ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 09 | September - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

IMMEDIATE EFFECT OF SELF-MYOFASCIAL RELEASE VS DYNAMIC STRETCHING OF LOWER EXTREMITY MUSCLES ON BALANCE AND JUMP HEIGHT IN AMATEUR MALE FOOTBALL PLAYERS

Physiotherapy

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ABSTRACT

Background: Football is a highly demanding contact sport requiring good physical fitness for better performance. Since flexibility is the major component of fitness this study aims to compare the immediate effects of self-myofascial release (SMFR) and dynamic stretching (DS) on balance and jump height in football players. **Methodology:** An experimental study was conducted on 30 male players aged 18-30 years allocated to group A- self-myofascial release and group B- dynamic stretching. Immediate effect on Y balance and Sargent jump & reach was studied. **Result:** A significant increase in Y balance scores was observed for group A [p=0.0003, p<0.0001] and group B [p=0.0092, p<0.0001]. Vertical jump height also increased significantly post SMFR(p=0.0067) and DS (p=0.0002). But there wasn't a significant difference when group A was compared to group B in balance (p=0.8302, p=0.8966) and jump test (p=0.5051). **Conclusion:** This study found that self-myofascial release and dynamic stretching are equally effective in improving dynamic balance and vertical jump height.

KEYWORDS

Self-Myofascial Release, Dynamic Stretching, Balance, Jump Height.

INTRODUCTION

Football is unquestionably the most well-known participant and spectator sport in the world. It is a high-impact sport wherein chances of injury are always high if a proper injury prevention program is not followed up regularly [1].

Dynamic balance represents the ability to perform an action while maintaining or restoring a stable position and plays a crucial role in many sports activities. Football is a sport that requires a good dynamic balance during actions such as kicking, volleying, and dribbling a ball. Since it is an integral part of the performance, poor balance is associated with a high risk of injury [2]. Also, the jumping header is another skill they require in football. It considerably affects performance in sports that require jumping. They often compete with their oppositions in the air during a jumping header [3]. Hence vertical jumping ability is an essential element in the performance of football players. This Vertical jumping ability is also widely used as an objective measure for the evaluation of lower limb power in athletes [4].

Dynamic stretching is incorporated by some athletes in their training. It is the act of moving a joint through its entire range of motion in a quick manner with little resistance. It consists of exercises that replicate movement patterns similar to those required in sports [5]. It has positive effects on flexibility, power, sprint and jump performance as well as dynamic balance [2,5].

Myofascial release, a hands-on soft tissue technique, put forth by Barnes which stretches the restricted fascia, is emerging in sports in the form of self-myofascial release. Due to repetitive microtrauma, fascia gets disturbed leading to the formation of adhesions and scar tissue which disturb muscle biomechanics and thus the performance [6,7]. SMFR aims to break down these adhesions and allow smooth gliding of muscular layers. This technique can be performed on our own and prohibit the presence of a therapist as compared to other MFR methods.

As the studies comparing these two techniques have shown variable results on dynamic balance and vertical jump height, this study was done to compare the effects of self-myofascial release and dynamic stretching on balance and jump height.

MATERIALS AND METHODS

Approval from ethical committee was obtained.

Inclusion Criteria- 30 male football players in the age group of 18-30 years.

Exclusion Criteria- 1. Upper or lower limb injury or surgery performed in last 6 months 2. Any impairment of spinal column, dysfunction of vestibular system, visual system that affect balance.

Written consent was taken from subjects after explaining the details of the study.

Proedure:

Participants were randomly allocated into two groups by computerised generated sheet- Group A (SMFR) and Group B (DS). First, a baseline assessment of dynamic balance using Y balance test and jump height using sargent jump & reach was taken. Then intervention as per the allotted group was performed over following muscles bilaterally- calves, hamstrings, glutei and quadriceps for 30 seconds per muscle [8].

Y balance test:

Participant was in standing position at the centre of Y shaped tape with hands on waist. The goal of YBT was to maintain single leg stance while reaching as far as possible with the contralateral leg. Player was instructed to not to lift heel off the floor till he comes back to neutral, not to take off hands from waist or twist their trunk go backwards. 4-6 practice trials were given to players for all three directions. Best of 3 distances was measured for every reach [9].

Sargent Jump And Reach Test [10]

Participant was standing next to the wall. He marked starting point using pencil. Next, he stood away from wall and leaped vertically as high as possible using lower limb power and upper limbs in projecting body upwards. Distance between the two were measured as vertical jump height. Best of three was counted as vertical jump height.

Group A- Multilevel rigid foam roller was used for 30 second bout per muscle. Foam rolling was done on calf, hamstrings, quadriceps and glutei bilaterally with 30 seconds rest between two muscles. Foam roller was rolled against the muscle from origin to insertion till feeling of discomfort**.**

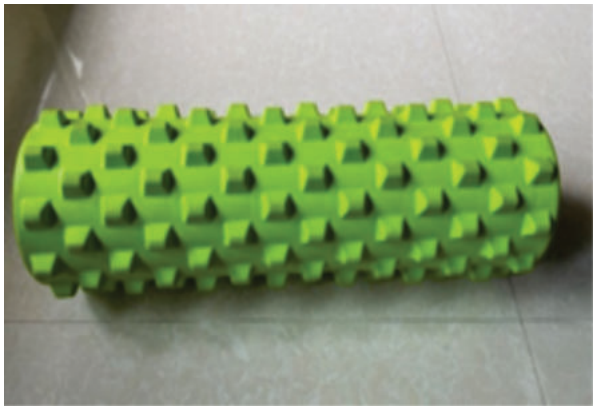
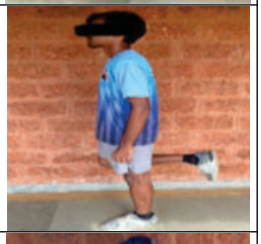


Fig. 1 Foam Roller

Fig. 2 SMFR

Group B- Dynamic stretching of following muscles was performed for 30 seconds each with 30 second rest when changing to second muscle [III].

Dynamic stretching protocol		
Gluteals	Walking high bringing knee to chest.	
Hamstrings	Walking while actively swinging the leg into flexion with knee extended and ankle plantarflexed.	
Quadriceps	Walking, rapidly kicking heels toward the buttocks while moving forward.	
Calf	Mountain climber position. Alternate dorsiflexion and plantarflexion.	

Statistical Analysis & Results

- The data collected was statistically analysed using GraphPad Prism app. Shapiro Wilk test was used to examine distribution of normality.
- For the data passing normality, paired t test was performed to compare results within the group. For the data not passing normality, Wilcoxon sign rank test was performed to compare results within the group.
- For the data passing normality, unpaired t test was used to compare effects between group A and group B. For the data not passing normality, Man-Whitney test was used to compare effects between group A and group B.
- There was a significant increase in vertical jump height and dynamic balance post SMFR and DS as well.

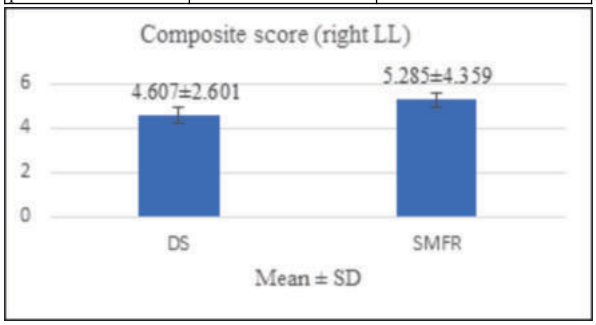
Table 1

composite score (right LL)			composite score (left LL)		vertical jump height	
SMFR	pre	post	Pre	post	pre	post
Mean	94.08	99.37	93.21	98.49	42.1	46.45
SD	5.196	4.743	4.119	3.619	13.39	14.39
P value	0.003(significant)		<0.0001(significant)		0.0067(significant)	
DS	pre	post	Pre	post	pre	post
Mean	95.84	100.5	94.84	100.5	42.22	46.85
SD	4.498	5.492	6.597	5.586	7.560	7.515
P value	0.0092(significant)		<0.0001(significant)		0.0002(significant)	

Comparing SMFR with DS on Y balance and jump height

Table 2

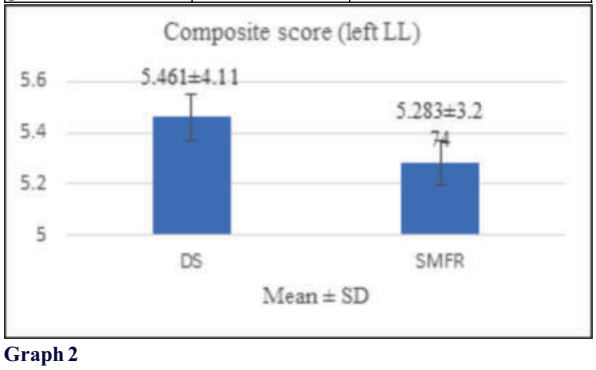
Composite score		
Right LL	DS	SMFR
mean	4.607	5.285
SD	2.601	4.359
p value	0.8302	NS



Graph 1

Table 3

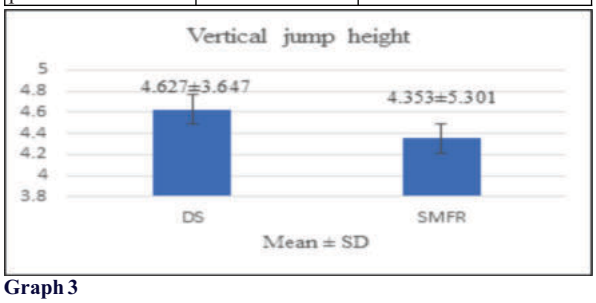
Composite score		
Left LL	DS	SMFR
mean	5.461	5.283
SD	4.11	3.274
t value	0.1312	
p value	0.8966	NS



Graph 2

Table 4

Vertical jump height		
	DS	SMFR
mean	4.627	4.353
SD	3.647	5.301
p value	0.5051	NS



Graph 3

DISCUSSION

This study aimed to compare immediate effect of self-myofascial release with dynamic stretching on dynamic balance and jump height. All male footballers of mean age ±20 was recruited.

According to statistical analysis it was proved that self-myofascial release help in improving dynamic balance. There is significant effect on y balance test which includes anterior reach (p-<0.0001), posteromedial reach(p-0.0036), posterolateral reach(p-0.0335) and composite reach of right lower limb(p-0.0003) as well as posteromedial reach(p-<0.0001), posterolateral reach(p-<0.0001) and composite reach (p<0.0001) of left lower limb.

These effects are consistent with Qingshan Zhang et al [2020] who studied immediate effects of SMFR of posterior muscle chain on y balance test [12]. These effects are attributed to muscle contractions, proprioception or central nervous system activation. Also, pressure exerted by foam roller stimulate mechanical receptors like golgi and pacini receptors which improve proprioceptive information to brain, CNS integrates it to tune the activation level of motor units.

It was also observed that Vertical jump height improved significantly after SMFR(p-0.0067). For this study possible mechanism of improved VJ height can be attributed to increased flexibility post MFR. SMFR help to reduce adhesion between different layers of fascia. Mechanical pressure and heat generated during MFR reduces viscosity of muscle tissue and remobilises fascia to its gel like state [7].

Dynamic stretching is used as warm-up routine by players. This study found that dynamic stretching of lower extremity muscles improved y balance reach distances in all directions (anterior reach p-0.0022, posteromedial p-0.0065, posterolateral p-0.0092, composite reach p-0.0092) of right lower limb as well as anterior reach p-0.0004, posteromedial p-<0.0001, posterolateral p-<0.0001, composite reach p-<0.0001 of left lower limb. Similar findings were reported by Zafar Azeem, Rahul Sharma [2014]. It proposed that there is improvement in performance due to rehearsal of movement patterns, increase in circulation, increase in neuromuscular activity due to post activation potentiation [2]. There was significant increase in vertical jump height(p-0.0002) in accordance with study by Paul Hough et al, which suggested that there is rise in neuromuscular activity and post-activation potentiation is induced after dynamic stretching [14]. L. Parsons et al concluded that dynamic stretching increased vertical jump height [15].

This study found that self-myofascial release and dynamic stretching are equally effective on dynamic balance of right lower limb (anterior reach p-0.2126, posteromedial p-0.616, posterolateral p-0.6115, composite reach p-0.8302) & left lower limb (posteromedial p-0.1951, posterolateral p-0.7643, composite reach p-0.8966) as well as vertical jump height (p-0.5051).

SMFR and DS influence soft tissue flexibility by different mechanisms. However, both these methods help in improving muscle and connective tissue elasticity equally thus enhancing the athletes' performance.

CONCLUSION

This study concludes that both self-myofascial release and dynamic stretching are equally effective in improving vertical jump height and dynamic balance. Further studies can be done on the long-term effects of SMFR or DS on the performance of football players or different groups of population such as female players and other sports players.

Clinical Implications And Limitations:

Since SMR and dynamic stretching are equally effective, both can be used by footballers before match to improve performance. Both methods are easy and can be performed on our own. Limitation in this study was small sample size.

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