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A Study on the Difference of Body Composition between College Students and Professional Canoeists in Jiangxi Province

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ABSTRACT. *In order to explore the difference of body composition characteristics and physical health between ordinary college students and professional canoeists in Jiangxi Province, this paper makes a comparative study of body composition of ordinary college students in Jiangxi Normal University, canoeists of Jiangxi Team and canoeists of national team, basing on literature, experiment and mathematical statistics. The research result shows that long-term canoeing can lead to significant decrease of BMI, fat percentage, soft weight without fat and skeletal muscle, visceral fat, fat in upper and lower limbs. And it can produce soft weight without fat and increase in nutritional elements such as protein, minerals and inorganic salts.*

KEYWORDS: *national team athletes; provincial team athletes; College students; body composition; comparison*

1. Preface

For the general population, body composition has a certain impact on the physiological characteristics of the human body; for athletes engaged in sports training, body composition has an important impact on sports ability and performance. Combined with the analysis of sport characteristics, body composition can provide theoretical basis for scientific selection of athletes, scientific training, morphological status, technical and tactical play and training level. Appropriate structure and proportion of body composition is of great significance to athletes. It helps athletes to maintain health and achieve excellent results.

2. Research object and method

2.1 Research subjects

Fifty college students from Jiangxi Normal University were randomly selected as

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the general college students group, and 22 canoeists from Jiangxi Water Sports Center were selected as the provincial team athletes group, and 15 canoeists from the national Canoeing Team were selected as the national team athletes group. The people selected were all male and met the experimental criteria. The specific basic conditions of the subjects were as follows: Table 1.

Table 1. Grouping of subjects

	General College Students Group (50)	Provincial Team Athletes Group (22)	National Team Athletes Group (15)
height	1.74±3.35	1.85±3.24	188.64±3.78
weight	64.66±6.90	86.34±7.18	85.43±5.76
Age	20.80±1.48	23.58±4.60	24.78±3.67

2.2 Research method

2.2.1 Documentation Method

Extensive access to a large number of domestic and foreign literature, in-depth understanding of domestic and foreign scholars and experts in the field of research direction and development trend, collection of relevant information and collation and analysis.

2.2.2 Experimental method

Body Composition Analysis: The body composition was determined by Vivente Body Composition Analysis made in Korea. The main test indexes were height, weight, fat-free weight, skeletal muscle content, total body water, intracellular water, extracellular water, protein content, mineral quality, body mass index, fat-free soft weight.

2.2.3 Mathematical Statistics

Statistical software SPSS 16.0 was used to collate the data obtained, and the mean (+standard deviation) (X ±SD) was used. Independent sample T test was used among the groups. The difference was significant ($P<0.05$), and the difference was very significant ($P<0.01$).

3. Research results and analysis

The body composition of three groups of subjects was tested by body composition tester. The body condition, abdominal obesity specialty, limb stage, nutritional status and water status of the subjects were compared and analyzed. Since there is no

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standard value or normal range of water status in China at present, it is not compared with standard value or normal range here, only with the already public. A comparative analysis of body composition and fat status was conducted with the recognized standard values or with a normal range of body composition.

3.1 Current status of body composition

Table 2. Body Composition Status Table

	Ordinary College Students	Provincial Team Athletes	National Team Athletes
Body mass index (BMI)	5.091±3.857	21.340±1.771	26.156±3.830**
Percentage of fat	16.900±4.275	14.460±3.773	13.549±3.297*
Fat-free soft weight	66.567±4.489	61.340±4.034	60.972±4.524*
skeletal muscle	25.830±3.533	37.116±3.980	39.642±3.895**

This study found that BMI, fat percentage, soft weight and skeletal muscle of the national team athletes group were significantly better than those of the ordinary college students group, and there were significant differences ($P < 0.01$).

3.2 Abdominal obesity

Table 3. Abdominal obesity analysis table

	Ordinary College Students	Provincial Team Athletes	National Team Athletes
Visceral fat area	54.917±1.929	46.200±4.435	44.762±2.789*
Waist hip ratio	0.760±0.058	0.741±0.052	0.741±0.053
Visceral fat content	1.800±0.724	1.100±0.457	1.037±0.736

The results showed that visceral fat area ($P=0.016$) $P < 0.05$ had significant difference, while waist-hip ratio and visceral fat content ($P=0.117$) had no significant difference.

3.3 Analysis of Soft Weight Content of Limb Fat Removal

Table 4. Analysis of Soft Weight Content of Limb Fat Removal

	Ordinary College Students	Provincial Team Athletes	National Team Athletes
Left upper limb	3.273±0.938	3.793±0.6722	4.084±0.758*
Right upper limb	3.263±0.8300	3.721±0.67731	4.066±0.771*

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Left lower extremity	8.567±0.948	9.800±1.590	9.568±0.706*
Right lower extremity	8.746±0.949	10.053±1.616	9.517±0.722*
trunk	24.941±3.381	27.366±3.734	30.552±4.44*

The above data suggest that in the comparison of the soft weight content of upper and lower limbs and body fat removal, the soft weight of upper and lower limbs and trunk of the national team athletes group is higher than that of the provincial team athletes group and the college students group.

3.4 Comparative analysis of nutritional assessment

Table 5. Nutrition Assessment Table

	Ordinary College Students	Provincial Team Athletes	National Team Athletes
Protein	11.660±0.872	13.774±2.057	15.008±1.0535**
Mineral	3.790±0.390	3.964±0.347	5.033±0.416**
inorganic salt	1.847±0.675	2.781±0.643	4.635±0.653**
Basal metabolism	1325.63±286.677	1599.62±237.077	1697.48±266.746**

Table 5 shows that there are significant differences in protein, minerals and inorganic salts among the three groups ($P < 0.01$).The results of college students group < provincial team athletes group < national team athletes group exist, and the basal metabolic value also shows this result.

4. Discussion

4.1 Effects of Canoeing on Body Weight, BMI and Obesity of Athletes

Body Mass Index (BMI) is one of the commonly used indicators proposed by Lambert Quetelet, a Belgian scientist, to measure body weight. BMI, based on the relationship between height and body weight (kg)/height ^{2} (m^2), indicates whether obesity exists. According to the recommendations of the WHO Western Pacific Obesity Task Force in 2001, the body weight classification of Asian adults are as follows: BMI 18.6-22.9 Kg/m^2 represents normal weight, BMI 23-24.9 Kg/m^2 indocates overweight, and BMI (>25 Kg/m^2) indicates obese. According to the measurement results based on this standard, the subjects of the ordinary college students group are obese; but the weight of the ordinary college students group is significantly lower than that of the provincial team athletes group and the national team athletes group; moreover, compared with the visceral fat area, the national team athletes group is obviously better than the provincial team athletes group and the ordinary college students group. We all know that the human body is composed of

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muscles, bones, visceral organs, skin, fat and other tissues. The national team athletes have more developed bones and muscles and more lean body tissues. Overweight can not be simply judged as obesity. High weight may be caused by more lean body tissues. It is a sign of physical fitness, not too much fat.

4.2 Effects of Canoeing on Body Composition of Athletes

In terms of structure and function, human body composition can be divided into Lean Mass and Fat Mass. The measurement of human body composition is of great significance to the evaluation of human health. The content of lean body tissues is an indicator to determine whether the body is strong or not. Too little lean body tissues and too much fat indicates obesity. The results of this body composition test are as follows. In terms of the content and division of adipose tissue in the body, body composition can be divided into subcutaneous fat of upper and lower limbs, subcutaneous fat of abdomen, body fat and percentage of body fat. There were significant differences in body fat content, body density, abdominal subcutaneous fat and body fat percentage between the national team athletes group and the general college students group, but there were no significant differences in waist-hip ratio and visceral fat content ($P > 0.05$).

Minerals, proteins and inorganic salts are essential nutrients for the human body. They are important components of the body, and they are also important substances to regulate the physiological function of the human body.The minerals, proteins and inorganic salts of the national team athletes group were higher than those of the provincial team athletes group and the general college students group, with significant differences ($P < 0.01$).It shows that canoeing can improve the physiological function of college students and enhance the Body composition;s uptake and utilization of nutrients.

Previous studies have found that kayakers are characterized by strong bones, high height, large weight, long upper limbs, strong chest and upper limbs, narrow hips and thin lower limbs. Studies have shown that canoeists with height of 180-190 cm are most likely to achieve good results.

5. Conclusion

Long-term canoeing can significantly improve body composition, lower BMI and fat percentage, decrease visceral fat area and fat in upper and lower limbs and increase fat-free soft weight, skeletal muscle and nutritional elements such as protein, minerals and inorganic salts.

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