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Weight Loss Methods in Male Combat Athletes: Effects and Differences by Discipline

Esin Çağla ÇAĞLAR[1], Rıdvan ÖZKAN[2], Mustafa Tolga BAYRAKTAR[3], Recep Nur UZUN[4]

Abstract

Aim: This study examined the impact of weight loss methods on male combat athletes across different disciplines and in the context of pre-competition periods.

Method: A total of 321 male athletes participated in the study, and data were collected using the ' Athlete Weight Loss Methods and Effects Scale.' Since the data were not normally distributed according to the Kolmogorov-Smirnov test, non-parametric analyses, including the Mann-Whitney U test and the Kruskal-Wallis test, were used.

Results: The athletes lost an average of 5.86% (4.43 kg) of their normal body weight prior to competition. Significant differences were found between the competition branches in the sub-dimensions of ergogenic aid, physiological effects, and psychological effects ($p<0.05$ and $p<0.001$). Specifically, athletes participating in wrestling, boxing, and judo reported more frequent use of ergogenic aids compared to other disciplines. Athletes who reported losing weight before every competition were more likely to engage in dieting, induce fluid loss, and use ergogenic support. These athletes also experienced greater physiological and psychological effects compared to those who lost weight only before important competitions or rarely ($p<0.05$ and $p<0.001$).

Conclusion: In conclusion, discipline-specific differences in weight loss practices among combat sports athletes should be taken into account. This study contributes to the existing literature by addressing a gap regarding weight loss methods and their physiological and psychological effects vary across different combat sports disciplines. The findings highlight the need for individualized approaches to weight management tailored to the specific demands and risks associated with each sport.

Key words: Ergogenic Aid, Male Combat Athletes, Nutrition, Performance, Weight Drop.

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INTRODUCTION

Combat sports such as boxing, wrestling, kickboxing, judo, muay thai, karate, and taekwondo are organized based on athletes' body weight. The main goal of this classification is to ensure fair competition by matching athletes with similar physical characteristics (Lakicevic et al., 2020; Park et al., 2021). In theory, such regulation enables skills and performance to become decisive for success. However, a major drawback of this system is the widespread use of unhealthy methods by athletes trying to fit into lower weight classes (Artioli, 2010). Athletes commonly reduce weight in either short periods before competitions or over longer preparatory periods. Rapid weight loss strategies often include extreme food and fluid restriction, excessive exercise in plastic suits, prolonged sauna use, vomiting, and the use of laxatives or diuretics (Moore, 2017; Matthews, 2019). Athletes have been reported to lose up to 10% of their body weight using such aggressive approaches (Turocy, 2011; Reading, 2022). These practices are typically employed to gain a competitive edge by competing in a lower weight category, where opponents may be physically smaller or less experienced (Berkovich et al., 2016; Baranauskas et al., 2022).

Scientific evidence highlights the detrimental effects of these methods on physical and mental health. Common physiological consequences include fluid loss, fatigue, muscle cramps, electrolyte imbalance, elevated heart rate, reduced cardiac output, and impaired thermoregulation. Psychological effects such as increased stress, irritability, and performance anxiety have also been documented (Alderman et al., 2004; Küçük et al., 2024). Alarmingly, these practices often begin at a young age (13–15 years), with some athletes undergoing weight loss up to 15 times in a single season, increasing the risk of long-term health consequences, including growth impairment and, in extreme cases, death (Oppliger et al., 1996).

[1] Hitit University, Faculty of Sports Sciences, Recreation Department, Türkiye, esincaglacaglar@hitit.edu.tr
[2] Kastamonu University, Faculty of Sports Sciences, Department of Physical Education and Sports, Türkiye, ridvanozkansgm@hotmail.com
[3] Ondokuz Mayis University, Yaşar Doğu Faculty of Sports Sciences, Recreation Department, Türkiye, mustafatolga.bayraktar@omu.edu.tr
[4] **Corresponding Author:** Ondokuz Mayis University, Yaşar Doğu Faculty of Sports Sciences, Department of Sports Management, Türkiye, recepnur.uzun@omu.edu.tr

The issue of rapid weight loss is highly prevalent across combat sports. A review by Santos et al. (2024), which analyzed 446 studies, reported prevalence rates ranging from 40% to 92.9%, with average body weight reductions of approximately 5%. In a national study, Aktitiz et al. (2024) reported that 88.6% of Turkish martial artists engaged in weight cutting prior to competition. In this context, three key sub-dimensions of weight loss practices are identified: dietary behaviors, fluid loss methods, and ergogenic aid use. The dietary dimension refers to reducing carbohydrate and fat consumption or overall food intake. Fluid loss involves methods such as spitting, excessive sweating through sauna use, or running in raincoats to induce fluid loss. Ergogenic aid includes the use of chemical substances such as diet pills and diuretics to accelerate weight reduction (Yarar et al., 2016; Sarıakcalı et al., 2025). The extent of ergogenic aid use (e.g., diet pills, diuretics) is also concerning and varies among athletes. While there is substantial global research on weight loss practices in combat sports, limited studies have focused on the differences among combat disciplines, particularly within the Turkish context. Factors such as training culture, branch-specific demands, and institutional pressures can lead to varying approaches in weight loss. Furthermore, comparative analyses of the physiological, psychological, and ergogenic effects among combat sports disciplines are insufficiently addressed in the literature (Zhong et al., 2024).

It is assumed that athletes competing in combat sports in Türkiye experience different effects of weight loss depending on the specific sport discipline. This study aims to investigate the impact of weight loss practices on combat athletes across seven disciplines—wrestling, boxing, kickboxing, judo, karate, muay thai, and taekwondo—focusing specifically on their physiological, psychological, and ergogenic responses to weight reduction. The findings aim to inform sports scientists, coaches, and policymakers about the sport-specific risks and needs regarding weight management in combat athletes.

METHOD

Research model

This study adopts a descriptive and comparative survey design within a quantitative research framework. The primary objective is to examine the weight loss methods employed by male combat athletes and to evaluate the physiological, psychological, and ergogenic effects of these methods across different combat sports disciplines.

Population and sample

In this study, data were collected from 321 male combat sports athletes using a convenience sampling method. The participants were recruited from various sports clubs located in (Samsun City — e.g., Samsun and surrounding provinces) in Türkiye. Data collection was carried out between September 2023 and February 2024. The inclusion criteria required that athletes be actively training and competing in one of the seven combat sports disciplines: boxing (n = 41), wrestling (n = 54), kickboxing (n = 41), judo (n = 54), karate (n = 47), muay thai (n = 44), and taekwondo (n = 40). The age range of the participants was 18 to 30 years. Participants have at least one year of athletic experience.

Participants completed a two-part questionnaire consisting of a researcher-developed demographic form and the Athlete Weight Loss Methods and Effects Scale, developed and validated by Yarar et al. (2016). Before participation, athletes were informed about the aims, procedures, and ethical considerations of the study. All participants gave written informed consent and were informed that they could withdraw from the study at any time without penalty.

Data collection tools

Athlete Weight Drop Methods and Effects Scale: The scale consists of 5 sub-dimensions and 19 items. These are named "Physiological Effects" (10,11,12,13,14), "Psychological Effects" (15,16,17,18,19), "Ergogenic Assistance" (7,8,9), Diet (1,2,3), and Fluid Loss (4,5,6). A five-point rating scale was used to evaluate the scale items. The scores are: 1=never, 2=rarely, 3=occasionally, 4=often and 5=always. The alpha value of the total scale was found to be α=0.74 (Yarar et al., 2016). When the questions in this scale are examined, high scores in physiological, psychological, and ergogenic assistance sub-dimensions can be considered undesirable. In addition, those with high scores in fluid loss are likely to have more weight loss than those with low scores. The subscale consistency coefficients of the scale

are: Diet: 0.83, fluid loss 0.73, ergogenic aid 0.81, physiological 0.73, and psychological 0.72. The total scale internal consistency coefficient was 0.73.

Data analysis

IBM SPSS Statistics version 27.00 package program was used in statistical procedures. Since the data were not normally distributed according to the Kolmogorov Smirnov test, the Mann Whitney U test was used for pairwise comparisons, and the Kruskal Wallis test was used for multiple comparisons. The significance level was accepted as $p<0.05$. To determine the effect size of the statistical results, Eta-squared (η^2) values were calculated, which indicate the proportion of total variance attributed to a factor in non-parametric tests. According to Cohen's guidelines, η^2 values of 0.01 represent a small effect, 0.06 a moderate effect, and 0.14 or higher a large effect (Cohen, 1988; Yagin & Pınar, 2024). These thresholds were used to interpret the practical significance of findings presented in Table 1.

Table 1. Cohen's effect size limits

Effect Size	Eta Square (η2)
Small Effect	$0.01 \leq \eta2 < 0.06$
Medium Effect	$0.06 \leq \eta2 < 0.14$
Big Effect	$\eta2 \geq 0.14$

RESULTS

Table 2. Weight loss of combat athletes

Gender	Normal weight (kg)	Weight in the competition (kg)	Amount of weight deducted (kg)	Percentage of the deducted weight in relation to Normal Body weight	Eta Square (η^2)
Male	75.61	71.18	4.43	5.86	0.032 (small effect size)

The average pre-competition body weight of male athletes was 75.61 kg, which decreased to 71.18 kg during competition. This corresponds to a mean weight loss of 4.43 kg or 5.86% of total body weight. The effect size for this change was calculated as $\eta^2 = 0.032$, indicating a small but meaningful effect (Cohen, 1988).

Table 3. Scale subscores of competition athletes according to branches (Kruskal Wallis)

Sub-dimensions	Sports Branches	n	Mean Rank	X^2	p	Meaningful Difference	Eta Square (η^2)
Diet	Boxing (1)	41	139.11	10.18	0.070	-	0.032
	Wrestling (2)	54	138.30				
	Kix Box (3)	41	98.85				
	Judo (4)	54	126.03				
	Karate (5)	47	116.12				
	Muay thai (6)	44	115.90				
	Taekwondo (7)	40	142.06				
Fluid loss	Boxing (1)	41	130.65	2.77	0.731	-	0.009
	Wrestling (2)	54	124.99				
	Kix Box (3)	41	135.26				
	Judo (4)	54	124.14				
	Karate (5)	47	114.32				
	Muay thai (6)	44	113.33				
	Taekwondo (7)	40	136.83				
Ergogenic aid	Boxing (1)	41	105.06	28.11	0.001**	1.5.6.7<2.3.4	0.088
	Wrestling (2)	54	142.25				
	Kix Box (3)	41	142.19				
	Judo (4)	54	140.26				
	Karate (5)	47	112.12				
	Muay thai (6)	44	110.61				
	Taekwondo (7)	40	111.24				
Physiological effect	Boxing (1)	41	81.222	47.39	0.001**	1.3<2.4.5.6.7	0.148
	Wrestling (2)	54	167.07				
	Kix Box (3)	41	83.95				
	Judo (4)	54	140.55				
	Karate (5)	47	139.26				
	Muay thai (6)	44	120.79				

	Taekwondo (7)	40	148.08				
Psychological impact	Boxing (1)	41	110.36	17.97	0.003*	1.3< 2.4.5.6.7	0.056
	Wrestling (2)	54	158.50				
	Kix Box (3)	41	101.10				
	Judo (4)	54	131.63				
	Karate (5)	47	134.25				
	Muay thai (6)	44	133.51				
	Taekwondo (7)	40	112.28				

According to Table 3, no significant differences were found between the sport branches in the fluid loss (X^2 = 2.77; p = 0.731) and nutrition (X^2 = 10.18; p = 0.07) sub-dimensions. However, significant differences were found in the ergogenic support (X^2 = 28.11; p = 0.001), physiological effects (X^2 = 47.39; p < 0.001), and psychological effects (X^2 = 17.97; p = 0.003) sub-dimensions. Post-hoc analyses showed that athletes in wrestling, kickboxing, and judo had significantly higher ergogenic support scores compared to those in boxing, karate, muay thai, and taekwondo. For physiological effects, lower scores were found among boxing and kickboxing athletes compared to all other branches. Similarly, in the psychological effects dimension, lower scores were found among boxing and kickboxing athletes compared to the other disciplines. Although the eta-squared values for these tests were not computed, the observed chi-square values and p-values indicate medium to large effects. Wrestlers, judokas, and kickboxers reported higher ergogenic and physiological impact scores, while boxers and kickboxers showed the lowest psychological burden.

Table 4. Comparison of scale scores of combat athletes of different branches according to weight loss status

Variables	Weight loss status	n	Mean	X^2	p	Meaningful Difference	Eta Square (η^2)
Diet	Weight drops before each competition (1)	103	138.216	16.13	0.024*	3<2.1 2<1	0.050
	Weight drops before important competitions (2)	88	121.425				
	Very rare falls (3)	24	92.896				
Fluid Loss	Weight drops before each competition (1)	103	130.651	15.64	0.036*	3<1	0.049
	Weight drops before important competitions (2)	88	121.455				
	Very rare falls (3)	24	110.432				
Ergogenic Aid	Weight drops before each competition (1)	103	152.459	36.29	<0.001**	3<2.1 2<1	0.113
	Weight drops before important competitions (2)	88	113.325				
	Very rare falls (3)	24	98.206				
Fizyolojik etki	Weight drops before each competition (1)	103	167.180	38.51	<0.001**	3<2.1 2<1	0.120
	Weight drops before important competitions (2)	88	137.520				
	Very rare falls (3)	24	83.9062				
Psychological impact	Weight drops before each competition (1)	103	159.508	37.62	0.001**	3<2.1 2<1	0.117
	Weight drops before important competitions (2)	88	130.631				
	Very rare falls (3)	24	100.192				

According to Table 4, significant differences were found among weight loss frequency groups in the fluid loss (X^2 = 15.64; p = 0.036) and nutrition (X^2 = 16.13; p = 0.024) sub-dimensions. Post hoc comparisons (Bonferroni correction) revealed that athletes who rarely lost weight (Group 3) had lower scores than those who lost weight before every competition (Group 1) and before important competitions (Group 2). Additionally, Group 2 scored lower than Group 1. Similar patterns were observed in the ergogenic aid (X^2 = 36.29; p < 0.001), physiological (X^2 = 38.51; p < 0.001), and psychological (X^2 = 37.62; p = 0.001) sub-dimensions, where Group 1 consistently scored higher than Groups 2 and 3. In these sub-dimensions, higher scores indicate greater use or impact, suggesting that frequent weight loss is associated with more pronounced physiological, psychological, and behavioral consequences.

The data suggest that nutrition-related practices are the most impactful component of rapid weight loss, followed by psychological challenges. These results highlight the need for structured athlete education programs, discipline-specific guidelines, and support from nutritionists and sport psychologists in managing weight safely and sustainably.

DISCUSSION

This study contributes to the limited but growing body of literature on rapid weight loss in combat sports by providing sport-specific insights into its ergogenic, physiological, and psychological consequences. Unlike many previous studies that have addressed weight loss practices in a general context, the present research emphasizes how the frequency and methods of weight reduction differ across combat disciplines and how these practices may uniquely affect athlete well-being and performance. In particular, the findings highlight patterns among Turkish male combat athletes, addressing a gap in the literature and offering preliminary guidance for coaches, sports scientists, and athletic organizations. The results suggest that athletes employ certain methods more frequently than others and that the factors influencing weight loss behaviors vary across disciplines. While these findings are consistent with previous studies reporting sport-specific differences in weight reduction strategies, they also diverge from research that considers such practices uniform across combat sports. These inconsistencies may be due to differences in cultural context, training environments, or methodological approaches. In this context, the study provides useful directions for sports scientists, coaches, and nutritionists, and may contribute to the development of healthier and more sustainable weight management strategies for competitive athletes.

Consistent with previous research reporting pre-competition weight losses ranging from approximately 3 to 13.9 kg across various combat sports (Artioli et al., 2010; Reale et al., 2018; Aktitiz, 2024; Zhong et al., 2024), the present study found that male athletes lost an average of 4.43 kg, corresponding to 5.86% of their body weight. This value is within the upper range of what is generally considered a tolerable threshold, though it may still pose risks depending on the methods and frequency of weight loss. The eta-squared value calculated in this study ($\eta^2 = 0.032$) indicates a small variance in the percentage of weight loss among the participants. It is important to note that η^2 does not directly measure or predict performance outcomes; therefore, no inference about the effect of weight loss on athletic performance can be made based on this result. The low effect size simply suggests that the variation in weight loss was limited across the sample. Previous studies, such as those by Reale et al. (2018) and Aktitiz et al. (2024), have emphasized how the magnitude of weight loss can vary by discipline, and this study supports those findings by showing sport-specific trends. While the amount of weight lost in this sample aligns with prior findings, the data reinforce the necessity for sport-specific weight management education. As highlighted by Yarar et al. (2017), systematic education for athletes and coaches remains essential to prevent the long-term negative consequences of improper weight loss practices. Zhong et al. reported that rapid weight loss is quite common among combat athletes, and the weight loss methods are similar (Zhong et al., 2024). In this study, significant differences were found in terms of influence by the ergogenic, physiological, and psychological sub-dimensions of the scale by branch ($p<0.05$ and $p<0.001$). For the ergogenic dimension, athletes who competed in the sports of boxing, karate, muay thai and taekwondo scored lower than athletes who competed in the sports of wrestling, boxing and judo ($p<0.001$). Athletes in the sports of boxing, karate, muay thai, and taekwondo took fewer diet pills, diuretics, and laxatives than athletes in the sports of wrestling, kickboxing, and judo. In other words, athletes involved in wrestling, boxing, and judo are more likely to resort to this undesirable method of weight loss, namely the use of medication. Athletes differ in the extent to which they are affected by the use of chemicals, such as diet pills, diuretics, etc., to lose weight. The extent of physiological effects, such as muscle cramps, palpitations, breathing difficulties, etc., during weight loss, may vary depending on the branches, desire to exercise, performance, stress level, irritability, and degree of fatigue. In the physiological and psychological dimensions, the athletes who competed in boxing and kickboxing obtained lower scores than the athletes who competed in the other branches mentioned ($p<0.001$) (Table 3). It is better to score low than high on the physiological and psychological dimensions. In other words, athletes who compete in the sports of kickboxing and kickboxing have fewer muscle cramps, palpitations, breathing difficulties, and one or more injuries than athletes who compete in the sports of wrestling, judo, muay thai, taekwondo, and karate. Again, athletes who compete in kickboxing and

kickbox can be said to experience less desire to exercise, lower performance, excessive irritability, and excessive fatigue than athletes who compete in wrestling, judo, muay thai, taekwondo, and karate. These differences can be caused by various factors such as differences in sports, motivational states, training differences, and the effect of coaches, as well as personal characteristics. The reasons for these differences should be further investigated in larger groups.

The amount of weight lost by combat athletes before competitions varies in different studies. Some studies suggest that the number of times athletes lose weight is less than the number of competitions they participate in. Other studies show that most athletes do not lose weight before each competition, especially those who participate in a large number of competitions (Zhong et al., 2024). The average number of competitions in which Australian competitive athletes participated was 7.1 times, taking into account both the Olympic Games and national competitions (Reale, 2018). When rapid weight loss occurs continuously, it is likely to affect athletes' physical and mental health and their competitive performance (Franchini et al., 2012). Weight fluctuation, characterized by repeated weight loss and gain, is associated with a variety of adverse health outcomes. Weight fluctuations affect individuals of all ages and weights, not just overweight or obese individuals (Stewart, 2024). In this study, the difference between those who lost weight before every competition, those who lost weight before important competitions, and those who rarely lost weight was statistically significant ($p<0.05$ and $p<0.001$) in the sub-dimensions of nutrition, fluid, ergogenic aids, physiological and psychological factors (Table 4). Athletes who reported undergoing weight loss before every competition exhibited significantly higher scores in the sub-dimensions of diet, fluid loss, and ergogenic aid use, indicating a more intensive engagement with weight reduction strategies. This finding aligns with previous research demonstrating that frequent weight-cutting behaviors are associated with more extreme and potentially harmful methods, particularly in sports with strict weight classifications (Aktitiz et al., 2024; Zhong et al., 2024). Furthermore, these athletes also showed elevated physiological and psychological impact scores, suggesting that repeated rapid weight loss increases the overall physical and mental burden on athletes. These results underscore the cumulative risks of habitual weight cycling and the necessity for structured education and monitoring programs, especially for athletes exposed to repeated weight classification pressures. According to the scale of weight loss methods, it was an expected result that those who rarely lost weight were the least affected.

Rapid weight loss between 3-5 percent of total body weight is unlikely to have a negative impact on performance, but the overall adverse effects of this range have not yet been confirmed (Marttinen et al., 2011; Lakicevic et al., 2021). In this study, the mean values of the subscales of the nutrition scale were 9.35, hydration 5.91, and ergogenicity 3.67. The mean value for the physiological dimension was 8.36, and for the psychological dimension, 11.24. When the mean scores of each sub-dimension were evaluated as a percentage of the maximum possible score, it was observed that the nutrition dimension had the highest relative score (62.33%), followed by psychological effects (44.96%), fluid loss (39.40%), physiological effects (33.44%), and ergogenic support (24.55%) (Table 5). These percentages were calculated by dividing the mean sub-dimension score by the maximum achievable score in that dimension and multiplying by 100. The fact that the nutrition sub-dimension had the highest score suggests that dietary practices are the most common and prominent strategy used by combat athletes for weight loss. This is consistent with existing literature indicating that athletes often rely on meal restriction and macronutrient manipulation (especially carbohydrates and fats) as primary tools for achieving rapid weight loss (Berkovich et al., 2016; Aktitiz et al., 2024; Sarıakçalı et al., 2025). Such dietary practices may be perceived as safer or more controllable compared to pharmacological aids or fluid loss -based methods. However, excessive or unbalanced dietary restriction can still lead to adverse outcomes such as energy deficiency, nutrient imbalances, and decreased recovery capacity. This finding highlights the need for tailored nutritional education and intervention programs, particularly in weight-class sports, where athletes often manage weight independently without professional guidance. Coaches and sports nutritionists should work collaboratively to ensure that athletes adopt evidence-based, health-focused dietary strategies that support both performance and long-term well-being. In the evaluation of the questionnaire, a high score in all dimensions except fluid loss is considered poor. It can be seen that the highest percentage of concern is in the nutrition dimension. If we look at the equivalents of the scores according to the questionnaire evaluation, nutrition was the most affected. Based on these percentages, it can be said that athletes should be supported more in terms of nutrition. It is considered necessary to

offer athletes more support in terms of nutrition and diet. This study revealed that frequent weight loss among combat athletes is associated with increased physiological, psychological, and behavioral strain, particularly in disciplines such as wrestling, judo, and kickboxing. The findings highlight the need for discipline-specific, long-term weight management strategies supported by sports scientists, coaches, and nutrition professionals.

Consistent with prior findings (Martınez-Aranda et al., 2023; Zhong et al., 2024), these results underscore the importance of individualized and evidence-based protocols for managing weight in combat sports, especially in cultures where aggressive weight-cutting practices are normalized. Implementing athlete education programs and access to professional guidance can help mitigate the risks associated with rapid weight loss and support athlete health and performance.

CONCLUSION

The results show that rapid weight loss can have a detrimental impact on both the physical and mental health of athletes. Moreover, significant branch-specific differences were observed in the degree of impact. For example, athletes participating in wrestling, judo, and kickboxing demonstrated higher scores in physiological, psychological, and ergogenic sub-dimensions compared to those in boxing, karate, and taekwondo. This suggests that certain combat sports may impose greater pressure on athletes to engage in aggressive weight management strategies, potentially increasing their vulnerability to the associated health risks. Therefore, competitive athletes should be educated about healthy weight management and encouraged to get support from specialized nutritionists and sports scientists. Failure to implement long-term and scientifically sound weight management strategies can have serious adverse effects on athletes' health and performance.

This study demonstrated that rapid weight loss is a prevalent practice among combat athletes, with measurable physiological, psychological, and ergogenic consequences that vary across disciplines. Notably, athletes in sports such as wrestling, judo, and kickboxing reported higher levels of negative impact, highlighting the need for sport-specific approaches to weight management. Therefore, it is crucial to implement structured, long-term educational and nutritional programs tailored to the needs of each discipline. These interventions should be supported by multidisciplinary teams including sports scientists, coaches, and registered dietitians. Future research should investigate the longitudinal effects of repeated rapid weight loss on athlete health and performance and evaluate the efficacy of targeted intervention strategies across different combat sports. Such studies would contribute to developing evidence-based guidelines that promote both athlete safety and performance optimization.

Ethical Approval and Permission Information

Ethics Committee:	Ondokuz Mayis University Social and Humanities Research Ethics Committee Decisions
Protocol/Number:	09-2024-1023

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