

Correlation of refereeing motor characteristics and success at football referees in the sarajevo canton

Key words: **connectivity, basic motor skills, success of the refereeing, football referees**
Ključne riječi: **uticaj, bazično motoričke sposobnosti, uspješnost suđenja, nogometne sudije**

Preliminary communication

Abstract

The aim of this study was to determine the influence of basic motor skills to the success of the refereeing at football referees in the Sarajevo Canton. Population, a sample of respondents is derived from, are football referees in the Sarajevo Canton. There were about 90 of them, average age of 31.5 ± 1.5 who have met the criteria for obtaining a football referee license for next season at all levels of competition in Bosnia and Herzegovina. The sample of variables in this research covers the areas of basic motoring(18) and assessment of refereeing success in football game (7) variables.

Regression analysis revealed that prediction set has influence on the football refereeing success of referees in the area of basic motor skills where we can see that the mutual correlation of $r .63$ indicates a relatively high multiple correlation, and a group of predictor variables has significant 36% of a common variance with a group of criteria variables, which explains the common variability between predictor system and the criterion variables as well. Such a correlation was significant at the level of $p = .05$. As the football is the action with almost the biggest complexity and that the football referees can, as direct actors in a football game, contribute very much to the final result of a football match, we can say that the selected predictor system quite well predicts the criteria that are important for football referee success. Of course, in the process of training, it is necessary to pay attention to the development of not only one dimension of motor space but also of all basic motor-skills, with the organization of motor units by taking modern training methods

Introduction

Football refereeing efficiency as well as in other sports, whose results are not physically measurable, is limited with the anthropological status of referees (Delalić, 2002). The purpose of this paper is to extract predicted set of essential, relatively accessible and reliable anthropological features of football referees (anthropometrical and basic-motor) whose level of success depends on refereeing. The fact that football referees during a football match pass up to 12 km, and that their high intensity movements are up to 17% of the total motion (D'ottavio and Castagna, 2001), and that is higher VO_2 max affect a lot to the performance of referees who referees at the high level (Castagna and D'ottavio, 2001)), tells us how important the abilities of a football referee are. Of course, other skills other than motor skills also play a key role, as a good psychological and mental preparation, motivation and communication skills (Bartha, at al., 2009).

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Sažetak

Cilj ovog rada je da se utvrdi utjecaj bazično motoričkih sposobnosti, na uspješnost suđenja kod nogometnih sudija sarajevskog kantona. Populacija iz koje je izveden uzorak ispitanika su nogometne sudije sarajevskog kantona, njih $n=90$, prosječne dobi od $31,5 \pm 1,5$ koji su zadovoljili kriterije za dobijanje licence za suđenje u nogometu za narednu takmičarsku sezonu na svim nivoima takmičenja u Bosni i Hercegovini. Uzorak varijabli u ovom istraživanju hipoteski pokriva prostore bazične-motorike (18) i procjene uspješnosti suđenja u nogometnoj igri (7) varijabli.

Regresijskom analizom utvrđeno je da prediktorski skup ima utjecaja na uspješnost suđenja nogometnih sudija u prostoru bazično motoričkih sposobnosti gdje se vidi da sa međusobnom korelacijom od $r .63$ ukazuje na relativno visoku multiplu korelaciju i da skupina prediktorskih varijabli ima značajnih 36% zajedničke varijance sa skupinom kriterijskih varijabli, što objašnjava zajednički varijabilitet između prediktorskog sistema i kriterijske varijable. Takva povezanost je bila značajna na nivou $p = .05$. S obzirom da je nogomet aktivnost s gotovo najvećim kompleksitetom te da su nogometni suci kao direktni akteri u jednoj nogometnoj utakmici, mogu itekako doprinijeti kajnjem ishodu jedne nogometne utakmice, možemo reći da izabrani prediktorski sistem dosta dobro predviđa kriterije koji su važni za uspješnost u suđenju nogometnih sudija. Svakako da u procesu treninga treba obratiti pažnju na razvoju svih bazično-motoričkih sposobnosti, a ne samo jedne dimenzije motoričkog prostora uz organizaciju trenažnih jedinica suvremenim metodama treninga.

Anthropological status of referees from the aspect of Kinesiological Sciences predefined considerable number of essential features and for that reason it is accessed to the test selection (variables) of subspace of anthropological status that is in practice used to estimate capacity required for football refereeing license in order to allocate characteristic group of licensed referees in accordance with the existing criteria and to give significance to applied tests such as:

1. Anthropometrical characteristics;
2. Basic-motor skills;

To be able to treat general problems of successful football refereeing, it is necessary to fulfill the necessary conditions in order to achieve high quality and modern football refereeing and this refers to the following:

1. Knowing and studying football games rules;
2. It is necessary to have psycho-physical readiness, good health, mental and social maturity, balance and authority of a football referee personality;
3. It is necessary to know and follow the modern trends of football games development.

A very important condition for successful refereeing is to be familiar with rules of a football game and to follow the development trend of modern football game. However, to have all of this done in practice, capabilities of a referee are extremely important since it is found that increasing of endurance makes football referee overall mobility increased as well. Besides, it helps a referee to make better decisions that ultimately affect on the level of refereeing success. Having all this in mind, the problem of this paper is the impact of basic motor skills on refereeing success of the Sarajevo Canton football referees.

Methods

Survey samples

Samples for the survey are football referees of the Sarajevo canton N=90, average age of $31,5 \pm 1,5$ who have met the criteria to get a license to be referees for the next season at their levels of competition in Bosnia and Herzegovina.

Variation samples

Variations to estimate the basic physical capabilities

To evaluate the basic physical capabilities the following tests have been selected which measure:

Explosive strength, speed, coordination, repetitive strength, flexibility and balance. All of the basic physical capabilities will be tested with three tests each. Tests are standardized and published in publications (Gredelj, at al., 1975).

1. Standing long jump (MFESDM),
2. Standing triple jump (MFE-TRO),
3. Standing high jump (MFESVM),
4. 20 m running, high start (MFE20V),
5. Foot tapping against the wall (MBFTAZ),
6. Foot tapping (MBFTAN),
7. Foot slalom with two balls (MKLSNL),
8. Steps to a side (MAGKUS),
9. Mobility in the air (MKTOZ),
10. Push ups (MRESKL),
11. Lifting torso from lying position (MR-CDTŠ),
12. Forward bend on the bench (MFLPRK),
13. Forward bend with spread legs (MFLPRR),
14. Side stretch (MFLBOS),
15. Standing on a both feet along a balance bench with eyes opened (MBAU20),
16. Standing sideways on a low balance bench with eyes shut (MBAP2Z),
17. Standing on a foot along a balance bench (MBAU10).

Measuring of the physical capabilities was conducted in the big gym of the Faculty of sports for 100 days (3 days for two groups) always at the same time from 12:00-14:00 where every day 30 referees were tested in two groups. Before every test the samples had compulsory warm-ups for 20 min. (slow running 5 min, 10-12 min. crouch exercise and dynamic stretching, and 3-5 min. for individual needs. The flow of the tests was the following: I day: balance, flexibility, II day: coordination, speed and the III day: explosive strength and repetitive strength. The way the testing was conducted in this manner was because of the professional obligations of the candidates.

Variations for the evaluation of success of football referees in the Sarajevo Canton in a football game (criteria variations)

Variation to evaluate the success of football referees in the Sarajevo Canton during a football match and which are going to be used during this research will be based on the subjective evaluation of former football (FIFA) referees, by watching a taped match or observing a match in person, and they are evaluated as follows:

1. Grade success in using the rules of football VESURF
2. Grade success in positioning and movement VESPOM
3. Grade issuance of discipline measures VEIDME
4. Grade issuance of technical measures VEITME

5. Grade success in cooperation with other referees VESCOR
6. Grade capability in being a referee VECBRE
7. Grade feeling for the game and giving advantage VEFGGA

Success of the referees was evaluated on first level games and Cup games, on all levels of competition and fields where teams usually play. The success of the referees was evaluated by 3 observers-evaluators (former FIFA referees) who have received written instructions and the criteria of evaluations. Surveyed candidates have been tested and grades from 1-5 in every variation and their grades were marked in the grade sheet (Mrković, 2009). After every game the evaluators handed in the grade sheets to the research head. For every variation there is a special criteria of evaluating, as an example one variation is noted which tells how successful the referee was according to the evaluators:

Grade 5- during the whole time of the game the referee used fully LoG (Laws of the Game) and showed confidence, responsibility and quality;

Grade 4- during the whole time of the game the referee used fully LoG but did not show certain confidence and timeliness

Grade 3- during the whole time of the game the referee used fully LoG but did not show distinct routine and ease;

Grade 2- during the whole time of the game the referee did not fully show the use of LoG and did not lead the game successfully and made mistakes that had an impact on the outcome of a game;

Grade 1- the referee did not use the LoG and made mistakes that impacted the final score of the game.

Data processing methods

In order to evaluate the influence of the system of predictable variations (basic physical capabilities) on the criteria variation (success in arbitrating in regards to football referees) as well as the co-relation of the whole system of manifested variations, the multiple regression analysis will be used. It is known that by using the regression analysis the importance and magnitude of influence on the whole predictable system is determined in relation to the individual criteria and the prediction of results is made in any criteria variation on the basis of individual influence of every variation of the predictable system (Rađo and Wolf, 2000). The analysis was made with the SPSS program 15.0 to research the relation of physical capabilities and the success in arbitration.

Results and Discussion

As it can be seen from the tables predictable elements have an impact on the success of arbitration of football referees in the area of basic physical capabilities where we can see an inter correlation from R .63 (Table 1; Table 2; Table 3) and shows on a relatively high multiple co-relation and the determining number (R Square .39), which describes the joint variation in-between the predictable system and the criteria variation. This connection was significant at level Sig. = .01.

In the area of basic physical capabilities we can say that from the tests of speed and flexibility two variations have been singled out that statistically have a great influence on the success of arbitration of football referees, where as with balance one variation was singled out and we can conclude that the whole physical capabilities area was not included in this research because we lack explosive strength, coordination and repetitive strength. By

analyzing the influence of individual variations it can be concluded that the biggest statistical influence have forwardbend with spread legs (MFLPRR).006, standing on both feet on a balance bar with eyes open – MBAU20 .013, , 20 m running, high start MFE20V .034, forwardbend on the bench MFLPRK.034 i foot tapping MBFTAN .060.

In this part of the research the whole area of basic physical capabilities was not encompasses, the variations that have been singled-out that have the most statistical influence we can freely say that they would be more complete if the variations of explosive strength, coordination and repetitive strength which should make a more important and full picture of a football referee during a football game. Speed variation , sprint 20 m high start - MFE20M has met the results that were on an expected level and this is one of the important issues for one football referee and is used mostly by one referee during a football match in relation to other elaborated variations in the area of physical capabilities. This was

confirmed by authors Castagna, Abt, and D'Ottavio (2001) confirming that football referees rarely have highly intensified activities which are longer that 30m.

Results of the regression analyses show that the whole predictable system that in this research represent the basic physical capabilities of football referees of the Sarajevo canton have statistical connection with the criteria system which in this research makes the success of arbitration of football referees. Since football is an activity that has almost the most complexity (referees are a part of football), we can say that the selected predictable system fairly well predicts the criteria that are important for the success in arbitration of football referees. Of course during the training process attention should be given on the development of all basic physical capabilities, and not only one dimension of the physical area of training using modern methods, and that in the training of one referee in endurance and actions that are not longer that 30m

Table 1. Relationship among predictors and criteria variables - Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.623	.388	.232	.876

Table 2. Analysis of variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.488	18	1.916	2.496	.003
	Residual	54.512	71	.768		
	Total	89.000	89			

Table 3. Predictors influence the system to the criteria - Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	MFESDM	-.005	.007	-.101	-.630	.531
	MFESVM	-.024	.020	-.178	-1.207	.231
	MFETRO	.254	.236	.154	1.077	.285
	MBFTAN	.033	.049	.081	.685	.495
	MBFTAZ	.077	.040	.228	1.910	.060
	MFE20M	.721	.333	.286	2.167	.034
	MKLSNL	-.023	.017	-.146	-1.297	.199
	MAGKUS	-.057	.066	-.103	-.871	.387
	MKTOZR	.040	.146	.028	.270	.788
	MRESKL	-.014	.011	-.139	-1.280	.205
	MRCDS	-.002	.008	-.025	-.207	.837
	MRSCUC	-.007	.007	-.108	-.944	.348
	MFLPRK	-.044	.020	-.309	-2.168	.034
	MFLBOS	-.001	.009	-.016	-.118	.906
	MFLPRR	.031	.011	.400	2.834	.006
	MBAU20	-.068	.027	-.272	-2.563	.013
	MBAP2Z	.030	.050	.066	.599	.551
	MBAU10	-.004	.009	-.053	-.492	.624

(Castagna, C., Abt G., D'ottavio S. (2002). In their work Krstrup i Bangsbo (2001) indicate that the rightly designed and planned training of endurance has a significant influence on the performance of top level referees during a football match.

During the football game the referee has to be where the action is, in order to make the right decision, so high resistance to fatigue is very important (Castagna, Abt and D'ottavio, 2001; 2003; 2004), because it makes the decision making process much easier and more conscience.

In football games the arbitration decisions play an important role in the quality and up growth of sports. It is true that the requirements are high in professional football and they request a high level of readiness not only of the players but also of the referees (Johnston and McNaughton, 1994).

This tells us that in future researches we have to pay more attention to research and the influence on endurance and some specific capabilities of football referees and not only on the unspecific movements such as agility, explosive strength, segmental speed which according to this research do not have statistically significant influence on the success of arbitration.

Conclusion

Having in mind that football is an activity with almost the most complexity and that actions are conducted almost constantly, at one time on one side of the football field and then on the other side of the football field which requires the referee to move all the time (Peleg, 1991) in order to make the right decisions we can say that the selected predatory system does not predict well the criteria which is important for success in a football match.

Football does not only require from a referee a high level of basic physical capabilities, nor only rational movement but also the capability in making crucial decisions when all capabilities are being tested. (Johnston and McNaughton, 1994). In football even the movements are not standardized, but they are variation, (Talović and Rađo, 2003) which requires from the referees more involvement and the need to be as close as possible to the location where the activities are going on. It is well known that during the game there are many long balls, balls going diagonally across the whole field which asks from the referee to have exceptional capabilities in all segments, and even philological, when he has to make decisions under the pressure of fatigue and those decisions will not be harmful for anyone therefore we can say that in football there are no standards, fixed and closed stereotypes of movement, but variation of plastic stereotypes are ready for alternative movements so this is one more requirement for the referees.

References

Bartha, C., Petridis, L., Hamar, P., Puhl S., Castagna, C. (2009). Fitness test results of hungarian and international-level football referees and Assistants, *Journal of Strength and Conditioning Research*.

Castagna, C., D'ottavio, S. (2001). Effect of maximal aerobic power on match performance in elite football referees. *J. Strength Cond. Res.* 15:420–425.

Castagna, C., Abt G., D'ottavio S. (2002). Relation between fitness tests and match performance in elite italian football referees. *Journal of strength and conditioning research*, 16(2), 231–235. ©2002 national strength & conditioning association.

Castagna, C., Abt, G. (2003). Intermatch variation of match activity in elite italian football referees *journal of strength and con-*

ditioning research, 17(2), 388–392, ©2003 national strength & conditioning association

Castagna, C., Abt G., D'ottavio S. (2004). Activity profile of international-level football referees during competitive matches, *Journal of Strength and Conditioning Research*, 18(3), 486–490, © 2004 National Strength & Conditioning Association

Delalić, F. (2002). Uticaj nekih antropometrijskih karakteristika, motoričkih i funkcionalnih sposobnosti nogometnih sudija na uspješnost u suđenju "PREMIJER" i "PRVE" lige BiH. (Influence of some anthropometric characteristics, physical and functional capabilities of football referees on the success of arbitration in the PREMIER and FIRST league BiH). Masters paper.

D'ottavio, S., and C. Castagna. (2001). Analysis of match activities in elite football referees during actual match play. *J. Strength Cond. Res.* 15:167–171.

Gredelj, M., Metikoš, D., Hošek, A., Momirović, K. (1975). Model hijerarhijske strukture motoričkih sposobnosti. I. Rezultati dobijeni primjenom jednog neoklasičnog postupka za procjenu latentnih dimenzija. (Model of the hierarchy structure of the physical capabilities. I. Results gotten with the use of one neoclassic method in the evaluation of latent dimensions). *Kineziologija*, 5, 1-2, 7-82.

Krstrup, P., Bangsbo, J. (2001). Physiological demands of top-class football refereeing in relation to physical capacity: Effect of intense intermittent exercise training. *J. Sports Sci.* 19:881–891.

Mrković, R. (2009). Utjecaj bazično motoričkih sposobnosti, antropometrijskih karakteristika i teoretskog poznavanja pravila nogometne igre na uspješnost suđenja kod nogometnih sudija. (Influence of basic physical capabilities, anthropometric characteristics and theoretic knowledge of football rules on the success of arbitration of football referees). Masters paper. Faculty of sport and physical education.

Peleg, I. (1991). Physical fitness test for football referees. In, Tenenbaum, G. (ed.) and Eiger, D. (ed.), *Coach education: proceedings of the Maccabiah-Wingate International Congress*, Netanya, Wingate Institute, The Emmanuel Gill Publishing House, 1991, p.158-161, 4.

Perlejewski, A. (1997). Fit to officiate. *Football referee* (Coventry, England), Nov 1997, 4-5 2, Total Pages: 2

Racine, Wis (1992). Vinnie Mauro. World-class football referee; director of officials, U.S. Football. *Referee- (.)* 17 (10), Oct 1992, 28-31.;

Rađo, I., Wolf B. (2002). *Kvantitativne metode u sportu*. (Quantitative methods in sport). Sarajevo: Falultet za fizičku kulturu.

Johnston, -L., McNaughton, L. (1994). The physiological requirements of football refereeing. *Australian-journal-of-science-and-medicine-in.sport* (Canberra, Aust.) 26 (3 & 4), Sept/Dec, 67-72.

Talović, M., I. Rađo (2003). Prediktivne vrijednosti motoričkih i funkcionalnih sposobnosti u funkciji realizacije složenih motoričkih struktura iz nogometa. (Predictive values of physical and functional capabilities in the function of executing complex physical structures of football). *Sportki logos*, Mostar.

Eklblom, B. (1986). *Applied physiology of football*. *Sports Med* 3: 50–60.

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