# 2011 EHF Women's 19 European Handball Championship 4<sup>th</sup> – 14<sup>th</sup> August 2011 in Netherlands

# ANTHROPOMETRIC PARAMETERS AND SOMATOTYPES OF PLAYERS (Analysis)

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### REFERENCES

HEATH, B. H., CARTER, J. E. L. 1967. A modified somatotype method. In *Amer. J. Phys. Anthrop.*, 1967, Vol. 27, No. 1, pp. 57-74. ISSN 0002-9483.

PAŘÍZKOVÁ, J. 1962. *Rozvoj aktivní hmoty a tuku u dětí a mládeže*. Praha: Státní zdravotnické nakladatelství, 1962. 134 p.

RIEGEROVÁ, J., PŘIDALOVÁ, M., ULBRICHOVÁ, M. 2006. *Aplikace fyzické antropologie v tělesné výchově a sportu (příručka funkční antropologie)*. Olomouc: HANEX. 2006, 262 p. ISBN 80-85783-52-5.

#### **METHODS**

The purpose of the cross-sectional research was to determine the anthropometric profile and somatotypes of players on the national teams and examine the differences between individual national teams.

The research sample consisted of 207 players of 13 national teams (except Norway, Sweden and Austria), which participated in the 2011 EHF Women's 19 European Handball Championship in Netherlands.

The percent subcutaneous fat was determined using the method by Pařízková (1962), which is based on the measurements of 10 skinfolds (calliper BEST) on the following body landmarks: face, chin, chest I, chest II, triceps, subscapular, abdominal, supraspinal, thigh and calf.

The percent subcutaneous fat was calculated using the table for percent subcutaneous fat devised by Riegerova, Pridalova, Ulbrichova (2006). The table presents values based on the sum of 10 skinfolds. The somatotypes were determined using the modified Heath, Carter (1967) method, which is based on 3-number rating for individual somatotype components. The data required for somatotype determination were processed using the program SOMATO.

The collected data were processes using the basic statistical characteristics: x - arithmetic mean, s - standard deviation, min – minimal value (blue-color numbers) and max – maximal value (red-color numbers).

#### RESULTS

**Body height:** the body height average of the players participating in the championship equaled  $174.98 \pm 5.89 \text{ cm}$ . The average value of body height of the All-star team players was lower:  $172.75 \pm 1.80 \text{ cm}$  (170.0 - 175.5 cm). The greatest difference in body height: 5.3 cm was found between Spanish players  $172.5 \pm 6.73$  cm and Polish players  $177.8 \pm 5.65$  cm (see Table 2). Body height over 185.0 cm was recorded in 11 players.

Playing			Body			Body
position	Team	Name	height	Team	Name	height
Goalkeeper	RUS	Mikhayluta I.	186.0	Ne se	Esteban D. M.	168.5
	Mer Pol	Maczka M.				
Wing	<b>HEN</b>	Bjerregaard M.	183.0	🜌 ESP	Falcon G. M.	159.0
	📕 RUS	Petrova E.				
<b>Center Back</b>	Mer Pol	Wasiak A.	183.5	Ne se	Alvarez R. T.	161.5
				Ne se	Garcia Toro L.	
Back	💳 HUN	Planeta S	196.0	ROU 🚺	Florea S.	172.0
				FRA 🛃	Priou S.	
Pivot	FRA FRA	Bouchard C.	186.5	ned 🜌	Van der Mast S.	166.0

Tab. 1	Players	with ]	highest	and lowest	bodv	height	values	- ECh	W19	NED	2011
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Arm span (D-D): average value of arm span equaled  $175.43 \pm 7.05 \text{ cm}$ . The greatest difference on the measure of arm span: 7.1 cm was observed between Dutch players (170.7  $\pm 8.10 \text{ cm}$ ) and their Romanian counterparts (177.8  $\pm 6.13 \text{ cm}$ ). It is interesting to note that average values of arm span in the teams of ROU, FRA, DEN and POL were almost identical ranging from 177.3 to 177.8 cm. The highest difference between body height and arm span was found in French players: 3.9 cm. Negative difference between body height and arm span was recorded in Polish players: - 0.5 cm.

There were negative differences between body height and arm span in teams of RUS, POL, HUN and UKR (9th to 16th place). In teams that placed from the 1st to 8th place, negative difference was found in the Dutch team only: - 1.9 cm. The average value of arm span of the All-star players equaled  $172.83 \pm 3.56$  cm (166.5 - 177.5 cm) and the difference equaled 0.08 cm. The greatest difference between body height and arm span: 15.5 cm was found in FRA players, when the French players demonstrated the arm span of 181.5 cm with body height equaling 166.0 cm.

	Body			Body	SOMATOTYPE		YPE	
Ranking	height	D-D	Diff.	mass	Endo	Meso	Ecto	Categorization
1. 🗾 DEN	177.3	177.6	0.3	75.4	2.4	4.4	1.9	balanced mesomorph
2. 🌌 NED	172.6	170.7	- 1.9	68.3	2.3	4.3	2.0	balanced mesomorph
3. 🌌 AUT	—	—	Ι	—				1
4.   SRB	174.0	174.9	0.9	71.2	2.5	4.5	2.0	endomorphic mesomorph
5. 🎏 SWE	—	—	Ι	—				1
6. 🛃 ROU	176.5	177.8	1.3	72.2	2.0	4.1	2.2	balanced mesomorph
7. 🌌 CRO	175.6	176.2	0.6	73.2	2.3	4.4	2.0	balanced mesomorph
8. 🌌 ESP	172.5	173.6	1.1	71.9	2.5	4.5	2.0	endomorphic mesomorph
Average 1-8	174.73	175.14	0.41	72.04	2.34	4.35	2.04	
9. 롣 RUS	176.2	175.6	- 0.6	70.4	2.2	3.9	2.5	balanced mesomorph
10. 🌌 FRA	173.8	177.7	3.9	69.6	2.1	4.1	2.2	balanced mesomorph
11. 🌌 GER	174.6	175.2	0.6	71.8	2.0	4.5	2.0	balanced mesomorph
12. 🎏 NOR	_	_	Ι	_				-
13. 🚧 POL	177.8	177.3	- 0.5	72.9	2.1	4.0	2.4	balanced mesomorph
14. 🌌 HUN	177.1	175.3	- 1.8	72.2	2.1	3.7	2.4	balanced mesomorph
15. 🚞 SLO	173.3	174.5	1.2	70.4	2.2	4.3	2.0	balanced mesomorph
16. UKR	173.7	174.1	- 0.4	66.8	2.0	3.6	2.6	ectomorphic mesomorph
Average 9-16	175.20	175.69	0.49	70.58	2.10	4.01	2.32	
<b>Total average</b>	174.98	175.43	0.45	71.26	2.20	4.17	2.19	balanced mesomorph

Tab. 2 Teams' somatic parameters

Legend: D-D – arm span; Diff. – difference between body height and arm span (D-D); Endo – endomorphy; Meso – mesomorphy; Ecto – ectomorphy;

**Body mass:** average body mass equaled 71.26  $\pm 8.02 \ kg$ . The greatest difference on the measure of body mass: 8.6 kg was found between the European champions: 75.4  $\pm 5.57$  kg and Ukrainian players: 66.8  $\pm 8.68$  kg, who finished last in overall standings. An interesting finding was that the Dutch team, whose body mass average equaled 71.0 kg, finished in the 1st to 8th place group. Four teams: UKR, FRA, RUS, SLO that finished from 9th to 16th place demonstrated lower body mass average than Netherlands (see Table 2). The body mass average of the All-star team players equaled 70.10  $\pm 4.61 \ kg$  (63.6 - 75.8 kg).

**Percent subcutaneous fat:** average value of percent subcutaneous fat in championship players was  $11.35 \pm 3.95$  %. The greatest volume of subcutaneous fat 12.93 % was found in SRB players and the lowest volume was recorded in POL players: 10.04 %. The average value of percent fat in All-star team players equaled  $9.78 \pm 3.90$  % and ranged from 6.6 - 18.2 %. The lowest amount of fat was found in a wing player: 2.6 % and the largest amount of fat was recorded in a goalkeeper: 26.0 %.

**Somatotype:** the average value of endomorphic component equaled 2.20  $\pm 0.84$ . GER players were found to have the lowest endomorphy value: 1.9 (the only value less than 2.0). The highest value in endomorphy was observed in SRB players: 2.5. The total average value in mesomorphy equaled 4.17  $\pm 1.09$  and the average values of the teams ranged from 3.6 (UKR) to 4.5 (GER and SRB). The total average of ectomorphy was 2.19  $\pm 0.9$ . The highest value of ectomorphy: 2.6 was found in UKR players.



Fig. 1

### Average Somatotypes of National Teams Participating in 2011 ECh W19 NED

#### CONCLUSIONS

- the highest value of body height was 196.5 cm and the lowest value equaled 159.0 cm;

- the ratio of arm span and body height was highest in FRA players and equaled 3.9 cm. The values of the remaining teams ranged from -1.9 cm to +1.3 cm;

- teams that finished in the 1st to 8th place (except ROU) shared relatively higher values of endomorphy: 2.3 - 2.5 and mesomorphy: 4.3 - 4.5, lower values of ectomorphy: 1.9 - 2.0, which was indicative of *relatively less linear physique with higher values of body mass and percent subcutaneous fat, broader skeleton and well-developed musculature*;

- the teams that finished in the 9th to 16th place demonstrated relatively lower value of endomorphy: 2.0 - 2.2 (GER and SLO), lower value of mesomorphy: 3.6 - 4.1 and higher ectomorphy: 2.2 - 2.6 – relatively linear physique with longer body segments, lower values of body mass and percent subcutaneous fat and relatively lower voluminosity regarding musculature;

- relatively low values of body mass, percent subcutaneous fat and somatotype components are indicative of good physical preparedness, which results from the contemporary character of fast and dynamic handball;

- the placements of the teams with regard to the somatotype categorization were as follows:

- balanced mesomorph: 10 teams - CRO, DEN, FRA, GER, HUN, NED, POL, ROM, RUS and SLO

- endomorhic mesomorph: 2 teams – ESP and SRB

*ectomorphic mesomorph*: 1 team - UKR
Overall, the players of the U19 age category were classified as *balanced mesomorphs*.