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**CONTINUOUS EDUCATION AND TRAINING OF ADULT  
SPORTSMEN – STUDY CASE: THE FOOTBALL REFEREES**

Dan Monea (a), Rodica Prodan (b)\*, Vlad-Teodor Grosu (c)  
\*Corresponding author

(a) Babes-Bolyai University, Faculty of Physical Education and Sport, Pandurilor Street no.7, Cluj-Napoca, Romania, moneadan@yahoo.com

(b) Babes-Bolyai University, Faculty of Physical Education and Sport, Pandurilor Street no.7, Cluj-Napoca, Romania, rodica\_prodan2@yahoo.com, 0040762683970

(c) Technical University of Cluj-Napoca, Department of Mechatronics and Machine Dynamics, Muncii Blvd, Cluj-Napoca, vlad.grosu@mdm.utcluj.ro

***Abstract***

The most promoted sport in the last century is considered without any hesitation to be the football game. The psychical pressure of not taking a wrong decision is far greater upon the referees than it was fifty years ago. For this reason, their continuous physical and mental preparation are of utmost importance.

The purpose: This study is aimed to analyze the evolution of 70 referees from the 2nd Romanian Football League during 3 periods of fitness training and testing at a 6 month time interval. The action has two objectives: first, to maintain all the referees in a good fitness shape and second, if it is possible for some of them to increase their fitness shape.

The method: The tests organized by the Romanian Football Federation were approved by UEFA and were performed in February 2016, August 2016 and February 2017. They comprised of weight measurements, body fat percentage measurements, 40 meters sprints, Yo-Yo Submaximal Intermittent Recovery Tests.

Results: Following 12 months of intermittent high-intensity training, 84.5% of the referees maintained their performance on the Yo-Yo intermittent recovery test, while 15.3% of them improved their performance. Also, 1.2% failed the tests due to injuries, overtraining.

Conclusion: Fitness training and preparation are now key elements of any referee's daily program. The tests allow monitoring the effectiveness of training; they provide insight into the referee's health status: disease, injury, overtraining and fatigue. Also, they provide baseline data for determining appropriate prescription of exercise.

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**Keywords:** Football referee, fitness, evaluation, Yo-Yo test.



## 1. Introduction

The most promoted sport in the last century is considered without any hesitation to be the football game. The technological advances of television have brought into the stadium besides the referee team another pair of eyes, those of the "great public sitting in front of the TV set". The hard work of the players, the joy of the fans, all this mixture of dreams and hopes are now shared with tens of millions of people. Even the rules of the game have not changed in the last decades, the decisions took during the game by the central referee are nowadays placed under a considerable microscope having dozens of zooming and sharp focusing lenses. The psychical pressure of not making a wrong decision is far more significant upon the referees than it was fifty years ago. For this reason, their continuous physical and mental preparation are of utmost importance.

The physical fitness of the football players was studied by many researchers (Bradley, Mohr, Bendiksen, Randers, Flindt, Barnes, & Krstrup, 2011; Haugen, Tønnessen, Øksenholt, Haugen, Paulsen, Enoksen & Seiler, 2015; Los Arcos, Vázquez, Martín, Lerga, Sánchez, Villagra, & Zulueta, 2015; Selmi, Haj, Haj, Moalla, & Elloumi, 2016). Also, of great interest were the different tests dedicated to the endurance characteristics, VO<sub>2</sub>max, heart rate measurements (Bradley, Mohr, Bendiksen, Randers, Flindt, Barnes, and Krstrup, 2011; Buchheit, Simpson, Al Haddad, Bourdon, and Mendez-Villanueva, 2012; Baumgart, Hoppe, & Freiwald, 2014; Selmi, Haj, Haj, Moalla, & Elloumi, 2016).

From summer 2010 UEFA opened a Centre of Refereeing Excellence (CORE) at Nyon, Switzerland, with the central objective to develop the technical skills and fitness of young men and women referees and assistant referees who show the possibility to become future international match officials. Here twice a year are holding major referee gatherings. The courses comprise, among other things, fitness tests, analysis of match situations to help referees in the permanent search for improvement and consistency in decision making.

Similarly, the Romanian Referee Commission at Cheile Grădiștei and Mogoșoaia organized twice a year referee gatherings for the first three Romanian Football Leagues.

## 2. Problem Statement

The referees' fitness and technical skills to be kept at high levels must be supervised, efficiently trained in a controlled environment and adequately evaluated with the best methods and tools available. Otherwise, the act of match refereeing is compromised, resulting in a reduced evaluation of the game situations and faults, taking wrong decisions. Referee training by following just a voluntary program of exercises performed at randomly chosen time intervals, doing some game studies and analyses without certificated guidance does not ensure uniform fitness and technical skills between the central and assistant referees.

## 3. Research Questions

How can be maintained a uniform fitness and technical skill among the central and assistant referees?

What types of exercises ensure a proper maintenance of the referees' physical shape between matches, or between the competition seasons?

How often is necessary to practice in order to preserve a high level of fitness and technical skills?

How often is necessary to evaluate the level of fitness and technical skills?

Which are some other means different than match situations analyses that can provide an improvement in the consistency of decision making?

#### **4. Purpose of the Study**

This study is intended to analyse the effects of the time interval between two competitive seasons on the physical performance of 70 referees from the 2nd Romanian Football League. The action has two objectives: first, to maintain all the referees in a good fitness shape and second, if it is possible for some of them to increase their fitness shape.

#### **5. Research Methods**

The tests were organized by the Romanian Football Federation (RFF, 2016) being approved by FIFA and UEFA. The evolution of the physical fitness was studied over 3 periods of fitness training and tests were performed at a 6 month time interval, in February 2016, August 2016 and February 2017. They comprised of weight measurements, body fat percentage measurements, 40 meters sprints, Yo-Yo Submaximal Intermittent Recovery Tests, Assistant Referee Intermittent Endurance Tests (ARIET).

The official fitness test for football referees (RFF, 2016) consists of two tests. Test 1, Repeated Sprint Ability (RSA), measures the referee's ability to perform repeated sprints over 40m. Test 2, Interval Test (IT), evaluates the referee's capacity to perform a series of high-speed runs over 75m interspersed with 25m walking intervals.

At least once a year referees must pass the FIFA Fitness Test.

The Yo-Yo Submaximal Intermittent Recovery Tests (RFF, 2016) are following a well-designed pattern. Referees must complete a sequence of runs, turns and walks in accordance with the pace dictated by an audio file.

ARIET or Assistant Referee Intermittent Endurance Test (RFF, 2016) has a well-designed pattern. Assistant referees must start from a standing position and they must complete a sequence of runs, walks and runs sideways in accordance with the pace dictated by an audio file.

#### **6. Findings**

From the volunteered 70 finally, 65 referees (27 field and 38 assistant) were able to take part and provide the data for the study.

Results are presented as means  $\pm$  standard deviations. Statistical parametric techniques were applied, and normal distribution was tested using the Kolmogorov-Smirnov test. The t-test for paired samples was used to analyse the differences between the first and second round of measurements (T1 and T2), independently for each group (total sample, field referees CR, assistant referees AR). Both in T1 and T2 a paired t-test for independent samples was used to compare results between CR and AR. The in-between groups (CR and AR) comparison from T1 to T2 was performed by a two way mixed ANOVA (group x time). The practical significance was assessed by computing Cohen's d effect size. Effect sizes (d) of above 0.8, between 0.8 and 0.5, between 0.5 and 0.2 and lower than 0.2 were considered as large, moderate, small

and trivial, respectively. Differences between means were expressed as percentages. Statistical significance was set at  $p < 0.05$ . Data analysis was performed using the Statistical Package for Social Sciences (SPSS version 20 for Microsoft Windows Operating System).

The results in T1 and T2 are for total sample ( $n = 65$ ), central referees (CR,  $n = 24$ ) and assistant referees (AR,  $n = 41$ ).

**Table 01.** Men Referees

Test	Group	T1	T2	$\Delta T1-T2$ (%)	Cohen d
Sprint 40m	Total	5.49±0.16	5.56±0.08	1.05	0.26
	CR	5.47±0.17	5.54±0.15	1.46	0.29
	AR	5.45±0.14	5.54±0.04	1.38	0.33
	$\Delta CR-AR$ (%)	-1.15	-0.11	-	-
	ES	-0.16	-0.08	-	-

T1 = test 1; T2 = test 2; significant differences ( $*p < 0.05$ ,  $**p < 0.01$ ) between T1 and T2; ES = effect size.

**Table 02.** Women Referees

Test	Group	T1	T2	$\Delta T1-T2$ (%)	Cohen d
Sprint 40 m	Total	6.08±0.24	6.19±0.14*	1.05	0.26
	CR	5.87±0.45	5.89±0.01*	1.46	0.29
	AR	5.98±0.13	6.14±0.08**	1.38	0.33
	$\Delta CR-AR$ (%)	-1.72	-4.03	-	-
	ES	-0.05	-0.7	-	-

T1 = test 1; T2 = test 2; significant differences ( $*p < 0.05$ ,  $**p < 0.01$ ) between T1 and T2; ES = effect size.

## 7. Conclusion

Physical performance of national and international football referees has been previously presented in the literature (Da Silva, Fernandes & Fernandez, 2008; Di Salvo, Carmont, & Maffulli, 2011; Kizilet, 2011; Keller, Bizzini, Feddermann, Junge, & Dvorak, J., 2012; Mazaheri, Halabchi, Seif Barghi, & Mansournia, 2016; Yanci, Los, Grande, & Casajús, 2016; Castillo, Cámara, Castagna, & Yanci, 2017).

However, to our knowledge, this is among the first studies in which the effects of the time interval between two competitive seasons have been analysed in Romanian football referees. The results of this research show a decrement of straight sprint performance in both CR and AR after the off-season period.

Fitness training and preparation are key elements of any referee's daily program. The proposed tests allow monitoring the effectiveness of training; they provide insight into the referee's health status: disease, injury, overtraining and fatigue. Also, they provide baseline data for determining appropriate prescription of exercise.

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