European Journal of Physical Education and Sport Science
ISSN: 2501 - 1235
ISSN-L: 2501 - 1235
Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.1034767 Volume 3 │Issue 11 │2017

THE ROLE AND ASSOCIATION OF BODY HEIGHT AND WEIGHT OF THE PERFORMANCE OF MOTOR ABILITIES IN SOCCER PLAYERS

Nurja Fatjon[1], Mehmet Spahiu[2], Milla Ermal[1], Hoxha Kadri[2]
[1]The University of Shkodra "Luigj Gurakuqi", Albania
[2]Sports University of Tirana, Albania

Abstract:
The youth ability to perform high-speed running actions such as sprints to win possession of the ball or to pass defending players is believed to be critical to the outcome of soccer matches (Bradley et al., 2009). As such, sprint ability has been reported to be a physical prerequisite for professional soccer players (Cometti et al., 2001; Gissiset al., 2006). The goal of this study was to evaluate the role and association of body weight and height in the performance of motor abilities in youth soccer players.
Methods: The subjects of this study were 64 youth soccer players with an average weight 47.5 kg (+/- 7.3 kg) and height 157.3 cm (+/- 7.4cm). Anthropometrics were measured as body height and weight in youth. The subject underwent to perform a speed test (10m and 30m sprint test, 10x5m speed agility test) and standing long jump to evaluate explosive power to lower limbs. Analysis of correlation was performed to find out if there was the association.
Result: The results show that; body weight were correlated with motor abilities as follows; body weight with 10m sprint test (r= -0.054; sig= 0.671), body weight with 30m sprint test (r= -0.049; sig= 0.724), body weight with 10x5m agility test (r= -0.025; sig= 0.871), body weight with standing long jump test (r= 0.193; sig= 0.163). While body height were correlated with motor abilities as follows; body height with 10m sprint test (r= -0.051; sig= 0.6), body height with 30m sprint test (r= -0.054; sig= 0.671), body height with 10x5m agility test (r= -0.018; sig= 0.909), body height with standing long jump test (r= 0.215; sig= 0.119).
Conclusion: There was a negative but no significant correlation between body weight and body height with motor abilities with regard to speed and agility. There was no

significant correlation between body weight and height with explosive power of lower limbs. This results even though found no significance correlation but negative correlation, suggest that coaches should be careful with anthropometrics variables of their players in designing athletic program with regard to speed and agility

Keywords: anthropometrics, soccer, correlation, motor abilities

1. Introduction

Zaccagni and Gualdi-Russo, 1996) on their findings shows that there is of high interest for sport scientist and coaches on identification of specific characteristics of physique that may contribute to success in sports as well as the possible structural differences among athletes in various sports (Duncan et al., 2006).The importance of players' body height in basketball and volleyball is accepted as it is well known that body height influences positively all body segment lengths and, in turn, athletic performance (Malousariset al., 2008). Although adequate body size and shape are not the only elements necessary for an athlete to excel, they may represent important prerequisites for successful participation in sport (Lidor & Ziv, 2010). In volleyball body height is considered a determinant factor for good performance in volleyball and, together with its relation to body mass, is used as a criterion for the selection overpromising volleyball players (Grgantov et al., 2006;, Malousaris, et al., 2008).

The correlation between percent body fat and body mass index is influenced by gender, age and sport. Recent studies have shown (Nelson et al., 2011, Srdic et al., 2011, Mak et al., 2010). This correlation has not yet been identified in adolescent soccer players. If BMI was in strong correlation with body fat, it would offer the coach, trainer or other allied health care professional engaged in soccer training an important tool to develop proper exercise programs

Percent body fat and body mass index are associated with reduced physical fitness, as it has been indicated by research conducted chiefly on general population (Artero et al., 2010, Chen et al., 2006). The youth ability to perform high-speed running actions such as sprints to win possession of the ball or to pass defending players is believed to be critical to the outcome of soccer matches (Bradley et al., 2009). As such, sprint ability has been reported to be a physical prerequisite for professional soccer players (Cometti et al., 2001; Gissis et al., 2006). The goal of this study was to evaluate the role and association of body weight and height in the performance of motor abilities in youth soccer players.

2. Methods

This study was conducted in three youth soccer teams in Shkodra. The subjects of this study were 64 youth soccer players with an average weight 47.5 kg (+/- 7.3 kg) and height 157.3 cm (+/- 7.4cm). Anthropometrics were measured as body height and weight in youth. The subject underwent to perform a speed test (10m and 30m sprint test, 10x5m speed agility test) and standing long jump to evaluate explosive power to lower limbs. Analysis of correlation was performed to find out if there were the association between this variables.

2.1 Protocol of the tests

Body height and weight were measurement with a stadiometer, barefoot. The purpose of the test 10m and 30m sprint is to determine acceleration, maximum running speed and speed endurance. The test involves running a single maximum sprint over a set distance, with time recorded (10m and 30m). After a standardized warm up, the test is conducted over a certain distance, such as 10, 30, meters. The starting position should be standardized, starting from a stationary position with a foot behind the starting line, with no rocking movements. We use a measure of the time for 10 meters and 30 meters in seconds from a stationary start as a score.

The purpose of the test 10x5 m is a test of speed and agility. Procedure: of this test is as follows; marker cones and/or lines are placed five meters apart. Start with a foot at one marker. When instructed by the timer, the subject runs to the opposite marker, turns and returns to the starting line. This is repeated five times without stopping (covering 50 meters total). At each marker both feet must fully cross the line. The score is record the total time taken to complete the 50 m course.

2.2 Statistical analysis

A descriptive statistics (mean ± SD) was calculated for all of the variables (speed 10m, speed 30m, agility 10x5m, standing long jump, body weight and height) and putted before in an excel database taken for the field tests. An analysis of correlation was used to determine whether there was association for body weight and height with each variable assessed (motor abilities) in this study. All of the data were conducted using SPSS, version 20.0 (SPSS, Inc. Chicago, IL, USA). The significance level was set at $p < 0.05$.

3. Results

Results from the table 1 show the mean values for anthropometrics parameters and motor abilities parameters in youth soccer players. The mean values for body weight is 35 kg (SD 8.2) and body height is 1.60 m (SD 0.10 m), while descriptive statistics for motor abilities are: speed 10m 2.3 seconds (SD 0.4), speed 30 m 5.0 seconds (SD 0.5), speed and agility 10x5m 20.6 seconds (SD 1.2), and explosive power measured with standing long jump test is 1.90 m (SD 0.3).

Table 1: Descriptive statistics for anthropometrics and motor abilities parameters

	N	Min	Max	Mean	Std. Dev
Weight	68	35.0	65.0	49.1	8.2
Height	68	1.4	1.8	1.6	0.1
Speed 10m	57	1.8	3.3	2.3	0.4
Speed 30m	55	4.2	6.3	5.0	0.5
Speed Agility 10x5m	43	18.0	23.0	20.6	1.2
Explosive Power (SLJ)	54	1.5	2.4	1.9	0.3

Results from table 2 show the correlation coefficient (r) among anthropometrics and motor abilities parameters; Body weight * Speed 10m r= -0.054 (p=0.671) Body weight *Speed 30m r= -0.049 (p=0.724) Body weight *Explosive Power r= 0.193 (p=0.163) Body weight *Speed Agility 10x5m r=-0.025 (p=0.871) and Body height * Speed 10m r= -0.051 (p=0.6210 Body height *Speed 30mr= -0.054 (p=0.671)Body height *Explosive Power r= 0.215 (p=0.119) Body height *Speed Agility r= -0.018 (p= 0.909).

Table 2: Correlation coefficient among anthropometrics and motor abilities parameters

		Speed 10m	Speed 30m	Explosive Power	Speed Agility 10x5m
Weight	Pearson Correlation	-0.054	-0.049	0.193	-0.025
	Sig. (2-tailed)	0.671	0.724	0.163	0.871
Height	Pearson Correlation	-0.051	-0.054	0.215	-0.018
	Sig. (2-tailed)				
	Pearson	0.621	0.671	0.119	0.909

Results from the table 3 show correlation between body weight and motor abilities split by weight category (+5 0 kg each category). Each category starts from the lowest score of body weight and increase each level by +5 kg till the highest category.

Table 3: Correlation between body weight and motor abilities split by weight category (+5 0 kg each category)

Correlations						
Weight category			**Speed 10m**	**Speed 30m**	**Explosive Power**	**Speed Agility 10x5m**
1	Weight	Pearson Correlation	-0.476	-0.058	0.292	0.154
		Sig. (2-tailed)	0.164	0.874	0.445	0.742
2	Weight	Pearson Correlation	-0.137	0.07	0.104	0.023
		Sig. (2-tailed)	0.6	0.79	0.692	0.94
3	Weight	Pearson Correlation	0.437	0.176	-0.13	-0.412
		Sig. (2-tailed)	0.206	0.65	0.72	0.311
4	Weight	Pearson Correlation	-0.132	-0.211	0.387	0.666
		Sig. (2-tailed)	0.777	0.689	0.391	0.148
5	Weight	Pearson Correlation	-0.567	-0.419	0.33	-0.17
		Sig. (2-tailed)	0.142	0.301	0.47	0.785
6	Weight	Pearson Correlation	-0.458	-0.625	0.46	0.46
		Sig. (2-tailed)	0.09	0.26	0.08	0.07

Results from the table 4 show correlation between body height and motor abilities split by weight category (+5 0 kg each category). Each category starts from the lowest score of body height and increase each level by +5 cm till the highest category.

Table 4: Correlation between body height and motor abilities split by weight category (+5 cm each category)

Correlations						
Height category			**Speed 10m**	**Speed 30m**	**Explosive Power**	**Speed Agility 10x5m**
1	Height	Pearson Correlation	-0.708	-0.506	0.515	-0.226
		Sig. (2-tailed)	0.003	0.054	0.049	0.458
2	Height	Pearson Correlation	-0.147	-0.268	0.255	0.311
		Sig. (2-tailed)	0.65	0.4	0.424	0.415
3	Height	Pearson Correlation	-0.026	-0.231	0.243	0.169
		Sig. (2-tailed)	0.947	0.582	0.529	0.688
4	Height	Pearson Correlation	0.136	0.035	0.015	0.489
		Sig. (2-tailed)	0.727	0.934	0.972	0.067
5	Height	Pearson Correlation	0.271	-0.568	0.681	-0.324
		Sig. (2-tailed)	0.729	0.432	0.523	0.348
6	Height	Pearson Correlation	0.65	0.426	0.5	-0.417
		Sig. (2-tailed)	0.09	0.292	0.061	0.352

4. Discussion

There was a negative but no significant correlation between body weight and body height with motor abilities with regard to speed and agility. There was no significant correlation between body weight and height with explosive power of lower limbs. Chamari et al., 2004 on their study showed that the performance (time) of 20 m sprints correlates with the peak of the jump velocity, while the performance in the 10 m showed no relationship. In the shuttle test, several sprints of 20 m are performed, which seems to explain the significant correlation observed in the present study between the shuttles and the CMJ in the forward soccer players. The results show that; body weight were correlated with motor abilities as follows; body weight with 10m sprint test (r= -0.054; sig= 0.671), body weight with 30m sprint test (r= -0.049; sig= 0.724), body weight with 10x5m agility test (r= -0.025; sig= 0.871), body weight with standing long jump test (r= 0.193; sig= 0.163). While body height were correlated with motor abilities as follows; body height with 10m sprint test (r= -0.051; sig= 0.6), body height with 30m sprint test (r= -0.054; sig= 0.671), body height with 10x5m agility test (r= -0.018; sig= 0.909), body height with standing long jump test (r= 0.215; sig= 0.119),This results goes in line with the data of Hyka et al., (2017) showing no significance association between body weight and BMI with sprint performance (50m) and significance correlation between body height (negative correlation) and percent body fat (positive correlation) with speed. In the study of Mak et al., 2010, the associations were not similar for all the parameters of physical fitness that were examined. Flexibility was a parameter found to be in non-significant correlation with overweight and adiposity, which came to terms with previous observations. Peñailillo et al (2016) suggests that anthropometric characteristics should be considered to compare among youth players, and that youth players should undergo strength training to improve running speed.

The results of the study of Chamari et al., 2004, emphasized the role of adiposity, but supported the role of BMI in youth soccer, as well. The authors found the association between mean power and fatigue index of Wingate test with BMI, in which the boys in higher BMI quartiles demonstrated reduced performance compared to those in lower quartiles. To conclude, the results of this even though found no significance correlation but negative correlation, suggest that coaches should be careful with anthropometrics variables of their players in designing athletic program with regard to speed and agility.

References

1. Artero EG, Espana-Romero V, Ortega FB, Jimenez Pavon D, Ruiz JR, Vicente-Rodriguez G, et al. Health-related fitness in adolescents: underweight, and not only overweight, as an influencing factor. The AVENA study. Scand J Med Sci Sports. 2010;20(3):418-27.
2. Bradley, PS, Mascio, MD, Peart, D, Olsen, P, and Sheldon, B. High intensity activity profiles of elite soccer players at different performance levels. J Strength Cond Res, 2009.
3. Bunc, V. (1999).Role kondice v přípravěhráče fotbalu. Fotbal a trénink, 5, p. 20-21.
4. Bunc, V. and Psotta, R. (2001).Physiological profile of very young soccer players. The Journal of Sports Medicine and Physical Fitness, 41(3), 337-341.
5. Chen LJ, Fox KR, Haase A, Wang JM. Obesity, fitness and health in Taiwanese children and adolescents. EurJ Clin Nutr. 2006; 60(12):1367-75.
6. Cometti, G, Maffiuletti, NA, Pousson, M, Chatard, JC, and Maffulli, N. Isokinetic strength and anaerobic power of elite, subelite and amateur French soccer players. Int J Sports Med 22: 45–51, 2001.
7. Chamari, K., Hachana, Y., Ahmed, Y.B., Galy, O., Sghaïer, F., Chatard, J.C., Wisløff, U. (2004).Field and laboratory testing in young elite soccer players. Br J Sports Med; 38(2): 191-96.
8. Di Salvo, V, Gregson, W, Atkinson, G, Tordoff, P, and Drust, B. Analysis of high intensity activity in Premier League soccer. Int J Sports Med 30: 205–212, 2009.
9. Malina RM. Growth and maturity status of young soccer (football) players. In: Reilly T, Williams M, eds. Science and soccer. 2nd edn. London: Routledge, 2003:287–306.
10. Mujika, I, Santisteban, J, Impellizzeri, FM, and Castagna, C. Fitness determinants of success in men’s and women’s football. J Sports Sci 27: 107–114, 2009.
11. Mak KK, Ho SY, Lo WS, Thomas GN, McManus AM, Day JR, et al. Health-related physical fitness and weight status in Hong Kong adolescents. BMC Public Health. 2010;10:88
12. Nelson TF, Stovitz SD, Thomas M, LaVoi NM, Bauer KW, Neumark-Sztainer D. Do youth sports prevent pediatric obesity? A systematic review and commentary. Curr Sports Med Rep. 2011;10(6):360-70.
13. Hansen L, Bangsbo J, Twisk J, et al. Development of muscle strength in relation to training and level of testosterone in young male soccer players. J ApplPhysiol 1999;87:1141–7.

14. Gissis, I, Papadopoulos, C, Kalapotharakos, VI, Sotiropoulos, A, Komsis, G, and Manolopoulos, E. Strength and speed characteristics of elite, subelite, and recreational young soccer players. Res Sports Med 14: 205–214, 2006.
15. Garganta J, Maia J, Silva R, et al. A comparative study of explosive leg strength in elite and non-elite young soccer players. In: Reilly T, ClarysJ, Stibbe A, eds. Science and football, Vol II. London: E & FN Spon, 1993: 304–6.
16. Hyka A, Bicoku, E, Musliu A and Cuka A (2017), The Association of Sprint Performance with Anthropometric Parameters in Youth Soccer Players Sport Mont 15 (2017) 1: 31–33 Original scientific paper UDC 796.13:976.
17. Peñailillo, L., Espíldora, F., Jannas-Vela, S., Mujika, I., & Zbinden-Foncea, H. (2016). Muscle Strength and Speed Performance in Youth Soccer Players. *Journal of Human Kinetics*, *50*, 203–210. http://doi.org/10.1515/hukin-2015-0157
18. Psotta, R., Bunc, V., Netscher, J., Mahrová, A., and Nováková, H. (2006). Fotbal-kondičnítrénink. Praha: Grada
19. Ro¨sch D, Hodgson R, Peterson L, et al. Assessment and evaluation of football performance. Am J Sports Med 2000;28(Suppl):S29–39.
20. Reilly, T., Bangsbo, J., and Franks, A. (2000).Anthropometric and physiological predispositions for elite soccer. Journal of sports sciences, 18, p. 669-683.
21. Stolen, T, Chamari, K, Castagna, C, and Wisloff, U. Physiology of soccer: an update. Sports Med 35: 501–536, 2005.
22. Srdic B, Obradovic B, Dimitric G, Stokic E, Babovic S. Relationship between body mass index and body fat in children: age and gender differences. ObesRes ClinPract. 2011; 6(2):e167-73.