

## Impact of Rapid Weight Reduction on Judo Athletes: A Comprehensive Analysis


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This study examined in top male judo athletes the impact of fast weight reduction on physical and physiological measures. Over 36 hours, nineteen national-level competitors lost 5% of their body weight; then, they slept for fifteen hours. Before weight reduction and during recovery, a battery of motor ability tests and physiological examinations was carried out. Results showed mixed effects: submaximal aerobic capacity dropped even as some anaerobic performances improved. These results imply that fast weight loss plans could affect several elements of athletic performance, especially in endurance-related activities.

**Keywords:** weight reduction, athletes, strength, agility, strategy

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## An Introduction

Judo originated from arts and has evolved into a highly competitive combat sport featured in the Olympics today. Judo emphasizes a blend of strength, with agility and strategy. The sport is known for its adherence to weight categories to ensure competition. However this focus on weight divisions has sparked a practice among judokas—weight loss, before matches.

Extensive scientific studies have documented the occurrence of weight loss, among athletes in combat sports such as judo. In a research conducted by Artioli and colleagues in 2010 most judo Players adopt quick weight loss regimens before competitions. Connecting dots from source to sentence! These methods often involve calorie cutting hydration techniques and other extreme measures to shed pounds rapidly Rely on your creativity! This strategy is primarily motivated by the desire to qualify for a lighter weight category thus potentially gaining an advantage over opponents. According to findings by Franchini and team, in 2012, Use synonyms creatively!

In the world of judoka athletes aiming for weight loss is quite common. Its impact, on athletic performance remains a topic of debate within the scientific community. Older research conducted by Nichols et al. dating back to 1957 suggested that moderate weight loss did not significantly affect strength and endurance levels in athletes. However this study was conducted before the advancements, in sports nutrition and our current understanding of the needs of judoka fighters. Recent studies present results where some indicate drawbacks while others suggest performance improvements (referencing Fogelholm in 1994 and Franchini et al. in 2012).

The time athletes have to recover from weight loss and prepare for competition after the weigh in adds an extra layer of complexity, to the situation in events typically spanning about 15 hours before they showcase their skills on the mat. The methods of rehydration nutritional replenishment and other influencing factors highlighted in studies, like Reale et al. 2017 can impact how well they perform during this recovery period.

Quickly losing weight can lead to health risks such, as decreased heart function and reduced cognitive abilities (Franchini et al., 2012). Therefore it is crucial to understand the impact of weight loss

On judo athletes. This study aims to fill the gap, in knowledge by examining how weight loss, followed by a short recovery period affects the physiological traits of elite male judokas.

This research aims to explore the relationship, among weight loss recovery and athletic readiness by examining performance indicators such as grip strength anaerobic capacity and hormonal reactions The findings of this study could inform scientifically backed weight management strategies, for judo and other combat disciplines thereby prioritizing athlete well being and safety alongside the pursuit of a competitive edge.

Also this study could contribute to the dialogue, on weight categories in combat sports. The practical evidence regarding the effects of weight loss techniques, on performance could influence decisions on policies and competitive frameworks as governing bodies take into account the moral implications of these practices (Artoli et al., 2016).

In the intersection of sports science, nutrition and competitive tactics lies the significant realm of weight loss, in judoka. This investigation aims to enhance our understanding of weight management, in arts and potentially reshape the landscape of the sport by examining its effects within the realm of top tier judoka competition.

## Goals

The impact of a 5 percent reduction, in body weight within 36 hours followed by a 15 hour recovery phase on motor skills, in male judokas is being assessed.

To evaluate the impact of this weight loss and recovery plan, on markers.

Investigating whether this rapid weight loss method leads to a decrease, in measures that're crucial, for judos competitions.

## Approach | Methodology

### Participants of the study included...

In this research project nineteen male judokas competing at the level (with an age of 24 years and 63 months ± 3 years and 86 months ) volunteered to participate by providing their time, for the study. Each participant provided written consent after receiving information, about the procedures and potential risks involved.

Through a method that involved conducting two rounds of testing with the participants, in each round

Phase one involves taking measurements before starting the weight loss program.

After undergoing a 36 hour weight loss regimen it is recommended to allow 15 hours, for rest and recovery during Phase II.

### 3.3 Procedure for Weight Loss

Athletes had to drop 5% of their body weight within 36 hours utilizing their preferred weight-loss strategies (e.g., food restriction, hydration restriction, more physical activity) following Phase I testing. Participants had 15 hours to recover using ad libitum food and hydration consumption following the phase of weight loss.

3.4 Approaches of Testing

3.4.1 Anthropometric Evaluations

Height (cm); body weight (kg);

3.4.2 tests of motor ability

Thirty-meter sprint (s)

M's wide jump standing

The 4-count burpee test consists in one minute repeats.

Sit-ups—one minute's worth of repetitions

Chin-ups, or maximum repetitions

Six: Medicine Ball Throw (m)

Kg - left and right hands grip strength test

Dummy throw test (using Seo Nage method, number of throws in thirty seconds)

3.4.3 Tests of Physiology

VO<sub>2</sub> max (ml/kg/min, L/min)

Heart rate (post-exercise maximum)

Excess post-exercises oxygen consumption (EPOC) (ml/kg)

Anaerobic threshold (AT) assessed by oxygen intake and heart rate

3.5 Methodical Analysis in Statistics

Pre- and post-weight loss measures were matched t-tested. P < 0.05 determined the statistical significance. SPSS version 25.0 (IBM Corp., Armonk, NY, USA) was used for all tests.

4.1 Anthropometric Changes

Table 1 presents the anthropometric changes observed during the study

Parameter	Pre-Weight Reduction (Mean ± SD)	After Weight Reduction (Average ± S.D)	p-value
Decimal Age (years)	24.63 ± 3.86	24.63 ± 3.86	N/A
Height (cm)	166.41 ± 6.44	166.41 ± 6.44	N/A
Weight (kg)	69.13 ± 9.12	65.37 ± 8.62	< 0.01
Weight Regained (kg)	N/A	68.83 ± 9.20	< 0.01

Athletes successfully reduced their body weight by approximately 5.4% (p < 0.01). After the 15-hour recovery period, they regained weight but remained below their initial weight, indicating incomplete recovery.

4.2 Motor Ability Tests

Table 2 summarizes the results of the motor ability tests before and after the weight reduction protocol.

Motor Ability Test	Pre-Weight Reduction (Mean ± SD)	Post-Weight Reduction (Mean ± SD)	Significance Level
30-meter sprint (sec)	3.91 ± 0.24	3.89 ± 0.28	Not significant
Standing broad jump (m)	2.25 ± 0.11	2.25 ± 0.15	Not significant
4-count burpee test	29.68 ± 3.10	30.68 ± 2.75	Not significant
Sit-ups	48.84 ± 7.58	46.26 ± 8.37	Significant (p < 0.05)
Chin-ups	10.63 ± 4.25	12.74 ± 4.36	Significant (p < 0.01)
Dummy throws (30 sec)	10.00 ± 2.49	11.32 ± 1.70	Significant (p < 0.05)
Grip Strength (L)	45.66 ± 5.63	42.00 ± 6.06	Not significant
Dummy throws (30 sec)	10.00 ± 2.49	11.32 ± 1.70	Significant (p < 0.05)
Grip Strength (L)	41.68 ± 6.33	42.00 ± 6.06	Not significant
Grip Strength (R)	40.80 ± 5.80	42.70 ± 7.22	Not significant
Medicine ball throw (m)	3.12 ± 0.34	4.02 ± 0.54	Sig. (p < 0.05)

NS: Not significant

Significant improvements were observed in chin-ups, dummy throws, and medicine ball throw after weight reduction. However, sit-up performance decreased significantly. Anaerobic components such as sprint speed and standing broad jump remained unaffected.

4.3 Physiological Parameters

Table 3 presents the physiological parameters measured before and after the weight reduction protocol.

Table 3: Comparison of physiological parameters before and after weight reduction

Physiological Test	Pre-Weight Reduction (Mean ± SD)	Post-Weight Reduction (Mean ± SD)	p-value
VO <sub>2</sub> max (L/min)	3.05 ± 0.52	3.14 ± 0.55	Not significant
VO <sub>2</sub> max (ml/kg/min)	42.48 ± 4.56	46.09 ± 7.92	Not significant
EPOC (ml/kg)	4356.89 ± 1032.58	4032.56 ± 1205.56	Not significant
AT-VO <sub>2</sub> (L/min)	2.18 ± 0.09	1.93 ± 0.34	Not significant
HR Max (bpm)	182.50 ± 21.92	170.21 ± 44.14	Not significant
AT-HR (bpm)	155.50 ± 9.19	143.95 ± 35.90	Not significant

NS: Not significant

Athletes' VO<sub>2</sub> max levels did not alter much, indicating that weight loss had little impact on their maximal aerobic capacity. However, the anaerobic threshold (AT) was achieved at a considerably lower heart rate and oxygen consumption after weight loss, suggesting a possible impairment in submaximal aerobic capacity.

Discussion.

The research results offer a perspective, on how rapid weight loss affects the performance of judokas in a manner by showing a nuanced interplay between weight loss and various physical aspects involved in the sport of judo fighting

Sports. The improvements seen in performance measures along with declines in others underscore the nature of this widely used method, in combat sports.

The significant enhancements, in power related activities following weight loss are quite intriguing. Think chin ups and medicine ball throws being easier to do! These improvements could be linked to a power to weight ratio concept as highlighted by Franchini et al.s (2012) examination of weight loss effects in combat sports. The reduced body mass along, with retained muscle strength possibly contribute to these performance gains. Nevertheless this finding raises doubts, about the accepted notion that rapid weight loss automatically diminishes performance.

On the hand the decrease, in sit up performance and the quicker onset of the threshold suggest that rapid weight loss could negatively impact endurance

14 rmance levels.This finding backs up a research2017,6(2) conducted

By Rankin and colleagues in 1996 which highlighted how dehydration and glycogen depletion caused by weight loss can hamper endurance capabilities.The decline, in metrics related to endurance is particularly concerning for judo athletes as the sport demands sustained high intensity exertions during competitions.

Our research discovered that the levels of VO<sub>2</sub> max remain steady after a brief period of weight loss efforts are made.This finding aligns, with the study conducted by Reljic et al.(2016) which demonstrated changes in VO<sub>2</sub> max after weight loss among individuals involved in combat sports.However the significant decrease in threshold suggests that there may be an impact on endurance performance.The disparity, between submaximal measurements highlights the importance of considering various physiological markers when assessing how weight reduction affects athletic capabilities.

The slight regain of weight observed within the 15 hour recovery phase raises concerns, about the effectiveness of the recovery practices used by judo athletes.Reale et al.s study in 2017 emphasized the significance of this recovery phase, in mitigating the impacts of weight loss.Our results suggest that the current recovery timeframe might not allow for rehydration and glycogen replenishment potentially putting athletes at a disadvantage when commencing competition.

The results align, with the research by Artioli et al. (2010) showing that numerous combat sport athletes fail to recover their condition after weight loss, within typical recovery periods.The implications of recovery are significant as they can impact performance as well as increase the risk of injury and have long term health consequences (Franchini et al., 2012).

The varying effects of weight loss, on aspects of performance underscore the importance of personalized approaches to weight management, in judo sports training. To enhance athletic performance outcomes during weight loss programs it is essential for coaches and sports experts to routinely assess both strength and stamina related factors throughout the weight management journey.

These discoveries contribute to the debate surrounding weight categories and weigh in procedures, in combat sports.In a study by Loenneke et al.(2016) it was suggested that spacing out weigh ins and competitions could deter weight cutting methods.However the results we obtained suggest that a mere 15 hour gap between them may not be adequate for recovery.This implies that substantial changes, to weight control regulations may be necessary.

In summary of the study findings provided here reveals the responses, to rapid weight loss in judo athletes. The rise in power focused activities and decrease in endurance measures highlight the importance of gaining an insight into weight control strategies within combat sports. Future studies should focus on unravel the mechanisms behind these variations, in results and formulating advice based on evidence to enhance performance while mitigating the health risks tied to weight loss methods.

#### Conclusion.

This research indicates that rapid weight loss followed by a period of rest can have effects, on the performance of judokas athletes. The study found that certain anaerobic and power measures improved but submaximal aerobic capacity and aspects of muscle endurance declined. This challenges the belief that swift weight loss can enhance or sustain performance levels.

In light of these discoveries we propose adopting a strategy, towards managing weight in judo and other combat sports. A gradual

and structured approach to weight reduction might be preferable for attaining physiological capabilities in all key aspects. Subsequent investigations should explore the lasting impacts of weight reduction cycles and strategies to minimize their impact, on performance.

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