ORIGINAL ARTICLE

Physical and physiological profile in youth elite Chilean wrestlers

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Manuscript Preparation
E Funds Collection

David Venegas-Cárdenas [1,2ABCDE], **Rocío Caibul-Díaz** [1ABCDE], **Valentin Mons** [3ABCDE], **Pablo Valdés-Badilla** [4CD], **Aurélien Pichon** [3CD], **Daniela Cuadra** [2,5ABCDE], **Maicon Rodrigues Albuquerque** [6CD], **Jonatas Ferreira da Silva Santos** [7CD], **Tomás Herrera-Valenzuela** [1,5ABCDE]

[1] School of Sports and Physical Activity Sciences, Faculty of Health, Universidad Santo Tomás, Santiago, Chile
[2] Federación Deportiva Nacional de Lucha Olímpica de Chile, Santiago, Chile
[3] Laboratory Mobility, Aging & Exercise, Faculty of Sport Science, University of Poitiers, Poitiers, France
[4] Physical Education Pedagogy, School of Education, Universidad Autónoma de Chile, Santiago, Chile
[5] Laboratory of Sciences of Physical Activity, Sports and Health, Faculty of Medical Sciences, Universidad de Santiago Ode Chile, Santiago, Chile
[6] Combat Sports Laboratory, Universidad Federal de Minas Gerais, Belo Horizonte, Brazil
[7] Physical Training and Sport Performance Research Group, Physical Education Department, Health and Biological Science Faculty, Federal University of the Jequitinhonha and Mucuri Valleys, Minas Gerais, Brazil

Received: 12 September 2019; **Accepted:** 02 October 2019; **Published online:** 14 October 2019

AoBID: 12959

Abstract

Background and Study Aim: The most successful countries in wrestling have many studies that contribute development not only this sport. Results, conclusions and recommendations from these studies being essential to conduct research in Chilean wrestlers to establish indicators of evaluation for the needs of selection and training effects. The cognitive aim of this study is knowledge about physical and physiological profile in youth elite Chilean wrestlers and also correlation of measured specific and general adaptation indicators.

Material and Methods: Special Wrestling Fitness Test (SWFT), maximum oxygen uptake (VO_{2max}), squat jump (SJ), countermovement jump (CMJ), Abalakow's jump (ABK), relative strength index (RSI), handgrip strength, adipose and muscle tissues were measured on 20 young Chilean wrestlers, members of the national team of Chile. Data were analyzed with the GraphPad Prism 8 program, using t Student. Pearson and Spearman tests. For all cases, a significance value of $p \leq 0.05$ was established.

Results: There are significant differences between styles in age ($p = 0.0139$), height ($p = 0.0413$), VO_{2max} ($p = 0.0232$), handgrip EE ($p = 0.002$), handgrip EB ($p = 0.0008$), SJ ($p = 0.004$), CMJ ($p = 0.0043$), ABK ($p=0.0038$) and muscle tissue t-score ($p = 0.0088$). Significant correlations were found between the SWFT and VO_{2max} ($p<0.0001$), handgrip EE ($p = 0.012$), handgrip EB ($p = 0.0211$), SJ ($p = 0.0015$), CMJ ($p = 0.0002$), ABK ($p=0.0001$), RSI ($p = 0.003$) and % adipose tissue ($p<0.0001$).

Conclusions: All tests provide relevant information about the wrestler's performance, verifying that there are different physical, physiological and anthropometric variables that can be modified according to the wrestler style.

Keywords: aerobic fitness • combat sports • field testing • performance • physical condition

Conflict of interest: Authors have declared that no competing interest exists

Ethical approval: The study was approved by the Scientific Ethics Committee of the Santo Tomás University of Chile

Provenance & peer review: Not commissioned; externally peer-reviewed

Source of support: Departmental sources

Author's address: Tomás Herrera-Valenzuela, Las Sophoras 175, Estación Central, Santiago, Chile; e-mail: tomas.herrera@usach.cl

INTRODUCTION

The most successful countries in wrestling have many studies that contribute development not only this sport [1-13]. Results, conclusions and recommendations from these studies being essential to conduct research in Chilean wrestlers to establish indicators of evaluation for the needs of selection and training effects.

Olympic wrestling is characterized for being an intermittent sport [3] and having high demands of force, anaerobic power and aerobic capacity [14]; these capabilities are decisive to perform in the competition [1, 15, 16]. Force and power are used for attacks and counterattacks that are executed explosively and repetitively [17, 18]. Aerobic capacity is involved in recovery during combat and competition [3, 19-21].

Physical, psychological and technical-tactical preparation is of great importance to have a remarkable performance during the competition [1, 22]. becoming necessary to incorporate different tests to acknowledge specific characteristics of the athletes and energy contributions during each phase of the fight [23]. Some authors believed that the regular monitoring of physical and physiological performance increases the likelihood of success in the competition [24]. Besides, the specific tests can be used to the identification and development of young athletes as well as the identification of strengths and weaknesses of the athletes [14, 25].

Moreover, Karimi [21] showed the Special Judo Fitness Test (SJFT), which was initially developed by Sterkowicz [18] to evaluate judo athletes, can be valid to evaluate anaerobic fitness of the wrestler's athletes. On the other hand, the relationship of the SJFT with other measures of physical and physiological performance, such as strength, power, and aerobic fitness, could be of great interest in wrestler athletes.

In the end, two wrestling styles are included in the Olympic Games: Greco-Roman, in which only upper body attacks are allowed, and freestyle, in which upper and lower body techniques are used [26]. When compared, the wrestling styles seem to show distinct physical and physiological characteristics [27]. As an example, no significant differences were found in the anthropometric and physical features between freestyle and Greco-Roman wrestlers. However, the Greco-Roman wrestlers showed a higher level of relative leg power, peak arm power, relative peak arm power, and relative average arm power than freestyle wrestlers. Also, Greco-Roman wrestlers were significantly faster, had better agility, and a greater level of leg strength than freestyle wrestlers, but freestyle wrestlers were more flexible than Greco-Roman wrestlers. In this way, it seems crucial to verify the possible physical and physiological differences between athletes competing in different styles.

The cognitive aim of this study is knowledge about physical and physiological profile in youth elite Chilean wrestlers and also correlation of measured specific and general adaptation indicators.

MATERIAL AND METHODS

Participants

All Chilean wrestlers born between 2000 and 2005 (n = 85), who had their license from the Chilean federation, were considered in this study. The final sample consisted of 20 wrestlers, distributed in 14 men (8 Greco-Roman and 6 freestyle) and 6 women (freestyle), belonging to the Chilean national teams, U15. Cadet. and Junior (Table 1).

The inclusion criteria were: a) at least two years of experience in Olympic wrestling; b) train at least five times per week; c) being in a competitive period; d) have at least two months of uninterrupted training. While the exclusion criteria were: a) to have an injury or physical disorder that would disable them from sports practice; this criterion excluded three wrestlers (1 man and 2 women).

Combat sports – it involves different competitive contact sports with the purpose of the scoring point.

Combat sport – ***noun*** a sport in which one person fights another, e.g. wrestling, boxing and the martial arts [52].

Wrestling – activity of grappling with an opponent and trying to throw or hold them down on the ground.

Wrestling – ***noun*** a sport in which two contestants fight by gripping each other using special holds, each trying to force the other's shoulders onto a mat [52].

Physical condition – (in this article) it refers to the body state and physical possibilities.

Physical conditioning – ***noun*** same as **conditioning** [52].

Conditioning – ***noun*** the work or programme used to bring somebody or something to a good physical state [52].

Performance – ***noun*** the level at which a player or athlete is carrying out their activity, either in relation to others or in relation to personal goals or standards [52].

Field testing – ***noun*** testing for something such as biomechanical analysis, carried out at the athlete's usual training ground, for maximum authenticity of results [52].

Aerobic capacity – ***noun*** same as **VO2Max** [52].

Aerobic power – ***noun*** same as **VO2Max** [52].

Anaerobic capacity – ***noun*** the maximum amount of energy that can be produced by anaerobic metabolism [52].

Aerobic fitness – ***noun*** the ability to complete longer activities such as running, swimming or climbing that involve aerobic metabolism [52].

All participants were informed verbally and in writing of the purpose, methods, and means of the study. They signed an informed consent authorizing the use of the information for scientific purposes, while for minors, they were also requested to have their parent's consent.

The research protocol was reviewed and approved by the Scientific Ethics Committee of the Santo Tomás University of Chile and was developed following the Helsinki Declaration.

Procedures and Measures

Measures were carried out at the Olympic Training Center of Chile during April and May of 2019. Before each test, the participants completed a 20 min warm-up, which included general and specific wrestling exercises. To avoid any learning effect that could explain the improvement of the actions over time, the participants were familiarized with each test and the material before each evaluation.

We measured physical and physiological profile in youth elite Chilean wrestlers. Also, we correlated Special Wrestling Fitness Test (SWFT) performance with maximum oxygen uptake (VO_{2max}), jumps (Bosco Test), relative strength index (RSI), handgrip force, adipose, and muscular tissue could produce important results for trainers.

SWFT was performed with the athlete throwing two other wrestlers (that were 6 m apart from each other) as many times as possible in three series of 15, 30 and 30s respectively, with 10s of rest between each series [21, 26]. Greco-Roman wrestlers used a head and arm throw technique, while Freestyle used fireman's carry technique (Figure 1).

Heart rate was monitored using a Polar device (H10 model, Bluetooth, United States), during the entire test and 3 min once it finished [28, 29]. SWFT performed on a wrestling mat (Dollamur FlexiRoll, Texas, United States) approved by the United World Wrestling for international competitions. SWFT index was calculated using the following equation:

$$\text{SWFT} = \frac{\text{final HR} + 1\ \text{min HR}}{\text{A} + \text{B} + \text{C}}$$

VO_{2max} was estimated through the Yo-Yo intermittent recovery test on a surface where athletes could run during the entire test without any trouble [30]. The sounds were played by a notebook (Asus, E402S model, China) using high-range speakers, so the athletes could listen to the audio sound signals to maintain a race rhythm. The test was carried out until the participants were exhausted; the second time they failed to reach the mark before the sound signal, the test was finished, leaving the previous level as the best.

Squat jump (SJ), countermovement jump (CMJ), Abalakow's jump (ABK) were measured by the app "My Jump 2" [31-34] using an iPhone 7 (A1778 model, China) to assess the vertical jump height. Athletes were instructed to jump as high as possible following the protocols of each jump established by Bosco et al. [35, 36]. The rebound jump test was performed on an AxonJump contact mat (Buenos Aires, Argentina) [37, 38] to determinate the relative strength index. Athletes were instructed to perform a CMJ as high as possible, bouncing quickly and high on the contact mat [39, 40], in order to obtain the contact times in the ground and height reached. The index was calculated using the following formula:

$$\text{RSI} = \frac{\text{height (meters)}}{\text{contact time (seconds)}}$$

Athletes used their dominant hand to evaluate handgrip force [39] using a hydraulic dynamometer *Standar Baseline*® (United States) with capacity up to 200 pounds. The first evaluation was carried out with the elbow extended and the second with

Anaerobic power – *noun* same as **anaerobic capacity** [52].

Tissue – *noun* a type of substance that the body is made up of, e.g. skin, muscle or nerves [52].

Technique – *noun* a way of performing an action [52].

Abalakow's vertical jump – ABL-A with arm swing; ABL-NA without arm swing [36].

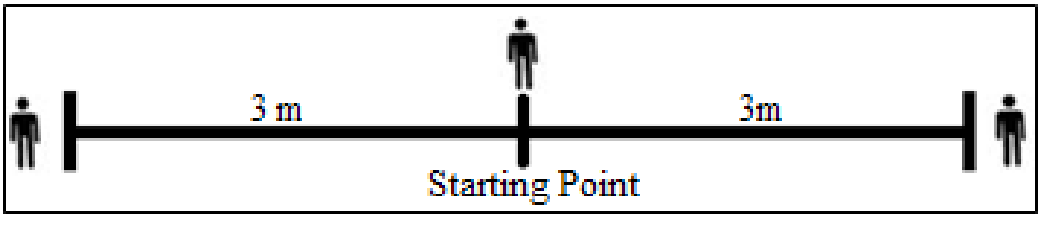

Figure 1. Special Wrestling Fitness Test distances.

the elbow bent, generating an angle of 90° [41]. Each evaluation was executed three times with a rest interval of 1 min between each attempt. Athletes were instructed to generate the greatest possible force for 5 s in a standing position.

Adipose and muscular tissue were determined using the anthropometric fractionation method proposed by Ross and Kerr [42]. Weight and height were recorded with an electronic scale (Charder. MS4900 model. Taiwan). Tricipital, subscapular, supraspinal, abdominal, medial thigh, and calf skinfolds were measure with a *SlimGuide* Caliper (China; precision: 0.05 mm). Relaxed arm, forearm, thorax, medial thigh, and calf variables were measured with a measuring tape (ADE®. MZ10021 model. Germany).

Statistical analysis

The GraphPad Prism 8 program was used to perform the corresponding statistical tests. Firstly, the normality of the sample was verified through the D'Agostino & Pearson test. The analyses were performed by wrestling styles (Greco-Roman and freestyle) and together. The Pearson correlation test (parametric) and the Spearman correlation test (non-parametric) were used, as appropriate. T Student test was used to assess if there were differences between wrestling styles in all the variables evaluated. For all cases, a significance value of $p \leq 0.05$ was established. Additionally, the statistical power was calculated as $r = \sqrt{t^2/t^2 + gl}$, using the following classification: 0.1 (small), 0.3 (medium) and 0.5 (large).

Table 1. Means and standard deviations of the tests for Greco-Roman, freestyle and together. differences between styles and effect size.

Variable	Greco-Roman (n=8)	Freestyle (n=12)	p Value	r Value	Total Sample (n=20)
Age (years)	16.9 ±1.6	15.0 ±1.4	0.0139	0.54	15.8 ±1.7
Weight (kg)	75.3 ±14.2	63.3 ±11.8	0.0629	0.42	68.1 ±14.3
Height (cm)	169.0 ±7.4	162.5 ±4.8	0.0413	0.46	165.1 ±7.2
SWFT Index	14.6 ±2.8	16.9 ±2.5	0.0702	0.41	15.8 ±2.8
Total Throws (n)	24.1 ±4.0	21.3 ±2.8	0.0828	0.40	22.5 ±3.5
Throws Series A (n)	5.6 ±0.9	4.8 ±0.8	0.0313	0.48	5.1 ±0.9
Throws Series B (n)	9.8 ±1.7	8.7 ±1.4	0.1384	0.34	9.1 ±1.6
Throws Series C (n)	8.8 ±1.7	7.9 ±0.9	0.1634	0.32	8.3 ±1.3
Final HR	187.1 ±8.2	189.3 ±8.8	0.5787	0.13	188.5 ±8.4
1min HR	155.5 ±13.6	164.9 ±11.6	0.1145	0.36	161.2 ±13.0
VO_{2max} (ml/kg/min)	45.1 ±3.4	41.5 ±3.1	0.0232	0.50	43.0 ±3.6
Handgrip EE	49.5 ±7.4	36.7 ±8.0	0.002	0.65	41.8 ±9.9
Handgrip EB	49.3 ±5.9	35.3 ±8.5	0.0008	0.69	40.9 ±10.2
SJ (cm)	33.8 ±4.0	25.2 ±6.6	0.004	0.61	28.6 ±7.1
CMJ (cm)	37.1 ±5.5	27.7 ±6.7	0.0043	0.61	31.5 ±7.7
ABK (cm)	42.3 ±7.6	31.7 ±6.5	0.0038	0.62	36.0 ±8.6
RSI	1.9 ±0.7	1.3 ±0.5	0.0512	0.44	1.5 ±0.6
Adipose tissue (%)	25.7 ±6.3	30.0 ±5.3	0.1221	0.36	28.3 ±6.0
Adipose tissue (kg)	19.8 ±7.1	19.0 ±5.3	0.7713	0.07	19.3 ±5.9
Adipose tissue (t-score)	43.7 ±9.3	40.1 ±10.1	0.4307	0.19	42.3 ±9.5
Muscle tissue (%)	56.0 ±3.6	50.8 ±7.4	0.0838	0.40	52.9 ±6.6
Muscle tissue (kg)	42.4 ±8.4	33.0 ±13.1	0.0922	0.39	36.7 ±12.2
Muscle tissue (t-score)	84.8 ±14.5	65.3 ±14.5	0.0088	0.57	73.1 ±17.1

SWFT Special Wrestling Fitness Test; **Final HR** heart rate at the end of the SWFT; **1min HR** heart rate one minute after the SWFT ended; **Handgrip EE** handgrip elbow extended; **Handgrip EB** handgrip elbow bent; **SJ** squat jump; **CMJ** counter movement jump; **ABK** Abalakow's jump; RSI = relative strength index.

RESULTS

There are significant differences between styles in height (t = 2.190; IC = 0.2668 to 12.82; d = 6.542 ±2.987), age (t = 2.726; IC = 0.43 to 3.32; d = 1.875 ±0.6878), throws series A (t = 2.3357; IC = –1.66 a –0.09; d = 0.8 ±0.384), VO_{2max} (t = 2.481; IC = 0.5523 to 6.664; d = 3.608 ±1.455), handgrip elbow extended (t = 3.615; IC = 5.376 to 20.29; d = 12.83 ±3.55), handgrip elbow bent (t = 4.02; IC = 6.684 to 21.32; d = 14 ±3.482), SJ (t = 3.293; IC = 3.13 to 14.17; d = 8.65 ±2.627), CMJ (t = 3.261; IC = 3.332 to 15.4; d = 9.367 ±2.873), ABK (t = 3.321; IC = 3.874 to 17.22; d = 10.55 ±3.176) and T-Score of muscular tissue (t = 2.936; IC = 5.524 to 33.31; d = 19.42 ±6.613) (Table 1).

Correlations (*r* value) and significances (*p* value) of each wrestling style and together, between SWFT index and the variables evaluated shows Table 2.

Correlations (*r* value) and significances (*p* value) of each wrestling style and for the whole fighters, between heart rate sum (final HR + 1min HR) in the SWFT and the variables evaluated shows Table 3). Meanwhile, Table 4 shows correlations (*r* value) and significances (*p* value) of each wrestling style and together, between the number of total throws in the SWFT and the variables evaluated.

DISCUSSION

Based on the data obtained, we can mention that there are significant differences in physical performance between Greco-Roman and freestyle wrestling, as in the Arzu-Vardar et al. [43] study. SWFT is a field test (field testing,) that has anaerobic components at the time of performing techniques and aerobic components for recovery between techniques, making it an intermittent test approaching

Table 2. Correlations between SWFT index and the variables evaluated.

Variable	Greco-Roman (n = 8)		Freestyle (n = 12)		Total Sample (n = 20)	
	r Value	p Value	r Value	p Value	r Value	p Value
Total Throws (n)	– 0.9689	0.0001	– 0.9340	0.0001	– 0.9542	<0.0001
Throws Series A (n)	– 0.8394	0.0091	– 0.7225	0.008	– 0.8188	<0.0001
Throws Series B (n)	– 0.9032	0.0021	– 0.8812	0.0002	– 0.904	<0.0001
Throws Series C (n)	– 0.9673	<0.0001	– 0.902	<0.0001	– 0.9197	<0.0001
Final HR	0.6535	0.0788	0.6601	0.0195	0.6453	0.0021
1min HR	0.02059	0.9614	0.6697	0.0172	0.4505	0.0462
HR sum	0.09715	0.819	0.5312	0.0755	0.3989	0.0815
VO_{2max} (ml/kg/min)	– 0.8146	0.0138	– 0.3251	0.2988	– 0.7719	<0.0001
Handgrip EE	– 0.3943	0.3337	– 0.4191	0.1751	– 0.5502	0.012
Handgrip EB	– 0.6192	0.1016	– 0.4412	0.151	– 0.5118	0.0211
SJ (cm)	– 0.7516	0.0315	– 0.5201	0.083	– 0.6615	0.0015
CMJ (cm)	– 0.7863	0.0206	– 0.6155	0.0331	– 0.736	0.0002
ABK (cm)	– 0.7648	0.0271	– 0.6280	0.0288	– 0.7499	0.0001
RSI	– 0.7594	0.0288	– 0.3608	0.2492	– 0.6279	0.003
Adipose tissue (%)	0.9514	0.0003	0.8414	0.0006	0.9063	<0.0001
Adipose tissue (kg)	0.8225	0.0122	0.5764	0.0498	0.6027	0.0049
Adipose tissue (t-score)	0.7869	0.0205	0.7091	0.0098	0.7421	0.0002
Muscle tissue (%)	0.1381	0.7444	– 0.3117	0.3218	– 0.1902	0.4218
Muscle tissue (kg)	0.4088	0.3146	– 0.2368	0.4532	– 0.2172	0.3577
Muscle tissue (t-score)	0.1242	0.7696	– 0.3630	0.2462	– 0.3536	0.1262

SWFT Special Wrestling Fitness Test; **Final HR** heart rate at the end of the SWFT; **1min HR** heart rate one minute after the SWFT ended; **HR sum** heart rate sum between Final HR and 1min HR; **Handgrip EE** handgrip elbow extended; **Handgrip EB** handgrip elbow bent; **SJ** squat jump; **CMJ** counter movement jump; **ABK** Abalakow's jump; **RSI** relative strength index.

Table 3. Correlations between Heart Rate sum in the SWFT and the variables evaluated.

Variable	Greco-Roman (n = 8)		Freestyle (n = 12)		Total Sample (n = 20)	
	r Value	p Value	r Value	Valor p	r Value	p Value
SWFT Index	0.0971	0.819	0.5312	0.0755	0.3989	0.0815
Total Throws (n)	0.1071	0.8007	– 0.2325	0.4671	– 0.1495	0.5293
Throws Series A (n)	0.0752	0.8595	– 0.1142	0.7238	– 0.1358	0.5681
Throws Series B (n)	0.2073	0.6223	– 0.1435	0.6563	– 0.0692	0.7718
Throws Series C (n)	0.0092	0.9828	– 0.4005	0.197	– 0.2277	0.3343
Final HR	0.6323	0.0925	0.7838	0.0026	0.7285	0.0003
1min HR	0.9811	<0.0001	0.9046	<0.0001	0.9336	<0.0001
VO_{2max} (ml/kg/min)	– 0.1981	0.6382	0.000	>0.9999	– 0.209	0.3766
Handgrip EE	0.3921	0.3367	– 0.0583	0.8571	– 0.0650	0.7854
Handgrip EB	0.2838	0.4957	– 0.1624	0.6142	– 0.215	0.3627
SJ (cm)	– 0.0876	0.8367	– 0.1904	0.5534	– 0.261	0.2664
CMJ (cm)	0.1661	0.6943	– 0.3604	0.2498	– 0.2729	0.2443
ABK (cm)	0.02295	0.957	– 0.4005	0.197	– 0.3054	0.1905
RSI	0.1198	0.7776	– 0.1219	0.706	– 0.1192	0.6167
Adipose tissue (%)	– 0.0043	0.992	0.4228	0.1709	0.2927	0.2105
Adipose tissue (kg)	0.2336	0.5776	0.4703	0.1228	0.3286	0.1572
Adipose tissue (t-score)	0.3441	0.4039	0.433	0.1597	0.4208	0.0647
Muscle tissue (%)	0.9941	<0.0001	– 0.014	0.9739	0.213	0.3673
Muscle tissue (kg)	0.6507	0.0806	0.0911	0.7782	0.0692	0.7718
Muscle tissue (t-score)	0.8476	0.0079	– 0.1791	0.5927	0.0609	0.7987

SWFT Special Wrestling Fitness Test; **Final HR** heart rate at the end of the SWFT; **1min HR** heart rate one minute after the SWFT ended; **Handgrip EE** handgrip elbow extended; **Handgrip EB** handgrip elbow bent; **SJ** squat jump; **CMJ** counter movement jump; **ABK** Abalakow's jump; **RSI** relative strength index.

the reality of competition. It allows the quantification of anaerobic [43, 45] and aerobic [26] capacities. In the absence of an Olympic wrestling study that classifies the level of the athletes by their performance in a specific field test, such as the SWFT, other studies [21, 46] have been using the classification table proposed by Franchini et al. [47] with judo athletes, classifying the athletes of this study with "very poor" performance. Differences between style also occur with athletes in Greco-Roman style classified as "poor" performance and freestyle as "very poor" performance level.

The Yo-Yo intermittent recovery test was used in a previous study with wrestlers [26] giving similar values of VO_{2max} to those obtained in this study. In a study by Mirzaei et al. [21] with cadet wrestlers, similar values were found to those obtained in this study. However, VO_{2max} values of the athletes in this study are lower than those reported in Iranian youth wrestlers [1, 47]. Theoretical VO_{2max} has a high correlation with the number of total throws and index of the SWFT, so it can be an indirect indicator of changes in the VO_{2max} of the athletes.

When comparing the results of this study with those obtained by López-Gullón et al. [48], we can realize that Chilean Greco-Roman wrestlers have similar performance in the SWFT. While freestyle wrestlers of this study have lower levels of strength. When handgrip results are relativized with body weight, the results of this study are classified as "poor" compared to those obtained by Mirzaei et al. [1]. Handgrip has a moderate correlation whit the SWFT index, being identified as a variable that can determine athletic performance.

SJ, CMJ, ABK and RSI values obtained indicate that these young fighters are below the average of a high-performance athlete, as proposed

Table 4. Correlations between the number of total throws in the SWFT and the variables evaluated.

Variable	Greco-Roman (n=8)		Freestyle (n=12)		Total Sample (n=20)	
	r Value	p Value	r Value	Valor p	r Value	p Value
SWFT Index	– 0.969	<0.0001	– 0.934	<0.0001	– 0.9542	<0.0001
Throws Series A (n)	0.83	0.0108	0.7734	0.0032	0.8351	<0.0001
Throws Series B (n)	0.9645	0.0001	0.9777	<0.0001	0.9688	<0.0001
Throws Series C (n)	0.9858	<0.0001	0.9113	<0.0001	0.954	<0.0001
Final HR	– 0.471	0.2388	– 0.4211	0.1728	– 0.4471	0.0481
1min HR	0.2183	0.6035	– 0.3916	0.2081	– 0.2102	0.3737
HR sum	0.1071	0.8007	– 0.2325	0.4671	– 0.1495	0.5293
VO_{2max} (ml/kg/min)	0.821	0.0125	0.4672	0.1264	0.8286	<0.0001
Handgrip EE	0.5225	0.184	0.4418	0.1505	0.5842	0.0068
Handgrip EB	0.7134	0.0469	0.3982	0.1998	0.5149	0.0202
SJ (cm)	0.7392	0.0361	0.5096	0.0905	0.6388	0.0024
CMJ (cm)	0.8426	0.0086	0.582	0.0471	0.7279	0.0003
ABK (cm)	0.7784	0.0229	0.5814	0.0472	0.7361	0.0002
RSI	0.8222	0.0123	0.4226	0.1711	0.7058	0.0005
Adipose tissue (%)	– 0.9497	0.0003	– 0.776	0.003	– 0.8817	<0.0001
Adipose tissue (kg)	– 0.7607	0.0284	– 0.5042	0.0946	– 0.563	0.0098
Adipose tissue (t-score)	– 0.7051	0.0508	– 0.6447	0.0236	– 0.6771	0.001
Muscle tissue (%)	0.0628	0.8826	0.2336	0.4619	0.2555	0.2769
Muscle tissue (kg)	– 0.2661	0.5241	0.1188	0.7105	0.256	0.276
Muscle tissue (t-score)	0.0594	0.8888	0.4313	0.1616	0.4146	0.0691

SWFT Special Wrestling Fitness Test; **Final HR** heart rate at the end of the SWFT; **1min HR** heart rate one minute after the SWFT ended; **HR sum** heart rate sum between Final HR and 1 min HR; **Handgrip EE** handgrip elbow extended; **Handgrip EB** handgrip elbow bent; **SJ** squat jump; **CMJ** counter movement jump; **ABK** Abalakow's jump; **RSI** relative strength index.

by Weineck [49]. The Bosco Test jumps and the RSI have a high correlation with the SWFT index and total number of throws because power and reactivity performance of the lower limb is important attacks and defense movements during combats [19].

In body composition, muscle and adipose tissue no differences were found between styles, except in T-Score of muscle tissue, where Greco-Roman wrestlers presented higher percentile than freestyle (Table 1). The index and the total number of throws in the SWFT have high correlation with adipose tissue, confirming the better performance observed with lower adipose tissue [50].

Martínez-Abellán & Radabán-Iniesta [26] showed correlations that did not exceed the moderate level of significativity (0.5 / –0.5), whereas this study is able to identify stronger relationships between the index and total number of throws in the SWFT and the other test performed by the athletes of this study. Meanwhile, the heart rate sum does not show significant correlations to determine athletic performance.

For subsequent studies, it should be considered that the significant differences in strength and resistance between Greco-Roman and freestyle, does not reflect wrestling performance in the SWFT index.

Practical applications: the results of this research provide a physical and physiological baseline of the Chilean reality in youth athletes, giving coaches the possibility of establishing indicators in control tests [51]; these data can become a guide for coaches, allowing them to generate individual programming and planning for athletes. depending on the style and physical profile they present.

CONCLUSIONS

The specific field test of the Olympic wrestling known as Special Wrestling Fitness Test, provides relevant information about the wrestler's performance, verifying that there are different physical and physiological variables that can be modified according to the wrestler style and fighter characteristics. It could be useful to continue this research using a larger population and including new tests that have not been carried out in this study to evaluate more precisely all the component of high performance.

HIGHLIGHTS

This study allows the characterization of physical and performance profile of young Chilean wrestlers. The results would be of great interest to recruit and train young fighters.

ACKNOWLEDGMENTS

We would like to thank different coaches of the Chilean federation and all the athletes who provided the possibilities to make this study possible. As well as to the families of the Chilean wrestlers who support them and us during the execution of the evaluation process.

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Cite this article as: Venegas-Cárdenas D, Caibul-Díaz R, Mons V et al. Physical and physiological profile in youth elite Chilean wrestlers. Arch Budo 2019; 15: 249-257