STUDY OF THE İNFLUENCE OF VARİOUS METHODS BASED ON STRENGTH AND STRENGTH-SPEED ON THE COMPETİTİON OUTCOME İN MİDDLE-DİSTANCE RACES (CORRELATION ANALYSIS)

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Abstract:
The present paper focuses on the study of the special training programme of middle-distance professional female runners and the measuring of the strength abilities that influence the performance of female runners in middle-distance races. The research was conducted between 2009 and 2010, based on the results of the most valuable middle-distance race female runners in Romania.
Keywords: *strength, power, sport training, timing, middle-distance*

HYPOTHESIS OF THE STUDY

The premise was that rationalizing the training programme for middle-distance races by identifying the strength abilities that influence high performance, will lead to maintaining motion speed on a given distance and, consequently, to increasing athletic performance.

RESEARCH METHODS:

The following methods have been used in the present research: observation, testing and measuring, experimentation and statistical–mathematical data analysis. The observational experiment focused on identifying the influence of various methods of training/ developing the strength and extension of the inferior limbs on performance ability in middle-distance races, of the most valuable middle-distance female athletes in Romania. Based on the results in the 800 metre race, three value groups of middle-distance runners were identified, as follows: level I, performance between 2:00.0-2:10.0, eight athletes; level II, performance between 2:10.1-2:20.0, ten athletes; level III, performance between 2:20.1-2:35.0, ten athletes.

INTRODUCTION

The data emerging from the research have confirmed that there is no employment of the most efficient specific methods of training towards the purpose under study, and implicitly, of the most efficient methods of evaluation of the specific force in the training of middle-distance female runners; the arithmetic mean of these parameters does not accurately convey the characteristics of the athletes, their individual values being highly scattered compared to the mean.

In order to study the influence of the various methods based on strength and strength-speed upon the competition results in middle-distance races, we calculated the linear correlations between the average values of the evaluation tests (independent variables) and competition results in the 800 metre and the 1500 metre races.

Table 1 displays the values of the Pearson correlation coefficient for the three groups identified on the basis of the 800 metre race results. The results displayed below confirm that, on the first level of performance in the 800 and 1500 metre races, the weight of the strength in the equation of performance is higher.

Table 1. Correlation coefficients on the three levels of performance

No.	Evaluation test	Pearson correlation coefficient					
		Group I (2.00,0-2.10,0sec.)		Group II (2.10,1-2.20,0sec.)		Group III (2.20,1-2.35,0sec.)	
		800 m	1500 m	800 m	1500 m	800 m	1500 m
1	Vertical jump (cm)	-0.75	-0.56	-0.68	-0.40	-0.61	-0.34
2	10 consecutive jumps on the strong leg (m)	-0.78	-0.48	-0.42	-0.31	-0.33	-0.21
3	Jump step on a distance of 100m (no. steps)	0.79	0.58	0.68	0.51	0.52	0.45
4	Depth jump –vertical jump (cm)	-0.68	-0.62	-0.43	-0.37	-0.33	-0.32
5	Depth jump, 3 sec. pause– vertical jump (cm)	-0.70	-0.60	-0.56	-0.53	-0.34	-0.28

6	Running 300 m high intensity, 30 sec pause – deca-jump in place (m)	-0.89	-0.81	-0.41	-0.32	-0.31	-0.21
7	20 genuflexions with dumbbell with 50% of the body mass (sec)	0.89	0.89	0.42	0.34	0.38	0.33
8	Absolute static force of the leg flexors (kg)	-0.89	-0.70	-0.54	-0.50	-0.48	-0.43
9	Absolute static force of the calf protractors (kg)	-0.71	-0.59	-0.57	-0.53	-0.44	-0.42
10	Absolute static force of the calf flexors on the thigh (kg)	-0.72	-0.62	-0.50	-0.43	-0.33	-0.16
11	Absolute static force of the thigh protractors (kg)	-0.70	-0.58	-0.43	-0.34	-0.33	-0.30
12	Absolute static force of the thigh flexors (kg)	-0.88	-0.81	-0.55	-0.41	-0.29	-0.23
13	Relative force of the leg flexors (kg)	-0.79	-0.58	-0.45	-0.37	-0.21	-0.14
14	Relative force of the calf protractors (kg)	-0.74	-0.66	-0.45	-0.47	-0.45	-0.35
15	Relative force of the calf flexors on the thigh (kg)	-0.73	-0.62	-0.53	-0.48	-0.58	-0.46
16	Relative force of the thigh protractors (kg)	-0.81	-0.68	-0.51	-0.37	-0.41	-0.32
17	Relative force of the thigh flexors (kg)	-0.84	-0.81	-0.58	-0.39	-0.49	-0.35
18	Maximum intake of oxygen (ml/min)	-0.63	-0.71	-0.58	-0.46	-0.32	-0.42
19	Relative intake of oxygen (ml/min/kg)	-0.71	-0.86	-0.61	-0.50	-0.42	-0.46

Observation. The value of the Pearson correlation coefficient "r" will be significant, at the threshold of 5 %, when it will be $\geq 0{,}556$.

The analysis of the way in which positive correlations are established between the level of the independent variables measured by us and the dependent variable, the result in competition, has revealed the following: the value of the independent variables: vertical jump; depth jump-vertical jump; depth jump, 3 sec.pause- vertical jump; 10 consecutive jumps on the strong leg; the absolute static force of the leg flexors - thigh flexors; the relative force of the calf flexors on the thigh and of the thigh flexors, do not rise to an optimum level that would have a positive impact and would facilitate performance in the 800 metre race, in which it is necessary to develop all the components of the specific force mentioned in the present study.

However, as can be inferred from the inter-group analysis, on the first level of performance there are several independent variables, the values of which correlate very well with the average level of the athletes' results: jump step on a distance of 100 metres (no.steps) and 20 genuflexions with dumbbell with 50% of the body mass. This explains the methodical approach of the trainers and gives us solid arguments in promoting these training instruments at the level of the experimental group.

The same tendency can be observed on the second and third level, with the additional note that on the third level, where a number of positive correlations with the level of the independent variables tested by us have been registered, the results of the athletes are much weaker than in the other groups.

The level of the correlations identified in the first level group has influenced, on the one hand, the maintaining, exclusion or replacement of some independent variables in the pedagogical experiment and, on the other hand, has offered the premises of the methodical approach with a view to achieving the aim of the present paper.

CONCLUSIONS

The analysis of the ways in which positive correlations are established between the level of the independent variables measured by us and the dependent variable, the result in competition, we have determined that the values identified by us of a number of independent variables correlate better with the competition results in the 1500 metre race, as far as the first level group is concerned: vertical jump; depth jump-vertical jump; depth jump, 3 sec.pause-vertical jump; 10 consecutive jumps on the strong leg; the absolute static force of the leg flexors and the thigh flexors; the relative force of the calf flexors on the thigh and of the thigh flexors. This confirms that the value of these variables do not rise to an optimum

point which would have a positive influence and favour performance in the 800 metre race, in which it is necessary to develop all the components of the specific force identified by us. At this level of performance there are a number of independent variables, the values of which correlate very well with the average level of the athletes' results: jump step on a distance of 100 metres (no.steps); running 300 m high intensity, 30 sec.pause- deca- jump in place; 20 genuflexions with dumbbell with 50% of body mass; the relative force of the thigh protractors and thigh flexors.

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ETUDE DE L'INFLUENCE DE DIVERSES MÉTHODES BASE SUR LA FORCE ET LA RESISTANCE DE VITESSE SUR LE RÉSULTAT DU COURSES DE FOND (ANALYSE DE CORRÉLATION)

Résumé:
Le présent document se concentre sur l'étude du programme de formation spécial de demi-fond professionnelles coureuses et la mesure des capacités de résistance qui influencent la performance des coureuses en milieu courses d'endurance.
La recherche a été menée entre 2009-2010, sur la base des résultats des coureurs les plus précieux de course de demi-fond féminin en Roumanie.
***Mots clés**: force, puissance, entraînement sportif, le calendrier, de demi-fondfranceza*

USING THE KINECT SENSOR TO STUDY THE KINEMATICS OF THE HUMAN BODY

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***Abstract*:**
The human body is a complex mechanism which is composed by multiple kinematic chains. The purpose of those multiple chains is to maintain the human body in continuous motion necessary for everyday life. In this paper we will present a state of the art technology defined by its huge potential and accessibility to study the kinematics of the human body.
Our work investigates how the Kinect sensor is capable to take part in the study of the human body kinematics.
***Keywords:** biomechanics, Kinect sensor, depthsensor, kinematics, sport, human body, markerless motion*

INTRODUCTION

The kinematic analyses upon the human body are at the moment a significant source of information about how the kinematic chains which compose it behave in everyday activities or in sports.

It is very important to understand the behavior of the human kinematic chains because this way we can predict, control or solve problems which regard the musculoskeletal which leads in deficiencies of the human body equilibrium.

Asymmetries of the musculoskeletal appear when pathologies impact on one side of the human body. It is crucial to maintain the health of the musculoskeletal because this way we can avoid displacement of the body and joints or avoid strokes like is shown by Lisa D. Alexander in her study regarding the link between gait asymmetry and brain lesion [1].

To do so, over the years new technologies appeared such as Vicon cameras [2], ToF cameras [3], Kinect sensors [4], which help us to study more closely and more efficient the kinematic of the musculoskeletal.

PREVIOUS WORK

The Kinect Xbox 360 is a powerful depth sensor developed by Microsoft and released in November 2010. Its first purpose was to be used in videogame industrywith the Xbox console but its high potential leaded the usage in multiple fields.

Previous authors explained the high usage of the depth sensors in different fields like: intuitive