

Comparison of the main anthropometric and biomechanical indices of elite adult male and female of canoe and kyak paddlers

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ABSTRACT: Achieving the level of elation in any sport requires having all-round information from the elite of that sport that recognizing and identifying the extent of changes in the various indicators in elite men and women can definitely be a criterion for determining the effectiveness of each of the indicators. On performance of person which can lead to help in the scientific scouting process. The purpose of this study was to compare the main anthropometric and biomechanical indices of elite adult canoe and kyak paddlers in Iran. In this study, 30 athletes (Kyak and Canoe) of the elite adult national team (15 women and 15 men) present at the National Sailing Camp were included as the statistical community of which 10 Kyak sailors and 10 Canoe boats participated as research samples. Anthropometric index variables (weight, height, length and height of organs, body width, body environment, body composition) and biomechanics (static equilibrium, speed and acceleration, leg strength, abdominal muscle strength and endurance, reaction time Fingers, Flexibility), which was analyzed statistically. The obtained data were first analyzed using Kolmogorov-Smirnov test (KS) for normal distribution of data. Then, using multiple correlation coefficient and analysis of the main components of information (PCA) to determine the variables of the test and independent t test, The group was analyzed at a significant level of 0.05. Significant differences were observed in all the major indices of anthropometric characteristics between the two men except forearm length. Comparing the main indices of biomechanical variables of elite male and female canoe and kyak paddlers, there was a significant difference between speed and flexibility variables. According to the results of the research, it can be said that having this comprehensive information of the current champions of sailing sport, in addition to a criterion for assessing, comparing and identifying the abnormalities of other sailors, a significant contribution to the development of talent as well as subsequent studies in this medal discipline Will.

Keywords: Anthropometrics, Biomechanics, Outboard, Elite.

INTRODUCTION

Today, the importance and desire to exercise and gain title and reach the peaks of honor among communities has increased. Achieving success in modern modern sports is subject to various factors. Among these factors, the discovery of talent is recognized as the most important factor. The progress from the elementary levels to the elasticity in sport is a very complicated process. This process requires the identification and selection of talented individuals who have the necessary physical, skill and behavioral requirements to succeed in a specific sport. Researchers are attempting to identify predictive indicators for people who are prone to various sports. To the extent that the efforts of many countries have led to the development of various programs for sports reconnaissance. In the late 1960s and early 1970s, in most Eastern European countries, there were special methods for identifying and directing athletes with high potential abilities (1).

Regarding the importance of sporting talent as the infrastructure of the success of elite sports systems, identifying and appropriate modeling of successful talent-identification systems in successful world countries is one of the paths for success for developing countries such as Iran. In fact, sports scouting can be used as part of the process of guiding people to different areas in the field of sports, especially at the championship level. Specialization and achievement of desirable results in any field of sport requires attention to the particular physical and mental conditions of the elite of that field, such as anthropometric, biomechanical, physiology, musculoskeletal structure, mental health, emotional intelligence and type Personality Achieving sports successes have physical capabilities, such as anthropometric, physiological (2) and biomechanical features in every sport. In many studies, elite athletes have special physiological and anthropometric properties in every field of sport. Studies in this field state that every sport field requires athletes with specific body dimensions and sizes (3). Sailing is one of the most entertaining and competitive sports around the world. Rowing sport requires a set of capabilities, including physical, technical and mental. Among these factors, the physical ability of boaters to play a significant role in the athlete's technical skills and psychosocial aspects.

Considering the importance of sailing sport, recognizing and fostering talent in this field, we can achieve a better and more respectable position in the Olympic and Asian Games, and it is worth noting that this is one of the few disciplines that besides men, women Iranians can also participate in international competitions without any limitations and with the preservation of Islamic cover and to honor the country. The researcher of Mirza Poetry in a study of the physical wrestling of the female elite rookie, Dragonbat, Kyak, and its relation to the subjective scales of the mental image, observed that male and female boatmen had different disciplines in body mass index, body fat percentage, and body mass index. There is also no significant difference. According to the results reported in the study, Rowing Men had the best impression of body appearance, strength and endurance, and men of dragon type, the best imagination of flexibility, and women of the Dragon Age had the best imagination. Lawton and et al (2012) observed anthropometric, strength, and benchmark testing for the development and selection of young talented young canoe and kayak paddlers on an adult-boat ride, meaning that there is a significant difference between male and female anthropometrics and strength and endurance tests between youth and adults and body fat and height altitude, and sitting in adult women were higher and higher than the young (4). Winzen and et al (2011) examined an overview of the exercise load (VO₂max) and musculoskeletal system injuries in the German elite women's parlor during the Olympic Games, which revealed a high prevalence of musculoskeletal injuries in German elite rowers (5). Rekačević and et al (2011) reported on the changes in body size in young elite rowing canoe and kayak paddlers from 1997 to 2007, which showed that male and female sailors in 2007 compared to those who participated in the tournament in 2007 significantly lighter and heavier than the other. The results observed in the finalists also applied to non-finalists at the youth championships (6).

Riley (2007) evaluated the Dragonton Dragonball bodybuilding injuries in the official tournament in Beijing and suffered the worst sports injuries in the ninth gear of the chest, lower shoulders and shoulders that had fractures (fracture stress). The report suggests that exercising, controlling the movement and shuffling on both sides in a technically correct manner would offer only solutions to prevent spinal damage that occurs in the long term due to unilateral activity of the sport (7). Bourgois and et al (2003) examined the age at which puberty began in the world's top sailing athletes and its association with anthropometric characteristics, and reported that intense exercise, physical characteristics, and body composition had no meaningful relationship with the age of maturity of boaters (8). Claessens and et al (2003) examined 27 anthropometric parameters on 383 Kyak sailors from among the 430 World Champions League participants in France, and reported a comparison between finalists and non-finalists that the finalists were heavier, taller. With a greater length of limbs, except for the diameter of the pelvis, they had a greater diameter and circumference (9).

So far, there has not been any reliable scientific observation that indicates the relationship between the rankings obtained by Iranian sailors, the athletic talent or the quality of the training program, and no comprehensive and complete information on the anthropometric, biomechanical characteristics of the male and female elite rowing and because attention to the physical and behavioral characteristics of the two groups of women and men is very important. Therefore, the present study attempted to answer the following question: Is there a difference between the main anthropometric and biomechanical indices of elite adult male and female canoe and kayak paddlers? In particular, the purpose of the study was to compare the main anthropometric and biomechanical indices of adult male and female elite canoe and kayak paddlers.

Method

The statistical society was comprised of the Kyak and Canoe (Kyak and Kyak) national teams of adult women and men (30) participating in the South Korean Asian Games (Incheon), with 10 out of 15 Kyak and Canoe men (5

Kyak parachute and 5 parachute canoes), and 10 out of 15 Kyak and Canoe female canoe and kyak paddlers (5 Kyak rows and 5 parasen cano), who scored the best in 2012, were selected as a sample of the research. Anthropometric 29 variables include: weight, height (standing and sitting), length and height of organs (length of two hands, length of hand, palm length, arm length, forearm length, length of the leg, foot length), limb width Elbow width, knee width, ankle width), limb circumference (head circumference, chest, back, resting arm, forearm, wrist, pelvis, middle hip, knee, leg, ankle, leg arches); Body composition (waist to hip ratio, body fat percentage) and seven biomechanical variables including static balance, speed and acceleration, leg strength, strength and endurance of abdominal muscles, fingers reaction time, flexibility were evaluated.

The tests and tools used to measure and evaluate the indicators in the anthropometric and biomechanical sections are as follows:

a. Anthropometric measurements and indicators

- Beurer scale BF66 with accuracy of 0.1 kg for measuring the subjects' weight in kilograms Flat matched wall, flexible strip meter with a length of 1.5 m with a sensitivity of 1 mm, seat for sitting mode for measuring height (standing, sitting) in cm
- A flexible 1.5 meter tape with a 1 mm sensitivity and a 60 cm MITUTOYO caliper with a precision of one millimeter to measure the length and height of the organs (length of two hands, length of hand, palm length, arm length, length Forearm, leg length, foot length)
- VERINER CALIPER small caliper with an error of 0.02 mm and calcium mic with a sensitivity of 0.05 to measure the width of the limbs (elbow width, knee width, ankle width)
- A flexible 1.5 meter tape with a sensitivity of 1 mm for measuring the environment of the organs (head, chest, back, resting arm and arm, forearm, wrists, pelvis, middle hip, knee, legs, Ankle, arc foot)
- Camcorder winding machine to measure fat percentage

b. Measuring instruments, tests and biomechanical indicators

- Flat surface and Q & Q connector HS45-003 with stack test for static balance measurement
- 36 meters long pavement, Q & Q connector model HS45-003 with 36 meter test for speed measurement using velocity formula ($v = x/t$)
- 36 m speed test for acceleration measurement using acceleration formula ($a = v/t$)
- Plain wall, smooth surface and gypsum powder with vertical jump test (Sargent) for foot power measurement
- Q & Q connector model HS45-003, measuring band 11.4 cm, and large mattress with long and sizable test in 60 seconds to measure abdominal muscle strength and endurance
- One meter ruler with Nelson's ruler test to measure the reaction time of the fingers
- Flexible sheet included with bench testing to measure flexibility

For statistical analysis of the data, the Kolmogorov-Smirnov test (KS) to assess the normal distribution of data, the mean and standard deviation for describing the data, the multi-correlation coefficient and the analysis of the main components of information (PCA) to determine the main anthropometric indexes and Biomechanics was used in two groups of women and men and inferential statistics were used to obtain the difference between the two elite groups for the main anthropometric and biomechanical indices. Independent t-test was used. All evaluations were used at a significant level of 0.05.

Results

Information on the individual characteristics of subjects is presented in Table 1. The average weight of boatmen participating in the study was 85.70 for men and 62.00 for women, average height for men was 1.85 and women was 1.70 cm. The highest mean value with the lowest standard deviation is related to the height of men and the lowest mean value is related to women's weight and the highest standard deviation is related to the height of women.

Table 1. Average (standard deviation) height and weight of the boaters participating in the present study

group	N	Height (cm)	Weight (kg)
Men	10	1.85 (3.68)	85.70 (5,034)
Women	10	1,70 (6.342)	62,00 (3,858)

Analysis results are the main components for determining the common anthropometric characteristics of adult male and female elite rowers: hand length, resting arm circumference, arm circumference in contraction, ankle foot, ankle width, WHR and indices Important in adult female elite roulette: Forearm length, wrist circumference, leg circumference and waist circumference, and among elite adult male canoe and kayak paddlers: standing height, foot length, foreskin and fat percentage. Common Indicators Related to the Biomechanical Features of Adult Male and Female Elite Canoe and kayak paddlers: Speed, Acceleration, and Static Equilibrium and Important Indicators in Adult Female Elite Canoe and kayak paddlers: Flexibility, Response Time, and Adult Male Elite Canoe and kayak paddlers: Strength and Endurance Abdominal muscles. In anthropometric characteristics, except for the percentage of subcutaneous fat, the mean of this characteristic among women is higher than in males, in other indices, the average index is higher among males than females. Also, using an independent t-test, anthropometric indexes for two The group of women and men were compared and the results showed that, except for the length of forearm, which did not differ significantly between adult male and female elite boaters, there was a significant difference between the other elite adult male and female boys ($p \geq 0.05$).

In biomechanical characteristics, the results from the comparison of the average biomechanical indices among adult male and female elite rowers indicate that women were better than men in the static equilibrium index and in other indices men were better than women, then using Independent T-test and comparison of the main biomechanical indices showed that there was a significant difference between speed and flexibility characteristics and there was no significant difference between the two groups in the remaining indices ($p \geq 0.05$). Mean values, standard deviations and significant levels for anthropometric measurements are shown in Table 2 and for the biomechanical measured indicators in Table 3.

Table 2. Mean and standard deviation and significance level for the main anthropometric indices

Length of limbs (cm)	Indicators	Men		Women		Significance level
		Average	Standard deviation	Average	Standard deviation	
Organic environment (cm)	Height	1.85	3.68	1.70	6.342	0.000
	Forearm	31.60	2.366	27.30	1.337	0.163
	Hand	88.00	4.268	77.60	3.062	0.000
	Palm	21.75	0.920	19.600	0.516	0.000
	The sole of the foot	27.60	1.349	25.40	1.429	0.002
	Real foot	97.90	4.121	88.40	3.777	0.000
	Arm	36.20	2.110	29.65	1.510	0.000
	Shrunk arm	39.65	2.749	32.00	1.509	0.000
	Forearm	31.10	1.612	25.35	1.001	0.000
	Wrist	17.60	2.846	16.25	0.978	0.000
WHR	Waist	86.75	3.474	75.40	3.893	0.000
	Shin	38.45	1.832	36.20	2.250	0.017
	Ankle	24.30	1.085	22.95	1.461	0.031
	Waist to hip ratio	0.83	0.022	0.70	0.045	0.000
Body width (cm)	Knee	17.35	1.055	15.35	1.930	0.010
	ankle	10.10	0.516	9.45	0.643	0.023
Fat (ml)	fat percentage	11.54	1.157	14.45	0.753	0.000

Table 3. Mean standard and standard deviation and significance level for major biomechanical indicators

Indicators	Men		Women		Significance level
	Average	Standard deviation	Average	Standard deviation	
Endurance and strength of trunk muscles	60.60	6.00	57.80	9.02	0.425
Speed	7.24	0.24	6.69	0.34	0.008
Reaction speed	2.69	0.17	2.83	0.20	0.600
Static balance	19.44	20.22	29.12	9.96	0.193
Acceleration	0.27	0.04	0.25	0.064	0.337
flexibility	33.10	2.23	25.90	2.60	0.000

Discussion

The overall aim of this study was to compare the main anthropometric and biomechanical indices of elite adult male and female canoe and kayak paddlers. According to the findings of this study, the comparison of the main anthropometric indices of elite adult male and female canoe and kayak paddlers showed a significant difference between all anthropometric indices (except forearm length). These results were closely aligned with the results of

Scats and colleagues in 2009, which looked at the relationship between the anthropometric characteristics of the Kyak -women and men's rowers in a distance of 1,000 meters. Also, with the study of Lawton and et al. (2012), which examined anthropometric indices for choosing male and female gifted rowers, (4) and Rakovac and et al, In 2011, who looked at changes in body size (anthropometry) on boaters The elite Roeing of Woman and Man from 1997 to 2007 (6) and Albert Claessens and John Burges and colleagues in 2003, who studied 27 anthropometric parameters on 383 Kyak canoe and kyak paddlers from 430 World Championships in France (9) are perfectly in line. According to the results of this study, the anthropometric indices of body length and body composition play a more significant and significant role in comparison with other anthropometric indices among boaters and are one of the important indices in sailing. Therefore, it helps the trainers and experts in this field. Will use optimally with these parameters in order to identify the talents and since more than %90 of these indices show a significant difference between the two groups of women and men, the gender factor is one of the main causes of the difference in indicators Anthropometrics was between two groups of male and female canoe and kyak paddlers.

According to the findings of this study, comparing the main biomechanical indices of female and male elite rowers showed that there is a significant difference between all the biomechanical indices among adult male and female elite rowers only between the speed and flexibility indices, and in the remaining indices There was no significant difference. The same research was not

Found in this study to compare the results with the results, but the results of the biomechanical indices in the Scottish research in 2009 are somewhat in line. Considering that sailing is a strength component, it is speed and endurance. Since the 7 parameters measured in comparison with the biomechanical indices of the present study, 5 main indicators for women (speed, acceleration, static equilibrium, flexibility) and The four main indicators for men (strength, velocity, acceleration, static equilibrium) indicate that biomechanical indices are important indicators and an important component in the elite elaboration process and talent identification in sailing between men and women. It is also possible to take into account these indices and align it with scientific and basic exercises to help elite development in this field. Get a seat. In general, we find that there is no widespread and appropriate research in this area, so further research is needed on the study of biomechanical indicators for male and female boatmen.

Conclusion:

According to the results of this study, it is recommended to consider the mentioned indicators as main indicators in two sections of anthropometrics and biomechanics. Also, considering the fact that there is a significant difference between all the anthropometric indices other than (forearm length) among adult male and female elite rowers, and in discussing the comparison of the main biomechanical indices between their speed and flexibility indicators Significant differences were observed and there were no significant differences in the other main indicators, and in addition to the important common indicators between the two groups, men and women were mentioned as important indicators for each adult male and female elite roulette group. For better performance of training programs as well as advocacy it is recommended that coaches, in addition to the joint program between men and women to evaluate and evaluate the heroes of this field, depending on their gender, the important indicators of each group in the anthropometric and biomechanical parameters should also be considered separately.

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