

AEROBIC AND ANAEROBIC FOOTBALL PLAYERS CAPACITY IS A BASIC OF SCIENTIFIC TRAINING WORK

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Abstract

Since training has to be adjusted with the level of sportsmen skills and legality of skills development scientific and professional approach is required. That kind of approach implies determination of aerobic and anaerobic skills according which we can determine training zones regarding football game requirements. On the other hand, deflection programming that is maintained in a certain space and time intervals and pauses is required to be in accordance with specific activities supported by situational elements of the game and only then the training is rational. The sample of respondents is 23 football players from „Spartak – Zlatibor voda“ club, First league of Serbia. The sample of variables presents ten indicators of functional skills. We calculated central and dispersion variable parameters and the group respondents, according to their skills, are classified through cluster analysis. The results confirmed that this type of approach is successful and in three years of following it this season they will participate in the biggest Serbian league.

Key words: Training, aerobic and anaerobic capacity, Conconi, football players

Introduction

All components of personality, in other words all anthropological status domains, influence sportsmen to achieve the top result. Morphologic characteristics, motor skills, functional skills, cognitive skills, personality traits and sociological status have crucial importance on the sportsmen result. To adjust training process on one side with the level of sportsmen skills and adjust it with all components of his personality, it is necessary to establish scientific and professional approach and adjust them with legality of development. This can be accomplished only if we use scientific approach in their diagnostics. During sports activity complex functional systems are being formed where all the elements of functional system (skeletal-muscle, cardio-vascular, respirator, humeral, vegetative, central-nervous etc.) act as harmonized. Each man, on a different level, possesses individual systems and they are mostly genetically conditioned, but each individual can develop these systems according to its predispositions. Whether this level enables average, a better or top result is a different issue. We should always have in mind that in a sport result there is a big involvement of sports and technical achievement in a specific way. The level of individual achievement in sports activity depends on the context and harmony of certain domains. Skill development occurs according to natural laws of growth and development.

But it is also possible to influence it systematically. The more muscular activity is intensive the bigger is functional activity of cardio-vascular and other systems responsible for muscle supplying with energetic and other tropic substances. Good knowledge of aerobic and anaerobic skills and capacities (Ekblom, 1986) is a pre condition to training programming scientific approach because there is empiric heritage and trainers that are not educated enough to apply scientific knowledge.

Aim

The subjects of the research are functional skills of football player in a control process and loading management. To raise efficiency of sports training system it is essential to bring the structure of training closer to structure of deflection during the game and depending on the level of abilities of each individual. With this work we want to specify methodical approach of skill determination, planning and observing training process of football players. Since the problem is complex and space and time capabilities are limited, in this work we presented functional test results of functional football player's skills estimation according to Conconi as well as Shuttle Run Test as a starting point to determine skills for scientific approach of planning and managing training process.

Methods

Conconi test is a method applied to establish the point of pulse deviation and deflection without measuring lactate, which means without taking a blood sample. The point of deflection (HR deflection) can be defined as a heart frequency above which lactate concentration increases. The content of lactate on HR deflection is 4 millimoles in 1 liter of blood. (Conconi et al., 1982). The testing was conducted on a treadmill. Shuttle run is the Maximal Multistage 20-Meter running test. The authors are Leger and Lambert (1982). It is used to estimate durability within Eurofit battery of tests used to estimate physical work capacity. Based on a cross section we follow the level of deflection and speed of movement and through appropriate tables we obtain values of maximal relative Oxygen consumption VO_{2max} . As a sample for training programming we had 23 football players' seniors from "Spartak-Zlatibor voda" club Serbia's First football league. In season 2007/08 they entered the II League. In half season 2008/09 they were 9th position out of 18 clubs. This year they entered the highest ranking in a competition. Variables obtained according to Conconi's test: Meters ran (CDIST), Systolic blood pressure resting (TAIS), Diastolic blood pressure resting (TAID), Systolic blood pressure at the end of a test (TAFD), Maximal pulse frequency (HRMX), Aerobic threshold (ATHR), Threshold percentage regarding HRMX (HRMP) and Heart frequency resting (MIHR). Variables obtained according to Shuttle Run Test: Bip level (BINI), Bip intensity (BINI), Speed km/h (KMHB), Distance ran (DIST)

and Maximal Oxygen consumption, ml/min/kg (VOMX). Successful trainers in their work with athletes are not supposed to be guided by their average results, but should base on a constant observation and monitoring of their individual capabilities regardless individual or team sports. For this reason it is necessary to plan and monitor individual zones of training. Results are arranged and tabled, central and dispersion variable parameters are calculated. Respondents are grouped according to their skills applying Cluster analysis.

Results and discussion

Obtained results of testing are statistically processed and central and dispersion parameters of individual variables are calculated, Table 1, and normality distribution testing was conducted. Obviously, all variables have normal distribution except maximal heart frequency variable (HRMX), $KSp = .045$. Results obtained indicate sample characteristics, however, in training process more important are individual indicators of functional skills. After determining central and dispersion variable parameters, respondents were grouped by cluster analysis regarding similarity in skills and for them we calculated training zones, deflection duration in that zone and length and type of recovery/pause. We also have to remember that respondents are arranged into groups that match to characteristics supervene from game tactics and systems. Such approach has its justification since many exercises are connected to player's cooperation in the game.

Table 1. Central and dispersion parameters and measures of asymmetry and flatness

Variable	<i>X</i>	<i>Sd</i>	<i>Min</i>	<i>Max</i>	<i>K.V.</i>	<i>Confidence Interval</i>		<i>SK</i>	<i>KU</i>	<i>KSp</i>
CDIST	3902.17	493.02	3000.0	5000.0	12.63	3688.93	4115.42	.12	-.14	.43
TAIS	133.43	10.53	109.0	149.0	7.89	128.88	137.99	-.53	-.52	.82
TAID	76.22	7.37	60.0	90.0	9.67	73.03	79.41	.10	.10	.38
TAFS	160.22	17.24	127.0	185.0	10.76	152.76	167.68	.02	-1.12	.56
TAFD	83.57	10.00	66.0	105.0	11.97	79.24	87.89	.41	-.23	.18
HRMX	194.74	4.82	182.0	207.0	2.47	192.66	196.82	-.29	1.72	.05
ATHR	181.17	4.93	168.0	190.0	2.72	179.04	183.31	-.80	.51	.50
HRMP	93.15	1.00	92.0	95.0	1.08	92.72	93.59	.57	-.82	.20
MIHR	58.39	1.80	55.0	62.0	3.09	57.61	59.17	.06	-.64	.95
VOMX	51.67	2.70	46.3	56.9	5.23	50.50	52.84	-.15	-.04	.02

Examples of training per groups:

Table 2. Training 1. 2x20 min pause 120 b/min

175 b/min	174 b/min	173 b/min	173 b/min
1. group	2. group	3. group	4. group
Z	O	L	V
T	G	J	M
K	D	R	OP
BO	MA	Š	MI
U	F	JA	P
			MA
			NO

Table3. Training 2. 1x45 min

165	163	164	161o/min
1. group	2. group	3. group	4. group
O	R	L	P
Z	B	K	OP
J	D	G	F
M	T	MA	MI
U	JA	N	Š
			V
			N

Table 4. Training 3. 2x10 min pause 115 b/min

186 b/min 1. group	183 b/min 2. group	176 b/min 3. group	182 b/min 4. group
O	T	R	B
Z	L	K	JA
J	V	MA	MI
G	D	Š	P
F	U	M	MA
		O	N

Table 5. Deflection values regarding respondents condition

Distance m	time	resting	Aerobic %	Anaerobic %
100	14s	60-75 s	5	95
200	30s	60-75 s	8	92
400	65s	60-75 s	10	90
600	110s	60-75 s	15	85
800	160s	90 s	25	75
1500	5,15 min	120 s	50	50
3000	12min	150 s	75	25
5000	18min	180 s	80	20
10000	45 min		85	15

It is well known the deflection has to match to what it wants to develop into, in other words has to be trained. Therefore, to increase aerobic skills, deflection intensity have to remain within pulse limits which matches 70-85% of maximal pulse frequency (HRMX), aerobic-anaerobic skills have to stay within limits 85-95% (HRMX) and to increase anaerobic skills (lactate and an lactate) deflection intensity has to remain within limits 95-100% (HRMX.).

Examples:

Running during 5 min at 85% of maximum, then 1 min of recovery running 8 series, 10 min easy running for relaxation. Running during 3 min at 90% of maximum, then 1 min of recovery running 6 series, 10 min easy running for relaxation.

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Maximum intensity running 60 sec, 150 sec of easy running. Maximum intensity running 55 sec, 120 sec of easy running. Maximum intensity running 50 sec, 110 sec. of easy running. Maximum intensity running 45 sec, 90 sec. of easy running. Maximum intensity running 40 sec, 60 sec of easy running. Maximum intensity running 35 sec, 40 sec. of easy running. Maximum intensity running 30 sec 20 sec of easy running and 10 min of easy running for relaxation. To achieve projected and possible results, player's activity is planned in such way to apply situational exercises with a ball, whenever it is possible, with certain number of participants in certain area (the size of area is determined according to training requirements) and activity duration that is suitable for needs of each individual. This segment of planning and realization is the key for success in training and it is based on large knowledge and experience of realization. Any other approach would be improvisation.

Conclusion

Results obtained indicate that middle values remain in expected limits, no significant deviations from normal distribution. However, individuals have showed individual variations in skills which helped group arrangement. Results demonstrated that the respondents, according to their functional skills, are not on the expected and necessary level. Therefore, based on the testing, functional parameters necessary for aerobic skills and anaerobic capacity were determined and in the following phase they helped in training zone determination for each individual respondent. According to this, all training parameters were determined and the types of exercises are; situational exercises with a ball with certain number of participants in a certain area and activity duration suitable for each individual needs.

AEROBNI I ANAEROBNI KAPACITET NOGOMETAŠA JE TEMELJ ZNANSTVENOG PRISTUPA TRENINGU

Sažetak

Pošto trening mora biti usaglašen s razinom sposobnosti sportaša i zakonitostima razvoja tih sposobnosti, neophodan je stručni i znanstveni pristup. Taj pristup podrazumijeva utvrđivanje aerobnih i anaerobnih kapaciteta na temelju kojih se određuju zone treninga u skladu sa potrebama nogometne igre. Nadalje, programiranje opterećenja koja se odvijaju u određenim prostornim i vremenskim intervalima, a također i pauze trebaju biti u skladu sa specifičnim aktivnostima oslonjene na situacijske elemente igre, jer samo je tada trening svishodan. Uzorak ispitanika čini seniorski sastav od 23 nogometaša „Spartak – Zlatibor voda“ člana Prve lige Srbije. Uzorak varijabli čini deset pokazatelja funkcionalnih sposobnosti. Izračunati su centralni i disperzioni parametri varijabli, a ispitanici su u grupe prema sposobnostima razvrstani pomoću cluster analize. Rezultati su pokazali da ovakav rad donosi rezultat i za tri godine ovakvog rada, momčad je osigurala učešće u najvišoj ligi Srbije.

Ključne riječi: *trening, aerobni i anaerobni kapacitet, Conkoni, nogometaši*

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