



COMPARE THE REACTION TIMES OF TURKISH NATIONAL TEAM WRESTLERS

Haluk Koç,

Latif Aydosⁱ

Assoc. Prof. Dr., Gazi University, Faculty of Sports Sciences,
Physical Education and Sports Teaching Department,
Turkey

Abstract:

The purpose of this study is to compare the reaction time abilities in Olympic level male greco-roman and freestyle national team wrestlers. A total of 36 male Turkish wrestlers, 19 greco-roman wrestlers and 17 freestyle wrestlers have participated as volunteers in this study. Statistical analysis of the data was made by SPSS 17.0 statistical package program and Statistical comparison of the Greco-Roman and Freestyle wrestler groups was carried out using Mann Whitney-U test. Spearman's correlation coefficients (r =Spearman's rho) were used to express the relationships between parameters. According to results, there were no statistically significant correlation among reaction time and other parameters except agility ability of the wrestlers. Apparently, the reaction time has not affected most of these variables for elite level wrestlers.

Keywords: Turkey, reaction times, wrestler

1. Introduction

A wrestling is a physical competition, between two competitors, who attempt to gain and maintain a superior position. There are a wide range of styles with varying rules with both traditional historic and modern styles (<http://en.wikipedia.org/wiki/Wrestling>). There are two basic styles of international wrestling, Freestyle and Greco-Roman. The Greco-Roman Style and Freestyle basically differ from each other. In Greco-Roman wrestling, it is strictly forbidden to grasp the opponent below the belt line or to trip him or to use the legs actively to perform any action. In Freestyle wrestling, it is permissible to grasp the legs of the opponent and to trip him and to use the legs actively to perform any action (International Wrestling Rule Book, 2010).

ⁱ Correspondence: email khaluk@gazi.edu.tr, latifaydos@gmail.com

Wrestling is a struggle consisting of not only the tricks used to beat the opponent, but is also a kind of sports that requires anaerobic strength. Wrestling is an intermittent sport characterized by short duration, high intensity bursts of activity. It requires significant anaerobic fitness, and operates within a moderate-level of aerobic system. Percent contribution of energy systems in wrestling is estimated to be 30% alactic anaerobic, 30% lactic anaerobic, and 40% aerobic. Anaerobic power and capacity are important in wrestling because of the need of short-duration and high intensity performance (Yoon, 2002).

In any sporting effort performed by a wrestler there are certain fragments of intensive and short lasting work, therefore anaerobic processes play a particular role. In delivery of energy to muscles involvement of anaerobic metabolism, and especially glycolytic changes is essential. High level of lactic acid in blood after wrestling shows that competitors should be characterised by high anaerobic capacity (Hübner-Wozniak, 1993).

Time of reaction is the hereditary characteristic that determines the duration between a person's initial muscular response or motion against stimulation. It is a known fact that the reaction time varies in different branches of sports and that the sportsmen have better reaction times than the ordinary people (Moka et al, 1992). In his literature research regarding the time of reaction, Kosinski mentions that the intensity depending on the anaerobic power affects the time of reaction. In modern wrestling, time of reaction is one of the determinants of performance and is closely related to wrestlers in different styles on the time of reaction. Related to wrestlers' ability to make quick decisions, who are subject to pressure deriving from space, time and the opponent. Reaction time is a prominent ingredient in many sports why athlete should respond to various stimuli during the competition as it is in the wrestling. Although most of reactive movements are carried out involving by gross muscles in many sport events, there are limited researches were focused on reaction time (Spiteri, Cochrane, & Nimphius, 2013). The study compares the reaction time abilities in Olympic level male Greco-Roman and freestyle wrestlers.

2. Methods

2.1 Participants

A total of 36 male Turkish wrestlers, 19 Greco-Roman wrestlers and 17 Freestyle wrestlers have participated as volunteers in this study. They were informed in detail about tests procedures, possible risks and benefits of the results. The study was performed in accordance with the Declaration of Helsinki.

2.2 Anthropometrics

In order to identify athletes' somatotype, body fat percentage and body mass index (BMI), body height, body mass, triceps, biceps, subscapular, suprailiac and middle of calf' skinfold values were obtained. The whole skinfold and diameter measurements

was taken from the right side of the body. Body fat percentage was calculated with the formula developed by Siri. (Durnin & Womersley, 1974; Siri, 1956)

2.3 Strength Tests

Right-left hand grip strength and leg strength tests were performed by dynamometers (Baseline dynamometer, Fabrication Enterprises, USA). All strength tests result were calculated as relative strength values, which is dividing the test performance by the athlete's body weight.

2.4 Jumping Test

It was utilized jumping mat device for counter movement jump (CMJ) test (Smartjump, Fusionsport, Australia). In determining anaerobic power (AP) with Lewis nomogram, the subjects' CMJ heights (d) and body weight were calculated by using the jump formula (given below).

$$AP = [(\sqrt{4,9 \times \text{Weight}}) \times \sqrt{d}] \times 9.81 = \text{watt}$$

2.5 Speed Tests

In order to determine the subjects' sprint ability, running test of 20 meter was performed. All results were recorded using photoelectric timing gates (Smartspeed, Fusionsport, Australia).

2.6 Pro-agility Test

For the pro-agility test, which is also known as the 20 yard running test, pins were set 5 yards (4,57m) on the left and on the right side (Figure 1). A timing gate (Fusionsport, Australia) was placed at the starting line. This way repeating passes were recorded. Before the test starts the athletes takes position. When the athlete is ready she is first touching the right pin, then the left pin, passes the starting line and finishes the test. For each athlete the total time was recorded (Dawes & Roozen, 2012).

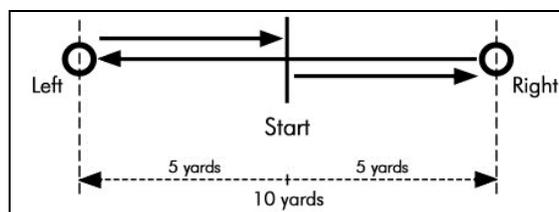


Figure 1: Diagram of the pro-agility test

Flexibility of the wrestlers was determined with using modified sit-and-reach test by normalized arm length (Baseline sit-reach scale, Fabrication Enterprises, USA).

2.7 Reaction Test

To evaluate reaction time of the research group, jumping mat and photocell system were used (Fusionsport, Australia). Participant has taken place on the jumping mat

with an offensive leg. Then the test were applied by given stimulus (audio-visual) from the photocell system.

2.8 Balance Tests

The standing stork test was performed to determine the wrestlers' balance ability (Mackenzie, 2005). The participants were fully resting between the tests in the measurement process.

2.9 Statistical analysis

General characteristics of the participants were presented as means and standard deviations (\pm SD). Statistical comparison of the Greco-Roman and Freestyle wrestler groups was carried out using Mann Whitney-U test. Spearman's correlation coefficients (r =Spearman's rho) were used to express the relationships between parameters. Interpretation of correlation coefficients was as follows: $r \leq 0.49$ weak relationship; $0.50 \leq r \leq 0.74$ moderate relationship; and $r \geq 0.75$ strong relationship (Portney & Watkins, 2015). A p value less than 0.05 was considered statistically significant.

3. Results

Athletes' reaction time results and their comparison were presented in Table 1. The wrestlers have shown similarity for reaction time according to findings ($p > 0.05$).

Table 1: Demographic, anthropometric features and the variables values of the research group

Variables	Greco-Roman (n=19)	Freestyle (n=17)	All (n=36)
Age (year)	23.6 \pm 3.7	23.7 \pm 2.5	23.6 \pm 3.1
Training experience (year)	12.0 \pm 3.6	12.7 \pm 2.5	12.3 \pm 3.1
Stature (cm)	171.6 \pm 7.6	171.7 \pm 8.2	171.7 \pm 7.8
Body mass (kg)	82.9 \pm 17.8	81.6 \pm 18.1	82.3 \pm 17.7
BMI (kg/m ²)	27.9 \pm 3.9	27.4 \pm 4.0	27.7 \pm 3.9
HG-Total (kg)	1.27 \pm 0.16	1.35 \pm 0.21	1.31 \pm 0.19
Leg Strength (kg)	2.21 \pm 0.21	2.12 \pm 0.62	2.17 \pm 0.45
AP (watt)	1129.2 \pm 228.1	1112.8 \pm 243.1	1118.3 \pm 232.1
0-20m sprint (20mS) (s)	3.084 \pm 0.14	2.963 \pm 0.06*	3.03 \pm 0.12
Pro-agility (ProA) (s)	4.585 \pm 0.18	4.478 \pm 1.17*	4.53 \pm 0.80
Flexibility (cm)	45.68 \pm 7.53	42.43 \pm 8.67	44.15 \pm 8.14
Balance (s)	9.20 \pm 9.53	20.51 \pm 18.99	14.54 \pm 15.63
Fat Free Mass (FFM) (kg)	68.0 \pm 11.7	68.2 \pm 11.8	68.08 \pm 6.81
Body fat %	17.3 \pm 4.2	15.4 \pm 5.2	16.4 \pm 4.7
Reaction Time (s)	0.252 \pm 0.05	0.254 \pm 0.04	0.253 \pm 0.04

*p<0.05

Table 2: Relationship between reaction time and age, training experience, strength, anaerobic power, speed, agility, flexibility, balance abilities and body fat percentage, FFS in Greco-Roman and Freestyle wrestlers

		Age	Training Experience	HG-Total	Leg Strength	AP	20mS	ProA	Flexibility	Balance	Body Fat %	FFM
Reaction Time	Greco	0.20	0.11	-0.41	-0.29	0.39	0.11	0.31	-0.10	0.01	0.30	0.37
	Free	-0.39	-0.33	0.03	0.04	0.00	0.20	0.42	0.33	0.27	0.08	0.00
	All	-0.04	-0.04	-0.14	-0.10	0.22	0.12	0.34*	0.05	0.10	0.18	0.24

*p<0.05

4. Discussion and Result

The reaction time which is the speed component may be advantageous to evaluate in wrestling such agility and speed abilities (Horswill, 1992; Kaya, 2016; Kraemer et al., 2001) for quick movements of wrestlers during the competitions. The present study has found that there are no significant differences between the wrestling styles. This result was coherent with previous studies (Koc, 2013; Mirzaei, Curby, Barbas, & Lotfi, 2013). Horswill (1992) have reported that there are no differences between successful and less successful wrestlers as well as non-wrestlers and wrestlers. Nevertheless, Kaya (2016) has elucidate that the reaction developing training increase the performance of the wrestlers unlike of the control group. It is considered that the inexplicit case between the studies' results may be caused from differences of the athletes levels in the studies and that there were not used sport-specific tests. Further, according to findings of the present study that reaction time of Greco-Roman (0.252 s) and Freestyle (0.254 s) were slower than the studies of Arslanoglu (2015) and Mirzaei et al. (2011), whereas faster than the researches which are reported by Kaya (2016), Mirzaei et.al (2013) and Yoon (2002). In conclusion, the present study has not found differences for reaction time abilities in wrestling styles. Similarly, there is no statistically significant correlation among reaction time and other parameters except agility ability of the wrestlers. There is a weak relationship between reaction time and agility features of the athletes ($\rho=0.34$, $p<0.05$). Apparently, the reaction time has not affected most of these variables for elite level wrestlers.

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