



AN INVESTIGATION OF THE EFFECTS OF RAPID WEIGHT LOSS ON OVERALL STRENGTH IN 17- AND 18-YEAR-OLD MALE WRESTLERS

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Abstract:

Introduction and Objective: The goal of this study is to examine the effects of rapid weight loss on the overall strength of young male wrestlers.

Methods: The study participants consisted of wrestlers aged 17-18 who competed in group competitions held in 5 cities in Turkey between March 31st and April 2nd, 2017. The participants included 6 Greco-Roman wrestlers in group competitions in Elazığ and 7 free-style wrestlers, for a total of 13 wrestlers. The first set of measurements of the athletes was taken 2 weeks before the competition, and the second set of measurements was made 1 day prior to competing. The measurements taken were weight, right and left hand grip strength, back strength, leg strength, vertical jump height, and the Cooper test. The statistical package program SPSS 17 was used to analyze the data. A value of $p < .05$ was considered statistically significant.

Results: Among the wrestlers participating in the study, significant differences were observed in weight, vertical jump height, back strength, leg strength, and the Cooper test results when compared to the pre-study measurements ($p < .05$). For vertical jump height, the average of the first measurement was 32.92 and that of the second measurement was 31.07, resulting in a statistically significant difference ($p < .05$). The difference in averages for the Cooper test was also statistically significant, with an average of 2646.1 obtained for the first test and 2467.6 for the second test ($p < .05$).

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Conclusion: Rapid weight loss in wrestlers has an adverse effect on their overall strength, as determined using several parameters.

Keywords: wrestling, strength, anaerobic, aerobic

1. Introduction

Wrestling is the struggle between two evenly-matched opponents to pin each other's back to the floor or achieve technical superiority, using all of their physiological and psychological strength, without the use of any implement or tool, within a given timeframe and in a designated area (Açak, 2005). In other words, wrestling is the struggle between two people using various methods to pin each other's back to the floor. According to Cemal Alpman, because wrestling is an activity which uses of all parts of the body as well as courage, reflexes, skill, endurance, and strength, it is a competitive sport which requires that training be started at an early age in order to be prepared (Avcuoğulları, 1993). Wrestling is defined as a branch of sport where aerobic and anaerobic environments are used together, in which performance is affect by such factors as speed, strength, quickness, flexibility, balance, muscularity, and cardiovascular endurance (Alpay, 2000). For this aspect, athletic performance that like wrestling performance depend on weight loss is affected by reaction time (Pancar et al., 2016), endocrine system (Pancar et al., 2017), cardiorespiratory system (Özdal, 2017; Özdal et al., 2017), life style (Çinar et al., 2016).

Weight loss is an integral component of every competitive sport in which athletes of the same weight are grouped in classes. Athletes who weigh less or have lower levels of body fat possess an advantage; therefore, wrestlers lose weight in order to achieve greater success and perform at the highest level, thus maximizing the benefits afforded by their training (Menderes et al., 2013, Sarıkaya et al, 2016).

In order to qualify for a lower weight class (3-9 kg on average), especially during periods of development, wrestlers employ various methods. The physiological and health outcomes of such actions are to a certain extent clear. What is critical to be aware of is the negative effect of rapid weight loss on wrestlers' aerobic performance (Sarıkaya et al, 2016).

The present study aimed to investigate the effects of rapid weight loss on the overall strength of 17-18-year-old wrestlers.

2. Method

The study was conducted between March 31 and April 2, 2017, and was composed of wrestlers in group competitions for the 17-18 age range organized in the provinces of Çanakkale, Erzurum, Isparta, Kastamonu, Elazığ, and Niğde who were competing in Elazığ. Of the participants, 6 wrestlers were Greco-Roman and 7 were freestyle, for a total of 13. The pre-test was conducted on the subjects 2 weeks prior to the matches, while the final test was performed one day following the matches. Measurements of weight, right and left hand grip strength, back strength, leg strength, and vertical jump height were taken, and the Cooper test was performed on the study participants.

2.1 Test Measurements

Weight of the study participants was measured using a Tanita scale, the Cooper test was used to measure aerobic fitness, and measurements for the anaerobic tests hand grip strength, back strength, and leg strength were made with a dynamometer. A standard measuring tape was used to measure vertical jump height.

2.2 The Cooper Test

This test, which was developed by Kenneth Cooper to determine the aerobic strength of athletes, was conducted according to the exercise protocol of a 12-minute run. The test developed by Cooper in 1968 and revised by Mac Naughton in 1990 has shown a 0.9 correlation with the results of laboratory measurements (Billat et al, 1998). In the test, athletes are requested to fill 12 minutes by running or walking, as an indicator of their aerobic strength (Kamar, 2008, Tamer 2011).

2.3 Vertical Jump Test

The vertical jump test was performed by measuring the difference between the highest point that the athlete could reach by stretching his arms (with the soles of his feet on the floor) and the highest point that he could reach by jumping (Bilgiç et al., 2016). With the feet parallel to each other, the torso upright, and arms extended, the maximum height that could be reached was recorded. The athletes, who were told to jump as high as they could from both feet with bended knees, utilizing the strength of their arms and legs, performed this test twice. The better of the two performances was used. Jump heights were recorded by subtracting the first (standing) measurement from the height reached by jumping (Kamar, 2008, Tamer, 2011).

2.4 Hand Grip Strength

Grip strength is determined by how much force is applied by squeezing a hand dynamometer with one hand by pressing the fingers toward the palm of the hand. This test is usually performed while the subject is standing. The subject compresses the dynamometer as hard as possible with his hand, without moving his arm. The test is performed three times, and the average value obtained is the test result (Tamer, 2011).

2.5 Back Strength

This test is conducted using a back and leg dynamometer, which have been used to determine strength according to a number of studies. After placing his legs, with the knees straight, on the dynamometer stand, while standing erect with arms stretched, back straight, and the torso leaning slightly forward, the subject pulls up the dynamometer bar vertically as far as possible with his hands. The test is conducted twice, after a 3-5 minute warm-up, and the best result is recorded (Zorba, 2001).

2.6 Leg Strength

The measurement was made using a leg dynamometer. After a 5-minute warm-up, the subject places his feet on the dynamometer stand with his knees bent, then pulls the dynamometer bar up vertically with his hands, using his legs to the maximum extent possible, with arms stretched, back straight and torso leaning slightly forward. The test was repeated and the best result for each subject was recorded (Tamer, 2011).

2.7 Statistical Analyses

The statistical package program SPSS 17 was used to analyze the data. A level of $p < .05$ was considered statistically significant for the data obtained.

3. Results

Table 1: Demographic data of the study participants

Age	Number	%	Mean	Standard Deviation
17 Years	7	53.8	1.46	0.51
18 Years	6	46.2		
Total	13	100.0		

According to Table 1, 53.8% of the study participants were 17 years old, while 46.2% were 18 years old.

Table 2: Analysis of some physical parameters of the athletes participating in the study

Variables		Number	Mean	Standard Deviation	P
Weight	Pre-test	13	67.53	11.5	.01
	Post-test	13	64.46	11.5	
Right Hand Grip Strength	Pre-test	13	26.65	4.55	.02
	Post-test	13	24.91	4.37	
Left Hand Grip Strength	Pre-test	13	23.83	3.97	.00
	Post-test	13	22.00	3.80	
Back Strength	Pre-test	13	102.4	28.1	.04
	Post-test	13	93.00	26.9	
Leg Strength	Pre-test	13	67.61	35.9	.03
	Post-test	13	65.65	36.0	
Vertical Jump	Pre-test	13	32.92	3.25	.01
	Post-test	13	31.07	3.27	
Cooper Test	Pre-test	13	2646.1	216.7	.00
	Post-test	13	2467.6	264.5	

As seen in Table 2, the difference in the average weight of the athletes before and after their weight loss, 67.53 and 64.46, respectively, was statistically significant ($p < .05$). When the right hand grip strength of the athletes was examined, the average before weight loss was 26.65 while the value following weight loss was 24.91 a statistically significant difference ($p < 0.05$). A statistically significant difference ($p < 0.05$) was also found when the athletes' left hand grip strengths were measured, with averages of 23.83 and 22.00 before and after weight loss, respectively. Examining the back strength of the athletes, the average before weight loss was 102.4 while that after weight loss 93.00, and a statistically significant result in terms of the pre-test and post-test parameters ($p < 0.05$). When the athletes' leg strengths were examined, the average prior to weight loss was 67.61 and following weight loss 65.65, also a statistically significant result ($p < 0.05$). The average vertical jump height before weight loss was 32.92, while the average value following weight loss was 31.07, resulting in a statistically significant difference ($p < 0.05$). Regarding the Cooper test results, the mean value prior to weight loss was 2646.1,

while the mean value after weight loss was 2467.6, a statistically significant result ($p < 0.05$).

4. Discussion

A pre-test average weight of 67.53 kg was found for the 17-18 year old wrestlers participating in the study, while the post-test average weight was 64.46 kg. In the pre- and post-test measurements, losses in the athletes' weight, right and left hand grip strength, back strength, leg strength, vertical jump height, and Cooper test were determined. The reason for these losses is thought to be the effect of rapid pre-match weight loss.

Examining the literature, Banu et al. (2003) obtained similar results in their study on judo players with respect to weight, right hand grip strength, back strength, and vertical jump height measurements.

In a study on tennis players by Sarikaya (2017), the average pre-test Cooper test value was 2047.1, while that of the post-test was 2177.5, resulting in a statistically significant difference.

Daniel et al. (2007) also reported that rapid weight loss had a negative effect on performance in their study of judo players.

In Eroglu's (2002) study on wrestlers, the mean body weight of wrestlers was found to have decreased, whereas Kılıç (2016) detected no change in weight in his study on boxers. This discrepancy is thought to be due to differences in the type of wrestling or the intensity of training.

Aydos (1991) found a statistically difference in leg strength as 191.76 ± 7.25 kg before weight loss and 181.76 ± 7.72 kg after weight loss ($p < 0.01$).

Kurt and Çatıkkaş (2006) reported that rapid weight loss leads to adverse results in their study of weight loss in cyclists.

Roemmich and Sinning (1997) investigated the effect of weight loss and training on the body composition, strength, and other physiological characteristics of wrestlers. They reported that changes related to weight loss in the pre-season and post-season periods were different in the experimental group compared to the control group.

Şahin and Süel (2006) investigated the effects of short-term weight loss on flexibility in their study on wrestlers and found no significant reduction in flexibility despite its negative effects on motor skills and performance related to motor functions.

These studies support our findings.

In conclusion, rapid weight loss in wrestlers can be said to negatively affect their overall strength and performance. It should be kept in mind that raising the awareness

of trainers, who play in important role in weight loss, particularly with their participation in conferences and symposia, is negatively associated with the rapid weight loss of their athletes. Extending the period during which weight is lost is thought to positively contribute to athletic performance.

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