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THE EFFECT OF STATIC VS DYNAMIC STRETCHING ON THE SPRINT PERFORMANCE IN SOCCER PLAYERS

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Abstract: Football is a sport that brings together various factors; namely speed, agility, endurance, balance, and skill. The capacity of the football players to produce varied high-speed actions is known to impact match performance. Maximal sprint speed is the maximal velocity at which a player can sprint. In the training sessions with more emphasis laid on the warm-up and its relation to injury prevention, it is pivotal to know if the warm-up routine has a bearing on these two high-speed characteristics. In the entire warm-up routine, stretching takes up a major chunk. Stretching in itself has 2 different types; static stretching and dynamic stretching. In this study, we are evaluating the effect of static stretching and dynamic stretching individually on sprint speed and agility.

Method: This is a quasi-experimental study in which 30 soccer players were selected as per the inclusion and exclusion criteria. The pre and post effect of static and dynamic stretching was evaluated on 2 separate days respectively on the sprint performance.

Result: 30 male soccer players with a mean age of 21 were included in the study. Data was collected and analyzed using the SPSS 12 software with the level of significance set at 0.05 Data was analyzed using the paired t-test. There was a statistically significant improvement in the sprint performance post dynamic stretching, with a p-value of 0.001. The mean value of the time(seconds) taken to sprint post static stretching was 3.542 and post dynamic stretching was 3.465.

Conclusion: Dynamic stretching is more effective in increasing sprint performance as compared to static stretching.

Index Terms **- Football players, Sprint performance, Static stretching, Dynamic stretching.**

INTRODUCTION :

Football or soccer, is played around the world over at the professional and amateur levels by approximately 240 million people from 200 countries. The sport is a universal game, has its followers and partakers all over the world with countries like Brazil, France, England, Portugal just to name a few being big names in the sport on the world scene.

The nature of the game itself is such that there is always risk involved. The sport being a contact sport can often lead to a wide variety of injuries ranging from concussions to sprains, fractures to even death in some unfortunate. The physical demands of the game practically keep the playing span of a footballer limited and adding an injury to it further brings down this span, this making injury prevention an important aspect alongside the necessities of the game.

Football is a sport that brings together various factors, namely speed, agility, balance, and skill. The capacity of the football players to produce varied high-speed actions is known to impact match performance. Although high-speed actions are more crucial moments of the game which contribute to 11% of the total distance covered. This is where the term maximal sprint speed comes into the picture. Maximal sprint speed is the maximal velocity at which a player can sprint. Training regimes for footballers worldwide include drills for improving sprint speed and agility, but these are the mainstay of the training session. With more emphasis being laid on warm-up and its relation to injury prevention, it is pivotal to know if the warm-up routine has a bearing on these two high-speed characteristics.

Warm-up forms an essential part of a pre-game routine because of the numerous physiological effects it has on the player's body and mind, which are without any doubt beneficial from the performance point of view. Some of these effects are increasing blood flow to muscular tissue, increasing muscle temperature, reducing muscle tightness, elevating body temperature, stimulating reflex activity related to balance and coordination, achieving full joint mobility in the specific joints involved in the activity, achieving full soft tissue extensibility, enhancing the functioning of the neuromuscular system, preparing the cardiovascular and respiratory systems, preparing the players psychologically for the coming activity and familiarizing themselves with the environmental conditions. In the entire warm-up routine, stretching takes up a major chunk. Two potential mechanisms are often proposed by which stretching could decrease the incidence of an injury: a direct decrease in muscle stiffness via changes in passive viscoelastic properties, or an indirect decrease in muscle stiffness via reflex muscle inhibition and consequent changes in viscoelastic properties from decreased actin-myosin cross-bridges. These changes in muscle stiffness would allow for an increased ROM due to the increased flexibility which is believed to decrease the risk of injury. Stretching in itself has various types, namely static and dynamic. Static stretching is used to stretch muscles or muscle groups while the body is at rest, and is performed by gradually lengthening a muscle or muscle group to an elongated position(to the point of discomfort) and holding the position for 20-30 seconds. While static stretching has long been known for its effectiveness to increase joint range of motion (ROM), its effectiveness to promote optimal performance in high-intensity explosive-type activities has been debated. Dynamic stretching uses momentum and active muscular contraction to produce a stretch and is comprised of movements that are similar to the movements in which the participant will engage thus making it more sport-specific and a comparatively better way to stretch. With research backing both these types of stretching, there is no sufficient literature endorsing either static or dynamic stretching before explosive types of activities. Hence the need to check for the effect of static stretching and dynamic stretching individually on sprint speed.

Sprint speed is the maximal velocity at which a player can sprint. This sprint speed can be measured using various assessment tools. The ones commonly used are the 10-meter sprint test, 20-meter sprint test, 35-meter sprint test, and 50-meter sprint test. The tests carry their significance with the 10-meter test checking mainly for acceleration, the longer ones checking for maximal speed, the 50-meter sprint test checking for graduated speed. The 50-meter test that was picked as the tool of assessment had the advantage of checking both the acceleration component as well as the maximal speed. The test distance also ensured that even with the simplest of available time recorders accuracy is maintained.

Method and Methodology

This is a Quasi-Experimental Study. The sample size for this study was 30. The subjects were selected as per the inclusion and exclusion criteria. Inclusion criteria were football players playing for more than 1 year, Age group 18-25 year old . The exclusion criteria were any history of recent lower limb injuries in the past 6 months history of any instability in the knee and ankle or a history of ankle fracture.

Procedure:

The study was approved by the Institutional Ethical Committee, the subjects were recruited based on the inclusion and exclusion criteria. Informed consent was taken. Two different modes of stretching protocol were used on 2 different days. A warm-up in the form of a 4 minute light jog was done. The maximum sprint time was calculated for a distance of 30 meters. Then the stretching protocol was given, post which the maximum sprint time was calculated again. The principal locomotor muscle groups were taken up for stretching which included: Gastrocnemius, Hamstrings, Quadriceps, Hip flexors, Glutei, and Adductors.

On Day 1 the footballer was subjected to static stretching protocol.

The total time duration for the protocol was around 12 minutes.

3 sets of the 30-second hold were performed for each stretch.

Static stretch was given in the following manner.

a. Gastrocnemius: Standing calf stretch
b. Hamstrings: Two Leg hamstring stretch
c. Quadriceps : Classic quadriceps stretch
d. Glutei: Lower back stretch
e. Adductors: Sitting groin stretch

On Day 2 the footballer was subjected to a dynamic stretching protocol

The total time duration for the protocol was 8 minutes

The stretch cycles/extremity was 20-30 cycles

Time duration/stretch cycle was 2-3 seconds/cycle

Dynamic stretch was given in the following manner:

a. Gastrocnemius: Exaggerated Heel to toe walking.
b. Hamstrings: Forward-backward leg swings
c. Quadriceps: Butt kicks
d. Glutei: High knee
e. Adductors: Side lunge walk

The test used for the maximal speed assessment was the 30-meter sprint speed test. The test was used because of its simplicity and ability to test the desired parameter.

Data Analysis

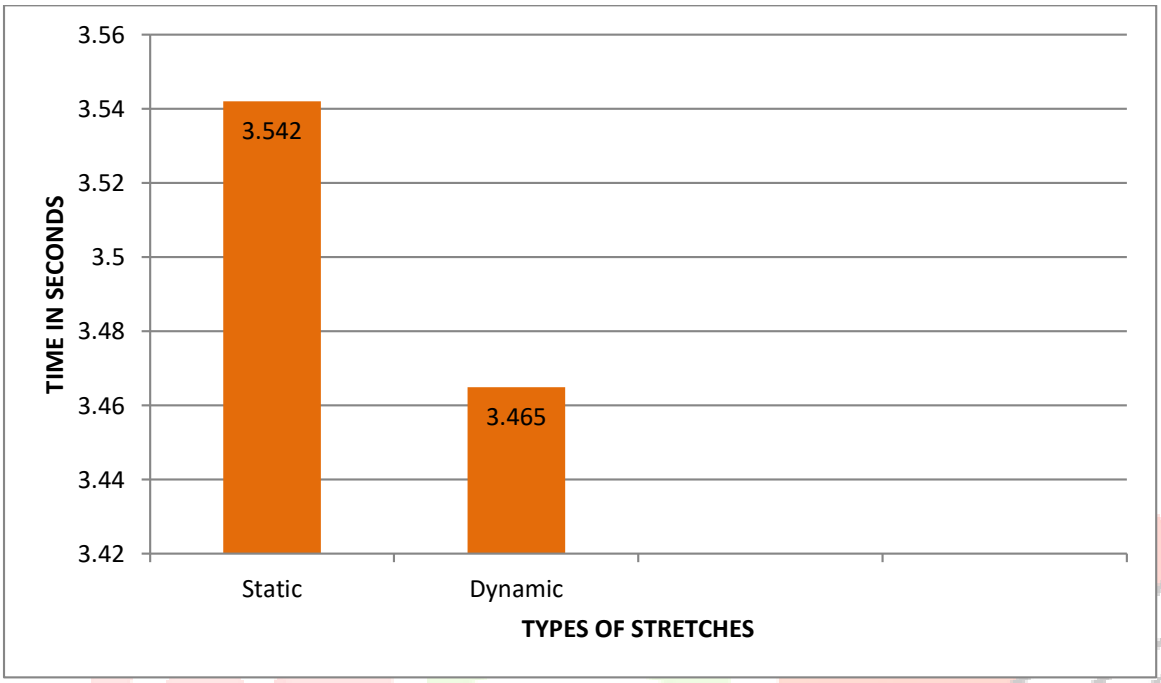
Data was collected and analyzed using the SPSS 12 software with the level of significance set at 0.05

Data were analyzed using the paired t-test

Results

- 30 male soccer players with a mean age of 21 were included in the study.
- The mean value of the time(seconds) taken to sprint post static stretching was 3.542 seconds and post dynamic stretching was 3.465 seconds.

mean value of the time(seconds) to sprint post static and dynamic stretching



- There was a statistically significant improvement in the sprint performance post dynamic stretching, the p-value = 0.001, by the paired t-test.

Discussion:

- It was found that there was a significant improvement in the sprint performance post dynamic stretching.
- As seen in the graph the mean value of the sprint time post dynamic stretches is 3.465 and post static stretches are 3.542.
- This implies that the dynamic stretch has a vital role to play as an adjunct in the output expected.

Dynamic Stretches and sprint performance

Sprinting **is running over a short distance at the top-most speed of the body in a limited period of time**. The above study was undertaken to evaluate the effect of static stretching Vs dynamic stretching on the sprint performance of football players. There was a significant improvement seen in the sprint performance post dynamic stretching, the reasons for this observation could be as follows:

Dynamic stretching defined as controlled movement through the active range of motion for one or more joints. It not only mimics part of the sprint cycle but there is an also involvement of ground contact which evokes myotatic stretch reflex.(14) myotatic reflex refers to the contraction of a muscle in response to its passive stretching by increasing its contractility as long as the stretch is within physiological limits. The magnitude of this myotatic reflex is related to stretching velocity (12, 13); by increasing stretch speed (as demonstrated in dynamic stretching), greater action potential of the myotatic reflex may result. The Increased in sprint performance come via rehearsal of specific movements and proprioception. In sprinting at the end of the swing phase the hamstrings undergoes an eccentric contraction where it is at its longest length; however concentric contraction occurs in the early phase of stance. To avoid injury and for better performance the contraction of the same group of muscles in different ways is important. The dynamic stretching movement allows an optimum shift from the eccentric to concentric muscle contraction which helps to generate high running speeds. enhancing performance has been linked to the rehearsal of movement patterns, helping (9) . The dynamic stretch has greater mechanical effect by increasing musculotendinous stiffness, thus helping to explain the increased running speeds.

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Static stretches were not as effective, the reasons could be as follows:

1. Static stretches before warm-up or competition could cause tiredness and decrease coordination. For a pre-participation routine before an explosive type activity, static stretching may not optimally prepare the athlete for the dynamic demands that would be placed on the body.
2. Also according to the musculotendinous theory, prolonged duration of stretch increases the sarcomere length which creates a greater slack along with greater time to overcome the slack; therefore a weaker contraction.

Conclusion :

This study shows that dynamic stretching is more effective in increasing sprint performance as compared to static stretching.

Conflict of interest: This study shows no conflict of interest.

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