

**The Effect of Somatotype on Cardiovascular Endurance in Football Players****M. Adam Mappaompo^{1✉}, Ians Aprilo², Poppy Elisano Arfanda³**Faculty of Sport Science, Universitas Negeri Makassar, Makassar, Indonesia¹²³**Article History**

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Keywords:Somatotype; meso-
morph; ectomorph;
cardiovascular endurance**Abstract**

This study was to determine the level of cardiovascular endurance of Bilopa FC football athletes related to somatotype. The subjects of this study were soccer athletes who were actively involved in the Bilopa FC Football Association in the city of Makassar. The population of this study amounted to 67 people, with an age range of 13-29 years. Samples were taken based on purposive sampling and selected 25 people in the age category 20-29 years. This study is a quantitative study, which aims to see the effect of somatotypes on physical fitness in soccer athletes. Somatotype data is taken based on the somatotype method that is often used the modified somatotype method introduced by Heath and Carter (2002), while the physical fitness data taken is cardiovascular endurance using the Bleep test. This study showed that the mesomorph somatotype 100% had cardiovascular endurance in the very good category. The ectomorph somatotype showed that 36.36% had cardiovascular endurance in the very good category, 54.55% in the good category, and 9.09% in the average category. The results showed that mesomorph somatotypes had better cardiovascular endurance than ectomorph somatotypes.

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INTRODUCTION

The success of a sport is determined by specific anthropometric characteristics, body composition, and somatotype. The Somatotyping technique is a universal technique that is applied in classifying body shape and structure (Gjonbalaj et al., 2018; Hapsari et al., 2021). Body composition shows the characteristics of the composition of the body's metabolism and the tendency of certain diseases, this is very necessary from a person's morphological status (Eler & Eler, 2018). In football games that require high intensity, you must combine technique, tactics, player positioning, and the physical characteristics of the athlete (Gjonbalaj et al., 2018).

The choice of sports specialization should start from an early age, so coaches or sports experts need to understand the importance of somatotypes in supporting an athlete's career. Somatotypes can be used as a screening or "diagnosis" in the selection of new athletes. In football games that require high intensity, you must combine technique, tactics, player positioning, and the physical characteristics of the athlete (Gjonbalaj et al., 2018; Eler & Eler, 2018; Hapsari et al., 2021; Cavia et al., 2019; Çinarlı & Kafkas, 2019). The demands of the game of football are characterized by strength, speed, agility, and agility (Goranovic et al., 2021). It is intended that the training program provided is appropriate and the exercises carried out are not in vain. In addition, it can support physical fitness, as well as minimize the risk of injury due to sports that exceed the body's physical capabilities.

The somatotype method that is often used is the modified somatotype method introduced by Heath and Carter (2002) (Eler & Eler, 2018). Somatotypes can be measured based on anthropometric and health data (Muhamad Sazeli Rifki1, Arif Rahmat2, 2017; Singh et al., 2019; Perroni et al., 2015). Somatotypes can be divided into three categories, namely endomorphy, mesomorphy and ectomorphic (Gjonbalaj et al., 2018; Eler & Eler, 2018). These three somatotypes have their characteristics.

Endomorph type, has the characteristics of a round body with a lot of fat, a large and round head, short bones, a short neck, fat centered on the abdomen and chest, narrow shoulders, fat chest, short arms, big ass, and wide legs and waist. . Endomorph has a low metabolism, so it is easy to gain weight even if you only eat a little. To form an ideal body, the endomorph type must have a healthy diet and exercise. This type is

suitable for light sports and does not cause more burden on the body frame, activities with a rather long duration but not excessive. Examples are cycling, jogging, and swimming.

The mesomorph type is the ideal type for most people. Has the characteristics of a body with strong and hard muscles, large bones and covered with thick muscles, legs, trunk, arms are generally massive (solid or heavy) with strong muscles, large studs, and relatively a slim waist, and broad shoulders. Mesomorph body types tend to be muscular even though they don't do special sports. This body type is very easy to form because of the balance of the body's metabolism. Most mesomorph types do not have serious problems with weight or body shape. It can be concluded that Mesomorphy has relative musculoskeletal rigidity (Chatterjee et al., 2021).

The ectomorph type is characterized by a slim stature, small body, small bones with thin muscles, relatively long arms and legs with a short trunk, this does not mean that the person is always tall, stomach and spine evenly distributed, and the chest is relatively sharp and up, shoulders narrow, and the muscle pathways are not visible. The ectomorph type includes a body with a high metabolism, so it is easy to burn whatever food you eat, it is very easy to lose weight even though you eat a lot because the ectomorph body does not store much fat in the body. This type can only increase body weight by increasing muscle mass with weight training. The conclusion is ectomorphy has relative linearity (Chatterjee et al., 2021).

Somatotype conditions in athletes will contribute optimally to training and performance carried out in top professional sports (Lameirade Oliveira et al., 2018). Athletes' performance in a competition is related to many things, especially the training they do. The physical and physiological characteristics of football players are aerobic fitness, muscle strength, high speed, explosive jumping power, and agility (Gaurav et al., 2015). The body's ability to adapt is also influenced by physical conditions. This is a factor that is quite important to maintaining or improving the athlete's physical fitness (Anggitasari et al., 2019).

Physical fitness of football athletes is needed because the length of time to play is 2 x 45 minutes. Somatotype greatly affects the state of a person's body in carrying out physical activities for sports. Somatotypes of athletes in certain sports have different and specific characteristics. The athlete's somatotype according to the sport they are involved in is very supportive of the athlete's performance, just as football athletes

can contribute to the formation of their level of fitness. Body type can be obtained from the frequency and intensity of physical activity that can increase fitness levels. A good level of fitness can be obtained with a regular and well-programmed pattern of physical activity (Anggitasari et al., 2019). Athletes' aerobic endurance can be significantly affected by percent body fat, muscle mass, and somatotype (Esco et al., 2018) (Latifah et al., 2019) (Gardasevic et al., 2018). Healthy physical exercise includes a series of components to be analyzed, among them, cardiorespiratory capacity, which is considered one of the important markers of cardiovascular health (Alonso-Fernández et al., 2019).

Therefore, the purpose of this study was to determine the effect of somatotypes on the physical fitness of Bilopa FC football athletes.

METHODS

This study is a quantitative study, which aims to see the effect of somatotypes on physical fitness in football athletes. Somatotype data is taken based on the somatotype method that is often used the modified somatotype method introduced by Heath and Carter (2002), while the physical fitness data taken is cardiovascular endurance using the Bleep test. The data were taken from football athletes who were actively involved in the Bilopa FC Football Association in Makassar city. The population of this study amounted to 67 people, with an age range of 13-29 years. Samples were taken based on purposive sampling and selected 25 people in the age category 20-29 years. Data were analyzed using inferential statistics.

RESULTS AND DISCUSSION

Based on the descriptive analysis carried out on the cardiovascular endurance data of Bilopa FC Football athletes in terms of somatotype. A summary of the results of the analysis is listed in the **Table 1.** below.

Table 1. Results of Cardiovascular Endurance of Bilopa FC Football Athletes in terms of Somatotype

Statistics	VO2max	
	Somatotype Mesomorph	Somatotype Ectomorph
N	14	11
Mean	52.00	42.66

Median	50.80	41.80
Std. Deviation	1.72	4.61
Variance	2.98	21.22
Range	3.80	15.10
Min	50.00	36.00
Max	54.30	51.10

From **Table 1** above, it can be presented a description of the data for each variable, for cardiovascular endurance data for mesomorph somatotypes, from 14 samples obtained an average value of 52.00 points, the mean value of 50.80 points, the standard deviation of 1.7263 points, range of 3.8 points, minimum score 50.5 points, maximum score 54.3 points. As for the cardiovascular endurance data of ectomorph somatotypes, 11 samples obtained an average value of 42.65 points, a mean value of 41.80 points, a standard deviation of 4.6061 points, a range of 15.1 points, a minimum value of 36.0 points, a maximum 51.1 points.

Table 2. Mesomorph Bleep Somatotype Test Results

Sample	Frequency	%	Category
14 people	14	100	Excellent
	-	-	Very good
	-	-	Good
	-	-	Average
	-	-	Fair
	-	-	Poor
	-	-	Very Poor

Table 2 illustrates that of 14 people or 100% who have mesomorph somatotypes have cardiovascular endurance in the excellent category.

Table 3. Bleep Somatotype Ectomorph Test Results

Sample	Frequency	%	Category
11 people	-	-	Excellent
	4	36.36	Very good
	6	54.55	Good
	1	9.09	Average
	-	-	Fair
	-	-	Poor
	-	-	Very Poor

Table 3 states that from 11 samples that have ectomorph somatotypes, it shows that 4

people or 36.36% have cardiovascular endurance in the very good category, 6 people or 54.55% in the good category, and 1 person or 9.09% in the average category.

From the explanation in **Tables 2** and **Tables 3**, it is found that the mesomorph somatotype has higher cardiovascular endurance than the ectomorph somatotype.

Several studies have suggested that there are specific anthropometric characteristics of players playing in different positions within the team. Goalkeepers are taller than players who play in the middle, such as defenders and offensive midfield players. Similar results were obtained in several studies that examined specifically the anthropometric characteristics of player positioning, and sports characteristics such as football, and rugby in several countries (Gjonbalaj et al., 2018).

Morphological structures and personality profiles in elite sports affect the position in the game, and in this way indirectly determine team assignments, where somatotype is a predictor of personality (Cavala et al., 2013). In training, in addition to technical and tactical coaching, physical training must also be carried out, so that all athletes can carry out the techniques and tactics that have been given by the capabilities of each player's body (Setiawan et al., 2019). In achieving achievement, regular, directed, and continuous training is needed, including the development of the necessary physical conditions (Sulistiyono et al., 2022).

Speed and balance are related to somatotypes. The game of football requires speed in dribbling, outwitting opponents, and breaking through the opponent's defense (Laksono & Rachman, 2020). While balance affects players in kicking the ball correctly. Many football players have good agility but don't necessarily have a good balance too (Pratomo et al., 2021) (Pratomo et al., 2021).

CONCLUSION

This study concludes that somatotype affects the type of exercise performed. Of course, so that the exercise is not in vain, it is necessary to understand the somatotype, so that the type of exercise can be adjusted to the somatotype that is owned, according to the physical abilities possessed. Somatotypes also support physical fitness, this of course can also minimize our risk of injury due to sports that exceed the body's physical capacity.

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