

The Comparison of Acute and Gradual Weight Loss Methods in Well-Trained Wrestlers

¹A. Rashidlamir, ²M. Goodarzi and ²A. Ravasi

¹Ferdowsi University of Mashhad, Faculty of Physical Education and Sport Sciences
²Tehran University, Faculty of Physical Education and Sport Sciences

Abstract: The aim of this research is to compare two weight loss methods (acute and gradual) in well-trained wrestlers. 30 well-trained wrestlers participated in this research voluntarily and then were randomly divided into two groups: Group A (n=15) and group B (n=15). Their percentage of body fat (measured with caliper), strength and endurance of upper and lower extremities were measured before and after the weight lose program. All subjects were required to lose 4% of their body weight. Group A (recommended) lost their weight according to a special diet program during 12 days and group B according to the traditional method: severe diet and sauna. Results showed that endurance of upper and lower extremities, strength of upper extremity decreased significantly ($P<0.01$) and body fat percentage and strength of lower extremity did not change significantly in group B. But, despite of a significant decrease in body fat percentage, none of the mentioned variables changed significantly in group A. We recommend wrestlers to use this gradual weight loss method in order to maintain the physiologic parameters of their body, to lose weight without harmful side effects and to have better performance.

Key words: Well-Trained Wrestler % Traditional Weight Loss % Gradual Weight Loss

INTRODUCTION

In most sports such as wrestling, the maintenance of the appropriate weight is essential to perform more ideally and efficiently [1]. Weight loss is difficult; for example some wrestlers and weight lifters do not pay enough attention to their weight and when they approach the competitions, they should lose their weight. Consequently, they adhere to unscientific methods which reduce the athletes' performance and their natural and sport lifespan [1].

Studies on weight loss show that 3% to 20% of weight loss in pre-seasons happens in last days or the day before weighing and it is common for the athletes to repeat such a weight loss during the season because successful wrestlers may participate in 15-30 competitions annually [2]. It is clear that wrestlers lose weight through traditional methods as well as nutritional and fluid limitations and through sweating by heat or exercise. It seems more common to lose weight through sweating; but when 1-5 hours is determined to rehydrate after weighing, this time span is not sufficient to rehydrate and to stabilize water and electrolyte homeostasis [2].

Scientific studies by Gornall *et al.* confirm the vital role of water in promoting an athlete's capability; they state that even slight dehydration reduces performance

capacity [3]. Fleming used a diuretic pill (lasix) in order to study the effects of dehydration on the athletes' performance. Although the dehydration was slight (2%-3%), it reduced their capability (3% in a 1500m run and 6%-7% in a 5000m run) [2].

It is surprising that body fat percentage does not greatly decrease in severe diets, especially in weight loss diets. Although the weight is lost in such diets, body fat percentage does not significantly decrease [1]. It is also observed that severe diets should be avoided as they create muscle catabolism in a phenomenon called gluconeogenesis [4].

Researches show that heat and exercise dehydration result in a decrease in plasma (twice as much as the percentage of weight loss). If the dehydration is more than 2% of body weight, it will result in a decrease in endurance performance; but it seems that it does not affect strength [1].

Most researches on acute weight loss show a decrease in the athletes' performance capability [1-4, 9], but no researches provide an appropriate method (with no side effects of traditional methods) to lose weight. The aim of this research is to compare traditional weight loss method (used by many wrestlers) with a researcher-recommended (gradual) method.

Table 1: A decrease in food for wrestlers to lose weight

	1 st day	2 nd day	3 rd day	4 th day	5 th day	6 th day	7 th day	8 th day	9 th day	10 th day	11 th day	12 th day
The decrease in lunch	10%	10%	10%	Eating like before weight loss phase	20%	20%	20%	10% decrease in food	30%	30%	30%	30%
The decrease in dinner	10%	10%	10%	Eating like before weight loss phase	20%	20%	20%	10% decrease in food	30%	30%	30%	30%

MATERIALS AND METHODS

This research used a quasi-experimental method. 30 well-trained wrestlers of Khorasan province (age range: 22.5 \pm 2.5 and BMI: 24 \pm 4) voluntarily participated in this research. They were randomly divided into two groups: experimental group (gradual weight loss method) and control group (acute weight loss method). The subjects' body fat percentage was measured by a caliper with 5-point method before and 16 hours after the weight loss phase [5]. 1RM was used to measure the subjects' capability of chest press and squat; 40% 1RM and maximal bar fix performance were used to measure the maximal repetition of chest press and foot squat to determine muscular endurance. The subjects were required to lose 4% of their weight. The acute group lost their weight by the traditional method (severe diet, nutritional and fluid limitation and sauna) for 48 hours. The gradual subjects' diet was evaluated for 10 days so that the amount and type of nutrition received could be averagely identified. Then, they were asked to lose their weight using the researchers' recommendations for 12 days (Table 1): three 4-day phases, in each phase the first three days: a decrease in nutrition and the last day: return. In the first phase, the subjects decreased 10% of their food (lunch and dinner) and then they returned to their usual eating habits (food they received before their diet). In the second phase, they decreased 20% first and 10% in the return. In the third phase, they decreased 30% first and 20% in the return. There was no limitation on drinking water and no decrease in breakfast, but the subjects avoided fat in all meals. This weight loss method was extracted from Movahedi's weight loss method and was modified by the researchers [6].

Statistical Population and Sample: The statistical population of this research consisted of well-trained wrestlers who were constantly trained in wrestling for at least 5 years, participated in many championships and hold the first to the third place in provincial and national championships.

30 wrestlers volunteered to participate in this research. Then, these subjects were randomly divided into two groups (acute and gradual weight loss groups).

Statistical Procedures: Paired t test was used to compare the changes in fat percentage and strength and endurance of lower and upper extremities before and after the weight loss phase.

RESULTS

- The average weight loss was equal in both groups (about 4% of the subjects' body weight).
- Acute group did not significantly ($P<0.4$) decrease body fat percentage when compared to the time before the weight loss phase although there was a slight decrease.
- Gradual group significantly decreased the body fat percentage when compared to the time before the weight loss phase ($P<0.01$).
- Those wrestlers who used acute weight loss method significantly decreased the strength of their upper extremity ($P<0.001$) although they slightly decreased the strength of their lower extremity (this decrease was not significant). Those wrestlers who used the recommended weight loss method did not significantly decrease the strength of their upper and lower extremities.
- Those wrestlers who used acute weight loss method significantly decreased the endurance of their upper and lower extremities ($P<0.001$) while those who used the recommended weight loss method did not significantly change the endurance of their upper and lower extremities.

DISCUSSION AND CONCLUSION

The findings of this study showed the following points.

Body Fat Percentage: The findings of this research showed a significant difference in a decrease in body fat percentage between gradual and acute weight loss groups ($P<0.05$). It can be concluded that the above finding seems rational as the researches show that acute and severe diets can damage metabolism and the body tends to preserve body fat [6- 8] and they should be avoided because they decrease body water and muscle catabolism

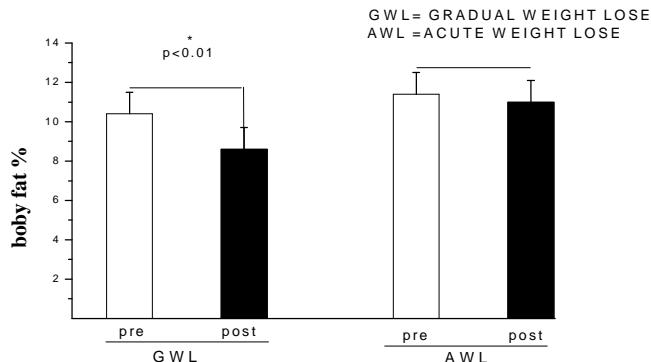


Fig. 1: A comparison of the average body fat percentage in both groups

in gluconeogenesis process increases [9]. Therefore, it is common for the wrestlers in acute group (who lost their weight by an acute diet and dehydration) to lose lean body mass and to lose less fat percentage when compared to those in gradual group (Fig. 1).

Gornall and Villani (1996) stated that basal metabolism and fat free mass decrease following a low-calorie diet. Their subjects had endurance training for four weeks as well as a weight loss plan. Their findings showed that endurance training did prevent a decrease in basal metabolism and fat free mass [3].

Researches show that if the individual is exposed to severe caloric limitation, his/her basal metabolism will decrease; his/her body will try to establish a connection between eating and physical activity and preserve a stable amount of body fat [7, 8]. Therefore, naturally acute group should lose less fat percentage than gradual group; the results of this research confirm it.

Strength and Endurance of Upper and Lower Extremities: The results showed that gradual group (recommended) did not significantly change the strength and endurance of their upper and lower extremities, but acute group significantly decreased the strength and endurance of their upper extremity as well as the endurance of their lower extremity ($P<0.001$). It can be stated that when food and fluid limitation is pursued in diets, it will lead to decrease water, proteins and body fats and the decreased ratio of these components depends on food and fluid limitation; for example, if eating limitation exists while the consumed fluids decrease, the body will lose more water. The problem will be more severe when the body loses the water by heat or physical activity because in addition to the water, the body loses their electrolytes. Even when 1-5 hours is determined for rehydration after weighing, this period is not sufficient for rehydration and stabilization of water and electrolyte homeostasis [2]. As both groups lost 4% of their body weight, the

recommended group significantly decreased their body fat percentage and acute group did not significantly decrease their fat percentage, it can be concluded that acute weight loss method (contrary to gradual weight loss method) resulted in a significant decrease in lean body mass and actually in water, muscle percentage. Therefore, it can be expected that acute group will decrease their lean body mass and it is clear that a decrease in lean body mass can drastically decrease the athletes' performance [1, 10]. The results of this research show a decrease in strength and endurance of upper and lower extremities as well as in endurance of traditional subjects' lower extremities and confirm the above mentioned facts.

Many researches on different athletes show that a rapid weigh loss can negatively affect the athletes' cognitive performance [4]. Fogelholm [2], Oopic, Hall and Kimpel [4, 11, 9] showed a decrease in boxers' and wrestlers' performance due to rapid weight loss methods. In addition, these weight loss methods lead to 1- decrease muscle strength 2- decrease performance of muscles 3- decrease blood volume and plasma 4- decrease cardiac function in submaximal condition which accompany more heart rates, less stroke volume and cardiac output 5- decrease oxygen transfer; especially together with eating limitation 6- create a disorder of body temperature 7- decrease bloodstream in kidneys [2].

As it is clear that a limitation on received calorie can dramatically decrease muscle and hepatic glycogen and as they play a vital role in athletes' performance [10], it is expected that acute group would decrease their muscle and hepatic glycogen (and even after 16 hours, they have not yet rehabilitated) due to a limitation on fluid and food. It is also expected that the above mentioned fact will affect their performance. A decrease in the endurance and strength performance of traditional wrestlers confirms the above points. Base on researches [2], a decrease in the endurance of acute group may be attributed to a decrease in their plasma and/or electrolytes.

Table 2: A comparison of the wrestlers' strength by 1RM test for chest press and foot squat before and after the weight loss phase ($P<0.001=**$)

Groups	Statistical data	M	SD
Group A (gradual weight loss)	1RM (kg) for chest press before the recommended weight loss	104.3	15.1
	1RM (kg) for chest press after the recommended weight loss	103.8	14.2
	1RM (kg) for squat before the recommended weight loss	123.3	27.6
	1RM (kg) for squat after the recommended weight loss	122.2	24.8
Group B (acute weight loss)	1RM (kg) for chest press before the acute weight loss	106.0	16.2
	1RM (kg) for chest press after the acute weight loss	**102.0	16.3
	1RM (kg) for squat before the acute weight loss	117.3	21.5
	1RM (kg) for squat after the acute weight loss	**113.3	21.1

Table 3: A comparison of the endurance of upper and lower extremities by bar fix test, maximal repetition and maximal performance of chest press and foot squat, 40% 1RM, before and after the weight loss phase ($P<0.001=**$)

Groups	Statistical data	No.	M	SD
Group A (gradual weight loss)	Bar fix before weight loss	15	24.3	6.6
	Bar fix after weight loss		25.0	5.9
	Chest press repetition before weight loss		22.4	5.6
	Chest press repetition after weight loss		22.0	5.4
	Squat repetition before weight loss		21.1	3.7
	Squat repetition after weight loss		21.4	3.8
Group B (acute weight loss)	Bar fix before weight loss	15	26.0	6
	Bar fix after weight loss		**20.0	5.1
	Chest press repetition before weight loss		22.4	5.2
	Chest press repetition after weight loss		**18.0	4.9
	Squat repetition before weight loss		21.7	2.9
	Squat repetition after weight loss		**13.9	2.08

On the other hand, the results showed no significant change in the endurance and strength performance of the recommended group wrestlers while the endurance performance of their upper and lower extremities showed a slight increase (not significant). These results state that recommended group wrestlers did not decrease lean body mass, easily rehabilitated their glycogen storage 16 hours after weighing and reached an ideal hydration (acute group wrestlers did not enjoy the above conditions after 16 hours) so that they could experience even a slight increase in the endurance of their upper and lower extremities and preserve their strength as well (Table 2 and 3). This slight increase can be attributed to recommended wrestlers' body weight loss and actually fat percentage decrease because researches show that a decrease in body fat percentage and strength preservation can lead to an increase in sporting performance [10, 11]. In addition, recommended wrestlers reported the mentioned method as ideal.

Generally, it can be stated that recommended weight loss method decreases wrestlers' body fat percentage (which preserves their fat free mass and consequently muscles, hepatic and muscular glycogen storage and body water), preserves the endurance and strength of their upper and lower extremities

and finally their sporting performance. Therefore, this method is effective for wrestlers to lose weight and as it is an easy method, it can be utilized for different age groups.

Therefore, coaches and athletes of weighing fields especially wrestlers are recommended to avoid traditional and acute weight loss methods (their physiological disadvantages were investigated in many researches) and use replacements such as the recommend method in this research so that they can preserve their health status, successfully lose their weight, preserve their sporting performance and gain better scores.

REFERENCES

1. Fogelholm, G.M., R. Koskinen Laaksoj, et al. 1993. Gradual and rapid weight loss: effects on nutrition and performance in male athlete. Med Sci Sports Exerc., 25(3): 371-7.
2. Fogelholm, G.M., 1994. Effect of body weigh reduction on sports performance, Sports Med., 18(4).
3. Gornall, J. and R.G. Villani, 1996. Short- term chanes in body composition and metabolism with sever dieting and resistance exercise. Int. J. Sport Nut., 6(3): 285-94.

4. Hall, G.J. and A.M. Lane, 2001. Effect of rapid weight loss on mood and Performance among amateur boxers. *Br. J. Sports Med.*, 35: 390-39.
5. Dale, R., Wagner, 1996. Body composition Assessment and Minimal Weight Recommendations for High School Wrestlers. *MED CSCS*, Volume 31 Number 3.
6. Movahedi, A., 2004. Examining effectiveness of Ahmadreza movahedis metabolic theory and model for weight control. *Asia Pac. J. Clin. Nutr.*, 13(suppl) S 145.
7. Keesey, R.E. and M.D. Hirvonen, 1997. Body weight set points:determination and adjustments. *J. Nut.*, 127(9): 1875s-1883s.
8. Schwartz, *et al.*, 2000. CNS Control of Food Intake. *J. Nut.*, 404(6778): 661-671.
9. Oopik, V., M. Paasuke and T. Sikku, *et al.* 1996. Effect of rapid weight loss on metabolism and isokinetic performance capacity. A case study of two welltrained wrestlers. *J. Sports Med. Phys. Fitness.*, 36(2): 127-31.
10. Lippincott Williams and Wilkins, 2006. ACSMs advanced exercise physiology, American college of sport medicine,Wolters Kluwer company.
11. Kimpel, Steve - Rapid weight loss in wrestlers: Problems and implicants, CSCS Head wrestling Coach colorado. School of Mines.