

# Competitive Efficiency Across Age Categories in Greco-Roman Wrestling: An Analysis of World Championship Performance Indicators

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## ABSTRACT

This report presents a comprehensive analysis of competitive performance across all age categories (U17, U20, U23, Seniors) in Greco-Roman wrestling, based on data collected from the 2025 World Championship competitions. The aim was to identify age-related patterns in technical–tactical efficiency, scoring structure, positional contribution, and match intensity, in order to support evidence-based long-term athlete development and coaching strategies.

The analysis reveals a clear developmental progression from high-intensity, open wrestling at the U17 level toward more controlled and efficiency-oriented performance in older age categories. Match intensity, expressed as points per minute (WQ), was significantly higher in U17 compared to all other age groups, with a pronounced decrease observed during the transition to U20. From U20 to Senior level, WQ values stabilized, indicating that further performance development is driven primarily by tactical control and execution efficiency rather than by increased technical output or diversity.

The first scoring action was strongly associated with match outcome across all age categories, confirming the importance of early initiative and positional control at the elite level. The findings identify the U20 age group as a critical transitional phase in athlete development and emphasize the need for age-specific performance benchmarks and training priorities.

This report provides practical insights for United World Wrestling (UWW), national federations, and coaches, supporting the alignment of competitive demands with long-term development models and the optimization of training focus across all age categories.

## INTRODUCTION

Modern elite wrestling is characterized by continuous changes in competition rules, tactical trends, and performance demands across all age categories. As a result, understanding how technical–tactical efficiency and match dynamics evolve throughout the athlete development pathway has become a key priority for international federations, national teams, and coaches.

While previous research has predominantly focused on senior-level wrestling, considerably less attention has been paid to the developmental progression from cadet to senior categories, particularly through the use of objective, competition-based performance indicators. This lack of longitudinal, competition-driven evidence limits the ability of coaches and federations to design age-appropriate training models and performance benchmarks. World Championships provide a unique and standardized context for such analyses, as they represent the highest competitive level within each age category (U17, U20, U23, Seniors) and reflect current global trends in wrestling performance. A systematic analysis of technical–tactical actions, scoring structure, positional dominance (standing versus parterre), and match intensity allows for a comprehensive understanding of how wrestling performance evolves with age and competitive maturity.

Greco-Roman wrestling (GR) has distinct characteristics compared to the other two Olympic styles, and previous analyses have identified a decline in both efficiency and attractiveness of GR wrestling relative to Freestyle (FS) and Women’s Wrestling (WW). Therefore, the primary aim of this report is to analyze and compare competitive performance in Greco-Roman wrestling across all age categories using detailed

technical–tactical indicators and match intensity metrics derived from World Championship competition data. Particular emphasis is placed on:

- differences in scoring structure,
- the contribution of wrestling positions to total points scored,
- the distribution of technical and non-technical points,
- wrestler efficiency expressed as points per minute (WQ),
- key performance actions and techniques that differentiate age categories.

By identifying stable patterns and critical transition points within the athlete development pathway, this report seeks to provide practical, evidence-based insights for coaches, performance analysts, and decision-makers within United World Wrestling (UWW). The findings aim to support long-term athlete development strategies, optimize age-specific training priorities, and contribute to the continuous improvement of elite wrestling performance.

## **METHODS**

### **Data Source**

The analysis was based on official match data from United World Wrestling (UWW) World Championships across four age categories: U17, U20, U23, and Seniors. All data were obtained from the official UWW Public Data Access (PDA) platform (<http://uww.io/wpar>). Only Greco-Roman wrestling matches were included in this report. All performance data were derived from official match results and competition records.

### **Performance Indicators**

Each bout was analyzed using a standardized set of performance indicators, including:

- technical–tactical variables (techniques executed in standing and parterre positions),
- scoring actions classified as technical and non-technical points,
- positional contribution to total points scored (standing position versus parterre),
- match duration and total points scored,
- match intensity and wrestler efficiency expressed as points per minute (WQ).

In addition, specific scoring situations (e.g., first scoring action) and their relationship with match outcome were examined.

### **Data Processing**

Performance indicators were calculated at both the wrestler and match levels and subsequently grouped by age category. To ensure comparability across age groups, selected indicators were expressed in relative or standardized forms (e.g., points per match, points per minute). Non-parametric statistical procedures (Kruskal–Wallis test) were applied to assess differences between age categories where appropriate. Data processing and analysis were conducted using the Python programming language with standard analytical libraries (Pandas, NumPy, Matplotlib).

### **Analytical Approach**

Comparisons between age categories were performed to identify patterns and developmental changes in competitive performance. Non-parametric statistical methods were applied where data distributions deviated from normality. Results are presented through a combination of descriptive statistics, graphical visualizations, and selected inferential analyses to support interpretation.

The focus of the analysis was not on individual athletes or teams, but on identifying global developmental trends characterizing each age category at the World Championship level.

## RESULTS AND DISCUSSION

### Development pathway of Greco-Roman wrestling performance (U17–Seniors)

The developmental transition from the U17 level to Senior competition is characterized by a gradual decrease in match intensity, expressed as points per minute (WQ), accompanied by a shift from parterre-oriented scoring toward standing wrestling and tactically induced points (Chart 1). This trend reflects increasing match control, efficiency, and strategic maturity at the elite Senior level.

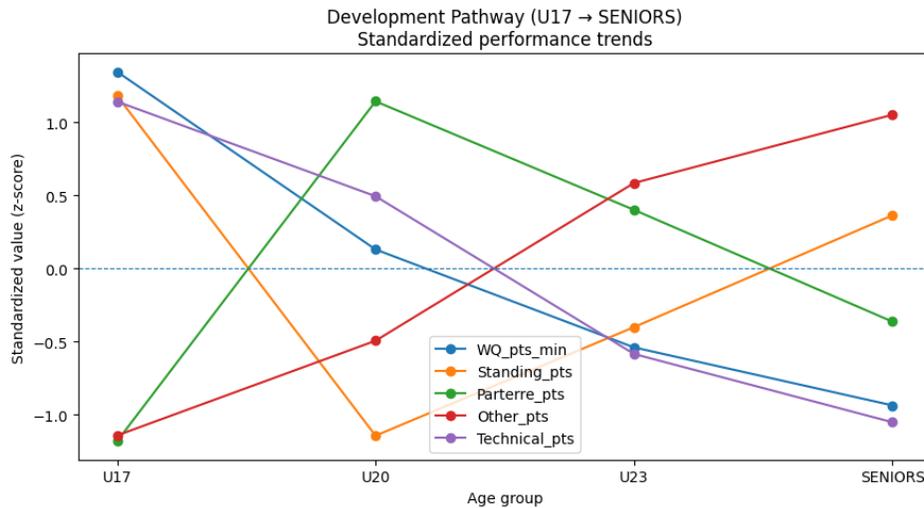


Chart 1. Development pathway by each age group

#### Match Intensity (WQ – Points per Minute)

A continuous decline in match intensity (WQ) was observed with increasing age category. Younger wrestlers tend to adopt a higher-risk approach, characterized by increased activity, a greater number of technical errors, and lower levels of tactical control. In contrast, Senior wrestlers demonstrate a slower competitive tempo, greater selectivity in attacking actions, and superior overall match control. This shift reflects a transition from volume-based scoring toward efficiency-driven performance.

#### Standing vs. Parterre Scoring Contribution

A clear positional shift in scoring contribution was identified across age categories. Parterre scoring reaches its peak at the U20 level and gradually decreases toward the Senior category. Conversely, the contribution of standing wrestling increases progressively with age, becoming dominant at the Senior level. While U20 wrestlers score the highest number of points from parterre situations, Senior wrestlers rely increasingly on standing exchanges, reflecting enhanced positional control and tactical maturity.

#### Technical vs. Non-Technical Points

A pattern similar to the standing–parterre relationship was observed in the distribution of technical versus non-technical points. As age category increases from U17 to Seniors, the relative share of technical points decreases, while the proportion of non-technical points increases. This trend is largely attributable to the ability of Senior wrestlers to generate scoring opportunities through passivity calls, step-out situations, and sustained tactical pressure, effectively forcing opponents into errors rather than relying solely on direct technical execution.

## Key Developmental Transitions

- **U17 → U20 (Technical base and volume)** - This stage is characterized by the development of technical foundations and automatized actions, particularly in parterre situations. High match intensity (WQ) and a greater volume of scoring actions reflect an emphasis on technical execution and activity.
- **U20 → U23 (Match control and reduced aggressiveness)** - This represents a critical transitional phase, marked by a reduction in aggressive volume-based wrestling and a growing emphasis on match control. Performance development at this stage is driven by improved attack selection and the effective transfer of parterre dominance into standing situations.
- **U23 → Seniors (Winning with control and reduced risk)** - At the Senior level, performance is defined by high standing efficiency, the ability to force passivity and step-out situations, and advanced management of match rhythm. Tactical leadership, score protection, and risk minimization become central elements of competitive success.

### 1. TOTAL POINTS PER TECHNICAL IN % (PERCENTAGE)

Out of 20 scoring segments identified in match analysis (), five segments accounted for more than 5% of total points scored across all matches (Chart 2). Of particular concern is the fact that only three of these segments represent wrestling techniques, while the remaining two are non-technical scoring actions resulting from penalties, namely **passivity** and **step-out** situations.

When examining the contribution of these five segments across the full sample, their combined share of total scoring ranges from **61.46% in the U17 category to 68.43% at the Senior level**. This indicates an increasing concentration of scoring within a limited number of actions as age and competitive maturity increase.

Table 1 provides an overview of all technical and tactical variables by age group, expressed as percentages, allowing for a detailed comparison of scoring structure across developmental stages.

Sn	AGE CATEGORY	SEN	U23	U20	U17	AVERAGE
	WRESTLING TECHNIQUE - GR					
1.	GUT WRENCH	22.17	21.95	25.30	24.19	23.40
2.	PASSIVITY	18.51	16.18	14.51	14.30	15.88
3.	TAKE DOWN	9.49	10.41	8.23	10.49	9.66
4.	LIFTS – SUPLEX	9.99	9.14	10.27	6.63	9.01
5.	STEP OUT	8.27	8.66	7.89	5.85	7.67
6.	SUPLEX THROW	3.27	4.59	3.42	7.54	4.71
7.	HIP TURNING THROV	4.11	3.76	3.55	6.68	4.53
8.	STANDING COUNTER	3.02	3.94	4.42	4.33	3.93
9.	FORWARD BEDING THROV	3.11	2.45	5.03	4.72	3.83
10.	SHOULDER TURNING THROW	3.95	3.15	2.95	2.60	3.16
11.	PARTERRE COUNTER	2.35	3.15	3.29	2.21	2.75
12.	TURN OVER	1.85	2.10	2.69	2.08	2.18
13.	STANDING CHALLENGE	2.69	1.40	1.82	2.12	2.01
14.	LIFTS – REVERSE GRIP	2.56	1.62	0.87	1.30	1.59
15.	PARTERRE CAUTION	1.09	2.36	0.95	1.56	1.49
16.	STANDING CAUTION	1.64	1.27	1.60	1.43	1.49
17.	PARTERRE CHALLENGE	1.09	1.88	1.30	0.74	1.25
18.	FRONT HEAD LOOCK	0.59	1.22	0.43	1.13	0.84
19.	TAKE DOWN HEAD TO HEAD	0.25	0.79	1.39	0.09	0.63
20.	NEGATIVE WRESTLING	0.00	0.00	0.09	0.00	0.02

Legend: red color – best result; green color – worst result; Note: values in the table are shown in percentage (%)

## Comparison of the Top Five Scoring Actions (Technical and Non-Technical Points)

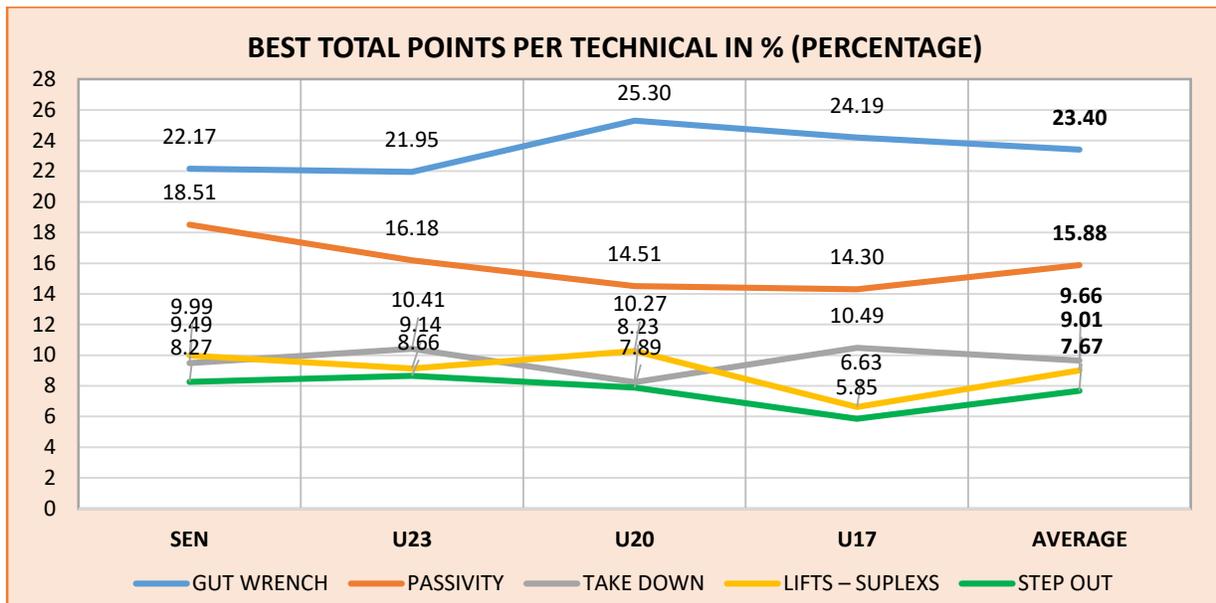


Chart 2. Five best technics by age groups – GR (%)

Across all age categories, **GUT WRENCH** is the most frequently applied scoring technique. On average, nearly **one in every five points (23.40%)** is scored using the gut wrench. This technique is more prevalent in the U17 and U20 categories compared to U23 and Seniors. One of the main reasons for this trend lies in the high static and dynamic strength requirements needed for effective gut wrench defense, which are significantly more developed in older wrestlers.

With regard to **PASSIVITY**, its contribution to total points scored ranges from **14.30% to 18.51%** across age categories. The lower proportion observed in U17 (14.30%) compared to Seniors (18.51%) can be explained by greater tactical maturity at the Senior level. Senior wrestlers tend to manage risk more conservatively, while U17 wrestlers rely more heavily on standing techniques—such as **suplex throw, hip turning throw, and standing counters**—to generate scoring opportunities before passivity situations arise.

The **TAKE DOWN** technique is most prevalent in the U17 category (**10.49%**), while the lowest percentage of points scored via this action is observed in U20 (**8.23%**). This pattern reflects the greater emphasis on open standing exchanges and direct technical execution in younger age groups.

The **LIFT–SUPLEX** technique shows the highest prevalence in the U20 category (**10.27%**), with only slightly lower values observed in U23 and Senior wrestlers. The lowest frequency of this technique is found in U17 (**6.63%**). Successful execution of lift–suplex actions requires substantial strength to elevate the opponent from the parterre position, a physical capacity that is still underdeveloped in the youngest age group.

For **STEP OUT** situations, a higher proportion of points is observed in older age categories (U23 and Seniors). While younger wrestlers place greater emphasis on executing wrestling techniques, older wrestlers increasingly apply tactical strategies aimed at scoring points with minimal risk, using mat control and positional pressure to force step-out situations.

## 2. SCORING PATTERNS BY WEIGHT CATEGORIES

Table 2. Highest number of won point by technics, weight category and age group

No	AGE CATEGORY	SEN		U23		U20		U17		TOTAL POINTS	AVERAGE POINTS
		Cat/kg	pts	Cat/kg	pts	Cat/kg	pts	Cat/kg	pts		
1	WRESTLING TECHNIQUE - GR	130	64	87	76	97	66	92	88	294	73.50
2	PASSIVITY	87	63	67	52	72	44	60	49	208	52.00
3	LIFTS – SUPLEX	67	45	77	37	60	46	60	45	173	43.25
4	TAKE DOWN	72	36	82	32	55	28	55	34	130	32.50
5	STEP OUT	77	35	55	31	67	38	92	19	123	30.75
6	SUPLEX THROW	72	22	67	24	67	12	80	32	90	22.50
7	HIP TURNING THROV	60	20	97	18	82	22	48	20	80	20.00
8	FORWARD BEDING THROV	60	20	130	12	72	24	71	20	76	19.00
9	LIFTS – REVERSE GRIP	67	34	63	10	67	12	48	10	66	16.50
10	SHOULDER TURNING THROW	67	20	97	14	60	12	110	14	60	15.00
11	TAKE DOWN HEAD TO HEAD	55	2	67	6	130	10	48	34	52	13.00
12	TURN OVER	55	16	60	8	55	14	60	10	48	12.00
13	FRONT HEAD LOOCK	0	0	67	14	130	4	48	12	30	7.50

When examining points scored across weight categories, it can be concluded that wrestlers competing in the 67 kg category demonstrate the broadest technical repertoire and achieve the highest number of points through a diverse range of wrestling techniques in three age categories (Seniors, U23, and U20). In the U17 category, wrestlers in the 48 kg weight class show the highest performance in as many as four different wrestling techniques compared to other weight categories (Table 2).

When points are analyzed according to the highest number of points scored by technique and weight category, the following patterns emerge:

- For the **GUT WRENCH** technique, which accounts for the highest number of points overall, dominance is observed primarily in heavyweight categories (130 kg, 97 kg, and 87 kg), as well as in the U17 category at 88 kg.
- **PASSIVITY** points are most prevalent in middleweight categories (67 kg, 72 kg, and 87 kg), while in the U17 category they are most pronounced in the 60 kg weight class.
- The **LIFT–SUPLEX** technique is most frequently applied in middle (67 kg and 77 kg) and lighter weight categories (60 kg). In the U17 category, the highest number of points scored with this technique was recorded in the 55 kg weight class.
- The **TAKE DOWN** technique is most prevalent in middleweight categories among Seniors and U23 wrestlers (72 kg and 82 kg), while in the U20 category the highest number of points from this technique were recorded in the 55 kg weight class. In the U17 category, the greatest number of points from take-down actions was also observed at 55 kg.
- For Seniors and U23, the highest total number of points was recorded in middleweight categories (77 kg and 67 kg). In contrast, U20 wrestlers achieved the highest total points in the 55 kg weight class, while in U17 the highest number of points was observed in the 92 kg category.

### 3. WQ/min - TOTAL PER AGE CATEGORY

The WQ/min index represents one of the most important indicators in the analysis of wrestling match quality, as it reflects the number of points scored per minute (pts/min). Higher values of this index indicate more dynamic, attractive, and spectator-friendly wrestling. The WQ/min values obtained in this analysis (Chart 3) are in line with expectations.

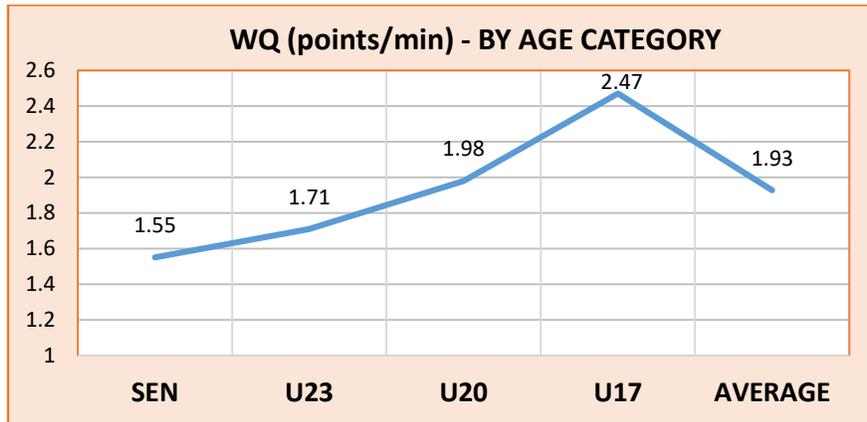


Chart 3. WQ – points / minutes by age category - GR

The lowest number of points per minute was recorded in the Senior category (**1.55 pts/min**). Each successive younger age category demonstrated a higher WQ index, with the highest value observed in the U17 category, where an exceptionally high index of **2.47 points per minute** was recorded.

As age increases, the level of tactical preparation for matches also increases, leading wrestlers to engage less frequently in high-risk situations and to attempt fewer high-amplitude techniques. In contrast, younger wrestlers are more prone to risk-taking and more frequently attempt throwing techniques. An additional factor contributing to the lower number of points per minute in older age categories is the substantial difference in strength compared to U17 wrestlers. With increasing strength, wrestlers are better able to neutralize opponents and more effectively prevent scoring actions against them.

Compared to the other two Olympic wrestling styles (Freestyle and Women’s Wrestling), Greco-Roman wrestling demonstrates a significantly lower WQ/min index across all four age categories.

### 4. POINTS IN PERCENTAGE (%): STANDING POSITION / PARTERRE POSITION

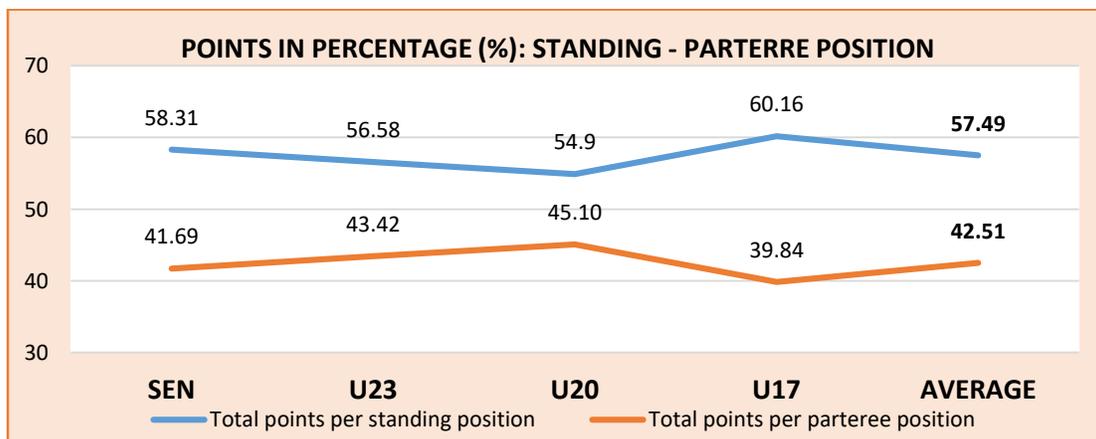


Chart 4. Standing – parterre position ratio (%) by age groups

The results indicate that, on average, 57.49% of points are scored from the standing position, with the largest contribution coming from points scored through **PASSIVITY** (15.88% of points, Chart 2). Analysis of the first point scored from passivity (all age groups combined) shows that the win rate after scoring the first point is 69.9%. Logistic regression analysis revealed that scoring the first point is a strong predictor of match outcome. Wrestlers who scored the first point had significantly higher odds of winning the match (**OR = 7.63, 95% CI: 5.67–10.25, p < 0.001**), increasing their chances of victory by approximately 7.6 times. The observed differences in points scored from standing and parterre positions fall within the expected range, except in the U20 age category, where a significantly higher proportion of points was scored from the parterre position (Chart 4). This can be explained by the fact that, in the U20 category, two wrestling techniques—**GUT WRENCH** and **LIFT-SUPLEX**—are considerably more prevalent compared to the other three age groups.

The Chi-square test revealed a statistically significant association between age category and the distribution of points between standing and parterre positions ( $\chi^2 = 14.54, df = 3, p = 0.002$ ). This suggests that the relative contribution of standing and parterre scoring differs depending on developmental stage, reflecting changes in match structure and tactical emphasis associated with age. The relationship between points scored from standing and parterre positions changes with age, indicating a gradual shift in tactical priorities as wrestlers progress toward senior-level competition.

## 5. POINTS IN PERCENTAGE (%): TECHNICAL POINTS / OTHER POINTS

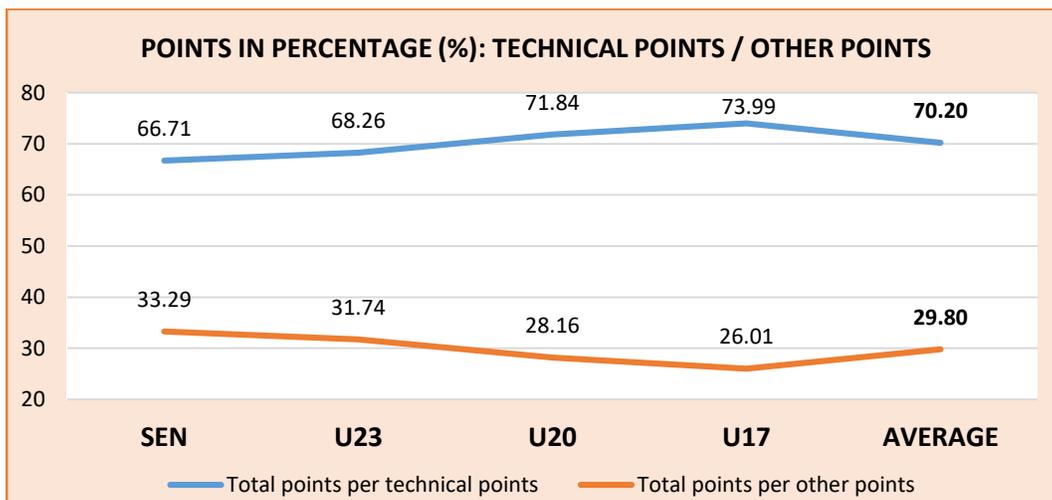


Chart 5. Technical – other points ratio (%) by age groups

The results fall within the expected range. In the senior category, the highest degree of tactical maneuvering is observed, resulting in a large proportion of points being scored from passivity and the opponent stepping out of the mat. Specifically, **33.29% of points in seniors do not originate from wrestling techniques but from penalty points** (passivity, stepping out, challenges, etc.). In contrast, in the youngest U17 age group, the highest proportion of points is scored from wrestling techniques, reaching **74%**, which aligns with expectations (Chart 5).

Chi-square analysis revealed a statistically significant association between age category and the share of technical versus non-technical points ( $\chi^2 = 36.81, df = 3, p < 0.001$ ). Although the effect size was small (**Cramér's V = 0.063**), the results indicate consistent changes in the scoring structure with age, showing a

gradual increase in the relative contribution of non-technical points at higher competitive levels. While technical actions remain the primary source of points across all age groups, the relative importance of non-technical points increases with age, highlighting the growing role of tactical control and match management in senior-level competitions.

## 6. PERCENTAGE OF MATCHES BY WAY OF WINNING

Table 3. Type of winning by age groups (%)

AGE GROUPS	VPO1	VSU	VPO	VFA	VSU1	VIN	VFO	VCA
SENIORS	55,0	22,5	8,4	6,3	5,9	1,6	0,3	0,0
U23	49,8	27,1	5,7	6,0	8,4	1,0	1,7	0,0
U20	42,6	30,9	5,1	8,5	12,1	0,0	0,4	0,4
U17	53,1	20,5	9,4	8,0	7,3	1,0	0,3	0,3
AVERAGE	50,1	25,3	7,2	7,2	8,4	0,9	0,7	0,2

**Legend:** **VPO1** - VICTORY BY POINTS (With point(s) scored by the opponent); **VSU** - VICTORY BY TECHNICAL SUPERIORITY (Without any point scored by the opponent); **VPO** - VICTORY BY POINTS (Without any point scored by the opponent); **VFA** – VICTORY BY FALL (Victory by fall); **VSU1** - VICTORY BY TECHNICAL SUPERIORITY (With point(s) scored by the opponent); **VIN** - VICTORY BY INJURY (If an athlete is injured before or during a bout); **VFO** - VICTORY BY FORFEIT (If an athlete doesn't show up on the mat); **VCA** - VICTORY BY 3 CAUTIONS (3 cautions given to the opponent during a bout)

The obtained data (Table 3) indicate that, in the senior category, the highest proportion of matches concluded after the full 6 minutes of combat was recorded (**63.4%**), comprising **55.0%** at VPO1 and **8.4%** at VPO.

The highest proportion of victories by fall was observed in the U20 age group (**8.5%**), as well as the highest proportion of victories by technical superiority (**total 43.0%**), while in matches where opponents scored a technical point under a 4–1 penalty, this share amounted to **12.1%**. In the U23 category, the highest proportion of victories by technical superiority in matches where opponents did not score any technical points under a 4–0 penalty was recorded (**30.9%**). Notably, **1.6% of senior matches ended with a VIN (victory by injury)**.

## 7. NATIONAL TEAM PERFORMANCE – MOST WIN POINTS / FIRST 3. NATIONS

When considering the most successful teams based on the total points scored across the four age categories (Table 4), the national teams of **Iran** stand out, ranking among the top three teams in all four age groups. In the senior, U20, and U17 categories, Iran achieved the highest number of points, while in the U23 category it ranked second.

The **UWW team** ranked among the top three teams in three age categories. It is important to note that the UWW team included wrestlers from two countries (**RUS** and **BLR**), which resulted in more than 10 wrestlers per age category in this selection, affecting the overall total points scored.

Table 5 presents the frequencies of individual techniques according to the order of execution. The most frequently used techniques in terms of points scored are GUT WRENCH, PASSIVITY, and TAKE DOWN.

Table 4. Top three nations across age groups by top three techics (by points scored)

AGE GROUP	NATION	1st best techn.	pts	2nd best techn.	pts	3th best techn.	pts	TOTAL pts
SENIORS	IRI	take down	54	gut wrench	42	step out	32	243
	UWW	gut wrench	42	passivity	39	lift - suplex	30	191
	AZE	lift - suplex	33	passivity	24	gut wrench, take down	22	150
U23	IRI	gut wrench	68	take down	50	passivity	30	262
	UWW	gut wrench	42	passivity	40	take down	20	228
	KAZ	gut wrench	38	lift - suplex	21	step out, take down	20	154
U20	UWW	gut wrench	130	take down	32	passivity	29	306
	IRI	gut wrench	58	passivity	28	lift - suplex	27	224
	AZE	lift - suplex	58	passivity	27	gut wrench	16	186
U17	IRI	gut wrench	50	take down	34	passivity	30	203
	KAZ	gut wrench	72	take down	24	passivity	21	197
	UZB	gut wrench	54	passivity	21	lift - suplex	20	197

Table 5. Frequency and points scored as 1st, 2nd, and 3rd technique across age groups

technics	freq	pts	freq	pts	freq	TOTAL pts	TOTAL freq
take down	1	54	4	140	3	62	8
gut wrench	9	554	1	42	2	16	12
lift - suplex	2	91	1	21	3	77	6
passivity	0	0	6	179	4	110	10
step out	0	0	0	0	2	32	2

**IRI** – In three age categories, the highest number of points was scored using the GUT WRENCH technique (Charts 6, 7, 9), while in the senior category the highest number of points was scored with the TAKE DOWN technique. For most of the top-performing teams, points scored for PASSIVITY rank third in the total points; in contrast, for most other nations passivity points rank second. Notably, in the senior category the STEP OUT segment ranks third in terms of total points scored.

**UWW** – Data were analyzed for a total of 56 wrestlers across the four age categories (Charts 6, 7, 8), whereas for other nations a total of 40 wrestlers were analyzed (10 per age category). UWW wrestlers scored the highest number of points with the GUT WRENCH technique in three age categories. Points for PASSIVITY rank second across all three age categories (seniors, U23, and U20). In the senior category, points scored with LIFT–SUPLEX from the parterre position rank third.

**AZE and KAZ** – The AZE and KAZ national teams rank among the top three teams in two age categories (Charts 7, 8). In the AZE team, the highest number of points in the senior and U20 categories was scored using LIFT–SUPLEX from the parterre position, with points for PASSIVITY ranking second. A characteristic of KAZ wrestlers is that their most effective technique is GUT WRENCH in the U23 and U17 categories, with a significant number of points also scored with TAKE DOWN.

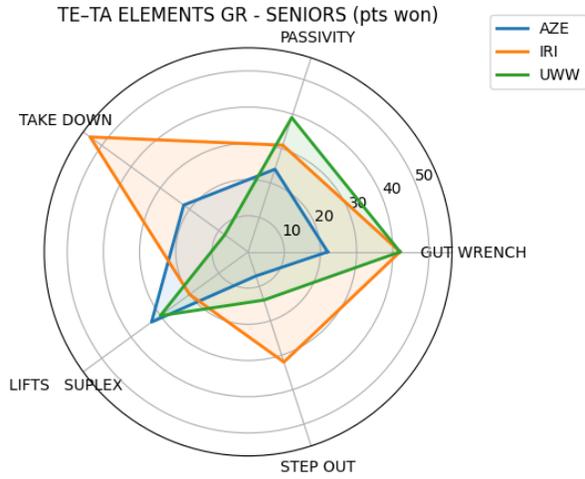


Chart 6. Visual comparison – SENIORS

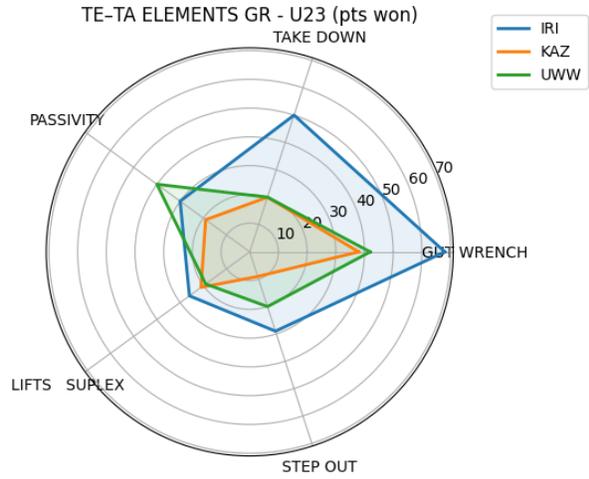


Chart 7. Visual comparison – U23

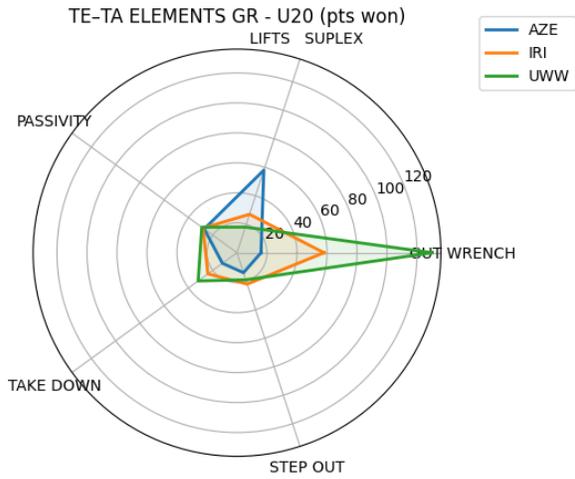


Chart 8. Visual comparison – U20

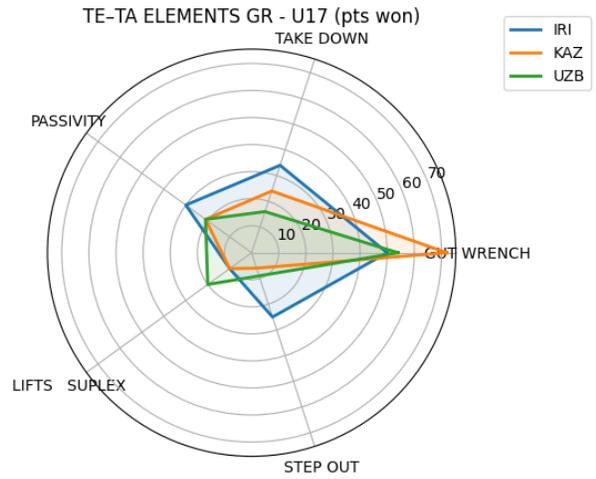


Chart 9. Visual comparison – U17

## 8. REVIEW OF % POINTS „ALL MATCHES“, „MEDAL MATCHES FINALS I-II, III-V“, „ ALL MATCHES OF WINNERS – GOLD MEDALIST“

Table 6. Review of % points „all matches“, „medal matches finals I-II, III-V“, „ all matches of winners – gold medalist“

AGE GROUPS	COMPETITION PHASE	%, points	I - best technique	%, points	II - best technique	%, points	III - best technique
SENIORS	ALL MATCHES	22,17	GUT WRENCH	18,51	PASIVITY	9,99	LIFT SUPLEX
	MEDAL MATCHES FINALS	20,75	GUT WRENCH	18,26	PASIVITY	12,45	TAKE DOWN
	ALL MATCHES OF WINNERS	19,87	GUT WRENCH	19,87	PASIVITY	14,74	TAKE DOWN
U23	ALL MATCHES	21,95	GUT WRENCH	16,18	PASIVITY	10,41	TAKE DOWN
	MEDAL MATCHES FINALS	23,36	GUT WRENCH	20,09	PASIVITY	10,28	TAKE DOWN
	ALL MATCHES OF WINNERS	20,32	GUT WRENCH	17,78	PASIVITY	15,87	TAKE DOWN
U20	ALL MATCHES	25,3	GUT WRENCH	14,51	PASIVITY	10,27	LIFT SUPLEX
	MEDAL MATCHES FINALS	27,89	GUT WRENCH	13,55	PASIVITY	10,36	LIFT SUPLEX
	ALL MATCHES OF WINNERS	20,11	GUT WRENCH	17,66	PASIVITY	10,33	LIFT SUPLEX
U17	ALL MATCHES	24,19	GUT WRENCH	14,3	PASIVITY	10,49	TAKE DOWN
	MEDAL MATCHES FINALS	21,8	GUT WRENCH	15,41	PASIVITY	12,03	TAKE DOWN
	ALL MATCHES OF WINNERS	24,04	GUT WRENCH	15,35	PASIVITY	11,76	TAKE DOWN

Table 8. Frequency review of 1st, 2nd and 3th technique for all matches, medal matches finals and all matches of winners

TECHNIQUE	I – best technique	li – best technique	III – best technique
GUT WRENCH	12		
PASIVITY		12	
TAKE DOWN			8
LIFT - SUPLEKS			4

Analysis of matches by competition phase (“all matches,” “medal matches I–II and III–V,” “all matches of winners – gold medalists”) in the Greco-Roman style revealed that GUT WRENCH is the most frequently executed technique across all phases and age categories (Table 7). In all age categories, points for PASSIVITY rank second in frequency, while two wrestling techniques, LIFT–SUPLEX and TAKE DOWN, rank third in terms of points scored (Table 8).

The highest proportion of points scored with GUT WRENCH in medal matches (I–II and III–V places) was observed in the U20 age category, accounting for 28.89% of points.

The highest proportion of points for PASSIVITY in medal matches was observed in the U23 category, amounting to 20.09% of points.

The highest proportion of points scored with LIFT-SUPLEKS in medal matches was observed in the U20 category, accounting for 10.36% of points.

The highest proportion of points scored with TAKE DOWN was observed in matches of gold medalists, who scored 15.87% of their points using this technique.

## 9. TECHNICS EXECUTION BY TIMELINE (ALL MATCHES)

The analysis of technique execution over time was conducted for the three wrestling techniques that score the highest number of points across all matches (Table 9). This segment of the match should be considered separately for the senior, U23, and U20 age categories, where matches last 6 minutes (360 seconds), compared to the U17 category, where matches last 4 minutes (240 seconds).

Table 9. Timeline of technique execution by age groups (all matches)

AGE GROUPS	0-360 SECONDS	1-Nbr. points	I - Best technique	2-Nbr. points	II - Best technique	3-Nbr. points	III - Best technique
SENIORS	0-60 second	56	TAKE DOWN	40	SHOULDER TURNING THROW	34	GUT WRENCH
	61-120 second	272	GUT WRENCH	258	PASSIVITY	117	LIFT - SUPLEKS
	121-180 second	86	GUT WRENCH	46	STEP OUT	32	TAKE DOWN
	181-240 second	140	PASSIVITY	72	GUT WRENCH	36	STEP OUT
	210-300 second	50	LIFT - SUPLEKS	48	GUT WRENCH	38	TAKE DOWN
	301-360 second	29	STEP OUT	28	STANDING CHALLENGE	22	TAKE DOWN
U23	0-60 second	58	GUT WRENCH	50	TAKE DOWN	36	HIP TURNING THROV
	61-120 second	266	GUT WRENCH	222	PASSIVITY	108	LIFT - SUPLEKS
	121-180 second	62	GUT WRENCH	48	STEP OUT	36	TAKE DOWN
	181-240 second	117	PASSIVITY	56	GUT WRENCH	42	TAKE DOWN
	210-300 second	48	GUT WRENCH	34	LIFT - SUPLEKS	32	TAKE DOWN
	301-360 second	26	STEP OUT	24	STANDING CHALLENGE	16	STANDING COUNTER
U20	0-60 second	64	GUT WRENCH	46	TAKE DOWN	33	STEP OUT
	61-120 second	336	GUT WRENCH	199	PASSIVITY	129	LIFT - SUPLEKS
	121-180 second	48	GUT WRENCH	46	LIFT - SUPLEKS	28	STEP OUT
	181-240 second	108	PASSIVITY	76	GUT WRENCH	31	STEP OUT
	210-300 second	52	GUT WRENCH	28	LIFT - SUPLEKS	27	STEP OUT
	301-360 second	32	FORWARD BENDING THROW	26	STANDING COUNTER	23	STEP OUT
U17	0-60 second	176	PASSIVITY	128	GUT WRENCH	64	TAKE DOWN
	61-120 second	298	GUT WRENCH	72	LIFT - SUPLEKS	70	TAKE DOWN
	121-180 second	121	PASSIVITY	88	GUT WRENCH	52	TAKE DOWN
	181-240 second	56	TAKE DOWN	44	GUT WRENCH	42	SUPLEKS-THROW

### First minute of the match

Out of the 12 analyzed segments, the wrestling techniques GUT WRENCH and TAKE DOWN stand out as the most frequently executed in the first minute across all four age categories. Exceptions include SHOULDER TURNING THROW in seniors, HIP TURNING THROW in U23, and STEP OUT in U20.

### Second minute of the match

Across 12 analyzed segments, the most frequent techniques in three age categories are GUT WRENCH, PASSIVITY, and LIFT–SUPLEX. The only exception is the U17 category, where a significant number of points in the second minute were scored using TAKE DOWN.

### Third minute of the match

Across 12 segments, GUT WRENCH and TAKE DOWN are the most prominent techniques in all four age categories, while the STEP OUT segment stands out in three age groups (seniors, U23, U20). In U17, the highest number of points in the third minute was scored for PASSIVITY, which is expected given that the match lasts 2 + 2 minutes.

### Fourth minute of the match

Out of 12 analyzed segments, only GUT WRENCH is prominent across all age categories. In three age categories (seniors, U23, U20), PASSIVITY accounts for the highest number of points. In U17, the highest number of points in the fourth minute was scored using TAKE DOWN, GUT WRENCH, and SUPLEX.

### Fifth minute of the match

Out of nine analyzed segments, two techniques stand out across three age categories (seniors, U23, U20): GUT WRENCH and LIFT–SUPLEX. In seniors, GUT WRENCH is the most frequently executed technique in the fifth minute. In U20, STEP OUT also stands out in terms of points scored in this minute.

### Sixth minute of the match

Out of nine analyzed segments, only STEP OUT is prominent across the three age categories (seniors, U23, U20). Notably, in seniors and U23, a significant number of points were scored through STANDING CHALLENGE and TAKE DOWN. In U20, the highest number of points in the sixth minute was scored with FORWARD BENDING THROW. In both U23 and U20, a large number of points were scored using STANDING COUNTER.

## 10. MOST SUCCESSFUL WRESTLER (MSW)

Table 10. Review of the most successful wrestler (MSW) by age groups

AGE GROUPS	Wrestler	NAT	WEIGHT/CAT	MSW INDEX
SENIORS	ESMAEILI GHOLI	IRI	67 kg	5,67
U23	FAROKHISENJANI JAVAD	IRI	87 kg	8,05
U20	KHALMAKHANOV AYTJAN	UZB	63 kg	5,35
U17	MOHAMMADI BEHNAM	IRI	92 kg	5,68

Based on the analysis of the most successful champions by age category, data were obtained identifying which wrestlers were most successful according to four main criteria: I – the number of points scored and points conceded in relation to the total match duration; II – the number of classification points won and lost in relation to the total number of matches.

Out of the four age categories, **Iranian wrestlers (IRI)** were the most successful in three categories (seniors, U23, and U17). Only in the U20 category was the most successful wrestler from **Uzbekistan** (Table 10).

Considering the **MSW index**, the best wrestler in Greco-Roman style was the U23 champion, **FAROKHISENJANI JAVAD (IRI)**, with an index of **8.05**. This wrestler competed in five matches totaling

**20.07 minutes**, during which he scored **44 technical points** and conceded only **1 point**. He also earned **20 classification points**, conceding only **1 classification point**, meaning that all five matches were won by **technical superiority**.

## 11. WINNERS (CHAMPIONS) / WIN– LOST POINTS

Table 10 shows, by age category, which techniques the champions used to score the highest number of points in each category. The dominant technique (1st – best technique) in terms of points scored is GUT WRENCH, the second most effective technique (2nd – best technique) is TAKE DOWN, and the third (3rd – best technique) is PASSIVITY (Table 11).

Table 10. Win and lost points of the champions by age groups

AGE GROUPS	WIN – LOST pts	1.-%	I. - best technique	2.-%	II. - best technique	3.-%	III. - best technique
SENIORS	WIN POINTS	23.57	GUT WRENCH	16.73	TAKE DOWN	14.45	PASSIVITY
	LOST POINTS	48.98	PASSIVITY	12.24	FRONT HEAD LOCK	8.16	STEP OUT
U23	WIN POINTS	23.31	GUT WRENCH	16.54	TAKE DOWN	13.91	PASSIVITY
	LOST POINTS	38.78	PASSIVITY	16.33	SUPLEX THROW	12.24	STEP OUT
U20	WIN POINTS	22.00	GUT WRENCH	13.67	PASSIVITY	12.67	LIFT-SUPLEX
	LOST POINTS	35.29	PASSIVITY	13.24	STEP OUT	11.76	GUT WRENCH
U17	WIN POINTS	27.92	GUT WRENCH	12.99	TAKE DOWN	12.34	PASSIVITY
	LOST POINTS	26.51	PASSIVITY	14.46	STEP OUT	9.64	GUT WRENCH

Table 11. Frequency review of 1st, 2nd and 3th technique for win and lost points

WIN – LOST pts	TECHNIQUE	I - best technique	II - best technique	III - best technique
WIN POINTS	GUT WRENCH	4	0	0
	PASSIVITY	0	1	3
	TAKE DOWN	0	3	0
	LIFT-SUPLEX	0	0	1
LOST POINTS	GUT WRENCH	0	0	2
	PASSIVITY	4	0	0
	FRONT HEAD LOCK	0	1	0
	SUPLEX THROW	0	1	0
	STEP OUT	0	2	2

**Points Scored** – Champions in their respective weight categories scored the highest number of points using the GUT WRENCH technique. In three age categories (seniors, U23, and U17), the second most

important technique was TAKE DOWN. Points scored for PASSIVITY ranked third. The highest number of points for GUT WRENCH was recorded by champions in the U17 category, while the highest proportion of points from TAKE DOWN was observed in seniors (16.73%), as was the highest proportion for PASSIVITY (14.45%). Champions in the U20 category were particularly effective with the LIFT–SUPLEX technique (12.67%).

**Points Conceded** – Across all age categories, champions lost the most points due to PASSIVITY, with the highest proportion in the senior category (48.98%). This is understandable, as gold medalists lost very few points from other wrestling techniques compared to other age categories. Seniors also lost points through FRONT HEAD LOCK and STEP OUT.

In the U23 category, a notable number of points were conceded through SUPLEX THROW (16.33%) and STEP OUT (12.24%). In the U20 category, STEP OUT ranked second with 13.24% of points lost, followed by GUT WRENCH (11.76%) in third place. In the U17 category, the distribution of points conceded was similar to U20: STEP OUT (14.46%) and GUT WRENCH (9.64%).

## **KEY FINDINGS**

### **1. Wrestling efficiency (WQ) decreases with age**

Wrestlers under 17 years of age demonstrated the highest wrestling efficiency (points per minute), with a statistically significant decline observed when moving to the U20 age group. From U20 onwards (U20, U23, seniors), match intensity remained relatively stable, indicating a shift from high-tempo wrestling toward controlled and strategically oriented performance.

### **2. Transition phase occurs around age 20**

The most pronounced developmental change was observed between the U17 and U20 age groups. This transition phase is characterized by reduced scoring tempo, improved tactical control, and more selective use of offensive actions.

### **3. Standing wrestling remains dominant across all age categories**

In all age groups, the majority of points were scored from the standing position. However, the relative contribution of parterre actions increased in the U20 and U23 categories before slightly decreasing at the senior level.

### **4. Technical points decrease with age**

The proportion of points scored through technical actions decreases with age, while points from PASSIVITY, STEP OUT, and CAUTION show a relative increase. This reflects pronounced tactical control and match management, particularly in older age categories.

### **5. Limited age-related differences in most techniques**

For most individual technical-tactical actions, no significant differences were observed across age groups. This suggests that the overall technical repertoire remains relatively stable, while effectiveness and contextual application of techniques develop with age.

### **6. Selected techniques show clear developmental patterns**

A small number of techniques (e.g., **TAKE\_DOWN\_HEAD\_TO\_HEAD**, **SUPLEX**) exhibited significant age-related differences, highlighting their importance in differentiating competitive performance at higher levels.

### **7. Scoring the first point strongly affects match outcome**

Across all age categories, wrestlers who scored the first point had a significantly higher probability of winning the match. This effect remained consistent across all age groups, emphasizing the importance of early initiative in the bout.

## **IMPLICATIONS FOR UWW & COACHES**

### **Long-term wrestler development**

The results confirm that competitive development in Greco-Roman wrestling follows a nonlinear trajectory, with a clear transitional phase occurring around the age of 20. Therefore, training models should be adapted to reflect the specific demands of each age and weight category, rather than prematurely applying senior-level performance expectations (early specialization in U17).

### **Coach focus by age category**

**U17** – Encourage offensive initiative and high wrestling tempo, accept greater variability and error rates as part of development, and focus on technical diversity rather than result control.

**U20** – Gradually reduce unnecessary “point wastage” and develop match management skills.

**U23** – Refine efficiency of key techniques and emphasize control of rhythm and tempo.

**Seniors** – Focus on precision, timing, and efficiency, capitalize on opportunities to score the first point, and maintain balance between standing dominance and maximizing parterre technique effectiveness.

### **Strategic implications for UWW**

- Competition analysis should be integrated into coach education programs to support evidence-based decision making.
- This and similar analyses can serve as valuable tools for modifying wrestling rules, particularly to reduce the proportion of points from passivity and enhance the attractiveness and effectiveness of the Greco-Roman style.
- Data from this or similar analyses can be useful for preventing injuries and enhancing athlete safety during matches.