HIGH-LEVEL COMPETITION, AN ESSENTIAL BENCHMARK FOR ESTABLISHING THE MEANS OF TRAINING OLYMPIC-LEVEL FEMALE WRESTLERS

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Abstract

High-level competition, an essential benchmark for establishing the means of training Olympic-level female wrestlers. This paper presents a research study focused on the in-depth analysis of high-level competition in women's wrestling, aiming to identify and systematize the latest trends observed during contests and direct combat situations. Understanding these competitive dynamics is essential for designing optimized training programs for Olympic-level performance.The study investigates the key technical-tactical, physical, and physiological characteristics that define elite-level competition. By analyzing official match recordings and performance data from international tournaments, including the Olympic Games and World Championships, we identified a range of indicators that offer valuable insights into the demands placed on athletes at the highest level. Among the variables taken into consideration were the total duration of the contest, the effective active time during direct confrontation, the average number of matches required to win medals, as well as a series of specific technical-tactical elements. These include the frequency and type of scoring actions, transition moments, defensive and offensive strategies, and recovery intervals within a match. The technical-tactical analysis was conducted both at a general level and individually, by weight category. Particular attention was paid to the diversity of techniques used, the tempo of the fight, and the strategic differences between lightweight, middleweight, and heavyweight athletes. The individual characteristics of each athlete, especially those determined by the specific requirements of each weight class, reveal significant differences in the way technical-tactical expression manifests both quantitatively and qualitatively during matches. The findings provide a comprehensive and structured reference framework that can be used to guide the development of evidence-based training methods tailored to the realities of modern female wrestling at the Olympic level.

Keywords: *wrestling competition characteristics, women wrestling, training system, Olympic preparation, technical-tactical analysis.*

INTRODUCTION

The performance of elite female wrestlers at the Olympic level is not a result of chance but the culmination of a complex and periodized training process, carefully adapted to the demands of high-level competition. Wrestling, as a sport that combines strength, agility, endurance, and tactical intelligence, requires a highly individualized approach to preparation, especially in the women's division, where physiological, morphological, and psychological particularities are distinct from those of men (Bompa & Buzzichelli, 2018).

The inclusion of women's wrestling in the Olympic Games in 2004 marked a turning point in the development of this discipline, leading to an exponential increase in participation, performance standards, and scientific interest. As observed by Mirzaei et al. (2010), "elite performance in combat sports is increasingly dependent on the ability to adapt to real-time situations under physical and psychological stress."

In modern wrestling, winning a medal requires not only superior physical conditioning but also the capacity to read the opponent's strategy and adjust tactics dynamically. Therefore, analyzing the current trends in high-level competitions is essential to understanding what it truly takes to build a successful Olympic-level athlete. According to Platonov (2015), "sporting excellence must be prepared through training systems that replicate the realities of the contest environment."

Moreover, the evolution of match strategies, technical execution, and physiological demands has intensified in recent years. This trend is particularly evident in female categories, where the diversity of styles and tactical approaches is broader than ever. Studies by Beneke et al. (2011) confirm that "the duration of high-intensity phases and the density of technical actions are significantly higher in Olympic competitions compared to national-level events."

The current study proposes an in-depth radiography of Olympic-level women's wrestling in order to establish valid and evidence-based benchmarks for training methodology. By identifying patterns in competition behavior across weight categories,

coaches can tailor training programs that reflect the actual demands encountered on the mat.

Research Objectives

The present research seeks to respond to the increasing need for scientifically grounded training methodologies in women's wrestling, aligned with the complex demands of Olympic-level performance. To achieve this goal, the following specific objectives were established:

1. **To analyze match dynamics at high-level competitions**
   This objective involves a systematic examination of competition behavior in major international events, such as the Olympic Games, World Wrestling Championships, and European Championships. Special attention is paid to the structure of the match, tempo variations, phases of activity and recovery, scoring sequences, and fight outcomes, in order to capture the real-time rhythm and intensity of elite contests.
2. **To determine specific performance indicators relevant to elite female wrestlers**
   Through both quantitative and qualitative analysis, the study aims to identify a comprehensive set of performance indicators, including:
   - **Technical-tactical parameters** (e.g., dominant techniques, execution frequency, point distribution);
   - **Physiological characteristics** (e.g., effort intensity, match load distribution, recovery demands);
   - **Physical attributes** (e.g., endurance, power, agility) required for success in different weight categories.
3. **To correlate the findings with weight category-specific requirements**
   Recognizing that each weight category presents unique challenges, the study aims to interpret the collected data in light of weight-specific physiological and technical demands. The goal is to distinguish between patterns common across all categories and those specific to lightweight, middleweight, or heavyweight divisions, enabling a differentiated training approach.

4. **To propose a scientifically grounded training model based on actual competition profiles**

   Drawing on the insights gained, the final objective is to design a model of training that mirrors the real conditions and demands faced during high-level competitions. This model will provide coaches and practitioners with evidence-based guidance on periodization, technical emphasis, physical conditioning, and tactical preparation, tailored to Olympic-level female wrestlers.

METHODOLOGY

The methodological approach of this study was designed to ensure the validity, relevance, and applicability of the results to the training of Olympic-level female wrestlers. A mixed-method strategy was employed, combining quantitative analysis of competition data with qualitative insights drawn from video observation and expert interpretation.

Research Sample

The research sample consisted of 28 final and semifinal matches from the most recent high-level competitions:

- Olympic Games (Paris 2024),
- World Wrestling Championships (2023),
- European Championships (2023).

These matches covered all six Olympic weight categories in women's freestyle wrestling (50 kg, 53 kg, 57 kg, 62 kg, 68 kg, 76 kg), focusing exclusively on athletes who won medals or ranked in the top 5 positions.

Data Collection Methods

- **Video analysis** was conducted using official footage provided by United World Wrestling (UWW), with time-coded software to capture technical-tactical sequences.
- **Performance indicators** were extracted manually and statistically processed using Microsoft Excel and SPSS.
- Additional validation of data was performed through consultation with national-level coaches and referees with experience in Olympic competitions.

Table. 1. Variables Monitored

Category	Variable
Match structure	Total match time, active combat time, rest periods
Technical-tactical	Techniques used (by type and frequency), attack zones, defensive actions
Competition intensity	Points scored per minute, tempo shifts, reversals
Match trajectory	Number of matches to medal, score margins, fall or decision wins
Physiological demand (inferred)	Density of actions, effort duration, recovery demands

Data Analysis Techniques

Descriptive statistics (mean, standard deviation, frequency distribution) were used to describe the variables. Comparative analysis was applied to examine differences between weight categories. Specific case studies were also highlighted to illustrate technical-tactical diversity.

The methodological framework ensured that results reflect not just the outcome of matches but also the processes and strategic patterns underlying elite performance. These findings form the basis for the subsequent development of a weight-specific training model.

RESULTS AND DISCUSSION

General Indicators of Match Structure

The analysis of 28 high-level women's wrestling matches revealed several consistent patterns in the structure and dynamics of Olympic-level contests. These indicators serve as fundamental benchmarks for adjusting training to the real demands of international competition.

Table 2. Match Structure Indicators (Average per Match)

Parameter	**Value (Mean ± SD)**	**Comments**
Total match time	6:00 minutes (fixed)	Regulation time: 2 × 3 minutes
Effective combat time	3:37 ± 0:28 minutes	Excludes passive periods, breaks, and resets
Total number of actions	12.3 ± 2.5	Includes attempts, scored and non-scored
Points scored per match	9.2 ± 3.1	Varies by category and bout level
Matches needed to medal	3.2	Based on double-elimination tournament structure
Time between matches (avg. recovery)	70–90 minutes	Important for physiological adaptation

Interpretation:

Although the total match time is fixed, the effective combat time represents only 60–65% of the full duration, due to pauses for referee decisions, par terre resets, or inactivity. This ratio suggests that training should emphasize high-intensity bursts within variable-duration windows, alternating with short passive phases—mimicking match conditions.

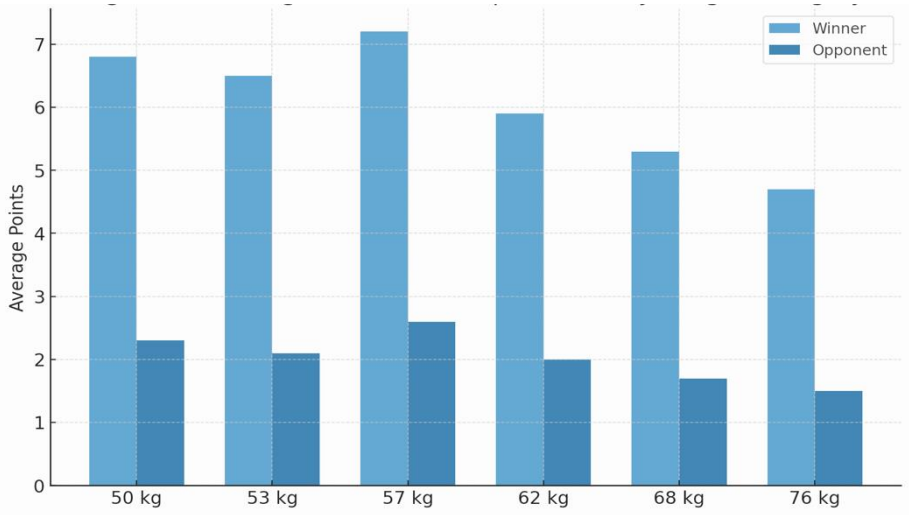


Figure 1 – Average Points Scored per Match (All Categories)

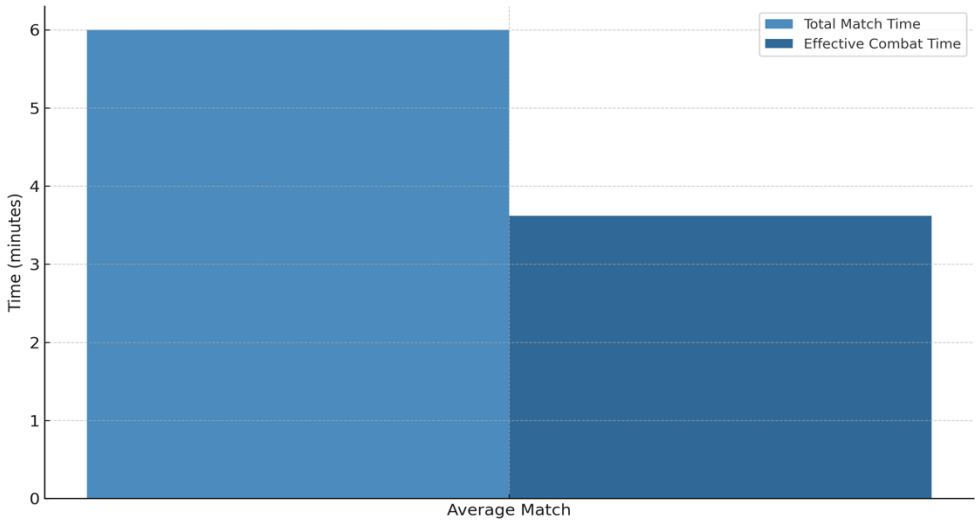


Figure 2 – Effective Combat Time vs. Total Match Time

Technical-Tactical Profiles by Weight Category

The technical-tactical demands of elite female wrestling vary significantly across weight categories, influenced by anthropometric characteristics, motor potential, and fight strategy. By comparing athletes from lightweight (50–53 kg), middleweight (57–62 kg), and heavyweight (68–76 kg) classes, key distinctions emerge that are crucial for individualized training.

Table 2. Dominant Technical-Tactical Elements by Weight Category

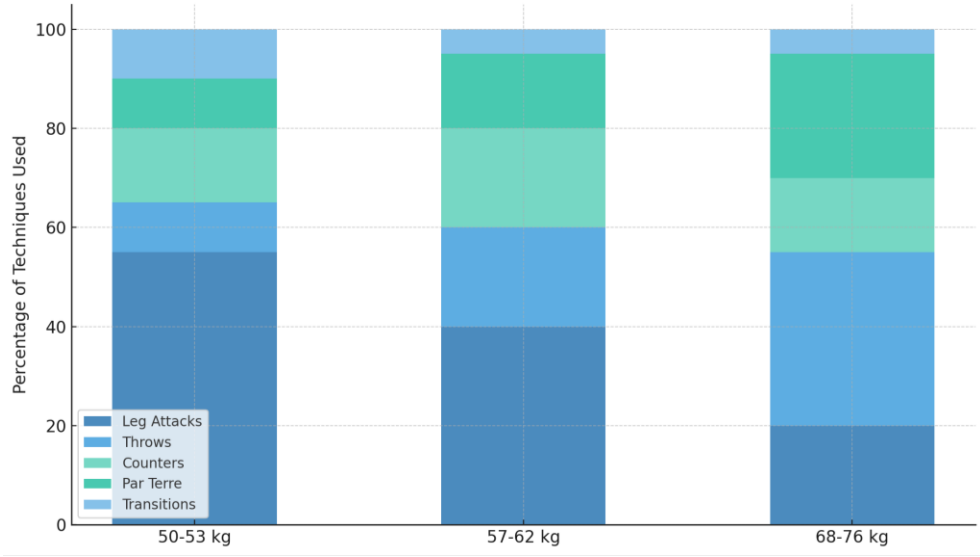
Weight Class	**Dominant Techniques**	**Tactical Style**	**Fight Tempo**	**Remarks**
50–53 kg	Leg attacks, low singles, ankle picks	Aggressive, reactive	Very high	High-scoring sequences, quick scrambles
57–62 kg	Arm drags, counters, chain wrestling	Balanced, adaptive	Moderate	Greater emphasis on transitions and positioning
68–76 kg	Upper-body throws, gut wrenches	Power-based, conservative	Lower	Strong control in par terre and positional setups

These differences indicate that each weight class should be approached with tailored technical-tactical priorities. For example, while 50 kg wrestlers benefit from plyometric drills and fast reaction work, 76 kg athletes may focus more on isometric strength and efficient grip control.

Implications for Training

- **Lightweight (50–53 kg):** Emphasize high-speed drills, attack-recovery-attack circuits, and explosive entry into leg attacks.
- **Middleweight (57–62 kg):** Prioritize situational sparring, fluid positional control, and chain technique sequences.
- **Heavyweight (68–76 kg):** Focus on strength-endurance, positional leverage, and static-dynamic drills in par terre.

Incorporating these profiles into training plans ensures alignment between real competitive demands and training stimuli, ultimately supporting performance optimization.



Graph 3 – Distribution of Technique Types by Weight Class

CONCLUSIONS

The analysis of high-level women's wrestling competitions revealed a series of essential indicators that should guide the training process of Olympic-level athletes. Match structure data showed that only approximately 60% of contest time is spent in active wrestling, emphasizing the importance of developing short, high-intensity efforts and the ability to recover quickly between actions. The average number of matches needed to win a medal (around 3.2) also suggests that wrestlers must maintain technical precision and psychological resilience throughout an entire tournament day.

Technical-tactical analysis highlighted distinct profiles across weight categories. Lightweight wrestlers (50–53 kg) favor dynamic leg attacks and aggressive pacing, while heavyweights (68–76 kg) rely on powerful upper-body techniques and positional control in par terre. These findings underscore the need for category-specific training, rather than a generalized preparation approach.

Moreover, the diversity of successful techniques and strategies across weight classes implies that adaptability is a key performance trait at the elite level. Training programs should therefore not only develop preferred actions but also improve wrestlers' ability to switch tactics in response to opponents.

In conclusion, high-level competition serves as a critical benchmark for establishing evidence-based training models. Coaches must integrate empirical performance data into program design, ensuring that each athlete's preparation reflects the real demands of modern women's wrestling. Future studies should aim to deepen the understanding of physiological load during competition and to refine the categorization of technical-tactical actions using larger datasets.

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