Comparison of Body Composition and Physiological Characteristics of Kuwaiti Fencing Players by Types of Sword

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Foil players scored 754.4 (kg) more than Sabre 620.3 (kg) and Epee players 718.3 (kg),respectively. The result indicated that Foil players have higher anaerobic capacity. The Kuwaiti fencing players demonstrated above average score comparing with normal subjects (51-60 cm) in standing vertical jump (cm) test. However, the Foil players scored 65 cm slightly more than Epee 64 cm and higher than Sabre players 54 cm, respectively. The results of sit and reach test showed that the Epee 46±3 7.0 (cm) players scored higher than Sabre 39±31.6 and Foil players 40±36.9, respectively. The mean score for Kuwaiti fencers in hand grip dynamometer test was 48.9 kg which was in the average score when compared with normal subjects 48-51, respectively. A significant difference in all subjects (kg) was reported, the Kuwaiti Epee players scored 55.3kg more than Sabre 49.6kg and Foil players 41.8kg, respectively.

Conclusion

The purpose of this study was to determine body Composition and physiological characteristics of male Kuwaiti fencing players by types of swords. The results confirmed that the Foil players have higher anaerobic capacity but not in handgrip strength and flexibility. In addition, Foil players have higher aerobic capacity than Epee and Sabre.

The information obtained about differences in functional fencing performance tests among different levels of fencers are helpful for the design of successful training conditioning programs for competitive fencers. Also, will provide standards and a baseline for Kuwaiti trainers, .coaches, players, and future investigators .

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Introduction

The body Composition and physiological profile of athletes has been studied in depth during the recent years, providing information about their physical fitness and response to training workloads. However, the fencing players profile has not been the focus in many studies. In competitive athletes, developing an athletic performance profile require a detailed battery testing that thoroughly analyzed all the components comprising athletic performance (i.e., anaerobic power, speed, maximal aerobic capacity, aerobic endurance, flexibility and body composition). In addition, sport-specific athletic profile can provide both the athlete and coaching staff valuable information to assess the athlete's potential for a successful performance (7). By observing these measurements over the competitive season as well as during the off-season, athletes and coaches staff can monitor the effectiveness of various training programs, detect periods when detraining occurred, when recovering from an injury and assess the rate of progress toward previously attained training levels (7,13).

Modem fencers use three types of swords, each designed for a specific style of fencing. Each style has its own set of rules. Fencing is a sport of skill, speed and power. Fencing is a sport that played in one-time bouts of three minutes maximum (5 points) in the first rounds, but in playoff rounds, three bouts of three minutes maximum (15 points) is used. Also, in playoff rounds, a fencing bout can last for nine minutes. On the average, a high level fencer can fence between 5-7 different opponents during the championships. Since the recommendations of the American College of Sports Medicine (ACSM) guidelines for exercise testing and prescription indicate that not only do continuous long duration physical activities constitutes endurance activity, but discontinuous shorter and repeated activity (six times ten minutes) is considered endurance activity as well (7). Consequently, aerobic fitness is essential in successful fencing competition during. playoff rounds. Furthermore, flexibility and muscle strength as well as the range of motion are parameters that should be considered when designing a fencing training program (8).

There is a need for more information about the body Composition and physiological characteristics of Kuwaiti fencing players that may be associated with successful fencing performance comparing types of weapons used (Foil, Epee and Saber). Therefore, the purpose of this study was of two-folds, firstly, to provide the body Composition and physiological profile of Kuwaiti fencing players and, secondly, to compare the body Composition and physiological characteristics of Kuwaiti fencing players by different types of swords. Protocols were developed to

measures aerobic and anaerobic such as VO_{2max} . Wingate test, flexibility, grip strength, vertical jump, and percent body fat.

Method

Subjects:

Thirty male members of the Kuwaiti National Fencing team ages of 18-34 years participated in the present study, The subjects were divided into three groups of 10 players according to the type of swords used (Foil, Epee and Saber). All subjects, before testing, were informed about the risks and benefits of research and signed their written informed consent.

All subjects performed an incremental treadmill test to estimate aerobic endurance (maximal oxygen consumption (VO_{2max}) and anaerobic power (Wingate test). Also, to measure anthropometry (body mass, height, BMI and percent body fat), and to calculate lower-body muscular power (vertical jump), upper-body muscular power (right and left hand grip), and flexibility (sit and reach).

Anthropometry (body mass, height, BMI and percent body fat):

Weight and height were measured to the nearest 0.1 kg and 0.1 cm, with a Seca portable height stadiometer (Leicester, England). BMI was calculated using the following formula: weight (kg) / [height (m)]^2. Percentage body fat was estimated using the BOD POD air-displacement plethysmography (ADP) (Life Measurement, Inc, Concord, CA) device within 24 hours before the study began. The BOD POD is considered a reliable method of assessing body composition and has been validated through many independent research studies (1,2,3,4,5). However, in some subjects, 2-3 measurements were needed to obtain a satisfactory result. The full test required 3-5 minutes to complete and body fat percentage was automatically calculated by the computer; body density was calculated as mass/body volume and body fat percentage was calculated by using standard equations Jackson-Pollock method (6).

Aerobic endurance: Maximal oxygen consumption (VO_{2max}):

Subjects were instructed and the procedures was explained before the test began. Subject performed the $V0_{2max}$ test by running on the Quinton 31 Q65 treadmill (Quinton Instrument, U.S.A). Prior to the test, O_2 and CO_2 .analyzers the metabolic cart (COSMED Quark B2-Roma, Italia) were calibrated with standard gases and the flow sensor calibration was done. Subjects wore a facemask during the test to ensure the collection of breath by breath pulmonary gas exchange. The test sterted at 0% grade and at a speed were the effort was set at 70% of maximum heart rate (220-age). After performing a 5-minute warm up on the treadmill, the subjects asked to walking.

keeping the speed constant, 2% grade would be increased every two minutes. When either the subject's heart rate exceed 180bpm or RER $\geq$1.15, the 2% grade would be increased for every minute. Metabolic data including O_2 uptake, CO_2 output and RER were obtained using metabolic cart at 20-second sampling intervals.

Anaerobic power: Wingate test.

The single effort anaerobic test was performed on a Monark cycle-ergometer (model 864 with weights) (Monark, Varberg, Sweden). According to ACSM's Guidelines for Exercise Testing and Prescription (7), the procedure included a 5-minute low intensity bike warm-up with several 5-second high intensity bursts intersperse. Two to five minutes of easy biking was followed, after which the resistance test was applied. The resistance was set to 7.5% of the subject's body mass while they accelerated for 15 seconds. Then at full speed, the subjects asked to pedal at their maximum revolutions for a full 30 seconds while a computer attached to the bike monitored power output against time. For a cool down exercise, a two-minute period of easy cycling was applied.

Lower-body muscular power:

Standing vertical jump test: The subjects put chalk powder on their fingers to observe the jumping and standing height. The subject were asked to stand with the feet together with the dominant side against the wall. The subject then started the test by reaching as high as possible with his fingers and make a mark on the wall. The height of the mark was recorded. The subject moved the feet into a jumping position; the jumping position started from standing (no steps). Using a quick knee bend and arm swing the subject had to jump as high as possible and touch the wall at the height of the jump. The difference between the standing and jump chalk marks was recorded as jump height. The subject performed three jump trials and the best trial was selected.

Anaerobic power calculation (7):

The anaerobic power for the vertical jump test was calculated by the following equation:

Power= 2.21 X wt X $\sqrt{D}$.

Were 2.21= a constant; . $\sqrt{4.9}$.

Wt = body weight (kg) in jump clothes.

D = difference between standing reach and jump height (m). The result then multiplied by 100 for conversion to watts.

Upper-body muscular power (hand grip): (maximum handgrip strength assessment):

A hand grip dynamometer (Takei Scientific Instruments Co., Ltd, Japan) was used in the test. The hand grip size was first adjusted to a suitable position for each subject. Subjects were told to hold the hand grip dynamometer with one hand with both of their arms hanging at their sides. Subjects were told to squeeze the dynamometer with their maximum strength for around 3 seconds. They were required to breathe out and keep their arms straight. The subjects were tested with both of their left and right hand alternatively. Three trials were carried out for both hands and the maximum score in kilograms was recorded as the subject's final result. The result achieved was then used in the analysis.

Flexibility test:

Each player performed a standardized warm up consisting of five minutes running followed by a series of supervised stretching exercises. The sit and reach test was performed as a measure of lower back and hamstring flexibility. Subjects were first required to' take off their shoes. They sat in front of the modified sit and reach box (Model 01285, Lafayette Instruments Company, Indiana, U.S.). Subjects performed the test with the legs fully extended and knees relaxed. They were required to extend their arms forward as far as possible and hold at the furthest point for two seconds. Three trials were conducted and the best score was used as the results.

Statistical analysis

Descriptive statistics, including means and standard deviations were determined for all dependent variables including age (yrs), height (cm), weight (kg), BMI (kg/m^2), percent body fat (%), $V0_{2max}$ (mL/kg/min), Wingate test (kg); standing vertical jump (cm), grip strength (kg), and flexibility (cm),

One way analysis of variance (ANOVA) was tested for the comparisons of data among fencing players with different sword types followed by Tukey post hoc test to clarify the-group differences. In order to process the results of the study, the SPSS statistical program for Windows (Release 10.0, Chicago, IL, USA) was used. The statistical level of significance was set at $p<0.05$.

Results

The mean and standard deviations of the physical and body Composition characteristics of the all Kuwaiti fencing players were shown in Table I.

Table 1

Descriptive statistics of various body Composition characteristics of Kuwaiti fencing players according to the type of swords (n=30)

Variables	Type of Sword	N	Minimum	Maximum	Mean	Standard Division
Age (yrs)	Epee	10	18	24	20.3	2.00
	Sabre	10	19	25	21.9	1.8
	Foil	10	18	25	21.4	2.22
Weight (kg)	Epee	10	53.8	81.1	70.4	8.38
	Sabre	10	59.4	69.4	66.1	2.77
	Foil	10	56.	78.3	66.7	5.34
Height (cm)	Epee	10	173	182	178.0	2.86
	Sabre	10	165	177	173.7	3.33
	Foil	10	160	175	167.25	4.47
BMI (kg/m")	Epee	10	17.9	24.5	22.1	2.08
	Sabre	10	18.97	23.52	21.9	1.18
	Foil	10	21.56	27.76	23.8	2.03
Percent Body Fat (%)	Epee	10	11	15	13.83	1.20
	Foil	10	12.8	20.70	18.44	2.15
	Sabre	10	6.60	13.0	10.75	1.74

**Significant at .05 level*

Table I. shows the body Composition variables of all Kuwaiti fencing players. The age of Epee, Sabre and Foil players was ranged from 18 to 25 years with a mean of 21.2± 2.0 years. The height of the subjects ranged from 160 to 182 cm with a mean of 172.96±3.54 cm. The weight of the subjects was ranged from 60.2 to 99.7kg with a mean of 73.62±9.88kg. The BMI of the subjects ranged from 17.9 to 27.7 with a mean of 23.01± 22.2. The percentage body fat measured by the BOD POD was ranged from 6.6 to 20.70/0 with a mean of-14.3± 1.69%

Table 2

One way ANOVA of body Composition characteristics of all Kuwaiti fencing players (N=30)

Variables	Sum of Squares	Mean Square	F	Sig.
Age (yrs)	16.467	8.233	2.032	.151
Weight (kg)	123.218	61.609	1.757	.192
Height (cm)	580.850	290.425	22.358	.000*
BMI (kg/m^2)	110.569	10.737	3.254	.054
Body Fat (%)	572.296	181.629	103.014	.000*

**Significant at .05 level*

ANOVA test shows no significant differences between all Kuwaiti fencing players in weight and BMI. However, when applying Tukey Post Hoc test to

determine the differences within groups showed there was a significant differences between all Kuwaiti fencing players in height and body fat (%).

Table 3

Descriptive statistics of various physiological characteristics of Kuwaiti fencing players according to the type of sword (n=30)

Variables	Type of Sword	N	Minimum	Maximum	Mean	Standard Division
VO_2max (ml/kg/min)	Epee	10	55	59.5	57.04	1.29
	Sabre	10	50	53.54	52.17	1.17
	Foil	10	60.6	64.3	62.46	1.28
Wingate (kg)	Epee	to	542	883	7181	98.58
	Sabre	10	522	730	620,3	18.57
	Foil	10	600	918	754.4	23.59
Flexibility (cm)	Epee	to	28	46	37.0	6.18
	Sabre	10	23	39	31.6	4.11
	Foil	10	33	40	36.9	2.28
Standing vertical jump(cm)	Epee	10	41	64	52.3	6.51
	Sabre	10	51	58	54.8	1.87
	Foil	10	53	65	59.8	2.93
Handgrip (kg)	Epee	10	51	64	55.3	3.65
	Sabre	to	48	54	49.6	1.71
	Foil	10	37	44	41.8	2.04

Table 3. illustrates that $V0_{2max}$ (mL/kg/min) values were 57.04±1.29, 52.17± 1.17 and 62.46±1.28 for Epee, Sabre and Foil players, respectively. The results of anaerobic power (Wingate test) were 718.3±98.58, 620.3±18.57 and 754.4±23.59kg for Epee, Sabre and Foil players, respectively. The Epee, Sabre and Foil players recorded 37.0±6.18, 31.6±4.11 and 36.9±2.28cm in sit and reach test (flexibility), respectively. Standing vertical jump (cm) values were 52.3±6.51, 54.8±1.87 and 59.8±2.93 for Epee, Sabre and Foil players, respectively. The results of handgrip (kg) were 55.3±3.65, 49.6±1.71 and 41.8±2.04kg for Epee, Sabre and Foil players, respectively. It seems that the Foil players are more fit in all categories except the hand grip.

Table 4

One way ANOVA of physiological characteristics of all Kuwaiti fencing players (N=30)

Variables	Sum of Squares	Mean Square	F	Sig.
VO_2max (ml/kg/min)	529.824	264.912	168.406	.000*
Wingate (kg)	963000.07	48150.03	7.641	.002*
Flexibility (cm)	236.067	118.033	6.095	.007*
Standing vertical jump (cm)	287.267	143.633	8.137	.002*
Handgrip (kg)	912.600	456.300	75.260	.000*

*Significant at .05 level

ANOVA test illustrates there is a significant differences *(P≤05)*between all Kuwaiti fencing players in VO_{2max} (mL/kg/min), Wingate (kg), flexibility (cm), standing vertical jump (cm) and handgrip (kg).

However, when applying Tukcy Post Hoc test to determine the differences within groups showed there is significant differences in flexibility for Sabre players and in standing vertical jump test for Foil players.

Discussion

To our knowledge, the present study is the first to investigate the body Composition and physiological characteristics of Kuwaiti fencing players.

Body Composition and physiological profiles data are crucial in determining the success of athletic performance in all sports (7,13,18).

The results of this study demonstrate that significant differences exist in body Composition variables. It seems that the Epee players are heavier and taller than the Sabre and Foil players. The Foil players have more percent body fat and BMI than Epee and Sabre players.

Body composition refers to the relative amounts of fat and lean *tissue* in the body, usually expressed as body fat percentage (7). Body composition testing is not just about measuring fat. It can be a very effective tool for planning, monitoring progress, improving current athletic status, improving fitness components, part of a rehabilitation program, offering encouragement, and finding irregularities in behavior (13). Therefore, it is important to include the body composition values to the athletes profile.

Tsolakis and Vagenas (8) suggested that elite fencers are very similar to sub-elite in most of the body Composition traits. They added that other factors may determine the formation of the top levels of fencing players.

Atiyat et al (11) compared the body composition of Egyptian and Jordanian national fencing team. The result revealed that Egyptian players were heavier 78.8kg, taller I 82.4cm and higher percent body fat 19.9%, in comparison to Jordanian players 60.2kg, 170.9cm and 11.6% respectively. Also, Egyptian players had higher BMI 23.7 than Jordanian players 20.3. Iglesias and Rodriguez (17) reported that Epee fencers were taller than FoiI and Sabre fencers.

The results of a study of body composition and somatotype of the elite of Polish fencers by Sterkowicz-Przybycien (12) suggested that Sabre fencers (weight = 84.4 kg, somatotype = 3.4-5.4-1.8) were heavier than both Epee fencers (77.9 kg, 3.6-4.9-2.5) and Foil fencers (74.9 kg, 2.9-4.22.8). also, Sabre fencers had higher fat free mass and a higher BMI and fat free mass index than fencers of the other two weapons.

Koutedakis et al (14) studied seven international British men Epee fencers with a mean age of 25.6 years mean height of 181cm and mean weight 77kg. They reported no statistical differences for body weight, body mass index, and percentages of body fat during in-season compared with offseason measurements. They suggested that fitness training programs to improve muscle strength and cardiorespiratory fitness should be offered, throughout the year.

World class Epee fencers were approximately 184cm in height, and 77 kg in weight (10). However, in the present study the body Composition data are for height is 172cm and the mean weight of the subjects was 73kg. This an indication of Kuwaiti fencing players are shorter and lighter than elite players. The mean body fat percentages found 'in the present study 14.3%. were higher than the value of 12.2% reported for national class collegiate fencers(9) and Jordanian fencers 11.60/0 (11). This also an indication that the Kuwaiti players have more fat content in their body than the elite fencing players.

When applying ANOVA and Tukey Post Hoc test to determine the significant differences between all Kuwaiti fencing players in different types of swords, the results showed only significant differences $P \geq 0.05$ was reported for height and body fat (%). However, there was a significant differences between all Kuwaiti fencing players in weight and BMI.

Several studied on the physiological characteristics of fencers has demonstrated relationships between performance and certain physiological parameters relating to fitness (14,18). For example, world class Epee fencers have shown considerably higher values both for maximal oxygen intake (VO_{2max}) and for isometric and dynamic strength than normal untrained men of comparable age (15). Muscular strength variables have also been included in equations designed to predict Olympic team potential (16). Poulis et al (19), suggested that long-term training in fencing influences the strength characteristics of the lower limbs. Also, Tsolakis and Tsiganos (20), studied the influence of training on neuromuscular factors in elite and non elite fencers. They concluded that fencing training produces significant muscular and strength and the fencers' muscle elasticity seems to be an important factor in neuromuscular performance among fencers. Weichenberger et al (21) added that fitness endurance training was. appropriate measure and assessment for determining sped tic endurance in fencers.

A study results showed that Epee fencers have a high maximal aerobic power and high maximal isometric and dynamic strength (15).

The values of VO_{2max} (mL. kg-^{l}.min-^{l}) in the present study were 57.04± 1.29, 52.17± 1.17 and 62.46± 1.28 for Epee, Sabre and Foil players, respectively which is more than the average 43 mL.kg-^{1} .min-^{l} for untrained male subjects age between 18-22 years. However, Koutedakis et al (14) reported that VO_{2max} values of 58 and 54. mL.kg-^{1}.min-^{1} obtained during the off-season and in-season respectively are lower than the mL.kg-'.min-reported for six World class members of the Swedish national team (15), but higher than the 50.2 mL.kg-^{1}.min-^{1} reported for leg work performed by fencers of lower competition standards (9).

ANOVA results showed that Foil players have higher aerobic capacity than Epee and Sabre. This is may be due to the nature of the training and the performance in the competitive matches that required more time and demand more physical effort.

Wingate anaerobic test has been established as an effective tool in measuring both muscular power and anaerobic capacity in a 30 second. Also in the present study, Foil players scored 754.4 (kg) more than Sabre 620.3 (kg) and Epee players 718.3 (kg),respectively. The result indicated that Foil players have higher anaerobic capacity.

Standing vertical jump (cm) is a test to measure the explosive lower-body muscular (leg) power by calculating how high a player can jump. The Kuwaiti fencing players demonstrated above average score comparing with normal subjects (51-60 cm), However, the Foil players scored 65 cm slightly more than Epee 64 cm

and higher than Sabre players 54 cm, respectively. This finding confirmed that the Foil players have higher anaerobic capacity.

The sit and reach test was performed as a measure of lower back and hamstring flexibility. The practice of stretching exercises is commonly recommended for recreational and professional athletes before the training programs and the pre-event warm-up activities (22). The importance of stretching and flexibility was studied by Tsolakis et al (23), were ten male and ten female international level fencers participated. The results of this study suggested that stretching used before training or competition does not hinder fencing players performance. Consequently, fencers can continue performing any type of stretching before training or competition. In the fencing criteria, the Epee 46±3 7.0 (cm) players scored higher than Sabre 39±31.6 and Foil players 40:±36.9, respectively.

A hand grip dynamometer was used to measure the upper-body muscular power of the hand grip and forearm muscles. Atiyat et al (11) reported that Egyptian male fencing players scored higher (48.89kg) than Jordanian players (37.0kg) but both scores were below international standards for grip test. The mean score for Kuwaiti fencers was 48.9 kg which was similar to Egyptian players and was on average and above the average score when compared with normal subjects 48-51 and 52-55, respectively (13). In the present study a significant difference in all subjects (kg) was reported, the Kuwaiti Epee players scored 55.3kg more than Sabre 49.6kg and Foil players 41.8kg. respectively.

Conclusion

This study provided information about the body Composition and physiological characteristics of all Kuwaiti fencing players. The results obtained are supposed to be used as baseline reference for future investigation on player selection, talent identification, planning and improving the training program as well as enhancing the future development of fencing in the state of Kuwait.

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مقارنة تركيب الجسم وبعض المتغيرات البدنية للاعبي المبارزة بدولة الكويت حسب نوع السلاح

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من المهم جداً أن يتمتع لاعبو المبارزة بأعلى المستويات من القدرة واللياقة البدنية العالية حتى الأبحاث يستطيعوا المنافسة في البطولات الإقليمية والعالمية. ولكن بسبب عمد وجود الأبحاث والدراسات والمعلومات التي تتطرق إلى المتغيرات البدنية والفسيولوجية للاعبي المبارزة بمختلف الأسلحة في دولة الكويت، لذا فالهدف من الدراسة الحالية هو الاتي: للتعرف على المعلومات المتعلقة بالتكوين البدني والمتغيرات الفسيولوجية للاعبي المبارزة بالإضافة إلى المقارنة هذه المعلومات البدنية والمتغيرات الفسيولوجية للاعبي المبارزة حب الأسلحة المختلفة باستخدام الاختبارات الفسيولوجية والبدنية.

اشتملت العينة على ثلاثين لاعبا يمثلون المنتخب الوطني في الكويت تراوحت أعمارهم بين 18-34 سنة. قاموا بإجراء الاختبارات التالية: الجهد البدني على السير المتحرك لتقدير الحد الأقصى لاستهلاك الأكسيجين (التحمل الهوائي) واختبار (Wingate test) لتحديد التحمل اللاهوائي ولتحديد التكوين البدني تم إجراء القياسات التالية: وطول الجسم مؤشر كتلة الجسم والنسبة المئوية للدهون في الجسم. ولقياس القوة العضلية لعضلات الرجلين تم إجراء اختبار الوثب من الثبات واستخدام جهاز الديناموميتير (hand grip dynamometer) لقياس القوة العضلية لقبضة اليد وأخيراً لقياس عنصر المرونة استخدام اختبار الثني للأمام من الجلوس باستخدام صندوق المرونة.

أظهرت النتائج على أن هناك دلالة إحصائية على الزيادة في وزن وطول والجسم والنسبة المئوية للاعبي دول العالم 12.2%. وأن هناك اختلاف أيضاً بين اللاعبين الكويتيين حسب نوع السلاح المستخدم. وتعتبر قيمة الحد الأقصى لاستهلاك الأكسجين للاعبي الأيبية (Epee) ملليتر/ كجم من وزن الجسم / في الدقيقة 57.04، وللاعبي السابر (Sabre) 52.17 ولاعبي الفويل (Foll) 62.46 أعلى بالمقارنة مع متوسط الأفراد غير الرياضيين الذي يبلغ 43 ملليتر/ كجم/ دقيقة. وعند استخدام طريقة تحليل المتغيرات الإحصائي وجد أن لاعبي الفويل (Foll) لديهم قيمة أكبر

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من الأسلحة الأخرى وأيضاً في التحمل اللاهوائي. وعند قياس عنصر المرونة وقوة القبضة وحد أن لاعبي الأيبية (Epee) يتمتعون بمرونة وقوة عضلية أفضل.

يوصي الباحثان باستخدام المعلومات التي تم الحصول عليها من الاختبارات على لاعبي أسلحة المبارزة المختلفة في وضع وتقنين البرامج التدريبية الخاصة لكل سلاح بالإضافة إلى استخدام المعلومات والنتائج من المتدربين والباحثين وتطبيقها كمقياس ومعايير أساسية للبحوث والدراسات المستقبلية المتخصصة في لعبة المبارزة.

Comparison of Body Composition and Physiological Characteristics of Kuwaiti Fencing Players by Types of Sword

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Abstract

Background

It is important for fencing players to have an excellent level' of physical fitness in order to be successful in international competitions. There is. no data describing the body Composition and physiological characteristics of Kuwaiti fencing players by types of swords. Therefore, the purpose of this study was of two-folds, firstly, to provide the body Composition and physiological profile of Kuwaiti fencing players and, secondly, to compare the body Composition and physiological characteristics of Kuwaiti fencing players by types of swords.

Methods

Thirty national fencers aged 18-34 years were selected for the present study. They performed an incremental treadmill test to estimate aerobic endurance (maximal oxygen uptake (VO2max), anaerobic power (Wingate test), to measure anthropometry (body mass, height, BMI and percent body fat), to calculate lower-body muscular power (vertical jump), upper-body muscular power (right and left hand grip), and flexibility (sit and reach).

Results

The height of the subjects ranged from 160 to 182 cm with a mean of 172.96±3.54 cm. The weight of the subjects was ranged from 60.2 to 99.7kg with a mean of 73.62±9.88kg. The BMI of the subjects ranged from 17.9 to 27.7 with a mean of 23.01± 22.2. The mean body fat percentages 14.3%. were higher than the value of 12.2% reported for national class collegiate fencers. This also an indication that the Kuwaiti players have more fat content in their body than the elite fencing players. Also, a significant differences $P \leq 0.05$ was reported for height and body fat

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(%). However, there was a significant differences between all Kuwaiti fencing players in weight and BMI.

The values of VO_{2max} (mL.kg-^{1}.min-^{1}) were 57.04±1.29, 52.17±1.17 and 62.46± 1.28 for Epee, Sabre and Foil prayers, respectively which is more than the averag 43 ml.kg-^{1}.min-^{1} for untrained male subjects age between 18-22 years. ANOVA results snowed that Foil players have higher aerobic capacity than Epee and Sabre.