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# Comparison between Some Morphological Characteristics and Motor Tests of Young Handball and Football Goalkeepers

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## Abstract

**Aim:** The aim of this research was to compare some morphological parameters and some motoric abilities of handball and football goalkeepers. Both sports have some similarities which include the role of the goalkeeper who can play with feet and hands in the attempt of saving the ball from reaching/entering the goal.

**Material and Methods:** The sample consisted of 37 boys aged 17±1 year (17 handball goalkeepers and 20 football goalkeepers) with at least three years of experience in the respective sports. Variable sample consisted of eight morphologic variables and six motor variables.

**Result:** Average body height of handball goalkeepers is 176.4 cm, while average body weight is 63.2 kg. On the other hand, with regards to football goalkeepers, these measures are 171.5cm and 58.5kg, respectively. Results of the research confirmed the hypothesized differences in body weight, with handball goalkeepers being 5cm taller as compared to their football counterparts. Motoric test results also favor handball goalkeepers, especially in variables involving fast reaction and quick movement by feet and hands.

**Conclusion:** Results from this research show that handball goalkeepers are characterized with higher body height than their counterparts. As for motoric tests, it is expected for handball goalkeepers to have better results in fast reaction and quick movements of upper and lower extremities because dynamics of the game and some other factors like speed and intensity of the game.

**Keywords :** Handball; Football; Goalkeeper; Morphologic characteristics; Motor abilities

## Introduction

Football and handball are popular collective sports that have certain similarities and differences. While football is played by feet, handball is a sport played by hand. Both sports have some similarities which include the role of the goalkeeper who can play with feet and hands in the attempt of saving the ball from reaching the goal. However, although goalkeepers save their goal by using feet and hands, the movements involved in the process differ significantly between the two sports. That is because the goal in football is wider and higher than in handball (7.32m and 2.44m), and the perception of the ball is very important. In addition, the players are allowed to enter in the goalkeeper's zone which makes protecting the goal in football even more specific. On the other hand, in handball, players are not allowed to enter the goalkeeper's zone of 6 meters, and the goal is smaller in width and in length. Moreover, due to the abovementioned reasons, the handball goalkeeper must move quickly, have fast reactions, and accurate movements. Handball is a sport which requires high physical preparation as well as technical and tactical skills [1]. Therefore, assessing morphological characteristics and some motor abilities is very important in modern handball and football. Although all players have certain roles in the former sport, some authors asses the role of the goalkeeper with 50%, in comparison to the rest of the team [2].

The results have shown that those goalkeepers who were able to express a higher level of explosive arm strength appeared to be more effective in handball [3]. Top football and handball goalkeepers should master the goalkeeping technique and specific goalkeeping movements that are used during training and competitions, and which are performed in a fast, correct, explosive, and accurate manner. Football and handball goalkeeping techniques consist of two main techniques; one includes a ball, and the other does not [4].

The importance of several anthropometrical characteristics in football was studied by Barišič [5]. According to football experts, there are two types of players in football: the goalkeeper and the field player. Goalkeepers have a high level of simple movement speed, reaction speed, and explosive power, flexibility, movement frequency, and coordination, anaerobic a lactate capacity, and longitudinal skeletal dimensionality. The

handball goalkeeper is a key element in the defense system of a team as he/she is the player in charge of avoiding goals by the opposing team [6].

The specific football goalkeeping technique and movements include:

a) The basic stance of the football goalkeeper,

b) Positioning of the goalkeeper,

c) Saving low,

d) Medium and high balls,

e) Saving by rolling the ball out,

f) Kicking the ball,

g) Diving on low balls,

h) Leg jump saving,

i) Diverting balls,

j) Punching,

k) Dropkicking the ball,

l) Throwing the ball out overhead [7].

Specific handball goalkeeping movements include:

a) The basic stance of the handball goalkeeper,

b) Positioning in front of the goal line and within the goal perimeter,

c) Jumps,

d) Saving low,

e) Medium and high balls by arm and leg,

f) Jump saving of high balls with arms,

g) Saving shot angles from wings,

h) From backcourt positions,

i) Saving the penalty line shot angles from the goal line in the basic stance,

j) Saving the penalty line shot angles by positioning in front of the goal line [4].

Aim of this research was to perform a comparison between some morphological characteristics and motoric abilities of the football and handball goalkeepers.

## Material and Methods

The sample consists of 37 boys aged 17±1 year (17 handball goalkeepers and 20 football goalkeepers) with at least three years of experience in respective sport. Variable sample consists of eight morphologic variables and six motoric variables. Morphological variables include body height (ALARTR), body weight (APESHA), arm circumference, (APEKRA), waist circumference (APEBEL), thigh circumference (APEKOF), abdomen skinfold (AIDHBA), thigh skinfold (AIDHKO) triceps skinfold (AIDHKR). Motor variables include standing broad jump (MKRVGJ), standing high jump (MKRVLA), 20m sprint running (MVR20MS) T-test. (MTTEST), hand taping (MTAPDR), foot taping (MTAPKE).

Table 1 shows central and dispersive parameters of morphologic variables and motor tests of handball goalkeepers. Average body height is 176.4 cm, while average body weight is 63.2 kg. Average of standing broad jump is 177. 23cm, while a standard deviation of 30.19 shows that the sample is heterogenic. Based on the values of skewness and kurtosis, most of the variables are normally distributed except variable mttest, which shows asymmetry of the results on the left side and a high value of kurtosis (14.807) shows that results have greater average than the group.

**Table 1:** Descriptive statistics of morphologic characteristics and motor tests of handball goalkeepers.

| | N | Minimum | Maximum | Mean & Std. Dev | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| ALRTRU | 17 | 165.0 | 187.0 | 176.41±6.35 | .020 | -.970 |
| APESHA | 17 | 49.0 | 80.0 | 63.24±10.63 | .205 | -1.332 |
| APEKRA | 17 | 22.0 | 30.0 | 26.65±2.60 | -.263 | -1.163 |
| APEBEL | 17 | 70.0 | 91.0 | 79.35±6.63 | .388 | -.867 |
| APEKOF | 17 | 45.0 | 60.0 | 52.24±4.47 | .005 | -.955 |
| AIDHBA | 17 | 6.0 | 29.0 | 12.53±6.57 | 1.338 | 1.245 |
| AIDHKO | 17 | 3.0 | 21.0 | 9.47±5.60 | .862 | -.092 |
| AIDHKR | 17 | 3.0 | 12.0 | 6.94±3.54 | .303 | -1.772 |
| MKRVGJ | 17 | 139.0 | 240.0 | 177.24±30.19 | .322 | -.780 |
| MKRVLA | 17 | 22.0 | 43.0 | 28.47±5.79 | 1.388 | 1.840 |



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| | | | | | | |
|---|---|---|---|---|---|---|
| MVR20MS | 17 | 2.2 | 4.8 | 4.25±0.34 | -.167 | -.793 |
| MTTEST | 17 | 3.6 | 14.3 | 12.08±3.20 | -3.738 | 14.807 |
| MTAPDR | 17 | 30.0 | 48.0 | 37.76±5.82 | .538 | -.877 |
| MTAPKE | 17 | 29.0 | 40.0 | 32.88±3.12 | .641 | -.063 |

Table 2 shows central and dispersive parameters of morphologic variables and motor tests of football goalkeepers. According to this table, average body height for football goalkeepers is for about 5cm lower than their handball counterparts at 171,5cm, while body weight is about 5kg lower at 58.5kg. According to the values of skewness and kurtosis, the only variable not normally distributed is the one measuring high standing jump. Motoric tests results show some systematic differences between two groups which will be verified with a t-test for independent samples.

**Table 2:** Descriptive statistics of morphologic characteristics and motor tests of football goalkeepers.

| | N | Minimum | Maximum | Mean & Std. Dev | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| ALRTRU | 20 | 162.00 | 187.00 | 171,50±6,62 | .587 | .063 |
| APESHA | 20 | 45.00 | 78.00 | 58,55±9,49 | .314 | -.761 |
| APEKRA | 20 | 22.00 | 28.00 | 25,50±1,91 | -.304 | -1.210 |
| APEBEL | 20 | 70.00 | 91.00 | 77,55±5,16 | .887 | .922 |
| APEKOF | 20 | 44.00 | 55.00 | 49,80±3,35 | .193 | -1.076 |
| AIDHBA | 20 | 6.00 | 22.00 | 10,25±4,71 | 1.315 | .835 |
| AIDHKO | 20 | 4.00 | 25.00 | 10,40±6,02 | .777 | -.069 |
| AIDHKR | 20 | 4.00 | 15.00 | 7,05±3,12 | 1.173 | .935 |
| MKRVGJ | 20 | 153.00 | 210.00 | 174,65±15,83 | .455 | -.436 |
| MKRVLA | 20 | 23.00 | 36.00 | 26,40±3,03 | 1.926 | 4.401 |
| MVR20MS | 20 | 3.66 | 4.60 | 4,07±0,23 | .168 | .291 |
| MTTEST | 20 | 11.13 | 13.90 | 12,85±0,82 | -.629 | -.785 |
| MTAPDR | 20 | 21.00 | 35.00 | 27,05±3,97 | .156 | -.280 |
| MTAPKE | 20 | 25.00 | 38.00 | 29,80±2,88 | .945 | 2.497 |

**Table 3:** Differences between handball and football goalkeepers in morphologic parameters and motor tests.

| | Group | N | Mean | Std. Deviation | Std. Error Mean | T | Df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| ALRTRU | Football | 20 | 171.5 | 6.62 | 1.48 | -2.29 | 35 | .028 |
| | Handball | 17 | 176.4 | 6.35 | 1.54 | -2.29 | 34.4 | .028 |
| APESHA | Football | 20 | 58.5 | 9.48 | 2.12 | -1.41 | 35 | .166 |
| | Handball | 17 | 63.2 | 10.63 | 2.57 | -1.40 | 32.4 | .170 |
| APEKRA | Football | 20 | 25.5 | 1.90 | .42 | -1.54 | 35 | .131 |
| | Handball | 17 | 26.6 | 2.59 | .62 | -1.50 | 28.9 | .142 |
| APEBEL | Football | 20 | 77.5 | 5.15 | 1.15 | -.93 | 35 | .359 |
| | Handball | 17 | 79.3 | 6.63 | 1.60 | -.91 | 29.9 | .370 |
| APEKOF | Football | 20 | 49.8 | 3.34 | .74 | -1.89 | 35 | .067 |
| | Handball | 17 | 52.2 | 4.46 | 1.08 | -1.84 | 29.3 | .075 |
| AIDHBA | Football | 20 | 10.2 | 4.71 | 1.05 | -1.22 | 35 | .228 |
| | Handball | 17 | 12.5 | 6.56 | 1.59 | -1.19 | 28.4 | .243 |
| AIDHKO | Football | 20 | 10.4 | 6.02 | 1.34 | .48 | 35 | .632 |
| | Handball | 17 | 9.4 | 5.60 | 1.35 | .48 | 34.6 | .630 |
| AIDHKR | Football | 20 | 7.0 | 3.11 | .69 | .09 | 35 | .921 |
| | Handball | 17 | 6.9 | 3.54 | .85 | .09 | 32.2 | .922 |



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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MKRVGJ | Football | 20 | 174.6 | 15.82 | 3.53 | -.33 | 35 | .741 |
| | Handball | 17 | 177.2 | 30.19 | 7.32 | -.31 | 23.2 | .753 |
| MKRVLA | Football | 20 | 26.4 | 3.03 | .67 | -1.39 | 35 | .173 |
| | Handball | 17 | 28.4 | 5.78 | 1.40 | -1.32 | 23.2 | .197 |
| MVR20MS | Football | 20 | 4.0 | .26 | .05 | -1.89 | 35 | .067 |
| | Handball | 17 | 4.2 | .34 | .08 | -1.85 | 29.9 | .074 |
| MTTEST | Football | 20 | 12.8 | .82 | .18 | 1.04 | 35 | .303 |
| | Handball | 17 | 12.0 | 3.20 | .77 | .97 | 17.8 | .344 |
| MTAPDR | Football | 20 | 27.0 | 3.96 | .88 | -6.63 | 35 | .000 |
| | Handball | 17 | 37.7 | 5.81 | 1.41 | -6.43 | 27.5 | .000 |
| MTAPKE | Football | 20 | 29.8 | 2.87 | .64 | -3.12 | 35 | .004 |
| | Handball | 17 | 32.8 | 3.12 | .75675 | -3.10 | 32.9 | .004 |

Table 3 shows differences between the two groups through a t-test for independent samples. Based on the results, only a few differences were found; one in the morphological variable (body height) at the 0.05 level of significance and in two motor tests including hand taping and foot taping, at the 0.01 level of significance. In both of these tests, handball goalkeepers showed better results.

## Discussion

Handball and football goalkeepers have similar morphological characteristics, except in body height where handball goalkeepers are positively favored for about 5cm, and body weight where they are 5 kg heavier. High range values and high values of standard deviation for body height and body weight, as well as in some motor variables show that the group is heterogenic. Regarding values of skewness and kurtosis, almost all variables are normally distributed, except for the variable measuring standing high jump for football goalkeepers. Also, the results from the t-test of agility for handball goalkeepers was not normally distributed either.

Differences between the two groups of goalkeepers are verified by a t-test for independent samples. Statistically significant differences were found in body height at 0.05 level of significance, where handball goalkeepers showed better results. More differences between two groups were found in motor tests which represent fast reaction and quick movements with upper and lower extremities. Here, handball goalkeepers showed better results than their football counterparts (sig=.01). In body height, systematic differences were found; however, none were statistically significant.

Similar results were found in a study conducted by Milanovic [4], where the difference in body height consisted of 12cm in favor of handball goalkeepers. Better results of handball goalkeepers in tests of taping may be interpreted with higher dynamics of the game in this sport. While handball is played in a smaller field, the attacks change from one side to the other almost every minute. That in return, requires from goalkeepers to be more active and to have faster movements with both extremities. On average, during a handball match, there are 50 strikes toward the goal. On the other hand, in football there are a lower number of shots toward the goal and for that reason; football goalkeepers are less involved in play than their counterparts from handball [8,9].

## Conclusion

Comparison of handball and football goalkeepers is a topic that needs further exploring. Results from this research show that handball goalkeepers are characterized with higher body height than their counterparts. Theoretically, given the larger dimensions of the football goal, it is expected for the body height to favor goalkeepers of this sport. However, our results contradict with expectations from theory.

As for motoric tests, it is expected for handball goalkeepers to have better results in fast reaction and quick movements of upper and lower extremities because dynamics of the game and some other factors like speed and intensity of the game.

## Practical Applications

Results of this research will serve as a reference for future researches of the same field. The present study will help coaches to understand better on which morphologic parameters to take care and to choose right motoric tests for selecting and developing top level goalkeepers.

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