Institute of Experimental Morphology and Anthropology

Acta morphologica et anthropologica, 10
Sofia • 2005

Body Composition of Female Students Players in Volleyball

H. Al Mabruk, M. Toteva

National Sports Academy, Sofia

The preliminary morphological selection of the sportsmen is important and so is the building of a suitable body structure both a predisposition for high results. The **purpose** of our study is the investigation of the body composition of female students volleyball players. **Material and Methods** — 72 female competitors were investigated from different students teams. Sixteen anthropological features were measured — height, weight, 4 girths of the limbs and 10 skinfolds. In addition 7 parameters were calculated which characterize the main body components. **Results and Conclusion** a) Students female volleyball players compared to national competitors have lower height, weight, muscle arm girths and LBM; bigger fat mass and almost equal development of leg muscles. b) The body composition in different sports vary not only based on the differences in the exercises but on the level of this process. c) The data could be used in preliminary selection of female volleyball players.

Key words: Body composition, female students, volleyball.

Introduction

The components of the athletes' body structure considerably vary according to the differences in the sports. Their characteristics differ from those of untrained people. For this reason the preliminary morphological selection of the sportsmen is very important as well as the building of a suitable body structure which are a predisposition for high results.

There are few publications on this topic focused on volleyball competitors and there is not any information about lower qualified players that could help the selection. This defined the purpose of our study — the investigation of the body composition of female students volleyball players.

Material and Methods

Seventy-two female competitors were investigated from different Bulgarian students teams. The mean age was 21.3 years. Sixteen anthropological features were measured — height, weight, 4 girths of the limbs and 10 skinfolds. In addition 7 parameters were calculated which characterize the ratios between the main body

components: per cent fat mass (%FM), total fat mass (kg), total muscle mass (kg), muscle arm girth (cm), muscle tight girth (cm), lean body mass (LBM), body mass index (BMI).

The method of Parizkova was used for the determination of fat components. Muscle mass was calculated on the basis of main girths and the thickness of appropriate skinfolds.

The data were submitted on statistical analysis. They were compared to the results of the Bulgarian population [3] female students volleyball players and elite competitors [2]. Student's ratio was used at the level of $p< 0.05$.

Results

Students volleyball players have high stature (171.1 cm) in comparison to Bulgarian population (161.6 cm) but according to the elite Bulgarian competitors (183.7cm) they are not tall enough for this sport [2]. The data of foreign students players do not differ essentially from ours because the sport's level is relatively low. The Hungarians are 170.9 cm, Americans —176 cm, Japanese — 168.2cm and the competitors from World Students Games'77 are 173.8 cm tall (Fig. 1).

The weight of students volleyball players (61.84 kg) shows average values compared to the 21-year-old Bulgarian women (59.9 kg). They are considerably lighter than the national competitors (71.8 kg), and others from student's female teams (Fig. 2).

The fat mass quality is very important because there is negative correlation between this feature and sports achievements [1]. Our contingent has 18.85% FM which is higher than those of the national Bulgarian competitors —15.1 %, but the differences are not statistically significant. The data of the other authors are very similar — Americans 17.9%, Japanese 18.3 % (Fig. 3).

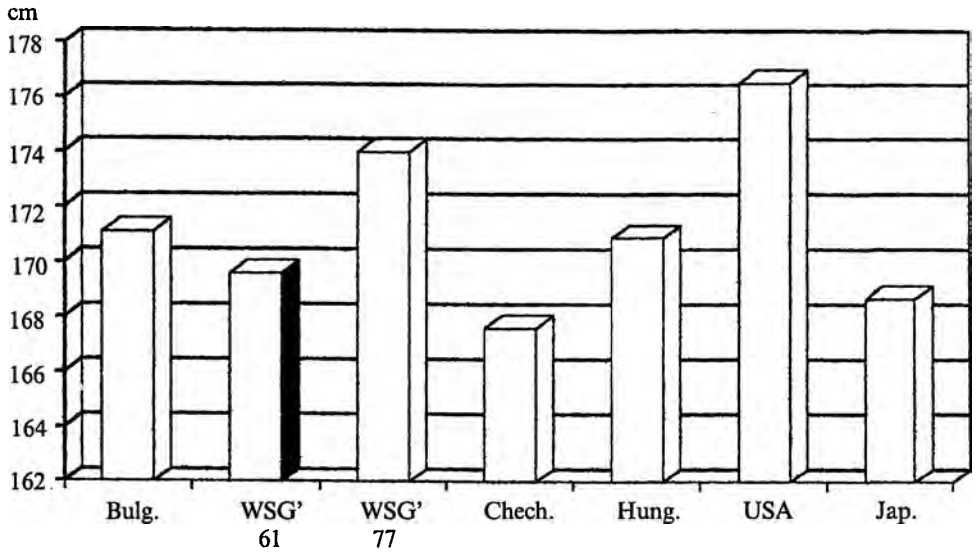

Fig. 1. Height of female volleyball players

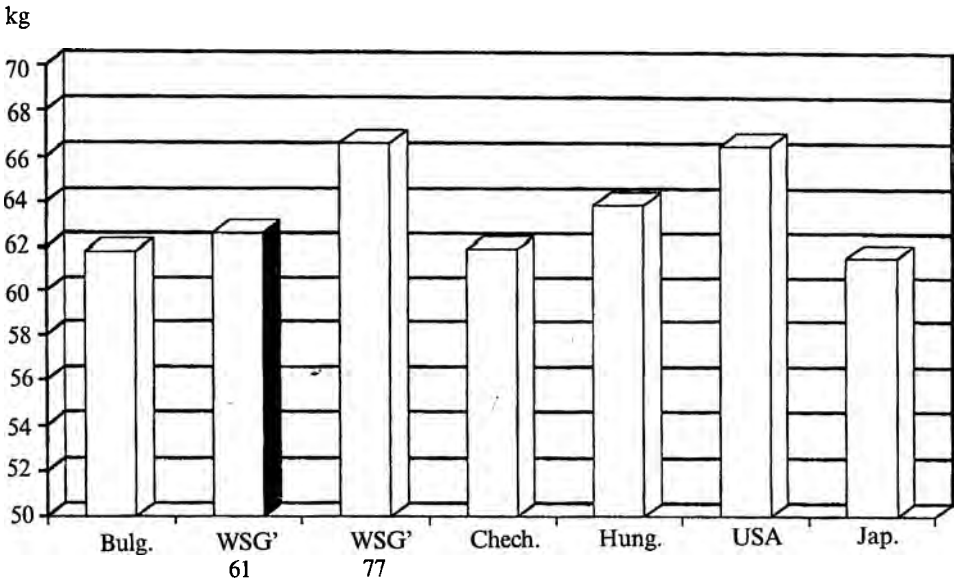

Fig. 2. Weight of female volleyball players

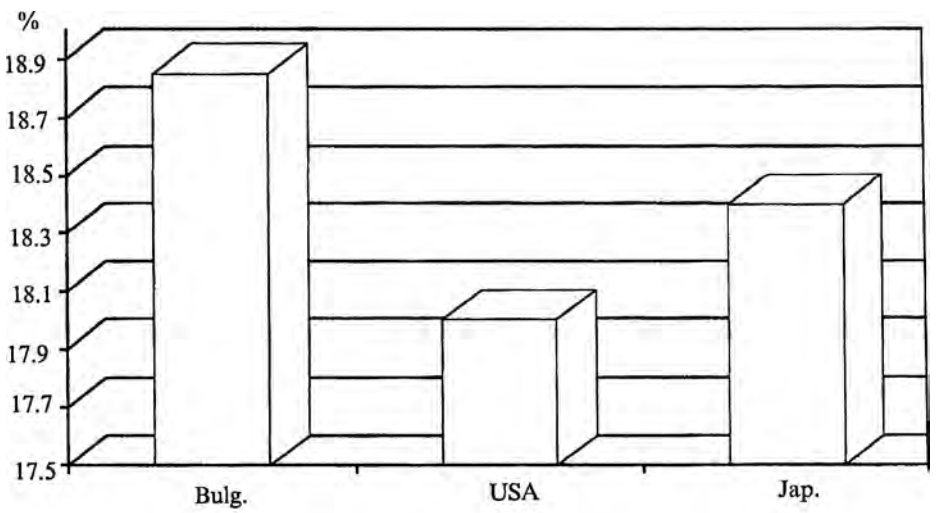

Fig. 3. Per cent body fat of female volleyball players

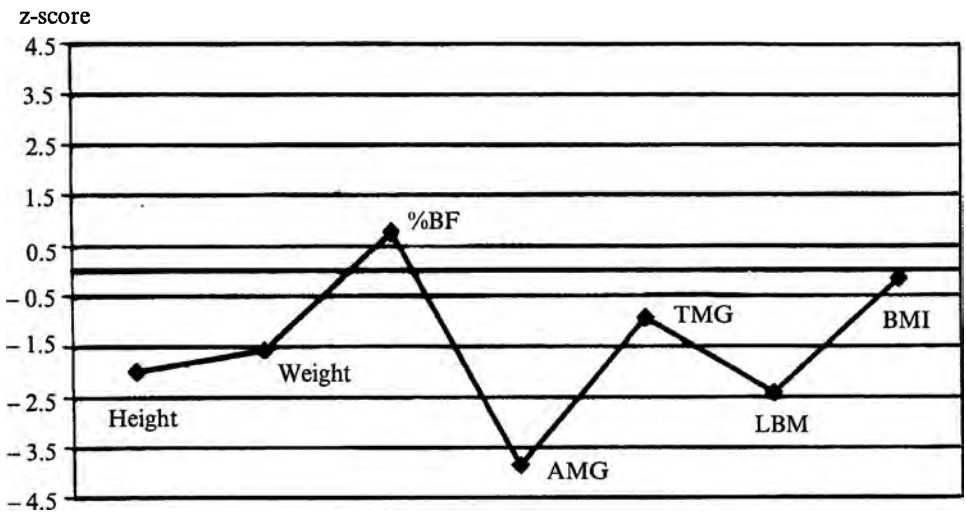

Fig. 4. Body composition of female student's volleyball players in Z-scores versus elite female volleyball players

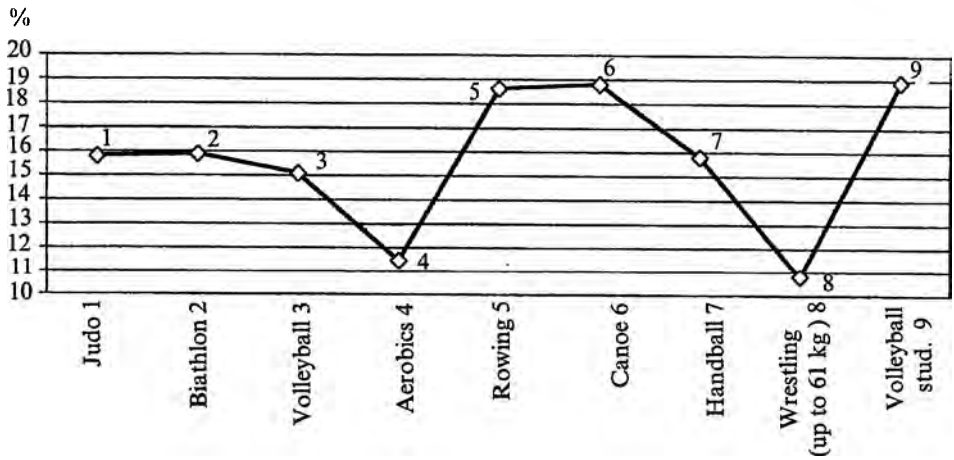

Fig. 5. Per cent body fat of elite female competitors

The body composition of students and elite volleyball players is presented in Z-scores in Fig. 4. This visualizes clearer the differences in body structure according to the level of sports qualification.

The permanent exercises play main part in the development of muscle mass, which is in great correlation with physical fitness. The muscles of higher and lower limbs are very important for success in volleyball. The muscle arm girths of the students are 17.25 cm and 21.3 cm of national competitors. The difference of

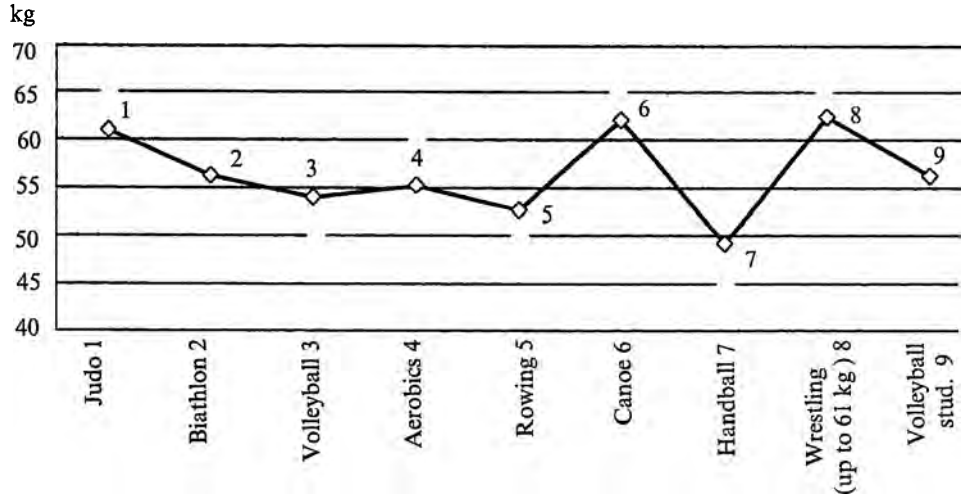

Fig. 6. Lean Body Mass of elite female competitors

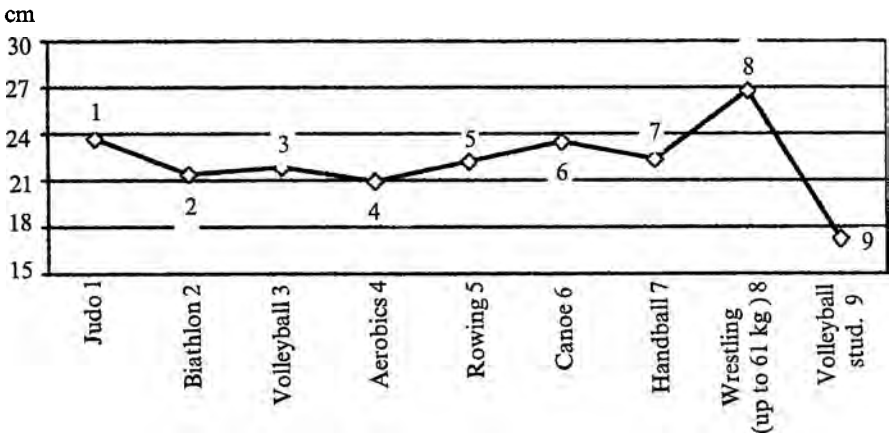

Fig. 7. Arm muscular girths of elite female competitors

4.55 cm is considerable due to the different sports level of the two groups. The muscle tight girths (51.03 cm and 53.0 cm) of these athletes do not have essential differences.

LBM is an indirect mark of muscle development. It is directly related to oxygen consumption and main characteristics of physical working capacity. We find great difference between LBM of students (49.05 kg) and elite volleyball players (60.8 kg) based on various sports practice.

BMI is not very suitable for athletes but it was calculated as an additional parameter and it shows similar values (20.86 kg /m^2 and 21.86 kg /m^2) in two contingents.

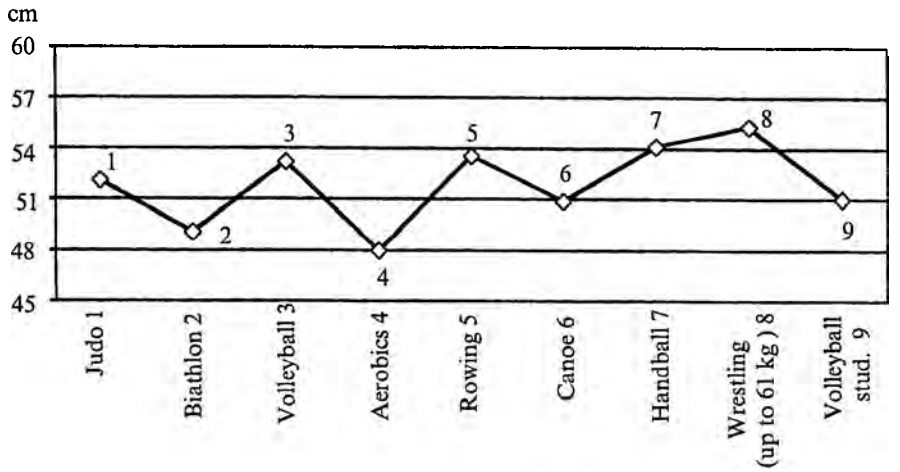

Fig. 8. Tight muscular girths of elite female competitors

Body composition of athletes is very different according to sports discipline and could be seen in figures 5-8. Students volleyball players have the highest % FM, almost equal values of these in rowing and canoe (Fig. 5). LBM is similar to this of competitors in aerobics and biathlon (Fig. 6). Muscle arm girths, which is so important for volleyball has the least values in students (Fig. 7). Muscle tight girth shows better development equal to those practising canoe (Fig. 8).

Conclusions

— Students female volleyball players compared to national competitors have lower height, weight, muscle arm girth, and LBM; bigger fat mass and almost equal development of leg muscles.

— The body composition in different sports varies not only based on the differences in the exercises but on the level of this process.

— This data could be used in preliminary selection of female volleyball players.

References

1. Siders, W. A., H. C. Lukaski. Body composition and collegiate volleyball performance. N. D. Acad. Sci., 46, 1992.
2. Игнатов, П. В. Спортна медицина. С., Нови знания, 1998.
3. Слънчев, П. и др. Физическо развитие, физическа дееспособност и нервно-психична реактивност на населението на България. С., 1992.
Световна купа по волейбол жени. Бюлетин, 2000.