

COMPARISON OF STATIC AND DYNAMIC STRETCHING
ON HAMSTRING FLEXIBILITY AMONG CONTACT SPORTS
ATHLETES

NOR NAJIHAH BINTI SAMINGUN

UNIVERSITI PENDIDIKAN SULTAN IDRIS

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DECLARATION

I hereby declared that all the writings, works, and the idea in this research report

Is my own ideas and concept except for reference

Which have been fully acknowledged

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COMPARISON OF STATIC AND DYNAMIC STRETCHING ON HAMSTRING FLEXIBILITY AMONG CONTACT SPORTS ATHLETES.

ABSTRACT

The purpose of this research is to compare the static and dynamic stretching on hamstring flexibility among contact sports athletes. Twenty-six UPSI contact sports athletes age from 19 to 25 years old, while their BMI's ranges from 17 to 30 were randomly allocated to Static Stretching (SS) (n=13) and Dynamic Stretching (DS) (n=13) groups. The subjects undergone pre-test and post-test of Active Knee Extension Test (AKE) using universal goniometer to measure their hamstring flexibility. They will follow the designed stretching protocol according to their groups accompanied with aerobic running for 3 times per week for total of 4 weeks stretching program. The data were analyzed by Paired and Independent T-test. Paired T-test result shown that there was a significant improvement in the knee angle between the pre-test and post-test in both SS ($t = -10.823$, $p = 0.001$; left leg and $t = -9.870$, $p = 0.001$; right leg) and DS ($t = -0.144$, $p = 0.887$; left leg and $t = -0.463$, $p = 0.647$; right leg) in hamstring flexibility after 4 weeks intervention. However, independent t-test revealed that the results was not statistically significant between the post test of SS group and DS group with $t = -0.144$, $p = 0.887$ for left leg and $t = -0.463$, $p = 0.647$ for right leg. Therefore, the findings of this study revealed that 30 seconds of both static and dynamic stretching for 4 weeks can be effective program to improve hamstring flexibility however there was no stretching mode that are more effective in increasing hamstring flexibility among UPSI contact sports athletes.

Keywords: Stretching, static, dynamic, hamstring, flexibility, contact sports athletes

PERBANDINGAN ANTARA REGANGAN STATIK DAN DINAMIK PADA KELENTURAN DALAM KALANGAN ATLET SUKAN KONTAK

ABSTRAK

Tujuan kajian ini adalah untuk membandingkan regangan statik dan dinamik pada kelenturan hamstring dalam kalangan atlet sukan kontak UPSI. Dua puluh enam atlet sukan yang dihubungi berumur dari 19 hingga 25 tahun, manakala julat BMI mereka dari 17 hingga 30 diperuntukkan secara rawak kepada kumpulan Regangan Statik (SS) (n=13) dan Regangan Dinamik (DS) (n=13). Subjek menjalani ujian pra dan ujian pasca *Active Knee Extension* (AKE) menggunakan goniometer universal untuk mengukur kelenturan hamstring mereka. Mereka akan mengikut protokol regangan yang direka mengikut kumpulan mereka disertai dengan larian aerobik selama 3 kali seminggu untuk program regangan selama 4 minggu. Data dianalisis dengan ujian-T Berpasangan dan Bebas. Keputusan ujian-T berpasangan menunjukkan terdapat peningkatan yang ketara dalam sudut lutut antara ujian pra dan ujian pasca dalam kedua-dua SS ($t = -10.823$, $p=0.001$; kaki kiri dan $t = -9.870$, $p=0.001$; kaki kanan) dan DS ($t = -0.144$, $p=0.887$; kaki kiri dan $t = -0.463$, $p=0.647$; kaki kanan) dalam fleksibiliti hamstring selepas campur tangan 4 minggu. Walau bagaimanapun, ujian-t bebas mendedahkan bahawa keputusan adalah tidak signifikan secara statistik antara ujian pos kumpulan SS dan kumpulan DS dengan $t = -0.144$, $p=0.887$ untuk kaki kiri dan $t = -0.463$, $p=0.647$ untuk kaki kanan. Oleh itu, dapatan kajian ini mendedahkan bahawa 30 detik kedua-dua regangan statik dan dinamik selama 4 minggu boleh menjadi program yang berkesan untuk meningkatkan fleksibiliti hamstring namun tiada mod regangan yang lebih berkesan dalam meningkatkan fleksibiliti hamstring di kalangan atlet sukan kontak UPSI.

Kata kunci: Regangan, statik, dinamik, hamstring, fleksibiliti, atlet sukan kontak

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CHAPTER 1

INTRODUCTION



1.1 Introduction

Warming up before exercise is a proven strategy for athletes to prepare themselves physically and psychologically for peak performance. Warm-up programs usually include submaximal aerobic activity (e.g., running and cycling) and stretching activities. Stretching is said to improve athletic performance, prevent injury, relieve muscular pain, and promote flexibility. According to Weerapong, Hume, and Kolt, (2004), stretching is demarcated as any movement that uses an external and/or internal force to enhance muscle flexibility and or joint range of motion.



To enhance ROM, the stretching of muscles and connective tissues around the joint are crucial. Flexibility and range of motion are constantly linked. Stretching can help to increase the connective tissue around the surrounding joint. There are many categories of stretching such as static stretching, dynamic stretching, ballistic stretching, proprioceptive neuromuscular facilitation (PNF), active stretching, passive stretching and others. The purpose of stretching beforehand any activity is intended to increase muscle–tendon unit length and flexibility consequently increased flexibility may aid to improve sports function and reduce the risk of injuries. Many studies have proven that stretching can help with hamstring flexibility. However, there is still a gap in knowledge whether which types of stretching modes are far superior in increasing hamstring flexibility.

Flexibility is the ability to extend the muscles to allow a joint or many joints to move based on the full range of motion. This statement is supported by Zachezeweski which is he has defined muscle flexibility as the muscle's ability to lengthen to allow a joint or more than one joint to move in the full range of motion. (Page, 2012). The ability of a muscle to return to its normal length means that it loses flexibility. This condition narrows the range of motion of the joint. We need the flexibility to increase your ROM. It is important to stretch the muscles and other connective tissue around the joints. If not stretched, it can strain the muscles (Mondam, 2017).

Static stretching (SS) is an exercise that involves adopting a body posture near the end of a joint's ROM and holding it still for a certain length of time, generally 10 to 30 seconds. In a typical warm-up before rigorous exercise, such a stretch would be repeated after a short-term recovery, for a total stretch time of 0.5 to 2.0 minutes per muscle group (Young, 2007). Moreover, according to Kay, and Blazeovich, (2012),



static stretching relaxes and lengthens muscles, increasing ROM, decreasing musculotendinous stiffness, and lowering the risk of acute muscular strain injuries. It is a slow and controlled movement that focuses on postural awareness and body alignment.

Moreover, in a narrative review by Lima, Ruas, Behm, and Brown, in 2019, dynamic stretching is defined as an exercise that includes performing motions throughout a complete or nearly full range of motion (ROM). These motions are usually carried out under-regulated settings. The focus, however, is on the regulated movement. Dynamic stretching is also believed to have many benefits such as similar movement patterns between stretching and exercise. Dynamic stretching exercises can also increase core body temperature, which increases nerve conduction velocity, muscle compliance, and enzyme cycling, thereby promoting energy production.

Besides that, the effects of the dynamic and energetic movement of dynamic stretching tend to augment rather than diminish the central drive, (Behm et.al, 2016). Besides that, research done by Brahim and Chan, in 2016 among male Sukma sprinters showed that dynamic stretching alone resulted in a faster time (3.16 ± 0.090) to complete the 20-meter sprint test compared to combined static dynamic stretching.

Furthermore, both static and dynamic stretching has been prevalent technique to improve flexibility. Flexibility is an important aspect of physical fitness. A prospective study by Ruiz-Pérez, López-Valenciano, Jiménez-Loaisa, Elvira, Croix, and Ayala, in 2019, reported that knee injuries had the highest injury load (31.9 days loss / 1,000 hours exposure), followed by quadriceps (15.3 days loss / 1,000 hours) and hamstring strain (14.4 days loss / 1,000 hours) in sub-elite female futsal players. Besides that, a research that done by Yap, Chuen, VinodKumar, and Viswanath, in 2020



to investigate the relationship between hamstring flexibility and skill performance in collegiate recreational futsal players and they reported that there is a strong association between the hamstring flexibility scores and skills performance scores with $r = 0.701$, $p < 0.001$. This shows that hamstring flexibility is an important factor in improving futsal skill performances that are unique to the game, as well as in sustaining performance and lowering the risk of injury among players.

However according to the review by Opplert, & Babault, (2018) who reviewed 84 papers and found contradictory findings which were some research demonstrated that static stretch was more effective than dynamic stretching in improving ROM while there was research that reported that dynamic stretching offered similar or larger acute gain in flexibility than static stretching. Therefore, this study would help in adding information in identifying whether static stretching or dynamic stretching would be more effective for increasing flexibility during warm-up thus it is important to determine the critical information on the acute effect of static stretching and dynamic stretching on flexibility contact sports athletes.

1.2 Problem Statement

Stretching has been used as part of the warm-up program in both training and competition for decades in an attempt to improve flexibility, sports performance, and injury prevention. The main purpose of stretching is to increase the length of the skeletal muscle unit or the distance between the origin and insertion of the skeletal muscle.

Flexibility is essential for proper biomechanical function. Muscle tension is caused by a decrease in the ability of muscles to deform.

Moreover, contact sports such as football, rugby, futsal, field hockey and others often suffer from muscle tightness due to their strenuous and fast pacing that includes running thus muscle tightness is more likely to occur in them. Lower extremity injuries were by far the most common place for an injury, with an incidence rate of 6.8 injuries per 1000 hours of exposure, as predicted. The most usually damaged anatomical region was the thigh, followed by the knee. Furthermore, muscle/tendon injuries were the most prevalent kind of injury grouping. Previous epidemiological research has consistently revealed that the hamstring muscles are the most often injured muscle group in professional football players. (López-Valenciano et al. 2020). Hamstring tightness increases the likelihood of recurrent injuries, reduces athlete performance, causes post-exercise pain, and reduces athlete coordination (Koli, and Anap, 2018).

In attempting to reduce hamstring tightness and increase its flexibility, stretching techniques such as active and passive stretching were introduced. Although passive and active static stretching (SS) methods appear to yield the biggest increases in ROM, it is well known that they can also cause acute deficits in muscle function (Lima et al., 2019). As a result, dynamic stretching techniques have been included into athletes' routines because they involve more sport-specific dynamic motions and cause increases in body temperature which can decrease tissue viscosity and enhance neural conduction velocity. Meanwhile, according to systematic review paper by Opplert, and Babault, (2018) that reviewed 84 papers reported that there is a substantial amount of research indicating that dynamic stretching has either positive or neutral impact on subsequent muscular performance however more research is needed to explain these

contradictory findings and to identify whether dynamic stretching, rather than static or ballistic stretching, would be more effective for increasing flexibility during the warm-up.

Stretching has a number of additional benefits to neuromuscular system however there are still gap in the information regarding which type of stretching whether static or dynamic offers more benefits in terms of hamstring flexibility thus more research is needed to fill in the gap. As a result, it sparks the interest in exploring their possibilities after 4 weeks intervention. This study could help with determine the critical information obtaining with the effect of these stretching thus help to reduce the potential hamstring injuries and increased sport performance.

1.3 Justification of the study

1. There are contradictory findings in identifying whether static stretching or dynamic stretching would be more effective for increasing flexibility during warm up.
2. Moderate amount of research that devoted to the acute effect of static and dynamic stretching on the flexibility among contact sports athletes.

1.4 Implication of the study

1. This study could help in ascertain the acute effect of static and dynamic stretching on the flexibility among contact sports athletes.
2. The findings from this study could help sports therapist using stretching protocol in designing injury prevention programs, warm-up protocol and rehabilitation programs.
3. This study could help enhancing athlete's knowledge in stretching and warm up protocol and also help reducing the injury prevalence while increasing their performance.

1.5 General Objective

The general objective of this study is intent to explore the effect of static stretching and dynamic stretching on hamstring flexibility among UPSI contact- sports athletes.

1.6 Specific objective

1. To determine the effect of static stretching on hamstring flexibility among UPSI male contact sports athletes.
2. To determine the effect of dynamic stretching on hamstring flexibility among UPSI male contact sports athletes.

3. To distinguish between the static stretching and dynamic stretching which are more effective in increasing hamstring flexibility among UPSI male contact sports athletes

1.7 Research questions

1. Is there any effect of static stretching on hamstring flexibility among contact sports athletes?
2. Is there any effect of dynamic stretching on hamstring flexibility among contact sports athletes?
3. What are the differences between the effect of static stretching and dynamic stretching on hamstring flexibility among contact sports athletes?

1.8 Hypothesis

H₀. There is no statistically significant difference after acute static and dynamic stretching on hamstring flexibility among contact sports athletes?

H_a. There is a statistically significant difference after acute dynamic stretching on hamstring flexibility compared to static stretching among contact sports athletes?

1.9 Limitation of Study

- a) This study is being done during the competition season (Sukipt) thus the athletes are at their peak performance and that might influence the results of the intervention.
- b) The researcher also cannot control and monitor the subjects training program schedule as well and other activities during the intervention period.

1.10 Operational definitions

1) Static stretching

Passively extending the joint to a position close to maximum and hold it for a long time (15-30 seconds).

2) Dynamic stretching

The active stretching of the joint that includes muscular contractions to move the joint through its complete active range of motion.

3) Flexibility

Muscle flexibility is defined as the muscle's capacity to extend in order to allow a joint or multiple joint to move in complete range of motion.

4) Hamstring flexibility

The ability hamstring muscle to contract through a joint or series of joints to move through an unrestricted, pain free range of motion that will be measured using Active Knee Extension Test (AKE).

5) Contact sports

Contact sports are sports in which participants inevitably come into physical contact with each other.



1.11 Summary

This chapter presented the introduction of the information regarding the stretching types which is going to be the variable in this study which are static stretching (SS) and dynamic stretching (DS). Besides that, problem statement, objective, research questions, hypothesis also mentioned in this chapter

