CORRELATION OF LUMBAR FLEXIBILITY AND HAMSTRING FLEXIBILITY ON FUNCTIONAL MOVEMENT SCREEN TEST IN YOUNG ADULTS

Swati[1], Sheena Arora[2], Anand Kumar Singh[3], Shalini Singh[3] & ,Kanika Wadhwa[3]
[1]Department of Physiotherapy, School of Allied Health Sciences, MVN University, NCR, Aurangabad Haryana, India.
[2]Physiotherapist at IGESIC Hospital, Jhilmil, Delhi
[3] Department of Physiotherapy, School of Medical & Allied Sciences, G.D. Goenka University, Gurgaon Sohna Road, Gurgaon, Haryana, India.

ABSTRACT

Objective: To find out the effect of lumbar flexibility on functional movement screen among young adults. & to find out the effect of hamstrings flexibility on functional movement screen among young adults.

Methods: Total 50 subjects were taken from Manav Rachna International Institute of Research and Studies, Delhi NCR. The subjects for the study were included based on the inclusion and exclusion criteria. The details of the procedure regarding benefits aims and purpose of the study were explained to them and then on meeting the study criteria, asked to fill the consent form. After that demographic details of the subjects were taken i.e. name, age, sex, weight, height. Prior to the testing demonstration for each test position was given to practice each test once before the main reading was taken. All tests were performed on level flooring.

Results: It was found that AKET (right & left) had moderate positive correlation with FMS test, MMST(flexion) had weak positive correlation with FMS & it was found that MMST extension had weak negative correlation with FMS.

Conclusion: Flexibility has a major role in functional movement pattern and this knowledge can be used to design various flexibility or stretching exercises to improve lumbar and hamstrings flexibility so that functional movement of the body also improves.

1. INTRODUCTION

Young adulthood (spanning the ages of approximately 18-26) is a sequential and essential time of life. Young people move from adolescence into adult life, physical changes occur but they are more gradual. Individuals begin weight gain that will characterize adulthood. (Cole et.al. 2003)
During this time, young women and men typically complete their education, start working, develop relationships, and follow other trial that help set them on the path to a healthy and fruitful adult life. From a developmental point of view, young adulthood is characterized by a period of normal and predictable biological and psychological maturation.
For normal human body functioning, good muscular flexibility play an important role. Limitation in flexibility causes severe musculoskeletal overuse injuries in a person and affects a person's level of function. Many musculoskeletal repeated overuse injuries due to decrease lower extremity flexibility that ranges from stress fractures and shin splints leads to patella femoral pain syndrome or anterior thigh pain or Runner's Knee and muscle strains. (Davis, Ashby et.al. 2005)

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Movement is a fundamental characteristic of all animal life and the means by which the organism adapts itself to the demands made upon it by the environment in which it lives.
Most functional movement patterns require movement in several joints, i.e. mass movement and observation of these patterns in everyday activities.
The timing of functional movements usually proceeds from distal to proximal as it is distal areas which receive most of the stimuli which control the movement, i.e. the hands and feet.
The word rhythm means a regular beat or recurrence of a sequence of events. Each movement has its own natural rhythm which varies to some extent in individuals.
The motor unit is the functional unit of the Neuromuscular System which initiates and achieves movement in response to a demand for activity.
Flexibility is a crucial elememt of fitness to gain optimal musculoskeletal function enhancing peak performance. Forward bending is a combination of lumbar flexion and pelvic tilting.
Appropriate levels of flexibility and skeletal muscle strength are requisite for carrying out systematic movements, which in sequentially provide effective quality of life and best presentation in competitive sports.(Nobrega , Paula.et.al.2005)
Hamstring tightness may restrict pelvic tilting due to their attachment to the ischial tuberosity on pelvis. Hamstrings tightness and low back flexibility are also associated with low back pain.
The core of the body consist of lumbar, pelvic and hip region which simultaneously known as lumbopelvic-hip complex (LPHC). (Hewett, Zazulak et.al.2012). Ideal core function require both torso mobility and flexibility. When the core is working effectively, desirable length- tension relationships are maintained which permit the sports players to produce strong movements in the end point. (Hewett, Zazulak et. al.2012)
Core stability can also be important to allow a person to maintain the center of gravity over the base of support. Core strength training might be extremely important for the female athlete because exhaustion in core could remould posture, thereby worsen factors that are believed to contribute to injury. (Hewett, Zazulak et. al.2012)
Many muscles in the core region are important for postural alignment and dynamic postural equilibrium during activities. Transverso spinalis group, erector spinae, quadratus lumborum, and latissimus dorsi are the main muscle that are included in lumbar region. The transversospinalis group is mainly responsible for dynamic stabilization of the LPHC during movement and plays a very small role in producing movement.
Gluteus maximus, gluteus medius and psoas major are the main core muscles involved in hip region. The gluteus maximus contracts to produce hip extension and external rotation and provides dynamic stability to the sacroiliac joint during movment.
The regular function or mobility of the adult mature spine is particularly based on the process of growth and development in spine which results in maturation of individual spinal vertebra, spinal postures, which occurs during the developing child. This procedure of development and bone growth is affected by innumerable feature which further affect structure, function and pathology of the vertebral column. Lumbar spine mobility is a key characteristic of childhood as requisite back mobility helps the child to perform his/her daily activities. Previous studies demonstrate that lumbar spine mobility is greater in children than in adults. Growth factors may contribute to this observation are ligamentous laxity, strength, and length of spinal musculature, and factors such as body mass index (BMI) and length of muscles like hamstrings can also have an effect on the mobility of the lumbar spine. (Varangaonkar, Ganesan et. al. 2019).

Modified- Modified Schober Test (MMST) was first described by van Adrichem and van der Korst, to measure lumbar flexion and extension range of motion. The MMST method uses two landmarks: a line intersecting the line connecting the PSISs with the midline of the back and a mark drawn 15 cm superiorly. The use of PSISs as the inferior landmark in the MMST has several advantages. A mark placed midway between the PSISs is at the second level sacral level. This mark is on the sacrum which is an inflexible bone, and no motion would be expected to be gained by using an additional mark below this level. Second the superior landmark for the MMST technique was identified as a measured distance (15cm) above the inferior landmark of the line intersecting the line connecting the PSISs, rather than the first lumbar vertebra. This method was proposed to minimize error in identifying the first lumbar vertebra. Van Adrichem and van Korst suggested that a 15-cm distance superior to the line intersecting the line connecting the PSISs was an accurate representation of the actual length of the lumbar spine.

Hamstring muscles are well known for their great tendency to shortening which is due to their multijoint condition, their tonic postural character, and considerable amount of tensional forces to which they are constantly submitted. (Medeiros,Cini et. al.2016).

The literature shows that lack of hamstring flexibility may result in major muscle imbalances, predisposing athletes to muscle injuries (Witvrouw et. al. 2003), patellar tendinopathy, and patellofemoral, as well as facilitating the development of low back pain. Thereby, hamstring flexibility becomes an important matter in the context of physiotherapy.(Medeiros,Cini et. al.2019)

Commenest sports injuries that occur among athletes is hamstrings muscle injury. (Hamid, Mohamed Ali, et. al. 2013) Factors that may contribute to the hamstring muscle injuries are previous injury, strength imbalance, older age, inadequate warm-up, and poor quadriceps flexibility and muscle fatigue. Tightness may also contribute to hamstring injury.

Methods to check hamstring flexibility include active knee extension (AKET) test. The AKET test is an active test that involves movement at the knee joint, and most considers it safe, as the patient dictates the end point of movement. *(*Hamid, Mohamed Ali, et.al.2013). The AKE test is considered by some to be the gold standard for hamstring flexibility assessment.

Functional movement screen is a system that can be used to assess fundamental functional performance. The Functional Movement Screen (FMS) has been described by cook and colleagues (Cook et.al.2006). If valid and reliable tests that assess domains of function may enhance the ability to identify risk for injury (Minick et.al.2010). The FMS is rapid, non-invasive and easily administered (Cook et.al.2006).

The FMS is comprised of seven multi-joint movement patterns designed to assess and rate functional movement by incorporating upper and lower extremity sequenced movements that require coordination of both stability and movement of the trunk and pelvis. These seven different functional movements assess the following: trunk and core strength and stability, neuromuscular coordination, asymmetry in movement, flexibility, acceleration, deceleration and dynamic flexibility (Peate et. al.2007). These tests incorporate many facts of human movement including strength, motor control, balance and symmetry (Cook et. al.2006) have suggested that movement on a scale of 0-3, with the sum of scoring range from 0-21 points. The FMS tests and the criteria for scoring their performance have been well described in previous studied. (Cook et. al.2006)

The Functional Movement Screen (FMS) is a means of identifying weak links and asymmetry in one's basic functional movements. Unlike other fitness assessments, the FMS emphasizes the efficiency fundamental movements, such as those that comprise the FMS, are basic movement skills that may be related to a wide variety of movement patterns used in ADL's and sports. The FMS measure the quality of the movement based on specific criteria that allow the quantitative value for of movement patterns rather than the quantity of repetitions performed or the amount of weight lifted (Beckham and Harper 2010). The FMS provides immediate feedback and is used as an assessment for a patient, client, or athlete that can be subsequently be used to guide the training program.

2. Biomechanics

The vertebral column, the axis of the body, must meet two contradictory mechanical requirements: rigidity and plasticity. In fact (fig 2.1.) the vertebral column as a whole can be viewed as the mast of a ship ,This mast, resting on the pelvis, extends to the head and, at the level of the shoulders, supports a main-yard set transversely, i,e" the scapular girdle. When the weight of the body rest on the one limb ,(fig2.2) the pelvis tilts to the opposite side and the vertical column is forced to bend: first, in the lumbar region, it becomes convex towards the resting limb, ,then concave in the thoracic region and convex once more.

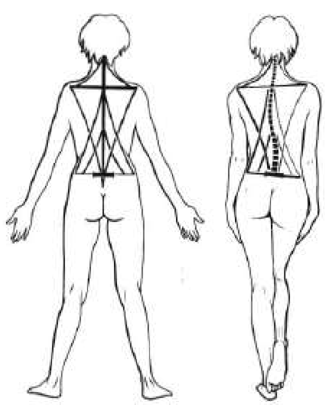

Fig2.1 Fig2.2

When viewed laterally, the functional components of the column are easily distinguished. Anteriorly lies the anterior pillar which is the essential supporting structure. Posteriorly lies the posterior pillar which contains the two minor pillars supported by the vertebral arch. While the anterior pillar plays a static· role, the posterior pillar has a dynamic role to play. There is a functional link between the anterior and posterior pillars. The joint between two vertebrae is a symphysis. It is formed by the two vertebral plateaus connected by the intervertebral disc.

The structure of this disc is quite characteristic and consists of two parts: A central part-a nucleus pulposus (N)- a gelatinous substance derived embryologically from the notochord. And A peripheral part -the annulus fibrosus (A) - made up of concentric fibres which appear to cross one another obliquely in space.

As a whole the column from sacrum to skull is equivalent to a joint with three degrees of freedom: it allows flexion and extension, lateral flexion right and left and axial rotation. The range of these elementary movements at each individual joint of the column is very small but, in view of the many joints involved, the cumulative effect is quite significant. Flexion and extension take place in the sagittal plane. Lateral flexion occurs in a frontal plane.

When seen on an **anteroposterior view** (fig.2 3) the lumbar column is straight and symmetrical relative to the interspinous line (m). The width of the vertebral bodies and of the transverse processes regularly decrease craniad. The horizontal line (h), passing through the highest point of the iliac crests, runs between L4 and L5. The vertical lines (a and a') drawn. In addition to supporting the trunk, the vertebral column protects the neuraxis, its canal, which starts at the foramen magnum and contains the medulla oblongata and the spinal cord, acts as a flexible and efficient casing. When one analyses the structure of a typical vertebra , one finds that it is made

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up of two major parts, i.e., the vertebral body anteriorly and the vertebral arch posteriorly along the lateral border of the sacral alae run approximately through the acetabula.

An oblique view (fig. 2.4) shows the features of the lumbar lordosis and of the lumbar vertebral column at rest, as worked out by De Seze:

The angle of the sacrum (a), formed between the horizontal and the line running through the Superior aspect of:Sl' averages 30°; the lumbosacral angle (b), lying between the axis of Ls and the sacral axis, averages 1400; the angle of pelvic tilt (c), formed by the horizontal and the line joining the promontory to the superior border of the pubic symphysis, averages 60°; the index of lumbar lordships (white arrow f) can be determined by joining the superoposterior border of LI to the posteroinferior border of Ls. The perpendicular to this line is usually maximal at L3 and. represents the index of 10rdo51is. It is greater as lordosis is more marked and almost disappear when the column is straight. It can rarely become inverted. the posterior projection (white arrow r) represents the distance between the posteroinferior border of Ls and the vertical line passing through the posteroinferior border of L1. It can be positive if the lumbar column is thrown backwards; it can be negative if the column is flexed.

The articular facets of the superior articular processes of the Lumbar vertebrae face posteriorly and medially.

Hamstring muscle is the extensor muscle of the hip that involve biceps femoris, semitendinosus, semimembranosus. During normal walking extension is produced by the hamstring and the gluteus maximus is not involved.

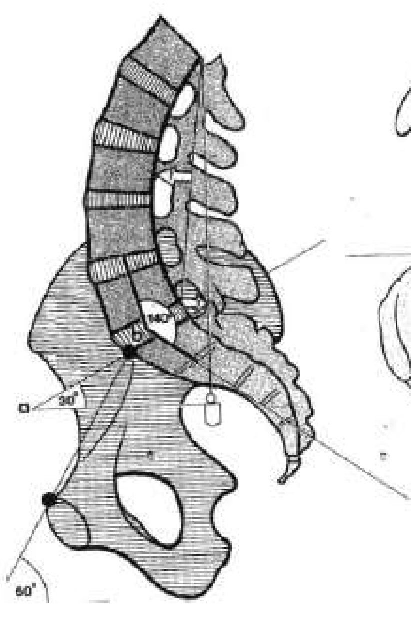

Fig2.3

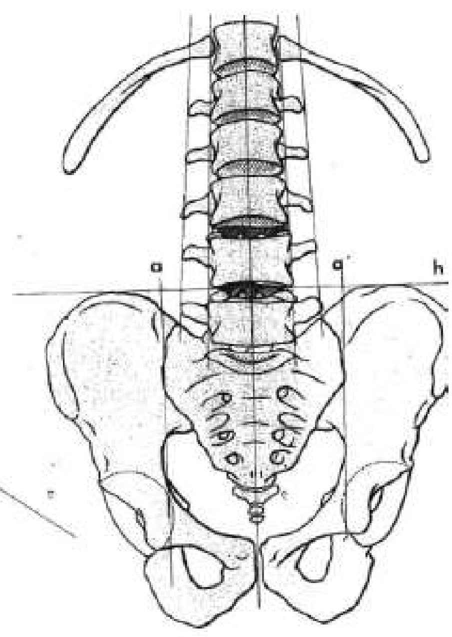

Fig2.4

Hamstring muscle in walking are most important as an antagonist to the quadriceps in the deacceleretion of knee extension. It crosses and act upon two joints -the hip and the knee. Semimembranous and semitendinosus extends the hip when the trunk is fixed they also flex the knee medially rotate the lower leg when the knee bents. The long head of biceps femoris extends

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the hip or when bending to work both short and short and long heads flex the knee and laterally rotates the lower leg when the knee is bent. It plays a crucial role in many activities such as walking, running, jumping and controlling some movements of the trunk.

Malik, Sahay et.al. 2016 had conducted a study to find the normative values of Modified-Modified Schober Test (MMST) to measure lumbar flexion and extension on Indian populations. The study was conducted in 2016 in which MMST flexion and extension were measured on 200 healthy adults of age 21 to 40 years out of which 100 were males and 100 were females. The study concluded that lumbar extension were found to be decreased with increasing age and lumbar flexion was more in males than females, whereas there is no difference in lumbar extension between the genders.

Varangaonkar, Ganesan et.al.2015 had conducted a study on Indian children's to find out the relationship between Lumbar range of motion with hamstring flexibility among 6-12 years

Children. The active flexion, extension, and right- and left-side bending, and rotation of the lumbar spine were measured using higher forward flexion, lateral flexion, and rotation range of motion than modified Schober's test for 294 normally developing school going children 6–12 years (147 girls, 147 boys) and the study concluded that females were found to have a considerably higher forward flexion, lateral flexion, and rotation range of motion than males. Age, anthropometric parameters, and hamstring length were significant correlates of lumbar spinal flexibility.

3. METHODOLOGY

Study Design: Correlation study, **Sample size**: Total number of subjects were 50

Source of collection of data: The study collection were gathered from Manav Rachna International Institute of Research And Studies

Inclusion Criteria: Age between 18 to 29 years, Fluent in English, Able to follow command, individual qualifying clearing tests of FMS.

Exclusion Criteria: Age below 18 years and above 29 years, Currently seeking medical care for lower extremity, Previous medical history that included any surgery for lower extremity injuries, Pregnant women, Any other ,medical or neuromuscular disorder, Had current or previous complaint of lower extremity pain, spine pain.

Instrumentation:

The instruments require for the following procedure are:

FMS kit include:

A measuring device, Hurdle step, Stretch band, measuring stick

For Active Knee Extension Test

Goniometer & Couch.

For Modified Modified Schober Test

Measuring tape

FIGURE 3.1 GONIOMETER FOR MEASURING JOINT RANGE OF MOTION

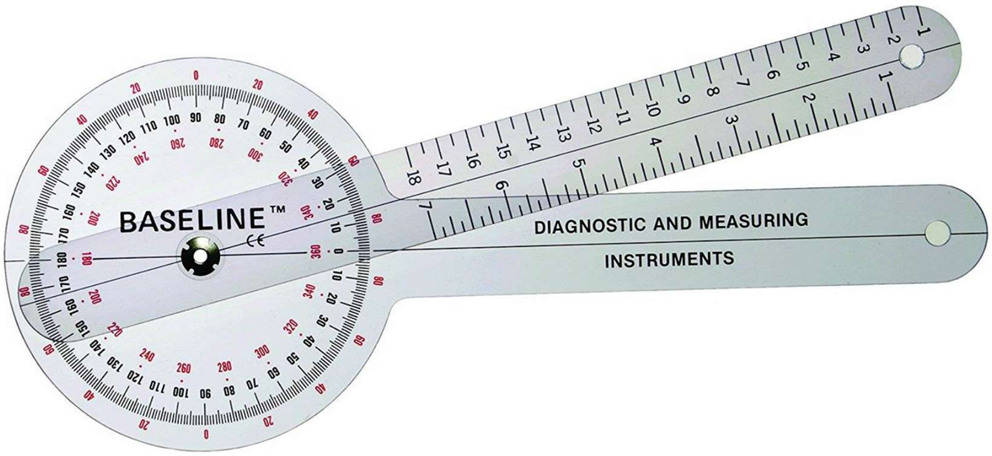


FIGURE 3.2 MEASURING TAPE

FIGURE 3.3 FUNCTIONAL MOVEMENT SCREEN KIT

Procedure:

Total 50 subjects were taken from Manav Rachna International Institute of Research and Studies, Delhi NCR. The subjects for the study were included based on the inclusion and exclusion criteria. The details of the procedure regarding benefits aims and purpose of the study were explained to them and then on meeting the study criteria, asked to fill the consent form. After that demographic details of the subjects were taken i.e. name, age, sex, weight, height. Prior to the testing demonstration for each test position was given to practice each test once before the main reading was taken. All tests were performed on level flooring.

1. Active knee extension test:

Position of patient: supine lying with test side hip should be flexed

Position of therapist: the therapist stands next to the patient

Method: the subject lies supine, head back and arms across the chest. The hip is passively flexed until the thigh is vertical (use the sprint level if available). Maintain this thigh position throughout the test, with the opposite leg in a fully extended position. The foot of the leg being tested is kept relaxed, while the leg is actively straightened until the point when the thigh begins tested is kept relaxed, while the leg is actively straightened until the point when the thigh begins to move from the vertical position. The thigh angle at this point is recorded.

2. Modified-Modified Schober Test

Measurement of Lumbar Flexion

The volunteers were instructed to remove their shoes and disrobe, exposing their back from gluteal fold to mid-thoracic spine with left and right PSIS fully exposed. The volunteers were asked to stand erect, with their eyes directed horizontally, arms at their sides, and feet placed on a paper footprint that was secured to the floor (the heels of the footprint was about 15 cm apart). This position helped the volunteers to stabilize the pelvis, aided them in maintaining their balance and helped us to improve the consistency of measurements. Then, the therapist demonstrated the proper procedure of forward bending with the arm hanging in front and keeping knees straight. After showing the proper procedure, the therapist confirmed that

Volunteers were doing it correctly. Then, the therapist kneeled behind the standing volunteers and identified both the PSIS with her thumb. Inferior margins of the volunteer's PSIS were marked with body marker and a ruler was used to locate and mark a midline point on sacrum (inferior mark). Then the final mark (superior mark) was marked on the lumbar spine 15 cm above the midline sacral mark (inferior mark). The therapist aligned the tape measure between two skin marks with zero at inferior mark and 15cm at superior skin mark. The measuring tape was kept firmly against the volunteer's skin while the volunteers were asked to bend forward with the instruction "Bend forward as far as you can while keeping the knee straight". The measuring tape was maintained against the volunteer's back during the movement but was allowed to unwind to accommodate motion. For each of the spinal motion measured, the end of the range of motion (ROM) was defined by instructing the volunteers to report that they cannot move any further. At the end of flexion ROM, the distance between the two marks was noted. The ROM was the difference between 15 cm and length measured at the end of motion. After each measurement, instruction given to volunteer was: "you can come back to a comfortable standing position".

Measurement of Lumbar Extension

The same landmarks and procedure described for the flexion technique were used for measuring lumbar extension. With the volunteers in the erect standing position, with their eyes directed horizontally, arms at their sides, and feet placed on paper footprint, the therapist lined up the measuring tape between the markings. While holding the tape measure placed firmly against the volunteer's skin, the therapist gave instruction: "Place the palms of your hands on your buttock and bend backward as far as you can". When the volunteers bent backward into full lumbar extension, the new distance between the superior and inferior skin markings was measured using the tape and the change in the distance between the marks was used to indicate the amount of ROM of lumbar extension. After measuring lumbar extension, instruction given to volunteers was: “You can come back to comfortable standing position”. At the end of data collection, all skin marks were removed with spirit.

3. Functional Movement Screen:

The FMS screening instructions and scoring process associated with the standardized version of the test was followed in order to ensure scoring accuracy and consistency across test administrators. For test components in which right and left side scores were recorded. In FMS 7 test components were performed by subject’s i.e.

1. Deep squats
2. Hurdle step
3. In –line lunge
4. Shoulder mobility
5. Active straight leg raise
6. Trunk stability push up
7. Rotary stability test

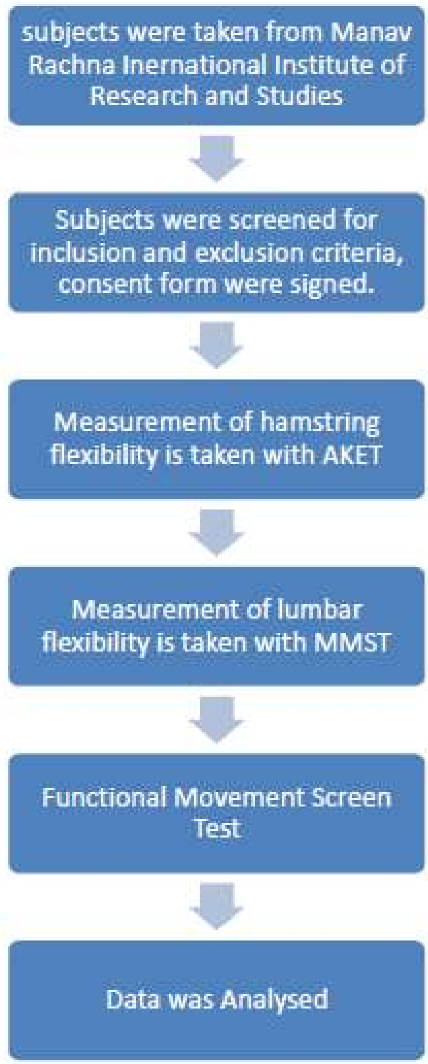
Each participant was given 3 trials for the deep squat and 2 trials for the hurdle step, in –line lunge, trunk, stability push-up and rotary stability test.

Each trial was scored on a scale of zero to 3:

1. A score of 3 was performing the specific movement perfectly.
2. A score was given when movement is completed with some compensatory movements observed.
3. A score of 1 was given when the subject could not complete the movement.
4. A score of 0 was given if pain was present during movement.

FIGURE 3.1 ACTIVE KNEE EXTENSION TEST

PROTOCOL



4. STATISTICAL ANALYSIS

The value of correlation coefficient

Value of 0.001 indicates no relationship, Value between 0.01 and 0.24 Weak, Value between 0.25 and 0.49 Moderate, Value between 0.50 and 0.74 Moderately strong, Value between 0.57 and 0.99 Strong, Value of 1.00 Perfect.

5. RESULT:

Correlation of Active Knee Extension Test (right) and Functional Movement Screen.

Table 5.1 shows moderate positive correlation is seen between Active Knee Extension Test (AKET) (right) with Functional Movement (FMS) (r= 0.3371) and figure 5.1 shows scatter plot representation the relationship between AKET (right) and FMS and it was found that AKET (right) had moderate positive correlation with FMS test.

	FMS TEST
AKET (right)	r= 0.33

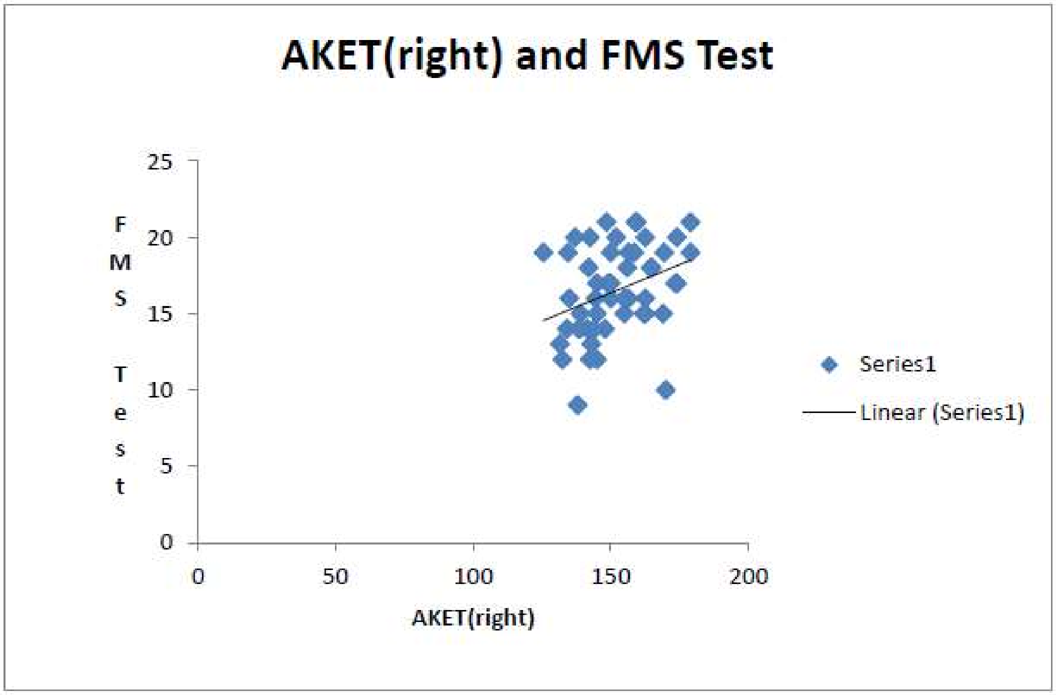


Figure 5.1 scatter plot representing the relationship between AKET(right) and FMS

Correlation of Active Knee Extension Test (left) and Functional Movement Screen.
Table 5.2 shows moderate positive correlation is seen between Active Knee Extension Test(AKET) (left) with Functional Movement Screen (FMS)(r=0.26) and figure 5.2 shows scatter plot representation the relationship between AKET(left) and FMS and it was found that AKET(left) had moderate positive correlation with FMS test.

	FMS TEST
AKET (left)	r= 0.26

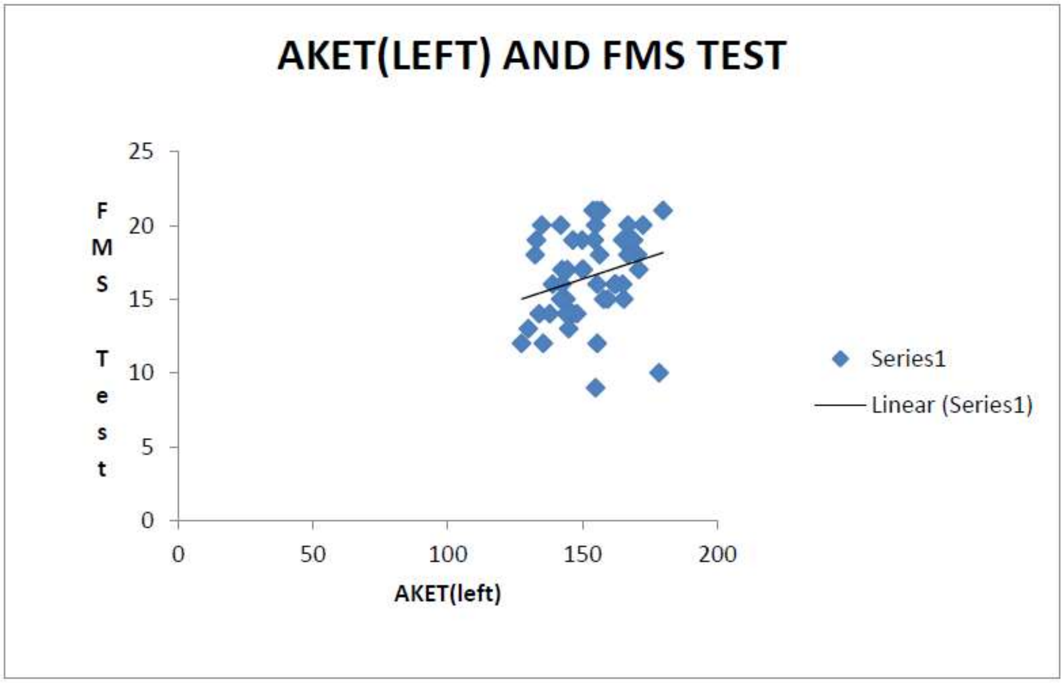


Figure5.2 scatter plot representing the relationship between AKET(left) and FMS

Correlation between Modified Modified Schober Test (MMST) (flexion) and Functional Movement Screen.

Table 5.3 shows weak positive correlation is seen between Modified Modified Schober Test(flexion) with Functional Movement Screen (FMS) (r= 0.09) and figure 5.3 shows scatter plot representation the relationship between MMST(flexion) and FMS and it was found that MMST(flexion) had weak positive correlation with FMS.

	FMS TEST
MMST(flexion)	r= 0.09

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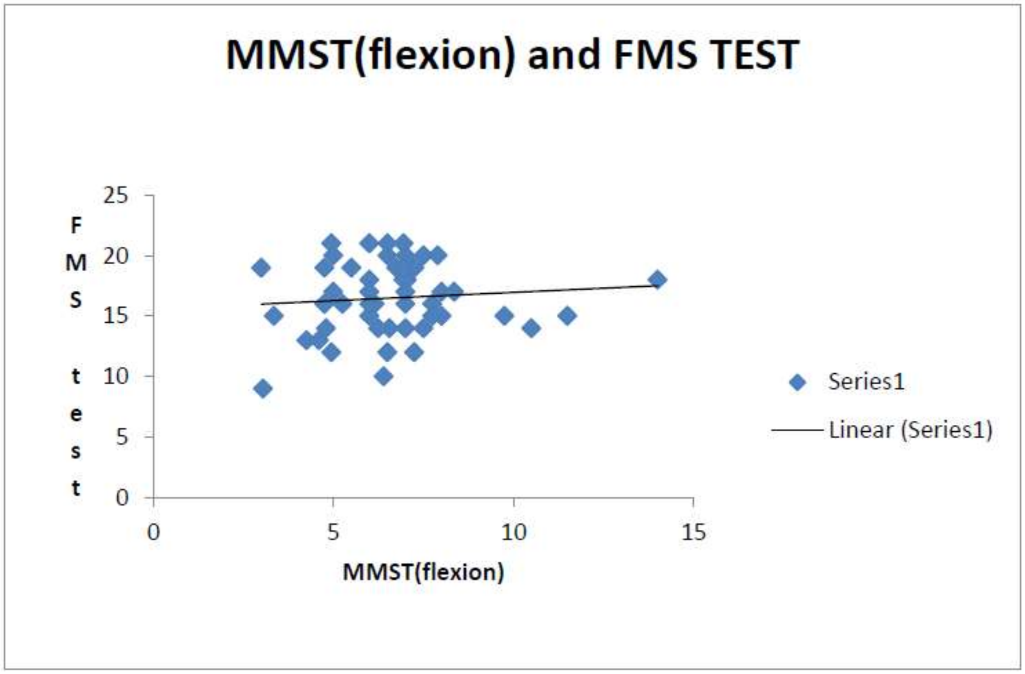

Figure 5.3 scatter plot representing the relationship between MMST (flexion) and FMS

Correlation between Modified Modified Schobetr Test (MMST) (extension) and Functional Movement Screen.

Table 5.4 shows weak negative correlation is seen between Modified Modified Schober Test(extension) with Functional Movement Screen(FMS) (r= -0.09) and figure 5.4 shows scatter plot representation the relationship between MMST(extension) and FMS and it was found that MMST extension had weak negative correlation with FMS.

	FMS TEST
MMST (EXTENSION)	r= -0.09

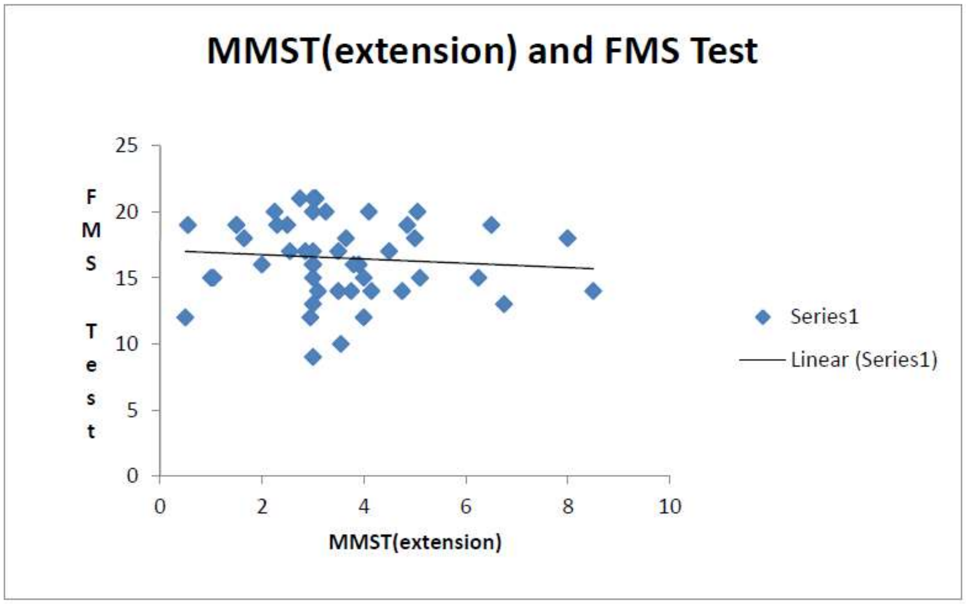

Figure 5.4 shows scatter plot representing the relationship between MMST(extension) and FMS

DISCUSSION

This study was done to find out the correlation of lumbar flexibility and hamstring flexibility on functional movement screen (FMS) amongst young adults with measured variables i.e. AKET(Active Knee Extension Test) for measuring hamstring flexibility and MMST(Modified Modified Schober Test) for measuring lumbar flexibility and FMS (Functional Movement Screen). A total 50 subjects were taken in which 7 tests of functional movement screen were performed by assessing the hamstring flexibility with Active Knee Extension Test and lumbar flexibility with Modified Modified Schober Test.

The main findings of our result were that Active Knee Extension Test for right leg shows moderate positive correlation (r=0.33) with functional movement. This signifies that increase in hamstring flexibility of right leg also increases the functional movement capacity of the body and Active Knee Extension Test for left leg also shows moderate correlation (r= 0.26) with functional movement. This signifies that increase in hamstring flexibility of right leg also increases the functional movement capacity of the body. By strengthening and stretching our hamstring muscle as part of our everyday fitness routine, we can achieve strong, limber thighs that will support the rest of our muscle groups preventing injuries and improving our physical abilities. One of the most important benefits from stretching and high flexibility is improving our ability to perform functional movements. Functional movements are movements that are multi- planar, multi-joint and usually require an enhanced range of motion.

Teyhen, Shaffer et. al.(2014) conducted a study in which they find out the clinical measures with dynamic balance and functional movement and concluded that individuals who performed better on the y-balance test demonstrated superior performance on the FMS in-line lunge tets, greater mobility performance of the shoulder and upper thoracic spine on the FMS shoulder/upper trunk mobility test, fewer hops to complete the 6-m hop test, and greater ankle dorsiflexion range of motion.

In this present study Modified Modified Schober Test for lumbar flexion shows weak positive correlation (r= 0.09) with functional movement. This signifies that when flexion of the lumbar spine increases it also positively affects the functional movement of the body. While Modified Modified Schober Test for lumbar extension shows weak negative correlation (r= -0.09) with functional movement means decrease in lumbar extension range of motion also decreases the functional capacity of the individual. Erector Spinae is the muscle responsible for lumbar extension and it further consists of three muscles i.e. spinalis thoracis, longismus thoracis and iliocostalis lumboram.When these muscles groups are shortened or tightened due to any factors significantly decreases the functional capacity of the body.

Varangaonkar.et.al(2019)Extension which may be limited by bony approximation has little variability within age groups or between sexes and decreases in small amount with increasing age.

For normal human body functioning, good muscular flexibility play an important role. Limitation in flexibility causes severe musculoskeletal overuse injuries in a person and affects a person's level of function. Many musculoskeletal repeated overuse injuries due to decrease lower extremity flexibility that ranges from stress fractures and shin splints leads to patellofemoral pain syndrome or anterior thigh pain or Runner's Knee and muscle strains.(Davis, Ashby et.al. 2005)

Appropriate levels of flexibility and skeletal muscle strength are requisite for carrying out systematic movements, which in sequentially provide effective quality of life and best presentation in competitive sports.(Nobrega , Paula.et.al.2005)

Williams et.al.(1993) conducted a study about the reliability of the MMST and Double Inclinometer (DI) for measuring lumbar flexion and extension and concluded that MMST technique appears to be a reliable and time-efficient method of measuring lumbar flexion and extension in comparison with DI technique.

Okada et. al.(2011) had conducted a study about the relationship between core stability. Functional movement screen and performance and concluded that no significant relationships were found between any of the core stability and FMS variables This suggests that if a subject has poor mobility or coordination, success in the FMS would not be attained despite strong core musculature.

Limitations

Limited sample size & Male and female ratio were not equal

Future Research

In future, similar study can be done on different age group of the individuals, Future research can be done by using more defined obesity measures like waist-hip and waist circumference. Future study can be done to study the effect of whole body flexibility program on functional movement screen.

CONCLUSION

This study showed that Active Knee Extension Test of the right and left leg showed moderate positive correlation with Functional Movement Screen.

Modified Modified Schober Test for lumbar flexion shows weak positive correlation with Functional Movement Screen while for while lumbar extension shows weak negative correlation with Functional Movement Screen. From these observations It can be concluded that flexibility has a majore role in functional movement pattern and this knowledge can be used to design various flexibility or stretching exercises to improve lumbar and hamstrings flexibility so that functional movement of the body also improves.

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