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Immediate effect of self myofascial release on the planter aspect of feet to increase hamstring flexibility in badminton players

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Abstract
Background: Self myofascial release (SMR) via a tennis ball to the plantar aspect of the foot is widely used and advocated to increase flexibility in badminton players, along the posterior muscles of a proposed "anatomy train". The main focus of our study to improve hamstring flexibility and prevent hamstring strain in badminton players.
Aim: To study the immediate effect of self myofascial release on the plantar aspect of feet to increase hamstring flexibility in badminton players.
Material and Method: This cross- sectional experimental study had 150 recreational badminton players. Badminton players both male and female with age group of 18 to 30 yrs of age, playing at least twice in week and having hamstring tightness according sit and reach test score were included. Whereas recent injury, stiffness in lumbar spine were excluded. Material required were sit and reach box, tennis ball, chair.
Result: After self myofascial release there was significant increase in the sit and reach test score as measure hamstring flexibility in badminton players.
Conclusion: On the basis of statistical analysis we conclude that single intervention of self myofascial release is effective in improving score of sit and reach test as flexibility of outcome measure. So, we conclude that self myofascial release might be effective treatment to reduce tightness of hamstring muscle in badminton players and improve their performance.

Keywords: badminton players, hamstring flexibility, self myofascial release, sit and reach test

Introduction

Badminton is one of the most widely- played sports in the world. It is an individual, non-contact sport which requires a combination of jumps, lunges quick changes in direction. It refers to a sport that is played with racket in which a shuttle cock is volleyed across a net [1].

Badminton also requires a constant analysis of continue changing situation on the court, which requires flexibility and agility [2].

Flexibility is important because player uses it to reach, dive and turn, to cover all parts of the court. The greater flexibility of stork arms is an important factor, hip and hamstring flexibility is also necessary to allow for more fluent stroking. Flexibility is important when participant is forced to stretch and facilitates agility on the court [2].

An improvement in flexibility is correlated with improved athletic performance and reduction of injuries amongst professional athletes.

Reduction in flexibility is caused by a shortened muscle, which may create imbalance at a joint and faulty posture alignment that may lead to injury and joint dysfunction [3].

Hamstring injury is one of the most common injuries in badminton players. 30.9 % of badminton players suffer from hamstring strain which is result of muscular fiber tears due to overstretching that can be decreased by increasing hamstring flexibility [1]. Decrease hamstring flexibility is suggested to be one of the most common factors of hamstring strain [1]. Hamstring strain causes disruption of muscle fiber which may result in microscopic tears or complete rupture of muscle which may lead to partial or complete loss of function.

Fascia is tough connective tissue which spreads throughout the body in a three dimensional web from head to toe. The fascia is ubiquitous surrounding every muscle bone, nerve, blood vessel and organ all the way down to the cellular level [4]. Therefore tightness of hamstring muscle will also involve the fascia covering it.

Myofascial release is a hands on soft tissue technique that facilitates a stretch into the restricted fascia. A sustained pressure is applied into the restricted tissue barrier, after 90-120 sec the tissue will undergo histological length changes allowing the first release to be felt [4].

Self myofascial release is one of the most common types of myofascial release. It works under the same principle of myofascial release and has been adapted to allow regular and frequent application without therapist intervention. Self myofascial release proposes the proper application of pressure and stretch which can release adhesion eliminate pain and restore healthy range of motion [5].

Self myofascial release technique can be performed by the athletes by utilizing an object to provoke relaxation effect through adding more tension to targeted soft tissue. This technique is very beneficial for the badminton players to increase hamstring flexibility.

There are various studies done on self myofascial release

which has shown positive effect on agility, range of motion and flexibility in normal healthy individuals [5, 6, 7].

Material and Method

Study design- cross sectional experimental study
Study setting- in around pane city
Sample size- 150
Target population- badminton players
Outcome measure- sit and reach test
Inclusion criteria-age group 18 to 30 yr, both male and female, recreational badminton players, hamstring tightness positive according sit and reach test score.
Exclusion criteria-recent injuries, stiffness in lumbar spine.

Procedure

- Ethical clearance was taken from the Modern College of Physiotherapy.
- Consent was taken from participants.
- Samples were collected according to inclusion and exclusion criteria.
- Pre intervention measurement was obtained by sit and reach test.
- Therapist has explained all procedure to participant and ask them to perform.
- Complete treatment time four minute, each foot for two minute.
- Immediate post sit and reach test measurement was taken.

Self myofascial release

- Position of participant comfortable and relaxed sit on the chair.
- Participant sit on edge of the chair, hand placed at two side's edges of the chair.
- Participant was instructed to roll a tennis ball on the sole of each foot from behind the metatarsal heads to the heel concentrating on the medial arch for two minute.

Fig 1

Self myofascial release intervention seated

- Pushing into discomfort but not pain
- Participant were instructed to apply as much pressure as they could.
- The total treatment part is four minute of self myofascial release.
- Treatment duration: bilateral of foot for four minute. Two minute for each foot.
- Post treatment immediate sit and reach test measurement will be taken.

Fig 2

Position of the tennis ball on the plantar aspect of the foot during self myofascial release

Result

150 recreational badminton players were taken according to the inclusion and exclusion criteria to participate in this study. The number of male were 77 and that of female were 73

1. Gender distributions

Table 1

Total no participant	Male	female
150	77	73

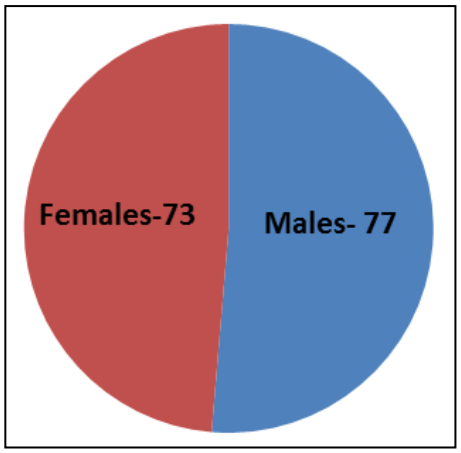

Fig 3: Interpretation - out of 150 77 males and 73 females

2. Age distributions

Table 2

Total no of participant	Mean age ± SD	maximum	minimum
150	22.28±2.496	29	18

Interpretation: The mean age of participant was 22.28 ± 2.496 years in this conducted study

Compare Pre intervention and post intervention sit and reach test

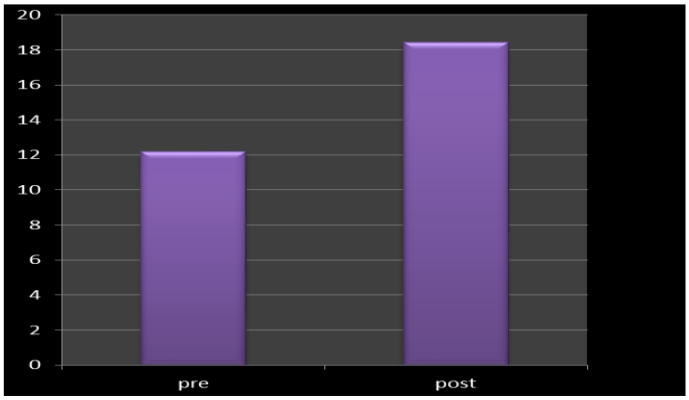

Fig 5

Table 3

	Pre SRT score	Post SRT score
Mean	12.19	18.41
Standard deviations	5.347	5.357
P value	< 0.0001 extremely significant	

Inerpretation: Graph 2 shows Pre intervention and post intervention sit and reach test score data analyzed by paired t test shows extremely significant with p value <0.0001

Comparison Male pre and post sit and reach test score and comparison female pre and post sit and reach test score

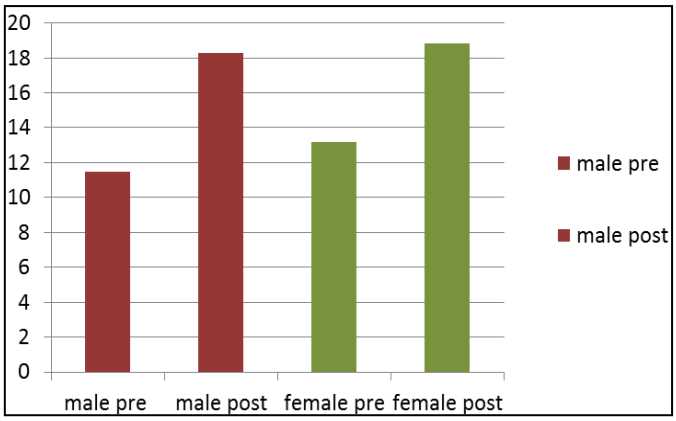

Fig 6

Table 4

	Pre male SRT score	Post male SRT score	Pre female SRT score	Post female SRT score
Mean	11.46	18.295	13.19	18.811
Standard deviation	5.251	5.355	5.401	5.368
P value	<0.0001 considered significant		< 0.0001 considered significant	

Interpretations: Graph 3 shows male pre intervention and post intervention data analyzed by paired t test shows extremely significant with p value < 0.0001
Female pre intervention and post intervention data analyzed by paired t test shows extremely significant with p value <0.0001

Comparision Male post and female post sit and reach test score

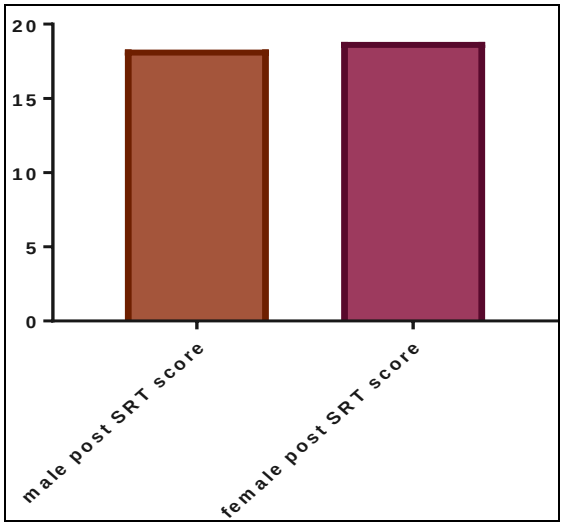

Fig 7

Table 5

	Post SRT male	Post SRT female
Mean	18.295	18.811
Standard deviation	5.355	5.368
P value	0.5571 considered not significant	
t test value	0.5884	
Mean difference	- 0.5154	

Inerpretations: Graph 4 Represent male post intervention and female post intervention data analyzed by unpaired t test shows not significant with p value 0.5571

Discussion

The present study was done to see the immediate effect of self myofasial release on the plantar aspect of feet to increase hamstring flexibility in badminton players. in this study total 150 subjects were selected amongst which 77 males and 73 females subjects based on inclusion and exclusion criteria which was in inclusion criteria age between 18 to 30, both male and female, subjects having hamstring tightness positive according to sit and reach test score. In the inclusion criteria subjects who were badminton players were considered while subjects with any recent injuries or surgeries were excluded.
In this study we found that a single treatment of bilateral self myofascial release to the plantar aspect of each foot resulted in an immediate increase in hamstring flexibility as indicated by an increase in sit and reach test score.
Pre intervention and post intervention data analysis showed a significant difference.

So the current study of self myofascial release is very effective treatment for badminton players to improve hamstring flexibility. Self myofscial release works under the same principle as myofascial release and has been adapted to allow regular and frequent application without therapist intervention. The difference between two techniques relates individual using their own body mass to exert pressure on soft tissue as they roll a tennis ball on the plantar aspect of foot. Rolling a tennis ball on plantar surface of the foot, applies slow pressure, this has effect on the superficial back line [5].

The superficial back line contains the plantar fascia and short toe flexors (lumbricals, flexor accessories and flexor digitorium brevis), the Achilles and muscle group of triceps surae, (gastronemius and soleus) the hamstrings semimebronus, semitendinosus and biceps femoris and sacrotuberus ligament the fascia of sacrolumbar area erector spinae and finally the epicranial fascia which extent and attached to supra orbital ridge of anterior surface of cranium. So the effect of that myofascial release in one area can have train another area [5].

The use of self myofascial release in this study, involved the use of a rolling motion, pressure and compression often similar to trigger point(Trp) pressure release with a tennis ball along the medial longitudinal arch and from the calcaneum (distal to the fat pad)to the metatarsal heads. The locations compressed in self myofascial release, would not contained only plantar fascia, but intrinsic foot muscle including those with MTrps, namely quadratus plantae, abductor hallucis and flexor digitorium brevis (Travell and Simons 1992) [5].

Our result are in account with Rob Grieve *et al.*, they reported that self myofascial release on the plantar aspect of feet to give beneficial effect of improving hamstring and lumbar spine flexibility.

The present study was focused on finding the improvement in hamstring flexibility after the intervention of self myofascial release in badminton players. And we also compared male and female group to see which group are mainly effective after the intervention. Previous studies were done to examine the effect of self myofascial release on the planter aspect of feet to increase hamstring and lumbar spine flexibility in normal healthy people. They reported a significant increase in post intervention.

But in our study there are 77 males and 73 females in gender distribution. Male pre intervention and post intervention data analysis showed post intervention significant difference. Female pre intervention and post intervention data analysis showed post intervention significant difference. Then we compare male post intervention and female post intervention and data analysis showed Not significant difference but female post intervention graph shows statistically increase so the result of our study on comparison in male and female post intervention shows improvement in female hamstring flexibility by the intervention of self myofascial release, may be because females have greater flexibility than males [12].

Conclusion

On the basis of statistical analysis we conclude that single intervention of self myofascial release is effective in improving score of sit and reach test as flexibility outcome measure.

So, we conclude that self myofascial release might be effective treatment to reduce tightness of hamstring muscle in badminton players and improve there performance.

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