

## THE EFFECT OF SPORT-SPECIFIC ABILITIES ON THE SOMATIC CHARACTERS AND CONDITIONAL ABILITIES OF YOUNG PEOPLE

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*Abstract: In this presentation we studied two ballgames: Volleyball and handball, asking what differences can be defined between the structure and condition of the two game's athletes. The significant differences between two sports were indetical for boys and girls. From the 7 tests made, volleyball players showed better performance in 4 tests.*

*Key words: Sport-specific abilities; Volleyball players; Handball players.*

### Introduction and Questions

It is difficult to answer the question whether successful athletes were born with talent, or they become stars because of their years of hard work.

During the selection process athletes must comply with special requirements for specific sports, but also athletes can adapt additional sport-specific characteristics, and become suitable. In the first case the key to success is "lucky" sport-specific selection, in the second case the key to success is special adaptation to high level physical and psychological loading (Mészáros 1990).

Knowing the rule governing the connection between structure and functional adaptation, as structure influences adaptation; it is understandable that adaptation will change the basic structure, as is shown in the following illustration:

structure → functional adaptation → structure \*

(The star \* means the structure altered by time.)

In this presentation we studied two ballgames: *volleyball* and *handball*. Both of them are teamgames and performance is a project of a team. Even so, there are major differences in the profiles performance. The most important differences and the consequence of these differences are presented in Table 1.

1. What kind of structural differences can be found between the two games' athletes, after many years of practice?
2. What similarities and differences can be found in the somatic characters and conditional abilities of boys and girls?

### Methods

Throughout the study the following data was collected on all participants' regularly:

*Anthropometry:* Height (cm), body mass (kg), chest circumference in rest (cm), upper arm circumference flexed (cm), upper arm circumference extended (cm), forearm circumference (cm), thigh circumference (cm), leg circumference (cm).

Table 1. Comparison of sport-specific characters

Areas of comparison	Handball		Volleyball	
	Consequence	Manifestation	Consequence	Manifestation
Dribble	well developed forearm	grip	a lot of practice fast decision	momentary
Time of ball-holding	wide variations during offence	almost unlimited	ball-touch is limited	0.08–0.1 s; limited
Target areas	changing, depends on the goalkeeper	vertical 2x3 m goal	changing, depends on the rival	horizontal 9x9 m; other half of court
Dominant movements	endurance & speed are expected	horizontal	explosive strenght is expected	vertical
Effective play area	short distance running	theoretically the full court, 54.2 m <sup>2</sup>	fast, frequent jumps and dives	own part of the court, 13.5 m <sup>2</sup>
Scoring	ball-holding is permitted	goal-difference tie is possible	each touch is sanctioned	difference of points and sets; no tie
Game-time	loading-time can be planned	half-time	special endurance	time is unlimited

*Conditional tests:* 30 m running (s), Cooper test (m), jump from both feet (cm), throwing medicine-ball (3 kg) forward (m), throwing medicine-ball (3 kg) backward (m), trunk bending forward (cm).

The anthropometric investigations were carried out according to Martin–Saller's (1957) methods. During the conditional tests Nádori et al. (1984), Rigler et al. (1979) methods were used.

*Distribution of young people* according to age and discipline are presented in Table 2. Girls and boys, age 11–18, had physical education class and 2x45 minutes balltraining weekly. Thus participants in this program had approximately 135–140 hours of training during the school year, plus weekend matches. The comparison was made with transverse method between boys aged 11–18 and girls 12–17 (Rigler 1990, 1993; Rigler & Derzsy 1994).

Table 2. Sample investigated

Age (year)	Handball		Volleyball		Together		Σ
	Female	Male	Female	Male	Female	Male	
12	204	75	40	5	244	80	324
13	200	104	68	27	268	131	399
14	239	174	220	157	459	331	790
15	238	97	128	65	366	162	528
16	205	192	58	49	263	241	504
17	109	107	18	15	127	122	249
18	71	23	–	4	71	27	98
Total	1316	870	532	324	1848	1194	3042

## Results

The statistical analysis of the yearly changes of the characteristics' means indicates significant differences, as shown in Tables 3 and 4.

*Table 3.* Comparison of averages in volleyball and handball players girls

Characteristics	Age (year)					
	12	13	14	15	16	17
Height (cm)	V	V	V	V	V	
Body mass (kg)	V	V				
Chest circumference (cm)	H	H	H	H	H	H
Upperarm circumference flexed (cm)						
Upperarm circumference extended (cm)			H	H	H	H
Forearm circumference (cm)				H	H	H
Tigh circumference (cm)	V	V	V	V	V	
Leg circumference (cm)			H			
30 m running (s)	H	H	H	H	H	H
Cooper-test (m)		H	H	H	H	H
Jump from both feet		V	V		V	
Medicineball throw forward (m)		H	H		H	H
Medicineball throw backward (m)	H	H	H	H	H	H
Trunk bending forward (m)	V	V	V	V	V	V

V = Volleyball players result are better or higher

H = Handball players result are better or higher

Volleyball players heights are higher for girls and 17 year old boys. 12-13 year old girls weigh more, however, 16 year old boy handball players will weigh more. Chest circumference is larger for handball players of both sexes. Upperarm (flexed and extend) and forearm circumference is larger for handball players of both sexes. Thigh circumference is larger for volleyball players, because they frequently jump from both legs. The leg circumference shows no significant difference between the two sports. 30 m sprints are faster for handball players, due to the importance of short sprints in their game. Cooper-test performance above age 13 is better among handball players, indicating increased aerob endurance. Volleyball players of both sexes displayed increased proficiency in jumping from both legs. Handball players of both sexes displayed increased proficiency in medicineball throwing, especially forward. Volleyball players of both sexes displayed improved truckular flexibility, due to the frequent rolls and dives.

Table 4. Comparison of somatic and motor characteristics in male and female volleyball and handball players

Characteristics	Handball players (n=2186) Female (F) – Male (M)								Volleyball players (n=856) Female (F) – Male (M)					
	11. (n) 148	12. (n) 279	13. (n) 304	14. (n) 413	15. (n) 335	16. (n) 397	17. (n) 216	18. (n) 94	12. (n) 45	13. (n) 95	14. (n) 377	15. (n) 193	16. (n) 107	17. (n) 33
Height (cm)		F		M	M	M	M	M	F		M	M	M	M
Body mass (kg)		F		M	M	M	M	M			M	M	M	M
Chest circumference (cm)		F	F	F	M	M	M	M			M	M	M	M
Upperarm circumference flexed (cm)		F		M	M	M	M	M			M	M	M	M
Upperarm circumference extended (cm)				M	M	M	M	M					M	M
Forearm circumference (cm)	M			M	M	M	M	M			M	M	M	M
Tigh circumference (cm)	F	F	F	F	F	F			F	F	F	F	F	
Leg circumference (cm)		F	F			M	M	M						M
30 m running (s)			M	M	M	M	M	M			M	M	M	M
Cooper-test (m)	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Jump from both feet		F		M	M	M	M	M			M	M	M	M
Medicineball throw forward (m)	M			M	M	M	M	M	M	M	M	M	M	M
Medicineball throw backward (m)				M	M	M	M	M	M	M	M	M	M	M
Trunk bending forward (m)	F	F	F	F	F	F	F	F	F	F	F	F	F	F

F = The girls' values are significantly bigger or better.

M = The boys' values are significantly bigger or better.

At the ages of 11 (n=2) and 18 (n= 4) the number of volleyball players isn't enough for comparison!

Analysing the tests' results among girls indicates a statistical difference in 67% of the cases, demonstrating a wide variability in somato-motor characteristics.

The significant differences between two sports were identical for boys and girls. From the 7 tests made, volleyball players shower better performance in 4 tests.

Girls aged 12-13 had better results in somato-motor skills. Above the age 14 years, boys scored higher in all tests except thigh circumference and trunk flexibility.

Analysis of the test results does not allow the identification of talented athletes, however, it does indicate some potential requirements.

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