

Rapid weight loss for MMA matches increases potential for traumatic brain injury, and chronic traumatic encephalopathy.



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ABSTRACT

Water loading is the main rapid weight loss method fighters use in order to qualify for a specific weight classes in mixed martial arts (MMA) competitions. This method involves severe dehydration that occurs just a few hours before the fight begins, followed by a quick rehydration and supplementation of nutrients to prepare for the fight. Here we hypothesize that while this method is widely used, we argue, it is an unnecessary method of achieving an inept advantage. In addition, this method increases the likelihood of bodily damage taken in the fight. In this review, we analyzed the available primary literature on this topic to show how this rapid weight loss is not beneficial in MMA and contributes to more bodily damage taken by MMA fighters. We found that in a dehydrated state, MMA fighters are more likely to suffer mild traumatic brain injury which, over the course of time through multiple fights, can lead to chronic traumatic encephalopathy (CTE). Though fighters are doing their best to rehydrate before fighting, evidence suggests that they are not fully rehydrated when they step into the cage. This lack of control over weight management by fight promoters, puts MMA fighters at a higher risk for CTE, an irreversible state of brain damage, due to a cultural norm of drastic weight cuts and one that can easily be rectified through MMA fighting promoters implementing specific urine testing and weight analysis throughout the year to ensure fighters weights do not deviate from their biological norm.

METHODS

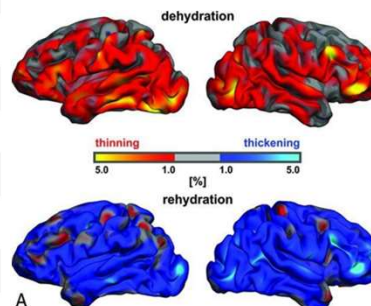
- Extensively researched primary literature on
- Dehydration in relation to a decrease in cerebral blood flow velocity.
 - Higher likelihood of brain translational motion due to dehydration.
 - Concussions, in relation to chronic traumatic encephalopathy (CTE), MMA fighters, women's health, and hydration testing.
 - Physical preparedness of MMA fighters.



WEIGHT LOSS STRATEGIES FROM VARIOUS SPORTS AND LOCATIONS OF BRAIN CHANGES FROM HYDRATION STATUS

	BJJ	Boxing	Judo	MMA	MTFK	TKD	Wrestling
Weight without a competition coming up (kg)	80.9±19.3 ^a	77.5±13.9 ^a	81.2±13.1 ^a	82.8±12.6 ^a	75.2±13.7 ^a	65.3±13.3 ^{b,c,d,e}	74.3±13.9 ^{a,f}
Current weight class (kg)	76.6±13.9 ^{a,f}	71.6±10.0 ^f	80.2±14 ^{a,f,g}	71.5±14.6 ^f	70.6±12 ^{a,f}	61.6±13.2 ^{b,c,d,e}	69.9±13.4 ^{a,f}
Participants that have lost weight to compete (% 3%)	88%	93%	86%	95%	94%	85%	97%
Most amount of weight lost for a competition (kg)	6.7±4.6 ^f	8.5±4.8	8.1±8.2	10.4±4.2 ^{a,f}	6.9±3.5 ^f	6.5±3.3 ^f	7.1±4.2 ^f
How much weight usually lost for a competition (kg)	4.2±2.6 ^f	5.3±2.9 ^f	3.8±2.1 ^f	9.8±7.9 ^{b,c,d,e}	5.9±3.5 ^f	4±3 ^f	4.4±3.7 ^f
How many days weight is usually lost over	18±19 ^f	26±20 ^f	14±16 ^f	27±24 ^f	21±20 ^f	28±48 ^f	7±9 ^{b,c,d,e,f}
Weight typically lost within 2 weeks of weigh-in	3.1±2.3 ^f	3.7±2.7	2.4±2.1 ^f	5.6±3.1 ^{a,b,c,d,e}	2.6±1.7 ^f	3.4±3.2 ^f	3.4±3.2 ^f
Weight typically lost within 24 h of weigh-in	1.4±1.4 ^a	1.8±2.1 ^f	1.5±1.1 ^f	3.4±1.9 ^{b,c,d,e}	2±1.2 ^f	1.6±1.4 ^f	2.3±1.5 ^a
Weight typically regained between weigh-in and competition	1.3±1.4 ^{a,b}	2±2.2 ^f	2±1.3 ^f	5.3±2.9 ^{b,c,d,e}	3.5±3.7 ^{a,b}	2.2±1.3 ^f	2.2±1.4 ^{a,b}
Time between weigh-in and competition (h)	6±8 ^{a,b}	7±2 ^{a,b}	11±8 ^{a,b}	24±11 ^{b,c,d}	18±9 ^{b,c,d}	19±5 ^{b,c,d}	7±15 ^{a,b}
Weight regained 7 days following competition	3.2±2.3 ^{a,b}	4±2.5 ^f	3.1±2 ^f	7.8±3.7 ^{b,c,d,e}	4.6±3 ^f	3.6±3 ^f	4.4±2.4 ^f

^a = P<0.05 when compared with BJJ. ^b = P<0.05 when compared with Boxing. ^c = P<0.05 when compared with Judo. ^d = P<0.05 when compared with MMA. ^e = P<0.05 when compared with Muay Thai/ Kickboxing. ^f = P<0.05 when compared with Taekwondo. * = P<0.05 when compared with Wrestling. N/A = Not applicable as no main effects were observed.



CONCLUSIONS

- Thirsting (dehydration) for 16hrs resulted in 0.55% decrease in brain volume.
- Repeated events of mTBI's result in progression towards CTE.
- CTE tends to become pronounced 8-10 years after mTBI events.
- CTE progression leads to various mental inhibition such as paranoia, dementia, language dysfunction, and a high likelihood of suicidal thoughts.

FUTURE DIRECTIONS

- Implementation of Weight, urine and thirst (WUT) testing.
- Implement a mandatory weight check for fighters, year-round and at randomly selected times.

ACKNOWLEDGEMENTS

(Barley et al. 2018), (Biller et al. 2015), (Editing Stats 2021 Sep 10), (UFC-Ultimate Fighting Championship 2015 Dec 12), (UFC-Ultimate Fighting Championship 2019 Jan 19)