IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

# Immediate Effects Of Myofascial Release Technique On Muscle Flexibility, Vertical Jump Height Performance In Recreational Badminton Players: Pilot Study.

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**Abstract:**

**Background:** Badminton sport is popular because almost every area is found badminton courts in both indoor and outdoor form. The physical condition factor of athletes is very important in supporting the implementation of technical and tactical training. Flexibility is the ability to rotate a single joint or series of joint smoothly and easily through an unrestricted, and pain free range of motion. The vertical jump test is a physical fitness test. It is an effective exercise for building both endurance and explosive power. Myofascial release technique is a treatment approach, a therapy and a rehabilitation tool. It is a hands-on therapy, meaning that the therapist applies pressure with the hands onto, and into, the client's body

**Aim & objective:** of study find out immediate effect of myofascial release on hamstrings, for muscle flexibility, vertical jump among recreational badminton players.

**Methods**: 6 young recreational badminton players will be recruited for study. There will be perform myofascial release technique on muscle. Flexibility will be measure by 90 – 90 hamstring tests. Vertical Jump will be evaluated through vertical height jump test.

**Results:** hamstring play a significant effect in vertical jump height and the flexibility of the muscles increases after the administration of MFR. Vertical jump height for hamstring ($p > 0.0028$) showed extremely improvement. Flexibility of right hamstring muscle ($p > 0.0035$) and left ($P > 0.0028$) also showed significant difference.

**Conclusion:** The study concluded that MFR has immediate effect on increasing muscle flexibility and muscle power.

**Keywords**: Recreational badminton players, myofascial release technique, flexibility, vertical jump height.

## I. INTRODUCTION

II. Badminton sport is popular because almost every area is found badminton courts in both indoor and outdoor form. The physical condition factor of athletes is very important in supporting the implementation of technical and tactical training. All sports, including badminton, definitely require good physical condition. This game demand bounces, deep-lunges, instant swift in direction and rapid overhead arm movements from a maintaining good stance and balance throughout the game.[1]

III. Flexibility is the ability to rotate a single joint or series of joint smoothly and easily through an unrestricted, and pain free range of motion. One of the physical condition elements needed for badminton players is flexibility.[3] Flexibility can affect the results of smash shots, where the flexibility of the backward took when doing smash will increase the strength of the blow. The better the backward bending of an athlete, the better the basic techniques that the athlete has, especially the basic smash technique. A limitation in the muscular flexibility leads to several musculoskeletal overuse injuries in players life and remarkably affect a person's level of function. Muscular tightness is frequently postulated as an intrinsic risk factor for the development of a muscle injury. Thus, enhanced flexibility is associated with improved movement economy and reduced risk of injury.

IV. The vertical jump test is a physical fitness test. It is an effective exercise for building both endurance and explosive power. The goal of vertical jump is reaching as high as possible, from the ground. A squat jump or countermovement jump is typically performed in the vertical jump from one or both the legs. The vertical jump is also commonly used as a test to estimate lower-body power as strength and conditioning exercise.[2]

V. Myofascial release technique has origins in soft tissue mobilisation, osteopathy, physical therapy, craniosacral therapy and energy work, among others, and all have become subtly blended to form what has been known as Myofascial Release for a number of decades.[5] Myofascial release technique is a treatment approach, a therapy and a rehabilitation tool. It is a hands-on therapy, meaning that the therapist applies pressure with the hands onto, and into, the client's body. The therapist addresses the tissue barrier of resistance by feeling for tightness, restrictions and adhesions in any plane that may be causing pain or dysfunction. The myofascial release technique is one of many techniques used to increase mobility in a joint or series of joints and also improve athletic performance.[3] The myofascial release technique has recently become a common injury prevention strategy used in pre-activity warm-up period to assist in improving muscle relaxation and tissue pliability through decreasing contractile activity and motor neuron excitability.

VI. In the field of manual treatment, there are many studies on myofascial release technique and muscular flexibility. However, research on the myofascial release technique immediate effects, muscular flexibility, and vertical jump height and agility has not been thoroughly investigated and tested. Another important factor in sports success is vertical jump and agility. Therefore, the goal of the study was to investigate how myofascial release technique directly affects the vertical jump height and muscular flexibility of recreational badminton players. The study's objectives were to assess recreational badminton players' vertical jump height, agility and determine the direct effects of myofascial release technique on muscle flexibility

## VII. METHODOLOGY

VIII. This study was interventional study design with six subject recruited with sample of purposive. Voluntary participation was obtained from each subject by getting the consent form signed and the ethical approval was taken from the Institutional Ethical Committee. The sample size was calculated with 95% confidence interval and 5% precision.

IX. **Inclusion criteria -:** recreational badminton player with an age group range between 18 and 30 years who played at least once or two times in the week for the last year will be recruited.

X. **Exclusion criteria**: 1) Subjects with any recent injury. 2) neuromuscular disorder. 3) recent trauma to the lower limb. 4)any type of breathing problem and with any psychological dysfunctions were excluded from the study.

## XI. PROCEDURE

### XII. 90 – 90 Test:

XIII. Measurement of Hamstring Tightness A 90-90 straight-leg raising test will be used to measure hamstring flexibility. The subject was requested to lie down supine on the plinth, and the pelvis strapped to the plinth for stabilization. A half-circle universal goniometer (ICC-0.9) was be used to measure the PA of the knee range of motion (ROM). The fulcrum of the goniometer was center over the lateral condyle of the femur. The movable arm was assigned with alignment to the lateral malleolus as a reference, and the stationary arm will be on the femur using the greater trochanter as a reference. The therapist will passively extend the test knee as far as possible. The goniometer measured the angle of knee extension in degrees, giving an indication of hamstring muscle length For normal flexibility in the hamstrings, the knee extensor should be within 20° of full extension.[4]

**Vertical jump test:**

Objective: To evaluate standing vertical jump height Equipment: A smooth wall with a relatively high ceiling A flat, stable floor that provides good traction Chalk (different colour than the wall) Measuring tape or stick, Step stool or small ladder After explaining the purpose of the vertical jump assessment, describe and demonstrate the procedure. Allow the subject to perform a few practice trials before administering the assessment.[3]

Instruct the subject to stand adjacent to a wall, with the inside shoulder of the dominant arm approximately 6 inches (15 cm) from the wall. Measure the subject's standing height by marking the fingers with chalk, extending the inside arm overhead, and marking the wall. This mark will then be compared to the maximal. height achieved on a vertical jump.

The subject then lowers the arms and, without any pause or step, drops into a squat movement before exploding upward into a vertical jump.

The goal of this assessment is to jump as high as possible from a standing position.

Since proper technique plays a role in achieving maximal jump height, encourage the subject to use the arms and legs for propulsion. At the highest point, the athlete touches the wall, marking it with chalk.

The vertical jump measurement is determined by the vertical distance between the new chalk mark and the starting height.

Allow three repetitions and record the maximal height achieved on the assessment form

**INTERVENTION:**

Application of the myofascial release technique all the subjects was requested to lie in an appropriate position on the plinth for specific muscles. The subject was placed in a supine position with the knees bent over the edge of the examination table for quadriceps, supine on the plinth, and the pelvis strapped to the plinth for stabilization of the hamstrings and prone for calf. While the subject is lying in the appropriate position, with hands placed on the surface of the body with the knuckles, descend into the soft tissue to contact the first barrier and engage the fascia. By taking up the slack in the tissues, finally move the fascia across the surface while staying in touch with the underlying layers. The subject then maintained pressure to stretch the barrier of the tissue and waited for approximately 3–5 minutes. As the barrier is released, the hand feels the motion and softening of the tissues. The post-test outcome measure will be done immediately after the myofascial release.[1]

## DATA ANALYSIS

All the statistical analysis was done with the help of Statistical Package for the Social Sciences (SPSS) software version 11.5.

Calculate means and standard deviations for hamstring flexibility and vertical jump height both pre- and post-intervention.

paired sample t-test was used to find the immediate effect within group.

## XIV. RESULT

For this study, 6 participants were selected, The MFR was administered to the hamstring muscles. Demographic data shows mean age for hamstring (22.16 ± 2.6 years).

| SAMPLE | AGE | BMI |
|---|---|---|
| Recreational badminton players | 22.16 ± 2.6 | 23.86 ± 1.6 |

XV. Paired t-test was applied for within group comparison of pre and post - test.

| HAMSTRING MUSCLE | PRE - TEST | POST - TEST | T - VALUE | P -VALUE |
|---|---|---|---|---|
| Flexibility (right) | 23.16 ± 3.3 | 19.15 ± 3.5 | 7.4 | 0.0028 |
| Flexibility (left) | 20.16 ± 2.1 | 17.16 ± 2.3 | 7.9 | 0.0035 |
| Vertical jump | 29.83 ± 1.9 | 35.83 ± 1.5 | 7.4 | 0.0029 |

XVI. Paired sample t-test within hamstring group was done to find out difference of vertical jump height between pre and post MFR and the results showed significant differences in vertical jump height ($p<0.0029$).

XVII. Paired sample t-test within hamstring group was done to find out difference of flexibility between pre and post MFR and the results showed significant differences in flexibility right ($p<0.0028$) and left ($p<0.0035$).

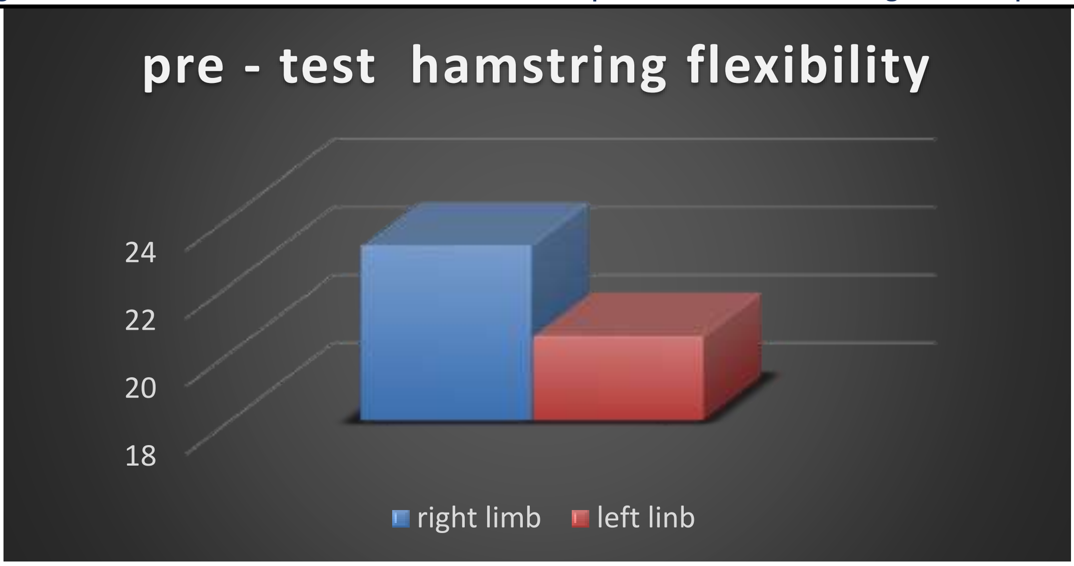


**Fig.1**– show average pre-test value of hamstring flexibility

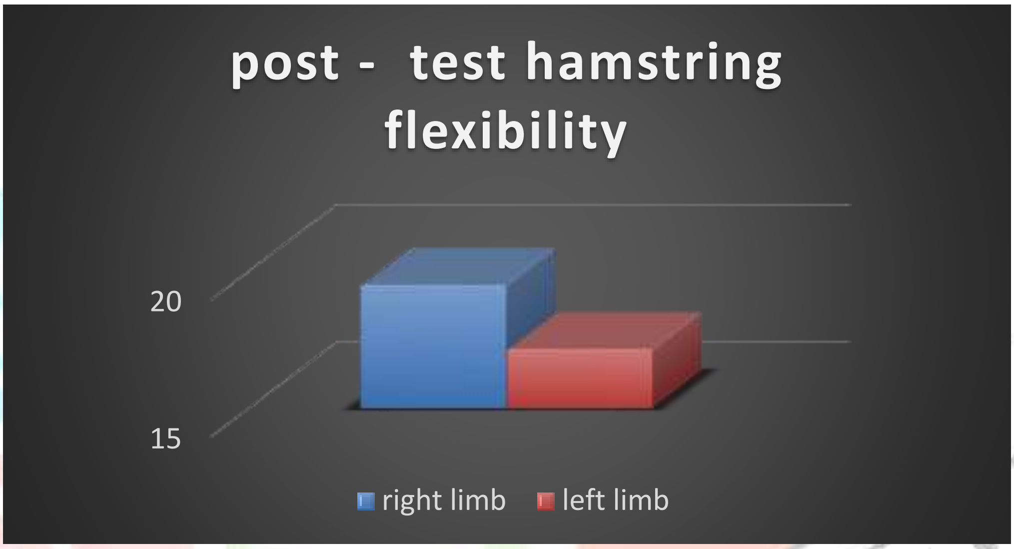


**Fig. 2** - show average post-test value of hamstring flexibility

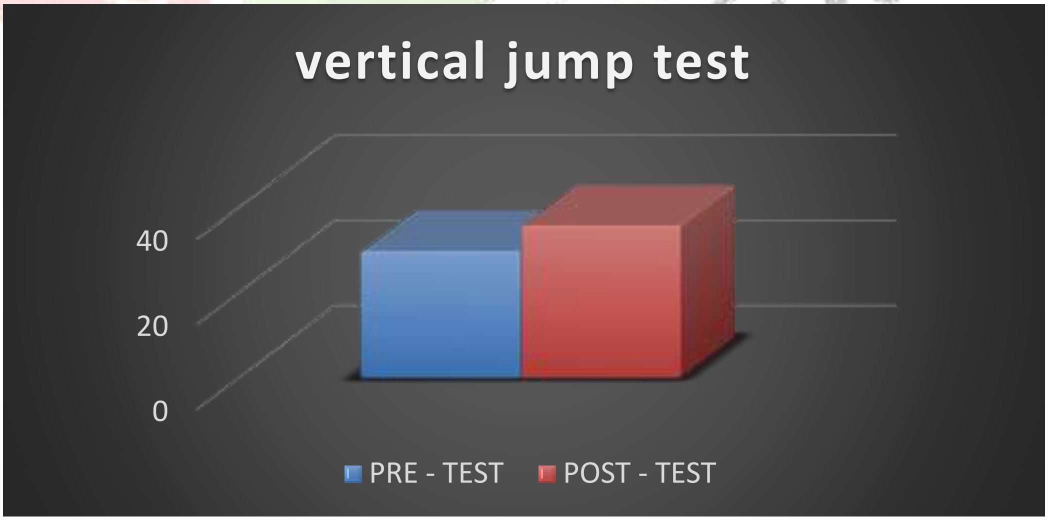


**Figure 3** – show pre and post-test value of vertical jump height

## XVIII. Discussion

**XIX.** The current investigation was created to look at how MFR technique affected recreational badminton players' vertical leap height and hamstring muscle flexibility right away. With the implementation of MFR, the study's findings demonstrated statistically significant variations in vertical jump height between pre- and post-intervention.[1]

XX. Jihye Jung et al.'s study, which supports the effectiveness of self-myofascial release in improving muscular flexibility and lowering myofascial discomfort, is comparable to this one. The release of fascial adhesions, enhanced tissue hydration, increased circulation, and decreased muscular tone are some of the hypothesized mechanisms underlying MFR and self-MFR, which result in increases in flexibility and pain reduction (Cheatham et al., 2015). There is experimental and clinical evidence for these effects. Overall, with strong backing from anatomical and clinical research, self-MFR is a useful intervention for anyone seeking to reduce muscle tension and increase flexibility.[3]

XXI. The vertical jump height increment due to MFR on hamstring muscle is because the effects of MFR technique through which muscle tension relationship improves and ultimately provides greater torque leading to improvement in the vertical jump height.

XXII. This study similar to the study Olivia Stovern et al., in which they concluded that use of foam rolling for improving ROM and flexibility, particularly in the hamstrings and other lower body muscles. While the short-term benefits are well-documented, including increased flexibility and reduced muscle tightness, the long-term effects on agility, vertical jump height, and overall athletic performance are less certain.[7]

XXIII. Serrano et al. (2023) In a recent study, Serrano and colleagues investigated how hamstring flexibility impacts lower body power and jump mechanics. Their findings suggest that moderate flexibility enhances jump performance by allowing athletes to reach a greater range of motion in the hips during the preparatory phase of the jump. However, they also noted that flexibility must be paired with sufficient muscle strength to maximize power output.[13]

XXIV. Lima et al. (2021) A study by Lima et al. examined the relationship between flexibility, strength, and vertical jump performance. They found that hamstring flexibility, along with muscle strength, was significantly correlated with vertical jump height. The study suggested that athletes with better hamstring flexibility demonstrated more efficient joint mechanics during the jump, leading to improved height.[14] Muscle flexibility is partially controlled by muscle spindles, which detect changes in muscle length, and Golgi tendon organs (GTOs), which detect changes in muscle tension.**[9]** During MFR, pressure applied to the fascia and muscle can activate the GTOs, causing a reflexive relaxation of the muscles (autogenic inhibition). This reduces tension in the muscle, allowing it to stretch further without eliciting a protective contraction[17]. Sustained pressure from MFR induces mechanical deformation of the fascia, stimulating a process known as mechano-transduction, where mechanical signals are converted into biochemical signals. This triggers the production of new collagen and elastin, the structural proteins responsible for tissue flexibility.

XXV. The remodelling of the extracellular matrix during MFR reduces fascial adhesions and scar tissue, allowing muscles and fascia to move more freely, thereby improving flexibility.

XXVI. The effects observed following MFR are a result of autonomic nervous system reactions that lower cortisol concentration levels, which in contribute in decreasing physical stress. The autonomic nervous system, which contracts the fascia through smooth muscle cells, may also be activated by activation of the fascia and subsequent mechanoreceptors.

XXVII. These contractions enhance blood flow, alter viscosity, and explain why MFR has a relaxing effect. As a result, they improve range of motion and lessen the delayed onset of muscle pain. All of these outcomes might have caused various muscle groups to relax and interfere with MFR, improving the study's subjects' range of motion.

**CONCLUSION:** The current study suggests that MFR has an immediate impact on improving muscular flexibility during vertical jumping. After taking MFR, there is an additional gain in hamstring flexibility during the vertical jump.

## XXVIII. LIMITATIONS

**Short-term Assessment**: The study focuses on the immediate effects of MFR on vertical jump height and hamstring flexibility, lacking long-term follow-up. This makes it difficult to determine the persistence of the observed benefits after the initial intervention.

**Lack of Control over Extraneous Variables**: Factors such as individual baseline flexibility, training history, diet, and physical activity outside the study were not extensively controlled and may have influenced the outcomes.

**Measurement Tools**: The study may rely on indirect or subjective measurement tools for flexibility and jump height. Variability in testing methods could affect result accuracy

## XXIX. FUTURE SCOPE OF STUDY

**Long-Term Effects of MFR:** While the current study focuses on immediate outcomes, investigating the long-term effects of regular MFR sessions on hamstring flexibility and vertical jump performance would be valuable. Such research could determine the sustainability of benefits and inform training regimens.

Extending research to include athletes from various sports and different levels of play (e.g., elite, amateur) can provide insights into the generalizability of MFR benefits. This approach can also identify sport-specific applications and effectiveness.

**Sports Implications**

Coaches and athletes may consider incorporating MFR—such as foam rolling—as a warm-up or recovery tool to acutely enhance flexibility and potentially vertical jump performance.

MFR can be particularly useful in sports where flexibility and explosive power are critical, contributing to reduced injury risk and improved physical performance.

## XXX. CONFLICT OF INTEREST

There are no conflicts of interests to declare.


## XXXI. FUNDING

This study was not funded by any source.

XXXII. ACKNOWLEDGMENT

XXXIII. My sincere gratitude goes out to everyone who helped this research endeavour come to a successful conclusion. would also like to express my gratitude to the instructors and staff at [DVVPF's college of physiotherapy/sports department] for giving me the tools and setting I needed to complete my research. Their steadfast assistance was much appreciated.

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