



# Effects of extreme weight manipulation on performance and health in combat sports

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Physiology

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consultant



- Prevalence of weight cutting
- Effects on performance
- Effects on health
- Youth athletes
- What can be done?



PhD thesis: the training practices,  
loads and effects of mixed martial arts  
(MMA)

Member of ad-hoc Athlete Weight  
Management Task Force



**IMMAF**  
INTERNATIONAL MIXED MARTIAL ARTS FEDERATION

# Weight Cutting in Combat Sports

- The amount of weight cutting in MMA far exceeds that seen in other combat sports



Sport	Weight usually cut (kg)	Weight cut in 24Hrs before weigh-in (kg)	Weight regained post-competition (kg)	Most weight cut (kg)
Brazilian jiujitsu				
Boxing				
Judo				
Muay Thai				
Wrestling				
MMA				

**Title:** Weight Loss Strategies in Combat Sports and Concerning Habits in Mixed Martial Arts

**Original Investigation**

**Authors:**

<sup>\*1</sup>Oliver R. Barley, <sup>1,2</sup>Dale W. Chapman, <sup>1</sup>Chris R. Abbiss



**Table 5.** Prevalence of weight loss practices in the combat sports of Brazilian jiu jitsu (BJJ), boxing, judo, mixed martial arts (MMA), muay Thai/kickboxing (MT/K), taekwondo (TKD) and wrestling

Individual	BJJ	Boxing	Judo	MMA	MT/K	TKD	Wrestling	All sports
Gradual dieting	92% <sup>g</sup>	86%	66% <sup>d</sup>	93% <sup>c,g</sup>	87%	92%	67% <sup>a,d</sup>	83%
Skipping 1 or 2 meals	53% <sup>f,g</sup>	36% <sup>f,g</sup>	66%	57% <sup>g</sup>	49% <sup>f,g</sup>	84% <sup>a,b,e</sup>	84% <sup>a,b,d,e</sup>	61%
Fasting (not eating all day)	33% <sup>f,g</sup>	36%	54%	48%	44%	68% <sup>a</sup>	57% <sup>a</sup>	49%
Restricting fluid ingestion	68% <sup>g</sup>	68%	84%	76%	76%	84%	94% <sup>a</sup>	79%
Increased exercise	86%	86%	82%	78%	82%	88%	95%	85%
Training in heated rooms	38% <sup>d,g</sup>	45% <sup>g</sup>	43% <sup>g</sup>	63% <sup>a</sup>	44% <sup>g</sup>	40% <sup>g</sup>	83% <sup>a,b,c,e,f</sup>	51%
Sauna	36% <sup>d,g</sup>	50%	43% <sup>d</sup>	76% <sup>a,c</sup>	51%	48%	50% <sup>a</sup>	51%
Training in rubber/plastic suits	16% <sup>d,g</sup>	50%	23% <sup>d</sup>	63% <sup>a,c,f,g</sup>	40%	28% <sup>d</sup>	83% <sup>a,d</sup>	43%
Use winter or plastic suits for the whole day (without exercising)	6% <sup>d,g</sup>	18%	7%	20% <sup>a</sup>	4%	8%	17% <sup>a</sup>	11%
Spitting	4% <sup>g</sup>	23% <sup>g</sup>	18% <sup>g</sup>	30% <sup>g</sup>	20% <sup>g</sup>	20%	47% <sup>a,b,c,d,e</sup>	23%
Laxatives (N/A)	9%	9%	9%	0%	9%	16%	12%	9%
Diuretics (N/A)	8%	9%	5%	7%	9%	12%	12%	9%
Diet Pills (N/A)	1%	5%	2%	7%	7%	8%	6%	5%
Vomiting (N/A)	1%	0%	5%	2%	0%	4%	5%	2%
Excessive fluid consumption (water loading)	50% <sup>d</sup>	64%	41% <sup>d</sup>	67% <sup>a,c,g</sup>	62%	48%	37% <sup>d</sup>	53%

# How Common (and serious) is this Likely to be?

## Rapid Weight Gain Following Weight Cutting in Male and Female Professional Mixed Martial Artists

in International Journal of Sport Nutrition and Exercise Metabolism

Kadhiresan R. Murugappan<sup>\*,1</sup>, Ariel Mueller<sup>\*,1</sup>, Daniel P. Walsh<sup>\*,1</sup>, Shahzad Shaefi<sup>\*,1</sup>, Akiva Leibowitz<sup>\*,1</sup>, and Todd Sarge<sup>\*,1</sup>

View Less —

THE PHYSICIAN AND SPORTSMEDICINE  
<https://doi.org/10.1080/00913847.2021.1960780>



Taylor & Francis  
Taylor & Francis Group

ORIGINAL RESEARCH

Check for updates

### Rapid weight gain following weight cutting in male professional boxers

Kadhiresan R. Murugappan<sup>a</sup>, Reid Reale<sup>b</sup>, Vincent Baribeau<sup>a</sup>, Brian P. O'Gara<sup>a</sup>, Ariel Mueller<sup>c</sup> and Todd Sarge<sup>a</sup>

*International Journal of Sport Nutrition and Exercise Metabolism*, 2019, 29, 68-71

<https://doi.org/10.1123/ijsem.2018-0087>

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CASE STUDY

### Case Study: Fatal Exertional Rhabdomyolysis Possibly Related to Drastic Weight Cutting

Kadhiresan R. Murugappan, Michael N. Cocchi, Somnath Bose, Sara E. Neves, Charles H. Cook, Todd Sarge, Shahzad Shaefi, and Akiva Leibowitz  
Beth Israel Deaconess Medical Center (BIDMC)

- Weight cutting is ubiquitous in both MMA and boxing
- Appears to become more severe as fighters progress through their careers.



- Jessica Lyndsey
- Yang Jian Bing



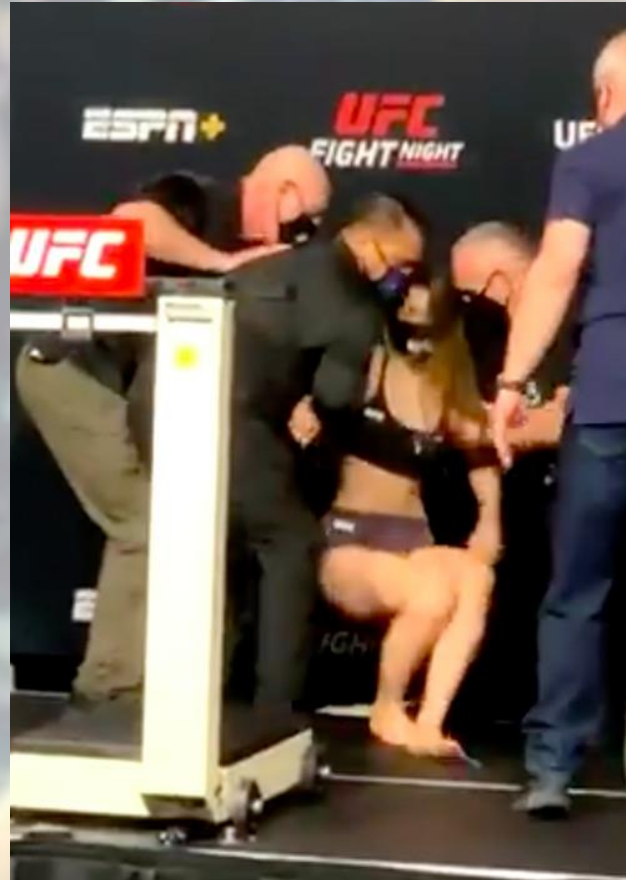
## Documenting The Tolls of Rapid Extreme Weight Cuts in MMA

Posted on September 3, 2014 by EMagraken

<https://combatsportslaw.com/2014/09/03/yes-athletes-have-been-hurt-from-weight-cutting-in-mma/>



# Dehydration and Performance



- **Reduced** blood volume
- 25-30% **reduced** stroke volume
- **Increased** heart rate
- **Lower** cardiac output
- Peripheral blood flow and sweat rate **reduced**, leading to increased core temperature
- **Reduced**  $\text{VO}_2\text{max}$ :
  - 1.9% of body mass = 10% reduction
  - 4.3% of body mass = 20-25% reduction
- Potentially **reduced** neuromuscular function

# Effects of Weight Cutting on Performance

6

## THE COGNITIVE AND PHYSICAL EFFECTS OF PRE-COMPETITION RAPID WEIGHT LOSS AND GAIN IN MIXED MARTIAL ARTS ATHLETES

J Soolaman, M Gaetz, J Brandenburg. *Kinesiology Department, University of the Fraser Valley, Chilliwack, Canada*

10.1136/bjsports-2017-098966.10



- Upper body strength, lower body power both reduced.
- Sit-to-stand HR response reduced.
- Cognitive abilities impaired.
- **None returned entirely to baseline within 3 hours before competition.**

### Original Research

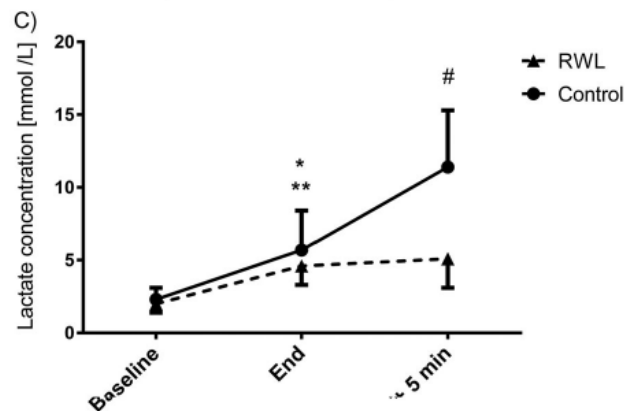
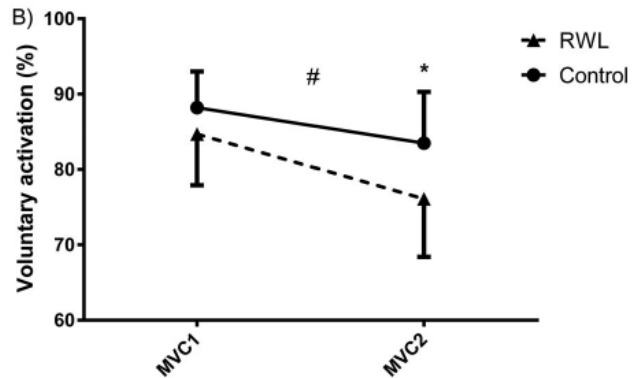
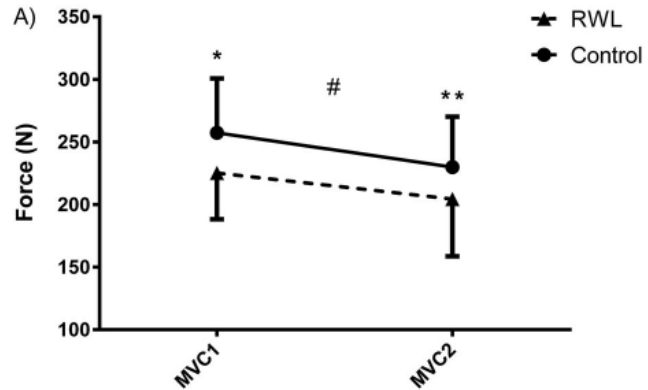
## A Survey of Combat Athletes' Rapid Weight Loss Practices and Evaluation of the Relationship With Concussion Symptom Recall

Nasir Uddin, MRes,\* Mark Waldron, PhD,†‡§ Stephen D. Patterson, PhD,\* Stacy Winter, DProf,\* and Jamie Tallent, PhD¶||

- 65% report at least one weight cut 'going badly' resulting in lack of energy (83%) and reduced strength/power (70%).
- **60-70% report longer concussion symptoms following a weight cut**



# Effects of Weight Cutting on Boxing Performance



European Journal of Sport Science, 2019  
<https://doi.org/10.1080/17461391.2019.1695954>



## ORIGINAL ARTICLE

### Neuromuscular performance after rapid weight loss in Olympic-style boxers

DAMIR ZUBAC<sup>1</sup>, BOŠTJAN ŠIMUNIČ<sup>2</sup>, ALEX BUOITE STELLA<sup>3</sup>, & SHAWNDA A. MORRISON<sup>4</sup>

<sup>1</sup>Faculty of Kinesiology, University of Split, Split, Croatia; <sup>2</sup>Science and Research Center Koper, Institute for Kinesiology Research, Koper, Slovenia; <sup>3</sup>Department of Medicine, Surgery, and Health Sciences, University of Trieste, Trieste, Italy & <sup>4</sup>Faculty of Health Sciences, University of Primorska, Izola, Slovenia

- Boxer's voluntary force output reduced by 12% after 3% weight loss.
- Fatigue occurs 16 seconds sooner
- Lactate production reduced by 53%





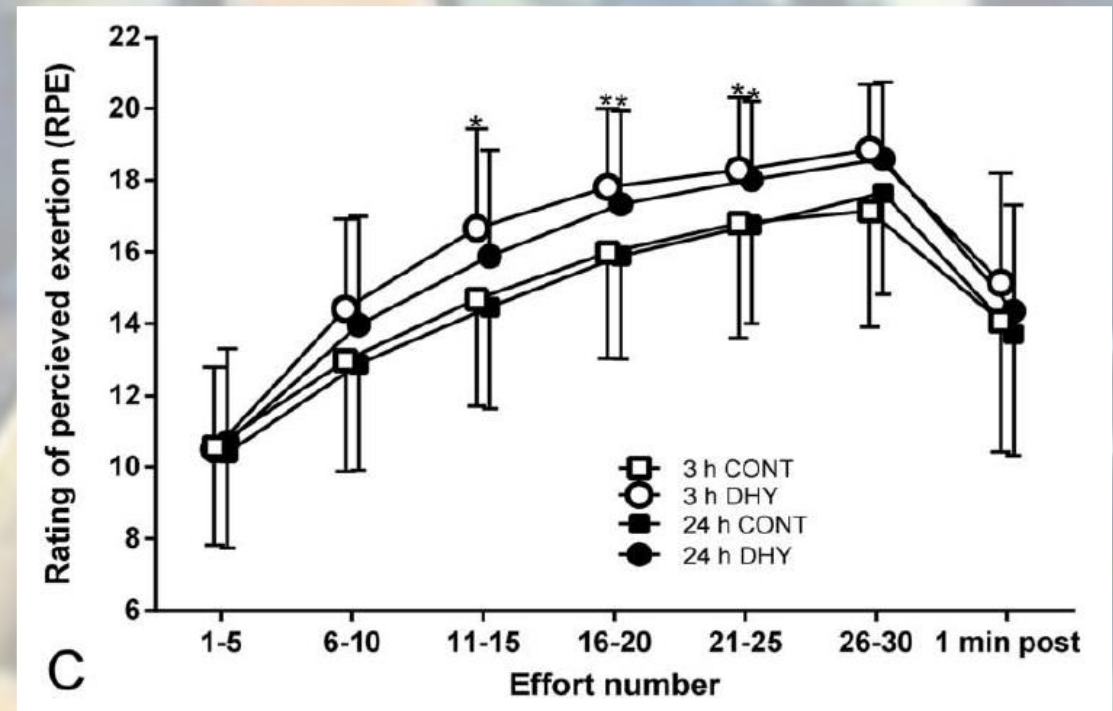
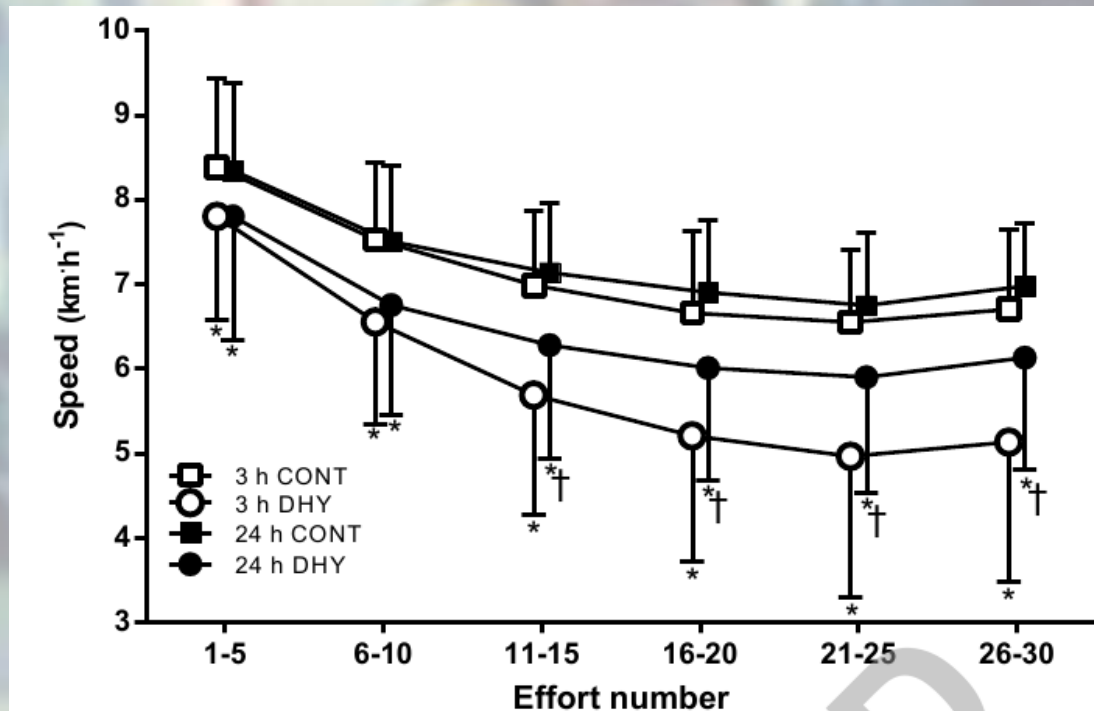
# Effects of Weight Cutting on MMA Performance

## REPEAT EFFORT PERFORMANCE IS REDUCED 24 HOURS AFTER ACUTE DEHYDRATION IN MIXED MARTIAL ARTS ATHLETES

OLIVER R. BARLEY,<sup>1</sup> FIONA IREDALE,<sup>1</sup> DALE W. CHAPMAN,<sup>1,2</sup> AMANDA HOPPER,<sup>1</sup> AND CHRIS R. ABBISS<sup>1</sup>

<sup>1</sup>Center for Exercise and Sports Science Research, School of Medical and Health Sciences, Edith Cowan University, Joondalup, Western Australia, Australia; and <sup>2</sup>Australian Institute of Sport, Bruce, Australian Capital Territory, Australia

- MMA fighters reduced BM by 5% via dehydration and exercise in the heat.



- Ability to perform repeat efforts reduced 3 hours after dehydration and 24 hours after dehydration
- The effort required to complete exercise increased after dehydration.

# Effects of Weight Cutting on Physiology

*International Journal of Sport Nutrition and Exercise Metabolism*, 2015, 25, 480-486  
<http://dx.doi.org/10.1123/ijsem.2014-0267>  
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ORIGINAL RESEARCH

## Rapid Weight Loss Elicits Harmful Biochemical and Hormonal Responses in Mixed Martial Arts Athletes

Victor Silveira Coswig, David Hideyoshi Fukuda, and Fabrício Boscolo Del Vecchio



- MMA fighters cutting weight by 10% of their body mass in week before the bout.
- Comparison to fighters who did not cut weight.
- Blood samples taken immediately before and immediately after professional bouts.
- Increased lactate dehydrogenase
- Increased alanine aminotransferase

Physiology & Biochemistry

## Rapid Weight Loss Decreases Serum Testosterone

T. A. M. Karila<sup>1</sup>, P. Sarkkinen<sup>2</sup>, M. Marttinen<sup>3</sup>, T. Seppälä<sup>4</sup>, A. Mero<sup>2</sup>, K. Tallroth<sup>3</sup>

<sup>1</sup> Hospital Orton, Helsinki, Finland

<sup>2</sup> Department of Biology of Physical Activity, University of Jyväskylä, Jyväskylä, Finland

<sup>3</sup> Orton Research Institute, Helsinki, Finland

<sup>4</sup> Drug Research Unit, National Public Health Institute, Helsinki, Finland

- Finnish national wrestling athletes cutting 8.2% of body mass.
- 63% reduction in testosterone.
- May have been more severe but dehydration may distort blood measures.



# Severe Energy Restriction

	RWL					
	WINNERS			LOSERS		
	Median	IR <sub>(25%)</sub>	IR <sub>(75%)</sub>	Median	IR <sub>(25%)</sub>	IR <sub>(75%)</sub>
Total Calories (Kcal)	745.5	103.5	1104.5	303.0	159.4	702.8
Carbohydrates (g)	79.8	26.3	166.7	20.0	1.2	96.5
Proteins (g)	18.3	1.2	60.4	17.0	11.7	30.3
Lipids (g)	18.2	0.5	36.8	12.9	8.7	14.9
Carbohydrates (%)	49.0	21.6	64.8	27.1	3.1	55.4
Proteins (%)	9.0	3.1	23.1	18.7	12.8	30.6
Lipids (%)	13.9	3.2	32.0	27.4	18.5	47.2
Carbohydrates (g/BM)	1.0	0.3	1.7	0.3	0.0	1.1
Proteins (g/BM)	0.2	0.0	0.7	0.2	0.1	0.4
Lipids (g/BM)	0.2	0.0	0.4	0.2	0.1	0.2

	WRG					
	WINNERS			LOSERS		
	Median	IR <sub>(25%)</sub>	IR <sub>(75%)</sub>	Median	IR <sub>(25%)</sub>	IR <sub>(75%)</sub>
Total Calories (Kcal)	5191.5#	2887.0	6117.0	2952.1#	2166.5	4722.1
Carbohydrates (g)	610.6#	374.2	663.2	299.1#	224.8	492.2
Proteins (g)	250.2#	184.1	347.1	224.3#	160.9	298.6
Lipids (g)	170.3#	105.7	205.9	116.1#	73.2	194.7
Carbohydrates (%)	45.8	43.2	50.0	35.6	30.0	50.4
Proteins (%)	21.5#	17.5	26.0	20.0	18.3	39.0
Lipids (%)	31.1	26.3	34.5	37.5	21.8	44.0
Carbohydrates (g/BM)	6.3#	3.4	8.0	3.9#	2.3	6.6
Proteins (g/BM)	2.8#	1.9	4.4	2.5#	1.8	3.2
Lipids (g/BM)	2.0#	1.3	2.5	1.5#	0.7	2.2


**Article Title:** Weight Regain, But Not Weight Loss, Is Related to Competitive Success in Real-life Mixed Martial Arts Competition

**Authors:** Victor Silveira Coswig<sup>1</sup>; Bianca Miarka<sup>2</sup>; Daniel Alvarez Pires<sup>1</sup>; Levy Mendes da Silva<sup>1</sup>; Charles Bartel<sup>3</sup>; and Fabrício Boscolo Del Vecchio<sup>3</sup>

# Rebound Hyperphagia



- Overcompensation of BM and fat mass following chronic energy deficit.
- Pre-comp energy intake = 11,900 kcal.week<sup>-1</sup>
- Post-comp energy intake = 33,000kcal.week<sup>-1</sup>
- Body mass gained 1 week post-comp = 8.3 kg, 1.5 kg fat mass.

 Langan-Evans, C. , Germaine, M. , Artukovic, M. , Shepherd, S. O. , Close, G. L. , Morton, J. P.

On the rebound: Symptoms of acute hyperphagia in an international level male taekwondo athlete following chronic body mass loss



# Relative Energy Deficiency in Sport Syndrome

	RWL					
	WINNERS			LOSERS		
	Median	IR <sub>(25%)</sub>	IR <sub>(75%)</sub>	Median	IR <sub>(25%)</sub>	IR <sub>(75%)</sub>
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Lipids (g/BM)	0.2	0.0	0.4	0.2	0.1	0.2

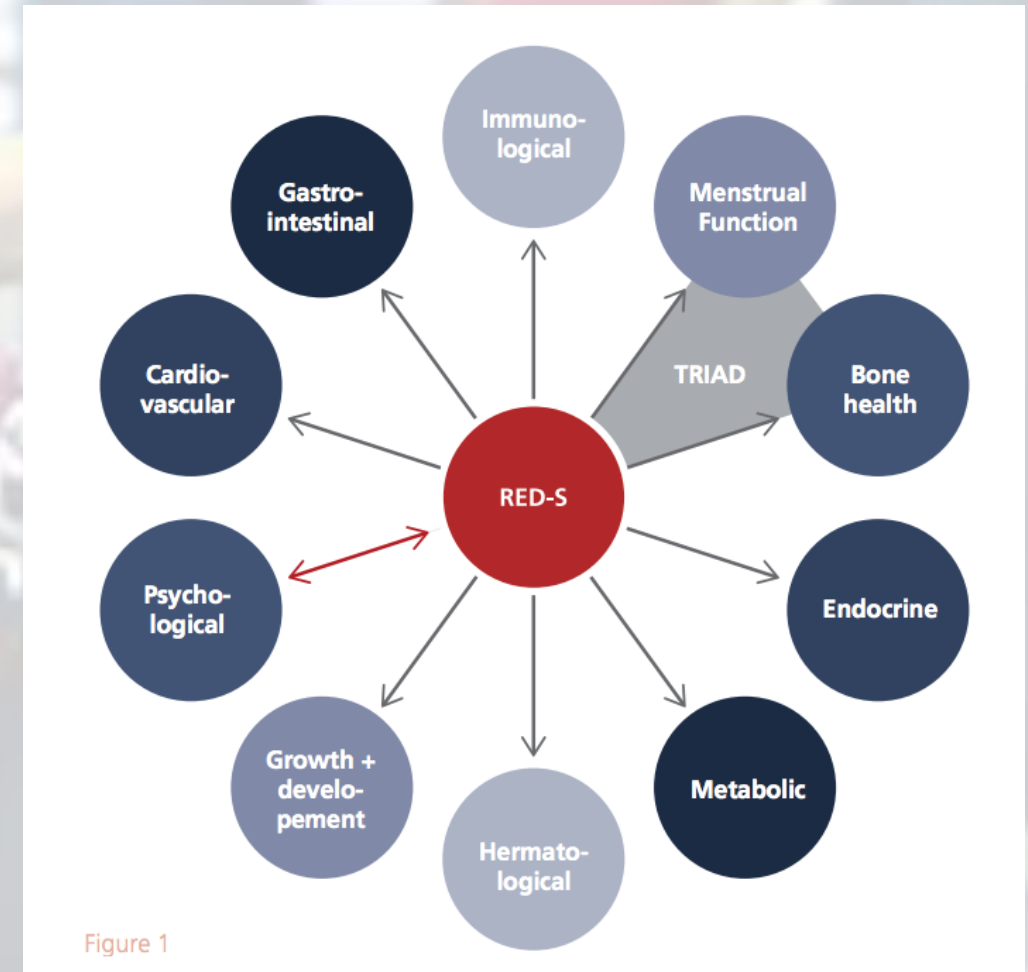
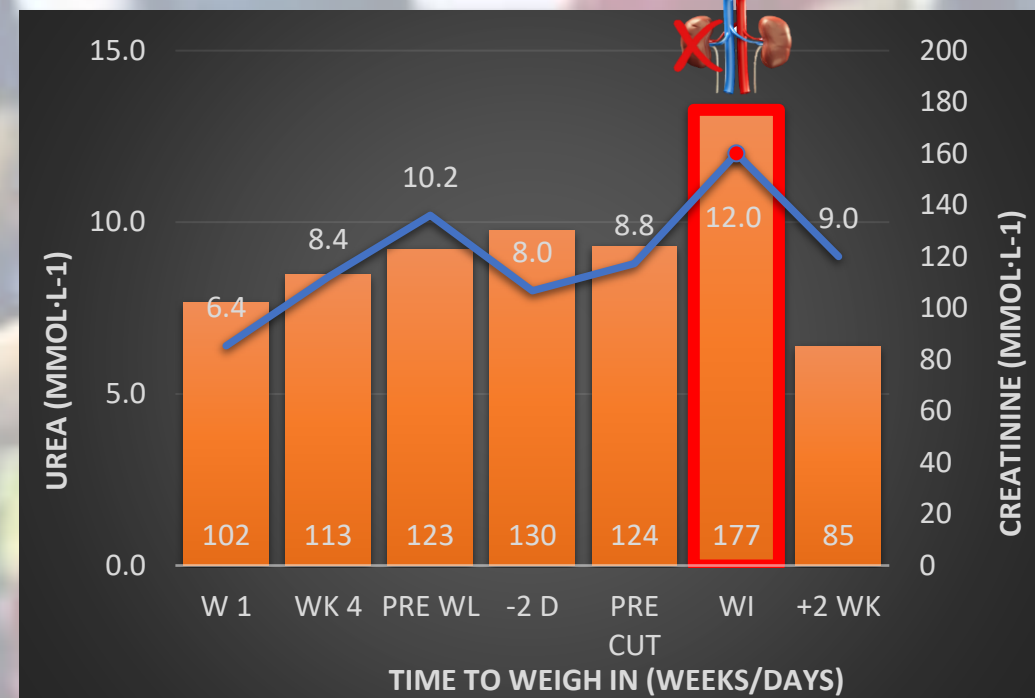
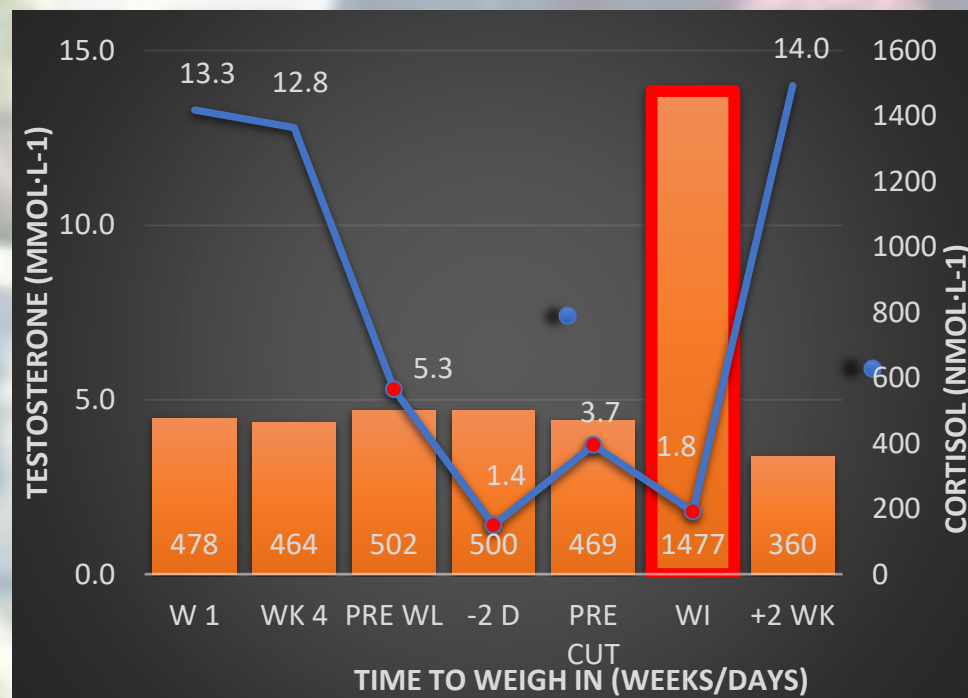


Figure 1

**Article Title:** Weight Regain, But Not Weight Loss, Is Related to Competitive Success in Real-life Mixed Martial Arts Competition

**Authors:** Victor Silveira Coswig<sup>1</sup>; Bianca Miarka<sup>2</sup>; Daniel Alvarez Pires<sup>1</sup>; Levy Mendes da Silva<sup>1</sup>; Charles Bartel<sup>3</sup>; and Fabrício Boscolo Del Vecchio<sup>3</sup>



- Lost 17kg over 8 weeks
- Lost 7kg in 36 hours before weigh in

International Journal of Sport Nutrition and Exercise Metabolism, 2019, 29, 331-338  
<https://doi.org/10.1123/ijsem.2018-0029>  
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 CASE STUDY

## Case Study: Extreme Weight Making Causes Relative Energy Deficiency, Dehydration, and Acute Kidney Injury in a Male Mixed Martial Arts Athlete

Andreas M. Kasper, Ben Crighton, and Carl Langan-Evans  
 Liverpool John Moores University





# Does it Provide More Chance of Winning?

Linked to Success

Not Linked to Success

APPLIED SCIENCES: PHYSICAL FITNESS AND PERFORMANCE

## Acute weight gain and its relationship to success in high school wrestlers

WROBLE, RANDALL R.; MOXLEY, DONALD P. [Author Information](#) ⓘ

Medicine & Science in Sports & Exercise: June 1998 - Volume 30 - Issue 6 - p 949-951

International Journal of Sports Physiology and Performance, (Ahead of Print)  
<https://doi.org/10.1123/ijspp.2016-0733>  
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ORIGINAL INVESTIGATION

## Rapid Weight Loss Is Not Associated With Competitive Success in Elite Youth Olympic-Style Boxers in Europe

Damir Zubac, Hrvoje Karnincic, and Damir Sekulic

**Title:** Weight re-gain is not linked to success in a real life multi-day boxing tournament

**Submission Type:** Original investigation

**Authors:** Reid Reale<sup>1,2</sup>, Gregory R Cox<sup>1,2,3</sup>, Gary Slater<sup>2</sup>, Louise M Burke<sup>1,3</sup>,  
1 Australian Institute of Sport, Canberra, Australian Capital Territory, Australia  
2 University of Sunshine Coast, Sippy Downs, Queensland, Australia  
3 Australian Catholic University, Melbourne, Victoria, Australia

“Regain in Body Mass After Weigh-In is Linked to Success in Real Life Judo Competition”  
by Reale R, Cox GR, Slater G, Burke LM  
*International Journal of Sport Nutrition and Exercise Metabolism*  
© 2016 Human Kinetics, Inc.

*Journal of Sports Sciences*, January 1st 2010; 28(1): 21–32

Routledge  
Taylor & Francis Group

## Rapid weight loss followed by recovery time does not affect judo-related performance

GUILHERME G. ARTIOLI<sup>1</sup>, RODRIGO T. IGLESIAS<sup>1</sup>, EMERSON FRANCHINI<sup>2</sup>,  
BRUNO GUALANO<sup>1</sup>, DANIEL B. KASHIWAGURA<sup>2</sup>, MARINA Y. SOLIS<sup>1</sup>,  
FABIANA B. BENATTI<sup>1</sup>, MARINA FUCHS<sup>1</sup>, & ANTONIO H. LANCHI JUNIOR<sup>1</sup>

THE PHYSICIAN AND SPORTSMEDICINE, 2016  
VOL. 44, NO. 4, 349–354  
<http://dx.doi.org/10.1080/00913847.2016.1228421>

Taylor & Francis  
Taylor & Francis Group

CLINICAL FEATURE  
ORIGINAL RESEARCH

## Rapid weight gain in professional boxing and correlation with fight decisions: analysis from 71 title fights

Gianlorenzo Daniele<sup>a</sup>, Richard N Weinstein<sup>b</sup>, Paul Wesley Wallace<sup>c</sup>, Vincenzo Palmieri<sup>a</sup> and Massimiliano Bianco<sup>a</sup>

<sup>a</sup>Sports Medicine Unit, Internal Medicine and Geriatrics Institute, Catholic University of Sacred Heart, Rome, Italy; <sup>b</sup>Westchester Health Associates, White Plains, NY, USA; <sup>c</sup>Cedars-Sinai Medical Center, Los Angeles, CA, USA

## Influence of rapid weight gain after the weigh-in on success in collegiate wrestlers.

Horswill CA<sup>1</sup>, Scott JR, Dick RW, Hayes J

[Author information](#) ▶

Medicine and Science in Sports and Exercise, 01 Oct 1994, 26(10):1290-1294  
PMID: 7799774

# Does it Provide More Chance of Winning in MMA?

**Article Title:** Weight Regain, But Not Weight Loss, Is Related to Competitive Success in Real-life Mixed Martial Arts Competition

**Authors:** Victor Silveira Coswig<sup>1</sup>; Bianca Miarka<sup>2</sup>; Daniel Alvarez Pires<sup>1</sup>; Levy Mendes da Silva<sup>1</sup>; Charles Bartel<sup>3</sup>; and Fabrício Boscolo Del Vecchio<sup>3</sup>

- 59 amateur and 16 professional MMA fighters
- Fighters who lost cut more weight (10.6% of body mass) than fighters who won (8.6% of body mass).
- Odds of winning decreased by 11% for every unit of BM cut.

- 15 professional MMA fighters in simulated bouts
- Both winners and losers reduced body mass by  $14 \pm 4$  kg.
- Bout winners regained ~3% more body mass than losers

Original Research

*The* Journal of Strength and Conditioning Research™

## Weight-Cutting Implications for Competition Outcomes in Mixed Martial Arts Cage Fighting

Grant C. Brechney,<sup>1</sup> Eevon Chia,<sup>1</sup> and Ashleigh T. Moreland<sup>1,2</sup>

<sup>1</sup>School of Exercise Science, Sport and Health, Faculty of Science, Charles Sturt University, Bathurst, New South Wales, Australia; and

<sup>2</sup>Exercise and Sport Science Discipline, School of Health and Biomedical Science, RMIT University, Melbourne, Victoria, Australia



# Does it Provide More Chance of Winning in MMA?

*International Journal of Sport Nutrition and Exercise Metabolism*, (Ahead of Print)  
<https://doi.org/10.1123/ijsem.2019-0347>  
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RAPID COMMUNICATION

## Worth the Weight? Post Weigh-In Rapid Weight Gain is Not Related to Winning or Losing in Professional Mixed Martial Arts

Christopher Kirk

University of Derby and Liverpool John Moores University

Carl Langan-Evans and James P. Morton

Liverpool John Moores University

- Athlete's regained 7-15% of their body mass in 24 hours.
- No difference in weight regained or weight in the cage between winners or losers
- No differences whether the bout ended due to strikes, submission or decision.

- 62 professional MMA bouts
- CSAC data – athlete's official weigh in the day before the bout and again the day of the bout.

Division	Body Mass in the Cage (kg)	Divisions Above Weigh-in
LHW	100.1 ± 1.4 kg	1
MW	92.2 ± 3.2	1
WW	82.1 ± 2.9	1
LW	77 ± 4.8	1
FW	73.6 ± 3	2
BW	68.5 ± 2	2
FIW	65 ± 1.2	2
Women's FW	71.6 ± 1	2
Women's BW	68.5 ± 3.3	2
Women's FIW	64 ± 3.1	2
Women's SW	57.5 ± 1.3	2

# Does it Provide More Chance of Winning in MMA?

- Athlete's regained 7-15% of their body mass in 24 hours.
- **Chances of winning increased by 4.5% with every 1% of BM regained.**
- However:
- Differences in BM regained between winners and losers only occurred in 'national' standard events, not in 'elite' or 'regional'.
- No differences in BM in the cage between winners and losers at any standard.

- **700 professional MMA bouts**
- CSAC data – athlete's official weigh in the day before the bout and again the day of the bout.

EUROPEAN JOURNAL OF SPORT SCIENCE  
<https://doi.org/10.1080/17461391.2021.2013951>

 **Routledge**  
Taylor & Francis Group

 Check for updates

## Rapid weight gain predicts fight success in mixed martial arts – evidence from 1,400 weigh-ins

Heloiana Faro <sup>a</sup>, Dalton de Lima-Junior <sup>a</sup> and Daniel Gomes da Silva Machado <sup>b</sup>

<sup>a</sup>Associate Graduate Program in Physical Education of Federal University of Paraíba, Federal University of Paraíba, João Pessoa, PB, Brazil;

<sup>b</sup>Department of Physical Education, Federal University of Rio Grande do Norte, Natal, RN, Brazil

# Youth Athletes

Asian J Sports Med. In Press(In Press):e104436.

doi: [10.5812/asjrm.104436](https://doi.org/10.5812/asjrm.104436).

Published online 2020 November 28.

Research Article



## Self-Confidence and Disordered Eating amongst Martial Artists: A Cross-Sectional Study

Tony Blomqvist Mickelsson<sup>1\*</sup>, Maxine Thylin<sup>1</sup> and Erika Hansson<sup>1</sup>

<sup>1</sup>Kristianstad University, Kristianstad, Sweden

Lakicevic et al. *Journal of Eating Disorders* (2022) 10:75  
<https://doi.org/10.1186/s40337-022-00595-w>

Journal of Eating Disorders

REVIEW

Open Access

## Patterns of weight cycling in youth Olympic combat sports: a systematic review

Nemanja Lakicevic<sup>1\*</sup>, Joseph J. Matthews<sup>2</sup>, Guilherme G. Artioli<sup>3</sup>, Antonio Paoli<sup>4</sup>, Roberto Roklicer<sup>5</sup>, Tatjana Trivic<sup>5</sup>, Antonino Bianco<sup>1</sup> and Patrik Drid<sup>5</sup>



- Youth athletes in Olympic combat sports follow the same weight cutting methods as adults, prescribed almost entirely by coaches and parents.
- Guidance very rarely sought from dietitians or physicians.
- Adverse symptoms reported amongst youth athletes:
  - Headaches, dizziness, nausea, nosebleeds, disorientation, increased HR, increased depression, anger and fatigue.
- 2/9 youth females observed were amenorrhoeic for 1 year.
- 7-11% of wrestlers diagnosed with eating disorders.



# Is there a better way?

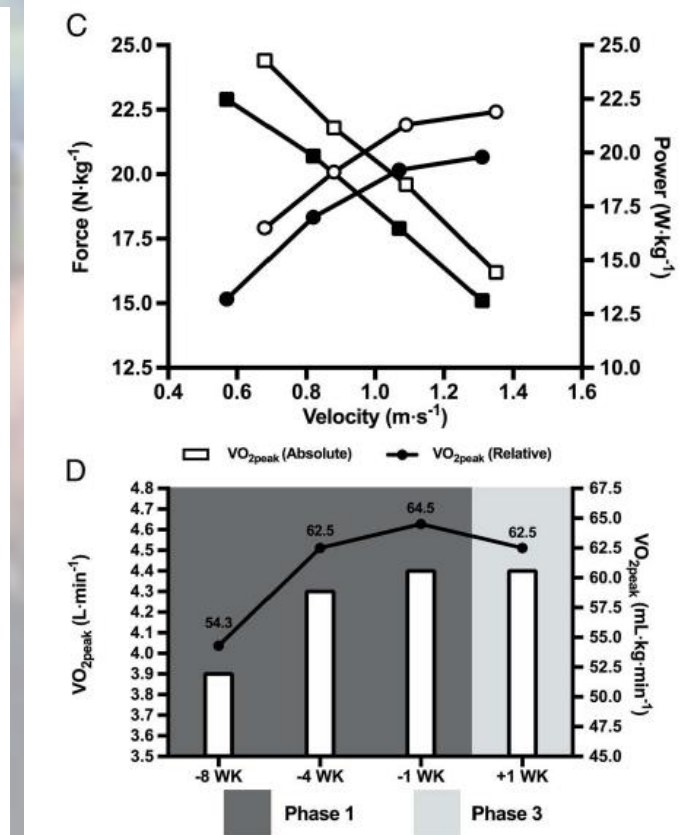
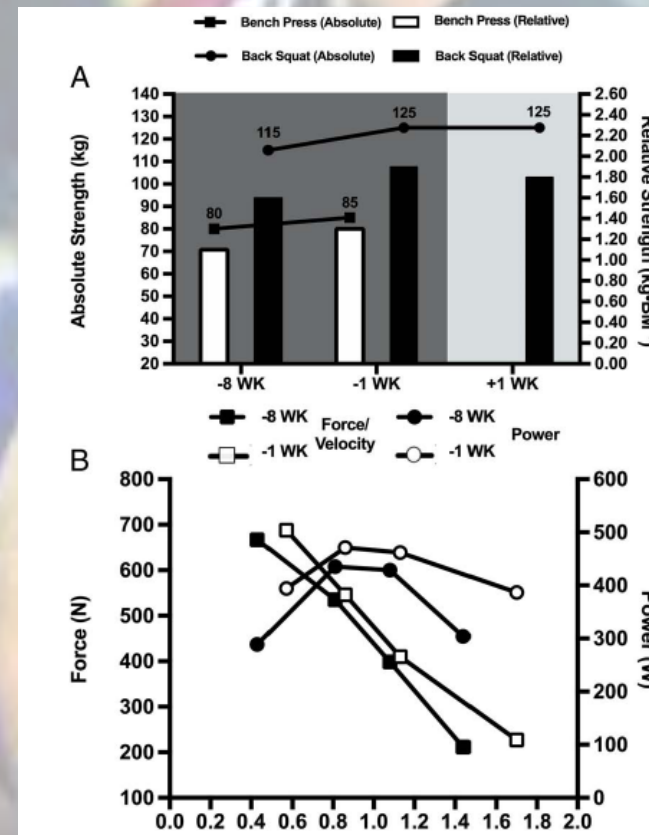
- Male taekwondo fighter.
- 8 weeks:
  - 7 week energy intake equal to RMR of 1,700 kcal.day
  - Energy availability = 20kcal.kg.FFM.day
  - 5 days of reduced energy intake 1,200-1,300 kcal.day
  - Energy availability < 10 kcal.kg.FFM.day
  - BM reduced 9.5kg (13%)
- No signs of RED-S or physiological dysfunction in first 7 weeks.
- Endocrine changes (testosterone < 5nmol.L) and reduced RMR (-257 kcal.day) in final week before weigh in.

## CLINICAL SCIENCES

### The Psychological and Physiological Consequences of Low Energy Availability in a Male Combat Sport Athlete

CARL LANGAN-EVANS, MARK GERMAINE, MARIO ARTUKOVIC, DAVID L. OXBOROUGH, JOSÉ L. ARETA, GRAEME L. CLOSE, and JAMES P. MORTON

Research Institute for Sport and Exercise Sciences, School of Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, UNITED KINGDOM



# Essential Reading

## Making Weight in Combat Sports

Carl Langan-Evans, BSc, Graeme L. Close, PhD, and James P. Morton, PhD  
Research Institute for Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, United Kingdom

SPECIAL COMMUNICATION

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### ACSM Expert Consensus Statement on Weight Loss in Weight-Category Sports

Louise M. Burke, PhD, BSc (nut) G Dip Diet, FACSM;<sup>1</sup> Gary J. Slater, PhD, BSc, G Dip Nutr Diet MSc;<sup>2</sup>  
Joseph J. Matthews, MSc, BSc (Hons);<sup>3,4</sup>  
Carl Langan-Evans, BA (Hons), MRes, PhD, FHEA, IIST, ASCC;<sup>5</sup> and Craig A. Horswill, PhD<sup>6</sup>



# Rule Change.....or Culture Change?

johnwayneparr Well my first hydration test was a complete disaster. I was hoping I could find a loop hole in the system for an advantage but it ended up costing me big time.

I woke up 77.2kg weigh-in day. I went down to the treadmill and got down to 76kg hoping I'd be able drink a litre of water to be hydrated.

But after losing 8kg in 4 days I was ridiculously dry & dehydrated and failed hydration test by a mile.

The One Championship staff suggested I drink 2litres of water to hydrate then go straight to treadmill to run it off.

I was now 77.8kg. So for the second time that day I put on my sweat clothes and ran on treadmill for an hour. When I went to check my weight again now 76.3kg & Easily under the 77kg limit. Problem was I still failed hydration test.

That was at 4pm. The staff said 2nd weigh in will be at 8pm.

The staff told me "You have already lost 20% of your prize money so weight no longer an issue. You need to drink plenty of water until you pass hydration test otherwise you're not allowed to fight".

Weigh-in started 1pm. After drinking 4 litres of water and 6 failed hydration tests. I didn't pass hydration test until 11pm that night and now finally the fight was officially on.

I started the day 76kg but they don't take official weight until you pass hydration test@and after 4 litres of water came in at 80kg 🤦‍♂️!

Massive lesson learnt on my part. Because of my hip I couldn't run and because I couldn't run my weight didn't move. I will rectify this problem for my next camp so this doesn't happen again.

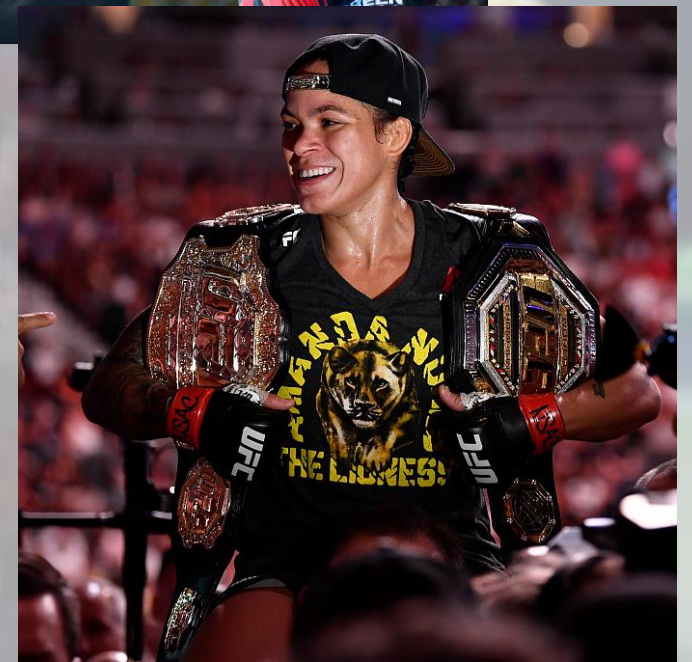
I want to apologise for my misjudgment to @onechampionship, Mr @yodchatri and of course to my opponent @niekyholzken and the embarrassment I bought upon myself for not doing my job correctly 🙏.



# Conclusions

- Weight-cutting in combat sports is extreme and highly reliant on severe energy restriction and dehydration.
- It is unlikely that such extreme weight cutting provides any benefit for the athlete during competition, likely reduces performance, deteriorates health and may be linked to lifelong eating disorders.
- Effects may potentially be minimised by ensuring energy availability and hydration is maintained throughout training camp and post weigh in.
- Culture change and education is likely our best option for turning this tanker.

**The next steps?**



# Thank you for Listening

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**Sheffield  
Hallam  
University**



Any Questions?