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SportMont

ORIGINAL SCIENTIFIC PAPER

The Effect of Static Stretching in Agility and Isokinetic Force at Football Players

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Abstract

The repercussion is an essential of the football training, also called "Cool Down". Static stretching and slow running are typical activities of this section, but in the last few years static stretching has had a great influence on performance functionality and is one of the most debated topics in sports sciences and medicine. The aspiration of this research is to show the impact of recovery associated with static stretching and the agility performance of young football players. This research was conducted between August and November with a sample of 20 players age 12.1±0.3 years (range 11-13 years) separated into two groups- control and experimental. First measurements that have been initiated are body weight 40.6±6.5 kg, height 152.6±6.9 cm and agility performance (Ajax test 5x10 m and zig-zag test with and without ball). Agility was measured with electronic photocells', with a measurement of .01 sec. Experimental testing proposed that both groups have completed the regular training program, while the experimental group (despite the control group) during the recuperation (cool down) except running, they conveyed out the experimental treatment / static stretching exercises. Each exercise lasts at least 20 seconds. After completing the experimental program members in both groups underwent final measurements. The results that were reached by univariate analysis of variance (ANOVA) at initial and final measurements, have shown insignificant statistical values between the control and experimental group in the agility performance.

Key words: *static stretching, recovery, agility, soccer players*

Introduction

Football is a sport that is represented by numerous and heterogeneous complex dynamic kinesiology activities that are represented by a large number of cyclic and acyclic movements (Bjelica, Popović, & Petković, 2013; Gardasevic, Bjelica, & Vasiljevic, 2016). Preparation is essential for conditional execution of all technical and tactical assets items and responsible to differentiate high-level players from those at lower levels. During a football game a player performs various activities around 1200-1400, of which 700-800 motoric with change of direction movements (sprint, jumping, stop, restart, etc.) and only 11% of the total distance of these movements are executed with high intensity and with a decisive influence on the outcome of the game (Joksimovic et al., 2015; Reilly, & Williams, 2003; Stolen, Chamari, Castanga, & Wilsloff, 2005).

Every movement that takes place above is closely associated to agility performance and is greatly responsible for carrying out these movements affecting the success of the game of football (Popović, Akpinar, Jakšić, Matić, & Bjelica, 2013; Popović, Bjelica, Jakšić, Hadžić, 2014). Agility is a psychomotor skill that enables rapid change of direction of movement without losing control and balance of movement. In football, players change direction of movement in all directions at a given time and space, with and without ball. Accordingly, the goal agility training in football is to improve the speed of running of the players with fast change of direction of movement with and without ball, with brakes and quick and situational accelerations.

Therefore, precisely the situational agility (the prediction and reaction to the ball, the co-starter, the opponent, etc.) is

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one of the most important means in the selection of footballers, but also determines the success of the football game. Understanding the importance of agility on a football pitch, the planning of training sessions should be in the function of the optimal development of this skill. Numerous researches were done to prove the influence of training sessions, respectively, general and specific body exercises during training sessions. Numerous discussions were made about where, when until what mass and which form of stretching is with optimal indication in motoric performances. Amiri-Khorasani and Sotoodeh (2013) showed that different methods of stretching improved agility performance in young soccer players. On the other hand, there have been many studies (Amiri-Khorasani, Sahebozamani, Tabrizi, & Yusof, 2010; Herbert, & Gabriel, 2002; Milanovic, Sporiš, Trajkovic, James, & Samija, 2013) that have shown that static and dynamic stretching improved flexibility in soccer players and minimizes the risk of injuries to developing muscle (Amiri-Khorasani et al., 2010; Herbert & Gabriel, 2002; Milanovic et al., 2013; Witvrouw, Danneels, Asselman, D'Have, & Cambier, 2003). Nonetheless, recent studies (Marek et al., 2005; Faigenbaum, Bellucci, Bernieri, Bakker, & Hoorens, 2005) have shown that both static and dynamic stretching can decrease soccer performance, high-intensity (what) especially activities like repeat sprint and sprint performance over 5-30m (Behm, Chaouachi, Lau, & Wong, 2011).

For this reason, it is essential to confirm the importance of the static stretching phase (recovery) in agility performance of young soccer players. Recuperation of organism is one of many important components to increase sport performance (Rey, Carlos, Luis, & Joaquin, 2012; King, & Duffield, 2009; Kinugasa, & Kilding, 2009; Tesitore, Meeusen, Cortis, & Caprinica, 2007).

The cool-down phase of the training session is necessary to enhance the recovery where activities like slow running, and static stretching, are typical for this part. Relaxation of the body is reached by extension static (static stretching), as one of the fundamental processes that apply for prevention, and maintenance of physical performance components "recovery of the players" (Dawson, Gow, Modra, Bishop, & Stewart, 2005; Sporiš, Jovanović, & Kubla, 2010). Execution of a variety of movements such as changing the pace and direction of the movement, jumps, execution of technical elements, depends among other things than just the flexibility of the locomotor system (Vučetić, Šoš, & Rocak, 2003; Carling, Espie, Gall, Blomfieldc, & Julie, 2010; Gardasevic & Bjelica, 2013; Famisis, 2015). Static stretching for decades has been part of warm-up during training and competition in order to enhance sports performance, flexibility and prevention of injuries.

Numerous researches conducted in the last few years indicated that static stretching applied during warm -up has affected the reduction of specific motor performance such as speed, strength and explosive agility (Nelson, Driscoll, Landin, Young, & Schexnayder, 2004; Chaouachi et al., 2008; Behm et al., 2011; Gelen, 2010; Sayers, Farley, Fuller, Jubenville, & Caputo, 2008; Albrecht, Meier, & Zahner, 2001; Zakas, 2005). Research conducted suggests that during warm up applied dynamic flexibility exercises should be combined with static stretching exercises, with checked movements and optimal amplitude complete (ROM) which are very effective in the development of flexibility and improving power explosive type of sprint (Frederick, & Szymanski, 2001; Sporiš, 2007; Andersen, 2005). All forms of stretching are effective ways to increase the amplitude of movements (Walker, 2006; Magnusson, Aagard, Simonsen, & Bojsen-Moller, 1998). Static stretching after exercise is recommended as a precautionary measure for delayed-onset muscle soreness and improved dispersion range of motion through reduction of edema or tension of the muscle-tendon unit (Montgomery et al., 2008). In a survey conducted with 26 football coaches of Mauritius Football Association (MFA), 76% of them think that stretching exercises three times a week in the run-up and 2 times a week during competition, as well as regular sessions with a total duration of 0.6 to 1.3 hours per week (Kelly, Fawzi, & Rajiv, 2012).

The main goal of this study was to ascertaining the impact of static stretching exercises applied during a recovery stage of the training session (Cool-down) on agility performance of young soccer players.

Methods

To accomplish this research, initially all samples were conducted at a medical control center of sports medicine in Pristina and confirmed that all the players are sufficiently healthy to train for football, and in accordance with the statement of Helsinki, all participants were informed of the purpose and procedures of testing and experimental treatment.

Participants

In this study twenty young players U13 have participated, from Football club Ramiz Sadiku from Prishtina led by coaches licensed by UEFA who have held regular training sessions.

Procedures

Twenty participants with an average age 12.1±0.3 years (range 11-13 years), are measured initially by body height 152.6±6.9 cm (anthropometry of Martin) and body weight 40.6±6.5 kg (In body 720), and were divided into an experimental control group (n=10) to compare initial and final tests of body weight, body height and agility performance i.e. Ajax test 5x10 m and 20 m zig-zag test (with and without ball). Agility performance was measured with new test, i.e. Power timer 300 photocells with exact time of 0.01 sec. All measurements were performed on the parquet flooring at College Sports "University" of Pristina. The initial testing took place before the beginning of the pre-season while the final testing was performed at the end of the season (after 16 weeks of intervention with static stretching exercise). Players, after warming up procedure for 10-12 minutes, have undergone the agility test: Ajax test 5x10 m (Verheijen, 1997), test 20 m zig-zag with and without ball (Little, & Williams, 2006; Idrizovic, 2014). Participants in this research were separated into two groups (control and experimental) in length between August and November 2015, and have trained regularly 3 times a week i.e. 48 training sessions with a plan and program of the school's Football club, Ramiz Sadiku Prishtina.

Protocol of the control group as follows - general warm up 5-7 min, specific warm up 10-15 min, the main part of 35-45 minutes, cool down 10 min, recovery by running. Protocol of the experimental group as follows, general warm up 5-7 min, specific warm up 10-15 min, 35-45 min the main part, cool-down 25 min which includes recovery by running (10 min) and static stretching (15 min).

The experimental group (unlike control group) besides regular training, has also implemented an experimental program of recovery with static stretching that is part of the

cooling phase (cool- down) of the training session. The Experimental Program was developed by the author of the study based on the recommendations of the authors researcher of this area (Anderson, 2006; Walker, 2006; Lycholat, 1999).

The Experimental Program consisted of 17 exercises extension–static stretching upper body-flexibility exercises as follows Neck stretch Upper Back, Chest and Back, Shoulder and mid-upper Back, Shoulder and triceps, Lateral flexion right-left, and lower body flexibility exercises (hamstring Teo Leg Stretch, Achilles and Back Stretch, Quadriceps Stretch, hamstring and Groin Stretch, Standing Groin Stretch, Groin Stretch, Chest Stretch, Stretch Sitting hamstring, Lower Back Stretch, The hamstring Seat Leg Stretch, Stretch Tendon Achilles. Each exercise was executed for a period of 20 seconds.

Statistical analysis

Data analyses were performed using the SPSS version 21.0. The Arithmetic mean and standard deviation were calculated for both groups with initial and final measurements for anthropometric (body height and weight) and agility performance (Ajax test 5x10 m and zig zag 20 m with and without ball). Analyses of variance (ANOVA) are calculated differences between arithmetic mean of each variable of control and experimental group before and after the experimental treatment (static stretching). The level of significant is $p<.05$.

Results

The parameters are shown in Tables 1 and 2 for both groups (control and experimental) of initial and final measures.

Table 1. The significance of differences between arithmetic means of variables data of anthropometric (body height and body weight) and agility performance of the control and experimental group at the initial measurement

Variable	control group (M±SD)	experimental group (M±SD)	F	p-value
Age (years)	11.9±0.5	12.0±0.4	-	-
Weight (kg)	42.36±7.29	38.91±5.5	1.41	.250
Height (cm)	153.8±7.8	151.8±6.1	.543	.471
Ajax test 5x10 m	14.29±0.6	14.67±0.8	1.31	.267
Test 20 m zig-zag with out ball	7.21±0.7	6.93±0.3	1.29	.270
Test 20 m zig-zag with ball	9.04±0.4	9.17±0.6	.316	.581

The measurements data in Table 1. show that univariate analysis of variance (ANOVA) based on the coefficient value F-relations and statistical significance (significance) p-value are proved statistically insignificant among the control and experimental groups; this confirms the homogeneity of the groups initial measurements.

Table 2. The significance of differences between arithmetic means of variables data of anthropometric (body height and body weight) and agility performance of the control and experimental group at the final measurement.

Variable	control group (M±SD)	experimental group (M±SD)	F	p-value
Age (years)	12.3±0.5	12.4±0.4	-	-
Weight (kg)	43.25±7.5	39.9±5.6	1.23	.282
Height (cm)	156.1±8.0	153.6±6.2	.589	.453
Ajax test 5x10 m	13.96±0.6	13.43±0.9	2.47	.133
Test 20 m zig-zag with out ball	6.91±0.4	6.58±0.4	2.69	.118
Test 20 m zig-zag with ball	8.75±0.9	8.27±0.5	2.05	.169

The final measurement data in Table 2. show that univariate analysis of variance (ANOVA) based on a coefficient F-relations and value of statistical significance p-value. These have proved statistically insignificant among the control and experimental group thus certifying that the experimental program (static stretching exercises) has not had an impact on the difference among the groups in the final measurements of basic anthropometric parameters (height and body weight) and motor performance variables of agility of players.

Results reached confirm that the experimental program (static stretching exercises) has not had an impact on the difference between the groups in measurements of variables of final agility.

Discusion

Although a large number of researches have concentrated on the evaluation agility performance of lower extremities in soccer players, most of these studies have been focused only on changes of agility performance after a training program applied during the season (Behm et al., 2011; Milanovic et al., 2013). Static stretching is still one of the topics of controversial discussion in sport and medicine.

Debates focus on the idea that stretching exercises should be applied during warm-up or cooling, for prevention of injuries for growth performances or for other reasons, so there are differing opinions on when, and to what extent, the application of stretching exercises have favorable or unfavorable impact on motor performance of players.

More research is confirmed by the static stretching exercises pertained during the warm up which have negative impact on speed and agility (Little, & Williams, 2006; Nelson et al., 2004; Gelen, 2010; Brandey et al., 2012; Power, Behm, Cahill, Carroll, & Young, 2004; La Torre, 2010; Haddad et al., 2014). Otherwise, some researchers say impact is statistical-

ly non-significant using static stretching execution of movements for speed, agility and explosive force (McHugh, 2006; Kay, & Blazevich, 2011; Behm, & Kibele, 2007; La La Roche, Lussier, & Roy, 2008; Rey et al., 2012;).

Comparing to the above mentioned research, few studies have examined the impact of stretching combined (dynamic and static) and have no impact showing the determinant in motor performance of speed and agility (Behm et al., 2011; Samson et al., 2012; Gonçalves, Pavao, & Dohnert, 2013; Keiner, Sander, Wirth, & Harmann, 2015). In the last years the influence of static stretching on motor performance applied during the warm up is explored by many researchers of sports and medicine. One of the first studies that compared the effect of a stretching program performed during warm-up and cool-down among two groups of schoolchildren, the results of the current study did not show statistically significant differences for both groups (Mayorga-Vega, Merino-Marban, Garrido, & Viciana, 2014). Many researches were done to verify the impact of stretching during warm-up phase; however, such research has been minimal and has been limited to researching the effect of stretching during cool-down in motor performance in soccer players. But the main reason for this study is to establish whether static stretching can decrease soccer performance especially agility (i.e. repeat sprint by changing direction) in the young soccer players. After carrying out the experimental program participants endured final measurements. Univariate analysis of variance (ANOVA) has shown that static stretching exercises applied at the end of the training session "cool- down" have had no statistically significant impact on agility in football players U13. Details of results of tests for agility reflect statistically unimportant differences among the control and experimental group at initial and final tests, thus suggesting that static stretching exercises throughout the cool down have no significant effect on agility performance.

In this research it has been proved that static stretching exercises performed 3 times per week throughout the cool down for a period of 16 weeks have not had a significant impact statistically according to the agility tests to U13 football players. We can conclude that static stretching exercises performed at the end of the training session (cool-down) have no impact on agility performance to young players. Therefore, to young players we can recommend 2-3 times a week application of static stretching during the end of the training session, or special training sessions, in order to increase the optimal flexibility of the body as a prerequisite for executing the movements' agility (i.e. motion quick to change direction with and without the ball). These results may be useful in fulfilling knowledge of the impact of static stretching (during the cool- down) to young players in agility performance; and following the rationalization content of planning and programming training sessions. The results of this study can be used as a stimulus for exploration of the impact of static stretching (during the cool- down) and other characteristics of the anthropological status (i.e. morphological, performing other motor performance, functional, psychological, rehabilitative, recuperative, prevention against injuries, demonstration technical and tactical elements etc.).

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Conflict of Interest
The authors declare that there are no conflict of interest.

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