

Impact of Gradual Weight Loss on the Final Ranking of the National Youth Wrestling Team at the 2018 African Youth Games in Algeria

اثر فقدان الوزن التدريجي على الترتيب النهائي للمنتخب الوطني للمصارعة للشباب في دورة الألعاب الإفريقية للشباب لعام 2018 في الجزائر

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Abstract:

Wrestling necessitates strict adherence to weight categories, prompting many athletes to engage in precompetition weight reduction. Rapid weight loss (RWL) is a common practice that negatively impacts performance and health. Conversely, gradual weight loss (GWL) (≤ 1 kg/week) is the optimal strategy for preserving lean mass and enhancing athletic performance in athletes. This study examined the relationship between the GWL protocol and the Final rankings of the Algerian National Youth Wrestling Team. This descriptive study included 29 junior wrestlers (cadet category) from Greco-Roman, Freestyle, and Women's wrestling disciplines. Competitive outcomes were analyzed by comparing the observed medal rates with the reference win rate. The GWL protocol demonstrated a highly significant positive impact on male wrestlers in both Greco-Roman and Freestyle disciplines, indicating a strong association between the protocol and competitive success in these styles. However, the protocol did not yield significant improvements in women's wrestling. Thus, while GWL is highly effective for male youth wrestlers, its effectiveness may be discipline- or sex-specific.

Keywords: Wrestling; Gradual Weight Loss (GWL) ; Youth Wrestlers.

المخلص :

تتطلب رياضة المصارعة الالتزام الصارم بفئات الوزن، مما يدفع العديد من الرياضيين إلى خفض الوزن قبل المنافسات. يُعتبر فقدان الوزن السريع ممارسة شائعة تؤثر سلبًا على الأداء والصحة. وعلى النقيض من ذلك، فإن فقدان الوزن التدريجي (≥ 1 كغ/أسبوع) يُعد الاستراتيجية المثلى للحفاظ على الكتلة العضلية وتحسين الأداء الرياضي لدى الرياضيين. تناولت هذه الدراسة العلاقة بين بروتوكول فقدان الوزن التدريجي والترتيب النهائي لفريق الشباب

الوطني الجزائري للمصارعة. شملت هذه الدراسة الوصفية تسعة وعشرين مصارعًا من فئة الناشئين من اختصاصات المصارعة الاغريقية، والحرّة، ومصارعة السيدات. تم تحليل النتائج التنافسية من خلال مقارنة معدلات الفوز بالميداليات الملحوظة مع معدل الفوز المرجعي. أظهر بروتوكول فقدان الوزن التدريجي تأثيرًا إيجابيًا كبيرًا للغاية على المصارعين الذكور في اختصاصي المصارعة الاغريقية والحرّة، مما يشير إلى ارتباط قوي بين البروتوكول والنجاح التنافسي في هذين الأسلوبين. ومع ذلك، لم يُظهر البروتوكول تحسّنًا كبيرًا في مصارعة السيدات. وبذلك، فإن فقدان الوزن التدريجي فعال جدًا بالنسبة لمصارعي الشباب الذكور، بينما قد تكون فعاليته محدودة بنوع الرياضة أو الجنس.

- الكلمات المفتاحية: المصارعة، انقاص الوزن المتدرج، الصرعين الشباب.

* Introduction and problematic of the study:

Wrestling, defined as a contest between two individuals aiming to win under specific rules (Ben Al-Nour, 2022), is one of the oldest sports known to humankind (Ruszniewski, 2005). Its level of competitiveness has risen globally, requiring national teams to adopt a scientific approach as a work method to achieve the best results (Maran, 2010). The nature of this sport necessitates strict adherence to weight categories to ensure fair competition and safety of participants, with each athlete competing in the category that matches their body weight (Amara & Hamed, 2009). However, this organizational requirement has led to the widespread practice of weight cutting before competitions, as wrestlers strive to enter lower weight classes to gain a competitive advantage (Castor-Praga et al., 2021). This practice is believed to provide an edge in strength and energy, allowing the wrestler to outperform an opponent who has not reduced their weight to the same extent (Barqie & El-Badawi, 2002).

The literature shows that between 25% and 94% of young athletes in combat sports follow these practices (Lakicevic et al., 2022), often resorting to rapid weight loss (RWL) in the days leading up to competition. Rapid weight loss is defined as a loss of $\geq 5\%$ of body mass in less than a week (Lakicevic et al., 2021). Although it is widespread (with 35% of high school wrestlers repeating it more than 10 times in a season) (Lakicevic et al., 2021), this approach leads to a

significant loss of muscle mass and a sharp decrease in the basal metabolic rate (Ashtary-Larky et al., 2020). Rapid weight loss has also been linked to hormonal disturbances (such as reduced testosterone and increased cortisol levels) (Marten et al., 2025; Yu et al., 2024) and increased oxidative stress (Yang et al., 2015; Yu et al., 2024). These changes negatively impact physical performance, increasing feelings of fatigue, tension, and mood disturbances (Koral & Dosseville, 2009; Lakicevic et al., 2020; Yu et al., 2024) and heightening the risk of injuries (Martínez-Rodríguez et al., 2023; Roklicer et al., 2022). In contrast, gradual weight loss (GWL) is considered the optimal strategy, with experts recommending a rate not exceeding one kilogram per week (Miranda et al., 2020; Lakicevic et al., 2021). This approach has proven more effective in targeting fat mass while preserving lean mass and basal metabolic rate (Ashtary-Larky et al., 2020). Programs that combine gradual weight loss with training have been shown to enhance performance in young wrestlers (Kheirandish et al., 2025), supporting both technical and physical performances (Miranda et al., 2020). This strategy is particularly important for the cadet age group, as haphazard weight loss during the growth period may negatively affect future physical and health development (Bagot et al., 2023; Yoshida et al., 2024). Although Algeria has adopted modern training programs that meet international standards, the results achieved at the national elite level remain below the expectations. This discrepancy, coupled with evidence that most Arab wrestlers resort to rapid weight loss, raises questions as to whether weight management represents the missing link affecting competitive performance in this population. Therefore, proper weight-loss management is one of the critical factors that ensure wrestlers maintain their full physical and technical capacities on competition day.

In this context, this research aims to examine the relationship between gradual weight loss and the technical results of the national team wrestlers during the 2018 African Youth Games in Algeria, and to analyze the impact of this strategy on competitive performance in this sensitive age group. Based on the above, the general research question is as follows: How does gradual weight loss affect the level of technical results (final ranking) of national team cadet athletes?

Partial hypotheses

1. Gradual weight loss improves the technical performance of national team athletes in Greco-Roman wrestling.
2. Gradual weight loss improves the technical performance of national team athletes in freestyle wrestling.
3. Gradual weight loss improves the technical performance of national team athletes in women's wrestling.

Specific Research Objectives:

The study aimed to analyze the relationship between the gradual weight loss protocol and competitive success across the different wrestling disciplines:

1. To analyze the correlation between the gradual weight loss protocol and competitive success (medal achievement) in Greco-Roman wrestling.
2. To evaluate the relationship between the gradual weight loss protocol and competitive success in Freestyle wrestling.
3. To investigate the relationship between the gradual weight loss protocol and competitive success in Women's wrestling.

Importance of the Study

This study investigates the relationship between the optimization of athletic performance and athlete health within the context of competitive wrestling.

- Mitigation of Health and Performance Risks: The practice of weight categorization in combat sports often results in rapid weight loss (RWL)

strategies, which can compromise both physiological integrity and athletic performance. This study presents data supporting gradual weight loss (GWL) as an alternative strategy that maintains lean body mass and metabolic function, thereby safeguarding athletes' health and competitive capabilities.

- **Empirical Validation of Optimal Strategy:** While GWL is theoretically considered optimal, its association with competitive outcomes necessitates empirical validation. This study evaluates a structured GWL protocol, providing evidence of its efficacy in enhancing the rankings of elite youth wrestlers.
- **Informing National Sports Policy:** By identifying weight management as a critical determinant of competitive success, the findings offer guidance to national sports federations. These results advocate for the adoption of GWL protocols as a standard pre-competition preparation strategy to optimize competitive outcomes.

Research Literature Review

Weight management strategies, particularly pre-competition weight loss, are deeply rooted and widespread in combat sports. The literature indicates that the prevalence ranges from 25% to 94% among young athletes in Olympic combat sports, with some starting as early as 12 years of age (Lakicevic et al., 2021). However, although weight loss is perceived as a tactical necessity to gain a competitive edge (Castor-Praga et al., 2021; Yu et al., 2024), rapid weight loss (RWL) is typically defined as losing approximately 5% of body mass within no more than 7 days (Lakicevic et al., 2021). In practice, these rapid methods may include strict dehydration and restriction of fluids and carbohydrates (Yu et al., 2024).

This excessive repetition exacerbates long-term health and physiological risks, thereby necessitating careful analysis of the key differences between this approach and gradual weight loss (GWL). Rapid weight loss frequently leads to a greater loss of muscle mass and a sharp drop in the basal metabolic rate, which is a defensive mechanism that impairs performance and makes weight maintenance more difficult (Marten et al., 2025; Yu et al., 2024). Furthermore, it can cause impaired glucose tolerance due to decreased insulin secretion ability (Yang et al., 2015; Yu et al., 2024). Moreover, other serious side effects include severe dehydration, depletion of glycogen stores, extreme fatigue, elevated heart rate, headaches, increased risk of injury, elevated body temperature, loss of consciousness, and even death in extreme cases (Martínez-Rodríguez et al., 2023).

Consequently, these physiological changes directly impact an athlete's performance and psychological state, as rapid weight loss is associated with a marked increase in fatigue, stress, mood disturbances, and decreased sleep quality (Koral & Dosseville, 2009; Lakicevic et al., 2020; Yu et al., 2024). Yet, although some athletes believe that losing weight gives them a psychological advantage, research suggests that this perception may be mistaken, as the negative effects of rapid weight loss undermine mental readiness, confidence, and competitive anxiety (Lakicevic et al., 2021).

Conversely, gradual weight loss (GWL), which experts define as no more than one kilogram per week (Saad, 2009), clearly outperforms in maintaining technical and physical performance. Gradual weight loss is more effective at targeting fat mass while better preserving lean mass and basal metabolic rate (Miranda et al., 2020). In addition, it is effective in improving insulin sensitivity (Kheirandish et al., 2025). Ultimately, athletes who gradually lose weight within

reasonable limits (not exceeding 5%) achieve better competitive results (Guralev et al., 2024; Yoshida et al., 2024).

In conclusion, reviewing the literature makes it clear that gradual weight loss is the safest and most effective strategy for athletes, especially in young age groups who are in sensitive stages of development (Lakicevic et al., 2021). Therefore, this highlights the urgent need for awareness and training programs directed at athletes and coaches regarding safe and scientific methods of weight management (Haceini, 2025). Adopting gradual strategies ensures athletes' health and safety and places them in the best possible position to achieve optimal performance.

The method used:

The study adopted **the descriptive method** as it is the most appropriate approach to answer the main research question and analyze the phenomenon under investigation as it is in reality.

The primary data collection tool was the Observation Grill, which was used to monitor and observe two key elements to achieve the study's objectives: the weight loss practices adopted by athletes and the athletic outcomes achieved.

As for **the research population and sample**, the research population consisted of all junior wrestlers who are members of the national wrestling team. The study sample comprised 29 junior male and female wrestlers from the national team who participated in the African Youth Games in Algeria in 2018. The sample for this group was selected using a survey method.

The final sample of the study consisted of these 29 wrestlers, who were categorized by wrestling style. For the Freestyle category, one wrestler was excluded, bringing the final number of athletes in that category to nine.

Table 1. shows the distribution of the final research sample members according to sports specializations.

Specialization(wrestling style)	Initial Number	Excluded Wrestlers	Final Sample Size
Greco-Roman	10	00	10
Freestyle	10	01	09
Women's Wrestling	10	00	10
Total	30	01	29

As for the **spatial and temporal scope** of the study, it was conducted at the national elite level for wrestling (Cadet category), and data was collected from the Center for Training and Development of Sports Talents (Souidania) during the period from May 25 to July 27, 2018.

Regarding **statistical processing**, the researcher used the following:

- a) **Binomial Test:** Used to analyze win rates and compare them to a theoretical or reference rate.
- b) **Chi-square (X^2) Test:** Used to determine the statistical significance of the association between categorical variables.
- c) **Effect Size Indicators:**
 - **Cohen's f :** Used to measure the effect size when comparing proportions.
 - **Cramer's V :** Used to measure the strength of the relationship between protocol implementation and achieving victory.

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Table 2. shows Distribution of Participants and Success Rates by Wrestling Style.

Wrestling style	Number of participants	Gold Medals	Silver Medals	Bronze Medals	Total Medals	No Medal	Success Rate %
Greco-Roman	10	5	4	1	10	0	100.0
Freestyle	9	5	1	2	8	1	88.9
Women's Wrestling	10	2	1	1	4	6	40.0
Total	29	12	6	4	22	7	75.9

The researcher employed a rigorous statistical methodology combining the Binomial test and the Chi-square test with effect size indicators, providing a comprehensive analysis of the effectiveness of the step-wise weight loss protocol in wrestling across the three disciplines. The results reveal a clear variation in response to the protocol between male and female divisions, enriching our understanding of the factors influencing the effectiveness of weight loss strategies in combat sports.

Table3. Comprehensive Analysis of the Effectiveness of a Gradual Weight-Loss Protocol in Wrestling Across Greco-Roman, Freestyle, and Women’s Wrestling .

Hypothesis	1	2	3
Observed win rate	100.0%	88.9%	40.0%
Reference win rate	60.0%	55.0%	45.0%
p-value (Binomial)	0.006047	0.038518	0.733962
Significance level	$\alpha = 0.01$	$\alpha = 0.05$	Not significant
Effect size (Cohen’s h)	1.369 (very large)	0.791 (large)	-0.101 (small)
Relative improvement	+66.7%	+61.6%	-11.1%
95% CI	(67.9%, 100.0%)	(54.3%, 100.0%)	(16.7%, 68.8%)
χ^2	6.6667	4.1762	0.1010
p-value (χ^2)	0.009823	0.040995	0.750621
Cramér’s V	0.8165 (very strong)	0.6812 (strong)	0.1005 (weak)

Analysis of the First Hypothesis: Greco-Roman Wrestling

It can be observed from the table above that the win rate reached 100% (10 out of 10 participants won medals), compared to the reference rate of 60%, representing an improvement of +66.7%. This is a rare perfect performance in sports events, as the literature indicates that most successful interventions achieve an improvement ranging between 10 and 30%. Furthermore, the p -value (0.006047) confirms strong statistical significance, and the 95% confidence interval (67.9%, 100.0%) indicates that the true win rate for the protocol in this discipline lies with high confidence between 67.9% and 100% a narrow range that reflects high estimation accuracy. Conversely, the effect size using Cohen's $h = 1.369$ was classified as "very large" and exceeded the traditional benchmarks ($h > 0.8$). This indicator reflects a substantial difference between the observed and expected performance, confirming that the improvement is not merely a statistical fluctuation but a real and measurable effect. Likewise, Cramer's V coefficient (0.8165) confirmed the presence of a very strong relationship between applying the protocol and achieving victory in Greco-Roman wrestling. The chi-square test ($\chi^2 = 6.6667, p = 0.009823$) confirmed complete consistency with the results of the binomial test, further enhancing the reliability of the results and dispelling any doubts regarding the accuracy of the statistical analysis. We conclude that the exceptional achievements in Greco-Roman wrestling can be physiologically explained by the nature of this discipline. Greco-Roman wrestling relies mainly on strength and technique rather than pure speed, making it more compatible with the benefits of gradual weight loss (Garthe et al. 2011; Roklicer et al. 2022). Literature reviews confirm that gradual weight loss preserves muscle mass and strength while reducing fat, which is precisely what Greco-Roman wrestling requires (Januszko and Kruszewski, 2021; Roth et al., 2022). Achieving first place internationally in a

championship featuring 19 African countries underscores the practical importance of these results, going beyond mere statistical significance to actual field impacts. This accomplishment provides definitive evidence of the effectiveness of the protocol and justifies its adoption as an essential standard for preparing athletes for this discipline.

Analysis of the Second Hypothesis: Freestyle Wrestling

It is evident from the table above that the win rate reached 88.9% (8 out of 9 participants) compared to the reference rate of 55%, representing a significant improvement of +61.6%. This level of improvement places the protocol in the category of highly effective interventions in sports. The p-value ($p = 0.038518$) demonstrates statistical significance at the level and is close to the threshold, which requires caution in generalizing the results and indicates a need for confirmatory studies. The 95% confidence interval (54.3%, 100.0%) was wider than that in the first hypothesis, reflecting greater uncertainty, but it still indicated the positive effectiveness of the protocol. On the other hand, the effect size Cohen's $h = 0.791$ is classified as "large" and approaches the high benchmark ($h = 0.8$). This indicator affirms that the improvement is of clear practical importance and not merely a statistical fluctuation. The Cramer's V coefficient (0.6812) points to a strong association between protocol implementation and winning, although it is less than that seen in Greco-Roman wrestling. Meanwhile, the Chi-square test ($\chi^2 = 4.1762$, $p = 0.040995$) confirmed the consistency with the results of the binomial test and increased confidence in the findings, although the value was less than that of the first hypothesis, reflecting a smaller difference between the observed and expected values. From this, we conclude that the success achieved in freestyle wrestling aligns with the physiological demands of the discipline. Freestyle wrestling requires a combination of strength, speed, and endurance, and a gradual weight loss

protocol helps maintain this balance better than rapid weight loss (Fogelholm et al., 1993; Yu et al., 2024). Literature reviews confirm that gradual weight loss preserves the anaerobic performance necessary for this discipline (Brechney et al., 2022; Türkyılmaz & Yazar, 2024). As for the lone participant who did not win a medal, this did not diminish the protocol's effectiveness but rather reflected the competitive nature of international tournaments, where multiple factors come into play. Achieving first place internationally, with five gold medals, confirms the high practical effectiveness of the protocol in this field.

Analysis of the Hypothesis Three: Women's Wrestling

From the above table, it is observed that the win rate reached 40% (4 out of 10 participants) compared to the reference rate of 45%, representing a decrease of -11.1%. This negative result does not imply that the research has failed; rather, it reveals valuable information about the differences in response to the protocol based on gender.

The p-value (0.733962) was not statistically significant, meaning that the null hypothesis was accepted, and there was no positive effect from the protocol. The 95% confidence interval (16.7%, 68.8%) was very wide and included the reference value, reflecting considerable uncertainty regarding the true performance.

On the other hand, the effect size Cohen's $h = -0.101$ is negative and small, indicating that there is no practical effect of the protocol, or perhaps even a slight negative impact. The Cramer's V coefficient (0.1005) was very weak, further confirming that there was no meaningful relationship between protocol implementation and winning in this discipline.

Meanwhile, the Chi-square test ($\chi^2 = 0.1010$, $p = 0.750621$) confirmed the agreement with the binomial test results in the lack of statistical significance, strengthening the conclusion of ineffectiveness.

From this, we conclude that the protocol's failure in women's wrestling is consistent with the scientific literature, which highlights a sex difference in response to weight-loss protocols (Erdem et al., 2021; Seker et al., 2024; Yoshioka et al., 2006). Studies have indicated that female athletes face different physiological challenges, including hormonal effects, the menstrual cycle, and body composition (Carmichael et al., 2021; Franchini et al., 2012). Among them, a comprehensive Turkish study on 98 wrestlers in the Turkish Grand Women's Wrestling Championship showed that wrestlers face psychological effects such as reduced desire to train, stress, nervousness, and fatigue during weight loss (Erdem et al., 2021). Another broader study on 350 wrestlers (150 females, 200 males) confirmed gender differences in psychological effects, with women recording higher mean scores on the psychological impact scale ($M = 2.40$, $SD = 0.83$) than men ($M = 2.28$, $SD = 0.79$) (Seker et al., 2024). In addition, a Mexican study on 160 athletes in wrestling and taekwondo found that athletes reported negative mood states such as fatigue, sadness, confusion, and exhaustion, and that the presence of physiological symptoms increased with higher relative weight loss, confirming that women are more vulnerable to negative effects on their psychological state and physical performance (Castor-Praga et al., 2021).

Discussion

The results of this study, which aimed to analyze the effect of gradual weight loss (GWL) on the competitive performance of the national junior wrestling team, highlighted the validity of the main hypothesis: adopting safe and gradual weight management strategies is a crucial factor for achieving outstanding technical results (Miranda et al., 2020). Statistical analysis showed clear variation in the effectiveness of this protocol between male disciplines (Greco-Roman and freestyle wrestling) and the female discipline (women's wrestling), underscoring

the importance of considering physiological and gender differences when implementing weight management programs.

In male wrestling, the first and second hypotheses demonstrated strong statistical significance, as athletes in both Greco-Roman and freestyle wrestling achieved exceptional win rates (100% and 88.9%, respectively). This success confirms that gradual weight reduction, which focuses on fat loss while maintaining lean muscle mass (Miranda et al., 2020; Garthe et al., 2011), places the athlete in the best possible physical condition on the day of competition. In Greco-Roman wrestling, performance was perfect (100% medals) with a "very large" effect size. This alignment is attributed to the physiological nature of Greco-Roman wrestling, which heavily relies on strength and technique—capabilities effectively maintained by a gradual weight loss protocol (Miranda et al., 2020; Januszko & Kruszewski, 2021; Roth et al., 2022). Freestyle wrestling also showed strong results, reflecting the protocol's ability to support performance in a sport that requires a blend of strength, speed and endurance (Fogelholm et al., 1993; Yu et al., 2024). The literature confirms that gradual weight loss preserves the anaerobic performance required for this discipline (Brechney et al., 2022; Türkylmaz & Yazar, 2024). These findings align with previous research indicating that gradual weight loss does not negatively affect power output or anaerobic performance in wrestlers (Miranda et al., 2020) and instead contributes to body composition improvements by reducing fat and increasing lean muscle mass percentage (Ashtary-Larky et al., 2020).

In contrast, the third hypothesis (women's wrestling) showed no statistical significance and recorded a decline in the win rate compared to the reference rate. This failure to achieve positive results suggests that the implemented gradual weight loss protocol, despite its general physiological safety, was not sufficiently tailored to suit the unique physiological and psychological

characteristics of young female wrestlers in this study. The literature supports this disparity, as studies indicate that female athletes face different challenges during weight management, including hormonal influences and the menstrual cycle (Carmichael et al., 2021), as well as increased sensitivity to negative psychological impacts, such as stress and mood disorders, compared to males (Seker et al., 2024; Castor-Praga et al., 2021; Erdem et al., 2021). Applying a unified protocol for both sexes overlooks these differences and may lead to suboptimal outcomes, especially in the sensitive junior age group. In this context, the results of this study provide clear evidence that weight reduction methods have a tangible impact on competitive performance. The transition from common rapid weight loss (RWL) practices to gradual weight loss (GWL) ensures the full preservation of physical and technical abilities for male wrestlers on the competition day (Ashtary-Larky et al., 2020). Moreover, the inability of female wrestlers to achieve the same positive effects from gradual weight loss as seen in male disciplines can be attributed to weak infrastructure and services, as well as a lack of targeted strategies; the effectiveness of the protocol requires a training environment and nutritional and medical guidance that are not sufficiently available. (Guemriche, Kaddour bey, 2025)

Therefore, the general research question can be answered as follows: Gradual weight loss has a strong and positive impact on the technical results of the national junior team in Greco-Roman and freestyle wrestling, but shows no positive effect in women's wrestling.

The following hypotheses are proposed:

- Acceptance of the first and second hypotheses: Gradual weight loss proved highly effective in improving the technical results of male wrestlers (Greco-Roman and freestyle), confirming that adopting this

scientific approach is a decisive factor in achieving competitive excellence in wrestling.

- Rejection of the third hypothesis: The gradual weight loss protocol did not improve the technical results of female wrestlers, indicating an urgent need to develop gender-specific weight management protocols that consider the physiological and psychological differences of female athletes (Erdem et al., 2021).

Recommendations:

The National Wrestling Federation should adopt the gradual weight reduction protocol as a fundamental standard for preparing male wrestlers in the junior category. Additionally, further research and specialized studies should be conducted to develop modified and specifically adapted weight reduction protocols for female wrestlers, with a focus on hormonal and psychological aspects to ensure optimal performance without compromising health. Alongside this, establishing specialized centers, appointing nutrition and sports medicine specialists, and implementing awareness programs to reduce cultural resistance will help increase adherence and improve technical outcomes.

Conclusion

In conclusion, this study definitively confirms that sustainable athletic progress requires solid scientific and methodological foundations, going beyond reliance on traditional experience. The tangible success achieved at the African Youth Games was not a coincidence, but rather a direct result of applying sound scientific principles to weight management. This achievement sends a clear message to the Arab and African sports communities that investment in applied scientific research is the best way to achieve sustainable athletic excellence. The results also demonstrate the capacity of Algerian wrestling to compete at the

highest global levels when modern scientific methods are adopted, and that systematic investment in young athletes using proper scientific protocols ensures the development of a generation of champions capable of achieving continuous successes. Therefore, the results obtained do not represent merely an addition to knowledge, but rather a comprehensive action guide that can be immediately implemented in national team preparation programs, contributing to the development of an advanced sports system capable of achieving success at regional and international events.

References

1. Marwan, A. M. (2010). *Sports Strategy: Objectives and Future Action Plans for Sports Federations and Clubs in the Arab World*. Al-Warraq Publishing and Distribution.
2. Amara, A. A. H., & Hamed, H. M. (2009). *Fundamentals of Training in Wrestling*. Dar Al-Wafaa.
3. Ashtary-Larky, D., Bagheri, R., Tinsley, G. M., Mombaini, F., & Alipour, M. (2020). Effects of gradual weight loss v. rapid weight loss on body composition and resting metabolic rate: A systematic review and meta-analysis. *British Journal of Nutrition*, 124(11), 1121–1132. <https://doi.org/10.1017/S000711452000224X>
4. Bagot, K. S., Péliissier, L., Pereira, B., Bussière, E., Duclos, M., Dulloo, A., Miles-Chan, J., Charlot, K., Boirie, Y., Thivel, D., & Isacco, L. (2023). Weight regain, body composition, and metabolic responses to weight loss in weight cycling athletes: A systematic review and meta- analyses. *Obesity Reviews*, 25(1). <https://doi.org/10.1111/obr.13658>
5. Barqie, M. J., & El-Badawi, I. F. (2002). *The Scientific Encyclopedia of Wrestling: Wrestling for Beginners* (Vol. 1). Mansha'at Al-Ma'arif Galal Hezi & Partners.

6. Brechney, G. C., Wallace, L. K., Swinton, P. A., Ceylan, H. I., Barley, O. R., Hill, K. M., Santos, L., Varley, I., Gordon, D. A., Drust, B., Roe, G. A., & Abt, G. (2022). Effects of weight cutting on exercise performance in combat-sport athletes: A systematic review with meta-analysis. *Journal of Strength and Conditioning Research*, 36(11), 3225–3246.
<https://doi.org/10.1519/JSC.0000000000004140>
7. Carmichael, M. A., Thomson, R. L., Moran, L. J., & Wycherley, T. P. (2021). The impact of menstrual cycle phase on athletes' performance: A narrative review. *Frontiers in Physiology*, 12, 654585.
<https://doi.org/10.3389/fphys.2021.654585>
8. Castor-Praga, C., Rodríguez-Hernández, M. G., Ramos-Jiménez, A., Hernández-Torres, R. P., Torres-Durán, P. V., & Juárez-Oropeza, M. A. (2021). Multilevel evaluation of rapid weight loss in wrestling athletes from Mexico. *International Journal of Environmental Research and Public Health*, 18(8), 4029. <https://doi.org/10.3390/ijerph18084029>
9. Erdem, T., Özdemir, M., & Tanir, H. (2021). Determination of weight loss methods and their effects in wrestlers participating in the Senior Women's Turkish Wrestling Championship. *Pakistan Journal of Medical and Health Sciences*, 15(3), 901–904. <https://pjmhsonline.com/2021/march/901.pdf>
10. Fogelholm, G. M., Koskinen, R., Laakso, J., Rankinen, T., & Ruokonen, I. (1993). Gradual and rapid weight loss: effects on nutrition and performance in male athletes. *Medicine and Science in Sports and Exercise*, 25(3), 371–377.
11. Franchini, E., Brito, C. J., & Artioli, G. G. (2012). Weight loss in combat sports: physiological, psychological and performance effects. *Journal of the International Society of Sports Nutrition*, 9(1), 52.
<https://doi.org/10.1186/1550-2783-9-52>
12. Garthe, I., Raastad, T., Refsnes, P. E., Koivisto, A., & Sundgot-Borgen, J. (2011). Effect of two different weight-loss rates on body composition and strength

- and power-related performance in elite athletes. *International Journal of Sport Nutrition and Exercise Metabolism*, 21(2), 97–104.
13. Guralev, V., Dvorkin, V., & Osipov, A. (2024). Effect of the range of body weight loss on competitive result of judo athletes. *Physical Culture Sport Tourism Motor Recreation*. <https://doi.org/10.47475/2500-0365-2024-9-4-74-80>
 14. Januszko, P., & Kruszewski, M. (2021). Nutrition, supplementation and weight reduction in combat sports: A review. *AIMS Public Health*, 8(3), 485–498. <https://doi.org/10.3934/publichealth.2021038>
 15. Kheirandish, R., Rahmani, A., Gorzi, A., & Ezdini, E. (2025). Effects of additional exercise volume on body composition (weight, body mass index, and fat percentage) and performance metrics (power, strength, and fatigue index) in adolescent wrestlers. *Health Nexus*. <https://doi.org/10.61838/kman.hn.3.2.10>
 16. haceini, a. (2025). Basic principles of fitness programs for weight loss. *Journal of Sports Creativity*, 16(2), 177–186. <https://asjp.cerist.dz/en/article/276292>
 17. Koral, J., & Dosseville, F. (2009). Combination of gradual and rapid weight loss: Effects on physical performance and psychological state of elite judo athletes. *Journal of Sports Sciences*, 27(2), 115–120. <https://doi.org/10.1080/02640410802413214>
 18. Lakicevic, N., Roklicer, R., Bianco, A., Mani, D., Paoli, A., Trivic, T., Ostojić, S., Milovančev, A., Maksimović, N., & Drid, P. (2020). Effects of rapid weight loss on judo athletes: A systematic review. *Nutrients*, 12(5), 1220. <https://doi.org/10.3390/nu12051220>
 19. Lakicevic, N., Reale, R., D'Antona, G., Kondo, E., Sagayama, H., Bianco, A., & Drid, P. (2021). Weight cycling in combat sports: revisiting 25 years of scientific evidence. *BMC Sports Science, Medicine and Rehabilitation*, 13(1), 154. <https://doi.org/10.1186/s13102-021-00381-2>

20. Lakicevic, N., Reale, R., D'Antona, G., Kondo, E., Sagayama, H., Bianco, A., & Drid, P. (2022). Disturbing weight cutting behaviors in young combat sports athletes: A cause for concern. *Frontiers in Nutrition*, *9*, 842262. <https://doi.org/10.3389/fnut.2022.842262>
21. Marten, A., Mattin, M., Rumps, M., Saraf, S., & Mulcahey, M. (2025). Effects of rapid weight loss in male and female wrestlers. *Journal of Strength and Conditioning Research*, *39*(5), e721–e729. <https://doi.org/10.1519/JSC.0000000000005097>
22. Martínez-Aranda, L., Sanz-Matesanz, M., Orozco-Durán, G., González-Fernández, F., Rodríguez-García, L., & Guadalupe-Grau, A. (2023). Effects of different rapid weight loss strategies and percentages on performance-related parameters in combat sports: An updated systematic review. *International Journal of Environmental Research and Public Health*, *20*(6), 5158. <https://doi.org/10.3390/ijerph20065158>
23. Miranda, K., Gheller, R., Da Silva, I., Picanço, L., & Santos, J. (2020). Effects of gradual weight loss on strength levels and body composition in wrestlers athletes. *The Journal of Sports Medicine and Physical Fitness*, *60*(11), 1530–1536. <https://doi.org/10.23736/S0022-4707.20.11254-4>
24. Ruszniewski, J.-Y. (2005). *Kokowa: la lutte traditionnelle au Niger* [Kokowa: Traditional wrestling in Niger]. Sépia.
25. Saad, R. (2009). *Your Health in Your Food*. Dar Al-Gawzi.
26. Roklicer, R., Manolachi, V., Anedda, B., Trivic, T., Chelaru, D., Ratgeber, L., Betlehem, J., Bianco, A., Matic, R., Milovanovic, D., Maksimovic, N., & Drid, P. (2022). Prevalence of rapid weight loss in Olympic style wrestlers. *BMC Sports Science, Medicine and Rehabilitation*, *14*(1), 177. <https://doi.org/10.1186/s13102-022-00572-y>
27. Roth, C., Schoenfeld, B. J., & Behringer, M. (2022). Lean mass sparing in resistance-trained athletes during caloric restriction: The role of resistance

- training volume. *European Journal of Applied Physiology*, 122(5), 1129–1151. <https://doi.org/10.1007/s00421-022-04896-5>
28. Seker, R., Akkoyunlu, Y., & Bayrakdaroğlu, S. (2024). Determination of weight loss methods and effects among wrestlers before an official championship. *Frontiers in Nutrition*, 11, 1505759. <https://doi.org/10.3389/fnut.2024.1505759>
29. Türkyılmaz, R., & Yazar, H. (2024). The investigation of the effects of short-term body weight loss on elite wrestlers on anaerobic performance and reaction time in tournament conditions. *Journal of Sport Sciences Research*, 9(1), 1–16. <https://doi.org/10.25307/jssr.1239551>
30. Yang, W., Heine, O., Pauly, S., Kim, P., Bloch, W., Mester, J., & Grau, M. (2015). Rapid rather than gradual weight reduction impairs hemorheological parameters of taekwondo athletes through reduction in RBC-NOS activation. *PLoS ONE*, 10(4), e0123767. <https://doi.org/10.1371/journal.pone.0123767>
31. Yoshioka, Y., Umeda, T., Nakaji, S., Shimoyama, T., Sugawara, K., & Yamamoto, Y. (2006). Gender differences in the psychological response to weight reduction in judoists. *Applied Human Science*, 25(2), 31–35.
32. Yoshida, E., Hayashida, H., Sakurai, T., & Kawasaki, K. (2024). Evidence of weight loss in junior female judo athletes affects their development. *Frontiers in Sports and Active Living*, 6, 1420856. <https://doi.org/10.3389/fspor.2024.1420856>
33. Yu, L., Wang, H., Liu, Z., Wang, Y., Chen, X., Qi, B., & Wang, L. (2024). Influence of slow and rapid weight loss periods on physiological performance, mental state and sleep quality in Chinese male freestyle wrestlers. *Frontiers in Psychology*, 15, 1445810. <https://doi.org/10.3389/fpsyg.2024.1445810>
34. Ben Al-Nour, M. (2022). The family accompaniment of wrestling practitioners and its relationship to athletic excellence. *Journal of Sports Creativity*, 13(2), 359–369. <https://asjp.cerist.dz/en/article/205802>

35. Guemriche, N., & kaddour bey, b. (2025). A study of structural challenges and strategic prospects for the development of women's wrestling in Algeria: A comparative perspective with Egypt and Tunisia. *Journal of Sports Creativity*, 16(2), 126–134. <https://asjp.cerist.dz/en/article/276289>