Originalni naučni članak

RAZLIKE U MOTORIČKIM SPOSOBNOSTIMA ATLETIČARA I KALISTENIK VEŽBAČA¹

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Apstrakt: Predmet ovog istraživanja su motoričke sposobnosti atletičara i kalistenik vežbača. Cilj istraživanja je bio da se ispituju razlike u motoričkim sposobnostima atletičara i kalistenik vežbača. Istraživanje je sprovedeno na uzorku od ukupno 11 ispitanika sa područja grada Beograda: šest atletičara (grupa 1) i pet kalistenik vežbača (grupa 2). Za procenu motoričkih sposobnosti korišćeni su testovi skok udalj (SuD), troskok iz mesta (TRS), sprint 20 m, sprint 50 m (20 leteći start). Za obradu podataka korišćene su deskriptivna i komparativna statistička metoda. Rezultati istraživanja pokazali su da su atletičari bolji u ispitivanim motoričkim sposobnostima. Rezultati deskriptivne statistike pokazali su da atletičari ostvaruju bolje rezultate u svim testovima za procenu sposobnosti snage, brzine i ubrzanja. Rezultati komparativne statistike, korišćenjem t-testa za nezavisne uzorke pokazali su da je utvrđena statistički značajna razlika ($p < 0.05$) između grupa u motoričkim sposobnostima. Pronađene razlike se mogu pripisati treningu atletičara koji je više planski, sistematičan i specifičan u odnosu na kalistenik vežbanje.

Ključne reči: *testovi, snaga, brzina, ubrzanje*

UVOD

Motoričke sposobnosti predstavljaju jednu od ključnih oblasti naučnog istraživanja u sportu, rekreaciji i fizičkom vaspitanju. Pored toga, one su od značaja za mnoge profesionalne delatnosti, kao što su policija, vojska, vatrogasna služba i dr., ali i svakodnevni život ljudi. Motoričke sposobnosti su mogućnosti čoveka da, kao bio-psiho-socijalno i kulturno biće, ostvari uspeh u određenoj aktivnosti (Kukulj, 2006). Motoričke sposobnosti su urođene, razvijaju se i mogu se poboljšavati.

Struktura motoričkih sposobnosti je ista kod svih ljudi. Primenom faktorske analize u izučavanju strukture motoričkih sposobnosti utvrđeno je postojanje većeg broja faktora, što implicira na postojanje većeg broja motoričkih sposobnosti i da je struktura multidimenzionalna, tj. da ne postoji samo jedna motorička sposobnost (Fleishman, 1964). Od posebne važnosti za naučno istraživanje jeste da se motoričke sposobnosti mogu predstaviti kao veličine, čime se kao takve, mogu iskazati kvantitativno i kvalitativno.

Motoričke sposobnosti podrazumevaju mišićnu silu (jačinu), snagu, brzinu, izdržljivost, okretnost i gipkost (Kukulj, 2006). Sila, snaga i brzina predstavljaju mehaničke osobine mišića koje u velikoj meri određuju motoričke

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sposobnosti čoveka od kojih zavisi uspešnost vršenja fizičkih aktivnosti (Nedeljković, 2016). Snaga se takođe može posmatrati kao funkcija telesne mase, ostvarene visine ili daljine i vremena koje je potrebno da se izvrši određena aktivnost (Fukuda, 2019). Ta definicija upućuje na praktičnost u testiranju i proceni snage putem testova, kao što su skok udalj i troskok iz mesta. Brzina se u fizici izračunava preko količnika pređenog puta i vremena potrebnog da se pređe taj put ($V=S/t$). Sprinterska brzina je veoma konzervativna sposobnost i teško podleže promeni (Čoh et al., 2007). Ubrzanje se može posmatrati kao stopa porasta u brzini.

Procena i analiza motoričkih sposobnosti imaju ključnu ulogu u sportu, rekreaciji i ostalim vidovima fizičkih aktivnosti. Procena i analiza nisu sami sebi svrha, već se njima teži prikupljanju korisnih informacija, na osnovu kojih se mogu uočiti slabije ili jače strane sportista, poboljšati trenazni proces, sanirati ili sprečiti povrede, steći informacije o određenoj populaciji stanovništva i dr. Da bi informacije bile korisne neophodno je da uslovi u kojima se test realizuje bude što sličniji uslovima u kojima se sportista takmiči (Suzović, 2019).

Razlike u nivou motoričkih sposobnosti postoje između sportista različitih sportova, sportskih disciplina i specifičnih pozicija koje igrači imaju u timu. Razlike mogu biti suptilne, tj. manje ili više izražene. Osim razlika, ujedno postoje i sličnosti između sportista. Sportisti se međusobno mogu razlikovati po mišićnoj sili (N; njutn), snazi (W; vat) brzini (m/s) itd. Da bi se dobili relevantni podaci u nauci i praksi koriste se različiti testovi, instrumenti i tehnologija, zavisno od uslova za rad i mogućnosti primene.

Neke razlike u motoričkim sposobnostima su očigledne, a za neke je neophodno sprovesti određene testove, kako bi se dobilo realno stanje motoričkih sposobnosti. Recimo, evidentne razlike u motoričkim sposobnostima postoje između džudista i biciklista, trkačkih i bacačkih atletskih disciplina. Prilično je senzibilnija razlika u sličnim sportskim disciplinama, kao što su atletske sprinterske discipline trčanja na 100 m, 200 m i 400 m. Primera radi, sprinteri koji se takmiče u disciplini trčanja na 100 m, ostvarili su u testu skok udalj iz mesta 285.73cm, dok su sprinteri na 200 m ostvarili 256.00 cm, a sprinteri na 400 m su ostvarili 277.20 cm (Maćkala, Fostiak & Kowalski, 2015; Maćkala et al., 2015; Phogat & Ahlawat, 2015). Navedeno ukazuje da sprinteri koji se takmiče u disciplini trčanja na 100 m poseduju veći stepen razvijenosti snage donjih ekstremiteta u odnosu na sprintere u disciplinama trčanja na 200 m i 400 m. Razlike nastaju kao rezultat poboljšanja određenih motoričkih sposobnosti u manjoj ili većoj meri.

Atletika se zasniva na prirodnim oblicima kretanja kao što su hodanje, trčanje, skokovi i bacanja. Takođe, kalistenik vežbači izvode vežbe koje se zasnivaju na prirodnim oblicima kretanja i korišćenju sopstvene telesne mase kao opterećenja. Za razliku od atletičara, kalistenik vežbači nisu usmereni na postizanje sportskih, vrhunskih rezultata. Problem ovog rada čine razlike u motoričkim sposobnostima atletičara i kalistenik vežbača. Predmet ovog rada jesu motoričke sposobnosti atletičara i kalistenik vežbača. Cilj istraživanja je bio da se ispituju razlike u motoričkim sposobnostima atletičara i kalistenik vežbača.

METOD

U istraživanju su korišćene: metoda teorijske analize, deskriptivna metoda i komparativna metoda.

Uzorak ispitanika

Istraživanje je sprovedeno na uzorku od 11 ispitanika muškog pola sa područja grada Beograda. Prvu grupu ispitanika činilo je šest atletičara sprintera iz AK „Crvena Zvezda”, juniorskog uzrasta 18 ± 0.5 godina. Drugu grupu činilo je pet kalistenik vežbača, uzrasta 21 ± 2.1 godina, koji nisu u sistemu sporta i ne takmiče se. Kalistenik vežbači izvode vežbe, čije se opterećenje zasniva na sopstvenoj masi vežbača, uključujući opremu i rekvizite koji značajno ne menjaju telesnu masu vežbača.

Uzorak varijabli

Uzorak varijabli predstavljaju motorički testovi za procenu motoričkih sposobnosti:

- skok udalj iz mesta (cm) za procenu snage nogu,
- troskok iz mesta (cm) za procenu snage nogu,
- sprint 20 m (s) za procenu ubrzanja i
- sprint 50 m (20 m leteći start) (s) za procenu maksimalne brzine trčanja.

Metode obrade podataka

Za obradu podataka korišćen je Microsoft Office Excel, u okviru čega su putem deskriptivne analize izračunate sledeće vrednosti:

- aritmetička sredina,
- standardna devijacija,
- minimalna vrednost,
- maksimalna vrednost i
- koeficijent varijacije.

Takođe, putem komparativne statistike, primenom t-testa za nezavisne uzorke utvrđene su statistički značajne razlike između grupa, na nivou statističke značajnosti ($p < 0.05$).

REZULTATI

Rezultati istraživanja prikazani su u dva potpoglavlja. U prvom su prikazani rezultati deskriptivne statistike, a u drugom rezultati komparativne statistike motoričkih sposobnosti atletičara i kalistenik vežbača.

Rezultati deskriptivne statistike

Rezultati deskriptivne statistike prikazani su pojedinačno za atletičare (grupa 1) i kalistenik vežbače (grupa 2). U Tabeli 1. prikazani su rezultati deskriptivnih pokazatelja motoričkih sposobnosti atletičara (grupa 1).

Tabela 1. Rezultati deskriptivne statistike motoričkih sposobnosti atletičara (grupa 1)

Varijable	M	SD	MIN	MAX	cV%
SuD (cm)	266.00	22.03	236.00	298.00	8.28
TRS (cm)	775.00	32.75	746.00	830.00	4.22
Sprint 20 m (s)	2.60	0.20	2.51	3.05	7.74
Sprint 50 m (s)	2.91	0.27	2.70	3.43	9.15

Iz Tabele 1. može se tvrditi da prosečna vrednost daljine u testu skok udalj iznosi 266.00 cm, dok je apsolutna mera odstupanja 22.03 cm. Minimalna vrednost iznosi 236.00 cm, a maksimalna 298.00 cm. Prosečna vrednost daljine u testu troskok iz mesta iznosi 775.00 cm, dok je apsolutna mera odstupanja 32.75 cm. Minimalna vrednost iznosi 746.00 cm, a maksimalna 830.00 cm. Prosečna vrednost vremena u testu sprint 20 m iznosi 2.60 s, a apsolutna mera odstupanja iznosi 0.20 s. Minimalna vrednost iznosi 2.51 s, a maksimalna 3.05 s. Prosečna vrednost vremena u testu sprint 50 m iznosi 2.91 s, a apsolutna mera odstupanja iznosi 0.27 s. Minimalna vrednost iznosi 2.70 s, a maksimalna 3.43 s. Koeficijent varijacije za sve testove kreće se od 4.22% do 9.15%, što je manje od 30%, a to govori da je grupa homogena sa aspekta posmatranih varijabli motoričkih sposobnosti.

U Tabeli 2. prikazani su rezultati deskriptivnih pokazatelja motoričkih sposobnosti kalistenik vežbača (grupa 2).

Tabela 2. Rezultati deskriptivne statistike motoričkih sposobnosti kalistenik vežbača (grupa 2)

Varijable	M	SD	MIN	MAX	cV%
SuD (cm)	236.00	15.57	220.00	260.00	6.60
TRS (cm)	620.00	56.90	530.00	670.00	9.18
Sprint 20 m (s)	3.55	0.26	3.26	3.86	7.29
Sprint 50 m (s)	3.69	0.29	3.33	4.11	7.73

Iz Tabele 2. može se tvrditi da prosečna vrednost daljine u testu skok udalj iznosi 236.00 cm, dok je apsolutna mera odstupanja 15.57 cm. Minimalna vrednost iznosi 220.00 cm, a maksimalna 260.00 cm. Prosečna vrednost daljine u testu troskok iz mesta iznosi 620.00 cm, dok je apsolutna mera odstupanja 56.90 cm. Minimalna vrednost iznosi 530.00 cm, a maksimalna 670.00 cm. Prosečna vrednost vremena u testu sprint 20 m iznosi 3.55 s, a apsolutna mera odstupanja iznosi 0.26 s. Minimalna vrednost iznosi 3.26, a maksimalna 3.86 s. Prosečna vrednost vremena

u testu sprint 50 m iznosi 3.69 s, a apsolutna mera odstupanja iznosi 0.29 s. Minimalna vrednost iznosi 3.33, a maksimalna 4.11 s. Koeficijent varijacije za sve testove kreće se od 6.60% do 9.18%, što je manje od 30%, a to ukazuje da je grupa homogena u pogledu posmatranih varijabli motoričkih sposobnosti.

Rezultati komparativne statistike

U Tabeli 3. prikazani su rezultati razlika motoričkih sposobnosti atletičara (grupa 1) i kalistenik vežbača (grupa 2) primenom t-testa za nezavisne uzorke, na nivou statističke značajnosti ($p < 0.05$).

Tabela 3. Rezultati komparativne statistike motoričkih sposobnosti atletičara i kalistenik vežbača

Test		SuD (cm)	TRS (cm)	S 20 (s)	S 50 (s)
Atletičari (grupa 1)	M	266.00	775.00	2.60	2.91
	SD	22.03	32.75	0.20	0.27
	MIN	236.00	746.00	2.51	2.70
	MAX	298.00	830.00	3.05	3.43
	cV %	8.28	4.22	7.74	9.15
Test		SuD (cm)	TRS (cm)	S 20 (s)	S 50 (s)
Kalistenik vežbači (grupa 2)	M	236.00	620.00	3.55	3.69
	SD	15.57	56.90	0.26	0.29
	MIN	220.00	530.00	3.26	3.33
	MAX	260.00	670.00	3.86	4.11
	cV %	6.60	9.18	7.29	7.73
t-test		0.03	0.01	0.01	0.01

Iz Tabele 3. u kojoj su prikazani rezultati komparativne statistike, dobijeni primenom t-testa za nezavisne uzorke, može se utvrditi da u svim varijablama motoričkih sposobnosti postoje statistički značajne razlike ($p < 0.05$) na uzorku atletičara i kalistenik vežbača

DISKUSIJA

Analizom deskriptivnih podataka motoričkih sposobnosti može se zaključiti da su atletičari imali bolje prosečne vrednosti na svim testovima, što ukazuje da su atletičari bolji u svim posmatranim motoričkim sposobnostima od kalistenik vežbača. Preciznije, s aspekta snage, atletičari su u testu skok udalj (SuD) u proseku ostvarili vrednost od 266.00 cm, dok su kalistenik vežbači u testu skok udalj ostvarili 236.00 cm, što predstavlja razliku od 30 cm. Zatim, atletičari su u testu troskok iz mesta (TRS) u proseku ostvarili vrednost od 775.00 cm, dok su kalistenik vežbači ostvarili 620.00 cm, što čini razliku od 155 cm. Pored toga, u pogledu sposobnosti ubrzanja, atletičari su u testu sprint 20 m u proseku ostvarili vrednost od 2.60 s, dok su kalistenik vežbači ostvarili vrednost od 3.55 s, što predstavlja razliku od 0.95 s. Osim toga, s aspekta sposobnosti maksimalne brzine, atletičari su u testu sprint 50 m ostvarili vrednost od 2.91 s, a kalistenik vežbači vrednost od 3.69, što čini razliku od 0.78 s. Pored rezultata deskriptivne analize, rezultati komparativne analize, primenom t-testa utvrđene su statistički značajne razlike ($p < 0.05$) između grupa. Bitno je napomenuti da su atletičari izvodili testove u sprintericama i na atletskoj stazi, dok su kalistenik vežbači izvodili testove u sportskim patikama i sportskom terenu sa travnatom podlogom.

Rezultati ovog istraživanja su u saglasnosti sa istraživanjem Mačkala i saradnika (Mačkala, Fostiak & Kowalski, 2015) u kome atletičari ostvaruju bolje rezultate u testovima za procenu snage, brzine i ubrzanja u odnosu na studente fakulteta sporta. Normative odraslih vrhunskih sportista za test skok udalj dao je Ču (Chu, 1996), koji su sumirani od strane Fukude (2019) i predstavljeni pomoću trostepene skale. Prema trostepenoj skali (Nisko – 30-i percentil; Tipično – 50-i percentil i Visoko – 70-i percentil), atletičari u ovom istraživanju nalaze se na 50. percentilu. Dok se kalistenik vežbači nalaze na 30. percentilu skale. Osim toga, Ču je dao normative odraslih vrhunskih sportista za test troskok iz mesta, po kojima se atletičari nalaze u rasponu od 61 do 70%, dok se kalistenik

vežbači nalaze u rasponu od 41 do 50%. U poređenju sa datim normativima, potrebno je uvažiti trenutno stanje (uzrast, trenažno iskustvo, usmerenja itd.) atletičara i kalistenik vežbača. Kako Ču nalaže, dati normativi treba da služe kao inspiracija za buduće vrhunske sportiste. S obzirom da je obuhvaćen uzorak varijabli motoričkih sposobnosti samo za donji deo tela, postavlja se pitanje kakve razlike postoje u motoričkim sposobnostima gornjeg dela tela.

Ograničenja u ovom radu odnose se na uslove izvođenja motoričkih testova i broj ispitanika. Moglo bi se pretpostaviti da kada bi uslovi izvođenja testova bili izjednačeni za obe grupe, da bi rezultati istraživanja pokazali manje razlike u motoričkim sposobnostima. Radi izvođenja potpunijih zaključaka neophodno je povećati uzorak ispitanika.

ZAKLJUČAK

Dobijeni rezultati istraživanja pokazuju da su atletičari bolji u ispitivanim motoričkim sposobnostima snage, brzine i ubrzanja u odnosu na kalistenik vežbače. Navedeno sugerise da planski, sistematičan i specifičan trening atletičara AK „Crvena Zvezda”, uz rad i usmeravanje trenera i resursa AK „Crvena Zvezda” doprinosi poboljšanju motoričkih sposobnosti snage, brzine i ubrzanja u većoj meri u odnosu na motoričke sposobnosti kalistenik vežbača. U odnosu na normative odraslih vrhunskih sportista, atletičarima u ovom istraživanju se preporučuje rad na poboljšanju snage i sposobnosti od kojih ona zavisi (mišićne sile tj. jačine i brzine). Takođe, kalistenik vežbačima koji žele da poboljšaju snagu nogu preporučuje se rad koji se zasniva na vežbama koje podrazumevaju pliometrijski režim rada mišića, s obzirom da se može izvoditi korišćenjem sopstvene telesne mase. Za izvođenje relevantnijih i potpunijih zaključaka o motoričkim sposobnostima i razlikama motoričkih sposobnosti atletičara i kalistenik vežbača predlaže se u budućim istraživanjima veći uzorak ispitanika i varijabli.

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Original scientific paper

DIFFERENCES IN MOTOR ABILITIES OF TRACK AND FIELD ATHLETES AND CALISTHENICS PRACTITIONERS¹

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Abstract: The subject of this research are the motor abilities of track and field athletes and calisthenics practitioners. The aim of the study was to examine the differences in the motor abilities of track and field athletes and calisthenics practitioners. The research was conducted on a sample of a total of 11 participants from the City of Belgrade: 6 track and field athletes (group 1) and 5 calisthenics practitioners (group 2). The standing long jump (SLJ), standing triple jump (STJ), 20 m sprinting, 50m sprinting (20 flying start) tests were used for the assessment of motor abilities. Descriptive and comparative statistical methods were used for data processing. The results of the research showed that track and field athletes perform better in the examined motor abilities. The results of descriptive statistics showed that track and field athletes perform better in all tests that assess the ability of power, speed, and acceleration. The results of comparative statistics, using the t-test for independent samples showed that a statistically significant difference ($p < 0.05$) was found between the groups. These differences can be attributed to the training of track and field athletes, which is more planned, systematic and specific in relation to calisthenics workouts.

Key words: *tests, power, speed, acceleration*

INTRODUCTION

Motor abilities are one of the key areas of scientific research in sports, recreation, and physical education. In addition, they are important for many occupations, such as police, army, fire department, etc., but also people's daily lives. Motor abilities are the possibilities of a person as a bio-psycho-social and cultural being, to achieve success in a certain activity (Kukolj, 2006). Motor abilities are innate, evolving, and can be improved.

The structure of motor abilities is the same in all people. By applying factor analysis in the study of the structure of motor abilities, the existence of a larger number of factors was noted, which implies the existence of a larger number of motor abilities and that the structure is multidimensional, i.e. that there is not just one motor ability (Fleishman, 1964). Of particular importance for scientific research is that motor abilities can be presented as a value, which, as such, can be expressed quantitatively and qualitatively.

Motor abilities include muscle force (strength), power, speed, endurance, agility, and flexibility (Kukolj, 2006). Force, power, and speed are mechanical properties of muscles that largely determine a person's motor

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abilities, on which successful performance of physical activities depends (Nedeljković, 2016). Power can also be seen as a function of body weight, height, or distance and time necessary to perform a certain activity (Fukuda, 2019). This definition refers to the practicality of testing and assessing power through tests, such as standing long jump and standing triple jump. Speed in physics is calculated over the quotient of the distance traveled and the time required to cross that distance ($V=S/t$). Sprinting speed is a very conservative ability and is difficult to change (Čoh et al., 2007). Acceleration can be seen as a rate of increase in speed.

The assessment and analysis of motor abilities play a key role in sports, recreation, and other types of physical activity. Assessment and analysis are not an end in themselves, but they seek to gather useful information, which could help identify weaknesses or strengths of athletes, improve the training process, repair or prevent injuries, gain information about a certain population, etc. In order for the information to be useful, it is necessary that the conditions in which the test is realized be as similar as possible to the conditions in which the athlete competes (Suzović, 2019).

Differences in the level of motor abilities exist between athletes in different sports, sports disciplines, and specific positions that players have in their team. The differences can be subtle, i.e. more or less pronounced. Apart from the differences, there are also similarities between athletes. Athletes can differ from each other in terms of muscle strength (N; newton), power (W; watt), speed (m/s), etc. In order to obtain relevant data in science and practice, different tests, instruments, and technology are used, depending on the working conditions and possibilities of application.

Some differences in motor abilities are obvious and for some, it is necessary to conduct certain tests, in order to perceive the realistic state of motor abilities. For example, there are obvious differences in motor abilities between judokas and cyclists, running and throwing track and field events. The difference is quite more sensitive in similar sports, such as the 100 m, 200 m, and 400 m sprinting disciplines in track and field. For example, sprinters competing in the 100 m event achieved a result of 285.73 cm in the standing long jump test, while sprinters in the 200 m event achieved 256.00 cm and sprinters in the 400 m achieved 277.20 cm in the same test (Maćkala, Fostiak & Kowalski, 2015; Maćkala et al., 2015; Phogat & Ahlawat, 2015). This indicates that sprinters who compete in the 100 m running event have a higher degree of development of power in the lower extremities in relation to the sprinters in the 200 m and 400 m events, respectively. Such differences arise as a result of the improvement of certain motor abilities to a greater or lesser extent.

Track and field is based on natural forms of movement such as walking, running, jumping, and throwing. Also, calisthenics practitioners perform exercises that are based on natural forms of movement and using their own body weight as a load. Unlike track and field athletes, calisthenics practitioners are not focused on achieving athletic, top results. This paper looks into the differences in the motor abilities of track and field athletes and calisthenics practitioners. The subject of this paper is the motor abilities of track and field athletes and calisthenics practitioners. The aim of the study was to examine the differences in the motor abilities of track and field athletes and calisthenics practitioners.

METHOD

The following methods were used in the research: theoretical method, descriptive method and comparative method.

Sample of participants

The research was conducted on a sample of 11 male participants from the City of Belgrade. The first group consisted of 6 sprinters from the "Red Star" track and field club, junior age 18 ± 0.5 . The second group consisted of 5 calisthenics practitioners, aged 21 ± 2.1 , who are not registered in the sports system and who do not compete. The calisthenics practitioners perform exercises, where the load is based on the practitioner's body weight, including equipment and props that do not significantly change the practitioner's body weight.

Sample of variables

The sample of variables are motor tests designed to assess motor abilities:

- standing long jump (cm) to assess leg power,
- standing triple jump (cm) to assess leg power,
- 20 m sprinting (s) to assess acceleration and
- 50 m (20 m flying start) sprinting (s) to assess maximum running speed.

Data processing methods

Microsoft Office Excel was used for data processing, within which the following values were calculated through descriptive analysis:

- arithmetic mean,
- standard deviation,
- minimum value,
- maximum value and
- coefficient of variation.

Also, through comparative statistics, using t-tests for independent samples, statistically significant differences between groups were established, at the level of statistical significance ($p < 0.05$).

RESULTS

The results of the research are presented in two subchapters. The first one presents the results of descriptive statistics, and the second one presents the results of comparative statistics of the motor abilities of track and field athletes and calisthenics practitioners.

Results of descriptive statistics

The results of descriptive statistics are presented individually for track and field athletes (group 1) and calisthenics practitioners (group 2). Table 1 shows the results of descriptive indicators of the motor abilities of track and field athletes (group 1).

Table 1. *Results of descriptive statistics of motor abilities of track and field athletes (group 1)*

Variables	M	SD	MIN	MAX	cV%
SLJ (cm)	266.00	22.03	236.00	298.00	8.28
STJ (cm)	775.00	32.75	746.00	830.00	4.22
20 m sprinting (s)	2.60	0.20	2.51	3.05	7.74
Sprint 50 m (s)	2.91	0.27	2.70	3.43	9.15

From Table 1 it can be argued that the average distance value in the standing long jump test is 266.00 cm, while the absolute measure of deviation is 22.03 cm. The minimum value is 236.00 cm and the maximum is 298.00 cm. The average value of the distance in the standing triple jump test is 775.00 cm, while the absolute measure of deviation is 32.75 cm. The minimum value is 746.00 cm and the maximum 830.00 cm. The average time value in the 20 m sprinting test is 2.60 s, and the absolute measure of deviation is 0.20 s. The minimum value is 2.51 s, and the maximum is 3.05 s. The average time value in the 50 m sprinting test is 2.91 s, and the absolute measure of deviation is 0.27 s. The minimum value is 2.70 s and the maximum is 3.43 s. The coefficient of variation for all tests ranges from 4.22% to 9.15%, which is less than 30%, which means that the group is homogeneous from the aspect of the observed motor ability variables.

Table 2 shows the results of descriptive indicators of the motor abilities of calisthenics practitioners (group 2).

Table 2. *Results of descriptive statistics of motor abilities of calisthenics practitioners (group 2)*

Variables	M	SD	MIN	MAX	cV%
SLJ (cm)	236.00	15.57	220.00	260.00	6.60
STJ (cm)	620.00	56.90	530.00	670.00	9.18
20 m sprinting (s)	3.55	0.26	3.26	3.86	7.29
50 m sprinting (s)	3.69	0.29	3.33	4.11	7.73

From Table 2, it can be perceived that the average value of the distance in the standing long jump test is 236.00 cm, while the absolute measure of deviation is 15.57 cm. The minimum value is 220.00 cm and the maximum

one is 260.00 cm. The average value of the distance in the standing triple jump test is 620.00 cm, while the absolute measure of deviation is 56.90 cm. The minimum value is 530.00 cm while the maximum is 670.00 cm. The average time value in the 20 m sprinting test is 3.55 s, and the absolute measure of deviation is 0.26 s. The minimum value is 3.26 and the maximum one is 3.86 s. The average time value in the 50 m sprinting test is 3.69 s, and the absolute measure of deviation is 0.29 s. The minimum value is 3.33 and the maximum is 4.11 s. The coefficient of variation for all tests ranges from 6.60% to 9.18%, which is less than 30%, which indicates that the group is homogeneous in terms of the observed motor ability variables.

Results of comparative statistics

Table 3 show the results of the difference in the motor abilities of track and field athletes (group 1) and calisthenics practitioners (group 2) using the t-test for independent samples, at the level of statistical significance ($p < 0.05$).

Table 3. Results of comparative statistics of motor abilities of track and field athletes and calisthenics practitioners

Test		SLJ (cm)	STJ (cm)	20m S (s)	50m S (s)
Track and field athletes (group 1)	M	266.00	775.00	2.60	2.91
	SD	22.03	32.75	0.20	0.27
	MIN	236.00	746.00	2.51	2.70
	MAX	298.00	830.00	3.05	3.43
	cV %	8.28	4.22	7.74	9.15
Test		SLJ (cm)	STJ (cm)	20m S (s)	50m S (s)
Calisthenics practitioners (group 2)	M	236.00	620.00	3.55	3.69
	SD	15.57	56.90	0.26	0.29
	MIN	220.00	530.00	3.26	3.33
	MAX	260.00	670.00	3.86	4.11
	cV %	6.60	9.18	7.29	7.73
t-test		0.03	0.01	0.01	0.01

From Table 3, which shows the results of comparative statistics, obtained by applying the t-test for independent samples, it can be concluded that in all variables of motor skills there are statistically significant differences ($p < 0.05$) in the sample of track and field athletes and calisthenics practitioners.

DISCUSSION

By analyzing the descriptive data of motor abilities, it can be concluded that track and field athletes achieved better average values on all tests, which indicates that they perform better in all observed motor abilities than calisthenics practitioners. More precisely, from the aspect of power, the track and field athletes achieved an average value of 266.00 cm in the standing long jump (SLJ) test, while the calisthenics athletes achieved a value of 236.00 cm in the standing long jump test, which is a difference of 30 cm. Then, in the standing triple jump test (STJ), the track and field athletes achieved an average value of 775.00 cm, while the calisthenics practitioners achieved a value of 620.00 cm, which makes a difference of 155 cm. In addition, in terms of the ability to accelerate, the track and field athletes achieved an average value of 2.60 s in the 20 m sprinting test, while the calisthenics practitioners achieved a value of 3.55 s, which is a difference of 0.95 s. In addition, from the aspect of maximum speed, the track and field athletes achieved a value of 2.91 s in the 50 m sprinting test, and the calisthenics practitioners achieved a value of 3.69 s, which makes a difference of 0.78 s. In addition to the results of descriptive analysis, the results of comparative analysis, using a t-test, found statistically significant differences ($p < 0.05$) between groups. It is

important to note that the track and field athletes performed the tests in sprinting shoes and on a track, while the calisthenics practitioners performed the tests in sports sneakers and on a grass sports field.

The results of this research are in agreement with the research of Maćkała et al. (Maćkała, Fostiak & Kowalski, 2015) in which track and field athletes achieve better results in tests that assess power, speed, and acceleration compared to the students of the Faculty of Sports. The norms for elite adult track and field athletes for the standing long jump test were provided by Chu (1996), which were summarized by Fukuda (2019) and presented using a three-point scale. According to the three-point scale (Low - 30th percentile; Typical - 50th percentile and High - 70th percentile), the track and field athletes in this study are on the 50th percentile, while the calisthenics practitioners are on the 30th percentile scale. In addition, Chu provides the norms for elite adult track and field athletes for the standing triple jump test, according to which the track and field athletes are in the range of 61-70%, while the calisthenics practitioners are in the range of 41-50%. In comparison with the given norms, it is necessary to take into account the current condition (age, training experience, field of expertise, etc.) of the track and field athletes and calisthenics practitioners. As Chu specifies, the given norms should serve as an inspiration for future elite athletes. Since the sample of the variables of motor abilities is included only for the lower part of the body, the question arises as to what differences exist in the motor abilities of the upper part of the body.

Limitations in this research refer to the conditions for performing motor tests. It could be assumed that if the conditions for performing the tests were equal for both groups, the results of the research would show smaller differences in motor abilities. In order to draw more complete conclusions, it is necessary to increase the sample of participants.

CONCLUSION

The obtained research results show that track and field athletes perform better in the examined motor abilities of power, speed and acceleration in relation to calisthenics practitioners. This suggests that the planned, systematic and specific training of the "Red Star" track and field athletes, along with the work and guidance of coaches and resources of the "Red Star" track and field club contributes to improving the motor skills of power, speed and acceleration to a greater extent compared to the motor skills of calisthenics practitioners. In relation to the norms of elite adult athletes, the track and field athletes in this research are recommended to work on improving the power and abilities on which it depends (muscle force, i.e. strength, and speed). Also, calisthenics practitioners who want to improve leg power are recommended to work out based on exercises that involve a plyometric regime of muscle work, since it can be executed using their own body weight. In order to draw relevant and more complete conclusions about the motor abilities and differences in the motor abilities of track and field athletes and calisthenics practitioners, a larger sample of participants and variables is proposed in future research.

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