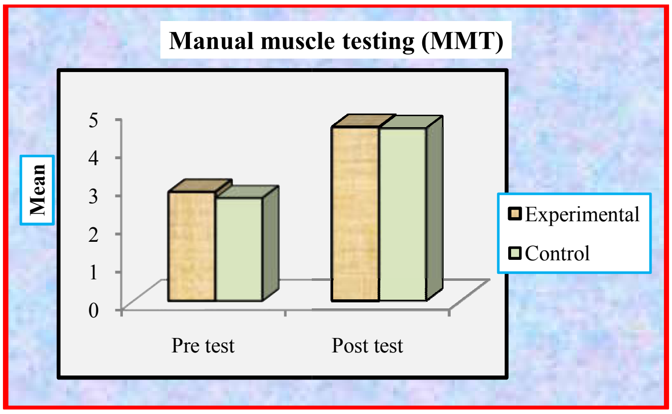
Graph 3 Comparison of Pre test and Post test scores with LEFS

Table 4 Comparison of Pre and post test average with Manual muscle testing (MMT)

Manual muscle testing (MMT)		Experimental	Control
Pre test	Mean	2.86	2.70
Post test		4.56	4.53

The average pre test score with the Manual muscle testing (MMT) in case of experimental group was 2.86 and in case of post test was 4.56.

The average pre test score with the Manual muscle testing (MMT) in case of control group was 2.70 and in case of post test was 4.53.



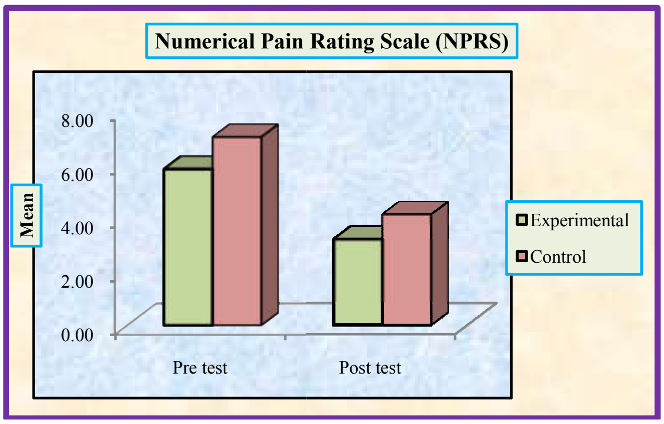
Graph 4 Comparison of Pre test and Post test scores with MMT

Table 5 Comparison of Pre and post test average with Numerical Pain Rating Scale (NPRS)

Numerical Pain Rating Scale (NPRS)		Experimental	Control
Pre test	**Mean**	5.83	7.03
Post test		3.20	4.13

The average pre test score with the Numerical Pain Rating Scale (NPRS) in case of experimental group was 5.83 and in case of post test was 3.20.

The average pre test score with the Numerical Pain Rating Scale (NPRS) in case of control group was 7.03 and in case of post test was 4.13.



Graph 5 Comparison of Pre test and Post test scores with NPRS

Table 6 Comparison of Pre test and Post test scores in Experimental Group (Paired 't' test)

Lower Extremity Functional Scale (LEFS)	N	Mean	S.D.	t value	p value
Pre test	30	18.63	5.83	45.34	0.00
Post test	30	82.58	8.23		
Manual Muscle Testing (MMT)	N	Mean	S.D.	t value	p value
Pre test	30	2.86	0.73	15.62	0.00
Post test	30	4.56	0.56		
Numerical Pain Rating Scale(NPRS)	N	Mean	S.D.	t value	p value
Pre test	30	5.83	1.14	7.00	0.00
Post test	30	3.20	1.37		

- With Lower Extremity Functional Scale (LEFS), p value less than 0.05 shows that there was significant difference in the pre test and post test scores, in experimental group.
- P value less than 0.05 shows that there was significant difference in the in the pre test and post test scores, in experimental groups with Manual Muscle Testing (MMT) and numerical Pain Rating Scale(NPRS)
- Concludes that treatment, Electrical muscle stimulation with Conventional physiotherapy was effective.

Table 7 Comparison of Pre test and Post test scores in Control Group (Paired 't' test)

Lower Extremity Functional Scale (LEFS)	N	Mean	S.D.	t value	p value
Pre test	30	19.17	8.59	43.34	0.00
Post test	30	75.42	10.69		
Manual Muscle Testing (MMT)	**N**	**Mean**	**S.D.**	**t value**	**p value**
Pre test	30	2.70	0.59	18.92	0.00
Post test	30	4.53	0.50		
Numerical Pain Rating Scale(NPRS)	**N**	**Mean**	**S.D.**	**t value**	**p value**
Pre test	30	7.03	1.06	11.16	0.00
Post test	30	4.13	1.01		

- With Lower Extremity Functional Scale (LEFS), p value less than 0.05 shows that there was significant difference in the pre test and post test scores, in control group.
- P value less than 0.05 shows that there was significant difference in the in the pre test and post test scores, in experimental groups with Manual Muscle Testing (MMT) and numerical Pain Rating Scale(NPRS)
- Concludes that treatment, with only conventional physiotherapy was effective.

Table 8 Comparison of the post test scores in Experimental Vs Control Group (Unpaired t test)

Lower Extremity Functional Scale (LEFS)	N	Mean	S.D.	t value	p value
Experimental	30	82.58	8.23	2.91	0.01
Control	30	75.40	10.70		
Manual Muscle Testing (MMT)	**N**	**Mean**	**S.D.**	**t value**	**p value**
Experimental	30	4.56	0.56	0.24	0.81
Control	30	4.53	0.50		
Numerical Pain Rating Scale (NPRS)	**N**	**Mean**	**S.D.**	**t value**	**p value**
Experimental	30	3.20	1.37	3.00	0.00
Control	30	4.13	1.01		

- With Lower Extremity Functional Scale (LEFS), p value less than 0.05 shows that there was significant difference in the post test scores, of experimental and control groups.
- With Manual Muscle Testing (MMT), p value more than 0.05 shows that there was no significant difference in the post test scores, of experimental and control groups.
- P value less than 0.05 shows that there was significant difference in the in the post test scores, of experimental and control groups with numerical Pain Rating Scale (NPRS).

DISCUSSION

In this study, sample of 60 subjects were drawn from the study population. The data were collected to describe the sample characteristics with demographic variables like age and gender. The sample was divided in to two groups, one experimental group of 30 subjects given Electrical muscle stimulation with Conventional physiotherapy treatment. Other control group of 30 subjects treated with only conventional physiotherapy protocol.

In case of experimental group most of them 43.33% were between 26-30 years of age group, 26.67% between 21-25 years, 20% belonged to 31-35 age group and 6.67% between 36-40 age group and remaining 3.33% in age group 15-20 years with 66.67% were male and remaining 33.33% were female. In case of control group most of them 36.67% were between 26-30 years of age group, 23.33% between 21-25 years, 20% belonged to 31-35 and 36-40 age groups with 60.00% were male and remaining 40.00% were female.

The Numeric Pain Rating Scale (NPRS) is a segmented numeric version of the visual analog scale (VAS) in which a respondent selects a whole number (0–10 integers) that best reflects the intensity of his/her pain. It is a unidimensional measure of pain intensity in adults, including those with chronic pain. High test–retest reliability has been observed in both literate and illiterate patients (r = 0.96 and 0.95) For construct validity, the NPRS was shown to be highly correlated with the VAS correlations range from 0.86 to 0.95.

Manual muscle testing (MMT) is a method of using the strength and response of a muscle to test function in the body. MMT (Medical Research Council score) Score ranges between 0-5, minimum 0, maximum 5/5. (r = 0.78)

The Lower Extremity Functional Scale (LEFS) is a questionnaire containing 20 questions about a person's ability to perform everyday tasks. The LEFS can be used by clinicians as a measure of patients' initial function, ongoing progress and outcome, as well as to set functional goals.TheLEFSreliability was 0.94 can be used to evaluate the functional impairment of a patient with a disorder of one or both lower extremities. It can be used to monitor the patient over time and to evaluate the effectiveness of an intervention.

The average pre test score with the Numerical Pain Rating Scale (NPRS) in case of experimental group was 5.83 and in case of post testwas 3.20 & in case of control group was 7.03 and in case of post test was 4.13.

The average pre test score with the Manual muscle testing (MMT) in case of experimental group was 2.86 and in case of post test was 4.56 & in case of control group was 2.70 and in case of post test was 4.53.

The average pre test score with the Lower extremity functional scale (LEFS) in case of experimental group was 18.63 and in case of post testwas 82.58 & in case of control group was 19.17 and in case of post test was 75.42.

Comparison of Pre test and Post test scores in Experimental Group & control group with Lower Extremity Functional Scale (LEFS), p value less than 0.05 shows that there was significant difference.

Inter group comparison with Lower Extremity Functional Scale (LEFS), p value less than 0.05 shows that there was significant difference in the post test scores, of experimental and control groups and with Manual Muscle Testing (MMT), p value more than 0.05 shows that there was no significant difference in the post test scores, of experimental and control groups.

P value less than 0.05 shows that there was significant difference in the in the post test scores, of experimental and control groups with numerical Pain Rating Scale (NPRS).

The statistical analysis shows insignificant result for all scales ($p<0.05$) except one result for LEFS. The electrical stimulation(NMES/SDIDC) in conjunction with conventional rehab protocol shows no significant difference. Though Eriksson *et al* (1979), Delitto *et al* (1988) studied and found that electrical stimulation prevent the muscle atropy after major knee ligament surgery. They concluded that neuromuscular electrical stimulation helped to improve torque generating capability of the quadriceps femoris after operation on the knee ligaments but the fact is those finding were qualified by isokinetic apparatus not by the functional parameters. The present study had some limitation that must be considered. The sample size considered for the study was small so generalizations are difficult. It would be of interest to evaluate the effectiveness of regular applicaton of NMES to investigate weather an application of NMES has a beneficial effect.

CONCLUSION

- Paired t test results for the experimental group, concludes that, treatment Electrical muscle stimulation with Conventional physiotherapy was effective.
- Paired t test results for the control group concludes that treatment, with only conventional physiotherapy was also effective.
- Unpaired t test results conclude that treatment Electrical muscle stimulation with Conventional physiotherapy was significantly more effective than the use of only conventional physiotherapy was effective.

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