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The Effects of Basic Fitness Parameters on the Implementation of Specific Military Activities

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A B S T R A C T

The aim of this study was to determine whether basic fitness parameters have the impact on the specific military activity such as walking 18km with 25kg of load. The members of Croatian Armed Forces (30 soldiers) were tested before the beginning of the training program. The study has included variables for the assessment of muscular endurance: push-ups in 2 minutes, sit-ups in 2 minutes, maximum number of pull-ups before dropping from the bar, bench press with 70% of body weight-max number of repetitions, max number of squats for 60 seconds, then the variables for the assessment of aerobic capacity: the 3200m run and relative oxygen uptake using the direct method of measurement on a treadmill as well as the variable for the assessment of body fat (body fat %). As the criterion variable, it was used the 18 km walking with 25 kg of load. The results of the regression analysis have shown statistically significant relation of predictor variables with the criterion variable. The two variables, 3200m run and RVO2 had a significant Beta coefficient. Based on the obtained results it could be concluded that great cardio-respiratory endurance has a much larger impact on the walking length of 18 km with a load of 25kg than other fitness parameters.

Key words: *military, impact, physical preparation,* VO_{2max}

Introduction

The soldiers are often forced to wear all the necessary equipment with them during training and operations[1]. Besides this, physically demanding activities such as walking under the load are often conducted on difficult terrain and longer sections[2]. Therefore, walking with backpack load is one of the most important tasks for the solders[3–5] and especially for the members of special forces[6]. These specific actions require from soldiers extraordinary conditioning.

It is that the soldiers are seen or treated as the »worst« examples of carrying extremely heavy loads over long period[7]. Christie and Scott[8] have studied the relationship of load and speed of walking on the metabolic status and the demands of soldiers. The most acceptable conditions (moderate stress) of walking were 3.5 km/h with 50 kg, 4.5 km/h with 35 kg and 5.5 km/h with 20 kg, acceptable conditions (high stress) of walking were 3.5 km/h with 65 kg, 4.5 miles/h with 50 kg and 5.5 km/h with 35 kg and 6.5 km/h with 20 kg, and the least acceptable (very high stress) conditions of walking were 4.5 km/h with 65 kg, 5.5 km/h with 50 kg and 6.5 miles/h with 35 kg.

Since the training effects that affect the performance of walking with load are highly specific[3], the question is what the skills and fitness training operators as an integral part of the training of Special Forces are that affect the implementation of specific tasks (walking with load). Many studies have confirmed that combination of strength and endurance training is necessary for the performance of specific military tasks such as walking with the backpack load[2,5,9–13] and that upper body strength and muscular development are perhaps the most important parameters. However, the majority of selective training for members of special units do not include in their structure the traditional training for the development of strength that would affect the ability of walking with load, but the majority of them are based on the development of aerobic and relative muscular endurance. Still we can come across to the problem of training without the variety of

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contents, that would have a positive relationship with specific tasks. Therefore, it is known that walking with load represents a considerable stress for the body[12,14] and is associated with the lower back pain[15]. All that leads to the question of how so the well and practical is to use it so often if a significant impact on those specific skills could be achieved with less stressful training and exercises.

However, it should not be forgotten that only a specific activity (overcoming barriers of space and the expected conditions in a real situation) has real situational efficiency (efficiency in carrying out tasks simulated combat conditions). Only by such kind of performance could be seen the true effects of a training process[16,17] since the basic anthropometric and fitness abilities could not be enough to predict the success of the implementation of specific tasks, like walking with the load[3]. Apart from the relatively large number of papers dealing with the problems of walking with load and fitness training, further researches in this area are required. The aim of this study is further confirmation of the relation of muscular strength and aerobic endurance performance with walking with load. Such obtained data could be of significant importance for training and diagnosis of walking not only with larger load but also at larger distance[18].

Since it isn't fully explained the influence of upper body strength compared to the lower body strength[13], it is necessary to investigate further the impact of upper body strength and the tests to assess the strength of the upper body[3]. The interesting fact is that the upper body strength plays a significant role in the improving of the performance of walking with load on a 2 mile section[7]. According to the research Maleš et al.[19] adipose tissue is a major morphological determinant for the endurance state. In addition, the endurance is very important for walking with a load[2,5,9–13], because of higher loads[7] that would increase the aerobic capacity demands. The positive correlation was also found among lean body mass and walking with load[11] and body composition as one of the determinants of implementation of walking with the load[20].

Based on this, along with fitness skills, this study included the variable of subcutaneous adipose tissue. The positive correlation which was found in lean body mass does not automatically lead to the conclusion of negative relationship between adipose tissue and walking with load. Adipose tissue is particularly useful as a source of energy for long walking.

The aim of this study was to determine whether basic fitness parameters have the impact on the specific military activity such as walking 18km with 25kg of load, that would indirectly have an impact on increasing the capacity to implement specific tasks with regard to the conditions in which to conduct training for Special Forces.

Materials and Methods

Subjects

For the purpose of this study 30 Members of Croatian Armed Forces (age = 23.65±1.79, body height = 178.66 ±5.93 cm, body weight = 79.35±7.71 kg) were tested. Ethics Committee of the Faculty of Kinesiology, University of Zagreb approved the study. All subjects were submitted to health examination before the testing and only the ones with adequate health status and doctor permission were allowed to participate in the study. The participants were aware that they could withdraw from the study at any time they want. The subjects were not excluded on the basis of their smoking or alcohol consumptions history or body mass index (BMI). However, participants who were taking medications for which is known to affect heart rate response to exercise, such as beta-blockers, calcium channel blockers, or other heart and antihypertensive medications, stimulants, or antidepressants, or with any previous medical history of heart disease, were excluded. Similarly, cases where the grade exercise test (GXT) exhibited an abnormal, sign/symptom-limited response (e.g., angina, ST-segment depression, significant dysrhythmia, or abnormal blood pressure response) leading to an early test end point and positive interpretation suggesting the presence of ischemic heart disease were also excluded from the analysis. The subject characteristics are presented in Table 1.

TABLE 1
BASIC DESCRIPTIVE PARAMETRES FOR SUBJECTS (N=30)

	Age (years)	Height (cm)	Weight (kg)	Percentage of body fat (%)
X±SD	23.65±1.79	178.66±5.93	79.35±7.71	10.80±3.97

X±SD – mean ± standard deviation

Procedures

Laboratory assessments were undertaken at the Faculty of Kinesiology, University of Zagreb, Croatia. Each athlete was measured by experienced anthropometrics prior to the measurement of VO_{2max}. Body mass was assessed to the nearest 0.1 kg using beam balance scale with the athletes wearing minimal clothing. Body height was assessed to the nearest 0.1 cm using portable stadiometer. The stadiometer and scale were calibrated periodically during the study.

The study included variables for the assessment of muscular endurance: Pushups in 2 minutes ($PU_{2\ minutes}$), sit-ups in 2 minutes ($SU_{2\ minutes}$), maximum number of pull-ups before dropping from the bar ($Pull\text{-}ups_{\ max}$), bench press with 70% of body weight-max number of repetitions ($Bench\ press_{\ max}$), max number of squats for 60 seconds ($SQUAT_{60\ seconds}$), then the variables for the assessment of aerobic capacity: the 3200 m run and relative oxygen uptake (RVO_2) using the direct method of measurement on a treadmill as well as the variable for assessment of body fat (body fat %). As the criterion variable it was used the 18 km walking with 25 kg of load (18 km Walk).

The testing was conducted within intervals of four days. Walking with load was carried out as an independent activity during the first day. During walking, each candidate was wearing standard military uniforms, military boots, combat vest, gun and backpack with weight of 25 kg. Water that each candidate carried with him during the walk, was not counted in the weight of the load. Walking was carried out in the forest along the gravel road on a section of 9 km. Once the candidates have come to the checkpoint at 9 km, they came back the same way. The measurement was carried out by the basic training instructors for special operations. After walking a day of rest has followed. The third day was spent measuring subcutaneous adipose tissue and spiroergometry. The fourth day was spent measuring the variables for the assessment of muscular endurance and aerobic endurance (3200m run).

Experimental protocols

To prevent unnecessary fatigue accumulation, subjects were asked to refrain from strenuous exercise for 24 h prior to exercise test. After warm-up and stretching, based upon the subject's habits, VO_{2max} was measured by standard incremental maximal exercise test protocol that was performed on a motor-driven treadmill (Run race, Technogym, Italy) with a 1.5% inclination was applied. During the testing period the air temperature ranged from 21 °C to 23 °C The testing was performed in morning hours (between 9 am and 13 am) in thermo-neutral conditions. After 1 minute of measuring VO_2 in rest (standing position), the starting speed was 3 km/h, with speed increments of 0.5 km/h every 30 seconds. The subjects walked the first few steps (up to 6 km/h), and continued running from 7 km/h, until volitional exhaustion. Expired gas was sampled continuously and O_2 and CO_2 concentration in expired gas were determined using stable and fast Zirconium Oxygen and NDIR Carbon Dioxide analyzers (breath-by-breath gas exchange system Quark b^2, COSMED, Italy) which were calibrated prior to and following each test using precision reference gases. The system was calibrated before each test using gases of known concentrations. Heart rate (HR) was collected continuously during the tests using telemetric heart rate monitor (Polar Electro, Kempele, Finland), and stored in PC memory. Expired airflow was measured with digital turbine flow meter (COSMED, Italy), which was calibrated prior to and following each test using a 3 l syringe at flow rate and volumes in the expected physiological range. Temperature and humidity of expired gas were measured using a rapidly-responding sensor (Quark b^2, COSMED, Italy). End-of-test criteria for the determination of maximal oxygen uptake (VO_{2max}) included two of the following: 1) volitional exhaustion, 2) achieving a plateau in VO_2 (highest values were calculated as arithmetic means of the two consecutive highest 30 s values), and 3) HR≥90% of age-predicted maximum. All subjects refrained from exercise for 24 h before testing. During recovery after test protocol, the subjects walked at 5 km/h for 2 minutes. The last half or full stage the subject could sustain (for either 30 s) was defined as the subject's maximal speed.

Statistical analyses

The collected data were store and analyzed for windows statistical software (Statistica for Windows 7.0). Descriptive statistics were calculated for all experimental data. Kolmogorov-Smirnov test was used to test if data were normally distributed. Statistical power was calculated using G-power software. Effect sizes (ES) were calculated by Cohen's suggested method[25] for the magnitude of treatment effects within groups. Linear regression and Pearson product movement coefficient of correlation was used to determinate relationship between criterion variable (18 km Walk) and prediction variables (body fat %, RVO_2, $PU_{2\ minutes}$, $SU_{2\ minutes}$, Pull-ups $_{max}$, Bench press $_{max}$, $SQUAT_{60\ seconds}$, 3200m run) among military personal. Statistical significance was set at $p<0.05$.

Results

The Kolmogorov-Smirnov test has shown that the data were normally distributed. The statistical power was 0.95. The total number of correlations between the predictor variables was 28, and out of that 11 (or 39%) were statistically significant (Table 2). The largest correlation was 0.73 between the pull-ups (Pull-ups $_{max}$) and the maximum thrust from the bench with 70% of body weight (Bench press $_{max}$) (Table 3).

The results of the regression analysis (Table 4) have shown that the two variables 3200 m run and RVO_2 have statistically significant regression coefficient. The relative oxygen consumption has the most unexplained vari-

TABLE 2
BASIC DESCRIPTIVE PARAMETERS OF TESTED VARIABLES

	$PU_{2minutes}$ (rep.)	$SU_{2minutes}$ (rep.)	Pull-ups$_{max}$ (rep.)	Bench press$_{max}$ (rep.)	$SQUAT_{60seconds}$ (rep.)	3200m run (min)	RVO_2 (mL/kg/min)	Body fat (%)	18 km walk (min)
X	70.63	82.90	12.80	22.87	55.27	12.90	60.50	10.93	164.53
SD	15.63	12.51	3.63	6.48	7.79	0.93	4.92	3.99	13.50

$PU_{2\ minutes}$ – pushups in 2 minutes, $SU_{2\ minutes}$ – sit-ups in 2 minutes, Pull-ups $_{max}$ – maximum number of pull-ups before dropping from the bar, $SQUAT_{60\ seconds}$ – maximum number of squats for 60 seconds, Bench press $_{max}$ – bench press with 70% of body weight-max number of repetitions, 3200m run – running for 3200 m, body fat % – Body fat percentage, RVO_2 – relative oxygen uptake, 18km Walk – 18 km walking with 25 kg of load, X – mean, SD-standard deviation, rep – repetition

TABLE 3
CORRELATION BETWEEN VARIABLES

	$PU_{2minutes}$	$SU_{2minutes}$	Pull-ups_{max}	$SQUAT_{60 seconds}$	Bench $press_{max}$	3200 m run	RVO_2	body fat %	18 km Walk
$PU_{2 minutes}$	1.00								
$SU_{2 minutes}$	0.37*	1.00							
Pull-ups_{max}	0.48*	0.43*	1.00						
$SQUAT_{60seconds}$	0.35	0.12	0.12	1.00					
Bench $press_{max}$	0.54*	0.23	0.73*	0.01	1.00				
3200m run #	–0.38*	–0.38*	–0.37*	–0.47*	–0.05	1.00			
RVO_2	0.32	0.11	0.13	0.31	0.01	–0.35	1.00		
Body fat %	–0.34	–0.22	–0.40*	–0.37*	–0.21	0.68*	–0.32	1.00	
18km walk #	–0.37*	–0.33	–0.38*	–0.20	–0.10	0.56*	0.08	0.27	1.00

$PU_{2 minutes}$ – pushups in 2 minutes, $SU_{2 minutes}$ – sit-ups in 2 minutes, Pull-ups $_{max}$ – maximum number of pull-ups before dropping from the bar, $SQUAT_{60 seconds}$ – maximum number of squats for 60 seconds, Bench press $_{max}$ – bench press with 70% of body weight-max number of repetitions, 3200m run – running for 3200m, RVO_2 – relative oxygen uptake, body fat % – Body fat percentage, 18km Walk – 18 km walking with 25 kg of load, * p<0.05, # – inversely scaled variables

TABLE 4
MULTIPLE REGRESSION ANALYSIS

	Beta	St. err. of Beta	B	St. Err. of B	t(21)	p-level
Intercept			12.57	63.30	0.20	0.84
$PU_{2minutes}$	–0.37	0.22	–0.32	0.19	-1.72	0.10
$SU_{2minutes}$	0.03	0.18	0.03	0.19	0.17	0.86
Pull-ups_{max}	–0.37	0.26	–1.36	0.98	–1.39	0.18
$SQUAT_{60seconds}$	0.07	0.18	0.11	0.31	0.37	0.72
Bench $press_{max}$	0.34	0.27	0.71	0.56	1.26	0.22
3200m run *	0.61	0.25	8.77	3.59	2.44	0.02*
RVO_2*	0.37	0.17	1.01	0.46	2.18	0.04*
body fat %	–0.20	0.22	0.66	0.73	–0.91	0.37

$PU_{2 minutes}$ – pushups in 2 minutes, $SU_{2 minutes}$ – sit-ups in 2 minutes, Pull-ups $_{max}$ – maximum number of pull-ups before dropping from the bar, $SQUAT_{60 seconds}$ – maximum number of squats for 60 seconds, Bench press $_{max}$ – bench press with 70% of body weight-max number of repetitions, 3200m run – running for 3200m, RVO2 – relative oxygen uptake, body fat % – Body fat percentage, * – significant on level p<0.05.

ances in relation to other predictors. The 3200 m run explains both the significant and the largest amount of the criteria but it has a relatively high and significant variability with all other predictor variables.

If we analyze the variables RVO_2 and 3200 m run with the criterion, independently without other predictors, they explain 40% of the variance criteria ($R = 0.64$, $R^2 = 0.40$, BETA (3200 m run) = 0.67, BETA (RVO_2) = 0.31, $p < 0.0009$) (Table 5).

Discussion

Based on the results, we can conclude that the predictor variables together comprise a relatively large area of fitness traits that aim to describe the impact on the criterion variable, in this case walking with the load. It is interesting to observe a relatively low correlation between the relative oxygen consumption and 3200 m running. This is in contrast to Mello, Murphy and Vogel[21] research where the 3200 m running test has high correlation with the maximum of oxygen consumption (for men the correlation was r=0.91). Because of the relative oxygen consumption, relatively low correlation could be the result of different body weight of subjects (minimum weight of examiners 64.5 kg, the maximum weight of examiners 95.6 kg). This problem requires further investigation and detailed analysis.

If we take into account the significance of these two variables (RVO_2 and 3200 m run) with respect to the explanation of the criteria, their interconnectedness, and a different amount of variance that they have with other independent predictors, as well as the amount of information, we can come to the conclusion that the independent variable RVO_2 contains information that describe the criteria which do not cover completely or

TABLE 5
PARTIAL CORRELATION

	Tolerance	R^2	Partial correlation	p-level
$PU_{2minutes}$	0.48	0.52	–0.35	0.10
$SU_{2minutes}$	0.70	0.30	0.04	0.86
Pull-ups$_{max}$	0.32	0.68	–0.29	0.18
$SQUAT_{60\ seconds}$	0.70	0.30	0.08	0.72
Bench press $_{max}$	0.31	0.69	0.27	0.22
3200m run *	0.36	0.64	0.47	0.02*
RVO_2*	0.79	0.21	0.43	0.04*
body fat %	0.48	0.52	–0.19	0.37

$PU_{2\ minutes}$ – pushups in 2 minutes, $SU_{2\ minutes}$ – sit-ups in 2 minutes, Pull-ups $_{max}$ – maximum number of pull-ups before dropping from the bar, $SQUAT_{60\ seconds}$ – maximum number of squats for 60 seconds, Bench press$_{max}$ – bench press with 70% of body weight-max number of repetitions, 3200m run – running for 3200m, RVO_2 – relative oxygen uptake, body fat % – Body fat percentage, * – significant on level $p<0.05$.

substantially all other combined predictors. Nevertheless, the improvement in 3200 m run variable, will affect the criteria for higher values of standardized regression coefficients (Table 4). Because the relative oxygen consumption refers to a certain amount of oxygen per kilogram of body weight, it is logical to assume that the weight was the factor that in a certain way affects the implementation of walking with the load.

Despite the significant correlation of predictor variables with the 18km Walk, a high level of specificity in these activities was visible, with 47% of unexplained variance. These data agree with the research of Rayson and Williams[3], who found that walking with load is highly specific and that basic anthropometric and fitness performances could not be enough to predict this specific task.

Maleš et al.[20] determined that the specific military activity (walking with the load), requires great absolute leg muscle endurance. In this study we did not find a significant correlation with variable $SQUAT_{60\ seconds}$ which manifested leg muscle endurance. However, variable $SQUAT_{60\ seconds}$ was actually used to estimate the relative muscular endurance of leg muscles, since the task in the test was to carry out maximum number of squats in 60 seconds, but without additional external loads.

According to this, we can conclude that the cause of disconnection of the $SQUAT_{60\ seconds}$ variable with the criterion variable was the lack of additional external loads (absolute load). In addition, this could be a valid conclusion on why the results of this study could not confirm the results of research Maleš et al.[20]. The same research[20] and the research Kraemer et al.[9] stated that the upper body strength and relative muscular endurance are very important for walking with load. However, the obtained data in this study do not confirm that fact. There is even a negative, but statistically insignificant impact of some variables for the assessment of muscular endurance of the upper body ($PU_{2\ minutes}$ and Pull-ups $_{max}$). These results may be explained by very good results in the measured sample ($PU_{2minutes} = 70.63 \pm 15.63$ and Pull-ups $_{max} = 12.80 \pm 3.63$). Because of the relatively high level of conditioning, results in variables $PU_{2\ minutes}$ and Pull-ups $_{max}$ had no significant impact on the criterion. The level of relative muscular endurance measured by the above mentioned variables was in a sufficiently high level that could not have further impact on walking with the load. Another possible explanation for these results is related to the movement structure of the measured variables and walking with the load. Variables $PU_{2\ minutes}$ and Pull-ups $_{max}$ are dynamic movements, while in the walking with the load the upper body is in a relatively static position therefore the static strength of the upper body was more evident. Because of such relation, short dynamic work in the variables and static long-term work, show a negative correlation of the variables ($PU_{2\ minutes}$ and Pull-ups $_{max}$) with the criterion.

The variable Bench press $_{max}$, that assesses muscular endurance of the upper body, has a positive but statistically insignificant impact on the criterion. The obtained results were not confirmed by some previous studies[9,20]. However, the explanation, regarding this variable, is the following: 1) Bench press $_{max}$ variable has a tendency of positive impact on the walking with the load. However, due to the large amount of variance, which was shared with all other predictor variables (Table 5) Bench press $_{max}$ could not be enough to affect significantly the criteria; 2) the results of the measured sample in the above variables showed very good levels of conditioning (Bench press $_{max} = 22.87 \pm 6.48$) which could lead to reduced impact of the variable on the predictor; the reason for such results is that some activities will produce less effects if they approach to the level at which they can realize their maximum value. The more developed a capability is, the smaller the impact of this exercise is for further progress. As it is previously stated, in the variables $PU_{2minutes}$ and Pull-ups $_{max}$, one of the reasons could be found in both, the structure and biomechanics of work, where the dynamic operation is dominated by the upper body in the variable Bench press $_{max}$ versus static load bearing of the upper body during walking.

According to this, the variable Bench press $_{max}$ must be certainly taken into consideration in further researches with other set of predictors that would not have so much influence to the variance and with the sample of subjects in different levels of conditioning, but also its impact on walking with different loads and at different lengths.

Since the relative muscular endurance is related to a higher number of repetitions with a load of their body weight (extensity), the answer must be found in the intensity of the load, because it is the intensity of the load that makes a specific military walking. Therefore, it is visible not only less but also a negative trend of the relative load influence in relation to the absolute load and specific military walking, taking into account the level of conditioning of the subjects.

The variable $SU_{2minutes}$, despite the importance of the strength of the core in maintaining stability of the body, particularly with external loads, and the importance of trunk muscles as the core of most movements, does not significantly influence the criterion. The reason again could be also seen in a relatively high score of participants in the above variables (82.90±12.51 repetition) and therefore a smaller impact on the criterion. Also, the movement that is performed in the variable $SU_{2minutes}$ is a dynamic movement of the body, while during walking the trunk muscles have mainly a stabilizing role of the body under load and do not have so dynamic work as in the study variables.

All participants had a substantial capability of relative muscle endurance, by which they define a large number of repetitions in certain activities. Therefore, for all the listed variables which estimated the capacity, the sensitivity has been decreased and the variance was contracted as well as that the relation with other variables was reduced, especially with the criteria variable. Because of that fact, the variables which refer to the assessed ability could not further explain the criteria variance.

The analysis of the results has showed the evident tendency of growing influence of absolute muscular endurance during walking with load, opposed to relative endurance. Therefore, we can conclude that absolute muscular endurance is more important for walking with a load than the relative muscle strength in well-trained people, because that load represents a specific walking, that requires different body work and body movement, which leads to a different manifestations of condition skills related to long-term absolute muscular endurance.

The variable Body fat% has shown a negative, but statistically insignificant impact on the criterion variable. This result does not agree with studies Maleš et al.[19] and Williams et al.[2] that confirmed the significant negative impact of subcutaneous fat on performance, and the positive impact of lean mass and body composition on walking with the load[2,20]. The reason for this result is less variability in the entity of Body fat% variable (Body fat=10.93±3.99%) which showed a disturbing factor for walking with the load. Therefore, in the previously mentioned studies, there was a significant influence of Body fat% while it was not confirmed in this study. We can conclude that this level of subcutaneous adipose tissue is allowed for candidates for special operations and does not affect their specific tasks and can be taken as a criterion for recruitment and selection.

The only two variables that significantly influence the criteria were 3200m run and RVO_2, what was also confirmed by many other studies[2,7,9,12,15,19,20] and it also could be concluded that for the walking length of 18 km with a load of 25 kg, specific cardio-respiratory endurance has a much larger impact than other fitness parameters. In terms of the training, these results tell us that the well-trained people with relatively highly developed endurance and strength capabilities, could perform better in the specific military activities, in this case walking with the load, through the development of aerobic endurance.

All of the above results were obtained by regression analysis, which used a linear model. The obtained data from this research, along with other researches confirm that certain fitness parameters cannot predict success in performance of walking with load and that the military walking is highly specific activity[3,16].

Conclusion

Certain basic tests of conditioning can significantly influence a specific military activity (walking with a load of 25 kg at a length of 18 km) for a highly trained people, but there is a large amount of specificity in carrying out such activities. Predicting the results of such specific activities is much more complex than it appears at first glance. The well-trained people can affect the improvement of such activities primarily by the implementation of specific training. Further researches are necessary to determine whether some another tests can significantly affect the implementation of activities, as well as what percentage of the variance is in fact specific and can not be described or influenced by any other variable except the implementation of the activity of walking with the load. The variables that are used for the explanation and describing of the impact on walking with the load, should by their structure also take into consideration the specific structure of the walk.

Moreover, it would be interesting to determine in the future researches the ratio and the relation between fitness parameters based on various combinations of length and walking loads during walking. When talking about the military walking with the load it is necessary to take into account not only the previous training experience but also the specific training, what was confirmed by the research Sampson et al.[22].

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UTJECAJ BAZIČNIH KONDICIJSKIH SVOJSTAVA NA PROVEDBU SPECIFIČNE VOJNE AKTIVNOSTI

SAŽETAK

Cilj ovog istraživanja je utvrditi koja bazična kondicijska svojstva utječu na provedbu specifične vojne aktinosti – hodnja 18 km s opterećenjem 25 kg. Trideset kandidata s temeljne obuke za specijalna djelovanja (OSRH) testirano je prije početka obuke. Bazična kondicijska svojstva izmjerena su testovima: sklekovi u 2 min, pretklon trupa u 2 min., čučnjevi u 60 sek., zgibovi, potisak sa klupe sa 70% tjelesne težine, trčanje 3200 m, relativni primitak kisika i potkožno masno tkivo. Regresijska analiza pokazala je statistički značajnu povezanost prediktorskog skupa s kriterijskom varijablom. Varijable prediktorskog skupa 3200 m i RVO_{2max} imale su značajan beta koeficijent. Kao krajnji zaključak možemo reci da je za hodanje s opterećenjem kod vojnika najvažnija dobra aerobna izdržljivost mjerena testom 3200 m ili direktnom metodom merenja maksimalne potrošnje kisika.