



FEDERATION INTERNATIONALE DES LUTTES ASSOCIEES
INTERNATIONAL FEDERATION OF ASSOCIATED WRESTLING STYLES



Federação Portuguesa de
Lutas Amadoras

AN OVERVIEW OF THE MINIMUM WRESTLING WEIGHT PROCEDURES USED IN AMERICAN SCHOLASTIC AND COLLEGIATE WRESTLING

Could this be a model for FILA?

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The health-related concerns regarding drastic weight loss measures to make weight in wrestling have been well documented. The American College of Sports Medicine (ACSM) has long been on record for the adoption of a system to discourage these practices. They published their first position stand on weight loss in wrestlers in 1977. Following the deaths of three college wrestlers in 1997, the National Collegiate Athletic Association (NCAA) moved quickly to adopt a weight control plan that included the establishment of a minimal weight class for each individual. All state athletic associations were required to have weight control plans in place by 2004. This paper summarizes the methods that are currently utilized in the USA in the administration of these weight control programs, with an eye towards FILA and its possible adoption of a similar program.

INTRODUCTION

Unhealthy weight loss practices have been a part of wrestling since the formation of weight classes. Excessive weight loss, too rapid weight loss, dehydration, the use of diuretics and laxatives, and the cycling of weight (repeated rapid loss and gain) have been problematic in the sport and have been documented as far back as 1930 (7). Efforts have been made to establish a safe, minimal weight for wrestlers. Iowa had explored the use of a minimum wrestling weight formula since 1968 (22,23,24). The American College of Sports Medicine published its first position stand on weight loss in wrestlers in 1976 (1). The Wisconsin Interscholastic Athletic Association adopted a mandatory minimal weight program in 1991. This included rules and an educational program, consistent with ACSM and AMA guidelines, to curtail "weight cutting" among high-school wrestlers. The project included skinfold estimates of body fatness to establish a minimum competitive weight, a limit on weekly weight loss, and nutrition education information. This program received widespread endorsement from parents, teachers, wrestlers, and coaches. The success in Wisconsin became a model for other states and the NFHS to follow (15).

USA BACKGROUND INFORMATION

In the US, high schools and colleges wrestling teams use the American folk style. The season extends from November – March. There are 304 colleges with teams with 8,400 athletes. High schools have 14 weight classes and colleges 10. Data shows, wrestling ranked 6th in the number of male participants with 278,890 for the 2012 school year (12).

Tragedy Stimulates New Rules (from *Mortality and Morbidity Weekly* (11)). In the fall of 1997, three previously healthy collegiate wrestlers died while each was engaged in a program of rapid weight loss to qualify for competition. All three wrestlers engaged in a similar rapid weight-loss regimen that promoted dehydration through perspiration and resulted in hyperthermia. The wrestlers restricted food and fluid intake and attempted to maximize sweat losses by wearing vapor-impermeable suits under cotton warm-up suits and exercising vigorously in hot environments.

Case 1 Over a 12-hour period, a 19-year-old wrestler attempted to lose 15 lbs [7 kg] to compete in the 195-lb [88 kg] weight class of a tournament. His preseason weight was 233 lbs [106 kg], and during the next 10 weeks he lost 23 lbs [10 kg]. On the day before weigh-in, dehydration procedures described, he lost an additional 9 lbs [4 kg]. After a 2-hour rest, he resumed his weight-loss regimen. He stopped exercising but began to experience extreme fatigue and became incommunicative; an hour later, he developed cardiorespiratory arrest. Resuscitation was unsuccessful.

Case 2 Over a 4-hour period, a 22-year-old man attempted to lose 4 lbs [2 kg] to compete in the 153-lb [70 kg] weight class of a wrestling tournament. His preseason weight was 178 lbs [81 kg]. During the next 10 weeks he lost 21 lbs [10 kg]. On the day before weigh-in he initiated the same weight-loss regimen as in case 1. He stopped exercising and indicated he was not feeling well. Efforts were made to cool him, and his clothing was removed. He became unresponsive and developed cardiorespiratory arrest; resuscitation was unsuccessful. Rectal temperature was 108° F (42° C) at the time of death. The autopsy report cited the cause of death as hyperthermia.

Case 3 In a 3-hour period, a 21-year-old man in Michigan attempted to lose 6 lbs [2.75 kg] to compete in the 153-lb [70 kg] weight class of a wrestling meet. His preseason weight was 180 lbs [82 kg]. During the next 13 weeks he lost 21 lbs [10 kg], of which 11 lbs [5 kg] were lost during 3 days. After wrestling practice, he initiated the same weight-loss regimen as in case 1; after 75 minutes, he had lost an additional 2 lbs [1 kg]. After a 15-minute rest, he resumed exercise. Approximately 1 hour later, he stopped exercising to weigh himself and demonstrated fatigue. A few minutes later, his legs became unsteady, he became incommunicative, and he had difficulty breathing. Attempts to administer fluid orally were unsuccessful, and he developed cardiorespiratory arrest. Resuscitation was unsuccessful. The autopsy report cited the cause of death as rhabdomyolysis. Rhabdomyolysis is the breakdown of muscle fibers that leads to the release of muscle fiber contents (myoglobin) into the bloodstream. Myoglobin is harmful to the kidney and often causes kidney damage.

Following the college deaths the NCAA implemented a mandatory minimum wrestling weight program and the high schools followed. The National Federation of High Schools (NFHS) established a rule for implementation in the 2004-05 season that each individual state high school association shall develop and utilize a specified weight-control program which will discourage excessive weight reduction (13). Each state association shall develop and utilize a weight management program that includes hydration testing with a specific gravity not to exceed 1.025 which immediately precedes the body fat assessment; and a minimum weight class will be determined by a body fat assessment with no less than 7% for males and 12% for females; and a program to monitor an average weight loss of 1.5% a week with descent, may

use the minimum weight determined by the body fat testing as the lowest weight a wrestler may wrestle during the year. College programs allow for a minimum of 5% body fat.

Hydration. The weight of the athlete used in the calculation of their minimum weight must be taken in a hydrated state, immediately followed by body fat testing. Otherwise an athlete could cheat by weighing in a dehydrated state and therefore have a lower minimum weight calculated. Hydration status is assessed through a measure of urine specific gravity (Usg) in all states. Urine specific gravity, or the density of urine, is a laboratory test that measures the concentration of all chemical particles in the urine. Water has a specific gravity of 1.0. Usg is tested by a refractometer (33 states), reagent strip (28 states), urinometer/hydrometer (6 states), and by urine color chart (5 states). Most states use a Usg of 1.025 or less. If an athlete fails the hydration test, the time before a retest is allowed is either 24 hours or 48 hours.

Body fatness. Most wrestlers seek to compete in a weight class where their strength (power) to size ratio is maximized. Studies on wrestlers yield low body fat values. In his summary of the characteristics of elite wrestlers, Horswill (7) reports a range of 7.6 – 9.8% body fat. Body fat is assessed through caliper measures of skinfolds (35 states), bioelectric impedance (24 states), hydrostatic weighing (21 states), air displacement plethysmography (12 states), physician observation (7 states), DEXA (4 states), ultrasound (3 states), near infrared interactance (1 state), and one program does not consider body fatness (6). Collegiate programs all use calipers.

For males in the 35 programs utilizing skinfold measures, 34 use the Lohman equation (8, 15), and 1 uses the Forsyth-Sinning equation (16). For females, the Boileau equation (3) is used in 32 programs, the Jackson, Pollock, and Ward equation (8) is used in one program.

The validity of bioelectric impedance has been questioned as applied minimal weight classification (5). Large individual variation was seen, and, by definition, the precision was poor when estimating minimal wrestling weights for individuals. The prediction error may span multiple weight classes. In programs utilizing bioelectric impedance, 12 use the “standard” setting while 12 the “athletic” setting. This can produce a large difference in results and only exacerbate the concerns regarding the validity of this methodology.

Example

- ✓ At the start of the season the wrestler comes to certification to set his lowest competition weight.
- ✓ He gives his urine sample and his urine specific gravity (Usg) is 1.018 – it is less than the cut point of 1.025 – he passes!
- ✓ He is weighed at 70 kg
- ✓ Caliper skinfold measures yield a body fat of 15%.
- ✓ $(MWW) = ([1-(\%BF/100)] \times TBW) / (.93)$
- ✓ $(MWW) = ([1-(\%15/100)] \times 70) / (.93)$

(MWW) = 63.9 kg

- ✓ The lowest weight class for this wrestler is therefore 66 kg
- ✓ Since only 1.5 % of weight per week can be lost, means that he can wrestle at this weight in four weeks.

Several research studies have found that compared to college wrestlers in the 1980s, weight loss behaviors were less extreme. The weight loss practices of college wrestlers appeared to have improved compared to wrestlers sampled previously. Forty percent of the wrestlers were influenced by the new NCAA rules and curbed their weight loss practices. Education is still needed, as some wrestlers are still engaging in dangerous weight loss methods (16,17).

The significance of this applied sports science initiative is extraordinary when one considers the large number of athletes this involves.

IS THERE A NEED FOR A MINIMAL WEIGHT CLASS CERTIFICATION PROGRAM IN FILA?

The rules set by the International Federation of Associated Wrestling Styles (FILA) do not determine an assessment of the hydration status of athletes in any situation. However, body mass reduction before competition is common worldwide in Olympic-style wrestling.

Recent research by Oöpik found that 27% of wrestlers can be seriously hypohydrated (USG values >1.030) at the time of competition (14). He “supports the suggestion of others to introduce relevant changes into the current rules of Olympic-style wrestling with the aim of restricting possibilities for practicing unhealthy body mass control methods by athletes.”

Others suggest introducing purposeful changes into the competition regulations in Olympic-style wrestling that reduce the prevalence of aggressive body mass management behaviors that should be considered by the governing bodies in wrestling (2).

A review of athletes in aesthetic and Olympic weight-class sports indicate that a high proportion of athletes are using extreme weight-control methods and that the rules of some sports might be associated with the risk of continuous dieting, energy deficit, and/or use of extreme weight-loss methods that can be detrimental to health and performance (20).

The Ad Hoc Research Working Group on Body Composition, Health and Performance (21), under the auspices of the IOC Medical Commission How to minimise the health risks to athletes who compete in weight-sensitive sports review and position conclude that there is a need for:

- (1) sport-specific and gender-specific preventive programs,
- (2) criteria for raising alarm and 'does not start' (DNS) for athletes with eating disorders and
- (3) modifications to the regulations in some sports.

Preventive strategies are justified for medical as well as performance reasons.

EXAMINATION OF A HYPOTHETICAL MINIMUM WEIGHT CLASS CERTIFICATION MODEL FOR FILA

While the literature does not contain evidence of mortality as is the case in American wrestling, FILA may be prudent to be proactive in this area, especially in light of the contraction of the men's weight classes to six, and added pressure to reduce a greater weight to get to the desired weight class. Several researchers have concluded that international governing bodies should introduce rules that restrict drastic short term weight loss. The following proposal is put forth to stimulate a discussion of the possibilities for FILA to address this issue through the implementation of a minimal weight certification program.

Because the greatest acute health risk seems to be extreme dehydration, the following model attempts to restrict that amount by having the athletes certify a weight, in a hydrated state, under the supervision of designees of FILA. The athletes would report to a certification at a specified time. Their hydration status would be assessed. If they met the standard of euhydration (Usg ≤ 1.02 ?) their body weight would be measured. They could not exceed the values from the following chart, which uses a weight loss limit of 9%.

FS	Span* Between Classes	+9%** Limit	GR	Span* Between Classes	+9%** Limit	WFS	Span* Between Classes	+9%*** Limit
57	12.3	62.5	60	11.8	66	48	9.4	52.5
65	13.3	71.5	68	11.7	74.5	53	8.6	58
75	12.8	82.5	77	12.5	84.5	58	7.9	63
86	11.3	94.5	88	12	97	63	8.7	69
97	22.4	106.5	100	23.8	110	69	8	75
125		137	130		143	75		82.5

*The amount of weight loss required to move from next higher class as a percentage of the lower weight class.

** Weight limit at certification for that weight class. Set at 9% above the weight class weight.

***Limit not to exceed the next higher weight class, even when the weight loss is less than 9%

This weight class would become part of the Athlete's License (Biological Passport).

DISCUSSION

Logistical Questions

When?

Where?

Who tests?

Scientific Questions

Hydration Methodology

Percent Reduction Cut-offs?

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