POSITION-RELATED DIFFERENCES IN MORPHOLOGICAL CHARACTERISTICS OF U14 FEMALE HANDBALL PLAYERS

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Abstract:

The aim was to establish differences in morphological characteristics of 48 selected girls under 14 years (U14 or younger cadets) handball players (age 13.88±0.46 years) in the playing positions of wings, backs and pivots. The sample of variables embraced 24 morphological measures defining the already established four latent body dimensions. Univariate ANOVA revealed the significant global differences among the three groups of U14 players in 11 morphological measures. Between the backs and pivots no significant differences were established. The greatest differences between the pivots and wings were established in body height, leg length, arm length, ankle breadth, body weight and calf circumference ($p<.01$). The greatest differences between the wings and backs were established in four variables: body height, arm length, knee breadth and ankle breadth ($p<.01$). We endorse the interpretation that specificities of technical-tactical activities executed by backs and pivots in attack repose in the background of the established differences, that is, backs and pivots are exposed to more body contacts in attack in which they must overcome defenders' resistance. In the sample of the Croatian U14 female handballers apparently no somatotypic component prevailed. However, a slightly larger contribution of endomorph component was perceived in the pivots' body composition, which was in line with the general results of the entire age group. In U14 backs both the endomorph and mesomorph components were pronounced equally, whereas all the three components were of even values in the wings.

Key words: *handball, girls, U14, morphological characteristics, backs, wings, pivots*

Introduction

Body built of female handball players is an important prerequisite for their good performance, especially with regard to playing position-specific requirements (Vuleta, Milanović, & Sertić, 1999; Vuleta, Milanović, et al., 2009; Urban & Kandrač, 2013; Wagner, Finkenzeller, Würth, & von Duvillard, 2014; Zapartidis, et al., 2009). The positional differences in requirements have their origin in the position-specific technical-tactical activities that players execute while playing in the positions of either backcourt (B), wing (W), or line (P for pivot) players (Lidor & Ziv, 2011; Manchado, Hoffmann, Valdivielso, & Platen, 2007; Manchado, Tortosa, Vila, Ferragut, & Platen, 2013; Michalsik, Madsen, & Aagaard, 2014). Pronounced longitudinal dimensions, especially body height and large hands, are more important for backs than for wings, whereas a higher speed of movement and reaction is more important for wings (Rogulj, Srhoj, Nazor, Srhoj, Lj., & Čavala, 2005; Srhoj, 2002; Šibila & Pori, 2009). Due to their higher speed and specific playing jobs and tasks, wings do not frequently establish direct body contacts with the opposition while attacking, thus their body built need not be robust (lower values of body height, body mass and voluminosity) like the body built of pivots who constantly establish body contacts with the opponents while struggling for the front position, trying to get free for ball reception, setting screens, or taking a shot (Bojić-Ćaćić, Vuleta, Milanović, Barišić, & Jerak, 2018; Čavala & Katić, 2010; Moss, McWhannell, Michalsik, & Twist, 2015; Karcher & Buchheit, 2014; Karpan, Škof, Bon, & Šibila, 2015).

The greatest increase in body height occurs in girls at the age of 11 to 13 years. After the age of 14, the deccelerated growth phase commences in adolescents. Girls reach 98% of their final body height at the age of 16.5 years. Visible growth usually stops in young women about the age of 18 (Mišigoj-Duraković, 2008).

In the last two decades a number of research papers have studied morphological characteristics of adult women handball players (for example: Bon, et al., 2015; Čavala & Katić, 2010; Granados, Izquierdo, Ibanez, Bonnabau, & Gorostiaga, 2007;

Manchado, et al., 2013; Vila, et al., 2012), a few dealt with juniors (for example: Belka, Hulka, Safar, Weisseer, & Samcova, 2014; Moss, et al., 2015; Srhoj, 2002), but few have considered younger age groups (Grujić, 2016) and, especially, position-related differences among them.

Urban et al. (2011) established, in the sample of national teams' players, that the European cadet female handball players were on average 69.09 kg heavy and 173.50 cm tall. These values may be considered referent for the Croatian younger cadets. Milanese et al. (2011) investigated BMI of younger junior handball players and established the average BMI value of 23.35, indicating the pronounced ectomorph body constitution. Bon et al. (2015) established an average percentage of subcutaneous fatty tissue in the Slovenian junior handballers (20.03%), whereas Milanese et al. (2011) found fatty tissue values of even 28.5% in the Italian female handballers (aged 17-19 years). It would be interesting to compare these values with the values found in our sample of younger cadets. In several research studies (Bon, et al., 2015; Čavala, et al., 2013; Villa, et al., 2011) it has been established that circle runners or pivots are more robust, havier and have larger transversal body dimensions than the wing players Further, backcourt players are taller than their teammates in other playing positions, whereas the wings are smaller and lighter than their teammates.

From previous literature is obvious that favourable or desirable body composition of female handballers generally refers to the mesomorph component being predominant over the relatively balanced endomorph and ectomorph component, although values of all the three somatotype components do not exceed average values of the general Caucasain female population (Bayios, Bergeles, Apostolidis, Noutsos, & Koskolou, 2006; Bon, et al., 2015; Čavala, et al., 2013; Exposito, et al., 2011; Nogueira, Cunha Junior, Dantas, & Fernandes Filho, 2005; Urban, et al., 2013). Nevertheless, the body composition determination may be useful in talent identification and selection, as well as in training programme design, nutritional regime prescription and their evaluation (Mišigoj-Duraković, 2008).

The present study treats position-related differences in morphological characteristics of the Croatian selection of younger cadet handball players. The research aim was to establish both the extent and structure of position-specific differences in morphological characteristics among 48 selected girl handball players (U14) who played in the positions of wings (W), backs (B) and pivots (P). We hypothesized that global, general differences existed between the three groups (B, W, P) of U14 female handball players in their morphological characteristics indicating also the existence of particular differences between U14 pivots and backs, pivots and wings, and backs and wings. Further, we were interested whether there were position-related differences in their somatotypes as well.

Methods

Sample of subjects

The sample of participants consisted of 48 female handball players pertaining to the competition category of younger cadets or U14 (age 13.88±0.46 years). They were members of the Croatian handball clubs and had been selected beforehand by their club coaches and the national team coaches, as the promising young players, for the expanded U14 national team list so they participated in the preparation of the U14 national team. Position-specific subsamples embraced: 10 wings, 24 backs and 14 pivots who had, on average, four years of handball training and playing experience (Bojić-Ćaćić, 2018). Their parents provided signed informed consent forms for their children's participation in the national team preparation and in the morphology measurement and physical condition testing.

Sample of variables

Twenty-four morphological variables were chosen under the premise that the following four well-defined latent morphological dimensions existed: longitudinal dimensionality of skeleton, transversal dimensionality of skeleton, body volume and body mass, and subcutaneous fatty tissue (Katić, et al., 1994; Kurelić, et al., 1975; Mišigoj-Duraković, 2008). The variables were obtained by the measurements that respected procedures explained in Mišigoj-Duraković (2008) based on the International Biological Program and in conformity with the Helsinki Declaration. All but one morphological measures were taken once; thickness of skinfolds was obtained by three sequential measurements (Bojić-Ćaćić, 2018).

Four manifest measures represented the longitudinal dimensionality of skeleton: 1. body height, 2. leg length, 3. arm length, and 4. arm span. Transversal dimensionality of skeleton was assessed by six measures: 5. shoulder width, 6. knee diameter, 7. elbow diameter, 8. wrist diameter, 9. ankle diameter, and 10. hip width. Six measures were used to determine body volume and body mass: 11. body mass, 12. extended upperarm circumference, 13. flexed upperarm circumference, 14. forearm circumference, 15. thigh circumference, and 16. calf circumference. Subcutaneous fatty tissue was assessed by eight measures: 17. subscapular skinfold, 18. abdominal skinfold, 19. upperarm (triceps) skinfold, 20. thigh skinfold, 21. lowerleg skinfold, 22. abdominal skinfold (suprailiac), 23. axillary skinfold, and 24. chest skinfold.

Body mass index (BMI) and percentage of subcutaneous fatty tissue (%FT) were also consid-

ered to get a deeper insight into morphological characteristics of U14 girl handballers at the global level. Out of the obtained measures, their somatotypes were also established.

Data processing methods

Basic descriptive statistics of the variables – arithmetic mean and standard deviations – were computed.

Univariate analysis of variance (ANOVA) was used to test the set hypotheses, i.e., to establish the differences among the three groups of female U14 handballers playing in the positions of backs, wings and pivots in their morphological characteristics.

Data were processed by the software Statistica for Windows, ver. 7.0.

Results

The general basic descriptive statistical parameters of anthropometric variables of the Croatian female U14 handball players are presented in Table 1: age, body height, body mass, body mass index, and percentage of subcutaneous fatty tissue.

In Table 2 basic descriptive paramters are presented of the variables assessing morphological characteristics of the Croatian prospective female handballers (N=48) and the results of difference analysis among the three groups of players in different positions (pivots n=10, backs n=24, wings n=14).

Table 1. Descriptive parameters of basic anthropometric variables of the Croatian female U14 handball players (N=48)

Variables	Mean	SD
Age (years)	13.88	0.46
ALVT (cm)	165.50	6.49
AVTT (kg)	56.95	7.43
BMI (kg/m^2)	22.35	1.99
%FT	17.44	3.20

Note. ALVT – body height; AVTT – body mass; BMI – index of body mass; %FT – percentage of subcutaneous fatty tissue.

Table 2. Basic descriptive parameters and analysis of position-related differences among the Croatian U14 female handball players in the measures of their morphological characteristics

Younger cadets (U14)	Mean			Standard deviations (SD)			Total		PIVOTS vs. BACKS	PIVOTS vs. WINGS	WINGS vs. BACKS
	PIVOTS n=10	BACKS n=24	WINGS n=14	PIVOTS n=10	BACKS n=24	WINGS n=14	F	p	p	p	p
ALVT	170.06	166.44	160.65	5.83	6.56	3.14	8.83	.00	.24	.00	.01
ALDN	97.45	95.34	92.14	3.25	4.28	3.08	6.19	.00	.34	.01	.05
ALDR	72.84	71.91	69.03	2.42	2.54	2.26	8.84	.00	.60	.00	.00
ALRR	167.23	164.75	159.34	5.70	6.70	6.16	5.16	.01	.59	.02	.05
ATSR	38.28	37.30	36.79	1.38	2.20	3.06	1.17	.32	.55	.32	.81
ATDK	9.22	9.21	8.77	0.39	0.42	0.26	6.84	.00	1.00	.02	.00
ATDL	6.54	6.36	6.21	0.35	0.33	0.28	3.15	.05	.33	.05	.38
ATDRZ	5.30	5.23	5.13	0.28	0.24	0.21	1.58	.22	.71	.23	.49
ATDSZ	7.19	7.10	6.76	0.20	0.27	0.31	9.64	.00	.65	.00	.00
ATSZ	28.55	27.93	27.34	0.90	1.67	3.46	0.85	.43	.76	.44	.74
AVTT	62.02	57.94	51.63	6.02	7.30	5.31	7.95	.00	.26	.00	.02
AVONADE	25.35	25.02	23.91	1.81	1.88	2.06	2.07	.14	.90	.20	.24
AVONADF	27.20	26.65	25.47	1.82	1.83	2.03	2.80	.07	.74	.10	.19
AVOPOD	23.45	23.28	22.50	0.92	1.22	1.18	2.62	.08	.92	.15	.15
AVONAT	54.64	52.88	50.66	2.74	4.16	3.75	3.34	.04	.47	.05	.23
AVOPOT	35.64	34.47	33.22	1.67	1.90	1.97	4.93	.01	.26	.01	.16
ANL	10.07	10.04	8.90	1.54	3.03	2.56	0.92	.41	1.00	.58	.45
ANT	17.79	17.59	16.20	3.58	4.94	3.99	0.54	.59	.99	.69	.65
ANNAD	14.94	13.15	12.25	2.85	2.92	2.81	2.58	0.09	.27	.09	.65
ANNAT	23.10	19.17	18.17	4.08	5.11	3.67	3.78	.03	.08	.04	.81
ANPOT	14.73	12.47	12.35	3.12	3.26	2.74	2.20	.12	.16	.19	.99
ANSIL	12.91	11.45	10.66	2.94	3.78	3.73	1.14	.33	.57	.33	.81
ANAKS	10.52	9.31	8.92	2.25	2.45	2.14	1.47	.24	.39	.26	.89
ANP	16.42	14.96	15.10	2.92	4.11	3.65	0.56	.57	.59	.70	.99

Note: ALVT – body height; ALDN – leg length; ALDR – arm length. ALVT – body height. ALDN – leg length. ALRR – arm span. ATSR – shoulder width. ATDK – knee diameter. ATDL – elbow diameter. ATDRZ – wrist diameter. ATDSZ – ankle diameter. ATSZ – hip width. AVTT – body mass. AVONADE – extended upperarm circumference. AVONADF – flexed and contracted upperarm circumference. AVOPOD – forearm circumference. AVONAT – thigh circumference. AVOPOT – calf circumference. ANL – subscapular skinfold. ANT – abdominal skinfold. ANNAD – triceps skinfold. ANNAT – thigh skinfold. ANPOT – lowerleg skinfold. ANSIL – suprailiac skinfold. ANAKS – midaxillary skinfold. ANP – chest skinfold.

By means of ANOVA, the significant global position-related differences were established in a total of 11 morphological variables: body height ($p<.01$), leg length ($p<.01$), arm length ($p<.01$), arm span ($p<.01$), knee diameter ($p<.01$), elbow diameter ($p<.05$), ankle diameter ($p<.01$), body mass ($p<.01$), thigh circumference ($p<.05$), calf circumference ($p<.01$), and thigh skinfold ($p<.05$).

As regards pair-wise differences, no statistically significant differences were established between the backs and pivots in any of the morphological variables of U14 female handballers. The significant differences between the wings and backs were established in the following variables: at the level of $p<.01$ in body height, leg length, arm length and arm span, and at $p<.05$ in leg length and arm span. More significant differences were established between the wings and pivots: at the level of $p<.01$ in body height, leg length, arm length, and arm span, ankle diameter, body weight, calf circumference, and at $p<.05$ in arm span, knee and elbow diameters, thigh circumference and thigh skinfold.

Table 3. Basic descriptive parameters of somatotypic characteristics of the Croatian female U14 handball players

Younger cadets	Mean			Standard deviation			Total		P-B	P-W	W-B
	P=10	B=24	W=14	P=10	B=24	W=14	F	p	p	p	p
END	3.735	3.461	3.298	0.579	0.849	0.874	0.854	.432	.669	.434	.837
MES	3.360	3.493	3.466	0.876	0.769	0.778	0.099	.906	.907	.950	.995
ECT	2.910	2.997	3.064	0.898	1.122	1.073	0.061	.941	.976	.941	.983

Note. B – backcourt player; P – pivot or circle runner; W – wing or winger; END – endomorph component; MES – mesomorph component; ECT – ectomorph component

In Table 3 descriptive parameters and analysis of the differences in the variables defining body type of the Croatian female U14 handball players (N=48) playing in different attack positions (pivots n=10, backs n=24, wings n=14). No significant difference was found among the U14 wings, pivots, or backs in the investigated sample of the Croatian handballers.

Discussion and conclusions

In the current study, the U14 girl handballers were 165.50±6.49 cm tall. Urban et al. (2011) established in their research on the cadet participants (U16) of the 2011 ECh that they were 173.50 cm tall, meaning they were by 8 cm higher on average than the Croatian girls.

Since girls on average reach 98% of their final body height at the age of 16.5 years (Mišigoj-Duraković, 2008) and their obvious growth is concluded abot the age of 19 years, it is feasible to say that our participants would have enough time to catch up with the cadets' average values of body height (Urban, et al., 2011).

Average body mass in our sample was 56.95±7.43 kg. The European female cadets (U16), with their average body mass of 69.09 kg (Urban, et al., 2011), were by 12.14 kg heavier than the Croatian younger cadets. However, the latter have enough time to reduce the difference during the next two years, up to their cadet age, by their growth and development of active muscle mass.

BMI of the U14 girls was 22.35 kg/m^2, which was in line with the findings by Milanese et al. (2011) who obtained the BMI value of 23.3±4.01 kg/m^2 with the sample of junior female handball players aged 17-19 years.

Percentage of subcutaneous fatty tissue of our handballers was 17.44%, which was considerably lower than the values established by Bon et al. (2015) in the Slovenian juniors (20.03%); the finding was expected due to age differences between the two samples. It is interesting to mention that the Italian female handball players 17-19 years of age (Milanese, et al., 2011) have a considerably higher percentage of subcutaneous fatty tissue (28.5±4.01%).

Global position-related differences among the Croatian U14 girl handballers

There were numerical position-related differences (Table 2) in numerous variables obtained in the sample of the Croatian U14 handballers. By means of ANOVA, the significant global position-related differences were established in a total of 11 morphological variables: body height ($p<.01$), leg length ($p<.01$), arm length ($p<.01$), arm span ($p<.01$), knee diameter ($p<.01$), elbow diameter ($p<.05$), ankle diameter ($p<.01$), body mass ($p<.01$), thigh circumference ($p<.05$), calf circumference ($p<.01$), and thigh skinfold ($p<.05$).

The greatest differences among the three position groups of girls were established in the following variables: ankle diameter ($F=9.64$), arm length ($F=8.84$), body height ($F=8.83$) and body mass ($F=7.95$), meaning that the measures assessing

body built (body height and body mass) had the greatest contribution to the global differences. The results corroborated the first assumption saying that younger cadet backs, pivots and wings can be significantly differentiated by their morphological characteristics even in age group under 14 years.

Differences between particular playing positions

Pivots vs. backs. No statistically significant differences were established between backs and pivots in any of the morphological variables of U14 women handballers. The finding was expected since, at the age under 14 years, the final selection and specialisation for a particular playing position had not been completed yet; the said is especially valid for backs and pivots (Bojić-Ćaćić, 2018; Čavala, Trninić, Jakšić, & Tomljanović, 2013; Srhoj, 2002).

Namely, our U14 girl handballers, being in the intensive stage of growth and maturation, are still in the predominant phase of physical growth and development, which is to be finished about their sixteenth year, therefore their coaches, as expected, have not conducted early position specialisation yet. So, most backs play also in the position of pivots to promote their versatility, the feature so important in contemporary handball. Moreover, many elite pivots played in the positions of backs in the beginning of their careers.

In our sample, pivots and backs were, on average, 170.06 cm and 166.44 cm tall, respectively; these measures of longitudinal skeletal dimensionality make apparent that the phase of physical growth and development has not been finished yet. Coaches should be extremely careful when conducting early selection and position directing; they must respect morphological characteristics of their players to enable their further sport development, but with clear image of handball position-specific tasks in mind (Bon, et al., 2015).

Pivots vs. wings. The greatest differences between pivots and wings, as expected, were established in the four variables defining longitudinal body dimensionality of U14 girl handballers: body height, leg length, arm length, and arm span. The differences were expected due to a common coaching practice of directing smaller players to the wing positions. Wings are required to execute many sprints over and over again, to jump explosively and, because they have to run over the longest course during transitions in the game, they must have a high level of aerobic and speed endurance; all these differ their playing position from the positions of backs and pivots (Čavala, et al., 2013).

Vila et al. (2011) determined that the Spanish handball wing players were lighter (lower values of body mass) and smaller (lower values of body height) than the players in the positions of backs and pivots. Extremely tall pivots predominate in contemporary elite handball game, who can perform at their maximum both in attack and defence. Therefore, during the process of early sports selection, tall and strong girls, the ones that can meet the requirements of contemporary elite handball game, should be directed to the position of circle runners or pivots.

In three variables of transversal skeletal dimensionality: knee diameter, elbow diameter and ankle diameter, the statistically significant differences were established between U14 pivots and backs. As have been said before in the part on the analysis of longitudinal characteristics, the differences are expected in the early stages of sport selection since they emerge from the specific technical-tactical activities of pivots who must confront defenders and overcome their resistance via direct physical body contacts. Namely, pivots are in a constant struggle with the opposing defenders for the front position, i.e., for the positions most favourable for ball reception, and for shot taking, meaning they must sustain constant fierce body contacts with the defenders.

Out of six variables defining body voluminosity, in three the significant differences were established between pivots and wings: body mass, thigh circumference and calf circumference. The wing players differ from Ps and Bs in most values of morphological variables since they have significantly lower values of body mass and they are smaller (Bon, et al., 2015). The differences are expected since pivots are superior in longitudinal variables and they occupy specific playing position within the opposing defence. On the other hand, wings experience far fewer body contacts in attack, whereas in defence they usually have less physically demanding defensive jobs and tasks (they usually play in the position of the end, outside defenders).

As regards subcutaneous fatty tissue, only one significant difference was established (Table 2) in the variable thigh skinfol.

In the present study, as well as in some other studies (Bon, et al., 2015; Čavala, 2013; Vila, et al., 2011) it has been determined that pivots are more robust, taller and heavier with higher values of transversal body measures than wings. On the other hand, wings' anthropological characteristics differentiate them significantly from all players in other positions (backs, pivots).

Wings vs. backs. As expected, the greatest differences between the younger cadet wings and backs were established in the variables of longitudinal skeletal dimensions, more precisely, in four of them: body height, leg length, arm length and arm span, at the significance level of $p<.01$, whereas the differences in leg length and arm span were established at the significance level of $p<.05$. The

listed differences were expected since, as it has already been explained in the part on the differences between the pivots and wings, handball coaches in practice of training direct players of a smaller body built to wing positions to enhance their prospectives. Tall backcourt players are predominant in contemporary handball, especially in the positions of right and left back. Therefore, tall and muscular girls are directed to the positions of backcourt players in the early sport selection, the ones that can meet all the requirements of playing handball at the international top-level. Recently, backs specialise for a single backcourt position (the right, centre, or left back) rather late in their careers; instead, they develop their technical-tactical skills in all three positions and only after their physical growth and development has finished, they commence their increasing specialisation. So, the obtained differences in morphology were expected and favourable – taller backs are apt to execute jump shots over the defence wall, i.e., over the defensive block (Čavala, et al., 2013), whereas lower wings can meet position-specific requirements of theirs (execution of various feints, dive-in jump shots and dive landings). As can be seen from the arithmetic means, backs had a higher average body height of 166.44 cm, whereas wings averaged in height only 160.65 cm.

Backcourt shooters take their shots mainly from jumps to overcome a high defence wall consisting, especially in the middle of defence, of tall defenders with a rather big arm span and good block-shot-play, therefore, body height (coupled with leg power/explosive strength of a jumping type; Bojić-Ćaćić, 2018) plays a very important role.

The statistically significant differences were established in two variables defining transversal skeletal dimensionality: knee diameter and ankle diameter. Out of six variables defining body voluminosity, only in one variable – body mass, the significant difference was established between the wing and back players, which is compatible to the difference in body height.

No significant differences were established between wings and backs in the variables assessing subcutaneous fatty tissue (skinfolds) (Table 2). So, backs are taller and have more muscular mass than wings; the finding is in accord with the specifities of technical-tactical activities of backs in attack. When taking long-range shots on goal over defenders or breaking through the defensive wall, backs must directly overcome resistance of defenders, which game requirements justify their more robust built. It is important to single out non-existence of any significant difference between wings and backs in the amount of subcutaneous fatty tissue. Namely, any amount of a ballast body mass may interfere with efficient performance of technical-tactical elements in the game.

Differences in somatotypes

In the sample of the Croatian U14 girl handballers apparently no somatotypic component prevailed (Table 3), therefore no significant difference was found among the U14 wings, pivots, or backs. However, a slightly larger contribution of endomorph component was perceived in the pivots' body composition, which was in line with the general results of the entire age group. In U14 backs both the endomorph and mesomorph component were pronounced equally, whereas all the three components were of even values in the wings. The endomorph component differed mostly among the three position-related groups of girls, although those differences had not reached the level of statistical significance, whereas the other two components demonstrated similar values (Table 3). The lack of significant differences in somatotypes of the U14 players among the three positions is in accord with the laws of growth and development of girls (Mišigoj-Duraković, 2008). Namely, the greatest increase in height in girls is common at the age period 11-13 years, after which, about the age of 14 years, the stage of slowlier adolescent growth commences. Teenage girls reach 98% of their adult height at the age of 16.5 years on average and their noticeable growth usually stops around 18 years of age in women (Mišigoj-Duraković, 2008). Also, the greatest increase in weight in girls occurs before the onset of the adolescent growth spurt (8-13 years). During that period, the girls' body mass increase may be up to 2.5 kg a year. Hence, U14 girl handballers are, somatotype-wise, in an erratic period of growth and maturation; data might have been quite different after six or tvelwe monts. Nevertheless, although the information reflects only the current state of players' body built, that information may still be very useful to coaches working with the respective handball population as a monitoring framework for morphological characteristics of teenage girls. Namely, during adolescence, the expression of the mesomorph component is somewhat reduced in girls, whereas the endomorph component is being encreased due to the increments of fatty tissue and its sex-specific distribution at that age (Mišigoj-Duraković 2008).

The aim of the research was to establish the differences in morphological characteristics of 48 selected female younger-cadet handball players playing in the positions of wings, backs, and pivots. Statistically significant differences among the three groups were established in 11 morphological measures. Between the groups of backs and pivots no significant differences were established in any of the morphological characteristics. The significant differences between the U14 pivots and wings occurred in four variables of skeletal longitudinal dimension as well as in three variables of skeletal transversality.

As expected, the greatest differences between the back and wing younger cadet players occurred in four variables assessing longitudinal body dimensionality, in two variables of skeleton transversality, and in only one variable of body mass and voluminosity – body mass. Subcutaneous fatty tissue variables (skinfolds) did not significantly differentiate between the backs and wings.

Even at the age under 14 years, backs and pivots are taller and heavier and have a greater amount of muscular mass than wings, which is in accord with specifities of the game. Namely, backs are expected to shoot over the defenders, but also to break through the defence wall towards the goal, whereas pivots have to directly overcome resistance of defenders, therefore their more robust body built is justified. It is commendable that no differences were found among the three groups of handballers in the variables assessing the amount of subcutaneous fatty tissue since even the smallest amount of faty tissue, being the ballast mass, may hinder performance and effective execution of technical-tactical elements in the game. The findings corroborated the presumption on the existence of statistically significant differences among the back, wing and line players in morphological characteristics at the age under 14 years.

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