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In Respectful and Loving Memory

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ADVANCING OUR SPORT THROUGH KNOWLEDGE
FAIRE PROGRESSER NOTRE SPORT PAR LA CONNAISSANCE
ПРОДВИЖЕНИЕ НАШЕГО СПОРТА ЧЕРЕЗ ЗНАНИЕ
PROGRESO PARA NUESTRO DEPORTE MEDIANTE CONOCIMIENTO

International Journal of Wrestling Science

The official journal of the International Network of Wrestling Researchers (INWR)

David Curby, EdD
Editor in Chief

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Editor's Comments

This issue is dedicated to the memory of two icons of our sport that we tragically lost this year (see cover).

In March Russian three-time Olympic freestyle wrestling champion Buvaisar Saitiev died at the age of 49, Saitiev was one of the most decorated freestyle wrestlers in history and mad inestimable contributions to sport. Saitiev won Olympic gold in the 74-kilogram category at the 1996, 2004 and 2008 Games and was a six-time world and European champion. He was known for his incredible achievements in freestyle wrestling. He is highly regarded as one of the best freestyle wrestlers to ever step on the mat. Saitiev has left an indelible mark on the sport, inspiring countless athletes.

Then in July, legendary Japanese wrestler Hitomi Obara, the 2012 London Olympic gold medalist at women's 48kg and an eight-time world champion, passed away at age 44. Obara, who won six of her world titles at 51kg under her maiden name of SAKAMOTO, became a model case for the ups and downs of high-level sports and the ability to overcome grave disappointment. Her victory at the London Olympics, at age 31, came after being denied spots on Japan's team at both of the two previous Olympics by fellow legend Saori Yoshida.

Sincerely yours in the advancement of Wrestling,

David Curby

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PROPOSAL

THE SPECIAL EXPANDED WRESTLING COMPETITION FORMAT: A CONCEPTUAL PROPOSAL FOR WRESTLING COMPETITIONS

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ABSTRACT
Traditional wrestling competitions are structured around individual matchups, limiting talent exposure, strategic depth, and team engagement. This paper introduces the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT—a conceptual model in which each country fields a three-wrestler team per weight class. Matches are held as best-of-three series, with tactical elements such as lineup declarations, strategic substitutions, and the Golden Fall mechanism that can trigger a fourth deciding match under specific conditions.

The SPECIAL EXPANDED WRESTLING COMPETITION FORMAT addresses key limitations of the current system by enabling broader athlete participation, enhancing the coach's strategic role, and increasing psychological fairness through distributed responsibility. It also promotes media engagement and audience retention through multi-layered match narratives.

The model is applicable to various competition levels, from national leagues to potential implementation in global formats such as a Wrestling Nations Cup. This article outlines the structure, logic, advantages, and possible criticisms of the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT, offering a roadmap for pilot implementation and broader adoption.

The paper concludes by positioning the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT as a modernization strategy for wrestling—an evolution aligned with global trends in sports governance and audience engagement.
Keywords: Wrestling – Competition Format, Team-Based Structure, Sports Innovation – Tactical Strategy – United World Wrestling

INTRODUCTION

Wrestling, one of the oldest combat sports in human history, has traditionally relied on an individual-based competition model. In this format, each country is represented by only one athlete per weight class. While effective in identifying top-tier individuals, this structure limits the exposure of other elite talents and reduces tactical diversity. Furthermore, the one-on-one model may face challenges in retaining spectator engagement and adapting to the evolving demands of modern sports entertainment.

With the increasing competition among sports for media visibility and fan engagement, wrestling must consider structural innovations to remain globally relevant. Research in sports science indicates that team-based, strategy-driven formats tend to attract wider audiences and offer more compelling narratives (Franchini, 2021). Such formats allow for broader athlete participation, enhanced tactical complexity, and greater emotional investment from both athletes and spectators.

In response to these challenges, this paper introduces the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT —a team-based conceptual model in which each country competes with a three-wrestler team per weight class. The match outcome is determined through a best-of-three structure. This model integrates tactical depth (e.g., lineup strategy, substitutions), highlights a broader talent pool, and fosters a team identity within an otherwise individualistic sport.

The purpose of this conceptual paper is to present the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT as a practical alternative for enhancing wrestling's competitive structure. It outlines the format's core

principles, tactical implications, and potential applications, with the intention of encouraging wrestling federations and stakeholders—especially United World Wrestling (UWW)—to explore its feasibility through pilot events or demonstration tournaments.

Previous discussions on the evolution of wrestling and collegiate formats have emphasized the importance of structural modernization to ensure sustainability and global growth (Curby, 2013; Smith, 2010; Demirkan, 2015).

Theoretical Background

In many sports, the transition from individual-based to team-based competition structures has significantly enhanced audience engagement, strategic depth, and collective identity. Formats such as the **Davis Cup in tennis** and the **Judo World Team Championships** have demonstrated that team events—even in traditionally individual sports—can offer a compelling blend of personal performance and group dynamics (Koning & Koolhaas, 2018). Team formats enable coaches to play a central role in determining lineups, managing risk, and executing tactical plans that go beyond the isolated athlete's performance.

In the current digital and media-driven era, the design of sports leagues must balance fairness with narrative excitement, comeback potential, and unpredictability. Sports like football and rugby utilize group and knockout formats to create progressive tension and emotionally resonant storylines (Scelles et al., 2020). Wrestling, by revising its format to include team-based competition, can similarly move from repetitive individual duels toward multi-layered tactical contests with broader appeal.

In sports where the coach has real-time strategic agency—such as substitutions in volleyball or lineup sequencing in team boxing—the coach evolves from a passive advisor to an active architect of competitive outcomes. This shift not only elevates the technical dimension of the contest but also enriches its analytical complexity for audiences and analysts alike (Wang & Bradbury, 2021). Within the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT model, the ability to choose lineups, deploy reserves, and manage psychological momentum ahead of the third bout redefines the coach’s role and positions wrestling within the realm of live tactical strategy.

Strategic innovations in sports formats are most effective when they balance competitive fairness with institutional flexibility. In this regard, insights from league structures and governance frameworks in football, team sports, and organizational collaborations provide valuable guidance for wrestling (Groll & McKeon, 2020; Andreff, 2011; Shilbury, O’Boyle, & Ferkins, 2016).

Structure and Logic

The Expanded Format introduces a hybrid competition model that blends the intensity of individual matches with the dynamics of team strategy. Under this format, each country fields a **three-wrestler team** per weight class, with the option to designate **one reserve wrestler**. A match between two countries at a given weight consists of three one-on-one bouts. The team that secures two victories wins the weight class. This structure is adaptable to both **group stage and knockout formats**, offering flexibility for event organizers. Each weight class operates independently, and match outcomes contribute to the overall team result.

Key tactical components of the model include:

- **Line-up Declaration:** Coaches privately submit their wrestler order before the match, which is then revealed simultaneously. This system allows for strategic pairing and anticipation of the opponent’s strengths and weaknesses.
- **Reserve Use:** Each team may designate one reserve, who can replace a starter before the third bout. This provides strategic depth, especially in cases of injury, unfavorable matchups, or psychological fatigue.
- **Scoring Logic:** The team that wins two out of three bouts, regardless of margin, claims victory for that weight class. Final outcomes can be 2–1 or 3–0.
- **Tournament Design:** Competitions may follow a group phase (e.g., four-team pools) followed by semifinals and finals. Team victories across weights can determine overall national team success.
- To enhance late-match suspense, the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT introduces the **“Golden Fall” rule**. If a team loses the first two matches **without being pinned**, and its third wrestler **wins by fall**, a **fourth and final deciding bout** is triggered. This final match features one of the previously defeated wrestlers from each team, selected by their coach. In this scenario, a fall is elevated to the equivalent of **two wins**, offering a chance to equalize and contest the weight class. The following example illustrates how the Golden Fall rule operates within a match sequence.

Table1. Example Scenario of the Golden Fall Rule

Bout	Team A Wrestler	Team B Wrestler	Result	Score
1	A1	B1	B1 wins (points)	0–1
2	A2	B2	B2 wins (points)	0–2
3	A3	B3	A3 wins (fall)	1–2
4	A1 (re-entry)	B2 (re-entry)	A1 wins (points)	Team A ties and wins

This rule is designed to keep the outcome in doubt until the final moment, adding dramatic tension and tactical depth. Comparable to a last-minute penalty in football or a knockout in boxing, the "Golden Fall" creates a redemption pathway that empowers the third wrestler and elevates the psychological and strategic stakes for both teams and coaches.

Advantages of the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT Format Compared to Traditional Wrestling Structure

1. 1 Expanded Opportunities for Talent
   In the traditional wrestling system, only the national champion in each weight class earns the opportunity to compete in global events. This leaves many world-class contenders sidelined. The SPECIAL EXPANDED WRESTLING COMPETITION FORMAT opens the field to three representatives per weight class, enabling the emergence of hidden champions and increasing motivation among emerging generations of wrestlers.
2. High-Level Strategy and Tactical Depth
   With team lineup sequencing, optional substitution before the third bout, and the Golden Fall mechanism, the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT model brings tactical complexity to the forefront. The coach transitions from a passive observer to a strategic architect. The structure introduces a coach–team–opponent triangle, similar to the tactical frameworks seen in team sports.
3. Enhanced Team Spirit and Collective Identity
   By shifting from an individual to a team context, psychological pressure is shared among team members. Athletes develop a sense of shared responsibility, improving mental resilience and fostering deeper camaraderie during training and competition.
4. Increased Spectator Appeal and Media Value
   With three matches per weight class and dramatic comeback possibilities (e.g., the Golden Fall), each weight becomes a layered narrative. This format is well-suited for storytelling, live analysis, and media engagement, boosting the commercial potential of wrestling events.
5. Structural Flexibility Across Competitions
   The SPECIAL EXPANDED WRESTLING COMPETITION FORMAT Format is not limited to special tournaments like world leagues or national cups; it can gradually replace the individual-based format across all levels of competition—from national to international—given proper scheduling and logistical support.
6. Psychological Fairness and Reduced Pressure on Individuals
   In the traditional format, a single loss can end a nation's hopes. The SPECIAL EXPANDED WRESTLING COMPETITION FORMAT system distributes responsibility, reduces performance anxiety, and fosters consistency—especially for younger or developing athletes.
7. Team Performance over Individual Heroism
   While current formats celebrate individual stars, they can overlook balanced, well-coached teams. The SPECIAL EXPANDED WRESTLING COMPETITION FORMAT model rewards collective strength: a team of three wrestlers rated 90/100 each may outperform a team with one superstar at 99 and two weaker teammates.

Moreover, the format creates opportunities for countries that traditionally lack elite-level superstars but can field a trio of competitive athletes. This expands the global footprint of wrestling by enabling nations with mid-tier talent to rise in team-based formats. Table 2 summarizes the structural differences between traditional wrestling and the proposed SPECIAL EXPANDED WRESTLING COMPETITION FORMAT.

Table 2. Comparative Overview: Traditional Format vs. SPECIAL EXPANDED WRESTLING COMPETITION FORMAT

Feature	Traditional Format	Special Expanded Wrestling Competition Format
Structure	Individual	Team-based (3 wrestlers per weight)
Athlete Participation	1 per country per weight	3 per country per weight
Tactical Role of Coach	Minimal	Strategic (lineup, substitutions)
Spectator Engagement	Limited	High (multi-bout narrative)
Pressure Distribution	On a single athlete	Shared among team
Media Potential	Low	High (analysis, branding)
Global Accessibility	Elite countries dominate	Mid-tier nations gain visibility

Potential Criticisms and Responses

1. 1This Increased Time and Logistical Demands
   Expanding from one to three matches per weight class could extend tournament durations.
   Response: By scheduling weights in staggered waves, using dual mats, and shortening rest intervals, events can remain efficient. Moreover, the inclusion of a reserve wrestler helps mitigate fatigue from shorter recovery times.
2. Increased costs because of the increased number of wrestlers-travel, food and lodging.
   Resistance from Traditionalists
3. Wrestling communities—especially at the international level—often resist structural change.
   Response: Pilot implementation at culturally respected events, such as the Takhti Cup in Iran, can demonstrate feasibility and build trust.
4. Rule Complexity for New Audiences
   Innovations like the Golden Fall might initially confuse casual viewers.
   Response: Visual media, simple graphics, and expert commentary can turn complexity into an educational and engaging asset.
5. Reduced Motivation for National #1 Spot?
   Critics may fear that allowing three representatives reduces the prestige of being number one nationally.
   Response: On the contrary, competition among the top three for starting roles—and even the reserve spot—will intensify. Teams can also introduce symbolic honors such as the 'team captain armband' to preserve leadership prestige within a team-based system.

Use Cases and Potential Applications of the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT

The SPECIAL EXPANDED WRESTLING COMPETITION FORMAT is not only a theoretical proposition but a fully executable structure designed to modernize wrestling competitions. Experiences from other sports have shown that restructuring formats can significantly enhance international participation, fan engagement, and market expansion (García & Rodríguez, 2002).

At the national level, the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT could be piloted within Iran's domestic wrestling scene—particularly in prestigious events such as the Takhti Cup or provincial league tournaments. A phased implementation (e.g., testing one weight class first) would allow for gradual adaptation to logistical and technical realities.

On the international stage, the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT has potential to serve as the official structure for a Wrestling Nations Cup or a new World Wrestling League. Similar models have already been tested in sports like judo, where team competitions enhanced viewer appeal and host-country engagement (Kudłacz et al., 2021). Additionally, comparative insights from NCAA team-based wrestling in the United States indicate that team structures in combat sports can maintain fairness and competitiveness while enriching the spectator experience (Ecker, 2005).

To successfully implement the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT a three-phase roadmap is recommended:

1. Pilot the format in a national or regional event with scientific and media supervision
2. Statistically evaluate feedback from athletes, coaches, and spectators
3. Present the proposal formally to United World Wrestling (UWW) for potential integration into the global calendar

If successful, the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT could not only transform the competitive face of wrestling but also inspire a governance model for traditional sports where structural innovation honors, rather than replaces, cultural heritage.

CONCLUSION AND NEXT STEPS

The SPECIAL EXPANDED WRESTLING COMPETITION FORMAT presents a structural response to the traditional limitations of individual-based wrestling competitions. It preserves the essence of one-on-one combat while introducing team dynamics, tactical complexity, and broader inclusion. By creating more opportunities for talent exposure, enriching the strategic role of coaches, enhancing team spirit, and amplifying spectator appeal, the model has the potential to complement—or even replace—the current formats used in international wrestling.

Given the successful implementation of similar formats in sports like tennis, judo, and collegiate wrestling, the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT is well-positioned for phased deployment. Initial implementation in national or regional competitions, followed by careful evaluation and refinement, can pave the way for broader institutional adoption. With proper logistical and media support, pilot programs could ultimately lead to the format's official consideration by United World Wrestling (UWW).

This paper invites federations, coaches, and policy-makers to view the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT not merely as an innovation, but as a structural modernization strategy—a necessary evolution to ensure the continued relevance, growth, and global appeal of wrestling in the 21st century.
Drawing from organizational insights across combat and team sports, a structured pilot phase—supported by transparent governance—can significantly improve adoption success (United World Wrestling, 2021).

For access to supplementary materials, implementation scenarios, and version history of the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT, the full documentation is available at OSF:
https://doi.org/10.17605/OSF.IO/QH3CT.

Disclosure Statement
The authors report no conflict of interest.

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THE TRADITIONAL WRESTLING GAMES OF DIDYMOTEICHO CITY (THRACE, GREECE)

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ABSTRACT
The modern city of Didymoteicho is a city of 16.000 inhabitants and is located in the northeastern part of Greece. Historical circumstances have turned it into a multi-ethnic mixture, with the majority of its inhabitants being Greek. Tradition has it that national festivals, including wrestling matches, are held in the upper part of the fortress. They began in 1257, on the day of Pentecost, as a commemoration of the failed Bulgarian offensive, following divine intervention. The following paper, drawing on numerous journal articles and monographs, as well as oral information, presents the games that took place in the city of Didymoteicho and examines whether this is a modern "invention", the reasons why wrestling matches played a primary role in these celebrations and, finally, examines the affinities with other wrestling matches that took place in the Balkan region. As will be seen, according to tradition, these games did indeed begin in 1257, but it is doubtful whether they continued uninterrupted and in the same form in the centuries that followed. The only certainty is that in recent years they have changed their form, following the norms imposed by new circumstances. The reasons for the primacy of the wrestling matches over others are also documented, taking into account the role of power in primitive societies, and finally, the affinity of the Greek traditional wrestling with the Turkish one and its differentiation from that of the northern Slavic nations is observed.

Keywords: Wrestling, Didymoteicho, tradition

INTRODUCTION

In modern times, Didymoteicho[1] is a city located in the region of Thrace and has a population of about 16,000 inhabitants (*Permanent Population – ELSTAT*). It is located 85 km from the capital of Evros prefecture,

[1] Historically, it is an area with a rich past, from antiquity to modern times, with many conquerors, as it was the closest part to the Byzantine center of Constantinople, which influenced the cultural and demographic identity of the city. According to recent studies, Didymoteicho is a continuation of the ancient city Plotinople (Manakas, 1963). It was founded towards the end of the first to the beginning of the second century AD by the Roman emperor Trajan in honor of his wife Plotinus. During the reign of Justinian, the two hills near the city were fortified, one of which is where Didymoteicho is built. The choice of the location was not accidental, as the hill on which it was built controlled an important passage of the river Erythropotamos, through which the Roman road of the Egnatia road leading to the middle and upper valley of the Evros river necessarily passed, while a fork of the river led to the Black Sea coast (Samsaris, 2005, 114-120). The city of Didymoteicho appeared on the scene in the ninth century, when Plotinople was in decline due to foreign invasions. During the Byzantine period it was an important security stronghold of Constantinople, due to its location and fortification, absorbing raids by Bulgarians and Cumans. Its importance was such that it was the capital of the Empire three times, playing an important role in intra-imperial disputes (Manakas, 1963). However, the ever-decreasing power of the Byzantine Empire, combined with the emergence of the newly powerful Ottoman power, resulted in the final capture of the city in 1361, making it the capital of the Ottoman authorities in Europe.

Modern history finds it to be the apple of discord between three countries, Greece, Bulgaria and Turkey. In the first Balkan wars in 1912 it was occupied by the Bulgarian army, while in the second wars the following year it was recaptured by the Turks. With the outbreak of the First World War, Western Thrace was ceded to the Bulgarians and united with Greece by the Treaty of Sevres in July 1920. The Asia Minor campaign and the subsequent defeat of Greece also had consequences for the local population, since the Treaty of Lausanne imposed a compulsory population exchange between the Muslims of Greece and the Orthodox of Turkey. Thus, many Greek refugees from Asia Minor, Eastern Thrace and Eastern Rumelia settled in Didymoteicho. It is worth noting that the Muslims of Western Thrace were excluded from this exchange. Finally, in World War II, the city was occupied by the

Alexandroupoli, and just 2 km from the border with Turkey. It is built at the confluence of the Evros River, which defines the city to the east and forms a natural border with Turkey, and the Erythropotamos River, which forms its western and southern borders. The city takes its name either from the double walls of the castle or from the two opposing fortified cities (Manakas, 1963). Populationally, due to border proximity and historical circumstances, formed a population that was extremely mixed, with all that this implies for the religious and cultural syncretism of the local population. More specifically, in 1871, which is the period after which the research is aimed, out of a population of 38,412, 18,522 were Ottomans (*Imerologion post Statistical Information on the Prefecture of Adrianople*, 1871, 67-69). The 1894 census of Andrianople province, to which Didymoteicho belonged, informs us that the population of Muslims was 49.5%, Greeks 35.7%, Bulgarians 10.5%, Armenians 2.4% and Israelis 1.9% (Antoniades, 1919, 3 et al). The census of 1928, i.e. after the first census after the Treaty of Lausanne, showed a population of 37,718 inhabitants, of which 9,208 were refugees, 15-19 % Muslims and 5-9 % Bulgarians (Zafiris, 2015, 400, 410). This demographic mix provides a unique context for the wrestling matches in the area, reflecting the heterogeneous yet homogeneous characteristics of the population. It is worth noting that the Muslims of Western Thrace were excluded from the exchange of population that the treaty of Lausane imposed. Thus the presence of Muslims in the period been examined.

The purpose of the following analysis is to present the wrestling games in Didymoteicho, drawing from relevant literature, fieldwork material and oral information. Journal articles and monographs from folklore, psychology, anthropology, and physical education sciences were studied to identify references to these games. The main questions addressed are: Are these games a genuine tradition or an "invented" tradition? What reasons explain the primacy of wrestling over other games? What are the similarities and differences with similar games in other Balkan states (Turkey, Bulgaria, Serbia, N. Macedonia, Albania, Kosovo, Moldova and Romania)?

THE GAMES

The wrestling matches in Didymoteicho took place at the upper part of the fortress, where there was a smooth ground of 4-5 acres. It was called Kuskoulas, which is a corruption of the Turkish word “kiz-kule”, meaning the tower of Vasilopoula (daughter of the king)[2]. There, the Greek population found sanctuary, away from the eyes of the Turkish authorities, and sang national songs, danced national dances and organized various events, without fear of misunderstandings. This tower ensured visibility as far as Adrianople and was the place where the Greek population fled in case of raids (Manakas, 1957). They occurred on the day of Pentecost, because of a miraculous event, as we will see below. So famous was the festival that many came days before, others on the eve, and many came on the same day. In the morning the archbishop celebrated the high priestly mass and then proceeded with the ritual procession carrying the miraculous image of Jesus from the church of Jesus Christ to that of St. Athanasius[3]. There he stayed until the afternoon, when he returned to the church of Jesus Christ. After the liturgy, crowds of people would go to the Kuskoulas area, where the wrestling matches were held nowadays (Vafeiadis, 1940).

They followed the typical wrestling matches with oil made of olives, which were quite widespread throughout the region of Thrace. The organization of the matches, at least from the beginning of the 20ου century onwards, fell to the ecclesiastical committee, in cooperation with the rulers and officials of the time. They, in collaboration with veteran athletes, formed the judicial committee and the judges. They placed the athletes in categories, without many formalities. It was enough for the athlete to declare the category he wanted to compete in. Information on the number of categories is not available, but the most common pattern is two, experienced and less experience[4]. There were no categories of athletes according to weight, as there were in the ancient games. Thus, the heavier athletes had an advantage, mitigated by the use of oil which made the handles more difficult (Basogiannis, 1933).

Germans and Bulgarians in 1941. During the two periods of Bulgarian occupation, an attempt was made to settle Western Thrace with Bulgarians, with the aim of ‘ethnological alteration’ (Divanis, 2000, 588).

[2] This name came about, according to tradition, because the king's daughter used to pass by that spot at the time of leisure in order to enjoy the natural landscapes of the city (Manakas, 1957).

[3] Saint Athanasius is the patron saint of the city of Didymoteicho. The church is unknown when it was built, but it is certain that it existed before 1778, which was built on the ruins of an another of an earlier era, and was rebuilt in 1834 (Vafeiadis, 1940).

[4] In larger events there were more categories, the naming of whom come from Turkish language. For example, on Thomas Sunday in Nigrita Serres there were three categories, the middle one of which had three subcategories: The first one was called *bashmas*, which is the equivalent of the children's, the middle one, the *orta*, with three subcategories, the *khutsuk orta*, the *bouyuk orta* and the *orta*, and the largest one, the *bash* (Paschaloudis, 2013, 208-209). In ancient games there were only categories according to age. Poliakoff (1987, 20) states that there were usually 2 categories, although in some there were 5.

As for the rules, the winner was the one who would manage to touch the opponent's back to the ground, «eat dirt», the one who would lift the opponent over his shoulders and, finally, if the opponent gave a *pes* (admission of defeat), a light blow to the opponent declaring defeat. There was no draw in these matches, as there were no written rules. Of course, everyone knew that dangerous blows to sensitive areas and the head were expressly forbidden (Basogiannis, 1933).

The match started with the smaller categories, followed by the larger one. In order to fight, the athlete took off all his clothes and wore a pair of leather shorts at knee height, the so-called *kispet*[5]. In the arena, the wrestlers would tie the opponent's ropes, which were at the knees and waist, followed by the application of the oil. The oil smearing made it difficult for the opponent's grips, so that the one with the best technique would prevail. The match could last for hours, so the referee had water and a towel to give to the wrestlers and could take short breaks. After the match the athletes would do a *barsa*[6], which was the round to the spectators who tipped.

During the matches bagpipes (gaida) accompanied the wrestlers. Very often the matches were also accompanied by two flutes and a zourna[7]. They performed the *gure hawasi*[8] and consisted of three melodic and rhythmic parts. The first was slow and was performed at the beginning of the match, the second was faster when the battle was at its peak and the third was faster and freer when the match was almost decided (Ekaterinidis, 2000).

The prizes were everyday objects, such as a shirt or a mirror, and in the larger events a lamb or a calf. These were the responsibility of the organising committee to provide. The winner was cheered by the crowd and the loser lifted him off the ground twice (Basogianni, 1933). Finally, it is worth adding that in these games both Bulgarian and Turkish athletes competed, while many times wealthy Ottomans sponsored prizes[9] (Papathanasi-Mousiopoulou, 1974).

TRADITION OR «INVENTED» TRADITION?

The task of dating the games in question is difficult, especially when various nationalities are involved and given that Greek folklore in its early stages was oriented towards the direct connection of modern events with corresponding ancient Greek ones, jumping centuries and neglecting cultural and social differentiations and functionalities in order to pursue national goals (Varvounis, 1997). According to tradition, the games began in 1257, when, after a Bulgarian raid[10], the inhabitants of the city took refuge in the fortress in order to save themselves. The siege seemed to be lost and on Saturday night, the night of Pentecost, everyone went to the church of Jesus Christ inside the fortress to ask the God-Man for help. It began to rain throughout the evening and the Erythropotamos river flooded so much that the attackers found themselves between the waters and the walls. The exodus of the besieged pushed the Bulgarians into the flooded river, saving the city. Since then, in gratitude, games were established on the day of Pentecost at this location. The games were held annually after the fall of the city in 1261

[5] Kispet is a Turkish word, that came to the Ottoman language through Persian, used also by the Greek population. It refers to a form of lederhosen, traditionally made from the hide of water buffalo or camel and often made from calfskin in modern times, worn by the participants in traditional wrestling games.

[6] Barsa is a round made by wrestlers holding a basket or a handkerchief, asking for money from the spectators for the spectacle they offered. Apart from the prize, it was the only reward for the wrestlers.

[7] The zourna is a wind instrument played in the center of Eurasia and is found from the Balkans to Central Asia. It is usually accompanied by a daouli (bass drum) in Anatolian folk music.

[8] It is very usual for Greeks to use Turkish words, especially in the borders, given that until lately Thrace was a Turkish province.

[9] The relations between the Greeks, the Bulgarians and Turks varied and were often acrimonious, for reasons that the limited space does not allow us to develop. As mentioned, the Turks respected the festivals of the Christians in order not to offend their national and racial dignity. As it seems, it is a fact that these games transcended the religious and national elements and overlapped the existed variations. However, sometimes they took ethnic character, to the extent that the Turkish Pashas trained and had their own wrestlers in order to fight with their counterparts from other nations and religions. The Turkish Pashas believed that the victory of their protégé reflected on themselves and usually the matches were held in a peaceful atmosphere. Of course, there was no lack of unrest, such as the tragic incident where a Greek wrestler killed the Turkish protégé of the Pasha, after provocation in the field. Unfortunately, we do not have a date of this event, but since then, in order to avoid incidents, Greek wrestlers did not wrestle with Turks for several years (Manakas, 1957, 259-260).

[10] After the death of Ioannis Vatatzis in 1254, the Bulgarians took the opportunity and invaded Thrace and Macedonia, plundering and raiding. In one of these raids, in 1257, the Bulgarians attempted to capture Didymoteicho unsuccessfully. The Bulgarian danger would be temporarily dealt with by Ioannis Vatatzis' successor, Theodore II Duke Laskaris (Kordosis, 2006).

by the Turks until 1940, when the site was moved to the *Chloe* plain due to lack of space and water. After 1940 the games tended to wane and were now held occasionally (Manakas, 1955, 331).

The question of the authenticity or otherwise of the specific games is another question that needs to be investigated. Namely, whether it is a direct continuation of earlier games or whether it is an «invented» tradition, as defined by Hobsbawm (2004, 9). The term is used in a broad sense, noting certain actions of a ritual or symbolic nature, usually carried out according to rules that are overtly or covertly accepted, seeking to instill certain inherited values and rules of conduct through repetition, and if possible establishing continuity with the past. In our case, we will investigate whether these ancient games are indeed as evangelized by experts or whether they are games that do have a basis in the past, but were rediscovered.

Indeed, this kind of games have undergone modifications that differentiate them from the original ones. The influx of elements of modern sport and social reality are beginning to become more and more apparent. In the light of the above, the character and function of the games have changed. The primitive games had a «serious» function aimed at exorcising evil spirits in order to fertilize the earth (Romaios, 1944-45, 113). Also, the primitive need of the wrestler to show off his strength, courage and ability, which had also social implications, to pay homage to the saints, as well as to discover a transcendental connection with the divine element and nature, tended to fade away, with the games becoming a purely recreational element to complement the festive programme of an event (Varvounis, 2000, 233-235; Ekaterinidis, 2006).

Further, the introduction of elements of contemporary wrestling is evident. The equipment of athletes in many cases has changed, with events preferring, either in parallel or autonomously, the modern wrestlers' clothing style or simple shorts. This has of course changed the style of wrestling as well, with wrestlers seeking grips that are common in club sport. It has even changed the rules of the match. Veteran wrestlers and experts (Charalambos, int. 16/3/23, Dinos, int. 29/6/23, Georgios, int. 7/4/23, Konstantinos, int. 15/7/24) in the field inform us that the previously time-limited fight has given way to a time-limited fight, usually 30-40 minutes, depending on the event, a result of increased participation and limited natural light time. If no winner emerges, a ten-minute overtime period is given and the winner is the one who knocks his opponent to the ground, without necessarily touching his back.

Also, the location of some customs have been changed to more spectator-friendly locations. The change of location for the games of Didymoteicho has already been mentioned, but there are also games where this change is more pronounced. For example, in villages around Serres, where traditional wrestling is popular, stadiums have been erected, like the one in Sochos, two in Nigrita, one in Antheia, one in Mavrothalassa, one in Nikokleia and one in Flabouro (Dinos, int. 29/6/23, Konstantinos, int. 15/7/24), to fulfil this purpose exclusively. Spotlights have even been added to allow the match to continue after sunset.

Nowadays, wrestling matches have fallen into the phase of folklorism[11] and their exploitation for tourist and economic reasons. Local clubs or public bodies have taken over their organization, with the aim of attracting as many people as possible and therefore more profit. Moreover, the original programme has been modified with activities aimed at this purpose (music concerts) and not related to the games (Bjeljac, 2021, 234). We should not neglect the addition of side economic activities (stalls selling food, animals, refreshments and games), which are also not related to the event (Vafeiadis, 1940, 245). Finally, visitors go to the event with the primary purpose of socializing and entertainment, rather than participating in some kind of social tradition (Bjeljac, 2021, 234-235). Nevertheless, with all their changes they continue to be an important cultural link in the eyes of the local community, which is why they continue to exist.

From the above we can understand that the folk sports that have recently taken place are a development of the original ones. As Elias (1998, 206) notes, the evolution of games marks 3 stages: 1) The games played at a particular time by individuals whom we can identify, 2) The games played during their evolution along with the organization that controls them, 3) The process of evolution of a game during the existence of the game. Also, Koulouri (1997, 83-87) states that historical approaches to sports oscillate between 2 interpretative versions: the first one concerns the continuity from traditional to modern society and the second version that sports games are a modern phenomenon linked to urbanization and industrial society, tending to accept that in nineteenth century Greece their appearance is not linked to previous sporting activity and that they are introduced in imitation of either

[11] Folklorism is the phenomenon that appeared after 1970 and refers to the artificial regeneration and revival of traditional forms of popular life and culture, which do not serve any modern organic or vital need of the present society, but exert a fascination on various social groups, wanting to connect nostalgically through them with the past (Meraklis, 1972, 29).

the Western or the ancient Greek model. Along the way, of course, as explained above, elements of modern sport were introduced into traditional, creating a parallel sporting activity, something akin to the second and third stages mentioned by Elias.

REASONS FOR WRESTLING PRIMACY

The reasons for the primacy of wrestling in these events, as logical as it may seem, because of the well-known ancient Greek tradition, may be problematic for a number of reasons. To begin with, given that the majority of the population was illiterate, did people know the legacy they were carrying and that's why they kept fighting or were there other deeper reasons? How can we be so sure that it was actually performed from the 13th century without interruption when there is a relative lack of sources? Assuming that they did occur, what role did the performance of games serve in a purely religious festival? Finally, how can we be sure that they were not later incorporated into the context of creating a unified national identity and defending it from hostile neighbors? The answer to such a complex question is difficult to answer. What is certain is that it did take place in recent years, since there is evidence of it, both written and oral, without being certain of the starting point.

The justification for their primacy in religious festivals should be sought in the world of archetypes[12] and not in an ancient tradition. Starting from antiquity, the archetype of the existence of good and evil is as old as the birth of the world. This was the case in all pre-Christian cultures, as it is also the case in Christianity. Pre-Christian cultures had allegorized this battle physically and instituted games in order to exorcise evil. It is known that Christianity had banned these games, only that some smaller-scale ones survived. The Church, recognizing its inability to stop these, preferred to allow them to continue, giving them a new meaning that would serve its own interests. That is, through them to achieve the glory of the Lord (Liponski, 2016a). But why did the athletes prefer the wrestling matches and not others? Liponski (2016a) states that sport has the ability to stimulate human sensibility, to shape the human view of the environment and supernatural forces, whether this is done consciously or unconsciously. This in the end brought about a higher state of spirituality, especially in conditions of extreme effort. Murphy and White (1978) observed that «sport has enormous power to draw us beyond our ordinary sense of self, to evoke bonds generally considered mystical, occult, or religious». Similarly, Sachs (1992) described it as causing «an increased sense of well-being, enhanced appreciation of nature, and transcendence of the barriers of time and space.» Jaspers (1957, 68) considered that « through physical activity the bonds subject to the control of will, energy and courage are maintained and the individual seeking contact with nature draws closer to the elemental forces of the Universe». Naturally, this feeling is evoked in sports that require great physical effort, such as wrestling, which pushes the athlete to his limits (Scott, 1971). Liponski (2016a) states that the existence of these games in religious festivals eventually acquired the character of offering human abilities and acquisitions that are symbolically formed in these games and treated as expressions of a common bond with God.

Not to mention that the idea of power in peasant societies was very important and had social implications, that seem unthinkable nowadays. By way of illustration, I mention a trial that took place during the days of Easter in Athikia of Corinthia. On Easter Monday, the villagers made an excursion to the highest mountain of the village. On the way, there was a ravine one part of which was 25 meters away from the other. In this ravine, the villagers were throwing a stone and the aim was to pass the other side. In this trial they did not compete with each other, but to pass through the other side. This trial was quite serious in primitive societies, as success for unmarried men meant that they were fit to marry, while failure was frowned upon, as both the prospective bride and her parents watched and were judged as not being able to bear the marital burdens. For the married man, failure in this trial meant that his strength was failing him and that the time was drawing nearer to death (Tzanavaras, 1933). As can be easily understood, a show of strength and a possible victory in a wrestling game was something important in those days, since it had a positive impact on the social environment and was a guarantee of his and his family's future.

The above views are confirmed by the science of psychology. Jung (1968) had identified numerous archetypes that govern human existence, drawing from the fields of psychology and mythology. A dominant one is that of regeneration. The subject’s participation in the process of wrestling is a testimony that lies outside of him but continues to influence him afterwards. His testimony lies in the regeneration and germination of the land, achieved through the magical ritual of the fight. Moore (1991) took Jung’s archetype theory a step further and identified four dominant archetypes found in all men from the beginning of the world. These are of the King, the Warrior, the Magician and the Lover. The second in particular, without disregarding the other three, becomes particularly prominent during the fight. The pursuit of assertion over the opponent, the display of skill and courage, respect for

[12] According to Carl Jung (1968), archetypes are the independent entities that constitute a structural element of the collective unconscious, remain unchanging and are the axis around which the human soul rotates, carrying out its innumerable variations. They are fundamental forms upon which, essentially, the human soul is structured.

the opponents and an understanding of a purpose that transcends oneself are elements that are inherent in the human psyche and manifest themselves in a way that the social and cultural circumstances of the time allow.

After all, wrestling matches are a mimetic activity that is reminiscent of warfare, without the danger and violence involved, but they activate emotions that tend to fade in times of peace. Thus, on the one hand, they can be considered substitutes for war and, on the other hand, they can be considered ideal means of military training that enhance the participant's roughness and aggression (Elias, 1998). If, as Caillois (2001) observes, the sports that are popular at a particular period of time reveal evidence of the cultural priorities of a particular society, a preference for wrestling could not be more appropriate, since it testifies to a society preparing for war.

RELATIVES WITH BALKAN WRESTLING GAMES

This kind of wrestling is not unique in the Balkan region. They are also found in neighbouring countries, with greater or lesser variety. Particularly popular in Turkey, oil wrestling spread to several Balkan countries, such as Bulgaria, North Macedonia, Kosovo and Albania. The Kirkpinar[13] festival that has been held for more than 600 years in the Edirne region is particularly well known and the best wrestlers in the country participate. It is held in memory of 2 soldier-wrestlers, traditionally brothers, Ali and Selim, who died of exhaustion after a long fight[14][15] (Basanar, 2011; Bakhrevskiy, 2019). Turkey and its people enjoy wrestling matches and were protected by the Sultans. It is known that the Sultans funded wrestling lodges, the so called *tekkes*, which was the center of the Sufis, followers of mystic-ascetic teaching in Islam, highlighting the close relation between religion and martial arts (Bakhrevskiy, 2019). The first was founded in Bursa, soon after the conquest of the city in 1324, and during 14th -17th centuries spread all over the Ottoman Empire (Kaya, 2022; Turgut, 2023)[16]. These games were particularly popular throughout the Ottoman Empire. Thus, wrestlers were allowed to entertain the crowd at various events such as arrival of a foreign messenger, holidays, circumcisions, births, and marriages, not to mention the sultan's matches at various events in his court (Kaya, 2022, 3-4, Bakhrevskiy, 2019). Last but not least, it is worth noting that the rules and the etiquette were similar with the ones mentioned above for the Christians' population wrestling games, showing the close relation and the mix of traditions during the Ottoman occupation (Türkmen, 2017).

Wrestling matches are also organized in neighboring Bulgaria. These are free wrestling matches where there is no oil coating. It is still organized by the local authorities and takes place on religious festivals (Jaouen, Barrenada, 2022). In essence, it follows the type of wrestling brought over from the Asian steppes, starting with the Huns and ending with the Mongolian Tatars (Liponski, 2016b).

In North Macedonia, oil wrestling is called *Pelivansko borenje* and is particularly popular in the northwestern part of the country and in the Prizren region in Kosovo. The formality of wrestling is not different from what was mentioned above for the region of Didymoteicho, except that in northern Macedonia and Kosovo there is a central organizing body, unlike in Didymoteicho which is organised by local authorities, and that they are also held on national holidays (Jaouen, Petrov, 2018).

In Romania there are two types of wrestling, *Küreş* and *Trântă*. *Küreş* in Tatar means wrestling and is performed by the Tatars living in the Dobrogea region, near the Black Sea. It is one of the belt wrestling styles performed in Central and East Asia and it was carried over in the Balkan peninsula from the Mongol and Golden Horde invasions and the subsequent movements by the successors of the Khanates (1478-1783). *Küreş* is a style of standing belt wrestling, with a firm grip on the belt with both hands as follows: The right arm of each wrestler goes under the

[13] Kirkpinar means Forty Springs. It takes its name either because at the tomb of the 2 soldier-wrestlers appeared forty springs or because there were a party of forty warriors at this campaign. During First Balkan war Samona village, which was the original place of the games, entered the state borders of Greece. From 1914 to 1924, due to First World war and internal Ottoman issues the games were not held. From 1924 the festival has been happening in Edirne (Bakhrevskiy, 2019, 13).

[14] The original location of these games was the place where the original fight took place, according to the tradition of the Turks. This was in the now Greek village of Ammovouno or in Turkish Samona, which is not more than 50 km from Didymoteicho. After the change of borders in 1920, the games were transferred to Edirne.

[15] According to the Greek version, the games are held to commemorate the fight between a father and his janissary (persons who were forced to join Islam and the Ottoman army) son, who after a two-day battle both ended up dead from exhaustion (Kyrkoydis, 2002, 44-45).

[16] Some of which were in Istanbul, Mecca, Jeddah, Alexandria, Cairo, Algiers, Latakia, Damascus, Aleppo, Baghdad, Maraş, Amasya, Tokat, Edirne, Ankara, Kütahya, Tire, Bergama, Manisa, Akhisar, Yenice, Konya , Karaman, Bursa, Balıkesir, Diyarbakır, Urfa, Skopje, Gelibolu, Ipsala, Strumica, Belgrad, Dımetoka (Didymoteichon), Deliorman (near Razgrad) (Dever, 2019, 49-55, Begiç,2021, 435-440).

opponent's left arm (or vice versa), with the hands gripping the belt at the back. This hold must not be released during the match. If a wrestler breaks the hold intentionally, he gets a penalty and on three he is disqualified. There are no time limits and a wrestler wins the match by throwing his opponent with his back, with himself not touching the ground before his opponent's back does. A long cloth belt was created specifically for the purpose of wrestling and must be fastened tightly around the wrestler's waist in a specific manner controlled by the referees. Nowadays it is only done on religious festivals, while in the past it was also done at weddings (Jaouen, Petrov, 2018).
Trântă is a style of wrestling that is widespread in Romania and Moldova. It is an upright style of wrestling, without legwork and oil, and a match started with a mutual firm hold. The hold had to be held during the match and leg holds were not allowed. Victory was awarded when one of the wrestlers fell or was thrown by the opponent. By the early 1960s it was established as a national style of wrestling and specific written rules were issued, with the existence of six categories, time limits and point scoring (Jaouen, Petrov, 2018).

Rvanje u koštac is the traditional style of wrestling in Serbia and means wrestling with a mutual grip. In this style the wrestlers stay chest to chest. Each wrestler's right hand goes under his opponent's left hand (or vice versa). In this position both hands are joined at the back of the opponent, locking one wrist or fingers together. This is an upright fight, it requires a belt and the winner is the one who throws his opponent with his back (Jaouen, Petrov, 2018). Nowadays these games are organized by a central organizing authority (Jaouen, Barrenada, 2022). They occur both in customary events and in national events. The best known is that of the *Haijduk*[17], which continue to take place in Lenovac, Bogatic, Osecina, Vreosi and Kotor Varos (Bjeljac, 2021).

Liponski makes two distinctions about the wrestling matches that took place in the Balkans. First, he distinguishes between the Asian style of wrestling, which was widespread among the Slavic populations, and the Mediterranean style, which was mixed with the wrestling that took place in the depths of the Middle East[18]. He stresses that the Mediterranean style was fought primarily for the honor of victory and secondarily for the prize, while the Asian style was fought for the resolution of everyday or military issues. For example, claiming a bride or settling military operations. Secondly, it raises the issue of oil and dry fighting. Slavic populations did not use oil, as mentioned above, and this was considered to be an element of cultural differentiation from the Turks (Liponski, 2016b). They believed it was an element of their national identity and, in fact, the best Bulgarian wrestlers were pitted against Turks as a sign of their anti-Turkish feelings[19] (Petrov, 1983, 35). Similarly, of course, Greek wrestlers wanted to be pitted against Turks, although they had adopted a similar style of wrestling (Pachtikos, 1893).

CONCLUSIONS

As the above research has shown, there were wrestling matches in the area of Didymoteicho, the beginning of which goes back to the depths of the centuries. They were organized by the common population of Greek origin, with the purpose of euphoria of the land, paying homage to the saints and later on confirming the national and communal identity and recreationally supplementing other customs. They were originally held in the place of Kuskoulas and later in Chloe plains, organized by the ecclesiastical committee, which, together with other officials and veteran athletes, constituted the judicial committee and the judges. They awarded the prize to the winners, which was usually a lamb or a calf, showing the close relation between prizes and the values and necessities of the primitives, donated by the local inhabitants.

According to tradition, the festivities began in 1257, after the unsuccessful Bulgarian raid on the fortress. Even if the festivities began then, it is doubtful that there were any such events at the same time from that date. However, it should not be considered unlikely that they took place several centuries later, since it is known that the Turks had been holding such games since 1360 in the neighboring area of Kirkpinar, given the cultural syncretism of the two population groups. Be that as it may, the modern games are different, since their function and etiquette have changed. They have become a purely recreational element and a supplement to parallel activities, with the aim of attracting tourists and bringing in more money. The way of wrestling changed, borrowing elements from modern

[17] The *Haijduk* were armed forces of the former Yugoslavian territory that emerged during the period of Ottoman occupation. They were more armed bandits than freedom fighters, but they were heroized by the common people because they were the last refuge of Christians who suffered under the Ottoman yoke.
[18] The Mediterranean style is a mixture of wrestling that was formed during the period of Ottoman occupation. It combined the wrestling of the indigenous Greek populations with that of the Turkish conquerors, with influences from Persian wrestling (Jaouen, Petrov, 2018, 86).
[19] It is a fact that, since the beginning of the 20th century, people have been using sporting events to showcase their diversity, especially when they are a minority. A noteworthy case is the ethnic population group of the Gagauz of the Autonomous Republic of Gagauzia and Moldova, who hold Gures-style wrestling matches in an attempt to preserve their cultural heritage and support their unique national identity (Türkmen, 2020, 438-443).

wrestling clubs. The modern clothing, the different way of grips and the change of rules testify to this evolution. Moving the custom to a more convenient location for the spectator, coupled with more amenities that facilitate the extension of the time of the matches, is another point of differentiation from the original. If we also factor in the fact that spectators also transition to the custom as an opportunity to socialize, rather than being part of a tradition, we realize that modern traditional wrestling matches have a basis in the past, but differ from them in many ways. For example, the date and place of the event, the clothing, the wrestling style, prizes etc.

The primacy of wrestling in such events is taken for granted. This is for a number of reasons. As we have seen, the human psyche is such that it likes to push its limits. Thus, man, consciously or unconsciously, considers himself to be in contact with inner forces that allow him to know better himself, the physical environment in which he lives and the divine element, whatever it may be at different periods of time. Wrestling could not be a more appropriate sport, because of the physical and psychological strain during its duration, so much so that it is reminiscent of an act of war in peacetime. In the age of Christianity, since it was not possible to put an end to these games, the Church proceeded to adopt them as the supreme act of giving honor, human abilities and psychic powers in the name of the Almighty.

Wrestling was not the exclusive privilege of the Greek population. It was said that similar games took place throughout the Balkan region. They were usually held on religious festivals or social occasions, and in some countries, they were also happened on national holidays or to commemorate an event. In our case they are still organized by local authorities, while in some neighboring countries there is a central organizing body. The main difference with the types of wrestling organized by the Slavs is that they preferred dry wrestling, to such an extent that they considered it an element of cultural and national differentiation.

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ANALYSIS OF THE POLYÁK IMRE & VARGA JÁNOS MEMORIAL RANKING SERIES TOURNAMENT BUDAPEST 2025 – IMPLICATIONS FOR RULES

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CONTENT

INTRODUCTION

This analysis compares the application of new rules at the European Senior Championship (Bratislava, April 2025) and the IV Ranking Series Tournament (Budapest, July 2025). In both events, under GR style, if a match ended 1-1, the wrestler who scored first was declared the winner.

The International Rules of Wrestling for these two events remain unchanged. Judges awarded 1 point for the first and second passivity; after the third, only the active wrestler could choose to continue in parterre or standing position, with no additional points given.

For this analysis, three European Championships from 2022 to 2024 were reviewed, all using the rule that in a 1-1 tie, the wrestler who scored last wins:

2022 European Senior Championship - Budapest (HUN)

2023 European Senior Championship - Zagreb (HR)

2024 European Senior Championship - Bucharest (ROU)

Two additional competitions used a modified rule where, in a 1-1 tie, the wrestler who scored first prevails.

IV Ranking Series Tournament 2025 - Budapest (HUN)

European Senior Championship 2025 - Bratislava (SVK)

According to the data presented, the quality of wrestling was higher in the first minute of the fight, as winning a point in the first round became more significant than in the second. This represents the primary change observed compared to the previous period.

A conclusion based on the data was provided at the end of the analysis. The conclusion included a brief and concise evaluation of the experiment's outcomes.

ANALYSIS OF THE NUMBER OF POINTS PER MINUTE OF THE MATCH (WQ/min)

A key metric for assessing the quality of wrestling matches is the number of points scored per minute of the bout (WQ/min), as illustrated in Chart 1. At the 2025 European Championship, the average points per minute of combat (WQ/min) was 1.37, the lowest in the past three championships. In the 2025 Ranking Series, the average points per minute (WQ/min) exceed those of the 2025 ECH in Bratislava (1.51) and align with the averages from the 2022–2024 European Championships (Chart 1).

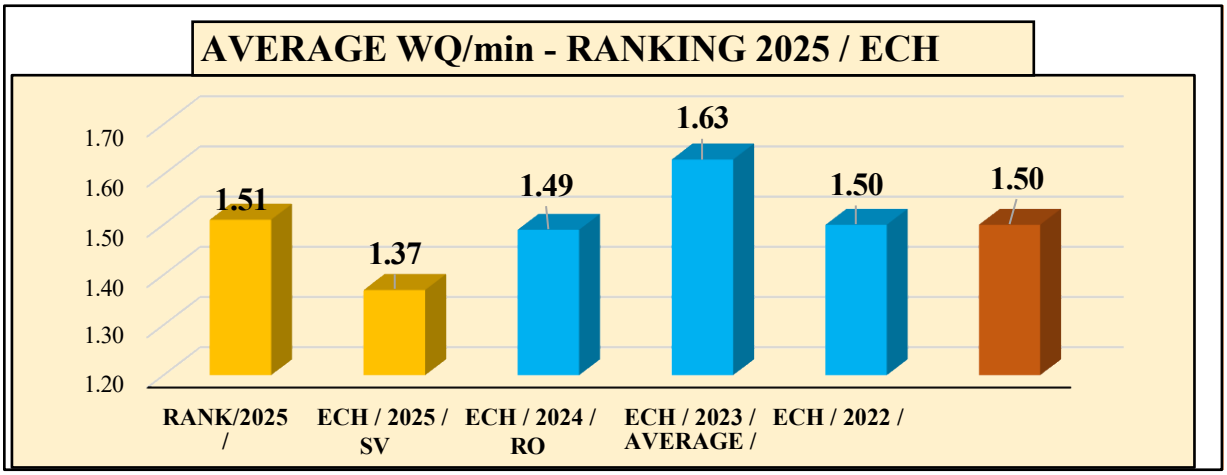

Chart 1. Wrestling quality (WQ - points per minute) – Comparison between European championship and ranking series

The higher average points per minute at the Ranking Series 2025 tournament can be attributed to the participation rules: while only one wrestler per country is permitted in the European Championship, up to three wrestlers from each country may compete in the Ranking Series. Analysis of participants at the tournament in Hungary shows that the average World Ranking position among medalists was 10.4. Only seven wrestlers ranked within the top three globally earned medals at the Ranking Series tournament, whereas the remaining 33 medals went to athletes ranked between 4th and 38th place. This data reflects the range of competitors who participated in Hungary. The variation in participant ranking contributed to a high number of matches, concluding by technical superiority, which influenced the increased points per minute observed during these bouts.

Table 1: 2025 Ranking Series (HUN) gold medalists and their current world rankings.

55 kg	60 kg	63 kg	67 kg	72 kg	77 kg	82 kg	87 kg	97 kg	130 kg	Average
2	5	30	6	7	12	18	3	8	13	10.4

The number of points WQ/min remains within the average range compared to the European Championships (2022-2024), primarily due to the quality of wrestlers and the allowance for three participants from the same country.

The modification of the rule regarding the first point did not have a significant impact on this aspect of the matches.

2. ANALYSIS OF POINTS WON IN THE FIRST MINUTE OF THE MATCH

Adjusting the rule so that, in the event of a 1-1 score, the wrestler who scored the first point wins was associated with specific outcomes in the two competitions analyzed in 2025, when considering only the first minute of each match.

According to Chart 2, 11.22% of all points were scored in the first minute at the European Championship 2025 (SVK), while 12.00% were scored during the same period at the Ranking Series 2025 (HUN). These figures

represent a higher percentage than those recorded at the previous three European Championships (2022-2024), when the rule stated that the wrestler winning the last point would win the match. This suggests that, during the first minute, wrestlers were actively attempting to score rather than delaying their efforts.

The implementation of this new rule altered both the underlying philosophy and tactical approach to wrestling matches, as it led all competitors to prioritize securing the initial point.

In numerous matches, both wrestlers often displayed equal performance during the initial minute, making it challenging for referees to determine which competitor should receive a passivity warning or penalty.

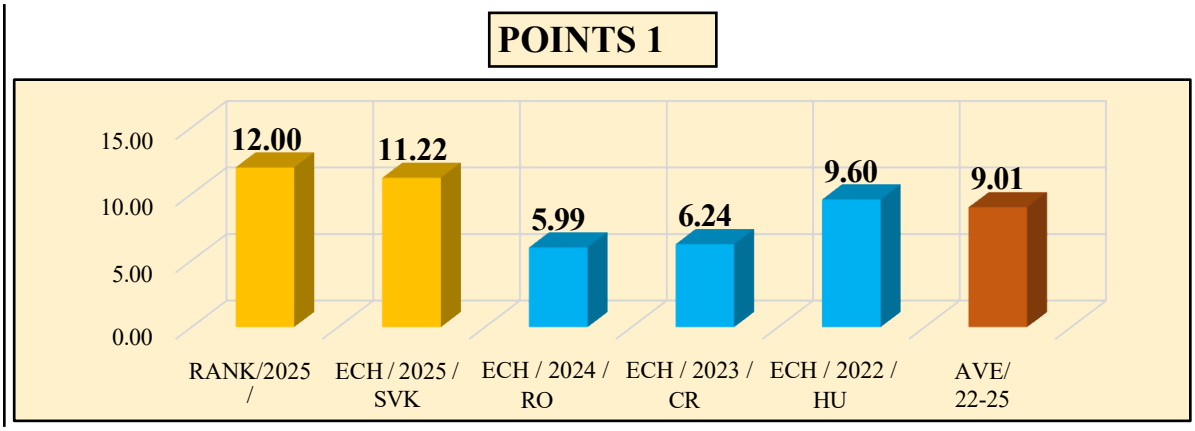

Chart 2. Percentage of achieved points in the first minutes: European competition compared with ranking series

Charts 3 and 4 present the percentage of points secured during the first minute of the match (blue) and the absolute number of points earned within the first minute of competition (green), categorized by weight class.

Chart 4 presents the analysis results of the Ranking Series tournament, indicating that a significant number of points were scored in the first minute of the match in two weight categories (67 kg - 42 points and 97 kg - 35 points). The high point totals in the first round can be attributed to differences in competition levels within these categories, which resulted in several matches ending due to technical superiority.

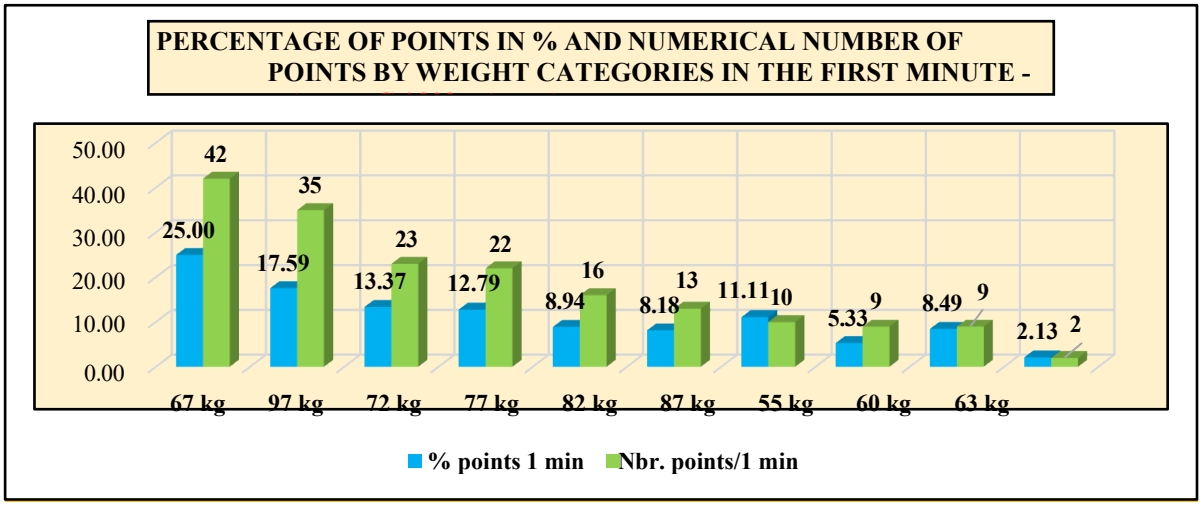

Chart 3. Percentage and points achieved in the first minute by weight categories at the ranking series tournament Polyak Imre & Varga Janos Memorial

Chart 4—ECH 2025 (SVK)—illustrates that, within the light and medium weight categories, a significantly higher percentage of points were earned during the first minute of competition compared to the heavier categories. Wrestlers in the 60 kg category achieved the highest proportion of points in the first minute (19.67%), while those in the 97 kg category recorded the lowest (2.89%).

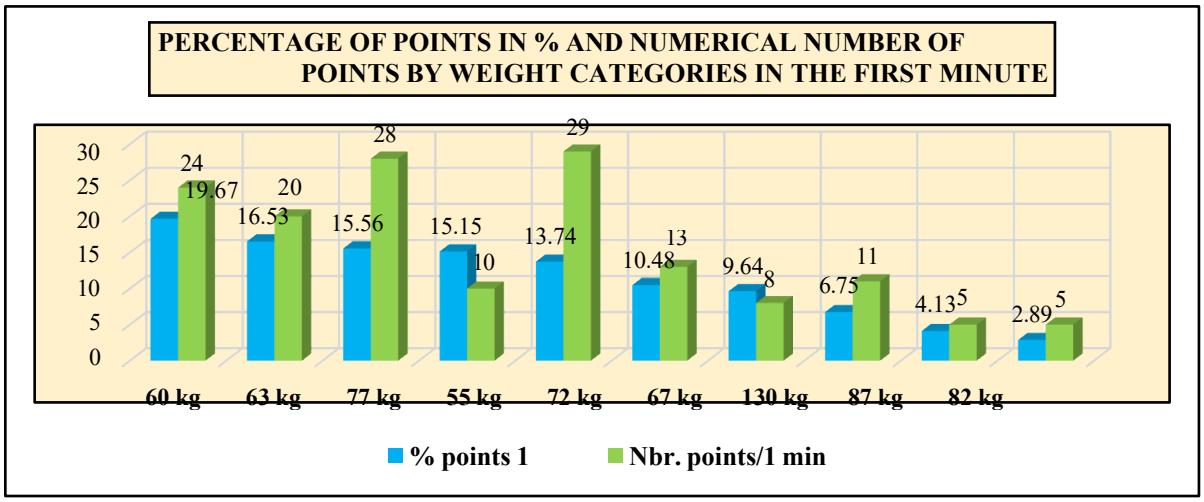

Chart 4. Percentage and points achieved in the first minute by weight categories at the European championship 2025

3. ANALYSIS OF THE NUMBER OF MATCHES WITH A RESULT OF 1-1.

At the Ranking Series 2025, 13 of 208 matches (6.25%) ended 1-1 (Chart 5). More matches that ended 1-1 were at ECH 2023 (7.11%) and ECH 2025 (6.60%). This means that there were no significant changes in this segment of wrestling matches.

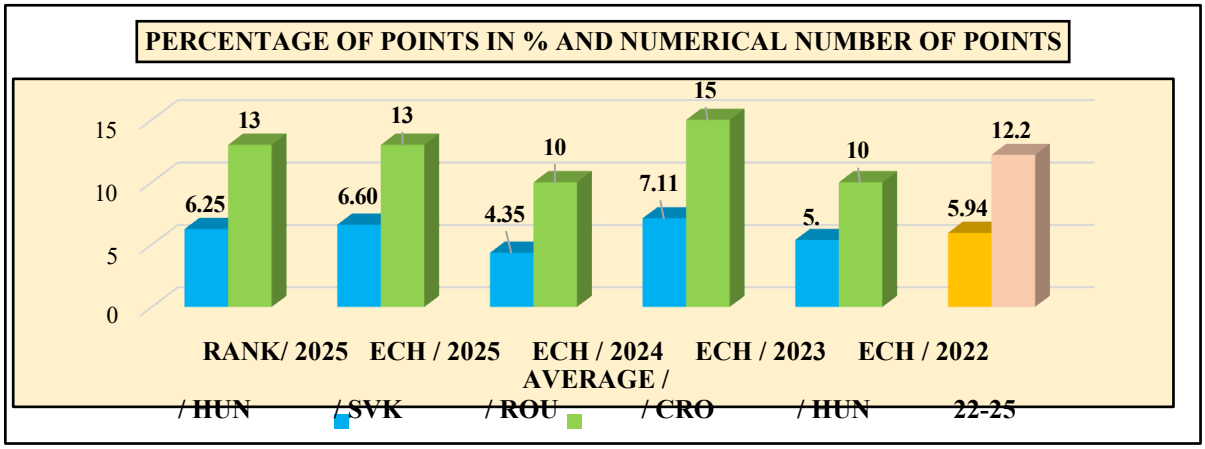

Chart 5. Percentage and points achieved in the first minute European championships compared with ranking series tournament Polyak Imre & Varga Janos Memorial

4. ANALYSIS OF THE NUMBER OF POINTS FOR PASSIVITY

An analysis of the percentage of points for passivity compared to the total number of points shows that at the most recent European Championship in 2025, this percentage was the highest (20.67%) among the past four European Championships. On average, across these four events, 19.63% of all points were awarded for passivity (see Chart 6).

At the IV Ranking Series Tournament, the percentage was 18.98%. This value is comparable to the average of the last four European championships (19.63), indicating consistency within this segment. The proportion of points awarded for passivity decreased by 0.65% compared to the three European championships held from 2022 to 2024 under previous rules.

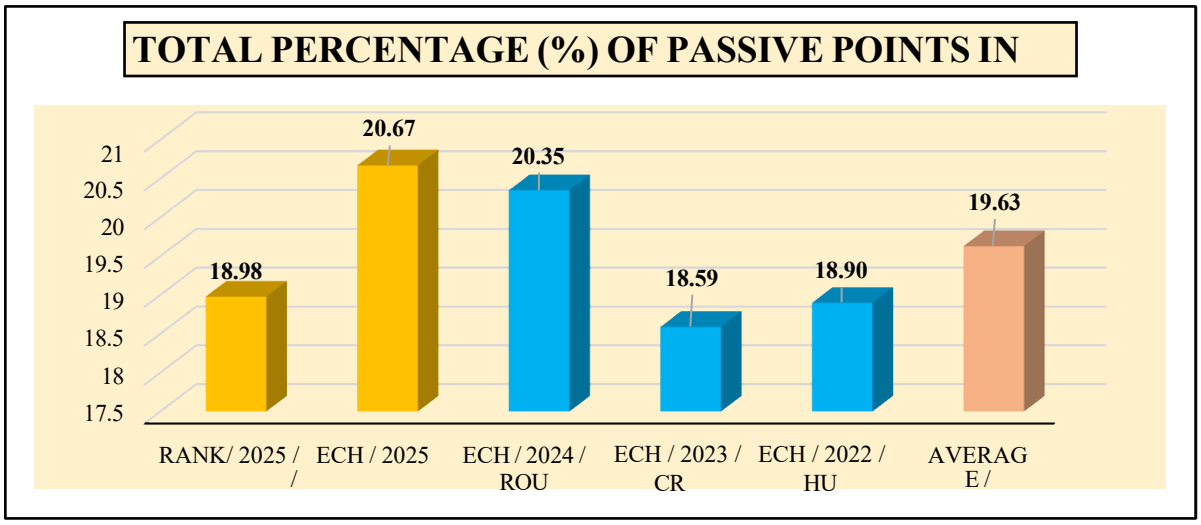

Chart 6. Percentage of the points achieved by passivity at the European championships compared to, Polyak Imre & Varga Janos Memorial

4.1. ANALYSIS OF THE FIRST POINT FOR PASSIVITY BY WEIGHT CATEGORIES

Tables 2 and 3 present data regarding the relationship between winning the first point and the outcome of the match. The analysis covers the last two competitions held in 2025 under the new rules (Tournament Ranking Series - HUN and Senior European Championship - SVK). According to the data, athletes who secure the first point tend to have an advantage for the remainder of the match. In many cases, this initial point is awarded by judges due to one wrestler's passivity.

Table 2 shows that, in the Ranking Series Tournament (HUN), wrestlers who received 1st point for passivity at the end of the match won 73.45% of cases. Four categories (67 kg, 77 kg, 55 kg, and 72 kg) had over 75% of matches won by wrestlers who scored the first point. In the 130 kg category, the lowest percentage was observed, with 60.00% of victories going to wrestlers who received the first passivity point.

Table 2. Review of the first point scored and match outcome by weight categories at the Polyak Imre & Varga Janos Memorial

Category	Total matches	Total points passivity	Total matches with passivity	Total matches without passivity	First passivity - win	First passivity - lose	Percentage (%) Total matches with Passivit & First passivity – win
55 kg	11	13	8	3	7	1	87.50
60 kg	20	27	18	2	13	5	72.22
63 kg	13	18	13	0	9	4	69.23
67 kg	22	30	19	3	17	2	89.47
72 kg	20	21	12	8	9	3	75.00
77 kg	25	37	22	3	17	5	77.27
82 kg	28	40	22	6	15	7	68.18
87 kg	26	40	26	0	18	8	69.23
97 kg	27	37	22	5	16	6	72.73
130 kg	16	25	15	1	9	6	60.00
TOTAL =	208	288	177	31	130	47	73.45

Table 3 shows that at the 2025 European Championship (SVK), wrestlers who gained 1 passivity point at the end of the match won in 79.88% of cases.

A total of eight weight classes recorded over 75% match victories by the competitor who secured the first passivity point. Notably, in the 60 kg division, every instance (11 in total) in which a passivity point was awarded resulted in that wrestler ultimately winning the match.

Table 3. Review of the first point scored and match outcome by weight categories at the European championship 2025

Category	Total matches	Total points passivity	Total matches with passivity	Total matches without passivity	First passivity – win	First passivity - lose	Percentage (%) Total matches with passivity & First passivity - win
55 kg	10	10	8	2	6	2	75.00
60 kg	15	15	11	4	11	0	100.00
63 kg	16	16	13	3	12	1	92.31
67 kg	19	19	17	2	13	4	76.47
72 kg	23	23	17	6	15	2	88.24
77 kg	26	26	22	4	17	5	77.27
82 kg	23	23	21	2	16	5	76.19
87 kg	24	24	22	2	16	6	72.73
97 kg	27	24	23	1	16	7	69.57
130 kg	17	17	15	2	13	2	86.67
TOTAL=	200	197	169	28	135	34	79.88

4.2. ANALYSIS OF PASSIVITY BY NATIONS

The Ranking Series 2025 (HUN) tournament recorded 288 passives: 177 in the first and 111 in the second round. Table 4 shows the number of assigned passives by nation.

Column 3 lists the number of wrestlers per nation.

Column 4 presents the total number of points earned by wrestlers, categorized by nation. Wrestlers competing under UWW received 52 passivity points, representing the highest total. Hungarian wrestlers followed with 34 points, and Azerbaijani wrestlers accumulated 33 passivity points.

Column 5 shows how many wrestlers by nation received points for passivity in the first round. Wrestlers who performed under UWW received by far the highest number (34 points), in second place are wrestlers from Hungary with 24 points, and in third place with Azerbaijan with 22 points.

Column 6 shows the assigned second passivity by nation in the second round.

Column 7 shows the average passivity score by nation. Looking at the nations, the best indicator is the Hungarian national team with 2.6 points for passivity per wrestler, UWW and Azerbaijan 2.4 (only national teams with 10 or more wrestlers are considered in this tournament, because it is the only realistic indicator. For example, Denmark has an average of 3 passivity per wrestler, but this national team performed with only one wrestler).

Column 8 shows the percentage (%) of points awarded for passivity in the first round. This is a significant indicator of the preparedness of certain national teams, because the wrestlers from those teams were aggressive and active from the very beginning of the match. For the nations that had 10 or more wrestlers, the best indicator is Georgia with 77.78%, in second place is Hungary with 70.59%, and in third place is Kazakhstan with 68%. These results are given separately for 10 representations in Table 4.

Table 4. Passivity points achieved by nation

Team ranking	NATION	Number. wrestlers	POINTS PASSIVITY	Point for first passivity	Point for second passivity	Average passivity per one wrestler	% first passivity
1	2	3	4	5	6	7	8
1	AZE	14	33	22	11	2.4	66.67
2	KAZ	20	25	17	8	1.3	68.00
3	UZB	15	22	13	9	1.5	59.09
4	HUN	13	34	24	10	2.6	70.59
5	GEO	11	18	14	4	1.6	77.78
6	MDA	7	7	4	3	1.0	57.14
7	IND	7	6	4	2	0.9	66.67
8	USA	14	13	7	6	0.9	53.85
9	ARM	3	8	5	3	2.7	62.50
10	SRB	10	14	7	7	1.4	50.00
11	DEN	1	3	3	0	3.0	100.00
12	KOR	13	10	5	5	0.8	50.00
13	NOR	4	8	4	4	2.0	50.00
14	FIN	3	7	2	5	2.3	28.57
15	AUT	1	3	2	1	3.0	66.67
16	ROU	2	2	2	0	1.0	100.00
17	TUR	9	8	5	3	0.9	62.50
18	BUL	2	5	1	4	2.5	20.00
19	CRO	10	7	1	6	0.7	14.29
20	ALG	1	1	0	1	1.0	0.00
21	BRA	3	0	0	0	0.0	0.00
22	EST	1	0	0	0	0.0	0.00
23	NED	1	1	1	0	1.0	100.00
24	SWE	1	1	0	1	1.0	0.00
25	UWW	22	52	34	18	2.4	65.38
		188	288	177	111		

Table 5 shows only data for nations that had 10 or more athletes at the tournament.

Table 5. Review of the nation who compete with more than 10 wrestlers at the at the Polyak Imre & Varga Janos Memorial

Sn	NATION	Number wrestlers	POINTS PASSIVITY	Point for first passivity	Point for second passivity	Average passivity per wrestler	% first passivity
1	GEO	11	18	14	4	1.6	77.78
2	HUN	13	34	24	10	2.6	70.59
3	KAZ	20	25	17	8	1.3	68.00
4	AZE	14	33	22	11	2.4	66.67
5	UWW	22	52	34	18	2.4	65.38
6	UZB	15	22	13	9	1.5	59.09
7	USA	14	13	7	6	0.9	53.85
8	SRB	10	14	7	7	1.4	50.00
9	KOR	13	10	5	5	0.8	50.00
10	CRO	10	7	1	6	0.7	14.29

CONCLUSION

The change in the rules, that in the case of a 1-1 result, the wrestler who wins the first point wins, brought certain changes, but not big ones. Nothing much has changed, except that the number of points per 1 minute of fight has increased in the last two analyzed competitions in 2025, compared to the previous competitions.

In the tournament Ranking series 2025 (HUN) and European championship 2025 (SVK), 12.00% and 11.22% of points were recorded in the first minute. When looking at the average from the last 3 European championships, it is 7.28% of points. It is progress, but still not that significant.

The most important indicator in match analysis is the number of points scored per minute of the match (WQ/min). Changing the rules in case of a 1-1 result did not change anything significantly. In the two competitions in 2025 that were held under the new rule, the average number of points per minute of fight (WQ/min) is 1.44. Average number of points per minute of combat in the last 3 analyzed European championships 2022-2024. is 1.54.

For what reason, there was a decrease in the average number of points per minute of the fight. This is due to the fact that after winning the first point, the wrestlers continued to concentrate on defending their advantage and did not run the risk of losing their points and advantage, if they had a 1-0 lead already after 80 seconds of the match. Wrestlers who had an advantage in the continuation of the fight made significant calculations, because they had a guaranteed victory if the match ended 1-1. Therefore, the change of rules did not contribute to increase the attractiveness of GR style wrestling, looking at this parameter, but the opposite.

Another important indicator of the quality of wrestling matches is the number of matches that ended 1-1. Changing the rules in case of a 1-1 result did not change anything significantly. In the two competitions in 2025 that were held under the new rule, the total number of matches that ended 1-1 was: 13 at the 2025 Ranking Series tournament and 13 at the 2025 European Championship, or an average of 6.25% and 6.60% of all matches. At the last 3 analyzed European championships in 2022-2024. on average there were 8.33 matches with a score of 1-1 or an average of 5.61 % of all matches. Therefore, the change of rules did not contribute to increase the attractiveness of GR style wrestling, looking at this parameter, but the opposite.

The biggest flaw in the current International Rules of Wrestling can best be seen when looking at the data on the number of points awarded by referees. Based on the data from Chart 7, it can be seen that at the European Championship (2025), this number of points given by judges for passivity has increased and it amounts to 20.67% of all points at the championship. In the Ranking Series tournament, this number of passive points was 18.98%. The average for the last 3 European championships (2022-2024) is 19.28 points for passivity. So this indicator at the Ranking Series tournament is above this average, and the best wrestlers of Europe and the world did not compete in the Ranking Series tournament, and 3 wrestlers from the same country were allowed to compete.

Table 2 shows that in 73.45% of cases (Ranking Series tournament), because the wrestler who received a point from the judges in the first round at the end of the match was most often the winner. In many matches in the first minute, it is very difficult for the judges to decide which wrestler is more active, because at the beginning of the match, physical and conditioning preparation is equal for both wrestlers. Due to the rules of wrestling, the referees are forced to decide to whom to award the first point. That first point is of great importance in the rest of the match. A wrestler who lost the first point has to take significant risks in the continuation of the match, and often the opponent punishes that big risk.

Table 5 provides an overview of the total number of passivities by wrestling nations, from which it can be concluded that the nations to which the judges awarded a higher number of points for passivity had better results at the end of the competition.

SPECIFIC PROPOSAL FOR THE UWW TECHNICAL COMMISSION:

Following the analysis conducted and the established facts concerning the testing of the rules, I present the following recommendation to the Technical Commission:

1. Cancel giving points for passivity (for the first, second, third and all other passivities);

2. To remain giving passivity with the option of continuing the fight in the parterre or standing position by the active wrestler

3. Leave the possibility that referees can award two passivity during one round, if the score is 0-0 during the match;

4. If the match ends 0-0 after 6 minutes, immediately after the end of the regular 6 minutes, there will be an extension in the floor position of a maximum of 30 seconds or until the first technical point is won (Activity time in GR style);

5. The wrestler with fewer passivity violations in the 6-minute regular match should choose to attack or defend in continuation.

6. Implement the rule of the continuation of the fight, so that the active wrestler can decide whether he wants to continue the fight in a standing position or a parterre position;

7. If the number of passivity is the same after 6 minutes of the match, the jury of judges (president of the mat, judge on the mat and score judge) make a decision which wrestler showed more activity (more number of attempts to throw a hold, keeping the head up, moving forward ...). Based on these additional criteria, the jury decides which wrestler chooses the position to continue the match;

8. If the active wrestler chose to defend on the parterre and successfully defends the opponent's attacks for 30 seconds, that wrestler is declared the winner. If the wrestler decided to attack, winning the first point ends the fight and he is declared the winner. If he does not score a point in 30 seconds, in that case he loses one point, which is awarded to the opponent for a successful defense in the parterre position;

9. In this way, a similar rule would be adopted as in FS "Activity time" and the wrestlers themselves would be the ones who decide the winner in all matches, without the judges doing it instead of the wrestlers.

10. If at the end of the match the score is 1-1; 2-2; 3-3; 4-4..., the first criterion should remain the higher value of the action by 2, 3, 4 or 5 points, the second criterion the lower number of warnings and as the third criterion the wrestler who scored the first point wins.

By adopting the proposed rule, it would not be possible for the judges to make decisions on such a large number of points (20% of points) based on their own assessments. No other Olympic sport has such a rule that the judges directly make decisions on the awarding (giving) of points through their decisions.

PRELIMINARY INVESTIGATION INTO THE BIOMECHANICS AND EMG ANALYSIS OF A SETUP IN WRESTLING

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ABSTRACT

This preliminary study explored methods for evaluating the setup techniques for wrestling, which are critical for successful leg attacks. Two male collegiate wrestlers, who had placed in the top ranks at national-level student competitions, participated in simulated trials in which setup motions were executed and evaluated using both biomechanical and subjective measures. Three-dimensional motion capture and surface electromyography (EMG) were employed to assess the kinematic and muscular responses, while the visual analog scale (VAS) was used by three assessors—the attacker, defender, and a coach with competitive and coaching experience (the first author of this study)—to rate the quality of each setup. Moderate inter-rater agreement was observed in one the trials of one participant (Kendall's W = 0.411, p = 0.016), whereas the other trial showed low agreement. Correlation analysis revealed that the kinematic features most strongly associated with the VAS scores varied among the assessors, suggesting differing evaluation criteria. EMG data showed consistent activation patterns, although quantitative comparisons were limited by the absence of a standardized reference point. These findings highlight the challenges of using subjective assessments alone to evaluate setup quality and suggest the need for objective kinematic indicators, such as vertical head acceleration, to standardize feedback and improve training. This study represents an early step toward developing reliable tools for analyzing and teaching setup movements during wrestling.

Keywords: wrestling, setup, electromyogram, kinematics, subjective evaluation, motion analysis.

INTRODUCTION

Wrestlers who achieve high performance often earn points through leg attacks (González, 2011; Tünnemann, 2016; Tünnemann & Curby, 2016). The ability to execute successful leg attacks in freestyle wrestling is a primary factor determining match outcomes. Disrupting the balance of the opponent and anticipating their movements are crucial for effectively executing a leg attack against a skilled opponent; English-speaking wrestlers usually refer to this as a "setup." We previously found that the setup before a leg attack improved the success rate of the leg attack and increased the number of points awarded to the attacker during freestyle wrestling in men (Ito et al., 2019). Thus, an effective setup improves the leg attack success rate.

Biomechanical analyses, including motion analysis and electromyography (EMG), are fundamental for understanding complex sports movements. Previous studies have investigated the biomechanics of takedowns (Yamashita et al., 2020) and throwing techniques (Stordopoulos et al., 2016). However, the mechanisms underlying the setup movements in wrestling remain unexplored. Understanding these mechanisms is important for both coaches and athletes, as they play a crucial role in the successful execution of attacks.

The visual analog scale (VAS), a subjective assessment tool, is commonly used to assess physical performance and technical execution in sports (Aderinola et al., 2023). To evaluate the effectiveness of setup movements, clarifying the relationship between the kinematic characteristics of the setup and subjective assessments (VAS) is important.

This study served as a preliminary investigation to establish a method for evaluating setup movements in wrestling. Specifically, we aimed to 1) examine the interrater reliability of subjective evaluations (VAS) among different assessors, including attackers, defenders, and evaluators (coaches); 2) clarify the relationship between subjective assessments (VAS) and kinematic characteristics in wrestling setup movements; and 3) identify key considerations and challenges for future EMG analysis in this context. Through this study, we aimed to develop a systematic evaluation method for wrestling setup movements, contributing to the advancement of sports movement analysis.

We hypothesized that specific kinematic indicators, such as vertical head acceleration, would be positively associated with higher VAS scores for setup effectiveness.

METHODS

Participants

We enrolled two male wrestlers (A: 20 years, 168 cm; B: 20 years, 171 cm) who had wrestled for >12 years and had placed among the top eight at national competitions. This study was conducted in accordance with the principles of the Declaration of Helsinki, and written informed consent was obtained from both participants before the experiment.

Experimental Procedure

Participant A performed the setup movement, while Participant B acted as the defender. The participants began the setup from a stance at the preferred distance of the attacker. To ensure consistency in the starting position for each trial, a tape was placed at the toes of both participants to mark their positions.

Participant A executed a simple setup technique commonly used in wrestling, in which the opponent was pushed and then destabilized when the opponent pushed back. This technique was repeated 10 times**.** A representative trial of the setup movement is shown in Supplementary Video 1.

Participant A was instructed to "perform the setup to destabilize the opponent as quickly and as significantly as possible." The defender was instructed to "respond as you would in a real match until destabilized and not to intentionally relax."

After Participant A completed all 10 trials as the attacker, the roles were reversed: Participant B then performed the setup movement, while Participant A acted as the defender. The same procedures and instructions were applied to ensure consistency between both participants' trials.

Data Acquisition

EMG

The EMG of the right biceps brachii (BB), triceps brachii long head (TBlo), triceps brachii lateral head (TBla), flexor carpi radialis (FCR), and extensor carpi radialis (ECR) were recorded using wireless EMG sensors (Trigno Wireless Sensor, Delsys Inc., Natick, MA.). The sampling rate was 1000 Hz, and the EMG signals were bandpass filtered (20–450 Hz) using a hardware-installed sensor filter. Furthermore, the sensors were securely affixed with surgical tape and subsequently covered with wrapping tape to minimize motion artifacts resulting from inter-participant contact. EMG data were collected simultaneously with motion data using the VICON system software (Nexus; Vicon Motion System Ltd., Oxford, UK).

Motion

Prior to the trials, reflective markers were attached to the participants according to their assigned roles: 11 markers for the attackers (on both shoulders, the medial and lateral sides of the elbow and wrist of the push arm [i.e., the arm used to push the opponent during the trial], the hand of the push arm, and the heel and toe of both feet) and nine markers for the defenders (on the head, both shoulders, both great trochanters [i.e., hips], and the heels and toes of both feet). Three-dimensional coordinates of the markers were recorded using a 12-camera optoelectronic motion-capture system at 250 Hz (VANTAGE; Vicon Motion System Ltd., Oxford, UK). The x, y, and z axes of the global coordinate system were defined in the medial–lateral, anterior–posterior, and superior–inferior directions, respectively. The position coordinates of the markers were smoothed using a fourth-order Butterworth low-pass digital filter with a cutoff frequency of 15 Hz. The cut-off frequency was determined by visual inspection of the raw data with reference to a previous study (Yamashita et al., 2020).

VAS

To assess the subjective evaluation of the setup motion, the attacker, defender, and evaluator (coach) each recorded VAS scores after each trial. The evaluator was the first author of this study. He has experience as an international medalist in wrestling and has been coaching wrestlers for 5 years.

Data Analysis

EMG data were collected for the exploratory observation of upper limb muscle activation during setup execution. All EMG and kinematic data were processed using MATLAB software (2024a; MathWorks Inc., Natick, MA, USA). The rectified EMG data were smoothed using a fourth-order Butterworth low-pass digital filter with a cutoff frequency of 20 Hz. Kinematic variables, including displacements, velocities, and accelerations of the markers, were subsequently calculated. The kinematic data of the head, shoulders, and hips were used for further analyses in this study.

Statistical Analysis

Since some VAS data were not normally distributed, Kendall's W test was used to assess the agreement between the VAS ratings of the attacker, defender, and coach. The relationship between the VAS scores and kinematic characteristics was examined using Spearman's rank correlation analysis. Given the preliminary nature of this study and the limited number of trials, greater emphasis was placed on correlation coefficients than on p-values. All analyses were conducted using SPSS statistical software (ver. 28, IBM Corp., Armonk, NY, USA).

Surface EMG data were analyzed qualitatively through visual inspection of the time-series waveforms. Because of the exploratory nature of the study and the difficulty in determining a consistent temporal reference point across trials, no statistical tests were applied to the EMG data. The order and switching of the muscle activation patterns were observed descriptively.

RESULTS & DISCUSSION

Inter-Rater Reliability of Subjective Evaluations Using VAS

Table 1 presents the VAS scores assigned by each evaluator (attacker, defender, and coach). Table 2 summarizes the mean and standard deviation of these scores for each participant. The level of agreement among the three assessors was examined using Kendall's coefficient of concordance (W). For the trials performed by Participant A, a moderate level of agreement was observed (Kendall's $W=0.411$, $\chi^2=8.211$, $p=0.016$). In contrast, the trials performed by Participant B showed a lower level of agreement, which did not reach statistical significance (Kendall's $W=0.271$, $\chi^2=5.421$, $p=0.067$). Therefore, VAS ratings were not fully consistent among evaluators; the level of agreement may depend on the attacker and possibly on the nature of each individual trial.

Table 1 VAS Scores by assessors

Participant	Trial Number	Attacker	Defender	Evaluator
A	1	6.9	8.1	5.9
A	2	8.2	7.2	8.5
A	3	8.6	8.0	9.2
A	4	7.5	8.1	8.5
A	5	7.2	6.4	9.1
A	6	7.5	6.7	9.5
A	7	7.9	8.3	8.8
A	8	7.5	8.1	8.1
A	9	7.1	9.4	9.4
A	10	7.2	9.0	9.7
B	1	4.6	7.1	7.2
B	2	5.2	7.9	6.3
B	3	7.2	9.2	8.7
B	4	7.5	9.0	7.1
B	5	8.8	9.5	9.2
B	6	8.5	9.2	8.8
B	7	8.3	8.7	8.0
B	8	7.4	7.7	7.4
B	9	8.6	8.5	9.5
B	10	10.0	9.8	9.8

Table 2 Mean ± Standard Deviation of VAS Scores for Each Evaluator

Participant	Attacker	Defender	Evaluator
A	7.56±0.50	7.93±0.89	8.67±1.04
B	7.61±1.56	8.66±0.82	8.20±1.11

These findings highlight inconsistencies in the subjective evaluation of setup movements in wrestling. The moderate agreement in the trials of Participant A and low agreement in the trials of Participant B suggest that the consistency of the setup movements and their clarity may have influenced the judgments of evaluators. Notably, the evaluators may have held different internal definitions of what constituted a good setup, contributing to variability in their assessments. Such issues of inter-rater reliability in subjective movement evaluation have previously been noted (Lindblom et al., 2021), indicating the need for more objective evaluation criteria.

Relationship Between Subjective Evaluations and Kinematic Characteristics

Figure 1 illustrates the raw kinematic time-series data for the displacement, velocity, and acceleration in both the anteroposterior (y) and vertical (z) directions, measured at the head, shoulder, and hip of the defender. These data reveal repeated backward displacements (negative y-direction) as the attacker applies pressure during the setup motion. Notably, a single pronounced downward acceleration (negative z-direction) was observed corresponding to the moment when the attacker dropped the posture of the opponent. This temporal pattern suggests a strategy in which the attacker induced a backward movement in the defender and then exploited the forward reaction of the opponent to apply a destabilizing downward force. The observed motion profile reflects the biomechanical signature of an effective setup. Figure 2 presents representative scatter plots illustrating the strongest correlations for each assessor. In the trials of Participant A, the kinematic variable with the highest correlation differed across evaluators: head ay minimum for the attacker, shoulder vz minimum for the defender, and shoulder az maximum for the evaluator. This variation suggests that each evaluator focused on different aspects of the movement, possibly reflecting differences in the physical experience, visual perception, or role-related emphasis during the setup. By contrast, the trials of Participant A showed greater consistency across the evaluators, with all three showing the highest correlation with the shoulder ay minimum. This may indicate that the setup movements of Participant B had clearer or more salient features that were commonly recognized regardless of the role of assessor.

Figure 3 provides a comprehensive correlation matrix, visualizing the relationships between the VAS scores (from the attacker, defender, and evaluator) and all selected kinematic variables. Color coding helps identify the variables most strongly associated with subjective ratings. The matrix further reinforces the evaluator-dependent variability in what was perceived as an effective setup. Notably, the vertical and horizontal accelerations of the shoulder and head tended to correlate more strongly with the VAS scores, suggesting that rapid displacement or sudden downward motion may be key cues in perceived effectiveness.

This variation suggests that the attacker, defender, and coach may have attended to different sensory or visual cues, such as physical exertion, balance disturbance, or technique appearance, respectively. This variability aligns with previous research in sports contexts, such as running, where subjective ratings did not always correlate with biomechanical indicators (Lussiana et al., 2017). These findings underscore the fact that, although subjective evaluation provides immediate and practical feedback in training environments, the underlying perceptual cues vary across individuals and roles. Therefore, a need exists to define “good setups” based on more objective criteria. Future research should consider using quantifiable kinematic parameters, such as the downward acceleration of the head or changes in the center of mass acceleration, because proxies for effective setup movements. Developing shared evaluation frameworks that combine subjective insights and biomechanical evidence can enhance training and feedback strategies in wrestling.

Issues and Considerations in EMG-Based Evaluation

Figure 4 provides a synchronized representation of EMG activity and actual movement during a representative setup trial. Panel (a) displays the raw EMG waveforms recorded from five upper limb muscles: the long and lateral heads of the triceps brachii (TBlo, TBla), biceps brachii (BB), flexor carpi radialis (FCR), and extensor carpi radialis (ECR). The waveform showed a consistent sequence beginning with the triceps, followed by activation of the biceps and then the forearm muscles. Panel (b) presents still images captured every 0.4 seconds from the same trial, visually confirming how muscular activation patterns correspond to specific phases of unbalanced motion. Given the limited sample size and absence of a clearly defined temporal anchor, the EMG data were treated as supportive visual evidence rather than as a basis for statistical analysis. The time-series data showed a relatively consistent activation order, beginning with the triceps, followed by the biceps, and progressing to the wrist flexor and extensor muscles. To better illustrate the timing of muscle activation during the setup, a synchronized video of the trial and the EMG waveforms is available in Supplementary Video 2. Notably, a switching pattern between the triceps and biceps was observed, suggesting alternating muscle activity during the execution of the setup motion.

Although these temporal activation patterns were visually apparent, no statistical analysis was performed because of the small sample size and preliminary nature of the study. One of the major challenges encountered was defining a clear reference point for comparing muscle activation across trials. Ideally, identifying “good” versus “poor” setups would require normalization of EMG activity relative to a consistent biomechanical event.

This issue has also been highlighted in EMG-specific guidelines for sports science, in which time alignment and task-based normalization are considered critical for reliability (De Luca, 1997). Future studies should address this limitation by establishing objective reference points for time alignment. Kinematic indicators, such as the minimum vertical acceleration of the head (head_az_min), may serve as viable temporal landmarks for aligning and comparing muscle activity across trials (Figure 5). Regardless of the subjective ratings, a distinct and temporally sharp head_az_min was consistently observed in all trials, suggesting that this marker was both reliable and robust. Although the magnitude of the acceleration and movement patterns preceding the head_az_min varied across trials, the point was clearly identifiable in every case. Therefore, head_az_min not only reflects a key moment of postural disruption during the setup but also offers a consistent biomechanical event that can be used as a reference for EMG synchronization and cross-trial comparison. Clarifying this aspect is essential for advancing EMG-based evaluations of setup movements in wrestling, because it enables a more precise time alignment and interpretation of neuromuscular activation patterns.

Figure 1

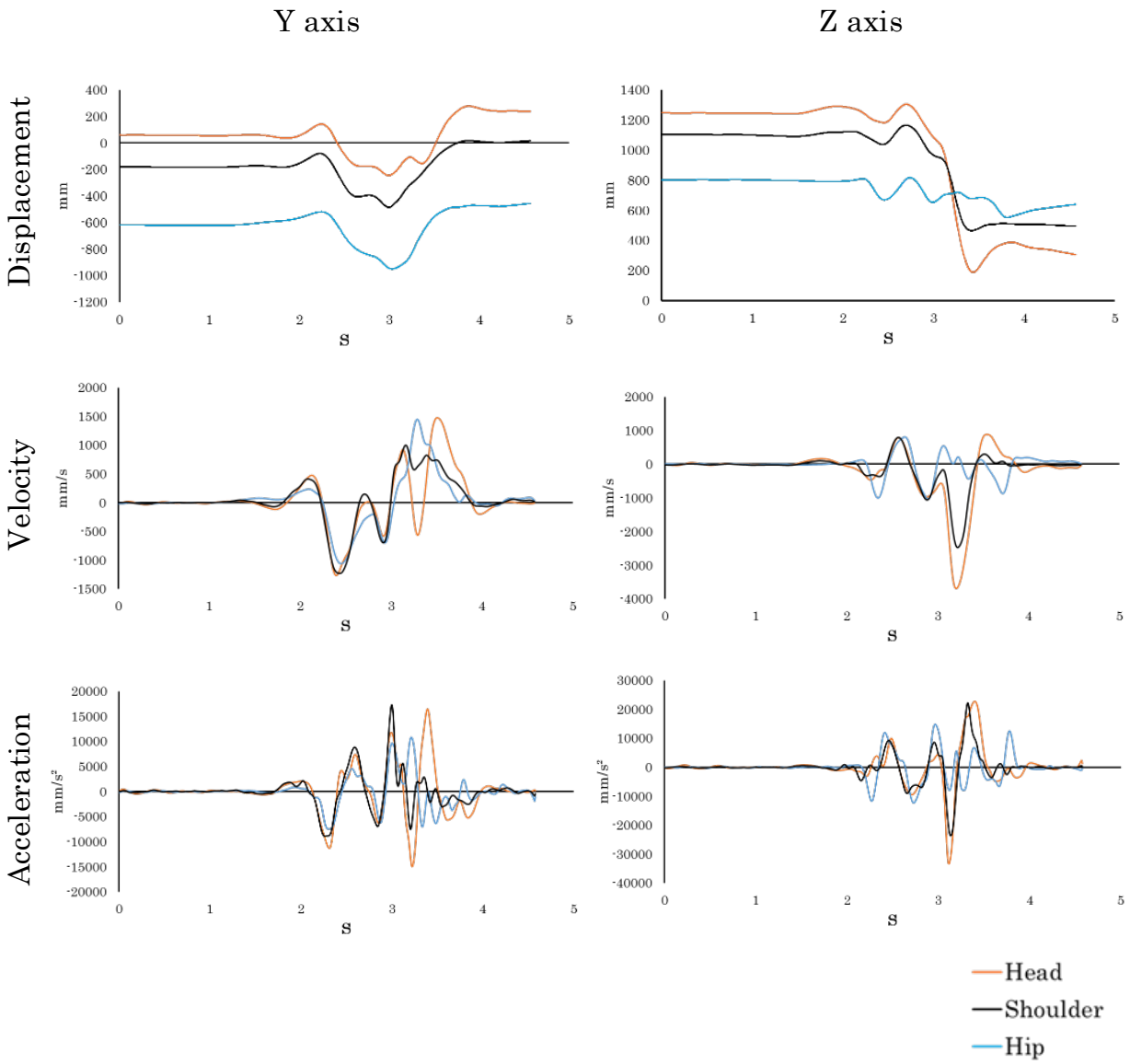

Figure 1. Kinematic Profiles of a Representative Trial

Kinematic data from a representative trial showing displacement, velocity, and acceleration in the y and z directions for the head, shoulder, and hip segments. These data illustrate the movement patterns of the defender in response to the setup motion performed by the attacker.

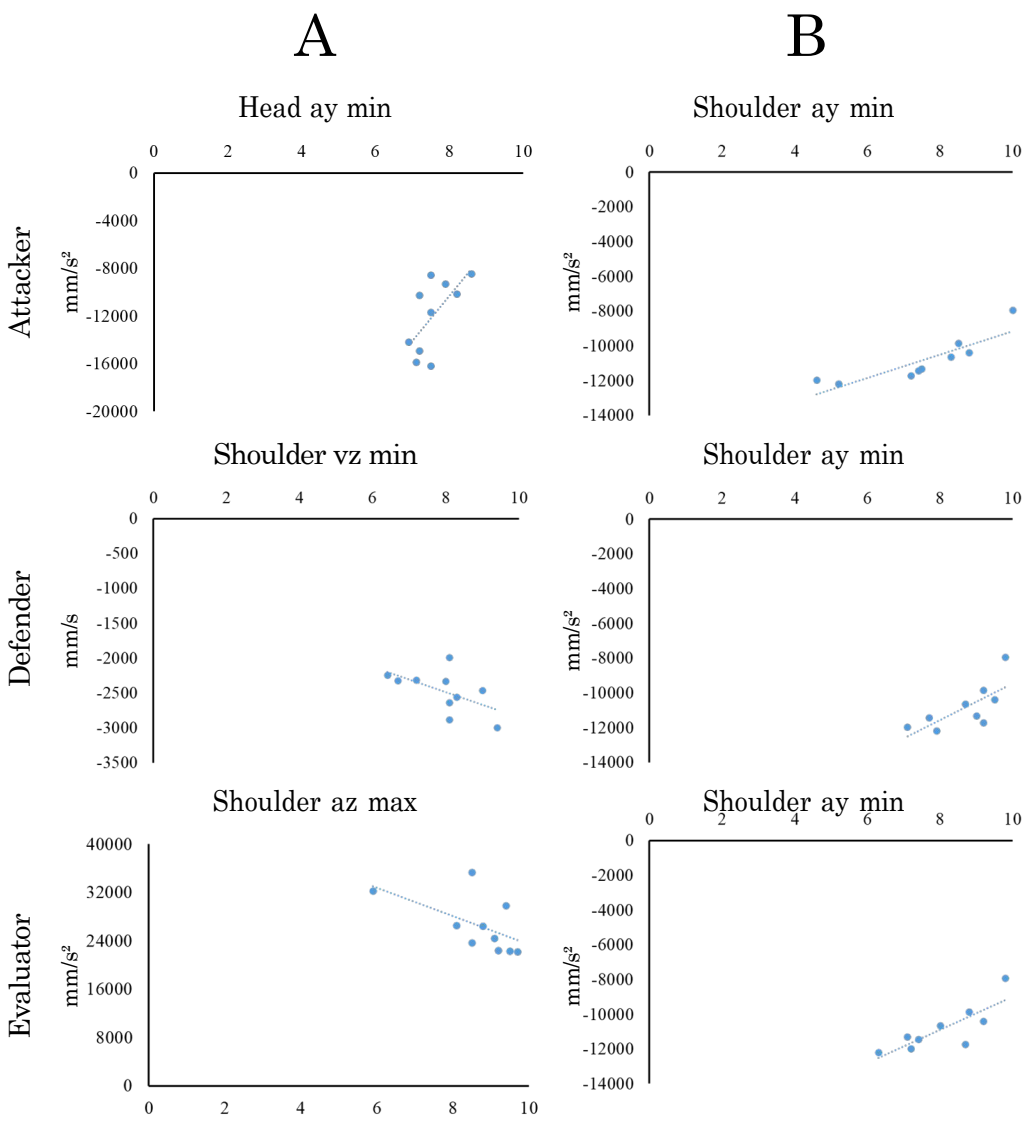

Figure 2. Scatter Plots of VAS Scores and Kinematic Variables

Scatter plots showing the relationship between the VAS scores and the kinematic variable with the highest correlation for each evaluator (attacker, defender, and evaluator). The left and right panels display the data for Participants A and B, respectively.

A

		Head_vy max	Head_vy min	Head_vz max	Head_vz min	Head_ay max	Head_ay min	Head_az max	Head_az min	Hip_vy_ max	Hip_vy_ min	Hip_vz_ max	Hip_vz_ min	Hip_ay_ max	Hip_ay_ min	Hip_az_ max	Hip_az_ min	SHO_vy max	SHO_vy min	SHO_vz max	SHO_vz min	SHO_ay max	SHO_ay min	SHO_az max	SHO_az min
Attacker	R^2	0.061	0.249	0.067	0.146	0.202	0.442	0.160	0.394	0.127	0.230	0.099	0.136	0.049	0.230	0.022	0.022	0.011	0.321	0.003	0.180	0.028	0.080	0.123	0.005
	r	-0.246	0.499	-0.258	0.382	-0.449	0.665	-0.400	-0.628	0.357	0.480	-0.314	0.369	-0.222	-0.480	-0.148	0.148	-0.105	0.566	-0.055	0.425	-0.166	0.283	-0.351	0.068
	Two-Tailed p-value	0.493	0.142	0.471	0.277	0.193	0.036	0.252	0.052	0.311	0.160	0.377	0.294	0.538	0.160	0.684	0.684	0.774	0.088	0.879	0.221	0.646	0.428	0.320	0.853
Defender	R^2	0.027	0.024	0.131	0.340	0.312	0.326	0.083	0.011	0.041	0.149	0.032	0.006	0.003	0.014	0.369	0.149	0.006	0.083	0.090	0.448	0.098	0.002	0.083	0.326
	r	0.166	-0.153	0.362	-0.583	0.558	-0.571	0.288	0.104	0.202	-0.387	0.178	0.080	-0.055	-0.117	0.607	-0.387	0.080	-0.288	0.301	-0.669	0.313	-0.043	0.288	-0.571
	Two-Tailed p-value	0.647	0.672	0.304	0.077	0.093	0.085	0.419	0.774	0.575	0.270	0.623	0.827	0.880	0.748	0.063	0.270	0.827	0.419	0.399	0.034	0.379	0.906	0.419	0.085
Evaluator	R^2	0.075	0.129	0.000	0.033	0.089	0.023	0.399	0.112	0.000	0.124	0.009	0.048	0.048	0.108	0.293	0.334	0.023	0.142	0.237	0.004	0.002	0.480	0.489	0.142
	r	0.274	0.359	-0.012	-0.182	0.298	0.152	-0.632	-0.334	0.000	0.353	-0.097	-0.219	0.219	0.328	0.541	0.578	-0.152	0.377	0.486	0.067	-0.049	0.693	-0.699	-0.377
	Two-Tailed p-value	0.444	0.309	0.973	0.614	0.403	0.675	0.050	0.345	1.000	0.318	0.789	0.544	0.544	0.354	0.106	0.080	0.675	0.283	0.154	0.854	0.894	0.026	0.024	0.283

B

		Head_vy max	Head_vy min	Head_vz max	Head_vz min	Head_ay max	Head_ay min	Head_az max	Head_az min	Hip_vy_ max	Hip_vy_ min	Hip_vz_ max	Hip_vz_ min	Hip_ay_ max	Hip_ay_ min	Hip_az_ max	Hip_az_ min	SHO_vy max	SHO_vy min	SHO_vz max	SHO_vz min	SHO_ay max	SHO_ay min	SHO_az max	SHO_az min
Attacker	R^2	0.3803	0.4665	0.3211	0.1003	0.5373	0.4665	0.2500	0.0803	0.4449	0.0336	0.3025	0.0711	0.4011	0.4011	0.5141	0.3211	0.0178	0.5141	0.2336	0.1003	0.0625	0.9351	0.0003	0.4225
	r	-0.617	0.683	0.567	0.317	-0.733	0.683	0.500	0.283	0.667	0.183	0.550	-0.267	0.633	-0.633	0.717	-0.567	-0.133	0.717	0.483	0.317	0.250	0.967	-0.017	-0.650
	Two-Tailed p-value	0.077	0.042	0.112	0.406	0.025	0.042	0.170	0.460	0.050	0.637	0.125	0.488	0.067	0.067	0.030	0.112	0.732	0.030	0.187	0.406	0.516	0.000	0.966	0.058
Defender	R^2	0.0511	0.2042	0.2118	0.0339	0.2692	0.1065	0.4706	0.0763	0.5300	0.0006	0.0034	0.3835	0.1681	0.4261	0.4476	0.2042	0.0025	0.2275	0.0202	0.0025	0.0908	0.5806	0.0045	0.2118
	r	-0.226	0.452	0.460	0.184	-0.519	0.326	0.686	0.276	0.728	0.025	0.059	-0.619	0.410	-0.653	0.669	-0.452	0.050	0.477	0.142	0.050	0.301	0.762	-0.067	-0.460
	Two-Tailed p-value	0.559	0.222	0.213	0.635	0.152	0.391	0.041	0.472	0.026	0.949	0.881	0.075	0.273	0.057	0.049	0.222	0.898	0.194	0.715	0.898	0.431	0.017	0.864	0.213
Evaluator	R^2	0.2025	0.2025	0.1736	0.0900	0.2178	0.1344	0.2025	0.0711	0.1600	0.0900	0.0278	0.1344	0.2500	0.5141	0.0900	0.0711	0.0225	0.2844	0.0544	0.0069	0.2844	0.6675	0.0178	0.3600
	r	-0.450	0.450	0.417	0.300	-0.467	0.367	0.450	0.267	0.400	0.300	0.167	-0.367	0.500	-0.717	0.300	-0.267	-0.150	0.533	0.233	0.083	0.533	0.817	0.133	-0.600
	Two-Tailed p-value	0.224	0.224	0.265	0.433	0.205	0.332	0.224	0.488	0.286	0.433	0.668	0.332	0.170	0.030	0.433	0.488	0.700	0.139	0.546	0.831	0.139	0.007	0.732	0.088

Statistical Significanc	Effect size
p < .05	Large
p >= .05	Large
p >= .05	Midium

Figure 3. Color-Coded Correlation Matrix Between VAS Scores and Kinematic Variables

Matrix of Spearman's rank correlation coefficients between VAS scores (attacker, defender, and evaluator) and selected kinematic variables. Color coding was used to visually represent the strength and direction of correlations, helping to identify the movement features most closely associated with subjective assessment

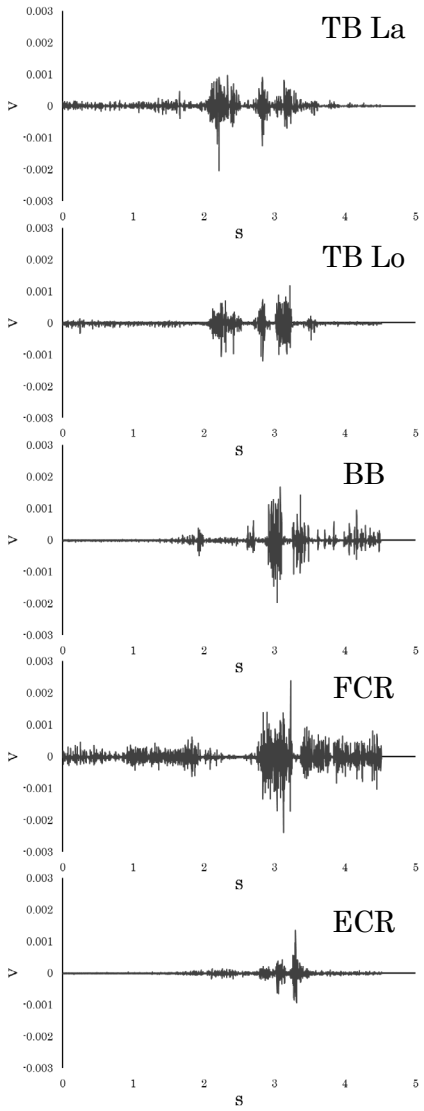

Figure 4a Muscle Activity and Movement Snapshots During a Setup Trial

(a) Time-series EMG waveforms for the long and lateral heads of the triceps brachii (TBlo, TBla), biceps brachii (BB), flexor carpi radialis (FCR), and extensor carpi radialis (ECR) recorded during a single setup trial. The data show a clear switching pattern from triceps to biceps activity.

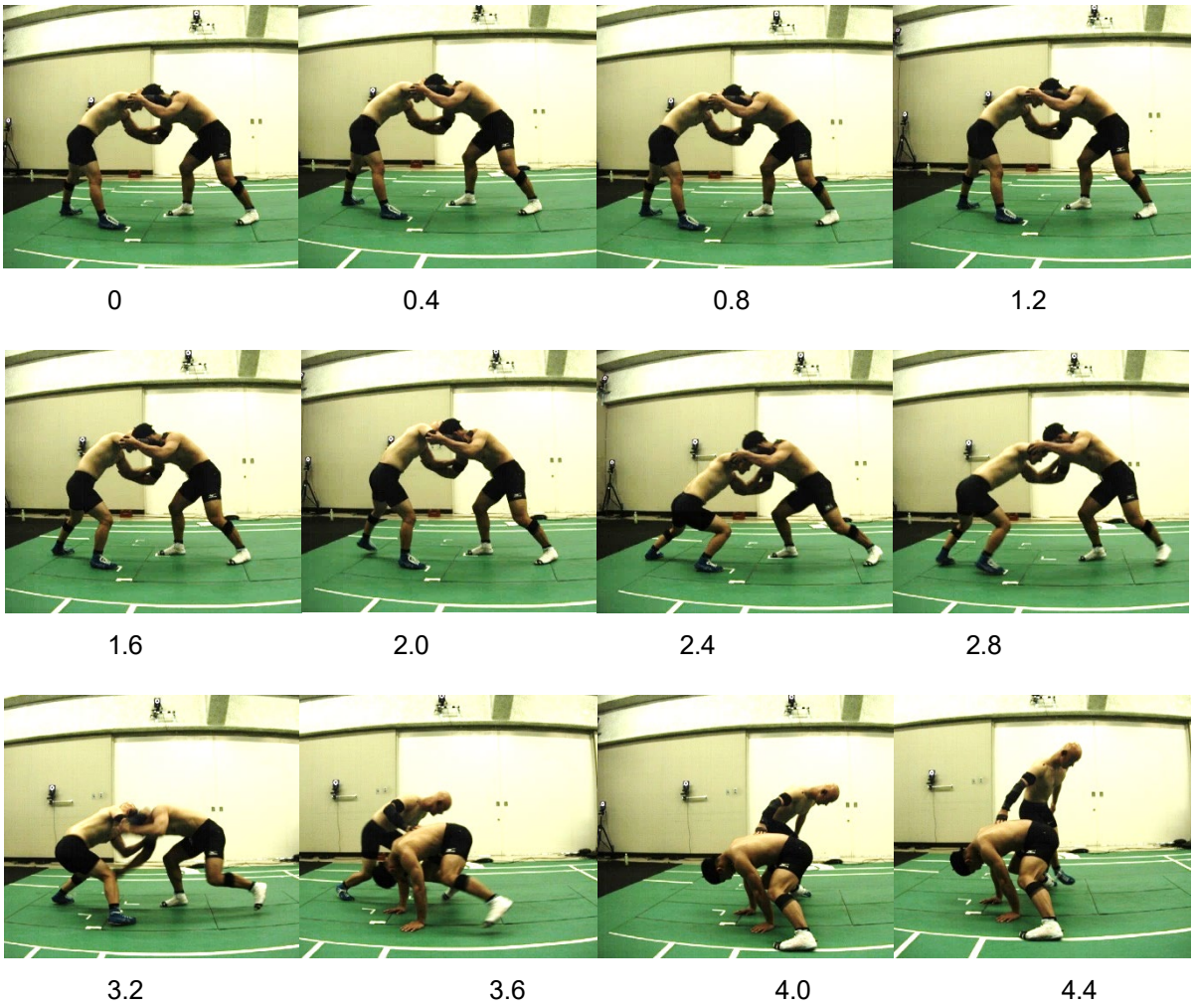

Figure 4b
(b) Sequential still images from the same trial corresponding to selected time points in (a), illustrating the movement of the attacker phases during the setup.

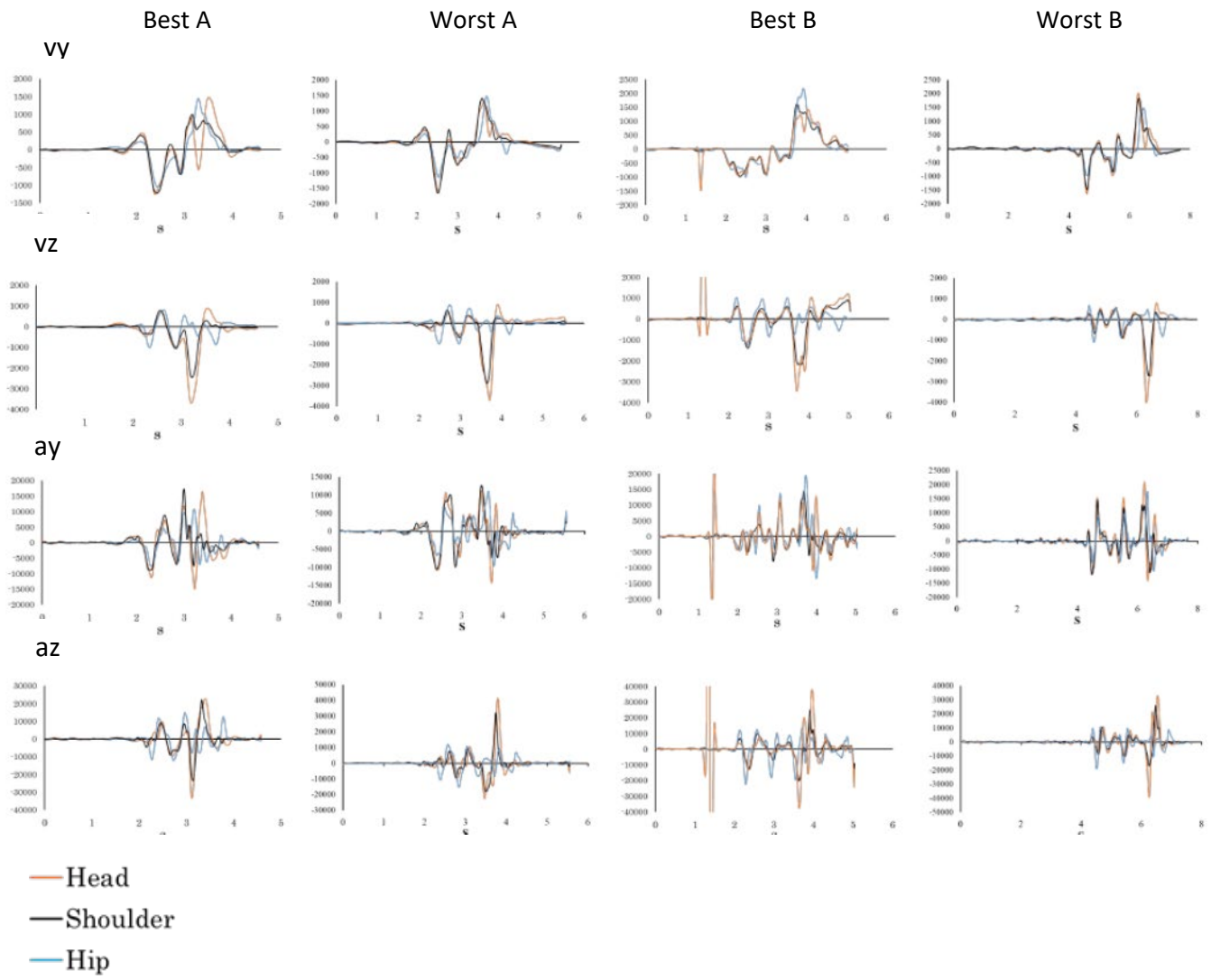

Figure 5. Kinematic Data from the Best- and Worst-Rated Trials of Each Subject

For both Participants A and B, the velocity (vy, vz) and acceleration (ay, az) of the head, shoulder, and hip segments are shown for the trials that received the highest and lowest VAS ratings. The plots enable the comparison of segmental motion characteristics between highly rated and poorly rated setup executions.

LIMITATIONS

This study was preliminary, involving only two participants and a small number of trials, which limits the generalizability of the findings. No statistical tests were performed on the EMG data, and the analysis relied primarily on visual inspection of the time-series data. The difficulty in identifying consistent temporal reference points further constrained our ability to quantify the differences in muscle activation between successful and unsuccessful trials.

Although small-scale experimental designs are acceptable for preliminary investigations, caution is warranted when interpreting the external validity of the results (Leon et al., 2011). To establish a more generalizable standard for evaluating setup movements during wrestling, future research will require extensive data collection across a broad range of athletes and scenarios. Additionally, the definition of “effective setup” should be refined using both subjective insights and objective biomechanical measures to support more reliable comparisons and training applications.

CONCLUSIONS

This preliminary investigation examined the subjective evaluations and kinematic characteristics of wrestling setup movements, along with an exploratory EMG analysis. The findings revealed that subjective evaluations using the VAS were not consistently aligned among the evaluators, indicating differing internal criteria for what constitutes an effective setup. Furthermore, the kinematic features most strongly associated with the VAS scores varied across evaluators, suggesting that the perception of setup movements is influenced by individual perspectives. Surface EMG data were successfully recorded, but challenges related to temporal alignment and defining comparison baselines limited a deeper analysis. These results emphasize the need for standardized objective indicators of setup effectiveness in wrestling. Future studies with larger sample sizes and improved alignment methods are necessary to establish reliable metrics for evaluating coaching setup techniques. This study serves as the first step toward establishing a systematic approach for evaluating and understanding setup movements in wrestling.

Supplements

Supplementary Video 1. Sample Trial of a Wrestling Setup Movement

This video shows a representative trial of the wrestling setup movement performed by Participant A. The movement was used for both kinematic and EMG analyses. Trials were selected based on a high VAS rating by the evaluators.

[https://drive.google.com/drive/folders/11YmI0W8lJwWJlcZfF58IXf0JMEoyTQ58?usp=drive_link]

Supplementary Video 2. Synchronized Video of a Setup Trial and EMG Waveforms

These supplementary videos present a synchronized display of a representative wrestling trial setup and the corresponding surface EMG waveforms recorded from the biceps brachii (BB), triceps brachii long and lateral heads (TBlo, TBla), flexor carpi radialis (FCR), and extensor carpi radialis (ECR). The video helps visualize the timing of muscle activation in relation to the movement of the attacker. The video is shown at 5x slow motion to facilitate easier observation of the relationship between movement and EMG activity. Note that the video and EMG data were recorded at different frame rates; therefore, the synchronization is not perfectly precise.

[https://drive.google.com/drive/folders/18oywR9rMkzCZHLLe5VPS72QS-8q4Rytd?usp=drive_link]

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Commentary

WEIGHT LOSS IN FEMALE WRESTLERS: OBSERVATIONS AND RECOMMENDATIONS FROM A COMPETITOR AND COACH

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INTRODUCTION

Weight cutting is the perceived equalizer in wrestling. We have used it to build resilient, disciplined athletes and humans. For some, weight cutting becomes a persona, for others, simply a means to a goal. Despite our unavoidable entanglement with managing weight, it is often the most misunderstood and mismanaged part of the wrestling experience. This is becoming especially true for girls and women.

My experience as an athlete has given me the opportunity to see weight cutting and weight management from all angles. I was a 7-time U.S. National Team Member (add a covid year and many years on the sidelines due to surgeries), a World University Champion, and a 2-time Olympic Team alternate. I've experienced the emotional highs of victory and the physical lows of poor weight management. Now, as a coach and founder of LuchaFit, I work with the next generation of female wrestlers and their support systems to ensure they don't make the same mistakes I did, or the mistakes of others I witnessed far too often.

Throughout my career, I saw athletes with bright futures break down after repeat cuts and never see out their potential. I witnessed hidden disordered eating, and chronic under-fueling. The unfortunate truth I observed was the habits of the women at the top level, trickling down to our development and youth wrestlers. I also discovered how proper nutrition, a grounded mindset, and phase-specific adjustments could transform the weight cut process and enhance performance.. What's missing in most wrestling rooms isn't cranking up the heat up, it's education.

This commentary is meant to bridge the gap. Pulling from my personal experience, as well as the science behind female physiology, I created a comprehensive guide to help female wrestlers manage their weight safely and sustainably. I will be summarizing the core principles from that guide, offering insights and recommendations to support athletes, coaches, parents, and the team behind them.

My goal is simple: create tools to build healthier, long-lasting careers for the women in our sport.

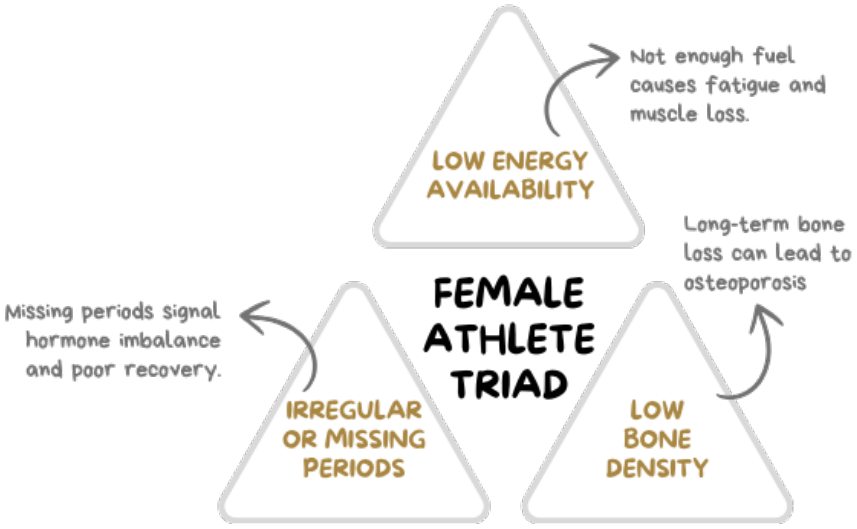
1. The Problem with the Current Culture

Generation after generation, wrestlers haven't been taught safe weight cutting. Instead, they mimic teammates or follow coaches who glorify the extreme tactics they once survived. These methods are rarely grounded in science, and often rely on extreme calorie restriction, dehydration, and last-minute panic strategies. Girls are especially vulnerable to this type of story, as they seek approval and validation from a sport they have long been left out of or ignored. Not to mention the high statistical likelihood of girls and women to develop disordered eating, more on this later.

There is also very little conversation around when it's actually worth-while to utilize weight manipulation for the aim of changing a weight class. The culture (even if unintentionally), encourages weight cutting at all levels no matter the goals or skill level of the wrestler. There have been some advancements to placate extremes, but athletes are still given an invitation to go down a weight class in the name of gaining a title. The culture has to change, and it must come from the wrestling community teaching athletes that there is a right and wrong time to focus on weight, and understanding the difference.

Female athletes have a unique physiology, one that is sensitive to energy availability, hydration, and a monthly sequence of hormonal shifts. Rapid weight loss can disrupt the menstrual cycle, reduce recovery, and in turn increase the risk of injuries. Hormone levels are variable from woman to woman, and can vary month to month. Female athletes need to build awareness of their own physiological changes.

In my work with LuchaFit and through my own career, I've seen how these invisible stressors manifest. Female wrestlers struggling with extreme fatigue, brain fog, or mood swings often assume they just aren't "tough enough." In reality, they're experiencing the effects of Relative Energy Deficiency in Sport (RED-S) or the early stages of the Female Athlete Triad. The chart below describes the Female Athlete Triad as adapted from The Female and Male Athlete Triad Coalition. The chart details the long-term consequences for bone health, hormonal function, and athletic performance when an athlete places themselves in a state of chronic under-fueling.



There are many layers tucked in amongst the stressors of being a female athlete. The cultural pressures around appearance and body image, the pressure to perform, and mental or emotional stress puts these athletes at higher risk for disordered eating. Female athletes are known to be perfectionists, and in sport where perfection is always one workout away, the ability to hyper-fixate on weight and control eating is a path many fall down; it becomes a measure of self-worth. Most do not realize their eating habits are unusual until they are many years past their competition days. They do not realize they have continued to dwell in the same disordered relationship with food they had as competitors.

This isn't a problem of the individual, but instead a systemic issue rooted in tradition, silence, and lack of female-specific education. We have to replace old-school weight cutting myths if we want female wrestlers to stay in the sport and thrive. Otherwise, only the females willing to navigate a gauntlet of misguided weight cutting will stick around.

2. What Women's Bodies Actually Need

It is a misconception that "weight management" and "weight cutting" are the same thing. Athletes and coaches alike have treated them as the same. They pile on extra workouts on top of regular training in order to manage weight, not recognizing that they are putting the body into further chronic under-fueling. Male coaches should be extra-tuned into their female athletes and what they are telling them about their personal process around weight management…

Let's define the two:

"Weight Management" A long-term approach focused on consistently fueling the body with the nutrients it needs to train hard, recover fully, and perform at its best. It supports overall health, hormonal balance, and sustainable athletic performance.

“Weight Cutting”: A short-term strategy used to temporarily reduce body weight in a controlled, safe manner to meet a competition weight class, without compromising strength, recovery, or health when done correctly.

When these lines are blurred, the athlete walks into competition underfed, under-recovered, and underperforms. They blame their technique or conditioning, then return to training and unknowingly repeat the same damaging cycle before the next competition.

Female wrestlers need a framework that prioritizes fueling and honors their physiological differences. Coaches, who are paying close attention, recognize that they cannot expect the same amount of weight loss from a sweaty practice as their male counterparts. So in turn, they cannot expect that any form of drastic weight loss will be beneficial to their athlete’s performance. Here’s a performance-based approach that includes balanced macronutrients at every meal:

- Protein (20-30g/meal) to support muscle growth, repair, and the immune system
- Carbohydrates (30-40g/meal, more around training) to refill glycogen stores and to fuel high-intensity workouts
- Healthy fats to regulate hormones and support long-term energy
- Hydrate consistently with 2-3 liters of water per day and electrolyte replacement on heavy training days

This is the baseline, and besides this, female wrestlers should learn how their bodies shift throughout the menstrual cycle. In the Female Wrestler’s Guide to Weight Mastery on LuchaFit, I stress the importance of cycle tracking. They should have a good understanding of how their hormonal fluctuations are affecting strength, mood, recovery, energy, and water retention. They should track on their calendar the estimated first day of menstruation, and know if that coincides with weight management or competition day.

Let’s break down the cycles in a digestible way:

- **Menstrual Phase (Days 1-5)**: Estrogen and progesterone are low. Fatigue, bloating, and reduced recovery are common. Weight cutting during this phase can feel more challenging for some. The focus should be hydration and rest, iron may be more depleted and affect the energy of the athlete.
- **Follicular Phase (Days 6-14)**: Estrogen rises, energy increases, and the body responds well to intense training. This is typically a good time to begin a gradual weight cut.
- **Ovulation Phase (Days 15-21)**: This phase is considered peak strength and speed. Wrestlers may experience some water retention, but fueling and hydration tweaks can make this a non-issue.
- **Luteal Phase (Days 22-28)**: Progesterone increases, cravings and bloating can return. During this phase it's important to pay attention to recovery and if that has slowed. Pay attention to mood dips and support the entire mind and body with consistent fueling. Potassium-rich foods should be prioritized when a wrestler must begin a weight cut during this phase.

The information we have linking performance and menstruation is still in its infancy. However, understanding these shifts allows female wrestlers to work *with* their bodies. One of the most common issues I am facing working with high school and college level athletes is they are chronically under-fueled. This is signaled by a missing or inconsistent period. With one athlete I advised, she used the Weight Mastery Guide to sync her fueling and hydration to her training intensity. This balanced out her hormones, her cycle returned, and she was able to make weight with no issues. She felt confident, sharp, and had an incredible performance. This was a stark contrast to her history of extreme weight cuts, and a cycle of binge and restrict in between competitions. She was tiptoeing towards a longer struggle with disordered eating, and potentially affecting the length of her time in the sport.

This kind of knowledge changes everything. When female wrestlers stop fighting their bodies and understand their natural fluctuations, those shifts no longer feel like setbacks. Instead, they become part of the process of becoming great athletes.

3. Safe, Strategic Cutting

The enemy here is not the weight cut itself, but how it’s done. We need a safe way for female wrestlers to make weight adjustments. It shouldn’t be last-minute, a test of strength or willpower, or a crash diet. We should not be putting any growing wrestlers into a plastic suit to sweat until they can barely stand. It’s unsustainable, affects the strength of our sport, and our ability to recruit talent.

When done right, a weight cut is a short-term, controlled reduction in water and food intake. It's designed to hit a number without compromising health or performance. It's not about shrinking, looking better in a singlet, or hitting a fantasy goal weight. It's about choosing a smart weight class and showing up ready to wrestle your best.

I teach a 5-day strategic cut that's simple and repeatable. Here are the basics:

5-Day Pre-Weigh-In Strategy (Simplified)

- **Day 5-4:** Focus on whole foods and a balance of macros. Think chicken, rice or sweet potato, roasted vegetables. Reduce sugar and processed foods. Hydrate with around 2.5-3 liters per day.
- **Day 3-2:** Drop fiber and salt intake (switch to white rice, plain toast, low fiber fruit). This phase minimizes the amount of weight in the gut. Maintain hydration and drop hard training sessions.
- **Day 1 (Night before weigh-in):** Eat a light, simple dinner. White carbs, lean protein, no salt. Taper fluids (about 75% of normal intake), and sip tiny amounts of electrolytes to maintain balance.
- **Weigh-In Morning:** Minimal or no food/fluid intake. Do a light movement session as needed for any final ounces.
- **Post-Weigh-In:** Rebuild energy and hydration with little sips of water and electrolytes immediately. This is often overlooked.

Match Day Fueling (Post-Weigh-in to Match Time)

4. **0-30 min after weigh-in**

Rehydrate: 0.5 liters sports drink or water + salt + easy digestible sugars (applesauce pouch, banana, sports gel)

5. **30-90 min after weigh-in**

Eat: A full recovery meal with protein + carbs. Think rice bowl w/ grilled chicken, sandwich with lean turkey, or greek yogurt + granola

6. **1-3 hours before match**

Keep it light: small snacks like bagels, rice cake and honey, sports bar. Sip water/electrolytes.

7. **During competition**

Maintain energy with small, fast-digesting carbs between matches. Sip fluids and avoid carbonated drinks.

This strategy is formulated to protect the athlete's body from extremes, crashes, and dehydration. When the athlete has a simple formula, they know what to expect and they can focus their mental energy on performance. Removing the guesswork for the athlete removes anxiety around making weight and what to eat at competition. We should be treating every wrestler like they are a professional, and arm them with the tools to act accordingly.

8. Long-Term Sustainability

As a coach, my goal is to help maintain the longevity of my athletes. I know for certain, weekend after weekend of brutal weight cuts will not allow for a long career. A coach who is willing to put their athlete's health at risk for a short-term goal of a championship should think twice about what they prioritize.

Your athlete should be within 5% of competition weight in order to safely and properly manipulate their weight for a short-term goal. It's a small enough range that makes the short cut manageable, and allows for the wrestler to be fully fueled in the off-season.

Losing your period is not a badge of honor, earned from hard training. Instead, it's a warning sign. Irregular or missing cycles point to under-fueling, overtraining, and hormonal disruption. All of these potential side effects can increase injury risk and reduce the athletes ability to perform at their best. Ignoring these symptoms can only risk your future in the sport.

9. Recommendations

If we want to continue to build the sport of wrestling for females, we have to have a safe and well informed environment for them to enter. We can no longer treat weight management like it's the shadow side of our sport. Where you are expected to weight cut but no one directly speaks about it. This should be a skill understood and taught by expert coaches so our athletes can master the skill as well. Here's where it begins:

For Wrestlers:

Track your cycle. Learn how each phase affects your weight, energy, mood, and recovery. Learn to eat consistently and pay attention to cravings. Don't wait until you are starving to eat, plan your meals ahead so you are fueling before and after training sessions.

For Coaches:

Prioritize and vocalize the importance of fueling over old-school toughness. Teach athletes to check their weight, be consistent with nutrition, and to not wait until the last minute to begin their descent. Help them build a plan around managing their weight, don't allow them to go into this process blind.

For Parents and Leaders:

Pay attention to red flags: skipped meals, chronic fatigue, emotional swings, and reluctance around training or competing. You can support your athlete by reinforcing that performance, not appearance, is the goal. Have them work with a nutritionist or dietician for solid information instead of whispers from past wrestlers who may have incorrect information.

Wrestling is demanding physically, mentally, and emotionally. We want female wrestlers, and all of the girls and women who enter this sport in the future, to be properly informed. They deserve knowledge, support, and strategies that actually have their best interests in mind. This is the future I can see for our sport, and the future I want for every girl who steps on the mat.

To learn more visit: LuchaFit.com, my platform dedicated to education, performance, health, and high level tools for wrestlers and the team around them.

To access the Female Wrestler's Guide to Weight Mastery visit: https://www.luchafit.com/wrestling-weight-management-guide

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