IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

COMPARISON OF MUSCLE ENERGY TECHNIQUE VERSUS DYNAMIC SOFT TISSUE MOBILIZATION FOR IMPROVING HAMSTRING FLEXIBILITY IN KABADDI PLAYERS

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ABSTRACT

BACKGROUND AND OBJECTIVES: Hamstring flexibility is always given a greater concern while looking for athlete's overall physical fitness as hamstring injuries are common and have a significant impact on the performance of an athlete. The hamstring muscles are important contributors to the control of human movement and are involved in a wide range of activities from running and jumping. To compare the effectiveness of muscle energy technique versus dynamic soft tissue mobilization for improving hamstring flexibility in kabaddi players.

METHODS: Randomized control trial. In this study, 70 subjects out of 100 were screened between the age group of above 18 years and were randomly allocated into two groups. Each group containing 35 subjects. Group-A received muscle energy technique and Group-B received dynamic soft tissue mobilization. Participants received 5 session per week for 4 weeks. The outcome measures of this intervention were measured active knee extension by using goniometer.

RESULTS: Independent t-test was used to compare the mean significance difference between continuous variables. Paired t-test was used to assess the statistical difference between pre-test and post-test scores p value of (0.001). Statistical analysis of the data revealed that within the group comparison, both groups showed significant improvement in all parameters. Whereas, in between the group's comparison muscle energy technique group showed better improvement.

CONCLUSION: After four weeks of training both the groups showed significant improvement. Group-A who received muscle energy technique showed better and effective results. However, muscle energy technique is more effective in improving hamstring flexibility than dynamic soft tissue mobilization in subjects.

KEY WORDS: muscle energy technique, dynamic soft tissue mobilization, active knee extension test, hamstring flexibility, Collegiate kabaddi players

INTRODUCTION

The Kabaddi is a traditional game played with minor variations in all regions of India - in fact, in most parts of Asia. It's an old backyard and in-house game. Both attackers and defenders in kabaddi need to possess extraordinary physical endurance, agility, individual proficiency, neuromuscular coordination, lung capacity, fast reflexes, intellect, and presence of mind. Two teams of seven players each compete in this contact team sport. The objective of the game is for a single player on offence, referred to as "raider", to run into opposing team's half of a court, tag out as many of their defenders as possible, and to return to their own half of a court, all without being tackled by the defenders, and in a single breath.[1]

Most Kabaddi players (57.89%) give up the game due to knee ailments, with amateur players giving up more frequently.[2] Kabaddi players might get hurt during practice as well as during matches. Stress-related injuries account for four percent or more of injuries suffered by athletes. Several factors, including overloads, mishaps, and poor technique, can result in these injuries.[3]

Knee injury is the most common type of injury sustained by both "Raiders" and "Stoppers/Defenders".

A Raider must make abrupt twisting and turning motions in order to break free from the stoppers. The thirty-second raid time constraint puts pressure on raiders to get to their home court within the allocated time and to hold them there until a stoppage is made. Knee injuries are particularly common at this phase because of the rapid reflexive motions that are required. The knee joint is one of the most commonly injured joints in Kabaddi.[4]

It draws attention to the substantial morbidity that is connected to knee injuries in Kabaddi. Flexibility of the hamstring muscles is crucial in avoiding knee injury[5]. The hamstring muscles are important contributors to the control of human movement and are involved in a wide range of activities from running and jumping to forward bending during sitting or standing and a range of postural control actions.[6] Hamstring muscle strains are the most common muscle injuries in athletes.[7]Throughout the game, the participants (defenders and raiders) often adopt a semi-flexed knee stance. When a player sees another player, they must respond by either completely extending their knee to contact the defender or twisting and turning their knee to change direction and aid in their own escape from the raider or defender.

This posture is also known as an active waiting stance. The extensor mechanism of the knee is affected and patella is located higher than normal in patients with severe HS, which may be a cause for knee discomfort.[8]The hamstring muscle is important in this situation, and straining it might increase the risk of injury. When assessing an athlete's total physical fitness, hamstring flexibility is always given more consideration because hamstring injuries are frequent and have a big influence on an athlete's performance. The hamstring muscles play a major role in the regulation of human mobility and are used for a variety of exercises, including jumping and running.[9]

Tightness in the hamstring muscles affects nearly everyone in the globe. One of the main causes of hamstring muscle injuries is a lack of flexibility.[10]A frequent athletic ailment that has a propensity to repeat is hamstring strains. It has been proposed that hamstring strains are predisposed to by a lack of flexibility. Flexibility training is widely regarded by clinicians as a crucial element in the prevention and recovery of injuries, in addition to being a means of enhancing athletic performance. As medical professionals, we frequently advise athletes to follow stretching regimens in the hopes that increased flexibility may at least temporarily improve their performance.

Hamstring flexibility is always given a greater concern while looking for athlete's overall Physical fitness as hamstring injuries is common

and have a significant impact on the performance of an athlete.[11] Before engaging in sports, it is common to recommend stretching and warm-up exercises that promote flexibility and enhance range of motion in the joints.[12] Numerous stretching exercises have been documented in the literature as a means of preserving or regaining muscular flexibility and preventing a reduction in range of motion (ROM), which may hinder an individual's ability to perform functional tasks. In Ballistic stretching, dynamic stretching, active stretching, passive stretching, static stretching, proprioceptive neuromuscular facilitation stretching, active release technique, muscle-energy technique, and dynamic soft tissue mobilization technique are some of the techniques used to improve hamstring flexibility.

Muscle energy technique (MET) is a manual technique developed by osteopaths and is now used in many different manual therapy professions. One such approach which targets the soft tissues primarily (although it makes a major contribution towards joint mobilization) has been termed as muscle energy technique and this is also known as active muscular relaxation technique. It is claimed to be effective for a variety of purposes including lengthening a shortened muscle, as a lymphatic or venous pump to aid the drainage of

fluid or blood and increasing the range of motion.[13]

The isometric contraction causes lengthening of viscoelastic and plastic changes in myofascial connective tissue. The post-isometric relaxation can principally be a biomechanical event; i.e.; combination of plastic change and viscoelastic creep in series and parallel connective tissue elements of the muscle.[14] Muscle energy technique has been explored as a treatment focusing on increasing extensibility of soft tissues.[15] Certain series of studies are validating the use of Muscle energy technique by observing the effects on different segments and directions of trunk motion, and hamstring extensibility.

During autogenic inhibition, the Golgi Tendon Organ (GTO) response plays an important role in flexibility.[16]The strong muscle contraction against equal counterforce triggers the Golgi tendon organ. The Golgi Tendon Organ inhibits the agonist muscles contraction and allows the antagonist muscle to contract more readily, thus the muscle can be stretched further an easier.,[17]

Dynamic soft tissue mobilization was developed with the aim of increasing muscle length. It utilizes a combined technique of classic massage followed by a dynamic component, where the limb is moved through its range. Determining a specific area of tightness, where the treatment is concentrated, proceeds the dynamic component. In addition, the Dynamic soft tissue mobilization model has standardized massage parameters for the most time effective clinical use.[18]

Significant increase in hamstring length could be achieved by identifying a specific area of hamstring tightness and targeting treatment to this specific area within 8-minute time frame, in a single treatment by Dynamic soft tissue mobilization.[19]

The effectiveness of massage on resting muscle flexibility has not been extensively researched. However, several studies investigated use of massage as treatment of delayed onset of muscles soreness. [20]The dynamic deep muscle tissue technique consists of series of progression from traditional to dynamic techniques which concentrated on one specific area of muscle tightness. [21] Clinical experiences suggest that dynamic deep muscle tissue model is an efficient pain free intervention that appears to have an immediate effect on improving hamstring flexibility.[22]

Several studies done on muscle energy technique and dynamic soft tissue mobilization on improving hamstring flexibility in sports athletes. But there is no study comparing the effect of dynamic soft tissue mobilization and muscle energy technique to improve hamstring flexibility in kabaddi players. Hence our study aims to see the effect of muscle energy technique vs dynamic soft tissue mobilization to improve hamstring flexibility in kabaddi players.

NEED OF THE STUDY

Flexibility is important not only for successful physical performance but also in prevention of injuries. In many situations a muscle is forced to stretch beyond its normal active limits. If the muscle does not have enough elasticity to compensate for this additional stretch the Musculo-tendonous units may be injured. The physical therapist has used many different therapeutic methods to maintain and increase joint range of motion by altering the extensibility of Musculo-tendonous units that produce movement in a joint and to prevent from injuries.

There have been studies done to check effectiveness of various stretching procedure to increase hamstring flexibility. Most studies have proved the effectiveness of individual stretching technique. Among these techniques muscle energy technique and dynamic soft tissue mobilization, has been proved to produce a very significant improvement in increasing hamstring flexibility.

There are limited studies done pertaining to the comparative effectiveness between muscle energy technique and Dynamic soft tissue mobilization technique and hence the need of study arises to check for the superior form of technique in a treatment of hamstring flexibility.

MATERIALS AND METHODS

STUDY DESIGN: This study is a randomized control trial design

ETHICAL CLEARANCE and INFORMED CONSENT: The study design and intervention were approved by the Ethical Committee of GSL Medical College and Hospitals, Rajamahendravaram (Annexure - I). The participants were explained by the investigator about the purpose of the study and information sheet was given to them. The subjects were requested to provide their

consent for participation in study (Annexure - II). All participants signed the informed consent and the rights of the included participants have been secured.

STUDY POPULATION: Collegiate kabaddi players who were willing to participate in the study were70 subjects within the age above of 18 years.

STUDY SETTING: The study was conducted in the sports arena of GSL Medical college, Rajamahendravaram, Andhra Pradesh, India.

STUDY DURATION: The Study was conducted during a period of one year.

INTERVENTION DURATION: Both the groups received intervention of 5 sessions per week for 4 weeks.

SAMPLING METHOD: Simple Random Sampling method

SAMPLE SIZE: A total 100 students were screened for eligibility; out of which 70 collegiate kabaddi players were recruited and were explained about the process and relevance of the study. Those willing to be voluntarily included in the study received informed consent and were asked to sign the forms. All the participants were consecutively randomized to either muscle energy technique (MET) group or dynamic soft tissue mobilization (DSTM) group with 35 subjects in each group. The participants were given numbers 1 and 2. All those who received number 1 were included in group A who received muscle energy technique and all the participants who got the number 2 were allocated to group B who underwent dynamic soft tissue mobilization.

GROUP A – Muscle Energy Technique (35 Subjects)

GROUP B – Dynamic Soft Tissue Mobilization (35 Subjects)

MATERIALS USED

- Yoga Mat
- Universal Goniometer
- Couch

CRITERIA FOR SAMPLE SELECTION

INCLUSION CRITERIA:

- Subjects with Aged above 18 years of age.
- Gender- Male.
- Subjects with Tight hamstring (Inability to achieve greater than 160° of knee extension with hip at 90° of flexion).

EXCLUSION CRITERIA:

- Subjects with Acute or chronic low back pain.
- Subjects with Acute or chronic hamstring injury.
- Subjects with Visible acute swelling in the region of hamstring muscle.
- Subjects with lower extremities surgeries.

OUTCOME MEASURES

ACTIVE KNEE EXTENSION TEST:

- A universal double arm goniometer was used to assess the active knee extension of the subjects at baseline and at the end of four weeks of intervention.

FIG 1: UNIVERSAL GONIOMETER

- Each subject was positioned in left side lying on examination table for bony landmark identification. The lateral femoral condyle, head of fibula and lateral malleolus of the right leg were marked to ensure that the same reference points were used for repeated measurements.
- Once the landmarks were identified, subjects were instructed to lie in supine position. The subject flexed right hip to 90^0 and grasps behind the right knee to stabilize hip at 90^0. A goniometer was then used to position right knee at 90^0. A stationary arm along lateral femur and movable arm aligned with lateral fibula keeping lateral femoral condyle as axis. Patient actively extended the right knee as much as possible without moving the thigh from vertical position. Active knee ROM was measured by goniometer. This procedure was used for flexibility measures in all the groups.

FIG 2: THERAPIST MEASURING ACTIVE KNEE EXTENSION

INTERVENTION

GROUP A

MUSCLE ENERGY TECHNIQUE

Subjects in the Group A would receive the muscle energy technique

Subjects in the Group A would receive the muscle energy technique subjects was taken in supine lying position.

Therapist knelt on the mat and placed the subject's heel against shoulder; the opposite extremity had been stabilized in extension by therapist's knee.

The subject's knee had been extended to the position up to barrier pointed and moderate (approximately 75% of maximal) isometric contraction of the hamstring muscle would elicited for a period of 5 to 8 seconds.

After a period of three seconds of relaxation, the technique would repeat three times (for a total of four contractions) for 5 consecutive days[23]

FIG 3: PERFORMING MUSCLE ENERGY TECHNIQUE

FIG 4: PERFORMING MUSCLE ENERGY TECHNIQUE

GROUP B
DYNAMIC SOFT TISSUE MOBILIZATION

Subjects in the Group B would receive the dynamic soft tissue mobilization

CLASSIC SOFT TISSUE MOBILIZATION
All subjects were positioned with hip and knee in neutral relaxed position. Each subject received a massaged based on traditional Swedish technique on hamstring muscle group. The specific technique included effleurage kneading. Picking up and shaking. The total massaged counted of 5 stroked of each of these techniques and was completed in 5 minutes.

DYNAMIC SOFT TISSUE MOBILISATION
Before dynamic intervention subjects received some classic massaged technique with same tissue frame of 5 minutes. The dynamic intervention would divide into hierarchical progression which involved assessment and identification of specific area of hamstrings tightness, the application of reassessment after each technique. To asses hamstrings muscle group subjects remained in prone position and deep longitudinal stroked was applied to the earlier muscle group.
Once specific area of tightness would locate remaining treatment was limited to target area
To execute dynamic intervention subjects would move into supine with hip and knee flexed in 90 degrees. In this position all dynamic techniques worked hamstrings muscle length from 3 quarters to end range of motioned. Deep longitudinal stokes was applied to proximal directions in the area of hamstring tightness when the leg would passively move to hamstrings lengthened positions.
Five stroked was applied and 20 seconds of shaking would perform at the completion of these technique. The specific area of hamstring tightness would not reduce the treatment was stopped. The same sequence had been implemented for the most dynamic technique. During this technique the subject required to actively extended their leg in ordered to achieve reciprocal inhibition of hamstrings. In the final technique the subject required to worked the hamstring muscle group eccentrically by creating tension in the therapist handed as muscle would elongate to end range of motioned. During this movement therapist performed 5 distal to proximal longitudinal stroked over the hamstring area of muscle tightness[18]

FIG 5: THERAPIST PALPATING THE TIGHTNESS IN HAMSTRING MUSCLE

FIG: 6 THERAPIST PERFORMING DYNAMIC SOFT TISSUE MOBILIZATION

STATISTICAL ANALYSIS

Statistical analysis was performed by using SPSS software version 21.0 and MS excel – 2007. Descriptive data was presented as mean +/- standard deviations and percentages.

Data was tabulated and graphically represented and was analyzed using both descriptive and inferential statistics.

Within the groups: Paired 't-test' was used to compare the levels of pre and post test scores (non-parametric or parametric accordingly). It was used to assess the statistical difference within the groups for Active Knee Extension Test using Universal Goniometer.

Between the groups: Unpaired 't-test' was used to compare the statistical difference between means of two independent group for Active Knee Extension Test using Universal Goniometer.

For all statistical analysis, $p \leq 0.05$ was considered as statistically significant.

RESULTS

The aim of the study was to find the effectiveness of muscle energy technique and dynamic soft tissue mobilization on improvement of hamstring flexibility in collegiate kabaddi players.

A total of 100 subjects were screened for eligibility, among them 70 subjects were found to meet the inclusion criteria. All the subjects underwent baseline assessment and included subjects were randomized into two groups consisting of 35 players in each group.

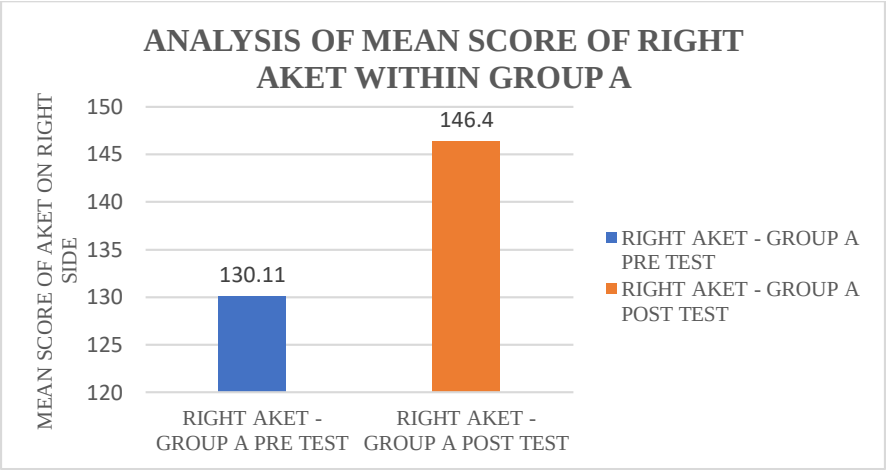
In this study the training sessions were given for 4 weeks,70 participants completed sessions; with 35 subjects completed muscle energy technique sessions in group-A and 35 subjects completed dynamic soft tissue mobilization in group-B.

Both the groups showed statistically significant scores in the active knee extension test using goniometer, where p-value was set at $p \leq 0.005$ was significant.

ANALYSIS OF MEAN SCORE OF RIGHT AKET WITH IN GROUP A

GROUP A		Mean	SD	P VALUE	INFERENCES
AKET	PRE - TEST	130.11	3.03	0.001	HIGHLY SIGNIFICANT
	POST- TEST	146.4	4.55		

TABLE – 1



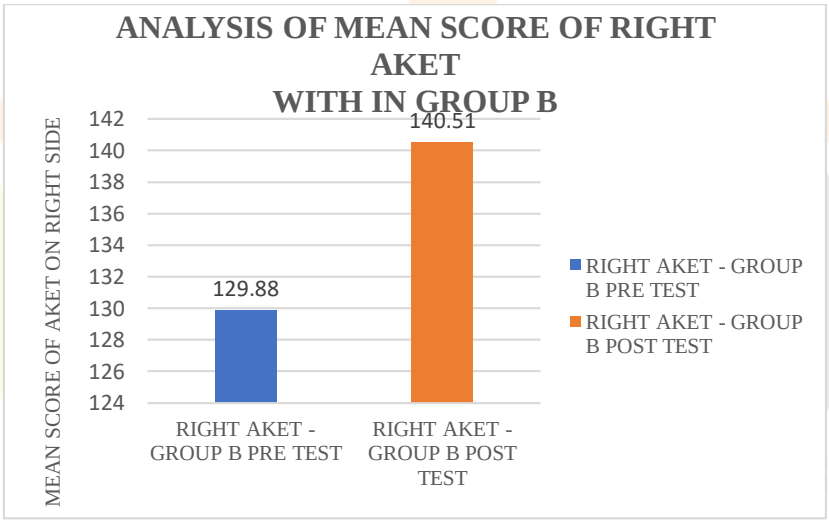
GRAPH - 1

RESULTS: The above table and graph show that mean score of right active knee extension test from pre-test to post-test values within group A were found to be statistically highly significant ($p<0.05$).

ANALYSIS MEAN OF MEAN SCORE OF RIGHT AKET WITH IN GROUP B

GROUP B		Mean	SD	P VALUE	INFERENCES
AKET	PRE- TEST	129.88	3.027	0.001	HIGHLY SIGNIFICAT
	POST- TEST	140.51	3.75		

TABLE – 2



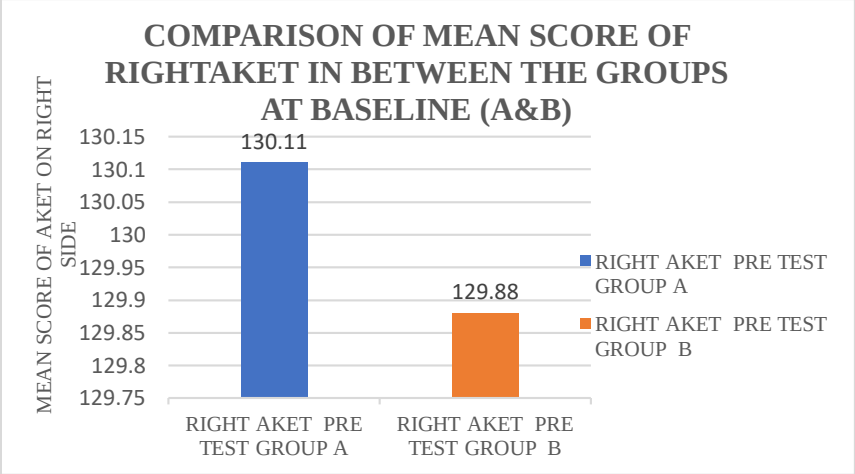
GRAPH – 2

RESULTS: The above table and graph show that mean score of active knee extension test from pre-test to post-test values within group B were found to be statistically highly significant ($p<0.05$).

COMPARISON OF MEAN SCORE OF RIGHT AKET IN BETWEEN THE GROUPS AT BASELINE (A&B)

RIGHT AKET		Mean	SD	P VALUE	INFERENCES
PRE- TEST	GROUP A	130.11	3.03	0.7534	INSIGNIFICANT
	GROUP B	129.88	3.027		

TABLE – 3



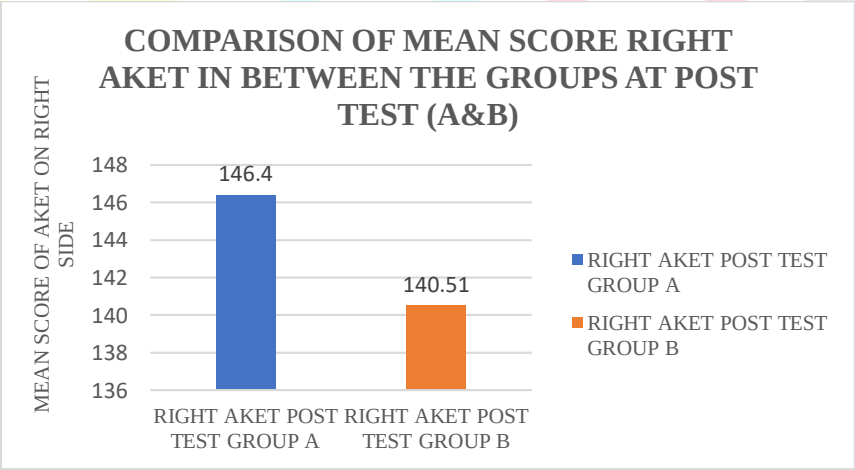
GRAPH - 3

RESULTS: The above table and graph show that mean score of right aket in between the groups at baseline (a&b) were found to be statistically insignificant.

COMPARISON OF MEAN SCORE OF RIGHT AKET IN BETWEEN THE GROUPS AT POST TEST (A&B)

RIGHT AKET		Mean	SD	P VALUE	INFERENCES
POST- TEST	GROUP A	146.4	4.55	0.001	SIGNIFICANT
	GROUP B	140.51	3.75		

TABLE – 4



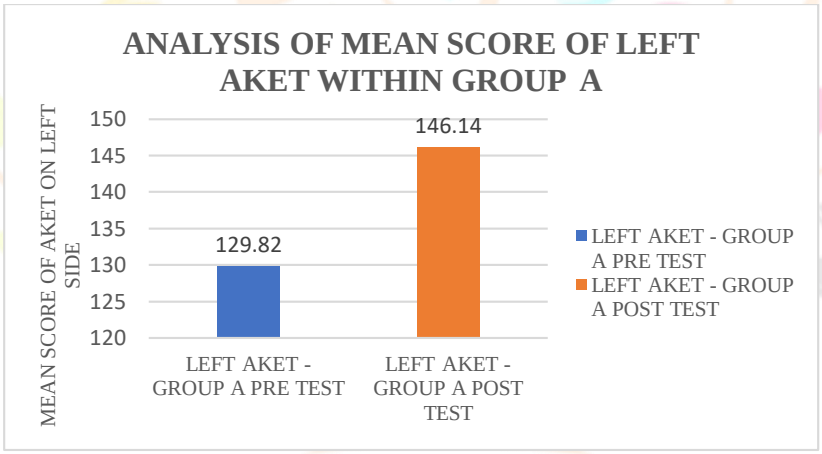
GRAPH - 4

RESULTS: The above table and graph show that mean score of right aket in between the groups at post test (a&b) were found to be statistically significant.

ANALYSIS OF MEAN SCORE OF LEFT AKET WITHIN GROUP A

GROUP A		Mean	SD	P VALUE	INFERENCES
AKET	PRE -TEST	129.8286	2.994954	0.001	HIGHLY SIGNIFICANT
	POST-TEST	146.1429	4.551295		

TABLE – 5



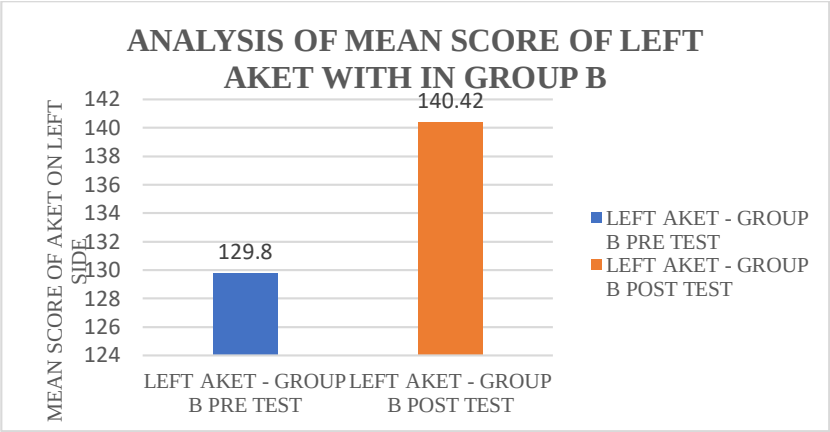
GRAPH - 5

RESULTS: The above table and graph show that mean score of left active knee extension test from pre-test to post-test values within group A were found to be statistically highly significant ($p<0.05$).

ANALYSIS OF MEAN SCORE OF LEFT AKET WITHIN GROUP B

GROUP B		Mean	SD	P VALUE	NFERENCES
AKET	RE – TEST	129.8	2.96	0.001	IGNIFICANT
	OST-TEST	140.42	3.806		

TABLE – 6



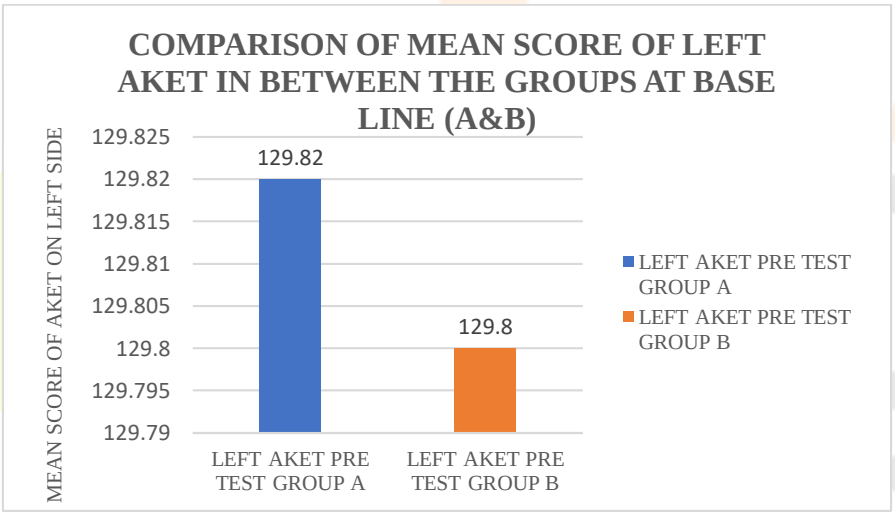
GRAPH - 6

RESULTS: The above table and graph show that mean score of left active knee extension test from pre-test to post-test values within group B were found to be statistically highly significant ($p<0.05$).

COMPARISON OF MEAN SCORE OF LEFT AKET IN BETWEEN THE BASE LINE (A&B)

LEFT AKET		Mean	SD	P VALUE	INFERENCES
PRE TEST	GROUP A	129.82	2.99	0.9681	INSIGNIFICANT
	GROUP B	129.8	2.96		

TABLE – 7



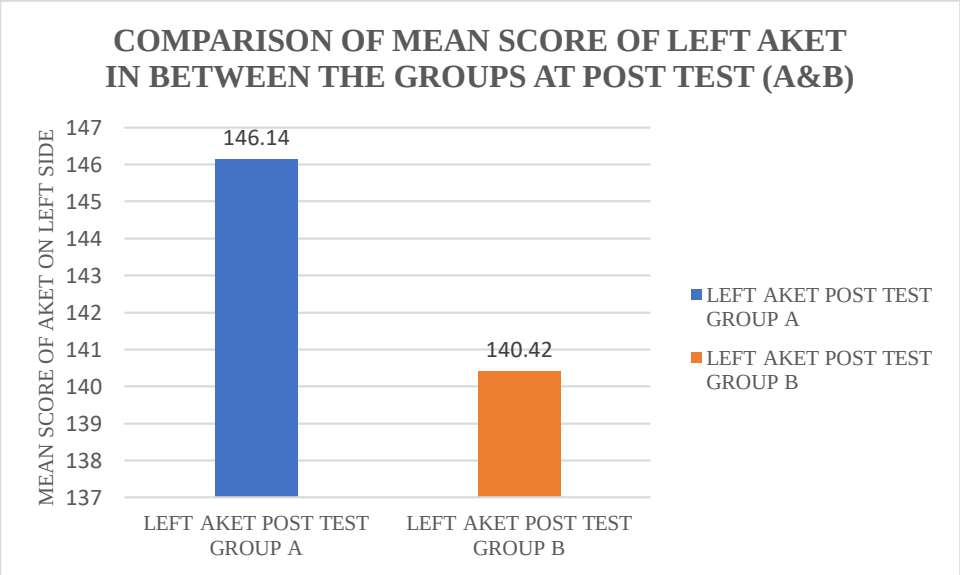
GRAPH - 7

RESULTS: The above table and graph show that mean score of left aket in between the groups at baseline (a&b) were found to be statistically insignificant.

COMPARISON OF MEAN SCORE OF LEFT AKET IN BETWEEN THE POST TEST (A&B)

LEFT AKET		Mean	SD	P VALUE	INFERENCES
POST TEST	GROUP A	146.14	4.55	0.001	SIGNIFICANT
	GROUP B	140.42	3.806		

TABLE – 8



GRAPH - 8

RESULTS: The above table and graph show that mean score of left aket in between the groups at post test (a&b) were found to be statistically significant

DISCUSSION

The main purpose of this study was to evaluate the effectiveness of muscle energy technique and dynamic soft tissue mobilization on improvement of hamstring flexibility in kabaddi players. In this study, subjects were assessed for hamstring flexibility using the outcome measures active knee extension test by using goniometer. seventy subjects were divided into two groups and group-A (n=35) received muscle energy technique and group-B (n=35) received Dynamic soft tissue mobilization, who underwent four -week program for five sessions per week. Assessment was done before and after four weeks program.

By the end of the four weeks program, the subjects of Group – A who received Muscle energy technique had significantly improved results which showed changes in outcome measures active knee extension test mean score (p = 0.0001). Group – B who received Dynamic soft tissue mobilization also showed significant results in active knee extension test score (p = 0.0001)

The results of the study implied that there is a statistically significant improvement in both Muscle energy technique program and Dynamic soft tissue mobilization program to effectively bring changes in outcome measure, active knee extension test in kabaddi players.

This study hypothesized around the concept that muscle energy technique will be more effective in improving hamstring flexibility than dynamic soft tissue mobilization. The study is supported by F Ballantyne et al, A significant increase in range of motion was observed at the knee 0.019) following a single application of MET to the experimental group. No change was observed in the control group. When an identical torque was applied to the hamstring both before and after the MET, no significant difference in range of motion of the knee was found in the experimental group[25]

Furthermore, the improvement in results of Group A is supported by the study done by Waseem M et al concluded that MET significantly improves hamstring flexibility in collegiate males.[24] MET increased muscle length by a combination of creep and plastic changes in connective tissue. It occurred due to biomechanical or neuro-physiological changes or due to an increase in tolerance to stretching[25].

Neuro-physiological and biomechanical mechanism may underlie changes to both ROM and muscle stiffness following the application of MET [26].

The neurophysiological component is explained by inhibition of motor activity of muscle exposed to stretch; the object of stretching is therefore to minimize muscle activity to reduce resistance to stretching. Meena K et al concluded that post isometric relaxation improves hamstring flexibility. post isometric relaxation helps in lengthening of tight hamstring by its contraction and relaxation method. post isometric relaxation causes reduction in tone experienced by muscle or a group of muscles, after brief periods during which an isometric contraction has been performed.[27]

RCT done by More et al. on posterior shoulder tightness in basketball players found immediate effect of Muscle energy technique. There was improvement in shoulder internal rotation and horizontal adduction ROM[28].

The isometric contraction causes lengthening of viscoelastic and plastic changes in myofascial connective tissue. The post-isometric relaxation can principally be a biomechanical event; i.e.; combination of plastic change and viscoelastic creep in series and parallel connective tissue elements of the muscle.[29] MET has been explored as a treatment focusing on increasing extensibility of soft tissues. Certain series of studies are validating the use of MET by observing the effects on different segments and directions of trunk motion and hamstring extensibility. During autogenic inhibition, the Golgi Tendon Organ (GTO) response plays an important role in flexibility.[30]

The strong muscle contraction against equal counterforce triggers the Golgi tendon organ. The GTO inhibits the agonist muscles contraction and allows the antagonist muscle to contract more readily, thus the muscle can be stretched further and easier.

This study demonstrated that a significant increase in hamstring extensibility (measured as ROM at the knee following AKE) occurred following MET (when stretched to the point of discomfort), but did not occur in the group B. The data suggests that no viscoelastic changes occurred as a result of a single application of MET. If a significant increase in joint angle was observed at the initial pre-test load (Torque) following the MET, a change in tissue property could be the only logical explanation. This was not the case as no significant change in range of motion at the knee occurred in the experimental group when the same initial load was applied.

A greater torque (Torque 2) was tolerated in the experimental group before discomfort occurred , supporting the theory that increased flexibility was a result of an increased tolerance to stretch.

Norris et al 1999, pointed out that the tightness and weakness together in muscle imbalance alters alignment of body segment. These alignment alterations cause weight bearing stresses on joint surfaces, and also results in further contraction of already shortened tissues. This imbalance reduces segmental control with chain reactions of compensation [31]. The Muscle Energy Technique has already shown significant change ($p<0.002$) in agility on a study conducted by Kiran Anil Mende et al on female cricket players, which is also in Favor of this study.

The mean scores and pre – test and post – test values showed that both Muscle energy technique and Dynamic soft tissue mobilization programs were beneficial in improving hamstring flexibility

LIMITATIONS OF THE STUDY

- The finding of the study are only applicable for college going kabaddi players
- Small sample size
- No Blinding

RECOMMENDATIONS FOR FUTURE RESEARCH

- To increase sample size.
- The treatment sessions per week can be increased to get better results.
- Can be implemented to professional Kabaddi players in future.
- A follow-up after 4 weeks could be useful to determine the improvement of flexibility in college going kabaddi players.

CONCLUSION

The present study concluded that 4 weeks program of muscle energy technique and dynamic soft tissue mobilization were shown to be

statistically significant in improving hamstring flexibility in kabaddi players. However, muscle energy technique has shown better results than dynamic soft tissue mobilization.

ACKNOWLEDGEMENT

I am grateful to Dr. Ganni BhaskaraRao, Chief Patron, G.S.L Educational Institutions, Rajamahendravaram, for his valuable support and help in permitting me to take the Subjects from G.S.L Medical College and General Hospital. I take this pleasant and unique opportunity to express my deep sense of gratitude and offer my most sincere and humble thanks to my teacher and my Guide, P. CHATHURVEDI, MPT (SPORTS), I also sincerely thanks to my faculty for their valuable suggestions and constant look to bring out this work Dr. Patchava Appa Rao MPT (Orthopaedics), Ph.D., MBA and Statistician Mr. CH. Ganapathi Swamy for their encouraging me and leading me through this gratifying task.

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