BODY COMPOSITION OF PROFESSIONAL FOOTBALL PLAYERS IN BULGARIAN FIRST LEAGUE

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Abstract

Aim. In the world of professional sport every point of excellence counts. In recent years body composition has been one of the main points of controlling body composition in professional football. Rapid testing of this component is possible using the InBody 270 body composition analyser. The following study aims to reveal the body composition of professional Bulgarian football players.

Methods. For the study, we used data from the InBody 270 analyser for 1 month. All data is analysed via descriptive statistics.

Results. We monitor several indexes such as muscle-fat analysis, segmental lean analysis, total body water, weight etc. All measurements are made every week for operational control of players' body composition. The results also included the height and weight of soccer players. Based on the body composition results, we have extracted data to show the current level of professional soccer players.

Conclusions. Body composition data for professional football players is an excellent way of controlling the sports form. Also, it can be used as a guide for selection among adolescent players.

Keywords: soccer, professional football, body composition, bulgarian football, first league.

Introduction

Nowadays professional sport seeks opportunities to improve performance in all ways – technical, tactical, physical, etc. In professional football one of the most important aspects is controlling body composition to achieve close to maximal performance during the season.

There are many solutions for rapid body composition control starting from simple scale to professional laboratory test. In recent years, the use of devices for body composition analysis has become necessary in sports practice. One of the leaders in this field is InBody 270 which gives rapid solutions for terrain control of body composition.

In recent years, every single detail of a professional football player's performance has been measured, monitored and optimized in a detailed and systematic way. In recent years, every single detail of a professional football player's performance has been measured, monitored and optimized in a detailed and systematic way. This purposefulness undoubtedly brings with it the prerequisite for a more qualitative and effective application of the technical, tactical, conditioning and psychological abilities of elite football players.

The modern development of sport, with its increasingly narrow specialization, requires a deeper knowledge of the structure of the human body. The consideration of morphological features of athletes is conditioned by two main points: on the one hand, such features as height, weight, body structure (somatotype) influence sports performance, and on the other hand, they ensure the system of selection and selection of sports personnel (Lovkov & Ivanov, 2020). Body composition undoubtedly enables players to reach their maximum performance in different sporting situations (Canhadas, et al., 2010). For example, a high level of body fat limits the speed, frequency, and amplitude of movements because of the constant struggle against gravity, which undoubtedly decreases a soccer player's effective performance, which correlates with competitive excellence (Gil, et al., 2007). Contrary to this assertion, low body fat is responsible for faster actions, quicker changes of direction, and influences the jumping ability of football players (Dodd & Newans, 2018). In addition, other authors believe that a lower fat level is characteristic of a higher-level football player (Slimani, et al., 2018). Body composition also appears to be a key element in scouting players at the elite level, according to several authors (Vaeyens, et al., 2006; Campa, et al., 2021; Campa, et al., 2022). The modern demands for high-intensity movements in soccer will undoubtedly influence the selection of players in early childhood for the body composition (Barnes, et al., 2014). Age period at the beginning of puberty is always hard for conducting adequate training process among young football players. Applying approach of using InBody 270 system can give detailed overview of respondents status, and this made on regular time schedule can help identify the level of physical development and from there can optimize training process (Ivanov, et al., 2022).

Body composition is a key controlled element of athlete development related to player performance and in professional football it is traditionally measured several times during the season to examine and monitor the effectiveness

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of training regimens and nutrition. In addition, suboptimal body composition may also increase the risk of injury (Suarez-Arrones, et al., 2018).

According to these facts, it is necessary to update the information about the characteristics that directly influence football performance and sports results, in order to be able to optimize and take into account in professional and elite football in Bulgaria and Europe.

Methods

The following study aims to reveal the body composition of professional Bulgarian football club players. We used data from the InBody 270 analyser for 1 month at the end of the First league season (2022/2023). All 26 respondents are part of the first team of the Professional football club "Levski" Sofia. For the period of the study, May-June 2023 in total 4 measurements were made (weekly) using the InBody 270 body composition analyser. All measurements were made in the early morning before 1st training session. For the study, we monitor six indexes: age (years), height (cm), weight (kg), Skeletal Muscle Mass/SMM (kg), Body Fat Mass/BFM (kg), Body Mass Index/BMI and Percent Body Fat/PBF (%). All data is analysed via descriptive statistics using SPSS software.

Results

The From

Table 1 to Table 4 we present the descriptive statistics from all performed tests within one month at the end of the official season of the Bulgarian first league. We can note from the tables that the number of respondents in the different tests varies between 18 and 26. The reason for that is the absence of certain players on the day of InBody testing. From the data, we can conclude that the team's average age is very low – ranging from 17 to 35 which is a good perspective for the future of this team. Average height is around 183-184 cm varying due to the different number of players. The other basic anthropometric index – weight – is strictly individual and that must be taken into account when setting the correct weight of each player.

We find normal data distribution based on Skewness and Kurtosis.

Table 1. Descriptive analysis of the results from the first testing

	N	Range	Min	Max	Mean	Std. Deviation	Skewness	Kurtosis
Age	22	18,0	17,0	35,0	22,2	4,4	1,04	1,87
Height	22	21,0	174,0	195,0	184,1	5,7	-0,01	-0,67
Weight	22	23,2	68,5	91,7	77,9	6,2	0,61	-0,39
Skeletal Muscle Mass (kg)	22	13,6	35,7	49,3	41,0	3,7	0,79	-0,14
Body Fat Mass (kg)	22	7,9	4,0	11,9	6,8	2,4	0,81	-0,55
Body Mass Index (kg/m2)	22	6,7	20,3	27,0	23,0	1,3	0,97	3,22
Percent Body Fat (%)	22	9,4	5,3	14,7	8,7	3,1	0,83	-0,52
Valid N (listwise)	22							

Table 2. Descriptive analysis of the results from the second testing

	N	Range	Min	Max	Mean	Std. Deviation	Skewness	Kurtosis
Age	24	18,0	17,0	35,0	22,1	4,2	1,12	2,32
Height	24	21,0	174,0	195,0	183,9	5,7	0,01	-0,74
Weight	24	23,4	68,2	91,6	78,5	6,5	0,41	-0,83
Skeletal Muscle Mass (kg)	24	12,9	35,7	48,6	41,0	3,8	0,67	-0,51

Body Fat Mass (kg)	24	9,2	4,0	13,2	7,3	2,6	0,61	-0,47
Body Mass Index (kg/m2)	24	7,1	20,0	27,1	23,2	1,4	0,51	2,02
Percent Body Fat (%)	24	11,6	4,5	16,1	9,2	3,1	0,62	-0,49
Valid N (listwise)	24							

Table 3. Descriptive analysis of the results from the third testing

	N	Range	Min	Max	Mean	Std. Deviation	Skewness	Kurtosis
Age	18	18,0	17,0	35,0	22,7	4,1	1,42	3,78
Height	18	21,0	174,0	195,0	184,2	6,1	0,01	-0,97
Weight	18	21,8	70,1	91,9	79,8	6,6	0,33	-1,38
Skeletal Muscle Mass (kg)	18	15,1	34,1	49,2	41,9	4,3	0,06	-0,88
Body Fat Mass (kg)	18	10,6	3,8	14,4	7,1	3,0	0,89	0,28
Body Mass Index (kg/m2)	18	5,7	21,3	27,0	23,5	1,3	0,92	1,81
Percent Body Fat (%)	18	15,0	4,3	19,3	9,0	3,9	1,17	1,28
Valid N (listwise)	18							

Table 4. Descriptive analysis of the results from the fourth testing

	N	Range	Min	Max	Mean	Std. Deviation	Skewness	Kurtosis
Age	26	19,0	16,0	35,0	22,1	4,3	0,89	1,55
Height	26	21,0	174,0	195,0	183,8	6,0	0,27	-0,79
Weight	26	25,2	67,0	92,2	77,9	6,1	0,43	-0,12
Skeletal Muscle Mass (kg)	26	12,8	36,7	49,5	41,5	3,7	0,66	-0,61
Body Fat Mass (kg)	26	7,9	2,8	10,7	6,0	2,2	0,45	-0,77
Body Mass Index (kg/m2)	26	7,0	19,8	26,8	23,1	1,3	0,19	2,63
Percent Body Fat (%)	26	9,8	3,4	13,2	7,8	2,8	0,45	-0,81
Valid N (listwise)	26							

To get into the body composition of professional football players we present Figure 1 – average values of Skeletal Muscle Mass. For the duration of our study, this value keeps similar values. This means that at the end of the season, we do not find emphasis on increasing muscle mass.
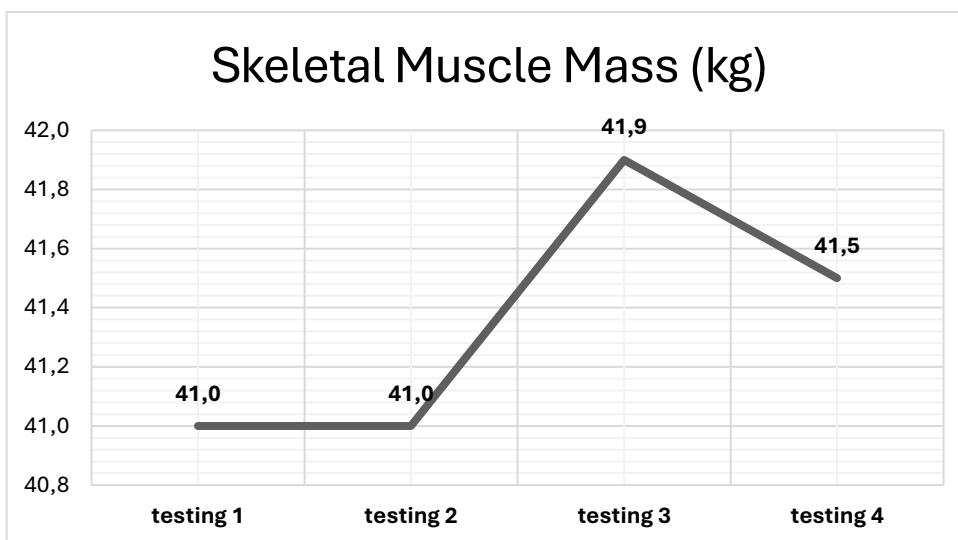
Figure 1. Average value of Skeletal Muscle Mass – SMM (kg)

The average values of Body Fat Mass (kg) are presented on Figure 2. We find a small decrease in this index in the last two weeks of the season. The reason for this may be the exhaustion from the long season.
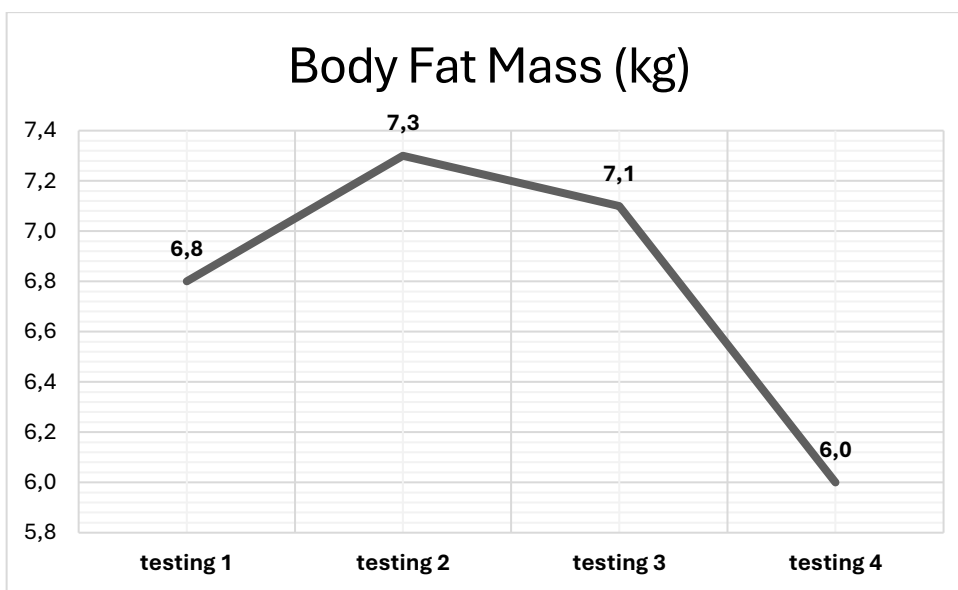

Figure 2. Average value of Body Fat Mass – BFM (kg)

Body Mass Index is a popular formula for assessing body composition based on weight and height. But when taken in sport it must be considered that its values are present in the need of the certain sport – more pronounced musculature. During the testing, it varies within small limits.
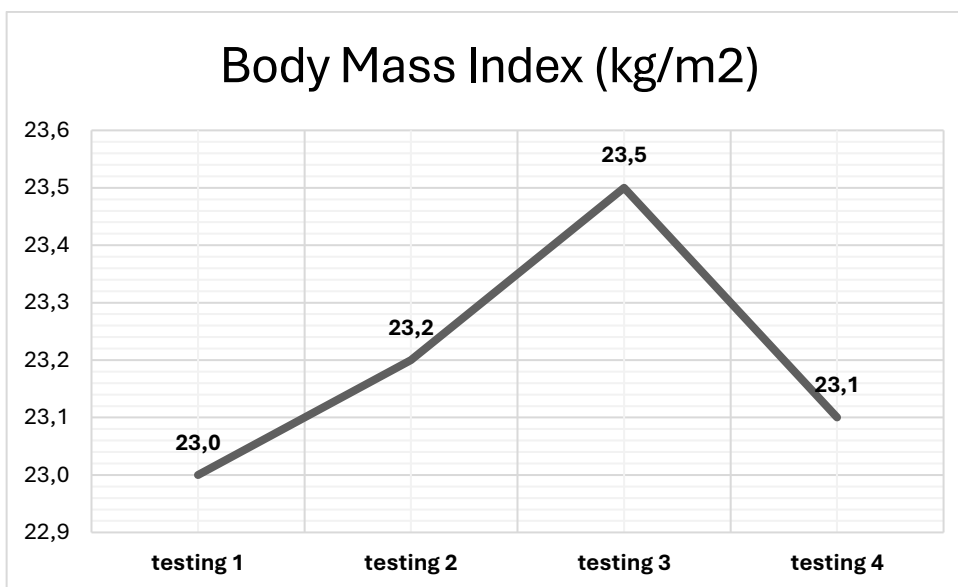
Figure 3. Average values of Body Mass Index – BMI

In our opinion, one of the most important indexes in professional football is the Percent Body Fat (%). This index gives us information is there a need for body weight correction – losing weight. The average value of this index varies between 7,8 (in the last testing) and 9,2 (three weeks before the end of the season).
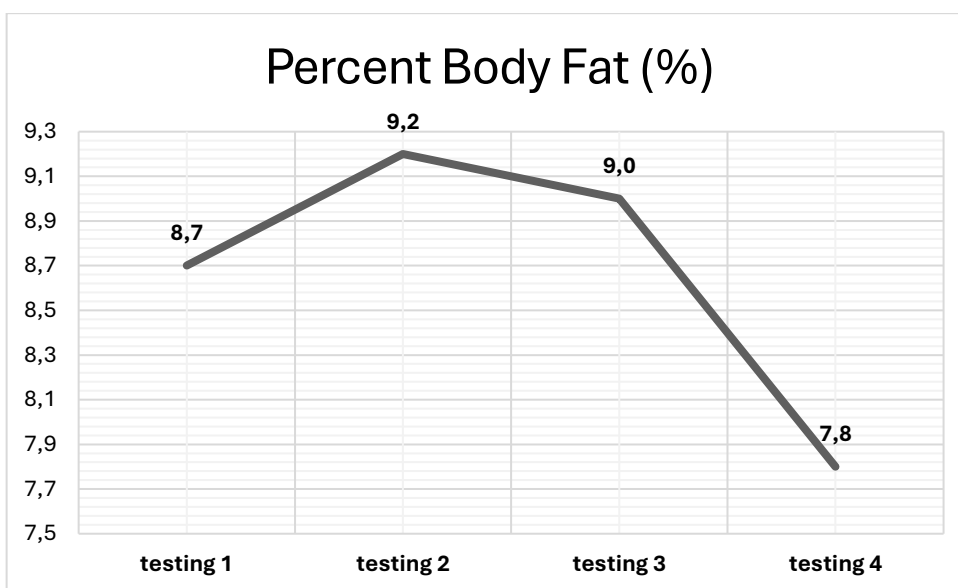

Figure 4. Average values of Percent Body Fat – PBF (%)

Discussions

The height of football players is based strictly on selection and genetic predispositions. We do not have control over it. Weight is a strictly individual indicator, and its interpretation must be based on a very wide range of information concerning the football player. The indexes that must be controlled are skeletal muscle mass (an index that must be kept at a certain level for optimal performance during a full 90-minute game), body fat mass (must be monitored in combination with skeletal and muscle mass), and percent body fat (which is one the most monitored index). Optimal body composition accompanied by an adequate training process will bring positive results.

Conclusions

According to the results and discussion from the study we recommend continuous monitoring of the anthropometric indicators presented.

It is difficult to compare similar indicators with other teams due to the lack of data from elite sports.

Practical application: in light of previous research, it has been observed that different playing positions are also characterized by different body composition. For example, goalkeepers tend to be taller, heavier and have a higher fat mass than strikers, who have been reported to have a higher muscle mass (Bernal-Orozco, et al., 2020).

The systematic study of the anthropometry and body composition of soccer players provides a clear picture of the athlete that will support the work of coaches, nutritionists, the medical team, conditioning specialists and individual training coaches in creating specific plans for training, recovery or optimizing the development of elite soccer players.

Specifically, the data obtained can be used to create a fully individualized program for the development of strength abilities that are closely specialized to the specificities of the anthropometric profile and body composition of the individual soccer player, even directly related to his playing position.

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