ISSN 2029-1701
ISSN 2335-2035 (Online)

Mokslinių straipsnių rinkinys
VISUOMENĖS SAUGUMAS IR VIEŠOJI TVARKA
PUBLIC SECURITY AND PUBLIC ORDER
2014 (12)
Scientific articles

THE ANALYSIS OF THE RESULTS OF SPECIAL PHYSICAL ABILITIES OF FUTURE POLICE OFFICERS

Algirdas Muliarčikas*

Mykolas Romeris University Faculty of Public Security, Department of State Border Protection
Putvinskio str. 70, LT-44211 Kaunas
Phone: (370 37) 303653
E- mail: a.muliarcikas@mruni.eu

Annotation. The adequate special physical training is one of the essential terms which influence the quality of statutory officers' work and life. Police officers have to use not only various skills but also their physical abilities on purpose to protect the rights of man properly, secure public order and public security and give people manifold help. Police officers have the right to use the actions of tactical wrestling as the measure of manual compulsion by way of preventing offences, extreme situations and natural disaster. The short term of psychomotor reaction, sudden and sure hold of an offender, regularly and quickly executable actions of detention are particularly significant in the exceptional situations to support public order. The article analyses the peculiarities of special physical abilities' training of future police officers (women and men) in a period of optional subject studies.

Keywords: optional subject; hand muscle strength; spine flexibility; anaerobic glycolytic capacity; agility; coordination capabilities; physical training tests.

INTRODUCTION

Police officers and the other ones who want to be police officers and exercise some functions in the subdivisions of interior offices have to be in perfect psychical and physical[1] health and good physical fitness[2, 3]. In consideration of the state of health and its

[1] Lietuvos Respublikos vidaus reikalų ministro ir LietuvosRrespublikos sveikatos apsaugos ministro 2003 m. spalio 21 d. įsakymas Nr. 1v-380/v-618 „Dėl sveikatos būklės reikalavimų asmenims, pretenduojantiems į vidaus tarnybą, pageidaujantiems mokytis vidaus reikalų profesinio mokymo įstaigose, kitose mokymo įstaigose vidaus reikalų ministerijos siuntimu, bei vidaus tarnybos sistemos pareigūnams sąvado patvirtinimo". *Valstybės žinios*. 2003-10-29, Nr. 101-4569. [interactive] http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=220127 [accessed 2014-10-10].

[2] Lietuvos respublikos vidaus reikalų ministro 2006 m. gruodžio 29 d įsakymas Nr. 1V-500. „Dėl vidaus tarnybos sistemos pareigūnų fizinio pasirengimo reikalavimų ir pareigūnų fizinio pasirengimo tikrinimo bei papildomų reikalavimų, susijusių su fiziniais ir praktiniais gebėjimais eiti tam tikras pareigas tam tikruose vidaus reikalų įstaigų padaliniuose, ir atitikties šiems reikalavimams tikrinimo taisyklių patvirtinimo". *Valstybės žinios*. 2007-01-25, Nr. 10-399. [interactive] http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=291558 [accessed 2014-10-10].

[3] Lietuvos Respublikos Vidaus reikalų ministro 2010 m.liepos 1 d. įsakymas Nr. 1V-446, Dėl Lietuvos Respublikos Vidaus reikalų ministro 2006 m. gruodžio 26 d. įsakymo nr. 1V-500 „Dėl vidaus tarnybos sistemos pareigūnų fizinio pasirengimo reikalavimų ir pareigūnų fizinio pasirengimo tikrinimo bei papildomų reikalavimų, susijusių su fiziniais ir praktiniais gebėjimais eiti tam tikras pareigas tam tikruose vidaus reikalų įstaigų padaliniuose, ir atitikties šiems reikalavimams tikrinimo taisyklių patvirtinimo" pakeitimo. *Valstybės žinios*, 2010-07-10, Nr. 81-4253 [interactive] http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=377936&p_tr2=2 [accessed 2014-10-10].

correspondence to particular column of "The digest… of requirements of the state of health of people who pretend to a domestic office"[4], the appropriate requirements[5] of physical training level are employed since 2014. According to work nature and the state of health accordance with proper column regulations the corresponding level[6] of general physical training is also required. The level of physical training which is assessed at the age aspect is divided into 8 groups[7]. It is likely that the higher requirements are practised on the level of physical training of police officers who administer the function of public order support than of simple people who propagate healthy and active lifestyle[8]. The attitude to such a relation is being formed by the requirements which are raised to the level[9] of physical training of domestic service officers and skills of acts of violence. According to the proposition of sport specialists, not only good special physical training but also sufficiently locomotor skills[10,11,12] are essential on purpose to perform technically complicated actions properly. Police officers have the right to use physical compulsion which matter consists of tactical self-defence and wrestling movements[13] to protect citizens and arrest offenders of public order. The sufficiently acquired capabilities of physical strength and speed, perfect response and rendering technique of special actions are required to give reasons for it. The great skills of tactical self-defence are particularly significant in a much more complicated situation if an offender is armed with a gun or other weapon.

[4] Lietuvos Respublikos vidaus reikalų ministro ir LietuvosRrespublikos sveikatos apsaugos ministro 2007 m. kovo 22 d. įsakymas Nr. 1V-102/V-172 „Dėl Lietuvos Respublikos vidaus reikalų ministro ir Lietuvos Respublikos sveikatos apsaugos ministro 2003 m. spalio 21 d. įsakymo Nr. 1V-380/V-618 „Dėl Sveikatos būklės reikalavimų asmenims, pretenduojantiems į vidaus tarnybą, pageidaujantiems mokytis vidaus reikalų profesinio mokymo įstaigose, kitose mokymo įstaigose Vidaus reikalų ministerijos siuntimu, bei vidaus tarnybos sistemos pareigūnams sąvado patvirtinimo" pakeitimo" . *Valstybės žinios.* 2007, Nr.36-1334. [interactive] http://www.vrm.lt/lit/Teises-aktai/650 [accessed 2014-10-10].

[5] Lietuvos policijos generalinio komisaro 2014 m. rugpjūčio 06 d. nurodymas Nr. 5-N-9 "Dėl pareigūnams taikomų sveikatos būklės reikalavimų skilčių ir pareigūnų priskyrimo fizinio pasirengimo reikalavimų lygiui". [interactive] http://www.policija.lt/index.php?id=2797 [accessed 2014-10-10].

[6] Lietuvos respublikos vidaus reikalų ministro 2006 m. gruodžio 29 d įsakymas Nr. 1V-500. *Supra* note 2, [interactive] http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=291558 [accessed 2014-10-10].

[7] Lietuvos respublikos vidaus reikalų ministro 2006 m. gruodžio 29 d įsakymas Nr. 1V-500., *op. cit* .

[8] Muliarčikas, A. ir kt. *Lietuvos gyventojų fizinio pajėgumo testavimo ir fizinės būklės nustatymo metodika* . Sveikos gyvensenos, fiziškai aktyvaus gyvenimo būdo ir jo praktinio realizavimo metodinės rekomendacijos : mokomoji knyga. Vilnius: Lietuvos sporto informatizacijos centras, 2007. 73 p.

[9] Lietuvos respublikos vidaus reikalų ministro 2006 m. gruodžio 29 d įsakymas Nr. 1V-500., *op. cit* .

[10] Lednicky, A. Pohyboė hry v kondičnej priprave. Bratislava: Perx K+K, 2008, p. 68.

[11] Bružas, V., Mačiulis V. Boksas. Istorija, teorija, didaktika. Kaunas: LKKA, 2008, p. 42-238.

[12] Liaugminas A. ir kt. Graikų-romėnų imtynės. Kaunas: LKKA, 2007.

[13] Lietuvos Respublikos Policijos veiklos įstatymas 2000 m. Spalio 17 d. Nr. VIII-2048. *Valstybės žinios,* 2000, Nr. 90-2777 (23, 24 str.)

The aim of this article is to analyse the peculiarities of variation of special physical training indices of future police officers in a period of optional subject studies.

The objective and methods of the research. The article has analysed the movement of physical abilities indices of the 1st year students, future police officers, girls (n=30) and boys (n=26), of Public Security Faculty (PSF) of Mykolas Romeris University (MRU). Depending on the first testing results and fitness form, students were divided into some groups. The students who study Physical Training had been carrying out partially individualized tasks for six months. During the aforesaid period of time the peculiar movement locomotion was single-mindedly formed and improved. Manual abilities had been trained by the usage of the methods of repetition, partial, continuous, flow and training cycle. Training sessions lasted for 130 minutes three times a week. The priority was for the training of slow physical qualities like speed, strength, special endurance, flexibility and agility. The results of those tests had been registered at the beginning and ending of the research which were the indices of Handgrip (left and right hand) Strength Test[14], Push Up Test in 30 seconds[15], Sit-Ups in 30 seconds[16], Sit and Reach Flexibility Test[17] (the result of a participant who reached his toes is 25 cm)[18], Stand and Squat Down Test in 60 seconds, Horizontal Waist Keeping Test (facedown), Boomerang Run Test[19], 10x10m Shuttle Run Test[20] and Simple and Complex (optional) Psychomotor Reaction Test. The reaction was registered when a switch was turned out by the right hand. The Electromyoreflexometer "EMP-01" was used to register the time of simple and complex reaction. To register the time of simple reaction (SR) the participants who were sitting at table had to react to the light glint on the apparatus shield and to switch off the light as quickly as possible. In case of the record of the rate of complex reaction (CR) they had to choose and push the button once the indicated colour light struck. The task was accomplished with the right hand for seven times at one go. The best 5 results were valid out of 7 ones. The pause of 20 – 30 seconds was given between the tests.

[14] Volbekienė, V. *Eurofit'o testai suaugusiems*. Metodinė priemonė. Vilnius, Lietuvos sporto informacijos centras,1997, p.68-69.
[15] Skernevičius, J., Raslanas, A., Dadelienė, R. *Sporto mokslo tyrimų metodologija*.Vadovėlis aukštųjų mokyklų studentams. Vilnius, Lietuvos sporto informacijos centras, (Vilnius : LSIC), 2004, p.85-86.
[16] Muliarčikas, A. ir kt. *Supra* note 8, p. 65-66.
[17] Volbekienė, V. *op. cit*., p. 57
[18] Muliarčikas, A. ir kt. *op. cit*., p. 67.
[19] Gates, D.P., Sheffield, R.P. Test of change of direction as measurement of different kinds of motor ability in boys of the 7th, 8th and 9th Graders. *Research Quarterly*. 1940, 11: 136-147.
[20] Skernevičius, J., Raslanas, A., Dadelienė, R. *op. cit*., p.37-190.

The methods of literature analysis, myoreflexometrication and mathematical statistics were used to perform the research. The values of registered indices of arithmetic average ($\overline{X}$), average square deviation (σ), average error (Sx), variation rate (V) and correlation coefficient were calculated. The difference reliability of collected results was valued according to the Student's t criterion of self-supporting proceedings.

RESULTS OF THE RESEARCH

The indices of handgrip intensity of left and right hands of women got better statistically significantly during the period of the research (1st table). According to the results of the 1st and 2nd tests, the rate of reliability of indices' difference ($p<0,001$; 2nd table) was more significant between the results of strength of a woman's left hand. The indices of a male group also increased (3rd table), however, the statistically significant difference was registered only between the results of left hand testing ($p<0,05$; 4th table). During the period of 6 months the spread of female group results of that index decreased (V of the left hand = 9% – "small", - 1st table) whereas male one increased (3rd table). The average correlation link was between the indices of right and left hands' strength in female (r=0,773 and 0,529) and male (r=0,741 and 0,866) groups.

Table 1. The results of testing of a female group

		First testing				Second testing				
		$(\overline{X}) \pm Sx$	**Max**	**Min**	**V(%)**	**$(\overline{X}) \pm Sx$**	**Max**	**Min**	**V(%)**	**p***
Handgrip Strength Test	Left (kg)	27,3±0,71	35	20	14,3	30,3±0,5	36	25	9	<0,001
	Right	30,2±1	41	20	18,7	33,6±0,8	43	26	12,5	<0,01
Push Up Test in 30 seconds		7,6±1,1	20	2	80,2	15,7±0,9	26	8	31	<0,001
Sit-Ups in 30 seconds		24,9±0,6	32	17	13,9	29±0,4	34	23	8,2	<0,001
Sit and Reach Flexibility Test (cm)		36,8±1,6	53	17	24,4	40,7±1,4	55	21	18,2	<0,05
Stand and Squat Down Test in 60 seconds		47,8±1,2	64	35	13,5	51,4±1,1	60	30	11,7	<0,05
Horizontal Waist Keeping, facedown (s)		93,6±6,2	155	11	36,3	109,2±6,9	210	30	34,5	<0,05
Boomerang Run (s)		12,7±0,3	18	11	10,6	11,2±0,1	12,9	10	6,4	<0,001
Shuttle Run, 10x10 m (s)		32,2±0,4	36	29,5	6,1	30,3±0,3	34	28	5,3	<0,001
Psychomotor Reaction (ms)	Simple	206,1±4,7	255	155	12,4	172±3,3	211	134	10,5	<0,001
	Complex	267,9±4,1	321	213	8,4	222,8±2,9	258	181	7	<0,001

*test

The members of both groups statistically credibly had improved the results of push up test in 30 seconds (1st, 3rd and 5th tables, $p<0,001$). The average of female results got better doubly (7 times/30 s). The rate meanings of group indices' variation had considerably

changed too (1st table). The indices of muscular strength of male hand reach had been improving (4 times/30 s) slower than female ones. During the first testing the correlation link was determined as the average one between the indices of muscular strength of female hand reach and handgrip (r=0,546 and 0,513).

Table 2. The reliability of rate difference of female handgrip strength

Handgrip	Testing	p*
Left – right	1	<0,01
Left – left	1-2	<0,001
Right – right	1-2	<0,01
Left – right	2	<0,001

*test

The difference of the first and second male and female testing results of Sit-Ups in 30 seconds is significant (p<0,001, 1st, 3rd and 5th tables). Following the second testing, the spread of male group's results was medium (V= 11,2%) whereas female one was small (V= 8,2%). The average correlation link (r=0,506) has related the results of the first testing of a female group of the aforesaid one and Push up Test in 30 seconds.

Table 3. The results of testing of a female group

		First testing				Second testing				
		$(\bar{X}) \pm Sx$	Max	Min	V(%)	$(\bar{X}) \pm Sx$	Max	Min	V(%)	p*
Handgrip Strength Test	Left (kg)	48,4±1,1	64	41	11,6	51,5±1,4	70	42	14,2	<0,05
	Right	54,3±1,3	75	44	11,8	57±1,6	80	44	14,7	>0,05
Push Up Test in 30 seconds		28,8±0,7	34	20	13,1	32,5±0,7	35	20	11,2	<0,001
Sit-Ups in 30 seconds		27,2±0,8	33	20	14,8	31,5±0,7	39	25	11,2	<0,001
Sit and Reach Flexibility Test (cm)		38,3±1,9	54	10	24,7	40,9±1,6	56	20	18,4	>0,05
Stand and Squat Down Test in 60 seconds		51,9±1,3	65	38	12,9	58,8±1,4	70	45	12	<0,001
Horizontal Waist Keeping, facedown (s)		68,2±5,9	151	20	44,5	88,9±5,3	158	55	28,8	<0,01
Boomerang Run (s)		11,3±0,1	12,3	9,8	5,6	10,4±0,1	11,9	9	5,8	<0,001
Shuttle Run, 10x10 m (s)		29,1±0,4	35,5	26,5	7,2	27,2±0,4	32	21	6,9	<0,001
Psychomotor Reaction (ms)	Simple	201,2±5,4	267	152	13,7	164±36	220	131	11,1	<0,001
	Complex	267,8±5,08	328	231	9,7	218,8±3,2	251	193	7,4	<0,001

*test

The statistically reliable difference between the results of the first and second testing of flexibility of male and female groups was not stated (p>0,05; 5th table). During the research the female results were improving statistically reliably (p<0,05; 1st table). The results of the second testing of a male group as compared to the first one got better too but the difference

was statistically unreliable (p>0,05; 3rd table). The indices of results' spread of both groups varied in nearly analogous proportions (female: from V= 24,4% to 18,2%; male: from V= 24,7% to 18,4%).

Table 4. The reliability of rate difference of male handgrip strength

Handgrip	Testing	p*
Left – right	1	<0,001
Left – left	1-2	<0,05
Right – right	1-2	>0,05
Left – right	2	<0,01

*ttest

The results of the second male and female testing of Stand and Squat Down Test in 60 seconds were higher than the first ones (the difference is significant - P<0,05; 1st and 3rd tables). To compare the results of the aforesaid test of male and female groups, the achievements of a male group were statistically significantly greater (p<0,01 and p<0,001; 1st, 3rd and 5th tables). The average correlation link was determined (r=0,560) between the results of the first female group's testing of Stand and Squat Down Test in 60 seconds and Push Up Test in 30 seconds. The correlation link of the second testing results of those tests was weak (r=0,494).

After 6 months' term of purposeful occupation the indices of endurance of static strength of female (from 93,6±6,2 s to 109,2±6,9 s, p<0,05; 1st table) and male (from 68,2±5,9 s to 88,9±5,3 s, p<0,01; 3rd table) back muscles increased statistically significantly. Both the results of the first female testing and the second one were statistically reliably higher than male ones (p<0,001; 1st, 3rd and 5th tables).

Table 5. The difference reliability of test results of male and female groups

*test; (F)-female; (M)-male		First testing	Second testing
		p*	p*
Handgrip Strength Test	Left (kg)	(F)<0,001(M)	(F)<0,001(M)
	Right	(F)<0,001(M)	(F)<0,001(M)
Push Up Test in 30 seconds		(F)<0,001(M)	(F)<0,001(M)
Sit-Ups in 30 seconds		(F)<0,01(M)	(F)<0,01(M)
Sit and Reach Flexibility Test (cm)		>0,05	>0,05
Stand and Squat Down Test in 60 seconds		(F)<0,01(M)	(F)<0,001(M)
Horizontal Waist Keeping, facedown (s)		(M)<0,01 (F)	(M)<0,01(F)
Boomerang Run (s)		(M)<0,001 (F)	(M)<0,001(F)
Shuttle Run, 10x10 m (s)		(F)<0,001(M)	(F)<0,001(M)
Psychomotor Reaction (ms)	Simple	>0,05	>0,05
	Complex	>0,05	>0,05

The results of the second testing of an agility test of Boomerang Run Test got statistically significantly better in both groups (1st and 3rd tables; p<0,001). During the research the spread of the test results men had achieved was steadily small (V= 5,6 and 5,8%; 3rd table) whereas the female one decreased from medium to small (V= 10,6 and 6,4%; 1st table). The results of the first and second tests of male agility were statistically significantly worse (the test done in a shorter time) than female ones (5th table). During the first testing the correlation link only between the results of male tests of Boomerang Run Test and Sit and Reach Flexibility Test (r = - 0,422) was weak. The variation of second testing indices (Boomerang Run Test) of a female group was related to the growth of endurance of static back strength (r = -0,449) whereas the male group's one was connected with the time decline of the complex reaction (r = 0,438).

The difference of results of Shuttle Run (10x10m) of both tests of male and female groups was significantly reliable (p<0,001; 5th table). The men passed the distance of the test in a shorter time than the women did (1st, 3rd and 5th tables). Both male and female results of the second testing significantly differed from the first one (p<0,001; 1st and 3rd tables), the spread of groups' results was little (proportionately V= 6,9% and 5,3%; 1st and 3rd tables). The correlation link (r = 0,428) was stated as weak between the results of female second testing of the aforesaid and Boomerang Run Test.

During the research the statistically reliable difference was not determined between the indices of simple and complex psychomotor reaction of the examined groups (p>0,05; 1st, 3rd and 5th tables). The statistically significantly smaller indices of female and male simple and complex reaction time were registered during the second testing (p<0,001; 1st and 3rd tables). The spread of simple reaction indices of both groups was medium (V= 10,5% and 11,1%) whereas the spread of complex ones was small (V= 7% and 7,4%). During the first testing the correlation link was determined as the weak one only between the results of male complex and simple reaction (r = 0,413) and Boomerang Run Test (r = 0,436). During the second testing the correlation link was estimated between the results of the male complex and simple reaction (medium – r = 0,562), Shuttle Run 10x10 m (weak – r = 0,378) and Boomerang Run Test (weak – r = 0,438), and the indices of female complex and simple reaction (medium – r = 0,534).

RESULTS UNDER CONSIDERATION

The significant specification to start Tactical Self-defence studies is the relevant students' physical fitness. The manual abilities of speed, strength, special endurance, flexibility and agility are of great significance by obtaining the knowledge of movement technique of self-defence, throw, detention, defence, kick, stab and offender's disarmament during the studies. On the very inceptive stage of the subject studies the strength of handgrip and hand, leg and waist muscular push up fulfils an essential function. On purpose to control the preparation process properly, the indices of these manual abilities have been registered not only with a view to value the standard of special physical training of students who take exercises single-mindedly but also to assess the common people fitness[21],[22]. The average of the second test results of the examined women was slightly higher than it was in other researches where upperclassmen took place in[23]. The results of a handgrip of the examined women were worse[24] if to compare with the achievements of the members of academic rowing. The indices of male and female hand strength to compare with the test results[25] of the students who studied in MRU in the year 2005 – 2006 were lower whereas to compare with the first-year students[26] of Kaunas Technology University they were significantly higher. According to the results' values[27] of "the physical fitness tests of Lithuanian people who are 19 – 29 years old" which have been listed in reference charts, the strength indices of left and right handgrips of the examined students could be assessed as "good" ones. The evaluation of the indices of hand strength of the examined students ("more than an average standard") was analogous in accordance with the integrated Eurofit standardization[28].

During the studies of an optional subject the results' average of Push Up Test in 30 seconds (hand reach muscular strength) of a male group got better with 12, 8% (from 28,8 to 32,5 k/ 30 s) whereas the results' spread decreased with 2%. The average of test results of a

[21] Volbekienė, V. Eurofitas. Fizinio pajėgumo testai, metodika. Lietuvos studentų fizinio pajėgumo rezultatai. Vilnius, Lietuvos sporto informacijos centras, 2003, p. 109.
[22] Muliarčikas, A. ir kt. *Supra* note 8, p. 73.
[23] Tamošauskas, P. ir. kt. Vilniaus Gedimino technikos ir Mykolo Romerio universitetų studenčių fizinio aktyvumo vertinimas 2010-2011 m. *SANTALKA: Filologija, Edukologija* 2013, 21(2): 142-153
[24] Skernevičius, J., Raslanas, A., Dadelienė, R *Supra* note 15, p. 59-60.
[25] Muliarčikas, A., Morkūnienė A. Būsimųjų statutinių pareigūnų – pirmo kurso studentų – ir jų bendraamžių fizinio parengtumo lyginamoji analizė. *Socialinis darbas*. 2006, 5 (2): 87-93.
[26] Jansonienė, A. irk t. KTU pirmo kurso student fizinio rengimo ir sveikatos stiprinimo program efektyvumas. *Sportinį darbingumą lemiantys veiksniai*. LSU. 2012, (V), p.60-65.
[27] Muliarčikas, A. ir kt. *Supra* note 8, p. 32.
[28] http://www.topendsports.com/testing/tests/handgrip.htm , [interactive], [accessed 2014-10-10].

female group increased doubly (from 7,6 to 15,7 times/ 30 s). Although the spread of group results remained sufficiently considerable, it declined nearly by a third. The male results could be valued as fairly good[29]. According to the police officers' requirements[30] they performed nearly half of exercise replays at great speed (32 t/30 s) from the maximum stated amount (75 t/120s). The female achievements could be assessed between "weak" and "satisfactory". According to age the intended minimum for female police officers is 2 movements of Push Up Test. The minimum requirement of this test is 10 times/30s for future female police officers who study Tactical Self-defence[31] at the university. To compare the achievements[32] of the first-year students of MRU PSF in 2006 the male results are similar ones whereas the results of the examined women are better.

The indices of dynamic strength of body press muscles of the examined men correspond to the average run-up standard of the contemporary Lithuania's male group [33] and students in the year 2006[34]. The result average of the second testing of a female group corresponds to the fairly high standardization criterion[35] of Tactical Self-defence studies. According to the reference of the evaluation tables[36] of body press muscles' endurance of women who do not take exercise actively the results of our examined students correspond to the higher than medium run-up standard and they are five times better by doing exercise than the students' of KTU[37].

The indices of the second testing of male and female waist mobility were identical. During the research the results varied from the value rate of "sufficient" to "good"[38] and corresponded to the standard of adequate age[39,40].

During the second testing the men (+7 times/min.) and women (+4 times/min.) achieved statistically significantly higher test results which characterise anaerobic glycolytic capacity ("Stand and Squat Down Test in 60 seconds") than they were registered during the first

[29] Muliarčikas, A., Mickevičius V., Lednicky A. Įvairaus amžiaus vyrų judėjimo gebėjimų rodiklių kaitos analizė. *Ugdymas. Kūno kultūra. Sportas*. 2007, 2 (65): 49-55.
[30] Lietuvos respublikos vidaus reikalų ministro 2006 m. gruodžio 29 d įsakymas Nr. 1V-500., *Supra* note 2, (1 priedas), [interactive], [accessed 2014-10-10].
[31] https://moodle.mruni.eu/course/view.php?id=842 [interactive], [accessed 2014-10-10].
[32] Muliarčikas, A.; Morkūnienė, A. *Supra* note 25, p. 87-93.
[33] Muliarčikas, A., Mickevičius V., Lednicky A., *op. cit*., p. 52
[34] Muliarčikas, A.; Morkūnienė, A. *op. cit*., p. 90
[35] https://moodle.mruni.eu/course/view.php?id=842., *op. cit*.
[36] Skernevičius, J., Raslanas, A., Dadelienė, R. *Supra* note 15, p. 84.
[37] Tamošauskas, P. ir. kt. *Supra* note 23, p. 148.
[38] Muliarčikas, A. ir kt. *Supra* note 8, p. 36.
[39] Muliarčikas, A., Mickevičius V., Lednicky A., *Supra* note 29, p. 52
[40] Volbekienė, V. *Supra* note 14, p. 96

testing. The results of students[41] who take exercise are significantly higher than M. Grosser introduced and satisfy Lithuanian contemporaries[42] and future police officers who were examined in 2006[43].

The results of isometric back endurance of future police officers which were achieved during the first and second tests correspond to value as "very good" (women) and "average" (men)[44]. The results of our examined students are worse than they were of the first-year students'[45] from PSF, who were examined in 2006. However, they are better than Lithuanian contemporaries' achievements[46] whereas female results are better than male ones. Other investigators[47] have also consulted that the results of female isometric back endurance are better than male ones.

The modified Boomerang Run Test also known as "box" is used by German policemen[48] and firemen[49] to investigate physical fitness. According to the presented results by B. L. Johnson[50] the assessment of Boomerang Run Test achievements of our examined students varied from "good" to "very good" during the period of 6 months. The exercises influenced the training of students' motor skills positively. Since the results, average and variation rates of group testing decreased, groups became increasingly homogeneous according to locomotor skills. There is a tendency that the result of Boomerang Run Test improved since the indices of male flexibility and female isometric back endurance were rising. It is believed that such variations of movement facilities in future could positively influence the fulfilment of tactical self-defence technique.

The results of Shuttle Run Test (10x10m) which reflect the capability of agility speed were getting better, the time of reach statistically significantly was decreasing ($p<0,001$). The averages of the first testing results of a male group were worse (proportionately 29,1 s and

[41] Grosser M., Starischka St. *Konditionstests* (2., a.w. Aufl.). München; Wien; Zürich. 1986.
[42] Muliarčikas, A., Mickevičius V., Lednicky A., *supra* note 29, p. 52
[43] Muliarčikas, A.; Morkūnienė, A. *supra* note 25, p.90
[44] Skernevičius, J.; Raslanas, A.; Dadelienė, R *Supra* note 15, p. 87.
[45] Muliarčikas, A.; Morkūnienė, A. *op. cit*., p. 90
[46] Muliarčikas, A., Mickevičius V., Lednicky A., *op. cit*., p. 52
[47] Moreau C. E. et. Al. Isometric Back Endurance. *Journal of Manipulative and Physiological Therapeutics*. 2001, 24 (2): 110-122.
[48] https://www.polizei.sachsen.de/de/dokumente/Landesportal/physischerXLeistungstestX02X14319529322035.pdf [interactive], [accessed 2014-10-12].
[49] http://www.feuerwehr-ausbildung.com/sporttest/index.php?page=kasten-bumerang-test [interactive], [accessed 2014-10-12].
[50] Johnson, B.L., Nelson J.K. *Practical Measurements for Evaluation in Physical Education*. United States of America. 1986, p. 126-127.

27,5 s) than they were of statutory officers'[51] whereas the averages of the second testing results were practically analogous (27,2 s and 27,5 s). According to the officers' standard table[52] men are given 12 from 15 points for the achievement whereas women ($(\overline{X})$=30,3 s) get 14 points. Physical fitness of an officer is valued by scoring the results of three exercises the maximum amount is 29 points.

To assess the time of psychomotor reaction of the examined students we could state that it was changing positively. According to the scientists' information about the criteria[53] of reaction time value of Lithuanian students the simple reaction time of our examined students, which was registered at the end of optional course studies, could be assessed as "medium". The indices of both male and female simple and complex reaction time statistically significantly vary ($p<0,001$). It is known that to choose one in a few stimuli more time is needed[54]. According to S. Akpinar[55] the shorter time of the reaction to a sound stimulus could give a significant advantage to take a particular action for those people whose hand strength is analogous. It is likely that given the analogous female and male reaction time but the better male strength and speed capabilities, the last-mentioned ones could give an advantage to perform actions of tactical self-defence.

CONCLUSION

The six months' studies of an optional subject and achieved goals of the syllabus positively influenced the results of students' physical fitness. At the end of the research the results of both examined groups' tests (except male right handgrip and sit and reach flexibility tests) statistically significantly differed from the registered ones in the beginning of the research. According to the Variation rate values (less than 10%) the students reached the more analogous results in the groups by tests as Boomerang Run Test, Shuttle Run Test (10x10m), Complex Reaction Test (women also by a left handgrip strength test).

The examined men achieved statistically significantly better results than the women did according to such tests as Handgrip (left and right hand) Strength Test, Push Up Test in 30

[51] Minkevičius, R., Veršinskas R., Pareigūnų fizinio rengimo modeliavimas: Valstybės sienos apsaugos tarnybos užkardos. *Jurisprudencija*. 2003, 49(41), p-163.
[52] Lietuvos Respublikos vidaus reikalų ministro įsakymas . *Supra* note 2.
[53] Skernevičius, J.; Raslanas, A.; Dadelienė, R *Supra* note 15, p. 89-92.
[54] Muckus, K. Psichomotorinės reakcijos ir jos komponentų priklausomybė nuo judėjimo užduoties sunkumo. 2003, *Ugdymas. Kūno kultūra.Sportas* 4(49) , 35-40.
[55] Akpinar, S. et. all. Anthropological and Perceptual Predictors Affecting the Ranking in Arm Wrestling Competition. *International Journal of Morphology*. 2013, 31(3): 832-838.

seconds, Sit-Ups in 30 seconds, Stand and Squat Down Test in 60 seconds, Boomerang Run Test and Shuttle Run Test (10x10m) whereas the examined women were better by doing Horizontal Waist Keeping Test, facedown. The difference was not statistically significant between the results of female and male tests such as Sit and Reach Flexibility Test and Psychomotor (simple and complex) Reaction Test.

The correlation link was significantly average between the strength of female right and left hands, hand reach strength and complex and simple reaction results whereas it was between the indices of right and left hand strength and the indices of complex and simple reaction in the male group. The correlation link was weak in the female group between the tests as Sit-Ups in 30 seconds, Stand and Squat Down Test in 60 seconds, Push Up Test in 30 seconds, Boomerang Run Test, Isometric Back Endurance and Shuttle Run Test (10x10m) whereas it was weak in the male group between the tests as Boomerang Run Test, Flexibility Test, Complex Reaction Time Test and Shuttle Run Test (10x10 m).

On purpose to improve the standard of physical and locomotor skills at least till a minimum one which is required at the beginning of tactical wrestling technique studies, the students who are physically weak are recommended to study an optional subject as Physical Training.

REFERENCE

1. Akpinar, S. et. all. Anthropological and Perceptual Predictors Affecting the Ranking in Arm Wrestling Competition. *International Journal of Morphology*. 2013, 31(3): 832-838.
2. Ando S. *et. al.* Effects of acute exercise on visual reaction time. I*nternational Journal of Sports Medicine*. 2008; 29 (12):994-998.
3. Bružas, V., Mačiulis V. Boksas. Istorija, teorija, didaktika. Kaunas: LKKA, 2008, p. 42-238.
4. Gates, D.P., Sheffield, R.P. Test of change of direction as measurement of different kinds of motor ability in boys of the 7th, 8th and 9th Graders. Research Quarterly. 1940, 11: 136-147.
5. Grosser M., Starischka St. Konditionstests (2., a.w. Aufl.). München; Wien; Zürich. 1986.
6. http://www.feuerwehr-ausbildung.com/sporttest/index.php?page=kasten-bumerang-test [interactive], [accessed 2014-10-12].
7. https://moodle.mruni.eu/course/view.php?id=842 [interactive], [accessed 2014-10-10].
8. https://www.polizei.sachsen.de/de/dokumente/Landesportal/physischerXLeistungstestX02X14319529322035.pdf [interactive], [accessed 2014-10-12].
9. http://www.topendsports.com/testing/tests/handgrip.htm , [interactive], [accessed 2014-10-10].
10. Jansonienė, A. irk t. KTU pirmo kurso student fizinio rengimo ir sveikatos stiprinimo program efektyvumas. *Sportinį darbingumą lemiantys veiksniai*. LSU. 2012, (V), p.60-65.
11. Johnson, B.L., Nelson J.K. *Practical Measurements for Evaluation in Physical Education. United States of America.* 1986, p. 126-127.
12. Lednicky, A. *Pohyboė hry v kondičnej priprave*. Bratislava: Perx K+K, 2008, p. 68.
13. Liaugminas A. ir kt. *Graikų-romėnų imtynės.* Kaunas: LKKA, 2007.

14. Lietuvos Respublikos Policijos veiklos įstatymas 2000 m. Spalio 17 d. Nr. VIII-2048. *Valstybės žinios,* 2000, Nr. 90-2777 (23, 24 str.).
15. Lietuvos Respublikos vidaus reikalų ministro ir LietuvosRrespublikos sveikatos apsaugos ministro 2003 m. spalio 21 d. įsakymas Nr. 1v-380/v-618 „Dėl sveikatos būklės reikalavimų asmenims, pretenduojantiems į vidaus tarnybą, pageidaujantiems mokytis vidaus reikalų profesinio mokymo įstaigose, kitose mokymo įstaigose vidaus reikalų ministerijos siuntimu, bei vidaus tarnybos sistemos pareigūnams sąvado patvirtinimo“. *Valstybės žinios*. 2003-10-29, Nr. 101-4569. [interactive] http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=220127 [accessed 2014-10-10].
16. Lietuvos respublikos vidaus reikalų ministro 2006 m. gruodžio 29 d įsakymas Nr. 1V-500. „Dėl vidaus tarnybos sistemos pareigūnų fizinio pasirengimo reikalavimų ir pareigūnų fizinio pasirengimo tikrinimo bei papildomų reikalavimų, susijusių su fiziniais ir praktiniais gebėjimais eiti tam tikras pareigas tam tikruose vidaus reikalų įstaigų padaliniuose, ir atitikties šiems reikalavimams tikrinimo taisyklių patvirtinimo“. *Valstybės žinios*. 2007-01-25, Nr. 10-399. [interactive] http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=291558 [accessed 2014-10-10].
17. Lietuvos Respublikos vidaus reikalų ministro ir LietuvosRrespublikos sveikatos apsaugos ministro 2007 m. kovo 22 d. įsakymas Nr. 1V-102/V-172 „Dėl Lietuvos Respublikos vidaus reikalų ministro ir Lietuvos Respublikos sveikatos apsaugos ministro 2003 m. spalio 21 d. įsakymo Nr. 1V-380/V-618 „Dėl Sveikatos būklės reikalavimų asmenims, pretenduojantiems į vidaus tarnybą, pageidaujantiems mokytis vidaus reikalų profesinio mokymo įstaigose, kitose mokymo įstaigose Vidaus reikalų ministerijos siuntimu, bei vidaus tarnybos sistemos pareigūnams sąvado patvirtinimo“ pakeitimo“ . *Valstybės žinios.* 2007, Nr.36-1334. [interactive] http://www.vrm.lt/lit/Teises-aktai/650 [accessed 2014-10-10].
18. Lietuvos Respublikos Vidaus reikalų ministro 2010 m.liepos 1 d. įsakymas Nr. 1V-446, Dėl Lietuvos Respublikos Vidaus reikalų ministro 2006 m. gruodžio 26 d. įsakymo nr. 1V-500 „Dėl vidaus tarnybos sistemos pareigūnų fizinio pasirengimo reikalavimų ir pareigūnų fizinio pasirengimo tikrinimo bei papildomų reikalavimų, susijusių su fiziniais ir praktiniais gebėjimais eiti tam tikras pareigas tam tikruose vidaus reikalų įstaigų padaliniuose, ir atitikties šiems reikalavimams tikrinimo taisyklių patvirtinimo“ pakeitimo. *Valstybės žinios*, 2010-07-10, Nr. 81-4253 [interactive] http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=377936&p_tr2=2 [accessed 2014-10-10].
19. Lietuvos policijos generalinio komisaro 2014 m. rugpjūčio 06 d. nurodymas Nr. 5-N-9 “Dėl pareigūnams taikomų sveikatos būklės reikalavimų skilčių ir pareigūnų priskyrimo fizinio pasirengimo reikalavimų lygiui”. [interactive] http://www.policija.lt/index.php?id=2797 [accessed 2014-10-10].
20. Minkevičius, R., Veršinskas R., Pareigūnų fizinio rengimo modeliavimas: Valstybės sienos apsaugos tarnybos užkardos. *Jurisprudencija*. 2003, 49(41), p-163.
21. Moreau C. E. et. Al. Isometric Back Endurance. *Journal of Manipulative and Physiological Therapeutics*. 2001, 24 (2): 110-122.
22. Muckus, K. Psichomotorinės reakcijos ir jos komponentų priklausomybė nuo judėjimo užduoties sunkumo. 2003, *Ugdymas. Kūno kultūra.Sportas* 4(49) , 35-40.
23. Muliarčikas, A., Morkūnienė A. Būsimųjų statutinių pareigūnų – pirmo kurso studentų – ir jų bendraamžių fizinio parengtumo lyginamoji analizė. *Socialinis darbas*. 2006, 5 (2): 87-93.
24. Muliarčikas, A. ir kt. *Lietuvos gyventojų fizinio pajėgumo testavimo ir fizinės būklės nustatymo metodika* . Sveikos gyvensenos, fiziškai aktyvaus gyvenimo būdo ir jo praktinio realizavimo metodinės rekomendacijos : mokomoji knyga. Vilnius: Lietuvos sporto informatizacijos centras, 2007. 73 p.
25. Muliarčikas, A., Mickevičius V., Lednicky A. Įvairaus amžiaus vyrų judėjimo gebėjimų rodiklių kaitos analizė. *Ugdymas. Kūno kultūra. Sportas*. 2007, 2 (65): 49-55.

26. Skernevičius, J., Raslanas, A., Dadelienė, R. *Sporto mokslo tyrimų metodologija*.Vadovėlis aukštųjų mokyklų studentams. Vilnius, Lietuvos sporto informacijos centras, (Vilnius : LSIC), 2004, p.85-86.
27. Tamošauskas, P. ir. kt. Vilniaus Gedimino technikos ir Mykolo Romerio universitetų studenčių fizinio aktyvumo vertinimas 2010-2011 m. *SANTALKA: Filologija, Edukologija* 2013, 21(2): 142-153.
28. Volbekienė, V. *Eurofit'o testai suaugusiems.* Metodinė priemonė. Vilnius, Lietuvos sporto informacijos centras,1997, p.68-69.
29. Volbekienė, V. Eurofitas. Fizinio pajėgumo testai, metodika. Lietuvos studentų fizinio pajėgumo rezultatai. Vilnius, Lietuvos sporto informacijos centras, 2003, p. 109.

BŪSIMŲJŲ POLICIJOS PAREIGŪNŲ SPECIALIŲJŲ FIZINIŲ GEBĖJIMŲ REZULTATŲ ANALIZĖ

Algirdas Muliarčikas*
Mykolo Romerio Universitetas

S a n t r a u k a

Pakankamas specialus fizinis pasirengimas – viena iš būtinų sąlygų, įtakojančių statutinių pareigūnų darbinės veiklos ir gyvenimo kokybę. Siekdami tinkamai apsaugoti žmogaus teises, užtikrinti viešąją tvarką ir visuomenės saugumą, suteikti asmenims visokeriopą pagalbą, policijos pareigūnai turi panaudoti ne tik įvairius mokėjimus, bet ir nemažai fizinių gebėjimų. Susidarius ekstremalioms situacijoms, kilus stichinėms nelaimėms , užkertant kelią teisės pažeidimams policijos pareigūnai, kaip fizinės prievartos priemonę, turi teisę panaudoti kovinių imtynių veiksmus. Maža psichomotorinės reakcijos trukmė, staigus ir tvirtas pažeidėjo sugriebimas, taisyklingai ir greitai atliekami sulaikymo veiksmai ypatingai reikšmingi išskirtinėse viešosios tvarkos palaikymo situacijose.

Šio straipsnio tikslas - išanalizuoti būsimųjų policijos pareigūnų specialaus fizinio parengimo rodiklių kitimo ypatumus pasirenkamojo dalyko studijų laikotarpiu.

Straipsnyje analizuojami Mykolo Romerio universiteto (MRU) Viešojo saugumo fakulteto (VSF) I kurso studentų, būsimųjų policijos pareigūnų, merginų (n=30) ir vaikinų (n=26), fizinių gebėjimų rodiklių dinamika. Atsižvelgiant į pirmo testavimo rezultatus ir pasirengimo lygį, studentai buvo padalinti į kelias grupes. Fizinio rengimo dalyką pasirinkę studentai 6 mėnesius vykdė dalinai individualizuotas užduotis. Per minėtą laikotarpį buvo kryptingai formuojamos bei tobulinamos specifinės judesių lokomocijos. Fiziniai gebėjimai lavinti naudojant kartotinį , dalinį, ištisinį, srautinį bei treniruotės ratu metodą. Užsiėmimai vyko po 130 min. tris kartus per savaitę. Prioritetai buvo suteikiami atsiliekančiųjų gebėjimų – greitumo, jėgos, specialios ištvermės, lankstumo, vikrumo – ugdymui. Tyrimo laikotarpio pradžioje ir pabaigoje buvo registruojami šių testų rezultatai: plaštakų (kairės ir dešinės) dinamometrijos; rankų lenkimo ir tiesimo gulint per 30s; sėstis ir gultis per 30s; pasilenkimo pirmyn sėdint (testuojamojo, pasiekusio savo kojų pirštus, rezultatas lygus 25 cm); atsistojimų ir atsitūpimų per 60 s; horizontalaus liemens laikymo (veidu žemyn); „Bumerango"; bėgimo šaudykle 10x10 testų, o taip pat paprastosios ir sudėtingosios (pasirenkamosios) psichomotorinės reakcijos rodikliai. Reakcija registruota išjungiant jungiklį dešine ranka. Paprastos ir sudėtingos reakcijos trukmei registruoti naudotas Elektromiorefleksometras „EMP-01". Registruojant paprastosios (simple reaction/response) reakcijos trukmę (PR), tiriamieji sėdėdami prie stalo turėjo sureaguoti į prietaiso skydelyje užsidegusią šviesele - galimai greičiau paspausti išjungimo mygtuką. Sudėtingos (complex reaction/response) reakcijos trukmės (SR) registravimo atveju jie turėjo pasirinkti ir paspausti mygtuką užsidegus tik nurodytos spalvos švieselei. 7 kartus iš eilės užduotis buvo atliekama dešine ranka. Iš 7 rezultatų, kaip įskaitinius, palikome 5 geriausius. Tarp bandymų buvo daroma 20 - 30 s pertrauka. Atliekant tyrimą buvo naudojami literatūros analizės,

miorefleksometrijos ir matematinės statistikos metodai. Apskaičiuotos užregistruotų rodiklių aritmetinio vidurkio ($\overline{X}$), vidutinio kvadratinio nuokrypio (σ), vidurkio paklaidos (Sx), variacijos koeficiento (V) ir koreliacijos koeficiento reikšmės. Testavimų ir grupių rezultatų skirtumo patikimumas įvertintas pagal Stjudento nepriklausomų imčių t kriterijų.

Šešių mėnesių trukmės pasirenkamojo dalyko studijos, atlikti programos uždaviniai, pozityviai įtakojo studentų fizinio pasirengimo rezultatus. Tyrimo laikotarpio pabaigoje abiejų tirtų grupių atliktų testų rezultatai (išskyrus vyrų dešinės plaštakos suspaudimo ir stuburo lankstumo pirmyn) statistiškai reikšmingai skyrėsi ($p<0,01$) nuo užregistruotų tyrimo pradžioje. Pagal Variacijos koeficientų reikšmes (mažesnės nei 10%) panašesnių rezultatų grupėse studentai pasiekė atlikdami „Bumerango“, „10x10m bėgimo šaudykle“, sudėtingosios reakcijos (moterys dar ir kairės plaštakos jėgos) testus.

Vyrai statistiškai reikšmingai geresnių rezultatų nei moterys pasiekė atlikdami tokius testus - plaštakų (kairės ir dešinės) dinamometrija, „rankų lenkimas-tiesimas gulint per 30s“, „sėstis ir gultis per 30s“, „atsistojimai ir atsitūpimai per 60 s“, „Bumerangas“ ir „10x10m bėgimas šaudykle“, moterys – „horizontalaus liemens laikymo (veidu žemyn)“ testą. Statistiškai reikšmingo skirtumo nebuvo tarp šių moterų ir vyrų testų rezultatų - „pasilenkimas pirmyn sėdint“ bei psichimotorinės reakcijos (paprastosios ir sudėtingosios).

Nustatytas reikšmingas vidutinis koreliacinis ryšys tarp moterų dešinės ir kairės plaštakos jėgos; rankų tiesėjų ir plaštakų jėgos; sudėtingosios ir paprastosios reakcijos rezultatų, o vyrų grupėje - dešinės ir kairės plaštakos jėgos rodiklių; sudėtingosios ir paprastosios reakcijos rodiklių. Silpnas koreliacinis ryšys moterų grupėje nustatytas tarp testų „sėstis ir gultis per 30 s“ ir „rankų lenkimas ir tiesimas gulint per 30 s“, „atsitūpimai ir atsistojimai per 60 s“ ir „rankų lenkimas ir tiesimas gulint per 30 s“, „Bumerango“ ir statinės nugaros jėgos ištvermės bei „10x10m šaudyklinio bėgimo“, o vyrų grupėje - tarp „Bumerango“ ir lankstumo testo bei sudėtingosios reakcijos laiko, „10x10 m šaudyklinio bėgimo“ ir „Bumerango“ testo rezultatų.

Pagrindinės sąvokos: pasirenkamasis dalykas; plaštakų raumenų jėga; stuburo lankstumas; anaerobinis glikolitinis pajėgumas; vikrumas; koordinaciniai gebėjimai; fizinio pasirengimo testai.

Algirdas Muliarčikas*, Doc. dr. Mykolo Romerio universitetas Viešojo saugumo fakultetas Valstybės sienos apsaugos katedra. Mokslinių tyrimų kryptys: visuomenės fizinis lavinimas ir sveikatinimas, fizinės prievartos veiksmai ir jų panaudojimo aplinkybės, fizinio parengtumo ir asmens saugumo sąsaja.
Algirdas Muliarčikas*, Assoc. prof. Dr. Mykolas Romeris University, Faculty of Public security, Department of State Border Protection. Research interests: Human physical education and healthiness, circumstances of physical violence actions and its resort, correlation of physical training and personal security.