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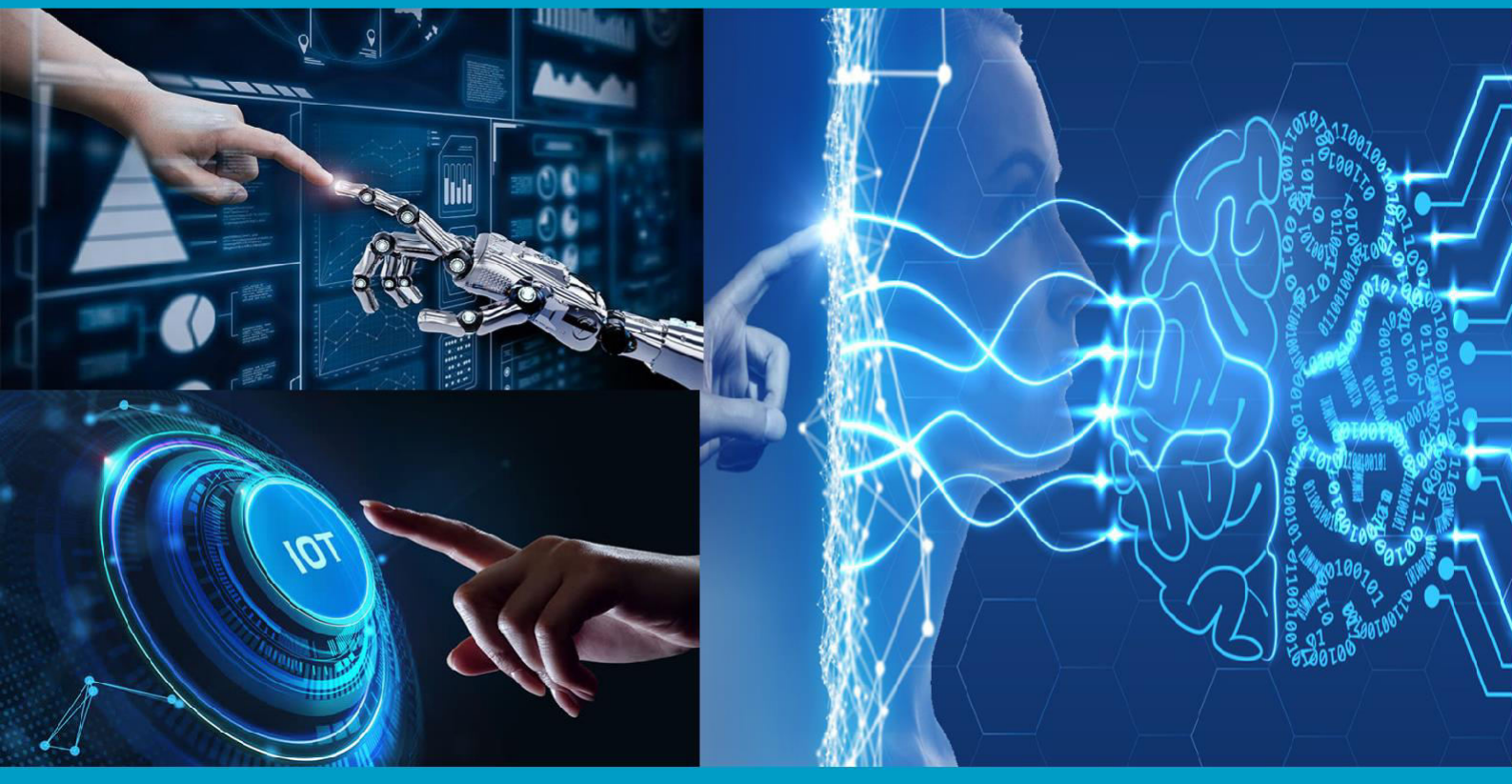

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Effect of Concentric Muscle Energy Technique on Hamstring Muscle Length in Asymptomatic Normal Individuals: A Pilot Study

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ABSTRACT: OBJECTIVES:Hamstring muscle flexibility is assessed and improved because it is a large muscle of the body used for many functional activities.The muscle energy technique (MET), according to them MET protocols differ in the number of repetitions, strength of contraction, duration of stretch phase, and duration of relaxation phase. So to observe and compare this study is done to find out effectiveness of concentric muscle energy technique for hamstring flexibility with less energy expenditure in simplified way.

METHOD: 30 subjects who were meeting the criteria of inclusion are taken and randomly checked for active knee extension test. The study has 3 weeks of protocol. Outcome measure in form of active knee extension test is performed before and after applying concentric muscle energy technique with 5 repetition and 3-5 seconds of hold.

RESULT: There was statistical significant improvement shown by mann-whiteny U test with 0.000 p value. This p value shows effectiveness of concentric muscle energy technique in positive way. It shows standard deviation of 6.48. That means after applying concentric MET, active knee extension test shows a higher value of knee extension due to increased flexibility.CONCLUSION: According to the result, this study shows that 3 weeks of intervention of isotonic concentric Muscle energy technique has positive effect on hamstring length by assessing it with Active knee extension test.

KEYWORDS: Concentric muscle energy technique, Hamstring flexibility, Active knee extension test

I. INTRODUCTION

Muscle energy technique is defined as a form of soft-tissue treatment, in which the patient's muscles are actively used, from a precisely controlled position, in a specific direction and against a distinctly executed therapist applied counterforce.[1]Muscle energy technique is a manual technique developed by osteopaths that is now used in manydifferent manual therapy professions. Such approach which targets the soft tissues primarily andprimarily known as MET. It is claimed to be effective for a variety of purposes includinglengthening of shortened muscle, as a lymphatic or venous pump to aid the drainage of fluid orblood and increase the range of motion of a restricted joint.[1,2]

Muscle Energy Techniques (MET) can help to release and relax muscles, and promote the body's own healing mechanisms.MET is unique in its application as the client provides the initial effort while the practitioner facilitates the process. The primary force originates from the contraction of soft tissue, which is then utilized to assist and correct the presentingmusculoskeletal dysfunction.[2,3]

Hamstring is the major muscle of the lower extremity which plays a great role in human movements like walking, running, jumping etc. Flexibility of hamstring muscle is required not only for high intensity exercise but also required for the normal biomechanical function of the body.[3]Hamstring tightness, the inability to stretch the muscle through in full range of amplitude. This is a prime mover and stabilizer of body that contains muscle spindle, as its functional unit and golgi tendon organs plays important in determining the length and function of muscular components.[3,4]

Hamstrings (Biceps femoris , Semi tendinosis, semimembranosis) are the long and powerful group of muscles that span the back of the thigh. Tightness of this muscle cause sport related injuries, lumbar spine disorder and general low back pain.[4]To improve the hamstring flexibility stretching has been used for many years. The concept of muscle energy

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technique is a part of manual therapy as this technique targets soft tissues of the human body. Muscle energy technique includes various methods, which improves hamstring muscle flexibility and maintains the muscle tone.[5]

There is observation of concentric MET technique in which there is isotonic muscle contraction. Isotonic concentric contraction is observed to check the hamstring flexibility. The basic mechanism concentric contraction causes muscle to be shortened and indicated to tone muscle structures

III. MATERIALS AND METHODOLOGY

This randomized control trial was conducted at the Parul Institute of Physiotherapy. Healthy male and female's age bracket 18-30 years who had tight hamstring muscles were included in this study whereas any pathology in hamstring muscle wereexcluded. A total of 30 asymptomatic individuals were randomly selected through lottery method; Groupswas applied concentric muscle energy technique onhamstring length. A writen informed consent was taken from all subjects.Concentric Muscle Energy Technique was applied, patient was in supine position then targeted muscle (hamstring) was allowed to contract with some resistance. The patient's force was greater than therapists' force which patient increased slowly not suddenly. Five repetitions were applied with 3-4 seconds hold.After applying this technique active knee extension test was checked to see the change in muscle length.

SOURCE OF DATA: Paruluniversity

METHOD OF COLLECTION OF DATA:

Study design: a experimental study

Sampling method: based on odd & even method

Study duration: 6 months

Data collection duration : 3 weeks

Sample size: Calculated based on formula

INCLUSION CRITERIA:

Subject willing to participate

Asymptomatic young individuals of age group of 18 to 30

Tight hamstring muscle (ability to extend the knee 120 to 160 degree)

EXCLUSION CRITERIA:

Individuals with severe hamstring muscle pain on contraction

Individuals which are very pain sensitive or frail

Individuals who have gone through any of the lower limb or lower back

surgery or injury

Individuals who are having any neuromuscular or musculoskeletal problem

OUTCOME MEASURES:

Active knee extension test

STATISTICS

Statistical analysis was done by the use of stata/MP 14.1 version. Paired sample Z-test (large sample test) for difference of mean is used to find significant in different para meters pre and post within the group

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RESULT

ACTIVE KNEE EXTENSION TEST

Table – 1: Descriptive Statistics

	N(Sample Size)	Minimum	Maximum	Mean	Std. Deviation
AKET PRE	30	120	145	132.33	7.457
AKET POST	30	130	160	145.93	8.412

Conclusion: In pre measure minimum value was 120, maximum value 145 and mean value for AKET was 132.33 with SD 7.457 which is increased in the post measure to 145.93 with SD 8.412.

Table – 2: Distribution of Students according to their Age Group in the group of Active Knee Extension Test.

AGE GROUP	No. of Participants	%
17 to 18	5	16.7
19 to 20	16	53.3
21 to 23	9	30.0
Total	30	100.0

Diagram – 1:

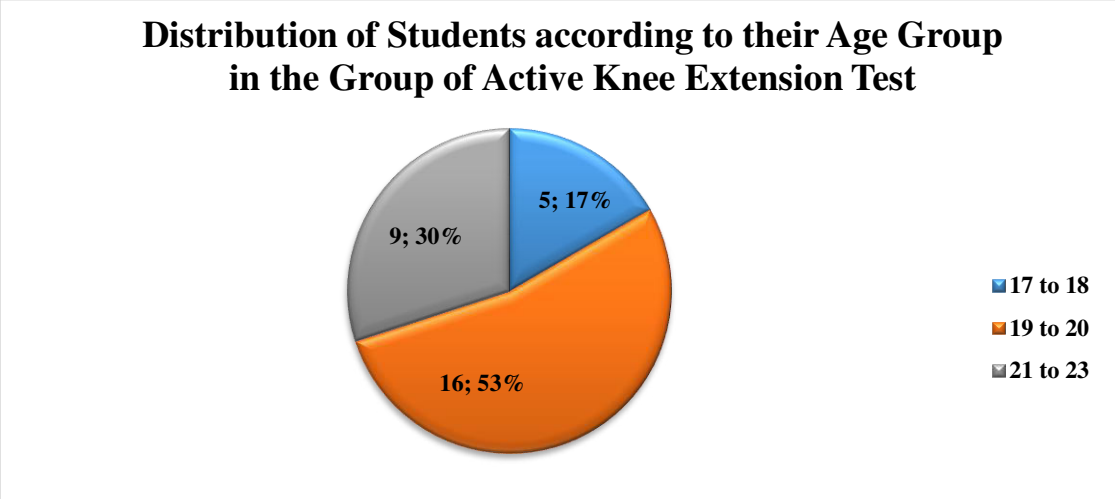

Table – 3: AKET PRE Measure wise Distribution of Students in the group of Active Knee Extension Test

AKET PRE	No. of Participants	%
120 to 125	6	20.0
126 to 130	9	30.0
131 to 135	6	20.0
136 to 140	2	6.7
141 to 145	7	23.3
Total	30	100.0

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Diagram – 2:

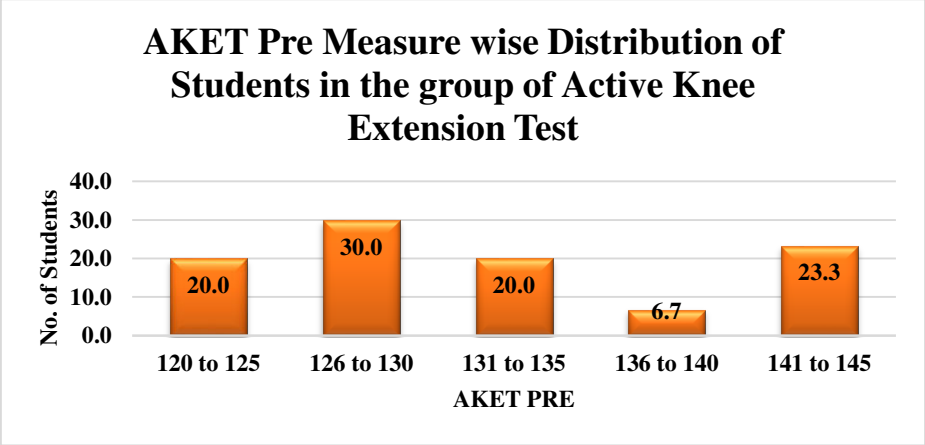
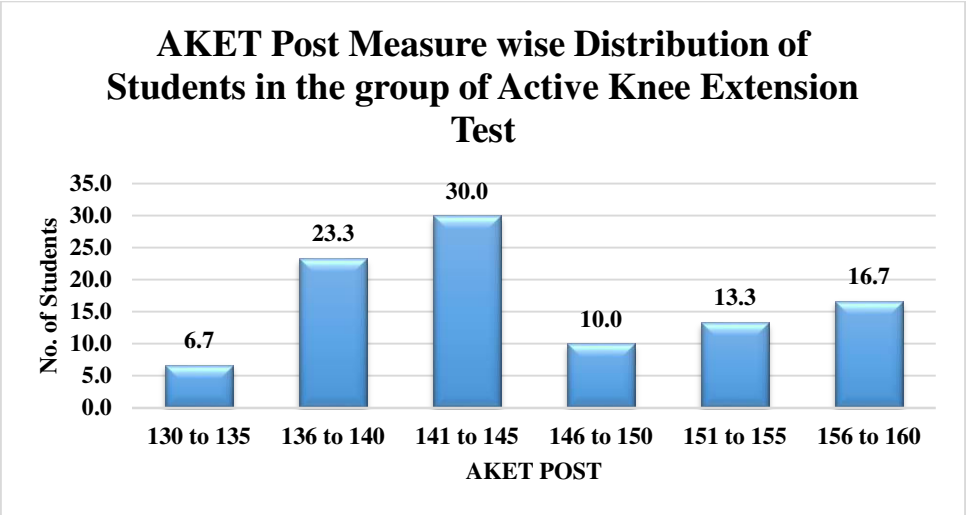


Table – 4: AKET Post Measure wise Distribution of Students in the group of Active Knee Extension Test

AKET POST GROUP	No. of Students	%
130 to 135	2	6.7
136 to 140	7	23.3
141 to 145	9	30.0
146 to 150	3	10.0
151 to 155	4	13.3
156 to 160	5	16.7
Total	30	100.0

Diagram – 3:



Parametric test (Paired Sample test):

Table – 5: Z – test to compare AKET pre and AKET post measures in the group of Active Knee Extension Test.

AKET PRE - AKET POST	Difference of means	Z - Value	p - value
	-13.6	-6.6264	0.000

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Conclusion: Mean difference for AKET pre measure and AKET post measure was -13.6. Test statistic Z value was -6.6264 with p – value 0.000 (Highly Significant), which is less than 0.05 (level of significance) i.e., mean of AKET post measure was significantly increase as compared to mean AKET pre measure. We can conclude that after applying Active knee extension test AKET was significantly increased.

Non – Parametric test (Paired Sample test):

Table – 6: Wilcoxon Signed Ranks Test to compare AKET pre and AKET post measures in the group of Active Knee Extension Test.

AKET POST - AKET PRE	N	Mean Rank	Sum of Ranks	Z - Value	p - Value
Negative Ranks	0	0.00	0.00	-4.785	0.000
Positive Ranks	30	15.50	465.00		
Ties	0				
Total	30				

Conclusion: Rank for the difference of AKET post measure and AKET pre measure, negative rank was 0, positive ranks were 30 and no ties. Test statistic Z value was -4.785 with p – value 0.000 (Highly Significant), which is less than 0.05 (level of significance). We can conclude that after applying Active knee extension test AKET was significantly increased.

IV. DISCUSSION

The hamstring is the muscle that is prone to get injured during sporting activities. If flexibility is adequate then decreased hamstring strains are possible. It also enhances the performance of certain activities.It has been well-recognized that testing of the flexibility of hamstring muscle can be measured by active knee extension test, according to reliability and validity.[6]

The study which has been done is for the hamstring flexibility is influenced by MET(Muscle energy technique). It has been demonstrated that MET was effective to improve AKET for 3 weeks of the MET program which concurred with an existing study that explains about hamstring flexibility was improved by MET. [7]

Muscle elongation is sustained by MET for the 3-week of duration which produces an increase in muscle length due to the combined effect of creep and plastic changes in connective tissue and an increase in flexibility after the muscle energy technique. It shows biomechanical or neurophysiological changes due to increased tolerance level to stretching.[8,9]

Previous studies were showing that MET (muscle energy technique) is found effective than other manual therapiesbut this study was done for finding the effect of concentric muscle energy technique to improve the hamstring muscle flexibility because of amount of expenditure.There for need this study was done for assessing effectiveness of concentric muscle energy technique for hamstring flexibility.

V. CONCLUSION

According to the result, this study shows that 3 weeks of intervention of isotonic concentric Muscle energy technique has significant effect on hamstring length by assessing it with Active knee extension test.

SOURCE OF FUNDING

Self

ETHICAL APPROVAL

Ethical approval was obtained from the institutional review board from Parul institute of physiotherapy

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CONFLICT OF INTEREST

Non

CONSENT FOR PUBLICATION

All individuals participating in this research signed the concent form prior to their inclusion in this study

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