Morphological Profiles of Playing Positions in Defense and Offense in Professional Men's Handball

Ante Burger, Nikola Foretić and Marijana Čavala

University of Split, Faculty of Kinesiology, Split

ABSTRACT

The main scope of the study is concerned with the morphological profiles of playing positions in defense, offense and the combinations of these two phases of the game. Furthermore, study attempted to identify the difference between the morphological profiles of the individual playing positions. Entity sample of the study consist of the 148 players that participated in 45 matches of the World Men's Handball Championship which took place in Croatia in 2009. The study dealt with the differences between playing positions concerning basic morphological characteristics which are due to the selection based on roles and tasks that need to be carried out in each position. Moreover, morphological similarity of playing positions in offense and defense was noticed. It was determined that wing players play dominantly in the position of left back, external players in the position of right and center back whereas pivots participate in the positions of center, back and center forward positions in defense. Morphological profiles of playing positions in defense, offense and in the combination of these two phases of the game were determined. Identical positions on different sides in offense (left-right wing player, left-right back player) have shown that these positions are quite similar when it comes to morphological profile and playing position in defense. It can be concluded that some playing positions in offense are accompanied by the respective positions in defense. All positions are characterized by one or two morphological profiles.

Key words: handball, morphological, profiles

Introduction

Handball is a sport in which players of two rival teams, that is, the defender and attacker change roles, depending on the ball possession. The main goal of the team is to »break« through the defensive wall and score a goal overcoming the goalkeeper positioned between the goal post. On the other hand, defensive players try to prevent scoring a goal and gain ball's possession as soon as possible[1]. As far as motoric abilities are concerned, the most important factors are speed, strength and agility which are manifested through the activities of sprint, jump, goal shots, as well as through physical contact which represents the basis of the physiological demands of the game.

Dynamics of handball has significantly changed in the last ten years which is shown in the parameters of the situation efficiency[2,3] and in the physiological parameters[4]. It is evident that there are a greater number of attacks, average time for the attack is decreased and goal shots are increased[2] which adds to the game acceleration. Number of contacts in defense and offense[5], running distances, concentration of lactate and heart frequency during the match add to the increased physiological demands of the game[6].

The player's roles depend on structural, physiological as well as on technical-tactical game features. These roles differ with regard to the playing positions and more often than not different playing positions mean different motoric abilities as well as different morphological characteristics[7,8].

The comparison of different playing positions has been the subject of studies of team sports[9,10]. Handball playing positions are compared on the basis of morphological characteristics[11,12] and not only on the basis of situation efficiency[13] and motoric-function dimension[14]. It is undoubtable that the playing positions in handball differ mutually[15,16] and it can be expected that their characteristics, roles and tasks influence the anthropometric (morphological) selection of players for different positions.

For every sports game qualitative selection of the most successful players is of vital importance. The selection process is undoubtedly the most responsible and the most difficult task to be carried out by the handball experts. The level criteria of general abilities with regard to the

motoric and morphological characteristics are used for primary selection[17]. Handball, as well as other sports, demands mesomorphic body type and minimum of ballast body fat. Players with this morphological status (as well as with proportional body size and longitudinal dimension of skeleton) improve their chances to succeed in handball[18]. Morphological criteria are based on the studies of handball game which defines the model of the player for different playing positions. The model must be coordinated with the motoric-function criteria[1,7,19].

Morphological differences between playing positions have been analyzed in large number of scientific studies. It is established that the wing players are significantly shorter and lightest with regard to the other playing positions in the offense[5,7]. External back players are the tallest because they must score a goal form the most distant positions from the goal[5,20], while central external players are shorter in comparison to back and wing players. This is due to the fact that height isn't of vital importance in the selection because the main role of these players is to collaborate and organize the attack strategy. These players do not take part in the realization of the goal shots. Pivots are the tallest and the heaviest in comparison to other players since the majority of their game activities involves physical contact with rival defensive players[5,20].

In order to analyze the total efficiency of the handball players, playing positions in defense and offense play an important role[5]. There are a small number of studies which analyze defensive playing positions with regard to the situation efficiency as well as with regard to the motoric and morphological abilities. This approach cannot be applied since handball practice highlights the fact that handball coaches and experts consider defense more important than offense if you are to achieve top results in professional handball[5].

The introductory part analyzes the specificity of playing positions which are conditioned by the roles and game features. These positions are manifested primarily by the morphological differences. Due to the fact that the handball game consists of 2 phases, defense and offense, it is important to know which morphological profile dominates which phase of the game. The quality of the player reflects in the efficient realization of the defense and offense phase. Each playing position has its roles and characteristics. Some are undoubtedly more demanding than others so the quality of player must be evaluated through his success in playing positions in offense and in defense[5].

Each handball expert prefers players that can participate at the same time in the most important positions in defense as well as in offense. The efficiency of the performance depends on the player's physical characteristics. Information about morphological profiles in playing positions of defense and offense and the combination of these positions plays an important role in game since it provides data for qualitative selection of players who play modern handball in »both directions« (defense and offense without substitution).

The main scope of the study which concerns the morphological profiles of playing positions in defense, offense and the combinations of these two phases of the game was influenced by the above mentioned facts. Furthermore, differences between morphological profiles of individual playing positions will be analyzed.

Materials and Methods

Sample of entities

Entity sample of the study consist of the players that participated in 45 matches of the World Men's Handball Championship which took place in Croatia in 2009. The first main round matches have been analyzed and a total of 148 players representing national teams of: France, Slovakia, Hungary, Romania, Argentina, Serbia, Norway, Egypt, Brazil and Saudi Arabia were observed.

Sample of variables

Variables used for the study can be divided into two main groups: variables of playing positions and morphological variables. Variables of playing positions concern playing positions in defense and offense. The observed playing positions in defense are: left back (LB), right back (RB), center back playing alone on that position (CB1), center back playing in pair with another center back (CB2) and center forward (CF). The observed playing position in offense are: left wing attacker (LWA), right wing attacker (RWA), left external attacker (LEA), right external attacker (REA), central external attacker (CEA) and pivot (PVT). Only the players who spend minimum of 20 minutes in the game are observed. Morphological variables comprise physical height (PH) and physical weight (PW). Data about basic morphological characteristics of players are taken from Team Roster application published by International Handball Federation (IHF) on their web pages at the end of Championship. With regard to the obtained data about physical weight and height 9 morphological profiles which are the combination of these two basic morphological characteristics were determined (Table 3).

Data analysis

Data processing methods included calculation of basic descriptive parameters of physical height and weight for each playing position in defense and offense (Table 1) and calculation of frequencies and proportions of different playing positions in defense, offense and morphological profiles (Table 4–6). The differences between different morphological profiles in playing positions in defense and offense as well as differences between the participation of players in defense were determined by χ^2-test (Table 7). Arithmetic mean ($\overline{X}$) and standard deviation (SD) of physical height and weight due to which average, below average and above average classes of the above mentioned morpho-

logical characteristics were calculated for the formation of 9 morphological profiles.

Results and Discussion

The results of the basic descriptive parameters of physical height and weight in each playing position« are shown separately in Table 1. The results are normally distributed since the sample is representative. All the variables are equally distributed and the results show that the playing positions in defense and offense differ in basic morphological characteristics.

Frequencies and proportions of playing positions in defense with regard to the respective morphological profile were shown in the Table 4. Significant differences between morphological profiles in defense positions are determined by the χ^2-test shown in Table 7 (p=0.00).

Left back players (LB) have generally below average height and weight for this position. The players of average weight (CB1 and CB2) are unlikely to be found in this position. This is due to the fact that their main role is to control the wings which have the similar body type as left back.

The largest number of center forward defenders (CF) is of average height and weight (37.66%) under the morphological profile MP5. It is interesting to notice that players of below average height and weight (MP1) as well as players of above average weight and height (MP1) play in this position for lesser amount of time. Players change different roles in this playing position since the shorter but also the faster players have to play »plasters« or »indians«[21] whereas in central variants of defense tall and strong players are the most suitable ones[21].

The greatest diversity of results is shown in playing position of right back (RB). 25.84% of players are of below average weight and height (MP1 and MP2), 23.40% of players are of average weight and height (MP5) whereas the greatest number, that is, 39.51% of players in this playing position are of above average weight and height (MP8 and MP9). These results do not come as a surprise since the right back is always in contact with other external attackers[5] so they have to be tall as well as fast, strong and explosive[21].

The most important characteristic of center back (CB2 and CB2) is physical height. The greatest number of players belongs to morphological profile MP8, MP9, CB1 with 61.97% and CB2 with 68.46%. The importance of physical

TABLE 1
DESCRIPTIVE STATISTICS OF PHYSICAL HEIGHT AND WEIGHT IN PLAYING POSITIONS IN DEFENSE AND OFFENSE

VAR	N	$\overline{\mathrm{X}}\pm$SD	Min	Max	Skew	Kurt	Max D	K-S p
LB PH	64	183.93±5.46	170.00	197.00	0.34	0.13	0.10	0.20
LB PW	64	83.015±7.39	61.00	99.00	−0.10	0.35	0.11	0.20
RB PH	90	190.84±6.10	174.00	203.00	−0.49	−0.19	0.10	0.20
RB PW	90	91.27±9.65	68.00	119.00	0.35	0.66	0.11	0.20
CF PH	33	188.12±6.20	177.00	202.00	0.40	0.17	0.19	0.15
CF PW	33	88.73±9.48	75.00	118.00	1.22	2.12	0.17	0.20
CB1 PH	22	193.32±4.88	186.00	201.00	0.02	−1.27	0.11	0.20
CB1 PW	22	92.95±8.71	76.00	107.00	−0.16	−0.87	0.13	0.20
CB2 PH	35	194.97±6.06	179.00	209.00	−0.09	0.51	0.08	0.20
CB2 PW	35	97.91±8.13	79.00	116.00	0.09	0.68	0.13	0.20
LWA PH	38	183.95±4.66	174.00	200.00	0.75	2.62	0.11	0.20
LWA PW	38	82.55±6.75	71.00	98.00	0.22	−0.33	0.09	0.20
RWA PH	32	183.16±5.41	170.00	195.00	0.10	0.25	0.09	0.20
RWA PW	32	81.63±6.88	61.00	95.00	−0.67	1.49	0.13	0.20
PVT PH	51	192.59±5.88	179.00	203.00	−0.23	−0.46	0.09	0.20
PVT PW	51	96.37±10.66	75.00	118.00	−0.02	−0.30	0.07	0.20
CEA PH	41	187.73±5.76	174.00	197.00	−0.49	−0.55	0.14	0.20
CEA PW	41	88.49±7.05	73.00	102.00	−0.16	−0.29	0.09	0.20
REA PH	36	192.86±6.48	177.00	209.00	−0.19	0.32	0.13	0.20
REA PW	36	93.44±8.36	78.00	116.00	0.31	0.23	0.08	0.20
LEA PH	45	194.20±4.68	186.00	205.00	0.22	−0.65	0.12	0.20
LEA PW	45	93.09±8.85	68.00	119.00	0.18	1.56	0.09	0.20

N – entity sample; $\overline{\mathrm{X}}$ – arithmetic mean; Min – minimal value of result; Max – maximal value of result; SD – standard deviation; Skew – coefficient of asymmetry, Kurt – coefficient of kurtosis; Max D – deviation between cumulative and theoretic proportions; K-S p – significance of Kolmogor-Smirn test of the normality of distribution

TABLE 2
CLASSES ACCORDING TO WHICH MORPHOLOGICAL PROFILES WERE DETERMINED

Classes	Below average	Average	Above average
PH	<186.26	186.26–193.10	193.1>
PW	<84.62	84.62–95.88	95.88>

PH – physical height, PW – physical weight

height for center back has already been described in previous studies since they have to block the shots of external players who are able to score a goal from the center because of more suitable (wider) angles in comparison to the goalkeeper[5,21].

Frequencies and proportions of playing positions in offense in comparison to morphological profile are shown in Table 5. Significant differences between morphological profiles in playing positions in offense are determined by the χ^2 test in Table 7. (p=0.00).

The same trend in results is noticed in both playing positions of wings (LWA and RWA). Players that belong to the first and the second morphological profile, that is, the players of below average height (MP1) and weight (MP2) dominate. Left wing player with 73.81% and right wing player with 80.99% are included in the above mentioned profiles. The main reason for this selection is due to the fact that height is not of vital importance for wings but the effectiveness of realization. Wing players are unlikely to shoot when they are surrounded by defenders. Their ef-

TABLE 3
MORPHOLOGICAL PROFILES WITH REGARD TO THE PHYSICAL HEIGHT AND WEIGHT

Code	Morphological profile	Range PH	Range PW
MP1	Below average PH – Below average PW	<186.26	<84.62
MP2	Below average PH – Average pw	<186.26	84.62–95.88
MP3	Below average PH – Above average PW	<186.26	95.88>
MP4	Average PH – Below average PW	186.26–193.10	<84.62
MP5	Average PH – Average PW	186.26–193.10	84.62–95.88
MP6	Average PH – Below average PW	186.26–193.10	95.88>
MP7	Above average PH – Below average PW	193.10>	<84.62
MP8	Above average PH – Average PW	193.10>	84.62–95.88
MP9	Above average PH – Above average PW	193.10>	95.88>

PH – physical height, PW – physical weight

fectiveness is related to their wing positions and to counter attack since they have to achieve distance in long jump so physical height does not influence the effectiveness of realization[5,22].

TABLE 4
FREQUENCIES AND PROPORTIONS OF THE DEFENSE POSITION WITH REGARD TO MORPHOLOGICAL PROFILE

Position	Profile									Overall Line
	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8	MP9	
LB	128.00	54.00	0.00	20.00	38.00	6.00	0.00	11.00	4.00	261.00
Column%	68.45%	47.79%	0.00%	54.05%	21.47%	12.50%	0.00%	9.65%	2.26%	261.00
Line %	49.04%	20.69%	0.00%	7.66%	14.56%	2.30%	0.00%	4.21%	1.53%	261.00
CF	10.00	17.00	0.00	4.00	29.00	4.00	0.00	1.00	12.00	77.00
Column%	5.35%	15.04%	0.00%	10.81%	16.38%	8.33%	0.00%	0.88%	6.78%	77.00
Line %	12.99%	22.08%	0.00%	5.19%	37.66%	5.19%	0.00%	1.30%	15.58%	77.00
RB	47.00	38.00	4.00	4.00	77.00	25.00	4.00	62.00	68.00	329.00
Column %	25.13%	33.63%	80.00%	10.81%	43.50%	52.08%	40.00%	54.39%	38.42%	329.00
Line %	14.29%	11.55%	1.22%	1.22%	23.40%	7.60%	1.22%	18.84%	20.67%	329.00
CB1	0.00	1.00	1.00	8.00	13.00	0.00	4.00	11.00	33.00	71.00
Column %	0.00%	0.88%	20.00%	21.62%	7.34%	0.00%	40.00%	9.65%	18.64%	71.00
Line %	0.00%	1.41%	1.41%	11.27%	18.31%	0.00%	5.63%	15.49%	46.48%	71.00
CB2	2.00	3.00	0.00	1.00	20.00	13.00	2.00	29.00	60.00	130.00
Column %	1.07%	2.65%	0.00%	2.70%	11.30%	27.08%	20.00%	25.44%	33.90%	130.00
Line %	1.54%	2.31%	0.00%	0.77%	15.38%	10.00%	1.54%	22.31%	46.15%	130.00
All groups	187	113	5	37	177	48	10	114	177	868.00

LB – left back; RB – right back; CB1 – central back (playing alone in central position); CB2 –central back (playing on central position with another back); CF – center forward

The position of center external attacker (CEA) is intended for the players of below average and average height and of below average and average weight (MP1+MP2= 35.85%, MP5=35.07%). Even though center players are heavier and taller than wing players[23] morphological characteristics do not play a vital role for this playing position. The efficiency of the center players concerns the organization of the attack and collaboration, primarily with the left and right back as well as with pivots. The realization is carried out by 1:1 and they shoot from the ground so physical height and weight aren't of vital importance[24].

Left and right external backs are the tallest and the heaviest since the largest number of these players belong to morphological profiles (MP8+ MP9) with 47.85% and the left external attacker (LEA) with 64.02. The 20% of players who play in both playing positions belong to morphological profile MP5 and they are of average height and weight. As well as with other playing positions right and left backs have unique morphological characteristics[25]. The most important task is to score a goal jumping high outside 9 meters and rarely by playing 1:1[5]. If there is contact with other players and without contact these players have to be tall and strong which is related to physical weight[7].

A total of 43.87% (PVT) belongs to morphological profiles in which physical height and weight play an important role (MP8 and MP9), 20% to morphological profile

MP5 and 17.42% to MP6 which is characterized by average height and average weight.

It is evident that the physical height and weight are very important for this playing position since the contact activity is significantly the highest in this playing position in comparison to other positions[26]. Moreover, pivot is often surrounded by back and center defenders that are very tall and heavy so the pivot must be very strong[27].

Table 6 shows the percentage of participation of players in offense and defense. The above mentioned proportions make it clear that playing positions differ. Some players in playing positions in offense participate dominantly in position in defense whereas other participates, more or less, in playing positions of defense.

It is evident that the wing players are dominant in the position of left and right back (LWA 63.49% and RWA 72.73%) since the role of left and right back is characterized by the control of the wing players and it can be said »wing is playing against wing«. Certain number of wing players plays also in the position of left and right back (LWA 23.02%, RWA 23.97%). The game is played in the deeper zone formations (i.e. 3:3) and the backs are to control the space so speed and explosive strength is more important than morphological characteristics.

Center external players often play in position of right back (42.54%) and rarely on position of left back (30.60%)

TABLE 5

FREQUENCIES AND PROPORTIONS OF POSITIONS IN OFFENSE IN COMPARISON TO MORPHOLOGICAL PROFILE

Position	Profile									Overall Line
	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8	MP9	
LWA	60.00	33.00	0.00	11.00	18.00	0.00	0.00	0.00	4.00	126.00
Column%	32.09%	29.20%	0.00%	29.73%	10.17%	0.00%	0.00%	0.00%	2.26%	126.00
Line %	47.62%	26.19%	0.00%	8.73%	14.29%	0.00%	0.00%	0.00%	3.17%	126.00
CEA	27.00	21.00	4.00	5.00	47.00	3.00	0.00	14.00	13.00	134.00
Column %	14.44%	18.58%	80.00%	13.51%	26.55%	6.25%	0.00%	12.28%	7.34%	134.00
Line %	20.15%	15.67%	2.99%	3.73%	35.07%	2.24%	0.00%	10.45%	9.70%	134.00
RWA	64.00	34.00	0.00	6.00	13.00	1.00	0.00	3.00	0.00	121.00
Column %	34.22%	30.09%	0.00%	16.22%	7.34%	2.08%	0.00%	2.63%	0.00%	121.00
Line %	52.89%	28.10%	0.00%	4.96%	10.74%	0.83%	0.00%	2.48%	0.00%	121.00
REA	19.00	14.00	0.00	3.00	28.00	11.00	0.00	32.00	36.00	143.00
Column %	10.16%	12.39%	0.00%	8.11%	15.82%	22.92%	0.00%	28.07%	20.34%	143.00
Line %	13.29%	9.79%	0.00%	2.10%	19.58%	7.69%	0.00%	22.38%	25.17%	143.00
PVT	10.00	9.00	1.00	4.00	31.00	27.00	5.00	22.00	46.00	155.00
Column %	5.35%	7.96%	20.00%	10.81%	17.51%	56.25%	50.00%	19.30%	25.99%	155.00
Line %	6.45%	5.81%	0.65%	2.58%	20.00%	17.42%	3.23%	14.19%	29.68%	155.00
LEA	7.00	2.00	0.00	8.00	40.00	6.00	5.00	43.00	78.00	189.00
Column %	3.74%	1.77%	0.00%	21.62%	22.60%	12.50%	50.00%	37.72%	44.07%	189.00
Line %	3.70%	1.06%	0.00%	4.23%	21.16%	3.17%	2.65%	22.75%	41.27%	189.00
All groups	187	113	5	37	177	48	10	114	177	868.00

LWA – left wing attacker; RWA – right wing attacker; LEA – left external attacker; REA – right external attacker; CEA – central external attacker; PVT – pivot

TABLE 6
FREQUENCIES AND PROPORTIONS OF POSITIONS IN OFFENSE IN COMPARISON TO POSITONS OF DEFENSE

Positions in defense	Positions in offense						Overall Line
	LWA	RWA	CEA	REA	LEA	PVT	
LB	80.00	88.00	41.00	37.00	11.00	4.00	261.00
Column %	63.49%	72.73%	30.60%	25.87%	5.82%	2.58%	261.00
Line %	30.65%	33.72%	15.71%	14.18%	4.21%	1.53%	261.00
CF	13.00	2.00	22.00	1.00	13.00	26.00	77.00
Column %	10.32%	1.65%	16.42%	0.70%	6.88%	16.77%	77.00
Line %	16.88%	2.60%	28.57%	1.30%	16.88%	33.77%	77.00
RB	29.00	29.00	57.00	97.00	77.00	40.00	329.00
Column %	23.02%	23.97%	42.54%	67.83%	40.74%	25.81%	329.00
Line %	8.81%	8.81%	17.33%	29.48%	23.40%	12.16%	329.00
CB1	3.00	0.00	8.00	3.00	25.00	32.00	71.00
Column %	2.38%	0.00%	5.97%	2.10%	13.23%	20.65%	71.00
Line %	4.23%	0.00%	11.27%	4.23%	35.21%	45.07%	71.00
CB2	1.00	2.00	6.00	5.00	63.00	53.00	130.00
Column %	0.79%	1.65%	4.48%	3.50%	33.33%	34.19%	130.00
Line %	0.77%	1.54%	4.62%	3.85%	48.46%	40.77%	130.00
All groups	126	121	134	143	189	155	868.00

LWA – left wing attacker; RWA-right wing attacker, LEA – left external attacker; REA – right external attacker; CEA – central external attacker; PVT – pivot; LB – left back; RB – right back; CB1 – central back (playing alone in central position); CB2 – central back (playing on central position with another back); IB – center forward

and center forward (16.42%). Right back is played by taller and stronger players especially in deeper zone formations (i.e. 3:2:1) while left back is played by the bench players that the coach uses only for the offense since they are very important for the realization of the attack.

Right back external player is always right back player in defense phase (67.83%). This is a common thing since the morphological characteristics of right back are suitable for the position in defense. A certain number of REA play in the position of left back which is probably consequence of »saving energy« of players in less demanding position.

On the other hand, left back external player plays often in positions in defense. He plays right back (40.74%) and center back (46.56%) which is significantly higher percentage than the percentage of right back. The reason for this is that many players are right-handed in comparison to left-handed so left-handed players are to »save energy« in defense.

Pivot plays in the positions of center back (54.84%), right back (25.81%) and center forward (16.77%) due to his physical characteristics. Zone formations are not so wide (6:0 and 5:1) so the physical strength and morphological voluminosity of pivot players is important.

Table 7 shows that the morphological profiles are significantly different between players playing in positions in offense, defense and in the combination of offense and defense. This variation is due to the fact that each playing position is characterized by one or two morphological pro-

TABLE 7
NONPARAMATRIC χ^2-TEST OF POSITIONS IN DEFENSE, OFFENSE AND MORPHOLOGICAL PROFILES

Position	χ^2	df	p
Offense	480.55	40	0.00
Defense	414.53	32	0.00
Offense-defense	481.96	20	0.00

files while other profiles play insignificant role. The reason for this can be found in the following: the coach is obliged to put players in the playing position that they do not play normally (i.e. wing player is playing in the position of center external player), wrong selection of players (i.e. too short pivots or external players) and some players have abilities and knowledge which help them to compensate their morphological »flaws«.

Conclusion

This study represented useful information concerning the morphology of playing positions in professional men's handball. First of all, the study dealt with the differences between playing positions concerning basic morphological characteristics which are due to the selection based on roles and tasks that need to be carried out in each position. Moreover, morphological similarity of playing positions in offense and defense was noticed. It was determined that

wing players play dominantly in the position of left back, external players in the position of right and center back whereas pivots participate in the positions of center, back and center forward positions in defense.

In accordance to the scope of the study morphological profiles of playing positions in defense, offense and in the combination of these two phases of the game were determined. Identical positions on different sides in offense (left-right wing player, left-right back player) have shown that these positions are quite similar when it comes to morphological profile and playing position in defense. It can be concluded that some playing positions in offense are accompanied by the respective positions in defense. All positions are characterized by one or two morphological profiles.

Furthermore, it should be stated that the obtained results concerning the average number of morphological profiles are related to the population of professional men handball players and cannot be generalized since the basic morphological characteristics are greater than the characteristics of wider population or other athletes.

Future studies should elaborate the correlation of the situation efficiency and the obtained morphological profiles in the playing positions in defense and offense as well as standard morphological profiles with regard to success and results. Results from this study can serve as model to handball experts, scientists and professionals in the selection of players for playing positions in handball.

REFERENCES

1. ŠIBILA M, Oblikovanje in ovrednotenje informacijskega sistema za iskanje nadarjenih rokometašev in za spremljanje njihovega razvoja. [Design and evaluation information system for talented handball and follow their evolution]. PhD Thesis. In Slovenia (University of Ljubljana, Ljubljana, 2004). — 2. SKARBALIUS A, Monitoring Sport Performance in Handball. In: Proceedings (EHF, Vienna, 2011). — 3. ŠIBILA M, BON M, MOHORIČ U, PORI P, Differences in certain typical performance indicators at five consecutive Men's European Handball Chanpionships held in 2002, 2004, 2006, 2008 and 2010. In: Proceedings (EHF, Vienna, 2011). — 4. MANCHADO C, HOFFMANN E, VALDIVIELSO FN, PLATEN P, Dtsch Z Sportmed, 58 (2007) 368. — 5. FORETIĆ N, Modeli situacijske učinkovitosti u vrhunskom rukometu [Situational efficiency in elite handball]. PhD Thesis. In Croat (University of Split, Split, 2012). — 6. CHELLY MS, HERMASSI S, AOUADI R, KHALIFA R, VAN DEN TILLAAR R, CHAMARI K, SHEPHARD RJ, JSCR, 25 (2011) 2410. DOI: 10.1519/JSC.0b013e3182030e43. — 7. SRHOJ V, MARINOVIĆ M, ROGULJ N, Coll Antropol, 26 (2002) 219. — 8. SPORIŠ G, VULETA D, VULETA Djr, MILANOVIĆ D, Coll Antropol, 34 (2010) 1009. — 9. ČAVALA M, TRNINIĆ V, JAŠIĆ D, TOMLJANOVIĆ M, Coll Antropol, 37 (2013) 93. — 10. GROBBELAAR HW, MARYKE E, S AFR J RES SPORT PH, 33 (2011) 45. — 11. URBAN F, KANDRAC R, TABORSKY F. Position-Related Changes in Anthropometric Profiles of Top Male Handball Players: 1980 and 2010. In: Proceedings (EHF, Vienna. 2011). — 12. VILA H, MANCHADO C, ABRALDES A, ALCARAZ P, RODRÍGUEZ N, FERRAGUT C, Anthropometric Profile in Female Elite Handball Players by Playing Positions. In: Proceedings (EHF, Vienna, 2011). — 13. HERGEIRSSON, T, 8th Men's European Handball Championship – Qualitative trend analysis. In: Proceedings: (EHF Periodical Vienna, 2008). — 14. BON M, BRAČIČ M, ŠIBILA M, PORI P, Handball Team Staff Heart Rate Monitoring during Women's Champions League Match. In: Proceedings (EHF, Vienna, 2011). — 15. CHAOUACHI A, BRUGHELLI M, LEVIN G, BOUDHINA NBB, CRONIN J, CHAMARI K, J Sport SCI, 27 (2009) 151. DOI: 10.1080/02640410802448731 — 16. URBAN F, KANDRAC R, TABORSKY F, Position-Related Changes in Somatotypes of Top Level Male Handball Players: 1980 and 2010. In: Proceedings (EHF, Vienna, 2011). — 17. ČAVALA M, KATIĆ R, Coll Antropol, 34 (2010) 1355. — 18. ROGULJ N, FORETIĆ N, School handball – textbook. Scientific-sports society. (Grifon, Split, 2007). — 19. MALIĆ Z, Handball – view from the bench (Kustos, Zagreb, 1999). — 20. ZAPARTIDIS I, TOGANIDIS T, VARELTZIS I, CHRISTODOULIDIS T, KOROROS P, SKOUFAS D, Serb J Sports Sci, 3 (2009) 53. — 21. ROGULJ N, Učinkovitost taktičkih modela u rukometu [Efficiency of tactical model in handball]. PhD Thesis. In Croat (University of Zagreb, Zagreb, 2003). — 22. SRHOJ V, ROGULJ N, ZAGORAC N, KATIĆ R, Coll Antropol, 30 (2006) 601. — 23. GOROSTIAGA EM, GRANADOS C, IBÁÑEZ JY, IZQUIERDO M, Int J Sport Med, 26 (2005) 225. DOI: 10.1055/s-2004-820974. — 24. FORETIĆ N, ERCEG M, TOMLJANOVIĆ M, KRESPI M, Throwing velocity dependence on some anthropometrical characteristics and game position in junior team handball players. In Proceedings, (Faculty of Sport, Ljubljana, 2006). — 25. SRHOJ V, ROGULJ N, PAPIĆ V, FORETIĆ N, ČAVALA M, Coll Antropol, 36 (2012) 967. — 26. ŠIBILA M, PORI P, Coll Antropol, 33 (2009) 1079. — 27. MARQUES M, TILLAR R, VESCOVI J, GONZALEZ-BADILLO JJ, Int J Sports Phys Perform, 2 (2007) 414.

Marijana Čavala

University of Split, Faculty of Kinesiology, Teslina 6, 21000 Split, Croatia
e-mail: mcavala@kifst.hr

MORFOLOŠKI PROFILI IGRAČKIH POZICIJA OBRANE I NAPADA U VRHUNSKOM MUŠKOM RUKOMETU

SAŽETAK

Osnovni cilj ovog rada odnosi se na utvrđivanje morfoloških profila igračkih pozicija obrane, napada i kombinacije te dvije faze igre. Nadalje, pokušalo se utvrditi razlike između morfoloških profila na pojedinim igračkim pozicijama. Uzorak entiteta ovog istraživanja predstavlja 148 igrača koji su sudjelovali u 45 utakmica Svjetskog prvenstva za

rukometaše održanog u Hrvatskoj 2009. godine. Uočena je razlika između igračkih pozicija u osnovnim morfološkim karakteristikama koja je posljedica selekcije uvjetovane ulogama i zadaćama na pojedinoj poziciji. Također, može se zamijetiti morfološka sličnost pojedinih igračkih pozicija napada i pojedinih pozicija obrane. Pri tome je utvrđeno kako krilni igrači dominantno igraju na poziciji krajnjeg braniča, vanjski igrači na poziciji bočnog i središnjeg braniča, dok se kružni napadači ravnomjerno pojavljuju na središnjim, bočnim ali i isturenim obrambenim pozicijama plićih zonskih formacija. Utvrđeni su morfološki profili igračkih pozicija obrane, napada i kombinacije te dvije faze igre. Identične pozicije na različitim stranama napada (lijevi-desni krilni igrač, lijevi-desni bočni vanjski igrač) pokazale su u velikoj mjeri međusobnu sličnost kada je u pitanju morfološki profil i igračka pozicija obrane. Može se konstatirati da pojedine igračke pozicije napada imaju odgovarajuće pozicije obrane a kod svih dominira jedan ili dva morfološka profila.