

## BODY COMPOSITION OF TURKISH VOLLEYBALL PLAYERS

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### Introduction

#### *Body compositions of athletes*

Body composition of athletic populations has been an interest of trainers, exercise scientists and sport medicine professionals.

Sport sector is growing day by day. With this growth every trainer wants to increase performance of their athletes to compete the others. So they have to know about body conditions of players and physical conditions of their sports. After learn about conditions of sport and players, they can make more useful and scientific training programs. In addition this, in some sport, such as wrestling or boxing body composition is more important than others. Because in these sports there is an weight limit. Each sport has different physical conditions. So athletes should have suitable body composition of their sports.

There are a lot of body composition components in sports. For example; height, weight, body fat, fat free mass, muscle mass, total body water etc... But the most important component in all sports is body fat. Because every feature, has a big relation with body fat. Like agility, strength, speed, flexibility, explosive strength, jumping ability.

Generally, low body fat is desirable for high physical performers in sports. Especially running and jumping activities. For male players, minimal body fatness should not be less than 5%. Because it is necessary for physiological and metabolic activities. In females limit should be 12-16%, depending on the sport. Less than this level, there is athletic amenorrhea risk. And amenorrhea may lead to bone mineral loss. Body composition values of athletes is not only for performers but also for health (Heyward, Stolorczyk 1996).

#### *Body composition of volleyball players*

Volleyball is a fast playing game. So it requires to be fast. Players can not hold the ball and can not stop the ball. They have to make quick touch without stop it. The speed of ball can be 30 m in a second. Players have to make fast movements to do blocking and defense. So volleyball requires agility. And agility requires low body fatness. Table 1 shows some body fat values of volleyball players. Fleck and Wilmore suggest that male players body fat percentage should be 11-12% and female players body fat percentage should be 16-25%. And the other examinations support the Fleck and Wilmore's suggestion.

In volleyball there is a net between the courts. Net height is 2.43 m in males, and 2.24 m in females. So it requires to be tall and have a high jumping ability. Examinations support that body fat affects the jumping ability. It shows us importance of body fatness again. Table 2 shows height of some volleyball teams.

The last feature of volleyball is about duration of the game. There is not a time limit in volleyball. Sometimes duration of a match may be 2-3 hours. So players should have a good strength. Strength is related with total body water. When body water level decreases, strength capacity decreases too. So players should have more body water than normal people. Players, which have large muscle mass, have more body water than players which have large fat mass. Because muscle consists more water than fat.

Table.1. Body fat (%) values of different examinations.

Reference	Male	Female
Fleck-wilmore	11-12%	16-25%
Puhl	12.5%	17.9±3.6%
Withers	9.8±2.9%	17%
Sinning	10.9%	
Kovaski-por		19.5%
Hornak-roitman		
Fleck-case		11.7±3.7%
Puhl- van handle		18.3±3.4%
Fleck-case		
Puhl- van handle		18.4±3.2%
Tsunawake-moji		
Muraka-tahara		18.4±3.2%
Minowa-yukawa		
Papadopoulou		22.4±4.7%
Papadopoulou		21.3±5.5%
Our examination results	9.76%	15.8%

Table 2. Height values of national teams.

Team (male)	Height
Brazil (world ranking 1. Place)	194.41 cm
Italy (world ranking 2. Place)	195.81 cm
Russia (world ranking 3. Place)	201.81 cm
Our examination results	198.3 cm
Team (female)	Height
Russia (world ranking 1. Place)	189.33cm
Brazil (world ranking 2. Place)	183.41 cm
China (world ranking 3. Place)	185.66 cm
Our examination results	183.25 cm

### Material and Method

In this study, 60 male and 60 female volleyball players body composition was estimated. 43 of them are playing in national teams in different categories.

In this study, bioelectrical impedance method was used. Because this method is more rapid and cheaper than others. Tanita BMC-148 body composition analyzer and standart anthropometer were used in this examination.

### Results

Table 3. Anthropometric values of turkish volleyball players.

	YOUTH (14-16)			JUNIOR (16-19)			ADULT		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
MALE									
HEIGHT	20	185,4	7,18	20	189,3	6,02	20	198,3	5,89
WEIGHT	20	69,62	8	19	74,89	9,49	20	91,72	7,77
BMI	18	20,77	1,93	19	20,72	2,14	20	23,31	1,47
FAT %	20	14,72	3,1	20	7,49	2,69	20	9,76	3,23
FAT (KG)	19	10,05	2,59	20	5,56	2,18	20	8,96	3,06
FAT FREE MASS	20	59,29	6,31	20	68,24	9,54	20	82,8	7,56
TBW	20	43,4	4,62	20	49,96	6,99	20	60,6	5,57
WBIMPEDANS	19	583,68	55,71	20	584,65	71,07	20	524,6	49,72
RIGHT LEG(%)	20	17,28	3,1	20	8,66	2,84	20	10,91	2,08
LEFT LEG(%)	20	17,92	3,13	20	8,22	3,12	20	10,83	1,72
RIGHT ARM(%)	20	20,12	3,73	20	5,46	4,15	20	7,75	2,63
LEFT ARM(%)	20	21,65	3,68	20	5,56	4,34	20	8,07	2,58
TRUNK	20	11,38	3,36	20	7,33	2,99	20	9,51	4,86
MUSCLE MASS	20	30,83	2,68	20	35,22	4,54	20	43,09	4,23

	YOUTH (13-15)			JUNIOR (15-18)			ADULT		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
FEMALE									
HEIGHT	19	177,21	6,29	20	181,65	2,92	20	183,25	6,15
WEIGHT	16	64,03	5,36	19	66,61	4,53	20	67,43	4,8
BMI	18	19,55	1,34	18	19,97	1,4	19	19,93	1
FAT %	20	21,66	2,24	20	19,27	6,21	20	15,86	3,11
FAT (KG)	20	13,37	2,65	20	12,88	4,84	20	10,77	2,55
FAT FREE MASS	20	47,96	5,08	20	53,06	4,2	20	56,66	3,48
TBW	20	35,11	3,71	20	38,84	3,08	20	41,49	2,55
WBIMPEDANS	20	672,1	48,76	20	688,05	73,87	20	652,6	50,88
RIGHT LEG(%)	20	28,84	2,09	20	23,57	3,68	20	22,54	2,66
LEFT LEG(%)	20	29,23	2	20	23,3	4,38	20	21,91	2,85
RIGHT ARM(%)	20	29,66	2,41	20	15,75	7,59	20	12,14	3,69
LEFT ARM(%)	20	31,83	2,59	20	16,57	8,52	20	12,39	3,88
TRUNK	20	14,99	2,77	20	17,1	7,68	20	12,96	3,67
MUSCLE MASS	20	26,66	2,84	20	28,58	2,38	20	30,7	1,85

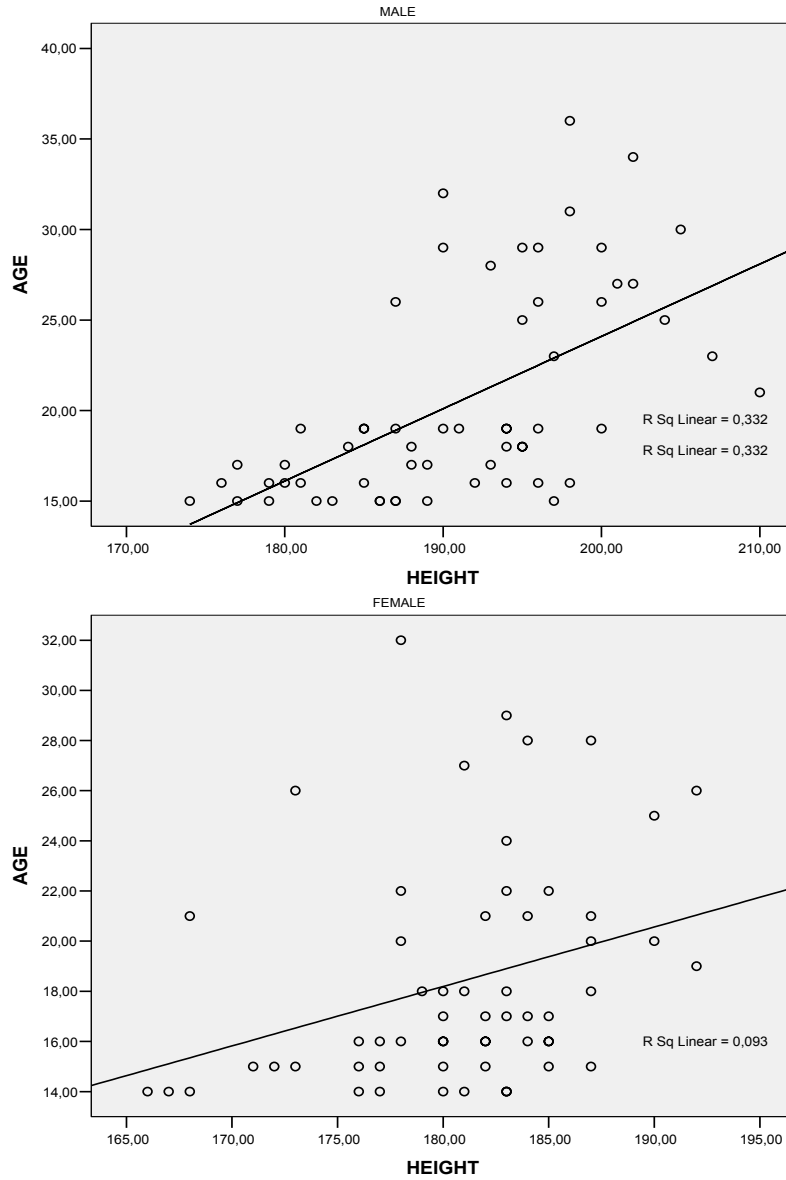


Figure 1: Age-height relationship.

These figures show age-height relationship in male and female players. There is a positive correlation between height and age both of male and female players.

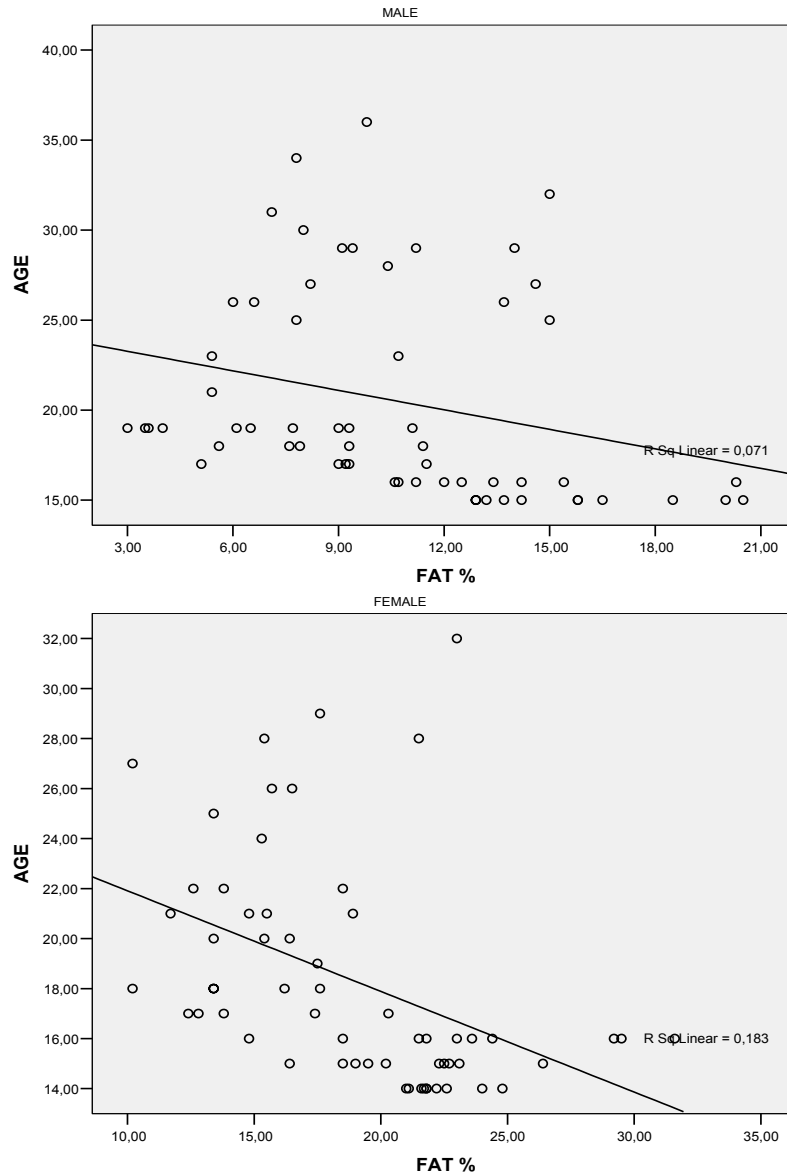


Figure 2: Age-fat % relationship.

These figures show age-fat percentage relationship in male and female players. There is a negative correlation between fat percentage and age both of male and female players.

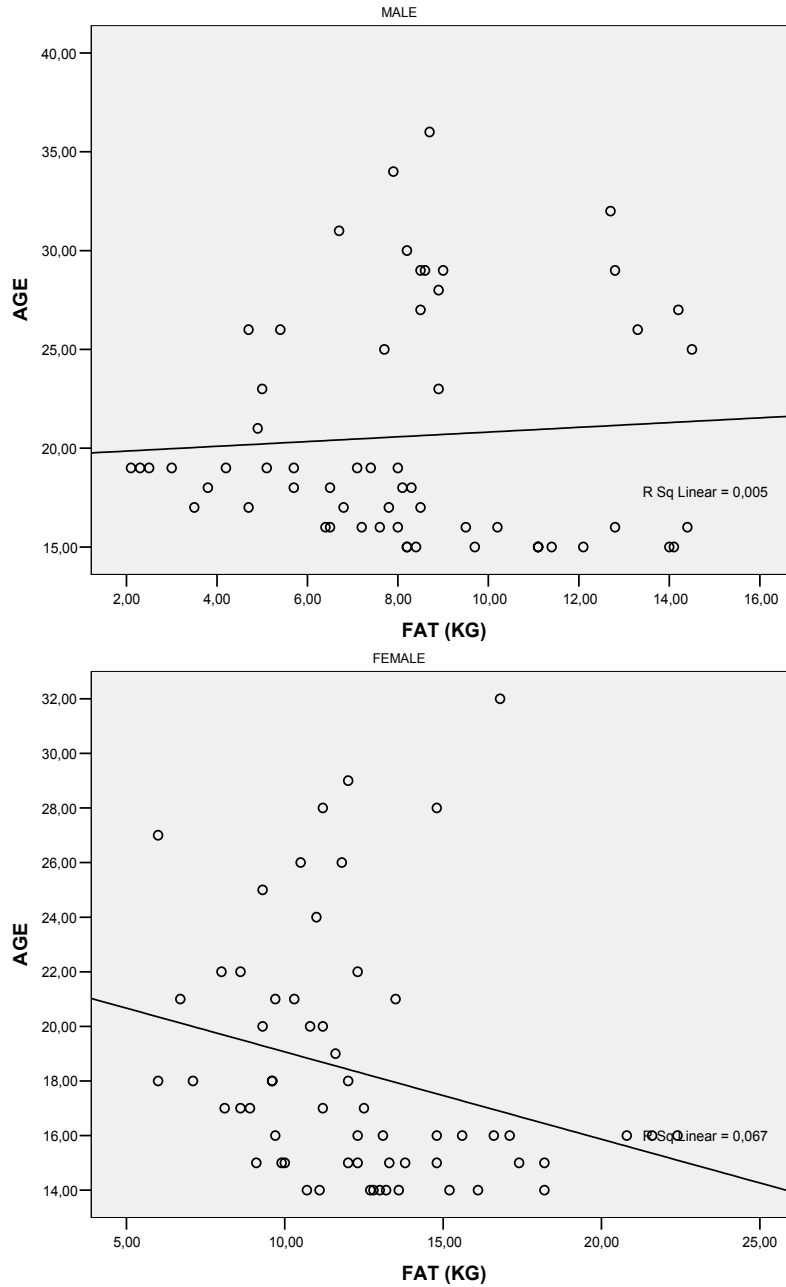


Figure 3: Age-fat (kg) relationship.

These figures show age-fat mass relationship in male and female players. There is a positive correlation between fat mass and age in male players. But in female players there is a negative correlation between fat mass and age.

The next figure show age-body water relationship in male and female players. There is a positive correlation between body water and age both of male and female players.

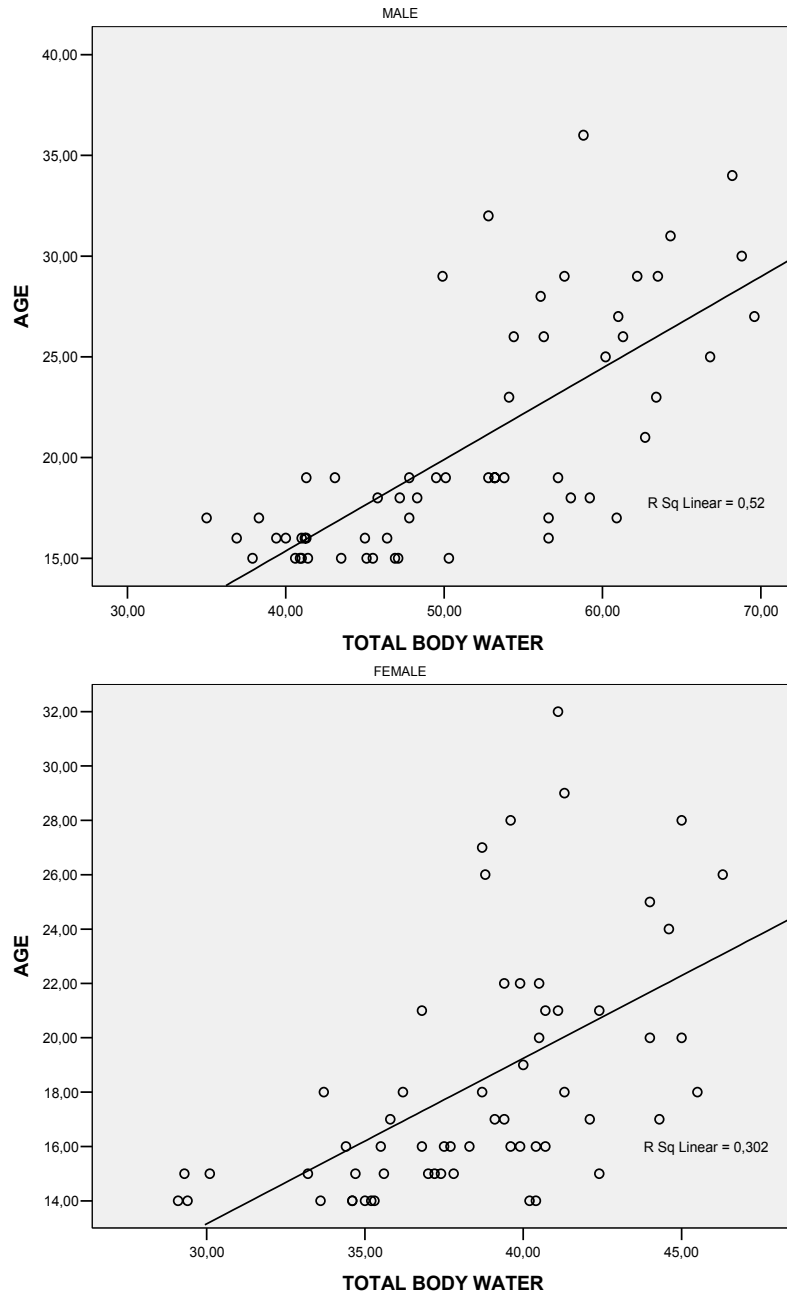


Figure 4: Age-total body water relationship.

### Conclusion

Our results show that there is a significant difference between Turkish male and female volleyball players ( $p < 0.05$ ). And there is a significant difference between the categories. In addition this, Turkish volleyball players have similar body compositions with other volleyball players in all over the world.

### References

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