

# THE ANTHROPOMORPHOLOGICAL PROFILE OF FEMALE POLICE OFFICER STUDENTS AND DIFFERENTLY TRAINED ATHLETES: A MULTICENTROID MODEL

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**Abstract:** The aim of the study was to compare the anthropomorphological (AM) statuses of female students of the Academy of Criminalistic and Police Studies (ACP students) and female athletes with different training regimens. The task was to position the AM space of the ACP students in relation to female athletes with an extended systematic training experience. The study involved a total of 106 subjects, divided into four subsamples as follows: 25 water polo players, 34 volleyball players, 11 karateists, and 36 ACP students. The AM status was assessed according to eleven (11) variables, and the results underwent multivariate discriminant analysis. The results were used to define the model of AM characteristics of the ACP students located in relation to the athletes. Three characteristic functions of the studied space were discriminated and defined as: 1) general indicators of the body constitution; 2) general indicators of the subcutaneous fatty tissue; and 3) the indicator of the local distribution of the fatty tissue in the upper arm. The results obtained indicate that the AM status of the ACP students generally (75.0%) corresponds to the profiled project standards of the effects of Special Physical Education. However, it should be pointed out that as many as 9 (25.0%) of the ACP students belonged to the water polo player model, i.e. the group with most pronounced characteristics of body fat, while the total of mere 6 (4+2; 16.7%) belonged to the volleyball player and karateist model, i.e., the group with the professionally most desirable anthropomorphological characteristics.

**Key words:** Anthropomorphological status ACP students, female athletes, centroids

## 1. Introduction

In a wider context, Special Physical Education (SPE) is an academic subject which deals with the issues of general, streamed, and specific professional competence, as well as with anthropomorphological characteristics and physical ability of the employees of the Ministry of the Internal Affairs. With regard to its importance and scope, the effects of SPE are defined as: affirmative and

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preventive influence on the health status of the police force; affirmative influence on the development of the required professional characteristics of the police force; the development and maintenance of the morphological status of the given population; and the adjustment of the level of motoric skills to individual characteristics as depending on the nature of work (Blagojević et al., 2008, pp. 1-9).

The anthropomorphological space assumes the study of bodily characteristics which define the shape and composition of the human body, as well as the study of basic dimensions which describe a given shape or composition (Wiener & Lourie, 1981; Howley & Don Franks, 1997; Blagojević et al., 2008, pp. 181-185).

There is a growing scientific evidence that people who are over- or underweight (with a certain level of obesity or asthenia, i.e. emaciation, respectively) do not only have a reduced working capacity, but they can also show a statistically significant decrease in psychological abilities (reduced concentration, attention, stress tolerance, etc.) or a decline in their health status (problems with endocrine, metabolic, haematological, gastrointestinal or cardiovascular systems, or locomotoric and physical malfunction, etc.) (Hulens et al., 2001; Wendel-Vos et al., 2004; Rezaeian et al., 2006; Anderssen et al., 2008; Booth et al., 2008).

Every police force in economically and socially developed countries ensures high performance quality of their staff by employing precisely defined models of selection of male and female candidates, including strict criteria in the bodily characteristics, i.e. the anthropomorphological status. Additionally, there are elaborate systems of control over these characteristics throughout a police officer's working life (Lord, 1998; Sorensen et al., 2000; Australian Federal Police, 2004). This has been enabled by the development of the working technology aided by the results of scientific research (Bonneau & Brown, 1995; The Cooper Institute, 2002; Booth et al., 2008; Boyce et al., 2008; Malavolti et al., 2008).

The aim of this study was to compare the anthropomorphological (AM) statuses of female students of the Academy of Criminalistic and Police Studies (ACP students) and female athletes at different training levels. So far such comparative analyses have been done with the male population in relation to certain motoric abilities (Blagojević, 2003; Koropanovski i Janković, 2007; Vučković i Koropanovski, 2007), while the adequate research of the female population is still lacking. The theoretical underpinnings of the study were set with relation to the fact that both female students and athletes undergo a regimen of regular physical exercise. Every training session has got a specific influence on the adaptability of the human body, while the dominant effect of a particular training will depend on what it is aimed at. The theory and practice of training has established that the level of the required physical fitness, along with adequately developed general and specific physical abilities, does not only depend on the actual morphological status but it also necessitates the optimization of the bodily status (Kostić et al., 2006; Jukić et al., 2007;

Malavolti et al., 2008; Marrin & Bampouras, 2008; Kostić et al., 2009). Within the context of the requirements of police work, this means that the professional performance of a person lacking in adequate AM (bodily) characteristics will not meet the required efficiency standards (Bonneau & Brown, 1995; Howley et al., 1997; Sorensen et al., 2001; Hulens et al., 2001; The Cooper Institute, 2002; Australian Federal Police, 2004; Anderssen et al., 2008; Booth et al., 2008; Boyce et al., 2008).

The task of this study was to identify the AM space in which female ACP students could be related to female athletes with extended systematic training of varying profiles that would have subsequent influence on the space under consideration. Thus, the ACP students' status would be defined, and an actual model showing the multivariate relations between the studied populations could be set in order to enable the utilization of the AM variable.

## 2. Methods

The basic method used in this study relies on laboratory measurements. The anthropomorphological variables were measured in accordance with the standard of the International Biological Program (Weiner & Lourie, 1981).

### *The sample*

The total sample included 106 women subjects, who were divided into four subsamples as follows: 25 water polo players of the senior Serbian national team, aged  $20.6 \pm 3.1$  years; 34 volleyball players from the 1<sup>st</sup> Serbian League VC "Radnički-Jugopetrol", aged  $19.8 \pm 3.2$  years; 11 karateists of the Serbian national team, aged  $21.3 \pm 3.4$  years; and 36 ACP students of the 2<sup>nd</sup> and 3<sup>rd</sup> academic year 2005/2006, aged  $20.8 \pm 0.8$  years.

The subsample of water polo players was composed of competitors in games where mixed (aerobic-anaerobic) effort is dominant, with an emphasis on endurance in strength (Marrin & Bampouras, 2008). The subsample of volleyball players consisted of competitors in games where aerobic effort is dominant, combined with anaerobic alactate effort and pronounced speed and explosion strength in longer intervals of over 30 minutes (Nešić, 2008; Rajić et al., 2008). The karateists competed in an individual sport – in fighting, where the effort is also dominantly aerobic in combination with anaerobic alactate efforts and pronounced speed and explosion strength in short intervals of up to 3 minutes (Koropanovski et al., 2008). The athletes were chosen with regard to the level of fitness and the AM status which corresponds to the theoretical projection model of

the effects of SPE and to the physical abilities and body composition of ACP students.

### *Sampling the variables*

The study used a set of eleven (11) variables with which the AM status of the subjects was assessed, as follows:

- Three basic variables to assess the AM status according to body composition –
  - Body weight – BW, expressed in kg,
  - Body height – BH, expressed in cm,
  - Body-Mass index – BMI, expressed in  $\text{kg/m}^2$ .
- Four variables to assess the AM status according to fatty tissue –
  - Skinfold of the upper arm, i.e. triceps skinfold –  $SF_{\text{TRICEPS}}$ , expressed in mm,
  - Skinfold of the hip, i.e. suprailiac skinfold –  $SF_{\text{SUPRAILIA}}$ , expressed in mm,
  - Skinfold of the upper leg, i.e. thigh skinfold –  $SF_{\text{THIGH}}$ , expressed in mm,
  - Total of three skinfolds –  $SF_{\text{TOTAL}}$ , expressed in mm.
- Four variables to assess the AM status according to body composition –
  - Percentage of fatty tissue –  $FAT\%$ , expressed in %,
  - Lean body mass – LBM, expressed in kg,
  - Fatty tissue mass –  $FAT_{\text{ABS}}$ , expressed in kg,
  - Index for assessing the ratio between lean and fatty tissue mass –  $LBM/FAT_{\text{ABS}}$ , expressed in kg.

### **3. Method of measurement**

The measurements of the ACP students were taken during the academic year of 2005/2006 in the SPE laboratory for assessing basic motoric status. The measurements of the water polo players, volleyball players and karateists were taken during the years of 2007 and 2008, using the same measuring instruments and procedures and performed by the same measurer.

Body weight was measured by the electronic scales with an anthropometer SECA – Cas (Germany) with the measurement precision MP of 0.05 kg, while that of the BH was 0.001 m (Dopsaj et al., 2006). Skinfolds were measured by The Body Caliper<sup>TM</sup> (The Caliper Co., Inc., NV, USA) with the measurement precision of 0.001 m.

The percentage of the fatty tissue (FAT%), the lean body mass (LBM), and the absolute value of the fatty tissue mass (FAT<sub>ABS</sub>) were calculated using a standard procedure of validated mathematical models (Howley & Don Franks, 1997, pp. 121-122).

The index for assessing the ratio between lean and fatty tissue mass (LBM/FAT<sub>ABS</sub>) was calculated as the value of the quotient of the lean body mass and the absolute value of the fatty tissue mass.

#### 4. Statistical analysis

The raw data first yielded two basic statistical indicators: the central tendency measure (the mean value – MEAN), and the dispersion measure (the standard deviation – SD). Next, multivariate statistical techniques were applied: multivariate data analysis (MDA), which established the differences between the subsamples studied, at both general and partial levels; and canonical discriminant analysis, which established the structure and the set of the variables responsible for the differences in the AM space between the subsamples under study (Hair et al., 1998). All statistical analyses were done by the software packages of Microsoft Office Excel 2003 (Copyright © 1985 – 2003 Microsoft Corporation) and SPSS for Windows Release 10.0.1 (SPSS Inc., 1989-1999).

#### 5. The results

The result of the Box's M test for homogeneity of covariance matrices showed that there was a high statistical agreement among the subsamples in the studied AM space at the levels of Box's M = 530.99, F = 3.05, p sig. = 0.000, so that the raw results can be claimed to be suitable for the application in multivariate analysis, that is, the results obtained in the study can be treated as scientifically valid.

Table 1 shows the basic descriptive statistics in the function of the subsamples with the established statistical differences between the ACP students (as the target, or criterion group) and the remaining three subsamples (as control project population).

Table 2 shows the general and partial MDA results, which can indicate to the existence of a general statistically significant difference among the groups with regard to the AM space, at the level of Wilks' Lambda of 0.258, F values = 6.019, and p = 0.000. The partial difference was established at seven variables: BW, BH, SF<sub>SUPRAILIA</sub>, SF<sub>TOTAL</sub>, FAT%, LBM, and LBM/FAT<sub>ABS</sub>.

Table 1- Basic descriptive statistics in the function of the subsamples

	Water polo pls (N=25)	Volleyball pls (N=34)	Karateists (N=11)	ACP students (N=36)
BW	61.67±6.75	69.82±6.68***	59.73±4.31	60.82±6.95
BH	169.57±6.15	180.79±4.04***	168.59±4.25	169.14±4.50
BMI	21.48±2.41	21.34±1.70	21.02±1.43	21.25±2.22
SF <sub>TRICEPS</sub>	13.37±2.91	13.22±3.03	12.14±4.62	14.44±3.46
SF <sub>SUPRAILIA</sub>	12.92±5.02	9.27±3.09*	7.29±3.90**	11.19±4.68
SF <sub>THIGH</sub>	21.17±4.53	19.18±4.25	18.50±4.40	21.19±4.99
SF <sub>TOTAL</sub>	47.46±10.20	41.67±8.09*	37.93±9.64**	46.82±9.97
FAT%	19.26±3.43	17.22±2.85*	15.96±3.42**	19.05±3.44
LBM	49.71±5.04	57.70±4.72**	50.14±3.47	49.08±4.37
FAT <sub>ABS</sub>	11.96±2.93	12.12±2.74***	9.59±2.38**	11.74±3.22
LBM/FAT <sub>ABS</sub>	4.356±0.979	4.972±1.030*	5.575±1.661*	4.433±1.085

ACP vs Volleyball players:  $p \geq 0.05^*$ ,  $p \geq 0.01^{**}$ ,  $p \geq 0.001^{***}$

ACP vs Karateists:  $p \geq 0.05^*$ ,  $p \geq 0.01^{**}$ ,  $p \geq 0.001^{***}$

Table 3 shows the results of the structure matrix of discriminant functions of the defined discriminant model. Table 4 shows the results of the centroids calculated with regard to the discriminant functions, while Table 5 shows the prediction of grouping the subjects according to the defined structure matrix of the obtained discriminant model.

Table 2 - General and partial MDA results

Multivariate Tests <sup>c</sup>						
Effect		Value	F	Hypothesis df	Error df	Sig.
Sport	Wilks' Lambda	0.258	6.019	27.00	275.17	0.000
c. Design: Intercept + Sport						
Tests of Between-Subjects Effects						
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Sport	BW	1848.91	3	616.30	14.15	0.000
	BH	3109.04	3	1036.35	45.26	0.000
	BMI	1.79	3	0.60	0.143	0.934
	SF <sub>TRICEPS</sub>	55.26	3	18.42	1.65	0.183
	SF <sub>SUPRAILIA</sub>	327.65	3	109.22	6.05	0.001
	SF <sub>THIGH</sub>	125.85	3	41.95	1.99	0.120
	SF <sub>TOTAL</sub>	1160.21	3	386.74	4.35	0.006
	FAT%	141.77	3	47.26	4.46	0.006
	LBM	1579.35	3	526.45	25.16	0.000
	FAT <sub>ABS</sub>	56.92	3	18.97	2.21	0.091
LBM/FAT <sub>ABS</sub>	16.43	3	5.48	4.41	0.006	

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Table 3 - The results of the structure matrix of discriminant functions

Summary of Canonical Discriminant Functions - Structure Matrix			
	Function		
	1	2	3
BH	<b>.844*</b>	-.066	-.139
LBM	<b>.629*</b>	.083	.122
BW	<b>.470*</b>	-.134	-.038
SF <sub>SUPRAILIA</sub>	-.152	<b>-.718*</b>	.051
LBM/FAT <sub>ABS</sub>	.121	<b>.594*</b>	.373
SF <sub>TOTAL</sub>	-.148	<b>-.551*</b>	-.332
FAT <sub>%</sub>	-.153	<b>-.551*</b>	-.338
FAT <sub>ABS</sub>	.077	<b>-.431*</b>	-.277
SF <sub>THIGH</sub>	-.121	<b>-.319*</b>	-.251
BMI	.010	<b>-.120*</b>	.064
SF <sub>TRICEPS</sub>	-.056	-.204	<b>-.655*</b>

\* Largest absolute correlation between each variable and any discriminant function

Table 4 - Group centroid values with regard to discriminant functions

Sport	Functions		
	1	2	3
Water polo pls	-.820	-.571	.334
Volleyball pls	1.947	.014	-.017
Karateists	-.917	1.295	.326
ACP students	-.989	-.012	-.315

Unstandardized canonical discriminant functions evaluated at group means

Table 5 - The results of the predicted group membership model with regard to discriminant functions

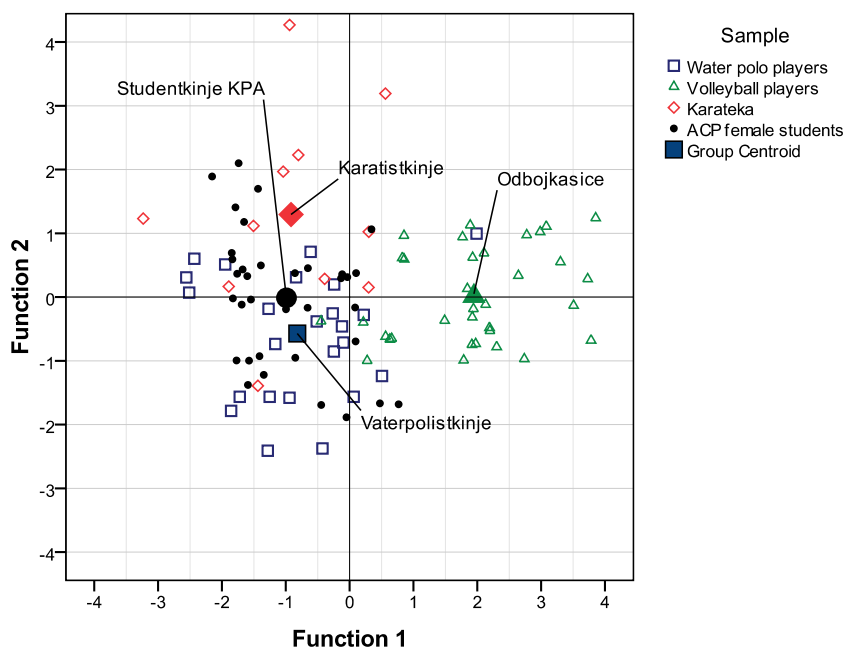
Classification Results <sup>b</sup>							
	Sport	Predicted Group Membership				Total	
		Water polo pls	Volleyball pls	Karateists	ACP students		
Cross-validated <sup>a</sup>	Count	Water polo pls	11	2	0	12	25
		Volleyball pls	3	29	0	2	34
		Karateists	1	0	3	7	11
		ACP students	9	4	2	21	36
	%	Water polo pls	<b>44.0</b>	8.0	.0	48.0	100
		Volleyball pls	8.8	<b>85.3</b>	.0	5.9	100
		Karateists	9.1	.0	<b>27.3</b>	63.6	100
		ACP students	25.0	11.1	5.6	<b>58.3</b>	100

a. Cross validation was done only for those cases in the analysis. In cross validation, each case was classified by the

functions derived from all cases other than that case.  
 b. 60.4% of cross-validated grouped cases was correctly classified.

Graph 1 charts the two-dimensional group centroid positioning with regard to the first two defined canonical discriminant functions.

Graph 1 - Centroid positioning with regard to the first two defined canonical discriminant functions



## 6. Discussion

One of the educational tasks at Academy of Criminalistic and Police Studies in Beograd is to develop the AM status of the students at the level required by their subsequent professional service, which is achieved through the effects of Special Physical Education. In addition to this, methodological aspects of projecting specialized educational systems, one of which is that of ACPS, model the aims and tasks of the curriculum upon the projected professional profiles to be attained by the students (The Cooper Institute, 2002; Dopsaj et al.,



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2006; Dopsaj et al., 2007; Koropanovski & Janković, 2007; Vučković & Koropanovski, 2007; Malavolti et al., 2008; Janković et al., 2008). In this study we defined the multidimensional AM status model for 2<sup>nd</sup>- and 3<sup>rd</sup>-year ACP students with regard to trained competitor female athletes from the sports whose physical ability criteria correspond to the desired professional profile of future female police officers (Bonneau & Brown, 1995; Australian Federal Police, 2004).

The results indicated that the measured spatial structure consisted of three independent factors set up by the following variables (Table 3):

1. Body height (BH=0.844), lean body mass (LBM=0.629) and body weight (BW= 0.470);
2. Suprailiac skinfold (SF<sub>SUPRAILIA</sub>= -0.718), the index for assessing the ratio between lean and fatty tissue mass (LBW/FAT<sub>APS</sub>=0.594), the total of the three skinfolds (SF<sub>TOTAL</sub>= -0.551), the percentage of the fatty tissue (FAT%= -0.551), etc.;
3. Triceps skinfold (SF<sub>TRICEPS</sub>= -0.655).

The first function was saturated by the indicators of body height and body weight (as total and lean), that is, by those variables that are the simplest to define the body constitution. The second function was saturated by the variables which are used to assess the quantity of subcutaneous fatty tissue of the whole body (the trunk, the thigh, the total, the ratio between fat and other, mostly muscle, tissues, etc.). The third function was saturated by only one variable, which assesses the subcutaneous fatty tissue in the upper arm, i.e. locally distributed upper arm fat.

The results of the sample showed that only the first two functions yielded a statistically significant interpretation of the overall variability of the space studied (First function: Eigenvalue = 1.846, % of the interpreted variance = 84.8%, Canonical Correlation = 0.807; Second function: Eigenvalue = 0.261, % of the interpreted variance = 11.9%, Canonical Correlation = 0.455), while the third factor had no statistical significance (Third function: Eigenvalue = 0.074, % of the interpreted variance = 3.4%, Canonical Correlation = 0.262).

Regarding the first discriminant function, the sample of the ACP students did not differ from the karateists or water polo players, but it varied from the volleyball players. In other words, with respect to the first function of body constitution, karateists, water polo players and ACP students made up a homogenous group (multiple Z score was at respective levels of -0.917, -0.820 and -0.989, while with karateists it was 1.947; Table 4, Graph 1). Such scores are quite logical, since the very nature of the volleyball game requires players of the above-average height, while its motoric structure involves very fast and explosive movements (Nešić, 2008; Rajić et al., 2008). On an average, the volleyball players

from our sample were 10 to 11 cm taller than the rest of the subjects, and also their body weight exceeded the other women's by 7 to 8 kg (LBM represents the equivalent to the muscle mass), simultaneously with a significantly lower percent of fatty tissue. Such characteristics of the studied space located the volleyball players toward the higher quality values of the first function for approximately 2.85 of the Z score in comparison with the remaining three subsamples.

The percentage levels of fatty tissue in highly fit women ranges between 12 and 22%, while the standards in developed western countries consider the percentage of fat in policewomen higher than 23% as a factor of aggravated health and professional work (Australian Federal Police, 2004; Blagojević et al., 2008, p. 185). The fatty tissue percentage in the studied sample of the ACP students was at the level of  $19.05 \pm 3.44$ , i.e., at 95% probability ranging from 15.61 to 22.49% (Table 1). This shows that the students tested had a body fat component within the defined health, physical and professional standards. Their average BMI was  $21.25 \text{ kg/m}^2$ , which the existing standards consider as the distribution level between 47 and 48 ‰ (percentile), that is, as average (normal) values for the ACP student population (Dopsaj i sar., 2006).

The results of the second discriminant function showed that the rates of fatty tissue from the hip, the ratio between the muscle and fatty tissue, the skinfold total, and the percentage of the fatty tissue were the variables which interpreted and discriminated between the given subsamples in a statistically significant manner ( $SF_{\text{SUPRAILIA}}$ ,  $LBM/FAT_{\text{ABS}}$ ,  $SF_{\text{TOTAL}}$  and  $FAT\%$ , respectively – Table 3). With respect to the second function, i.e. the quantity of the fatty tissue in the body generally, water polo players can be claimed to constitute a discriminant group with the highest indicators of bodily fat (multiple Z score was at the level of -0.571); volleyball players and ACP students constituted another group characterized by average indicators of body fat in comparison with the overall sample (multiple Z score was at the levels of -0.012 and 0.014, respectively); finally, the subsample of karateists belonged to a group with the least indicators of body fat (multiple Z score was at the level of 1.295) (Table 4, Graph 1).

The third discriminant function did not yield differences among the subsamples to be elaborated on; however, in this function the ACP students had the highest levels of subcutaneous fatty tissue in the triceps, i.e., of the fatty tissue locally located in the upper arm.

The results of the predicted group (subsample) membership redefined according to the obtained model discriminant functions showed that the anthropomorphological characteristics of the 36 tested ACP students were distributed as follows: 9 (25.0 %) belonged to the water polo player model (had a high % of body fat component); 4 (11.0%) belonged to the volleyball player model (pronounced BH and lean muscle mass); only 2 (5.6 %) belonged to the karateist model (below-average body fat levels with above-average lean muscle mass and average body height and weight) (Table 5).

## 7. The conclusion

Generally, the results obtained were used to define a characteristic AM model for ACP students with respect to three groups of athletes competing in different sports. The given model yielded three discriminant functions characteristic of the measured space, defined as: 1) general indicators of body constitution; 2) indicators of subcutaneous body fat rates at the general body level; and 3) the indicator of local distribution of the fatty tissue in the upper arm. However, statistically significant distinction was found only in the first two functions.

With respect to the first discriminant function, the ACP students did not differ from karateists or water polo players, but were different from volleyball players (regarding body constitution, karateists, water polo players, and ACP students made up a homogeneous group: multiple Z score was at respective levels of -0.917, -0.820 and -0.989, while with karateists it was 1.947; Table 4, Graph 1).

With respect to the second discriminant function, the results showed that  $SF_{SUPRAILIA}$ ,  $LBM/FAT_{ABS}$ ,  $SF_{TOTAL}$  and  $FAT\%$ , as indicators of fatty tissue rates at the general body level water polo players were discriminated as a separate group with the highest rates of body fat (multiple Z score was at the level of -0.571); volleyball players and ACP students constituted another group characterized by average indicators of body fat in comparison with the overall sample (multiple Z score was at the levels of -0.012 and 0.014, respectively); finally, the subsample of karateists belonged to a group with the least indicators of body fat (multiple Z score was at the level of 1.295).

The results indicate that the AM status of the ACP students in the study was generally in accordance with the profiled project standards of Special Physical Education and the normative criteria for the enrollment in Academy of Criminalistic and Police Studies. However, it should be noted that as many as 9 (25.0%) of the ACP students belonged to the water polo player model, i.e., to the group characterized by the highest rates of body fat (Marrin & Bampouras, 2008), while a total of only 6 (4+2; 16.7%) belonged to the group of volleyball players and karateists, i.e., to the group with professionally most desirable anthropomorphological characteristics.

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## REZIME

U širem kontekstu, Specijalno fizičko obrazovanje (SFO) se kao nastavna disciplina bavi i izučava problematiku opšte, usmerene i specifične profesionalno-radne pripremljenosti, antropo-morfološkim karakteristikama i fizičkim sposobnosima pripadnika Ministarstva unutrašnjih poslova. U odnosu na značaj i predmet SFO njegov uticaj je definisan i u odnosu na pozitivno i preventivno delovanje na zdravstveni status pripadnika službe, pozitivno delovanje na razvoj potrebnih profesionalnih karakteristika pripadnika službe, razvoj i održavanje morfološkog statusa date populacije, kao i usklađivanje nivoa motoričkih sposobnosti sa individualnim karakteristikama pojedinaca u funkciji zahteva posla.

U ovom radu predstavljeno je istraživanje čiji je cilj bio da uporedi antropo-morfološkog status (A-M) studentkinja KPA i populacije razičito treniranih sportistkinja, a zadatak da se u A-M prostoru lociraju studentkinje KPA u odnosu na sportistkinje koje sistematski višegodišnje treniraju. Do sada je takva vrsta uporednih analiza realizovana u odnosu na populaciju muškaraca i to sa aspekta određenih motoričkih sposobnosti, ali adekvatna istraživanja kod populacije devojaka još uvek nisu rađena. U istraživanju prikazanom u ovom radu učestvovalo je ukupno 106 ispitanica, podeljenih na četiri subuzorka i to: 25 vaterpolistkinja, 34 odbojkašica, 11 karatistkinja i 36 studentkinja KPA. Upotrebljen skup od jedanaest (11) varijabli kojima je procenjen A-M status. Rezultati su analizirani

primenom multiple diskriminantne analize. Na osnovu dobijenih rezultata definisan je model antropo-morfoloških karakteristika studentkinja KPA koji je lociran u odnosu na sportistkinje. Izdvojene su tri karakteristične funkcije merenog prostora definisane kao: 1). opšti pokazatelji konstitucije tela, 2). pokazatelji količine potkožnog masnog tkiva na generalnom telesnom nivou, i 3). pokazatelj lokalne distribuiranosti masnog tkiva nadlaktka – ruke. Dobijeni rezultati ukazuju da je A-M status ispitivanih studentkinja KPA, generalno u skladu sa profilisanim projektnim standardima efekata nastave SFO. Međutim, mora se naglasiti da čak 9 (25.0%) studentkinja KPA, ipak, pripadaju modelu vaterpolistkinja, odnosno grupi sa najizraženijim karakteristikama masne telesne komponente, dok ukupno samo 6 (4+2; 16.7%) pripadaju grupi odbojkašica i karatistkinja, odnosno grupi sa profesionalno najpoželjnijim antropo-morfološkim karakteristikama.

### SUMMARY

In a wider context, Special Physical Education (SPE) is an academic subject which deals with the issues of general, streamed, and specific professional competence, as well as with anthropomorphological characteristics and physical ability of the employees of the Ministry of the Internal Affairs. With regard to its importance and scope, the effects of SPE are defined as: affirmative and preventive influence on the health status of the police force; affirmative influence on the development of the required professional characteristics of the police force; the development and maintenance of the morphological status of the given population; and the adjustment of the level of motoric skills to individual characteristics as depending on the nature of work.

This paper presents the study the aim of which was to compare the anthropomorphological (AM) statuses of female students of the Academy of Criminalistic and Police Studies (ACP students) and female athletes with different training regimens, while the task of the study was to position the AM space of the ACP students in relation to female athletes with an extended systematic training experience. So far such comparative analyses have been done with the male population in relation to certain motoric abilities, while the adequate research of the female population is still lacking. The study presented in this paper involved a total of 106 subjects, divided into four subsamples as follows: 25 water polo players, 34 volleyball players, 11 karateists, and 36 ACP students. The AM status was assessed according to eleven (11) variables, and the results underwent multivariate discriminant analysis. The results were used to define the model of AM characteristics of the ACP students located in relation to the athletes. Three characteristic functions of the studied space were discriminated and defined as: 1)

general indicators of the body constitution; 2) general indicators of the subcutaneous fatty tissue; and 3) the indicator of the local distribution of the fatty tissue in the upper arm. The results obtained indicate that the AM status of the ACP students generally (75.0%) corresponds to the profiled project standards of the effects of Special Physical Education. However, it should be pointed out that as many as 9 (25.0%) of the ACP students belonged to the water polo player model, i.e. the group with most pronounced characteristics of body fat, while the total of mere 6 (4+2; 16.7%) belonged to the volleyball player and karateist model, i.e., the group with the professionally most desirable anthropomorphological characteristics.