

## THE IMPACT OF RECUPERATION WITH STATIC STRETCHING IN FLEXIBILITY AND AGILITY WITH AND WITHOUT BALL OF YOUNG SOCCER PLAYERS

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### Abstract

Recuperation at the end of the training session is extremely important for soccer players. Activities as running with slow tempo and static stretching are typical for this part. Lately the application of static stretching has sparked debates in the science of sport and medicine. The purpose of this research was the affect of static stretching during the recuperation phase in flexibility and agility of young soccer players. The research was conducted between August and November 2015 with a sample of 24 players 13.9±0.5 years (range 13-15 years) divided into control and experimental groups. At first step that was taken was the measurement of the body height 168.4±8.5 cm (Martin's anthropometer), and the body weight 52.9±8.5 kg (In body 720) and motoric performance flexibility (Sit and Reach test), agility performance (20m zig-zag running with and without ball). Both groups have realized the regular training session 3 times a week from August to November 2015, while the experimental group (unlike the control group), except the regular training during this period they conducted the experimental program which includes 17 static stretching exercises realized at the end of the training session. After the end of the experimental program both groups underwent the final measurements. Results analysis of variance (ANOVA) have shown that static stretching exercises applied at the end of the training session have found no statistically significant differences in any of the variables of flexibility and agility performance between the control and experimental groups of young soccer players (13-15 year old range). The level of significant is  $p < .05$ .

**Key words:** soccer players, static stretching, flexibility, agility.

### Introduction

Football is the most popular sport all over the world and is characterized by numerous and varied complex dynamic kinesiology activities that are characterized by a large number of cyclic and acyclic movements with and without ball, with positive affection in anthropological status to soccer players (Bjelica et al. 2013; Gardasevic et al., 2016). The purpose of every training session and every physical exercise at young soccer players is to affect the development of specific motoric performance, in protection against injuries, fast recuperation and optimal development of their anthropological status. The base to execute all the techno-tactical elements and responsible to differentiate between the high and low levels of the football players is the conditional preparation (Mujika et al., 2009; Sermaxhaj & Telai 2014). Electronic researches have shown that during a football match the players carry out around 1200-1400 different moving activities from which 700-800 of those are movements with change in directions (Reilly & Williams, 2005; Stolen et al., 2005; Milanović et al., 2013). The execution of high number of movements with changing the pace and the direction of the movement with and without ball despite others is also depended on the flexibility of the locomotor systems (Vučetić et al., 2003; Carling et al., 2010; Gardasevic & Bjelica, 2013). All movements of the above are closely linked to agility performance (running to change direction

with and without ball) and greatly responsible for carrying out these movements affecting the success of the football game (Popovic et al., 2013; Popovic et al., 2014, Sermaxhaj et al., 2015). The recuperation phase is one of the main competent to raise the performance of a player in sport. The cool down part of the training, is important to fasten the recuperation where the activities such as running with slow pace and the static stretching are typical for this part. The cool down of the soccer players organism is reached through static stretching, which is on of the main processes that are applied to prevent and save the main physical elements for the "recuperation of the players" (Rey, Ezequiel et al., 2012, Sporiš et al., 2010). For a long time stretching has been part of the warming up during the training but also during the competitions with the aim to raise flexibility, performing the sport performances and to prevent injuries. A number of researches carried out in the last decade have shown that the static stretching applied during the warming up has had an impact in lowering the performances in speed, agility and jumping (Chaouachi et al., 2008; Behm et al., 2011; Gelen, 2010; Sayers et al., 2008). The research that was carried out suggests that during the warming up should be applied exercises of dynamic flexibility combined with the static stretching exercises with controlled movements and a fully optimal amplitude (ROM) which are more effective in developing the

flexibility and improvement of the explosive force 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 et al., 1998). Static stretching after exercise is recommended as a preventative 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). A research carried out with 26 football coaches of Mauritius Football Association (MFA), 76% of those think that stretching should be exercised three times a week during the "getting ready" period and 2 times during the week while in competition, especially from the regular sessions with duration of 0.6 to 1.3 hours a week (Kelly et al., 2012). The main intention of this research was to prove the effect of static stretching exercises applied during a recovery (Cool-down) of training session in the flexibility of lower back and hamstring muscles and agility with and without ball.

## Materials and methods

In order to carry out this research, first of all the whole sample has carried out the medical check up at the medical sport center in Prishtina and it has been proved that all the football players are healthy to participate in football, and in accordance with the Helsinki declaration, all the participants have been informed with the aim of the testing procedures and the experimental treatment.

### Participants

In this study have participated twenty four young soccer players under the age of 15, part of the football school of the club Ramiz Sadiku from Prishtina which were under direction of a UEFA licensed coach where they have carried out regular training sessions and champion competition in the elite league of football of Kosovo, in the first macrocycle (training sessions and competitions) of the autumn season from 1<sup>st</sup> of August to 1<sup>st</sup> of December 2015.

### Procedures

Participants divided in two groups; control (n=12) and experimental (n=12) have been compared in the initial tests and the anthropometrical final ones (height and body weight) and motor performance; flexibility (Sit and Reach test) and agility (20m running zig-zag with and without ball). All these measures have taken place in the diagnostics lab of the Sports College Universe in Prishtina in the same time and date, from a specialized team. 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 4 month's of intervene with static stretching exercise). The average age of all participants has been  $13.9 \pm 0.5$  years (range 13-15 years of age), and the first step that was taken was the measurement of the body height  $168.4 \pm 8.5$  cm (Martin's anthropometer), and the body weight  $52.9 \pm 8.5$  kg (In body 720).

All participants (players) in this study after 12 minutes warm up procedure underwent testing of motor performance tests (variables) Flexibility: Sit-and-Reach test (Baumgartner & Jackson, 1995; Sporiš, 2007;) and agility 20m zig-zag test with and without ball (Little & Williams, 2006; Idrizovic, 2014,). *Flexibility (Sit and Reach test)*, this test measures the flexibility of lower back and hamstring muscles. The test was conducted indoors using a static sit and reach box, supplied with a tape measure. The participant was given the instruction to sit with legs together and extended in front of him, so that the feet (shoes off) touch the first step. Both knees were held together and flat on the floor. The scale (in centimeters) for measuring the distance was drawn on the first step. The end of the feet, that is, the beginning of the step represents the starting point of the scale, was regarded as point zero. All centimeters above zero were positive, whereas the ones below, toward the knees, were negative. The task was to perform the furthest possible front bend with arms extended, and hands on top of each other, palms facing downward. That position was held for 2 s in order to measure the distance. The test was performed 3 times (3 trials). The maximal reach distance was recorded in centimeters for all 3 trials. Agility test 20m running zig-zag with and without ball, were completed from a standing start, with the front foot placed 30cm behind the photocell's start line.

The photocells were placed at starting position and finish line test. This test was measured with New Test, e.g. Power Timer 300 photocells with exact time of 0.01sec. All measurements were performed on the parquet flooring at College Sports "Universi" of Prishtina. Participants of this research divided into two groups (control and experimental) during the period of August and November 2015 and have exercised 3 times a week, in total 48 training sessions, under the plan and the program of the football school of the Ramiz Sadiku Club in Prishtina. Protocol of the control group was as follows - general warm up 5-7 min, specific warm up 10-15 min, the main part 35-45 min, cool down 10 min recovery by running. Protocol of experimental group was as follows - general warm up 5-7 min, specific warm up 10-15 min, the main part 35-45 min, cool down (10 min recovery with running and 15 min static stretching).

The experimental group (compared to the control group) except the regular training, underwent the experimental program (recuperation with static stretching) which has taken place during the cooling phase (cool-down) of the training session. The experimental program was planned from the research author based on the recommendations of the authors of this field (Anderson, 2006; Walker, 2006; Lycholat, 1999) and involved 17 stretching exercises-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 Two Leg Stretch, Achilles and Back Stretch, Quadriceps

Stretch, Hamstring and Groin Stretch, Standing Groin Stretch, Groin Stretch, Chest Stretch, Sitting Hamstring Stretch, Lower Back Stretch, Two Leg Seat Hamstring Stretch, Achilles Tendon Stretch. Every exercise has been completed within the duration of 20 seconds.

#### Statistical analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS version 21.0). Mean and Standard Deviation (SD) were calculated for both groups in initial and final measurement for anthropometric (body height and body weight), Sit and Reach test and 20m zig-zag with and without ball. With univariate analysis of variance (ANOVA) were calculated differences between arithmetic means of control and experimental group before and after experimental programme (static stretching). The level of significant is  $p < 0.05$ .

#### Results and discussion

Table 1. The variables data of antropometric (body height and body weight) and motoric performance ( Sit and Reach test and 20m running zig-zag with and without ball) of the control and experimental group at the initial measurement

Variable	control group (M±SD)	experimental group (M±SD)	F	p-value
Age (years)	14 ±0.4	13.8 ± 0.5	-	-
Weight (kg)	52.3±8.9	53.45 ± 8.48	.094	.762
Height (cm)	169±9.6	167.8±7.6	.109	.745
Sit and Reach test	.41±5.08	-1.41±8.2	.427	.520
20m zig-zag without ball	7.00±.28	6.89±.36	.599	.447
20m zig-zag with ball	8.79±.54	8.47±.55	2.02	.169

Table 2. The significance of differences between arithmetic means of variables data of anthropometric (body height and body weight) and motoric performance ( Sit and Reach test and 20m running test zig-zag with and without ball) of the control and experimental group at the final measurement

Variable	control group (M±SD)	experimetal group (M±SD)	F	p-value
Age (years)	14.4 ± 0.5	14.2 ± 0.5	-	-
Weight (kg)	54.3 ± 9.1	56.1 ± 8.3	.266	.611
Height (cm)	170.3 ± 9.6	169.7 ± 7.0	.029	.865
Sit and Reach test	-.50±6.00	1.66±7.2	.635	.434
20m zig-zag without ball	6.75±.31	6.66±.43	.342	.565
20m zig-zag with ball	8.46±.62	8.35±.77	.126	.726

The results of the anthropometric measures in the Table 1. show that with the univariate analysis of variance (ANOVA) based on the coefficient F-relations and the value of the statistical significance p-value have been proved that there are unimportant statistical differences between the

control group and the experimental one, which does prove the homogeneity of the groups in the initial measures of the main anthropometric parameters (body weight and height) and motoric performance ( Sit and Reach test and 20m zig-zag running with and without ball) at the football players under the age of 15. The nondifference between control and experimental group in the initial measurements shows that the sample of the players was selected and homogeneous. The results of the anthropometric measures in Table 2. show the using the univariate analysis of variance (ANOVA) and based on the coefficient F-relations and the value of the statistical importance (significant) p-value have been proved unimportant statistical differences which prove that the experimental programme (static stretching exercises) did not have any impact in the differences between the control group and the experimental of the final measures in the main anthropometric parameters (body height and weight) and motoric performance ( Sit and Reach test and 20m zig-zag running with and without ball) of the football players.

#### Discussion and conclusion

The static stretching is still one of the main discussions in sport and medicine. Stretching should be applied during the warming up session or the cooling down session, to prevent the injuries, and to stimulate the motoric performances or for other reasons, so, there are different thoughts that exist when and in what form, the application of the stretching exercises do have an impact in favor or not in favor in the anthropologic status of the football players. From a lot of researchers it has been proved that the exercises of the static stretching applied in the warming up session have a negative impact with an statistical importance in the speed, agility and the explosive force of the football players (Little & Williams, 2006; Nelson et al., 2004; Gelen, 2010; Brandey et al., 2012; La Torre, 2010; Haddad et al., 2014).

Compared to the mentioned researches above, some have researched in the impact of the combined stretching (dynamic and static) and have not proved any determinant impacts in the motoric performances: speed and agility (Behm et al., 2011; Samson et al., 2012; Gonçalves et al., 2013). In the last decade the impact of the static stretching in the motoric performance applied in the warming up session has been researched on from a lot of sport and medicine researches. But the main reason for this study is that numerous researches have shown that static stretching can decrease soccer performance especially in agility and flexibility the youth soccer players. The results according to the univariate analysis of variance (ANOVA) have shown that the static stretching exercises applied at the end of the training session "cool down" have unimportant statistical differences between the control group and the experimental ones in the initial and final testing in the flexibility (Sit and Reach test) and agility (20m zig-zag

running with and without ball) of the football players under the age of 15. The non important statistical difference between the control and experimental group in initial measurements shows that the sample of the players was selected and homogeneous. Even though the experimental program (static stretching) that was applied in the experimental group has affect the improvement of flexibility up to 3cm, but according to variance analyses this change is statistical non important to make the difference between the control and experimental group in the final measurements. But the non statistical difference between the control and experimental group in the final measurements can be explained as a result of the regular program training which contained flexibility exercises during the warm up phase of the training sessions to both groups. In this research it has been proved that the static stretching exercises applied 3 times a week during the cooling down period, in duration of 4 months did not have any important statistical effect

in the testing of the flexibility and agility at the young soccer players range (13-15 age). We can conclude that the static stretching exercises applied in the end of the training sessions (cool down) do not have any impact in the flexibility of lower back and hamstring muscles and agility with and without ball of the young football players. So at the young football players we can recommend the application of the static stretching in the end of the training session 2-3 times a week or also in the special training sessions with the objective to raise the optimal flexibility of the body as one of the pre conditions to execute the speed movements, agility, coordination, and the execution of the technical elements of the football match. These results can be used to fill in the existing knowledge of the impact of the static stretching in the cool down at the young football players in the performances of the agility and flexibility and following the rationalization content the processes planning and programming training sessions.

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## UTJECAJ OPORAVKA STATIČKIM ISTEZANJEM NA FLEKSIBILNOST I AGILNOST SA I BEZ LOPTE MLADIH NOGOMETAŠA

### Sažetak

Oporavak na kraju treninga od iznimne je važnosti za nogometaše. Aktivnosti kao trčanje sa sporim tempom i statičkim istezanjem tipične su za ovaj dio rada. U posljednje vrijeme primjena statičkog istezanja potaknula je rasprave u znanosti o sportu i medicini. Svrha ovog istraživanja bila je ispitivanje utjecaja statičkog istezanja tijekom faze oporavka na fleksibilnost i agilnost mladih nogometaša. Istraživanje je provedeno između kolovoza i studenog 2015. uzorak od 24 igrača  $13,9 \pm 0,5$  godina (raspon 13-15 godina) podijeljen je na kontrolnu i eksperimentalnu skupinu. Prvi korak koji se poduzima bio je mjerenje visine tijela  $168,4 \pm 8,5$  cm (Martinov antropometar) i tjelesne težine  $52,9 \pm 8,5$  kg, a zatim i fleksibilnosti motoričke izvedbe (test Sit and Reach), agilnosti (20m Cik-cak trčanje sa i bez lopte). Obje grupe su redovito trenirale 3 puta tjedno od kolovoza do studenog 2015., a eksperimentalna skupina (za razliku od kontrolne skupine), osim redovitog treninga tijekom tog razdoblja, provela je eksperimentalni program koji uključuje 17 vježbi istezanja na stazi na kraju treninga. Nakon završetka eksperimentalnog programa obje skupine su prošle konačno mjerenje. Rezultati analize varijance (ANOVA) pokazali su da statičke vježbe istezanja primijenjene na kraju treninga nisu pokazale statistički značajne razlike u bilo kojoj od varijabli fleksibilnosti i agilnosti između kontrolnih i eksperimentalnih skupina mladih nogometaša. Razina značajnosti je bila  $p < .05$ .

**Ključne riječi:** nogometaši, statičko istezanje, fleksibilnost, agilnost.

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