

## Research Article

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# EFFECTS OF COMBINED SAQ TRAINING AND FLEXIBILITY TRAINING ON INCREASING THE AGILITY IN FUTSAL PLAYERS

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## Abstract

The purpose of this study was to investigate the effect of combining S.A.Q. and flexibility training program on the agility of futsal athletes. The quasi-experimental method was employed in this research. The sample group consisted of 20 male futsal athletes between the ages of 18 - 23 years from Naresuan University Phitsanulok Province, obtained using purposive sampling techniques. The samples were randomly allocated to the control group (CG; n=10) and experimental group (EG; n=10). Both groups received regular training program (including the endurance running, speed ladder drills, speed pyramid, and futsal playing) 5 times a week for a period of 8 weeks. In addition, the experimental group received training by combining the SAQ training and flexibility training for a period of 8 weeks. The Illinois Agility Test was administered to assess the agility of both groups before and after training and results recorded. Data were analyzed using independent samples t-test and dependent samples t-test. The level of statistical significance was .05. The results showed that there was no difference in the agility as reflected by the Illinois agility test between groups before training. After training, the experimental group had agility significantly higher than before ( $P < .05$ ). The time covered ( $16.66 \pm .52$  s) than the control group ( $17.36 \pm .68$  s), whereas no changes were observed for control group compared to baseline ( $P < .05$ ). Conclusively, this study demonstrated that an implementation of SAQ training and flexibility training was effective for increasing athlete's agility as reflected by the Illinois agility test.

**Keywords:** Combined Training, Agility, Futsal Players

## Introduction

Futsal is popular widely played around the world with more than 12 million people playing futsal in more than 100 countries in the world, playing at both amateur, semi-professional and professional levels (Moore, et al., 2014, p.108; Alexander, 2016). In Thailand, futsal is popular and had been developed into a professional sport. In some countries, futsal is used as a tool to develop youth athletes into sports for excellence and professional sports in the category of football and futsal and the development of futsal athletes

must develop both physical and technical fitness. and the tactical side especially in terms of physical fitness is a very important component because futsal is a sport that is played quickly. The intensity of the activity is quite high. Athletes must be on the move at all times. Therefore, if physical fitness training is not good it will affect the technical and tactical elements and the efficiency of using unique skills in both offensive and defensive games will deteriorate and the chances of being a winning team will be less.

In addition, there must be movement to receive the ball and defend opponent's attack. As such, it requires the ability to move quickly in terms of agility, must have good relationship and team collaboration, with high unique ability especially the direction of body movement to avoid the opponent from getting the ball as the mechanical performance is an important foundation in the sport of futsal and is the first qualification for every futsal athlete and every position of play. Therefore, it becomes necessary to develop the player's abilities, including speed, strength, agility and reflexes, consistent with Prompoy (2002, p. 1). Good human motor performance and factors that affect mechanical skills are flexibility, speed, agility, muscular endurance and Cardiovascular Endurance. The success of the competition depends on a number of factors, one of which is physical fitness, which if any futsal athlete is in full possession, this makes him an excellent futsal athlete.

In the sport of futsal, athletes must move with a free body that is accelerated, slowing down, changing direction of movement to avoid articulation and defense to the opponent to find an area to receive the ball and moving into the shot. This is a mechanical skill related to sports. This is the agility of futsal. This is a mechanical skill related to sports, referred to as the agility of futsal. Therefore, agility is a very important base of physical fitness in futsal. In any sporting event, if an athlete can effectively control their movements and relate it to the steps of their motor skills in competition, it will benefit the athletes themselves. Fast positioning in accordance with the nature of the movement pattern will result in an advantage in the on-going game at every opportunity and every stroke that athletes can make, the coach should understand the principles and methods of training to develop agility and agility to match the movement and movement skills in that sport has got its own specific pattern (Krabuanrat, 2014, p. 14). Therefore, it is important to design different training programs to suit the skills and specificity of the sport.

The SAQ training is a widely used and accepted form of training for agility development consisting of, speed and agility exercises According to Hale (2004), states that the SAQ training is popular and uses the principle of neurodegenerative and muscular relationship training enabling efficient and accurate movements in difficult situations. Athletes with neural connections and muscle will learn skills quickly and can perform the skills well.

Athletes with high mobility have a number of advantages. This pattern assists in changing direction to evade opponents and the ability to dribble, which requires speed, agility and quick reflexes. If SAQ training is accurate and skillful, it will help to show off skills as well and in addition to enhancing the agility of futsal athletes it eases the change of direction when running as it softens ligaments and joints which affects the mobility of futsal athletes. This is consistent with Chansri (2005, pp. 6-8) who states that strengthening mobility must be based on training principles as the basis of the activity and must practice that movement

correctly, repeatedly and at high speed, where flexibility is the ability of body joints, in the muscles, to have the full range of body motion possible. There is a movement of the body as possible to a full range of movements. Flexibility training should be practiced during puberty. This will have a greater effect than other ages, practicing memory to make it more agile, as well as precisely controlling the direction of movement.

Therefore, the researcher was interested in studying the development of agility in futsal athletes by combination of SAQ training and flexibility program on futsal agility of futsal athletes. This is another form of training that will help improve physical performance in Thailand's futsal athletes to be more effective and it is beneficial to futsal coaches as they can choose an appropriate training style and achieve maximum efficiency with the further development of futsal athletes

## **Research Objectives**

1. To study the effect of combining the S.A.Q. and flexibility training program on the agility futsal players.

1.1 To compare the effect of the S.A.Q. mix training program with the flexibility training program on the agility of futsal players before and after the training between the control group and the experimental group.

1.2 To compare the results of the training with S.A.Q. program and the flexibility training program on the agility of the futsal players before and after training for the experimental group.

## **Research Methodology**

### **Research Design**

This research was a Quasi -Experimental study

### **Research period**

This Quasi -Experimental study was conducted for a total of 8 weeks

### **Research sample**

**The sample consisted of 20 male** futsal players from Naresuan university, Phitsanulok, selected using purposive sampling technique. The age range for the sample population was 18 and 23 years. The sample was selected taking into consideration variables such as how long they can run assessed using the Illinois Agility Test. To gain more confidence in conducting the research, all participants had to sign a consent form to participate in the research. The research was reviewed and approved by Human Research Ethics Committee, Naresuan University P2-0144/2564. The research objectives were explained to the in order to enable participation decide whether to volunteer in this study or not. After voluntary acceptance, participants were selected based on some criteria as follows:

### **Criteria for selecting research participants**

Male futsal player, aged between 18 and 23 years old, Naresuan University, Phitsanulok Province, no history of cardiovascular disease, acute and chronic severe musculoskeletal, nervous system, or other diseases that may cause adverse effects of the research

### **Criteria for exclusion or elimination of research participants**

The participant was injured to an extent that they could not continue their research, and the participants voluntarily agreed to leave the research themselves.

### **Research Instruments**

#### **1. Experimental instruments**

- 1.1 S.A.Q. program with flexibility training program
- 1.2 1/100 second time reader (SMARTSPEED PT Product, fusion sport Australia)
- 1.3 Scales
- 1.4 Stadiometer
- 1.5 Whistle
- 1.6 Yellow -red flag
- 1.7 A distance measuring tape
- 1.8 Rubber cone

#### **2. Instruments used for data collection**

An Illinois Agility Test developed by Getchell (1979) whose Intraclass correlation coefficient had been determined at 0.888 was used for data collection

### **Research Procedures**

Firstly, a screening of volunteers by having volunteers sign a consent form to participate in research. The researcher explained the research aims and procedures involved in the study to the participants before opening the opportunity for them to decide whether to voluntary participate in the study or not. After that, a vital sign assessment was conducted consisting of: blood pressure and heart rate and then perform physical characteristic tests by measuring their weight and height. The volunteers had normal vital signs.

Secondly, volunteers familiarized themselves with the Illinois Agility Test on day 1 in advance of the actual data collection.

Thirdly, data was collected before training by performing the Illinois Agility Test and the results recorded.

The volunteers (research participants) were randomly divided into 2 equal groups by drawing lots. Divided into a control group of 10 people and an experimental group of 10 people, the training program was given in each group for a period of 8 weeks.

Fourthly, data were collected in the 8<sup>th</sup> week after training for both the control and experimental groups using the Illinois Agility Test and the results recorded in the form. and then used for statistical analysis.

### **Training Method**

#### **1. Training programs for control groups include:**

- 1.1 Running 10 laps around the field within 10 minutes.
- 1.2 Pyramid sprint, 80 meters in 30 seconds, 40 meters in 20 seconds and 20 meters in 10 seconds, run 1 time per round, repeat 3 times for duration of 6 minutes.

1.3 Inter-team training, 5 members per team for 40 minutes, trained 5 times a week for 6 consecutive weeks.

## 2. Training program for the experimental group

2.1 They practices same as the control group consisting of:

2.1.1 Running 10 laps around the field within 10 minutes.

2.1.2 Pyramid sprint: sprint 80 meters in 30 seconds, 40 meters in 20 seconds, and 20 meters in 10 seconds, running 1 time per lap, repeat 3 times, 6 minutes duration.

2.1.3 Inter-team training, 5 members per team for 40 minutes, trained 5 times a week for 6 consecutive weeks.

2.2 Two additional training exercises include:

SAQ training program combined with the flexibility training program in Weeks 1-8 Consists of training as follows:

### 2.2.1 SAQ Program

The training duration was 8 weeks. For weeks 1-2, training was done twice a week. For weeks 3-4 training was conducted 3 times a week, for weeks 5-6, training was done 4 times a week, and in weeks 7-8, training was conducted 5 times a week by doing a total of 5 exercises:

Exercise 1, a training program for futsal athletes running in the T-shape direction (T)

Exercise 2, a training program for futsal athletes running in the Y shape direction (Y).

Exercise 3, a training program for futsal athletes who run in alternating directions switches the extension legs with a 5-meter fast run.

Exercise 5, a training program for futsal athletes running in the lateral direction and alternating legs with a 5-meter fast run.

The number of exercises is 3 rounds, in addition to the futsal training that is the same as the control group, which is assigned by the futsal team coach of Naresuan University, Phitsanulok province, were set every day.

### 2.2.2 Flexibility training program

The training duration was 8 weeks. For weeks 1-2, training was done twice a week. For weeks 3-4 training was conducted 3 times a week, for weeks 5-6, training was done 4 times a week, and in weeks 7-8, training was conducted five times a week, with two muscle stretches, 10-15 seconds each, 16 moves, according to the group.

#### **Muscles as follows:**

- Stretching of shoulder muscles and back upper arms

- Stretching of thigh muscles

- Stretching hip muscles

- Stretching of upper arm, back and back shoulder muscles;

- Stretching of torso/trunk muscles

- Stretching of the back shoulder muscles and muscle groups that help rotate the shoulder

Before training and after 8 weeks of training, both the control and experimental groups were assessed using the Illinois Agility Test and data analyzed

## Data Analysis

The data from the study were shown in the form of mean and standard deviation (Mean $\pm$ SD) and were statistically processed using a packaged program (SPSS version 25). The Test for Goodness of fit with Shapiro- Wilk test found that the data was distributed normally. Therefore, independent samples t-test was used to compare variable data between the control group and the experimental group and using Dependent samples t-test statistics to compare the variable data within the group before and after training, setting the statistical significance level with p-value $<0.05$ .

## Results

There were 20 male futsal volunteers participating in the study, divided into two groups: a control group of 10 and an experimental group of 10 by physical characteristics of each volunteer in each group.

**Table 1** Summary of the physical characteristics of the subjects in the control group and the experimental group.

Variable	Control group	Experimental group
Age (year)	20.5 $\pm$ 0.5	20.2 $\pm$ 0.6
Weight (kg)	64.9 $\pm$ 10.7	20.2 $\pm$ 0.6
Height (cm)	171.2 $\pm$ 3.9	171.5 $\pm$ 4.2

Display values in terms of mean  $\pm$  standard deviation (Mean $\pm$ SD)

From Table 1, the physical characteristics of the volunteers in both groups had no difference in mean and standard deviation of age, weight, and height. The control group had mean age, weight and height of 20.5 $\pm$ 0.5 years, 64.9 $\pm$ 10.7 kg and 171.2 $\pm$ 3.9 cm. The experimental group had mean age, weight and height of 20.2 $\pm$ 0.6 years, 20.2 $\pm$ 0.6 kg and 171.5 $\pm$ 4.2 cm, respectively.

**Table 2** shows the comparison of the results of the combination of S.A.Q. and flexibility training program on Agility of futsal athletes before and after training between the control and experimental groups.

Group	Pre test				Post test			
	Mean	SD	t	Sig.	Mean	SD	t	Sig.
Control group	17.35	.84	- .154	.881	17.16	.67	5.562*	.000
Experimental group	17.36	.68			16.66	.52		

From Table 2, a comparison of the results from the Illinois Agility Test of futsal athletes before and after training for the control and experimental groups, it was found that after training futsal athletes, the experimental group was agile, and the Illinois Agility Test was statistically significantly higher than the control futsal athletes at .05.

**Table 3** shows the comparison of the results of the combination of S.A.Q. and flexibility training program on the agility of futsal athletes before and after training for the experimental group.

Experimental group	Mean	SD	T	Sig
Pre test	17.36	.68		
Post test	16.66	.52	8.054*	.000

\* $p < .05$

From Table 3 presents a comparison of agility of the experimental group from the Illinois Agility Test before and after training for the experimental group. Participants in the experimental group were found to be agile. The Illinois Agility Test score after training was statistically significantly higher than before at the .05 level.

## Discussion

Effects of a combination of S.A.Q. and flexibility training program on the agility of futsal athletes. The pre- and post-training data in each group revealed that both the control and experimental groups showed increased agility. This is a development that results from a combination of SAQ training program with flexibility training program. According to Krabuanrat (2014, p. 28), the development of the ability of athletes to progress to the highest level, a continuous and systematic training plan must be planned with increment of the intensity level for each interval of the training session sequentially in order to progress the training as it stimulates and develops from one level to another and will remain so until more training loads are added.

A comparison of the agility of futsal athletes between the control group and the experimental group, revealed that the experimental group had better agility than the control group with a statistical significance at .05 level. This explains that the control group who received regular training according to the trainer's program for 8 weeks showed no difference in agility compared to before and after training. Therefore, such training programs may not have an effect on increasing agility. According to the ACSM recommendations, a training program to increase respiratory endurance and a heart for normal people should train at least 5 times per week at moderate intensity, keeping your heart rate in the range of 64-76% of HRmax, or at least 3 times per week at vigorous intensity with heart rate values ranging from 77-93% of HRmax (Walter & Thompson, 2010).

However, when analyzing the training program received by the control group which consists of running around the field 10 laps, running pyramids and teaming down, which is a program that focuses on speed performance and relationship coordination. Therefore, the training program that the control group received may not be a specific training program for agility development performance. The results were consistent with Nageswaran (2013) who conducted a study on the effect of S.A.Q. program training on speed, agility and balance was found that there was a statistically significant difference because the experimental group after training with the SAQ program had speed, agility and balance better than the control group.

In the experimental group, the SAQ training and flexibility training were combined with the same pattern training that the control group received by the control group.

The results of the study revealed that after the training, the agility for the experimental group was higher than before. The results of this study were in line with Tokirie (2018) who examined the effects of SAQ

training program on agility on the dribbling ability of futsal players at the tertiary level, and it was found that the agility of the experimental group after the 4<sup>th</sup> and 6<sup>th</sup> week of training was significantly better than before at a statistical level of .05 and also in accordance with Pipatpaisankoon et al. (2017) who studied the effect of agility training on table tennis students in the institute of Physical Education Lampang Campus and found that the mean agility - after 8 weeks of training with the second experimental group who trained using the SAQ training program was better than the first experimental group who trained with the normal training program. The findings were also consistent with Oakley (2007) who conducted a study on static stretching and mobile muscles stretching affecting speed and agility. Both stretching types showed that the reduction in time was different. There was a reduced effect and when compared to the control group also shows that Mobile stretching group have a lesser stretching time than the static stretching group. This is consistent with Trambadia and Jadav (2012) who studied the effects of stationary stretching patterns and mobile stretching patterns affecting tennis players' agility and found that after both types of stretching exercises. There is a statistically significant increase in agility of tennis players as a result of the stretching exercise which allows the body and joints to be in constant motion which allows people with good flexibility to move better as the thigh muscles, calf and tendon muscles play an important role in the movement of futsal.

It is observed that the combination of SAQ training program and the flexibility training program was effective in enhancing the agility of futsal athletes after a period of 8 weeks. However, the study of the mechanisms arising from the combination of SAQ training program and the flexibility training program in training the futsal athletes should be further studied.

## Conclusions

This study concluded that the combination of SAQ and flexibility training program was effective in improving the agility of the futsal athletes.

## Recommendations

### Recommendations from research

1. Futsal trainers can use the S.A.Q. mix training program together with the flexibility training program as a training guide to enhance physical performance, speed and endurance for futsal athletes which is very useful in competing for the team's success.
2. In the practice of mixing the S.A.Q. program with the flexibility training program to have better performance, one aspect of the training style can be adjusted according to the circumstances and suitability.

### Recommendations for future research

1. Research studies should be conducted on the effect of a combination of SAQ training program with flexibility training program on agility in other sports such as football, rugby, soccer, etc.
2. There should be a development of a joint training program in many areas to strengthen the physical fitness of futsal athletes, such as increasing muscle strength and general endurance.

3. There should be a continuous implementation of the SAQ training program together with the flexibility training program for futsal athletes with increased time in order to practice as well as develop physical fitness for futsal athletes better.

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