

Role Of Intermittent Fasting in Modulating Stress-Related Weight Gain Among Combat Sport Athletes

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Abstract

Combat-sport athletes face a distinctive combination of physiological and psychological demands arising from high training loads, weight-class requirements, competitive pressure, repeated weight cycling, and, in some athletes, rapid pre-competition weight loss. These factors can interact with the hypothalamic-pituitary-adrenal (HPA) axis, appetite regulation, sleep, energy availability, glucose metabolism, and body-composition control. After aggressive weight loss, rapid post-weight-in refeeding and fluid restoration can cause substantial short-term fluctuations in body mass and, if repeated chronically, may contribute to undesirable changes in body composition.

Intermittent fasting (IF), particularly time-restricted eating (TRE), has attracted interest as a nutritional strategy for improving metabolic health and regulating body weight. Proposed mechanisms include improved insulin sensitivity, altered substrate utilisation, circadian alignment, activation of cellular energy-sensing pathways such as AMP-activated protein kinase (AMPK) and sirtuin-1 (SIRT1), and potential modulation of inflammatory and stress responses. However, human evidence does not currently support describing IF as a proven method for "resetting" the HPA axis or preventing cortisol-mediated adiposity, particularly in elite combat athletes.

This narrative review examines the relationship between psychological and physiological stress, weight cycling, low energy availability, cortisol, appetite regulation, and post-competition weight regain in combat-sport athletes. It evaluates current evidence regarding IF/TRE, body composition, exercise performance, metabolic health, circadian biology, and stress responsiveness. Particular attention is given to the potential advantages and limitations of implementing TRE during the off-season and general-preparation phases while preserving adequate energy availability, carbohydrate availability, protein distribution, hydration, recovery, and training quality.

Keywords: Intermittent fasting; time-restricted eating; combat sports; weight cycling; rapid weight loss; cortisol; HPA axis; stress; body composition; REDs; sports nutrition; yoga.

1. Introduction

Combat sports—including boxing, wrestling, judo, Brazilian jiu-jitsu, taekwondo, karate, kickboxing, Muay Thai and mixed martial arts—combine high-intensity intermittent exercise with substantial technical, tactical, psychological and metabolic demands. Athletes compete according to body-mass categories, making body-composition management an important component of competitive preparation.¹⁻³

Weight management occurs across general preparation, longitudinal weight descent, fight-week manipulation, official weigh-in, post-weigh-in rehydration/refuelling, and recovery. Weight loss is highly prevalent among combat athletes, while extreme methods remain a concern. Contemporary literature emphasises that repeated weight cycling can produce substantial physiological stress¹⁻³

Combat athletes experience psychological stress related to competition, body weight, performance demands, and repeated weight manipulation, which may influence the HPA axis, appetite, sleep, energy intake, and recovery. Cortisol plays an important role in the acute stress response and energy regulation, although its relationship with body composition is influenced by multiple factors, including sleep, diet, insulin regulation, and physical activity. Intermittent fasting (IF), particularly time-restricted eating (TRE), has gained attention as a strategy for weight and metabolic management. TRE may influence energy intake, insulin sensitivity, substrate utilisation, circadian rhythms, and body composition, with studies in exercising populations suggesting modest improvements in fat mass and body-fat percentage.⁴⁻⁷

The objective of this review is not to promote fasting as a rapid-weight-loss method, but to examine whether appropriately structured TRE may have a role in long-term body-composition management and metabolic health in selected combat athletes.

Review Methodology

This narrative review considers published literature addressing biomedical and sports-science literature concerning intermittent fasting, time-restricted eating, stress physiology, cortisol, weight cycling, rapid weight loss, body composition and athletic performance. Priority is given to systematic reviews, meta-analyses, randomised controlled trials, consensus statements and position statements. Direct research on IF specifically in combat-sport athletes remains limited; evidence from physically active and resistance-trained populations is considered where relevant.

The available literature was interpreted cautiously, with particular attention to differences between general-population fasting studies and the nutritional requirements of athletes competing in weight-class sports.

Stress Physiology And Weight Regulation

Psychological and physiological stress activates the hypothalamic-pituitary-adrenal axis: hypothalamic CRH → pituitary ACTH → adrenal cortisol. Cortisol is essential during acute stress, supporting glucose availability and cardiovascular responsiveness. Concern arises when athletes experience repeated high training loads, inadequate recovery, sleep deprivation, severe restriction, dehydration, and competition pressure.

The relationship between cortisol and body composition is multifactorial. Cortisol interacts with insulin, energy intake, sleep, activity, appetite and individual susceptibility. Therefore, stress should be viewed as one component of a broader system regulating body mass and metabolic health.

Combat athletes face multiple stressors from training, competition, dietary restriction, and weight manipulation, which may affect appetite, sleep, recovery, and metabolic regulation. Thus, stress-related weight changes should be viewed within a broader physiological context rather than attributed solely to HPA-axis activity.

Weight Cycling And Rapid Weight Loss

Combat athletes may cycle through long-term weight loss, fight-week restriction, dehydration, weigh-in, rapid rehydration/refuelling, and subsequent weight regain. Short-term post-weigh-in increases in body mass largely reflect restoration of water, glycogen and gastrointestinal contents and should not automatically be interpreted as fat gain.

Rapid weight loss may involve food and fluid restriction, increased exercise, sweating and manipulation of glycogen and intestinal contents. Effects on performance vary with magnitude, rate of weight loss, dehydration, recovery time, rehydration, and carbohydrate restoration. Modern combat-sport guidance therefore favours individualised and supervised strategies.

Rapid weight loss is common in combat sports and may compromise health and performance. Current guidelines emphasise individualised weight management and structured post-weigh-in recovery. Therefore, TRE should be considered as a long-term nutritional strategy rather than a method for rapid pre-competition weight loss.

Intermittent Fasting And Time-Restricted Eating

Intermittent fasting includes several patterns. Time-restricted eating concentrates daily intake within a consistent window, whereas alternate-day fasting and 5:2 approaches impose more substantial periodic restriction. For combat athletes, TRE is generally more compatible with daily training than alternate-day fasting.

Despite growing evidence that time-restricted eating may improve body composition when combined with exercise, its effects on athletic performance remain unclear. Evidence in trained athletes is limited, with existing studies characterised by small samples, short intervention durations, and variations in eating windows and training protocols. Therefore, further research is needed to determine whether TRE can improve body composition without compromising performance and recovery in athletic populations.

Potential pathway	Possible physiological implication
Consistent eating window	Reduced discretionary intake and improved meal organisation
Longer overnight fasting	Altered substrate utilisation and metabolic flexibility
AMPK/SIRT1 signalling	Cellular energy sensing and mitochondrial regulation

Meal timing	Potential alignment of peripheral circadian rhythms
Adequate protein + resistance training	Supports lean-mass preservation during weight loss

Table: 1

Insulin Sensitivity, AMPK And SIRT1

Fasting prolongs the interval between meals and may reduce prolonged postprandial insulin exposure. Early time-restricted eating (TRE) has demonstrated improvements in insulin sensitivity and selected cardiometabolic measures in controlled human studies. Cellular pathways involving AMPK, SIRT1, autophagy, energy sensing, and mitochondrial regulation may contribute to these metabolic adaptations and potentially influence exercise metabolism and recovery. However, these mechanistic pathways should be considered plausible biological mediators rather than definitive explanations for improvements in athletic performance, which require direct evidence from performance-based outcomes.

Circadian Rhythm And Meal Timing

Peripheral tissues such as liver, adipose tissue and skeletal muscle possess circadian clocks. Food timing is an important peripheral cue. Consistent meal timing, especially earlier eating, may improve metabolic organisation. For combat athletes, meal timing should therefore be considered alongside sleep, light exposure and training schedules rather than focusing solely on fasting duration.

Intermittent Fasting And Cortisol

The relationship between fasting and cortisol is complex. Fasting itself can act as a physiological stressor, so it is inaccurate to state that fasting universally lowers cortisol. Small studies in physically demanding populations have reported altered cortisol responses with TRE, but direct evidence in elite combat athletes is lacking. The most defensible conclusion is that TRE may influence stress responsiveness in some populations, while the magnitude and clinical relevance remain uncertain.

Effects On Athletic Performance

Systematic reviews in physically active adults generally indicate that TRE can be compatible with exercise performance and may modestly improve body composition. Evidence does not establish that fasting improves elite combat performance. High-intensity sparring, wrestling, grappling, and repeated anaerobic efforts require adequate carbohydrate availability; therefore, prolonged fasted training should not be routinely encouraged.

Practical Application In Combat Sports

Training phase	Potential approach	Primary priority
Off-season	10–12 h overnight fast; regular meals	Stable body composition and recovery
General preparation	12–14 h overnight fast if tolerated	Energy availability + training quality
High-volume training	Avoid aggressive fasting	Fueling and recovery

Fight camp	Individualised meal timing	Performance and weight-class management
Fight week	Do not introduce IF	Safe weight management
Post-weigh-in	Structured rehydration/refuelling	Fluid, electrolyte and glycogen restoration

Protein, Carbohydrate And Lean-Mass Preservation

Protein becomes particularly important during energy restriction. Depending on the degree of energy deficit, training status and body-composition goal, approximately 1.6–2.4 g/kg/day may be appropriate for athletes undergoing weight loss. Protein should be distributed across multiple feedings. Carbohydrate should be periodized around high-intensity sessions to support glycogen availability and training quality.

Gradual weight reduction is preferable to aggressive restriction. A rate around 0.5–1.0% body mass/week is commonly more compatible with preservation of lean tissue than rapid weight loss, although individual targets should be based on the athlete's starting body composition and competition timeline.

REDs And Low Energy Availability

The principal safety concern is that IF can unintentionally worsen low energy availability. The IOC consensus on Relative Energy Deficiency in Sport recognises consequences affecting endocrine, bone, immune, psychological, and performance health. Athletes with high training loads may require more frequent nutrition rather than a longer fasting window.

Warning signs include persistent fatigue, declining performance, poor sleep, recurrent injury or illness, excessive hunger, mood disturbance, menstrual dysfunction, reduced libido, and preoccupation with food or weight.

Disordered Eating

Combat sports have a strong cultural emphasis on weight. Strict fasting can be problematic for athletes with binge eating, compulsive restriction, purging, excessive weighing, or severe fear of weight gain. Screening for disordered eating and REDs risk should precede implementation of restrictive dietary strategies.

Yoga And Mind-Body Interventions

Yoga, slow breathing and relaxation practices may complement sports nutrition by supporting stress management, perceived recovery and sleep. Nadi Shodhana, Bhramari, restorative asana and Yoga Nidra can be incorporated as low-intensity recovery practices. However, mechanistic claims that individual practices directly "stimulate the vagus nerve" or produce a predictable cortisol reduction should be expressed cautiously.

Naturopathic Approaches

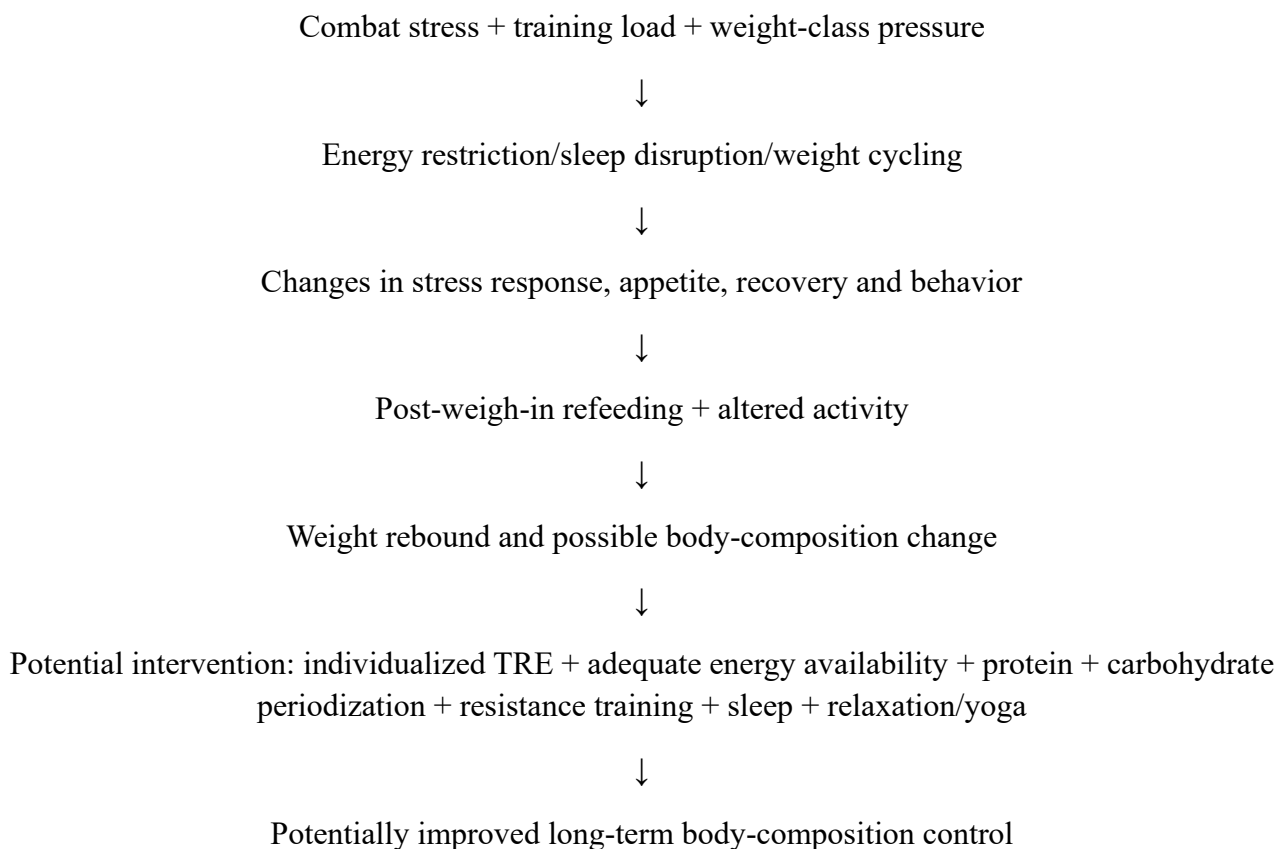
Evidence-informed naturopathic care should emphasize adequate sleep, whole-food nutrition, hydration, regular meal timing, stress management, appropriate exercise-recovery balance, and natural-light

exposure. Hydrotherapy may be used as a relaxation or recovery modality, but claims regarding detoxification or direct correction of cortisol-mediated weight gain require stronger evidence.

Ashwagandha And Adaptogenic Interventions

Ashwagandha has been investigated for stress and selected exercise-related outcomes. Some trials report reductions in perceived stress and cortisol, but evidence is heterogeneous and not sufficient to recommend routine supplementation for every combat athlete. Product quality, dose, interactions, contraindications, and anti-doping considerations must be assessed.

Integrated Conceptual Model



This framework is hypothesis-generating rather than proof of a direct causal pathway between IF and cortisol-mediated weight gain.

Evidence Summary

Outcome	Evidence	Combat-sport interpretation
Weight reduction	Moderate	IF can facilitate energy restriction
Fat-mass reduction	Moderate	Potential benefit
Lean-mass preservation	Moderate with adequate protein/training	Requires careful planning

Strength/power	Generally maintained in many studies	High-intensity work still needs adequate fuel
Cortisol	Limited	Possible stress-response modulation; direct fighter data lacking
Insulin sensitivity	Moderate	Potential metabolic benefit
Circadian regulation	Promising	Meal timing may be important
Autophagy	Human evidence limited	Avoid exaggerated claims
REDs/disordered eating	Important safety concern	Screen before restriction

Limitations Of Current Evidence

Direct studies of IF in combat-sport athletes remain scarce. Many IF trials involve overweight or metabolically unhealthy adults rather than elite athletes. Protocols vary substantially in fasting duration, energy intake, protein intake, and training status. Cortisol studies often use isolated measurements rather than complete diurnal profiles, while mechanistic evidence for AMPK, SIRT1 and autophagy is frequently extrapolated from laboratory models. These limitations prevent definitive conclusions about stress-related weight gain in elite combat sports.

Future Research Directions

Future randomized trials should compare TRE plus periodized sports nutrition with conventional energy restriction while matching energy and protein intake. Important outcomes should include body composition, lean mass, resting metabolic rate, insulin sensitivity, diurnal cortisol rhythm, HRV, sleep, appetite, psychological stress, training load, strength, power, repeated-sprint performance, REDs risk, menstrual function, injury incidence, post-weigh-in weight regain and competitive performance.

Conclusion

Combat-sport athletes experience a unique interaction between competitive stress, high training demands, weight-class requirements, rapid weight loss, dehydration and post-weigh-in refeeding. Repeated weight cycling can produce substantial physiological and psychological stress and may contribute to undesirable changes in metabolic health and body composition.

Intermittent fasting, particularly time-restricted eating, is a promising nutritional strategy for selected athletes during appropriate training phases. Current evidence suggests potential benefits for body composition, insulin sensitivity, meal organization, and metabolic regulation without consistent impairment of physical performance in exercising adults. However, evidence that IF directly "resets" the HPA axis or prevents cortisol-induced visceral adiposity in combat athletes remains insufficient.

The strongest practical application is conservative, individualized TRE during the off-season or general-preparation period, while ensuring adequate energy availability, carbohydrate availability, protein intake, hydration and recovery. Aggressive fasting, alternate-day fasting and prolonged energy restriction should

not be used as substitutes for evidence-based longitudinal weight management or fight-week weight cutting.

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