



## ORIGINAL ARTICLE

# Determining Physiological Profile of National Iranian Wushu Team

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### ABSTRACT

*For optimal implementation of movements and strikes as well as the effective competition in international fields, Wushu needs high levels of physiological abilities. The present study attempts to determine physiological profile of Iranian men's national Wushu team. Given that the number of youth and adults' national team's players and all Sanshou participated in the national team camp in 2013 was 18 people, all the population has been selected as the statistical sample. To measure physiological traits, Ergospirometry (aerobic power evaluation), Argojump test (Anaerobic power or lactic evaluation) (the first 30 seconds), 4×9 tests (agility evaluation), vertical sargent jump test (evaluating lower limb muscle power), curl-up and sit-up test (evaluating the endurance of lumbar muscles), show jumping (10 cm) (evaluating the endurance of foot's back muscles) (gastrocnemius and hamstring), forward bending test (evaluating flexibility of hamstring and lumbar muscles), 40-yard speed running (evaluating speed), and visual reaction rate test (evaluating the speed of reacting to visual stimulus) have been used. As the findings revealed, aerobic capacity of Iranian men's national Wushu team was 46.09 mg/min per kg, anaerobic capacity with lactic was 4.8 W per kg, lumbar muscle endurance of Taekwondo men was 57 per minute, lower limb muscle endurance was 132 per minute, the maximum lower limb muscle power was 58 and the speed of Iranian national Sanshou men for running a distance of 36 m was 5.15 seconds. Further, the rate of visual reaction of Iranian national Sanshou men was 0.429 seconds, the flexibility of lower limb for bending forward was 42 cm, the lumbar flexibility of Sanshou men for bending backward was 60.23 cm, and the agility profile for shuttle run (4×9) in a distance of 36 m was 8.50 seconds. The lack of physiological portfolio of elite Wushu of the country on one hand and different tests and indices used in few studies conducted inside and outside the country on the other hand have caused the results obtained by the internal and foreign studies cannot be directly compared with each other.*

*Keywords: Aerobic power, Anaerobic power, Reaction speed, Agility, Power, Flexibility*

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### INTRODUCTION

Wushu is also known as Kung Fu. Currently, there are various forms of Wushu. In spite of high variety in this kind of sport, creating standard conditions in terms of principle and techniques has recently provided the opportunity of this field in Olympic [1]; so that besides the official games, the world Wushu games were also held in Beijing Olympic of 2008. Competitive Wushu is composed of two disciplines of Taolu and Sanda. Taolu includes the official and standard forms, rotating movement with short and long weapons. Movements are evaluated with respect to accuracy, power and speed [1]. In Sanda part, fights are differently classified with respect to the weight of men and women. Wushu competitions are held in three 20minut rounds by considering 1 minute for rest between the two rounds [1]. Some researchers have studied physiological profiles of kick boxing [2], athletes [3 and 4], Judo [10-12], and Tekwando [13, 14]. According to the related literature, sportsmen who are involved with their competitors (Judo and wrestling) obviously have a high anaerobic capacity and power while in such sports, there are low body fat and high or average aerobic capacity [1, 5, 6, 9,15]. However, in sports like Karate and Tekwando, there are a high aerobic capacity and flexibility and average anaerobic capacity and power [2, 13, 14]. However, in Wushu, there is a combination of taking and striking which require the aforementioned physical preparation in a combinational form to be succeeded; with respect to the lack of the literature about physiological traits of Wushu, knowing these traits can lead to the success of sport teams [1]. As Kazemi (2009) reported, martial require muscle power with the maximum power and endurance since the muscular structure of lower limb plays an important role due to implementing fast and powerful

movements performed over combat and replace the weight of body. Of course, Agility, harmony and balance complete the mentioned abilities [16]. In Iran, some researchers have attempted to depict physiological and mental profile of athletes in various fields such as wrestling, football and Tekwando [17-19]. The results obtained by these studies have emphasized the importance of physiological indices in the success of different sport fields. By improving the level of physical training knowledge and sport sciences, few people can deny the key role of athletes' evaluation to improve their sport performance. The precise evaluation of physical, mental and professional preparation of elite athletes in the process of preparing them provides an opportunity for coaches and designers of exercises to be informed about overall preparation status of athletes and design their exercises based on the traits of each individual. Accordingly, in Wushu, it is necessary to implement specialized tests to obtain a reliable and practical framework in the country through standardization and profile providing in order to evaluate national Sanshou to achieve the best status of national players' performance.

Due to using the above mentioned factors, Wushu martial art calls for players who have especial conditions and capabilities. Therefore, recognizing these capabilities through physiological status and determining the related profiles can significantly contribute to the increase of Wushu efficiency. Accordingly, coaches need to evaluate the mentioned indices using authorized and appropriate methods and software, leading to providing an appropriate insight for coaches and researchers of sport sciences to select susceptible individuals and developing martial sports, especially Wushu. Furthermore, achieving these indices specifies the level of preparedness and weakness of Wushu and coaches can design particular exercises appropriate with players' needs. Given that Wushu is one of the sports in which players gain medals, comprehensive information about Wushu elites is undoubtedly not only the guidance of lower levels to achieve nobility to specify the way of gaining success in this sport but it is applied to design exercise programs of elites and remove their weaknesses. Additionally, physiological profile for national men Sandra team causes that coaches of national team and the authorities of federation be informed about the traits and needs of national players and such information can be an appropriate guidance to supply their needs; and in exercises, body building coaches emphasize on physiological factors which these factors have not high scores in national team players. Therefore, using the information provided by the present study will provide the opportunity of higher physical preparation of Iranian national Wushu men team. Hence, the present study has attempted to depict physiological profile of Iranian national Wushu men team. The obtained profile can be used by Wushu federation and provincial boards to provide the required schedule as well as by coaches and authorities focus on weaknesses and strengths to achieve more success by Iranian Wushu team in regional and international competitions.

## **METHODOLOGY**

The present project is an applied and descriptive study used survey method. The statistical population included all Iranian men's national Wushu team in 2013. With respect to the definition of elite player including 10 superior players of the country and/or national teams in various age range (adults, youth, adolescences) and/or premier league clubs' teams of a country (20). All Wushu participated in Sanshu part (the players of national youth and adults teams) are considered elite player. Therefore, the number of the statistical sample was 18 people since 18 players participated in national camp of the country in 2012. Notably, at the end of preparation period of Iranian national men's Wushu team for participating in international and Asian competitions of 2013 when the players were at the highest level of preparation, the considered tests were performed and these tests were recorded under appropriate conditions with the supervision of the specialist of physical capabilities assessment center of the national Olympic academy for 18 players of the national team. To assess physiological traits of national team's players, *Ergospirometry* (for aerobic power evaluation), *Argo jump* test (for Anaerobic power or lactic evaluation) (the first 30 seconds), *4×9* tests (for agility evaluation), vertical sargent jump test (for evaluating lower limb muscle power), curl-up and sit-up test (evaluating the endurance of lumbar muscles), show jumping (10 cm) (for evaluating the endurance of foot's back muscles) (gastrocnemius and hamstring), forward bending test (for evaluating flexibility of hamstring and lumbar muscles), 40-yard speed running (for evaluating speed), and visual reaction rate test (for evaluating the speed of reacting to visual stimulus) were used in the study.

After gathering data and regulating raw data of physiological traits tests, the physiological traits of the subjects were analyzed using descriptive statistics (mean and standard deviation) to determine the related profiles and the mean and standard deviation of the scores were computed through SPSS and Excel and their profile was depicted.

**RESULTS**

Table 1 presents demographic characteristics of Iranian national men’s Wushu team such as age, height, weight, and exercise background.

**Table 1.** Demographic Characteristics of Iranian National Men’s Wushu Team

Indices Subjects	Number	Age	Height	Weight	Exercise Background (Year)
Men	18	21/89±3/14	20±5/86179/	69/34±8/65	9/27±2/68

Shown in Table 1, the mean of age and height in national Wushu team’s players is 21.89 years and 176.53 cm, respectively. The mean of the players’ weight equals 69.34 kg and their exercise background is 9.27 years.

In the following, descriptive statistics (mean and standard deviation) to determine and depict physiological traits of Iranian national men’s Wushu team (see Tables 2, 3 and 4).

**Table 2.** Physiological Indices of the National Wushu Team’s Players

Indices	Mean and Standard Deviation	Z Score	Percentage
Aerobic power (mg/min per kg)	40/12±2/51	0/48	68
Aerobic power in anaerobic threshold (W for per kg)	5/96±0/37	0/44	67
Anaerobic power with Lactic ((W for per kg)	4/96±0/69	0/98	83
Lumbar muscle endurance	59/15±5/30	0/66	74
Lower limb muscle endurance	133/30±6/95	0/56	71
Maximum power of lower limb muscles (cm)	55/30±5/750	0/82	79
40-yard Speed (sec)	5/19±0/14	0/67	74
Visual reaction speed (one thousand seconds)	0/419±0/63	0/23	59
Lower limb’s flexibility	39±4/59	0/79	78
Lumbar flexibility	59/07±5/85	0/71	76
Agility	8/37±0/32	0/63	73

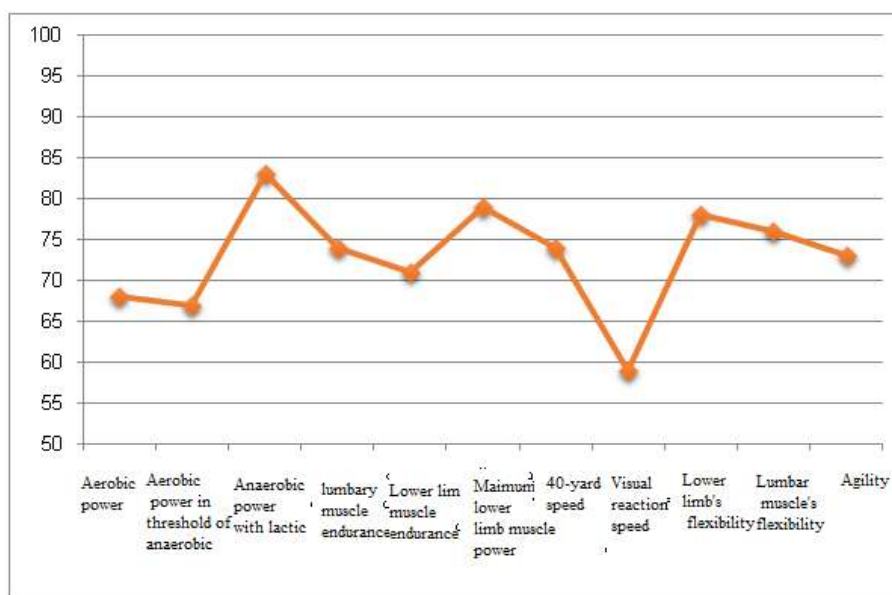


Figure 1. Linear Diagram of Physiological Traits of Wushu National Team’s Players

As shown in Figure 1, aerobic power of the players is 40.12 mg/min per kg; aerobic power in anaerobic threshold is 5.96 W per kg; aerobic power with lactic is 4.96 W per kg; lumbar muscle’s endurance is 59.15 per minute; and lower limb muscle’s endurance is 133.30 per minute. Further, the maximum lower limb muscle power is 55.30 cm; the speed of running a distance of 40 yards is 5.19 sec; visual reaction

speed is 0.419 sec; lower limb's flexibility for bending forward is 39 cm; lumbar flexibility for bending backward is 59.07 cm; and finally, agility profile for shuttle run (4×9) in a distance of 36 is 8.37 sec.

## DISCUSSION AND CONCLUSION

The purpose of the present study was to determine the profile of physiological traits of Iranian national men's Wushu team. The lack of physiological portfolio of elite Wushu of the country on one hand and different tests and indices used in few studies conducted inside and outside the country on the other hand have caused the results obtained by the internal and foreign studies cannot be directly compared with each other. However, the findings obtained by the present study have been compared with the other findings obtained from investigating elite Wushu's physiological traits. As the research findings revealed, the weakest trait of the players was their visual reaction speed. After this factor, aerobic power in anaerobic threshold was also evaluated weak. Therefore, coaches and authorities of the national team should plan to reinforce these weaknesses. For the national team, coaches and authorities should also select players gained high score in these two traits with respect to the importance of physiological traits such as the maximum muscular power in lower limb and anaerobic power with lactic.

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