



COMPETITIVE EFFICIENCY ACROSS AGE CATEGORIES IN FREESTYLE WRESTLING (FS)

SENIORS, U23, U20, and U17

ANALYSIS OF PERFORMANCE INDICATORS AT THE 2025 WORLD CHAMPIONSHIPS

Dr Milorad Dokmanac & Dr Kristijan Slaćanac

CONTENTS

ABSTRACT	4
INTRODUCTION	4
METHODS	5
Data Source	5
Number of wrestlers (World Championships 2025 – Senior, U23, U20, U17) / GR-FS-WW	5
Number of matches (World Championships 2025 – Senior, U23, U20, U17) / GR-FS-WW	5
Number of tags (World Championships 2025 – Senior, U23, U20, U17) / GR-FS-WW	6
Performance Indicators	6
Data Processing	6

Analytical Approach.....	7
RESULTS AND DISCUSSION	7
Developmental Pathway of Competitive Performance in Freestyle Wrestling (U17, U20, U23, and Seniors)	7
Match Intensity (WQ – Points per Minute)	8
Distribution of Points: Standing vs. Parterre	8
Technical and Non-Technical Points.....	9
1. Overall Share of Points by Technical Segments (%)	9
Contribution of the Five Most Frequent Scoring Segments	10
Comparison of the Five Most Frequent Scoring Actions (Technical and Non-Technical Points)	11
2. Overview of Scoring Techniques by Weight Categories and Age Groups	12
3. WQ/min – by Age Category	13
WQ/min & PERIOD 1976–2025 (SENIORS ONLY)	15
4. Points in Percentage (%): Standing Position / Parterre Position	15
5. Points in Percentage (%): Technical Points / Other Points.....	16
Chi-Square Analysis: Technical vs. Non-Technical Points	17
6. Distribution of Matches by Type of Victory.....	17
7. National Team Performance – Highest Points / Top Three Teams	18
Comparative Analysis of Wrestling Techniques by Age Category	19
USA	20
UWW	21
IRI.....	21
JPN i KAZ	22
8. Overview of the Percentage Distribution of Points: “All Matches”, “Medal Matches (Final I–II, III–V)”, “All Matches of Winners – Gold Medalists”	22
9. Execution of Techniques According to Time Parameters (All Matches)	24
General Conclusion for Time Parameters.....	25
First Minute of the Match	25
Second Minute of the Match.....	26
Third Minute of the Match	26
Fourth Minute of the Match.....	26
Fifth Minute of the Match	26
Sixth Minute of the Match.....	27
10. Most Successful Wrestler (MSW)	27
11. Champions / Points Scored and Conceded	28
Percentage (%) of Points Scored by Champions.....	28
Champions / Points Conceded	29

Percentage (%) of Points Conceded by Champions	29
Frequency of Techniques Executed by Champions	30
KEY CONCLUSIONS.....	31
RECOMMENDATIONS FOR UWW AND WRESTLING COACHES	32
Strategic Implications for UWW	32
Long-Term Wrestler Development.....	32
Coaching Focus by Age Category.....	32
Training Focus.....	32
Training Methodology	33
Development of Key Technical Segments	33
First-Point Training	33
Standing Position and Mat Control	33
Parterre Development.....	34
Age-Specific Conditioning.....	34
Tactical Education.....	34
Long-Term Development Organization	34
Training Process Organization	35
Role of the Coach	35

ABSTRACT

This report presents a comprehensive analysis of competitive performance across all age categories (U17, U20, U23, and Senior) in freestyle wrestling, based on data collected from the 2025 World Championships. The aim of the study was to identify patterns of technical-tactical efficiency, scoring structure, positional contribution, and match intensity across age groups, with the objective of supporting long-term athlete development and coaching strategies based on empirical evidence.

The analysis reveals a clear developmental progression from the high-intensity and open style of wrestling observed at the U17 level toward more controlled and efficiency-oriented performances in the older age categories. Match intensity, expressed as points scored per minute of bout time (WQ), was significantly higher in the U17 category compared to all other age groups, followed by a pronounced decline when transitioning to the U20 category. From U20 to the senior level, WQ values stabilize, suggesting that further performance development is primarily based on tactical control and execution efficiency rather than an increase in technical volume or diversity.

The first scoring action showed a strong association with match outcome across all age categories, confirming the importance of early initiative and positional control at the elite competitive level. The findings identify the period up to the age of 20 as a critical transition phase in athlete development and highlight the need to define age-specific performance standards and training priorities.

This report provides practical insights for the **United World Wrestling (UWW)**, national federations, and coaches, contributing to better alignment between competitive demands and long-term athlete development models, as well as to 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 develop throughout the athlete development process has become one of the key priorities for international federations, national teams, and coaches.

Although previous research has mainly focused on senior wrestling, significantly less attention has been devoted to developmental transitions from cadet to senior categories, particularly through the use of objective, competition-based performance indicators. This lack of longitudinal analysis and research, competition-based evidence limits the ability of coaches and federations to design age-appropriate training models and clear performance criteria. World Championships provide a unique and standardized framework for such analyses, as they represent the highest level of competition in each age category (U17, U20, U23, and Senior) and reflect current global trends in wrestling performance.

A systematic analysis of technical-tactical actions, scoring structure, positional dominance (standing wrestling versus parterre), and match intensity enables a comprehensive understanding of how wrestling performance characteristics develop with age and increasing competitive maturity.

Freestyle wrestling (FS) has specific structural and tactical characteristics compared with Greco-Roman (GR), while sharing many similarities with women's wrestling (WW). Previous analyses have indicated a relatively stable level of efficiency and attractiveness in freestyle wrestling compared with Greco-Roman wrestling. In this context, the primary objective of this report is to analyze and compare competitive performances in freestyle

wrestling (FS) across all age categories by applying detailed technical-tactical indicators and measures of match intensity derived from data collected at World Championships.

Special emphasis is placed on:

- differences in scoring structure,
- the contribution of different wrestling positions to the total number of points scored (standing and parterre),
- the distribution of technical and other points,
- wrestler efficiency expressed as points scored per minute of bout time (WQ/min),
- key actions and technical-tactical patterns that differentiate age categories.

By identifying stable patterns and critical transition points within the athlete development pathway, this report aims to provide practical, evidence-based insights for coaches, performance analysts, and decision-makers within the United World Wrestling (UWW). The findings are intended to contribute to the improvement of long-term athlete development strategies, optimization of age-specific training priorities, and continuous enhancement of elite competitive performance in freestyle wrestling (FS)

METHODS

Data Source

The analysis was based on official match data from World Championships organized by United World Wrestling (UWW), covering four age categories: U17, U20, U23, and Senior. All data were obtained from the official UWW public data platform, the Performance Data Analysis system (PDA) (<http://uww.io/wpar>).

Only freestyle wrestling (FS) matches were included in this report. All performance indicators were derived from official match results and competition records.

Number of wrestlers (World Championships 2025 – Senior, U23, U20, U17) / GR-FS-WW

Table 1. Number of wrestlers at the 2025 World Championships by age categories and styles.

Sn	COMPETITIONS	GR	FS	WW	TOTAL
1.	U17 SVETSKO PRVENSTVO	246	233	183	662
2.	U 20 SVETSKO PRVENSTVO	231	231	186	648
3.	U23 SVETSKO PRVENSTVO	255	241	189	685
4.	SENIOR SVETSKO PRVENSTVO	278	293	205	776
	TOTAL =	1.010	998	763	2.771

Number of matches (World Championships 2025 – Senior, U23, U20, U17) / GR-FS-WW

Table 2. Number of matches at the 2025 World Championships by age categories and styles.

Sn	COMPETITIONS	GR	FS	WW	TOTAL
1.	U17 SVETSKO PRVENSTVO	288	275	218	781
2.	U 20 SVETSKO PRVENSTVO	272	272	220	764
3.	U23 SVETSKO PRVENSTVO	299	282	224	805
4.	SENIOR SVETSKO PRVENSTVO	320	339	241	900
	TOTAL =	859	829	662	2.350

Table 3. Number of tags at the 2025 World Championships by age categories and styles.

Sn	COMPETITIONS	GR	FS	WW	TOTAL
1.	U17 SVETSKO PRVENSTVO	1.287	1.451	991	3729
2.	U 20 SVETSKO PRVENSTVO	1.345	1.644	1.113	4102
3.	U23 SVETSKO PRVENSTVO	1.373	1.699	1.127	4199
4.	SENIOR SVETSKO PRVENSTVO	1.444	1.876	1.149	4469
	TOTAL =	5.449	6.670	4.380	16.499

The previous three tables (Tables 1–3) present the basic data from four World Championships held in 2025: Senior, U23, U20, and U17, across all three Olympic wrestling styles.

All matches were analyzed, covering a total of **2,771 wrestlers** (Table 1) across the four age categories and all three wrestling styles.

In order to collect all the data required for this analysis, a **video review of 2,350 matches** (Table 2) was conducted across the four age categories and all three wrestling styles.

In total, **16,499 actions** were recorded in all matches across these four World Championships (Table 3), including all age categories and all three wrestling styles.

Based on this extensive dataset, a large amount of significant information was obtained regarding the characteristics of wrestling matches at the World Championships. Numerous comparative and expert analyses were conducted using different performance parameters across all four age categories.

Based on the results obtained, **specific conclusions were drawn and recommendations formulated**, which are presented at the end of this report and are of great importance for each of the four age categories.

Performance Indicators

Each match was analyzed using a standardized set of performance indicators, which included:

- technical-tactical variables (executed techniques in standing and parterre positions),
- scoring actions classified as technical and non-technical points,
- the contribution of wrestling position to the total number of points scored (standing position vs. parterre),
- match duration and the total number of points scored per minute of the bout,
- match intensity and wrestler efficiency expressed as points scored per minute of wrestling (WQ/min).

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

Data Processing

Performance indicators were calculated at the level of individual wrestlers and matches and then grouped according to age categories. To ensure comparability between age groups, selected indicators were expressed in relative or standardized forms (e.g., points per match, points per minute).

To assess differences between age categories, nonparametric statistical procedures (Kruskal–Wallis test) were applied where methodologically appropriate. Data processing and analysis were conducted using the Python programming language, employing standard analytical libraries such as Pandas, NumPy, and Matplotlib.

Analytical Approach

Comparisons between age categories were performed with the aim of identifying patterns and developmental changes in competitive performances. Nonparametric statistical methods were used in cases where the data distribution did not meet the assumptions of normality. Results were presented through a combination of descriptive statistics, graphical representations, and selected inferential analyses to support interpretation of the findings.

The focus of the analysis was not on individual athletes or national teams, but rather on identifying global developmental trends that characterize each age category at the World Championship level organized by United World Wrestling.

RESULTS AND DISCUSSION

Developmental Pathway of Competitive Performance in Freestyle Wrestling (U17, U20, U23, and Seniors)

The most important developmental transition occurs in the **U20 and U23** age groups. In the **U23** category, Graph 1 clearly shows the most pronounced change, indicating that **U23** represents a key transitional phase between junior and senior wrestling. This stage appears to be associated with the stabilization of technical-tactical performance.

The developmental transition from the **U17** category to the senior level of competition is characterized by a gradual reduction in match intensity, expressed through the number of points scored per minute of wrestling (WQ/min). Similar findings were observed in Greco-Roman wrestling as well as in the variable *Standing_pts*. These results indicate that with increasing age (**U17–Seniors**), wrestlers demonstrate improved tactical control and greater defensive stability. In other words, **younger age groups tend to score more points per minute because defensive systems are less developed and matches are more open. In contrast, senior wrestling is characterized by fewer mistakes and greater positional control.**

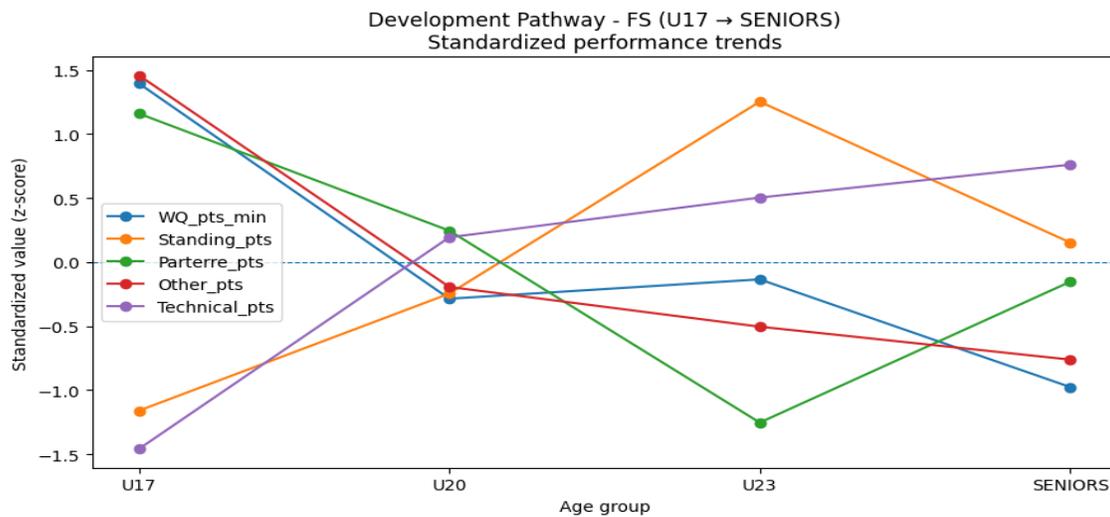
A key developmental effect is visible in the *Standing_pts* variable, which reflects the quality of offensive actions and the tactical setup of attacks. This confirms that progression toward the elite level is strongly associated with dominance in the standing position.

The *Parterre_pts* variable shows a “U-shaped” pattern, indicating that older age groups (especially seniors) make greater use of highly specialized techniques such as **ankle lace, leg attacks, and gut wrench.**

The *Other_pts* variable demonstrates an increase in the share of passivity calls and warnings with increasing age, suggesting that matches become tactically more complex.

Overall, the general developmental model in freestyle wrestling (FS) shows:

- a high pace, high scoring, and lower control at the U17 level;
- the initial formation of tactical structure at U20;
- dominance of standing techniques and stabilization of technical execution at U23;
- and finally, at the senior level, a slower pace, high tactical control, and a greater role of match management strategy.



Graph 1. Overview of competitive performance across four age categories (Senior, U23, U20, and U17) in freestyle wrestling (FS).

Match Intensity (WQ – Points per Minute)

With increasing age category, a continuous decrease in match intensity was observed, expressed through the number of points scored per minute of wrestling (WQ/min). Younger wrestlers tend to adopt a riskier style of wrestling (particularly in **U20** and **U17**), characterized by higher activity levels, a greater number of technical errors, and a lower degree of tactical control.

This trend was especially evident in 2025 among **U17** wrestlers, who recorded an exceptionally high WQ/min value of **3.09 points per minute**. In contrast, senior wrestlers demonstrate a slower competitive pace, greater selectivity in offensive actions, and superior control of the match flow.

This shift indicates a transition from activity-based scoring toward performance based on efficiency and an optimal balance between risk and point scoring.

Distribution of Points: Standing vs. Parterre

Points scored from the parterre position in freestyle wrestling show no major deviations across age categories. All values are close to the overall average distribution, which is **65.98% of points scored from the standing position** and **34.02% from the parterre position**.

A slightly higher percentage of standing points was observed in the **U23 category (68.62%)**, while the **U20 category showed the highest share of parterre points (37.40%)**. However, these differences represent only minor deviations from the overall average.

In general, it can be concluded that across all age categories more points are scored from the standing position, while differences between age groups remain relatively small and not statistically substantial.

Technical and Non-Technical Points

A similar pattern to the standing–parterre distribution was observed in the proportion of technical versus non-technical points. Again, there were no major deviations from the average values.

On average, **82.57% of points were technical**, while **17.43% were non-technical points**. A somewhat higher deviation was observed in the **U20 category**, where **85.86% of points were scored through executed wrestling techniques**. This is an important indicator, suggesting that U20 wrestlers achieve a large proportion of their points through active wrestling actions rather than receiving points primarily through “activity time” or other non-technical scoring situations.

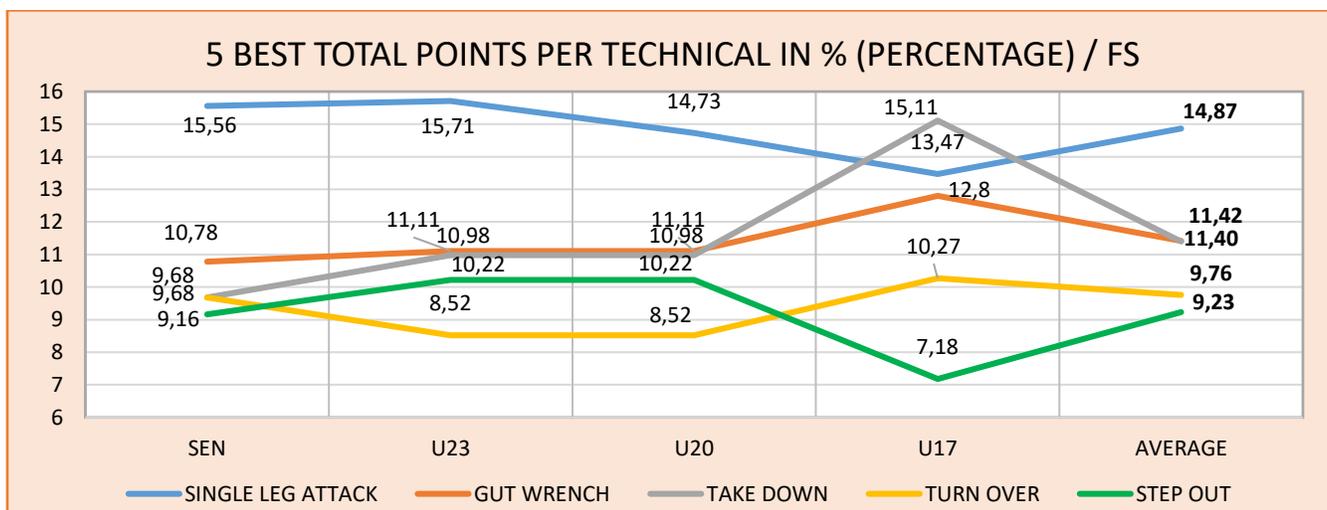
It is also expected that the **senior category shows a slightly higher proportion of non-technical points (19.15%)**, as senior matches often involve greater tactical maneuvering "interrogating the opponent", particularly in the early stages of the bout when points for passivity or activity time are more frequently awarded.

Unlike Greco-Roman wrestling, freestyle wrestling (FS) does not show large or significant variations in these indicators across age categories, as most values remain close to the overall averages.

1. Overall Share of Points by Technical Segments (%)

Out of a total of **23 identified scoring segments** in the match analysis, Graph 2 presents **five segments (variables) that accounted for more than 9% of the total number of points scored**.

Of these five segments, **four represent points obtained through wrestling techniques**, while the **fifth segment corresponds to points awarded for penalizing stepping out of bounds (step-out)**.



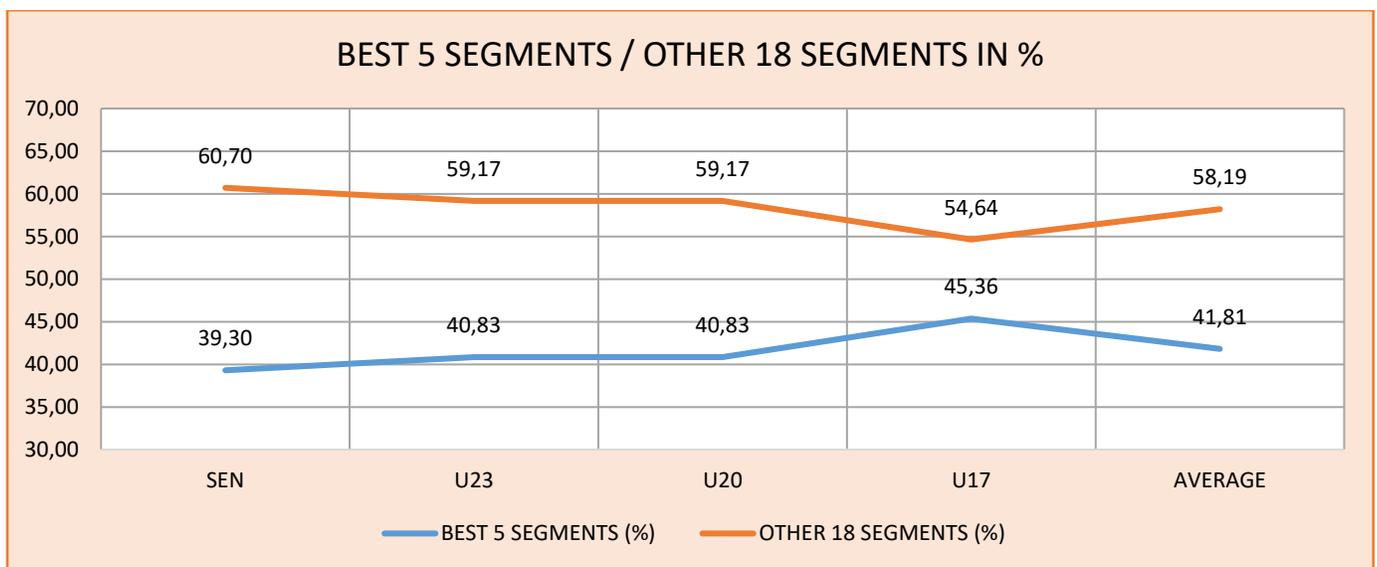
Graph 2. Five most frequent scoring categories (technical techniques and non-technical points) across age groups (U17, U20, U23, and Senior) in freestyle wrestling.

Contribution of the Five Most Frequent Scoring Segments

The analysis of the contribution of the **five most frequent scoring segments** across the entire sample shows that their combined share of the total scoring ranges from **39.30% to 45.36%**, with an **average value of 41.81%** (Graph 3).

A noticeable deviation appears in the **youngest age group (U17)**, where the percentage of points scored through the five most frequent segments is significantly higher (**45.36%**). In this category, **three segments individually account for more than 12% of the total points scored**.

This indicates that younger wrestlers tend to score points through a **smaller number of technical elements**, which may not represent an optimal developmental pattern. Such a distribution suggests a tendency toward **early technical specialization in the U17 category**, rather than a broader technical repertoire.



Graph 3. Overview of competitive performance across four age categories (Senior, U23, U20, and U17) in freestyle wrestling.

Table 4 presents an overview of all **technical-tactical variables (a total of 23 segments)** across age categories, expressed as percentages (%). Based on the data in this table, it is possible to conduct a detailed comparison of the **scoring structure across different age groups**.

The table highlights the **percentage of points scored through dominant wrestling techniques as well as other non-technical scoring actions (top five segments)** across all segments and all matches in freestyle wrestling (FS) for the four age categories.

Table 4. Overview of all technical-tactical variables by age category expressed in percentages (%).

Rb	WRESTLING TECHNIQUE	SEN	U23	U20	U17	PROSEK%
1.	SINGLE LEG ATTACK	15.56	15.71	14.73	13.47	14.87
2.	GUT WRENCH	10.78	11.11	10.99	12.80	11.42
3.	TAKEDOWN	9.68	10.98	9.82	15.11	11.40
4.	TURN OVER	9.68	8.52	10.58	10.27	9.76
5.	STEP OUT	9.16	10.22	10.34	7.18	9.23

6.	DOUBLE LEG ATTACK	8.39	7.05	6.98	5.43	6.96
7.	ANCLE LACE	7.17	4.93	7.81	6.03	6.49
8.	FORWARD BENDING THROV	5.30	6.06	5.57	7.37	6.08
9.	ACTIVITY TIME	6.92	4.76	4.25	4.35	5.07
10.	PARTERRE COUNTER	0.46	3.49	4.46	5.95	3.59
11.	SUPLEX THROW	2.08	4.23	2.63	4.69	3.41
12.	TAKE DOWN HEAD TO HEAD	2.70	3.53	5.05	0.00	2.82
13.	HIP TURNING THROV	2.33	2.43	1.11	1.64	1.88
14.	STANDING COUNTER	1.59	1.93	1.04	1.49	1.51
15.	STANDING CHALLENGE	1.16	1.13	1.35	1.04	1.17
16.	STANDING CAUTION	0.83	1.10	1.14	0.63	0.93
17.	FRONT HEAD LOOCK	0.98	0.67	0.00	1.04	0.67
18.	SHOULDER TURNING THROW	0.55	0.47	1.24	0.07	0.58
19.	PARTERRE CHALLENGE	0.46	0.70	0.35	0.45	0.49
20.	PARTERRE CAUTION	0.46	0.63	0.41	0.37	0.47
21.	LIFTS – REVERSE GRIP	0.12	0.33	0.14	0.30	0.22
22.	NEGATIVE WRESTLING	0.15	0.03	0.03	0.11	0.08
23.	LIFTS – SUPLEX	0.00	0.00	0.00	0.19	0.05

Legend: **Red color** – highest result by wrestling technique / **Green color** – lowest result by wrestling technique

Comparison of the Five Most Frequent Scoring Actions (Technical and Non-Technical Points)

I – Single Leg Attack

Across the four age categories, the **single leg attack** represents the most frequently used scoring technique. On average, it accounts for **14.87%** of all points scored across the four categories. The only exception is the **U17 category**, where this technique is not the most dominant. It is used significantly more often in the two older age groups (**Senior and U23**) compared with the younger categories (**U20 and U17**).

II – Gut Wrench

The contribution of the **gut wrench** to the total number of points scored ranges from **10.78% to 12.80%** across all age groups. The **lowest percentage** was recorded in the **Senior category (10.78%)**, while the **highest share** was observed in **U17 (12.80%)**.

One possible explanation is that **U17 wrestlers possess less physical strength compared with seniors**, which makes defensive actions against gut wrench techniques less effective. Another reason may be that **younger wrestlers tend to continue attacking actively in the parterre position after achieving control**, whereas senior wrestlers often secure the initial **two points for exposure or control** and do not continue with extended parterre sequences as frequently.

III – Takedown

The **takedown** action is most frequent in the **U17 category (15.11%)**, while the **lowest proportion** of points from this action appears in the **Senior category (9.68%)**. This pattern reflects a stronger emphasis on **open standing exchanges and a more dynamic style of wrestling** in the youngest age category (U17).

IV – Turn Over

The **turn over technique** is most common in the **U20 category (10.58%)**, while the **lowest occurrence** is observed among **U23 wrestlers (8.52%)**.

V – Step-Out

Regarding **step-out points**, the highest share is recorded in the **U20 category (10.34%)**, while a significantly lower proportion appears in **U17 (7.18%)**.

2. Overview of Scoring Techniques by Weight Categories and Age Groups

The analysis of points scored by **weight category** (Table 5) shows that wrestlers competing in the **74 kg weight class** demonstrate the **widest technical repertoire at the senior level**, achieving the highest number of points through **four different wrestling techniques**. The **largest number of points in the 74 kg category** was scored using the **gut wrench technique (72 points)**.

In the **U23 age category**, the **97 kg weight class** stands out as dominant, as wrestlers in this category achieved the highest number of points in **five different wrestling techniques** compared with other weight classes. The **largest number of points in 97 kg** was scored through **takedowns (50 points)**.

In the **U20 category**, the **79 kg weight class** is dominant, with wrestlers from this class achieving the highest scores in **four techniques**. The **largest number of points in 79 kg** was obtained through **turn over techniques (54 points)**.

In the **U17 category**, the **71 kg weight class** appears dominant, as wrestlers in this class scored the highest number of points in **six different techniques**, indicating a high level of **technical versatility** within this group. However, wrestlers from this category did not achieve the highest scores within the **five most common scoring techniques overall**. The **largest number of points in the 71 kg class** was scored using the **suplex throw (33 points)**, which is somewhat unusual given that this technique is less commonly used for scoring in freestyle wrestling.

Table 5. Highest number of points scored according to technique, weight category, and age group

Sn	WRESTLING TECHNIQUE	SEN		U23		U20		U17		UKUPNO POENA	PROSEČNO POENA
		Cat/kg	pts	Cat/kg	pts	Cat/kg	pts	Cat/kg	pts		
1.	SINGLE LEG ATTACK	92	66	74	78	61	56	65	56	256	64.00
2.	GUT WRENCH	74	72	70 74	50	92	58	51	56	236	59.00
3.	TAKEDOWN	74	60	97	50	79	42	80 65 55	48	200	50.00
4.	TURN OVER	61	62	97	42	79	54	51	34	192	48.00
5.	STEP OUT	97	46	92	50	79 74	47	110	37	180	45.00
6.	ANKLE LACE	86	52	61	42	65	54	60	30	178	44.50
7.	DOUBLE LEG	74	52	97 65	32	97	32	60	26	142	35.50
8.	FORWARD BENDING THROV	92	24	74	36	79	41	51	32	133	33.25
9.	SUPLEX THROV	86	16	70	20	92	28	71	33	97	24.25
10.	ACTIVITY TIME	74 92 97	28	79	22	57	14	71	18	82	20.50
11.	TAKE DOWN HEAD TO HEAD	57	20	70	24	92 97	28	0	0	72	18.00
12.	HIP TURNING THROV	65	28	79	17	57	8	71	10	63	15.75
13.	FRONT HEAD LOOCK	61	8	61	8	0	0	71	16	32	8.00
14.	SHOULDER TURNING THROW	57	4	97	6	57	16	71	2	28	7.00
15.	LIFTS – REVERSE GRIP	70	4	97	4	57	4	71	6	18	4.50
16.	LIFT - SUPLEX	0	0	0	0	0	0	65	5	5	1.25

When analyzing points according to the highest number of points scored by wrestling techniques and weight categories, regardless of age group, the following patterns emerge:

I – Single Leg Attack

The **single leg attack** yields the highest total number of points and is dominant mainly in **middle weight categories** (74 kg, 61 kg, and 65 kg), as well as in the **92 kg category at the senior level**.

II – Gut Wrench

The **gut wrench** technique is most frequently used by **Seniors and U23 wrestlers in the 74 kg category**, by **U20 wrestlers in the 92 kg category**, and by **U17 wrestlers in the 51 kg category**.

III – Takedown

The **takedown** is most often applied in **middle weight categories** for **Seniors, U20, and U17**, while in **U23**, it is most frequent in the **97 kg category**.

IV – Turn Over

The **turn over** technique is most represented in the following weight categories: **Seniors – 61 kg, U23 – 97 kg, U20 – 79 kg, U17 – 51 kg**.

V – Step-Out Points

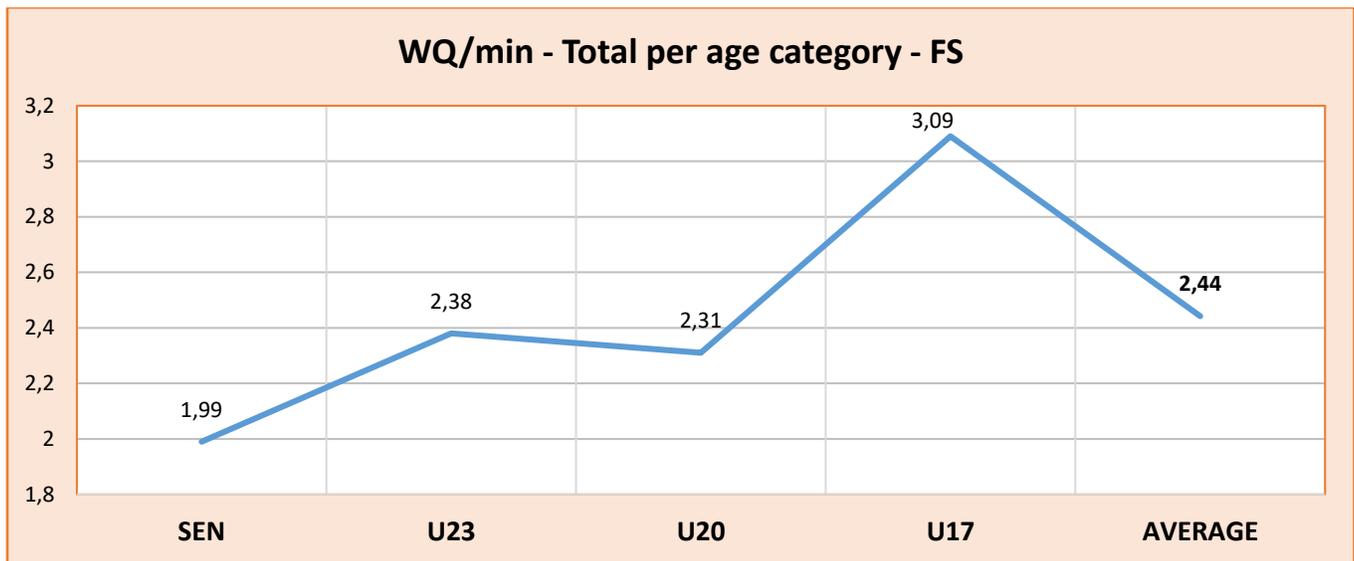
The highest number of points awarded for **step-out** occurs in **heavy weight categories** for **Seniors, U23, and U17** (97 kg, 92 kg, and 100 kg). In **U20**, the greatest number of points with this technique was recorded in the **79 kg and 74 kg categories**.

3. WQ/min – by Age Category

The **WQ/min index** is one of the most important indicators in analyzing match quality, as it reflects the **number of points scored per minute of wrestling** (points/min). Higher values of this index indicate **faster, more dynamic, and audience-attractive wrestling**.

The **WQ/min values** obtained in this analysis (Graph 4) align with expectations, confirming the trend of **decreasing points per minute with increasing age category**.

The **U17 category shows an exceptionally high WQ/min value of 3.09**, reflecting the faster pace and higher activity level of matches in this youngest age group.



Graph 4. WQ – Points per minute by age category, 2025 – GR.

The **lowest points-per-minute value** was recorded in the **senior age category (1.99 points/min)**. Although this index remains relatively high, a **slight decline** has been observed compared with the last three years (Graph 4).

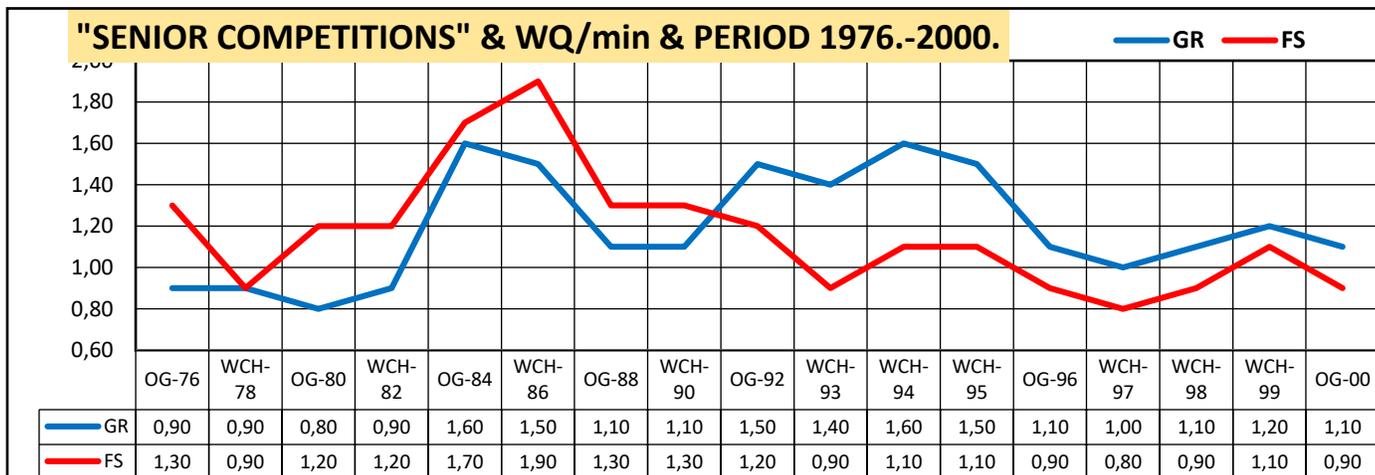
With increasing age categories, wrestlers demonstrate a **higher level of tactical preparation**, resulting in fewer risky situations and a tendency to attempt **fewer high-risk techniques**. In contrast, younger wrestlers show a **greater propensity for risk**, frequently attempting throws and high-risk maneuvers.

Another factor contributing to the **lower points-per-minute in older categories** is the significant difference in **physical strength** compared with U17 wrestlers. With increased strength, athletes can **neutralize opponents more efficiently** and better prevent conceding points.

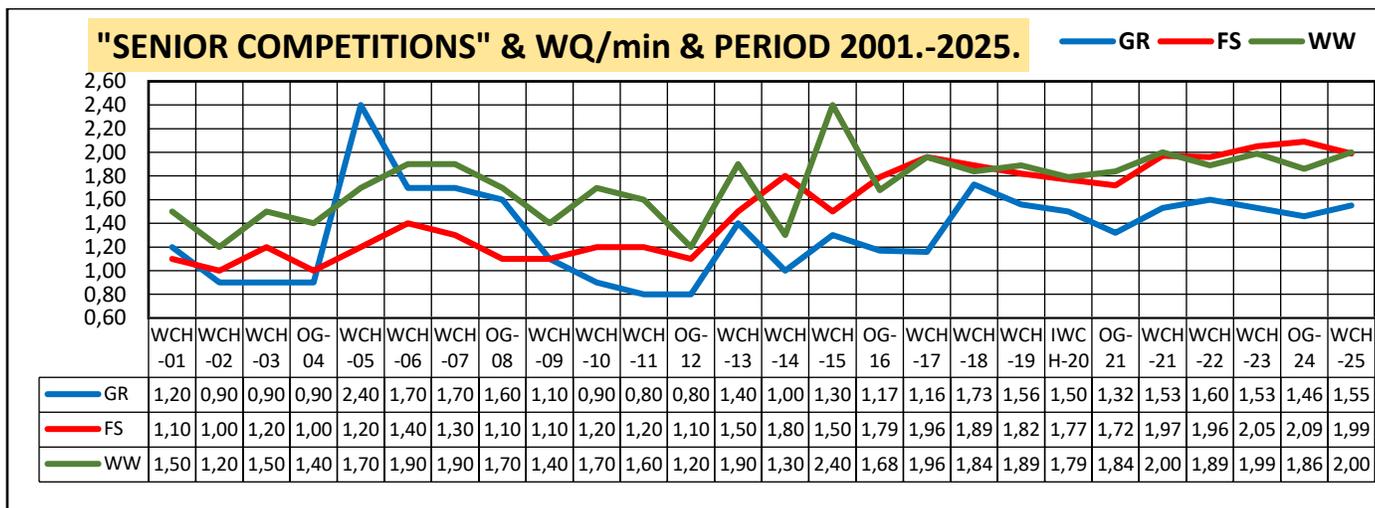
When compared with the other two Olympic wrestling styles (**Greco-Roman and Women’s Wrestling**), **freestyle (FS)** shows a **significantly higher WQ/min index** across all four age categories compared with Greco-Roman. For Women’s Wrestling (WW), FS is significantly better in three age categories; only in the **senior WW category** is WQ/min slightly higher at **2.00 points/min**, compared with **1.99 in FS**.

Graphs 5 and 6 present, for the first time since 2015 (when Dr. Tunnemann concluded his analyses of major world competitions), **complete data from major international tournaments (World Championships and Olympics) for the WQ/min index**. These graphs are highly significant for tracking trends in elite-level wrestling.

Since 2025, analyses have included **all age categories (Senior, U23, U20, and U17)**. For the **U23 category**, WQ/min has been continuously monitored since 2021. From 2025 onward, analyses will be conducted in all four age categories, allowing **longitudinal tracking of performance trends in younger age groups**.



Graph 5. WQ – points per minute by age categories, 1976–2000 – GR/FS



Graph 6. WQ – points per minute by age categories, 2001–2025 – GR/FS/WW

4. Points in Percentage (%): Standing Position / Parterre Position

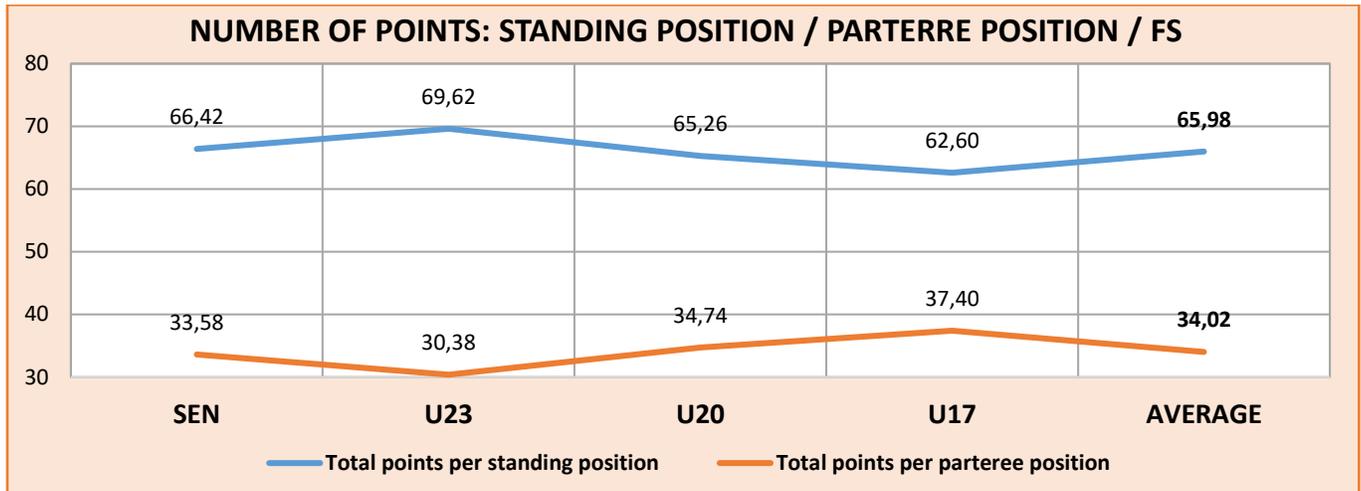
The results show that, on average, **65.98% of points are scored from the standing position** (Graph 7), with the **largest contribution coming from points scored via the single leg attack (14.87%)**.

Wrestlers who scored the **first point won 79.5% of matches**. Logistic regression indicated that **scoring the first point is a strong and statistically significant predictor of victory** ($\beta = 2.72$; $p < 0.001$), with the odds of winning being approximately **15 times higher** for the wrestler who scores first. The model explained about **27% of the variation in match outcome** (Pseudo $R^2 = 0.269$).

Differences in points scored from **standing versus parterre positions** generally fall within the expected range, except for slight deviations in certain age categories:

- **U17** shows a slightly higher proportion of points from the parterre position (**37.40%**).
- **U23** shows a slightly higher proportion of points from the standing position (**69.62%**) (Graph 4).

A **Chi-square test** revealed a **statistically significant association** between age category and the distribution of points scored from standing and parterre positions in freestyle wrestling ($\chi^2 = 32.348$; $df = 3$; $p < 0.001$). However, **Cramér's V = 0.052** indicates a **very weak strength of association**, suggesting that, although statistically detectable differences exist between age groups, the **method of scoring from standing versus parterre positions remains relatively stable** across developmental categories, with limited practical significance.

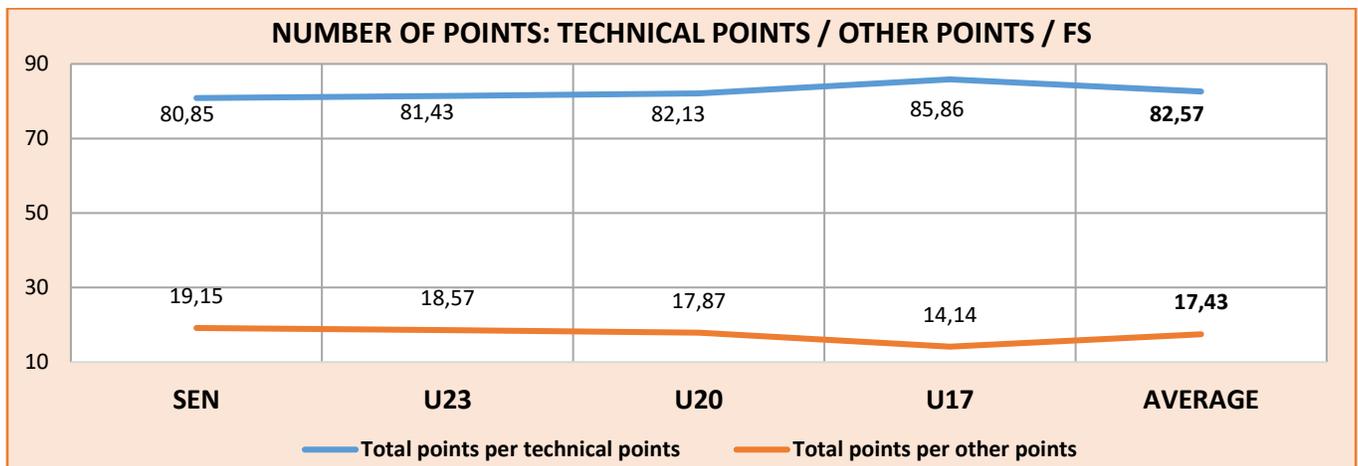


Graph 7. Distribution of points from standing and parterre positions (%) by age categories.

5. Points in Percentage (%): Technical Points / Other Points

The results for **technical and non-technical points** fall within the expected range (Graph 8). **Fluctuations between technical and non-technical points are minimal**, with a range of only about 5%.

- In the **senior category**, the highest level of **tactical maneuvering** is observed, resulting in a slightly higher proportion of points scored through **activity time** and **opponent step-out** actions (**19.15%**).
- In the **U17 category**, the **lowest proportion of non-technical points** is recorded at **14.14%**.



Graph 8. Distribution of technical and non-technical points (%) by age categories.

Chi-Square Analysis: Technical vs. Non-Technical Points

The **chi-square analysis** revealed a **statistically significant association** between age category and the proportion of **technical versus non-technical points** ($\chi^2 = 29.684$; $df = 3$; $p < 0.001$, Cramér's $V = 0.050$).

Although the **effect size is very small** (Cramér's $V = 0.050$), the results indicate a statistically meaningful relationship between age category and **scoring structure**. These findings suggest that with **increasing age**, there are **slight changes in the relative share of technical and non-technical points**.

- **Technical actions** remain the dominant source of points across all age categories.
- The **proportion of non-technical points** slightly increases in older age groups, reflecting **greater tactical control** and the **increasing role of strategic elements** in higher-level competitions.

6. Distribution of Matches by Type of Victory

Data from **Table 6** show that in the **senior category**, the **largest share of matches ended after the full 6 minutes of wrestling (59.6%)**, with:

- **46.3%** classified as **VPO1** – victory by points with the opponent scoring,
- **13.3%** classified as **VPO** – victory by points without the opponent scoring.

These represent **wins by points**, either with or without points scored by the defeated wrestler.

Table 6. Type of victory by age category (%).

AGE CATEGORY	VPO1	VSU	VPO	VFA	VSU1	VIN	VFO	VCA
SENIORI	46.3	22.7	13.3	5.3	10.0	1.5	0.9	0.0
U23	37.6	26.6	7.4	7.8	17.4	1.8	1.4	0.0
U20	43.4	25.0	7.0	9.9	12.5	1.1	0.7	0.4
U17	48.0	28.4	8.4	7.6	6.2	0.7	0.7	0.0
AVERAGE =	43.8	25.7	9.0	7.7	11.5	1.3	0.9	0.1

Legend:

- **VPO1** – Victory by points (**opponent scored points**)
- **VSU** – Victory by technical superiority (**opponent scored no points**)
- **VPO** – Victory by points (**opponent scored no points**)
- **VFA** – Victory by fall
- **VSU1** – Victory by technical superiority (**opponent scored points**)
- **VIN** – Victory due to injury (if a wrestler was injured before or during the match)
- **VFO** – Victory by forfeit (if a wrestler did not appear on the mat)
- **VCA** – Victory due to **3 cautions** against the opponent during the match

The **highest share of victories by fall (VFA 5-0)** was recorded in the **U20 age category (9.9%)**, indicating that **coaches should focus more on defending from the bridge position** in this age group.

In the **U23 category**, the **largest share of victories was by technical superiority**, both with and without points scored by the opponent (**VSU 4-0 and VSU1 4-1**), totaling **44.0%**.

It can be concluded that as the age category increases, the percentage of wins due to **injury** also increases (**0.7% for U17 to 1.8% for U23**) (**VIN 5-0**).

7. National Team Performance – Highest Points / Top Three Teams

Analysis of the **most successful national teams based on total points scored** across the four age categories (Table 7) shows that the **USA national team stands out**, ranking among the **top three teams in all categories**.

- In **senior, U23, and U20**, the USA scored the **highest number of points**, while in **U17**, it ranked **second**.
- The **UWW team** was also among the **top three teams in three age categories**. It is important to note that the UWW team included wrestlers from **two countries (Russia and Belarus)**, resulting in **more than 10 wrestlers per age category**, which affected the total points scored (**58 wrestlers**) compared to other countries, which had a maximum of **40 wrestlers** across all four age categories.
- Similarly, the **Iranian team** ranked among the **top three teams in three age categories**.

The **most frequently used techniques (top technique)** based on points scored across all nations and age categories are:

1. **Single leg attack**
2. **Double leg attack**
3. **Gut wrench**
4. **Ankle lace**

Table 7. Top three national teams by age category and the three most frequently used techniques (by points scored).

AGE CAT.	NATION	I best technique	points	II best technique	points	III best technique	points	UKUPNO poena
SENIORI	USA	DOUBLE LEG ATTACK	52	SINGLE LEG ATTACK	44	GUT WRENCH	38	303
						TAKE DOWN	38	
	UWW	SINGLE LEG ATTACK	42	TURN OVER	34	ACTIVITY TIME	29	280
	IRI	SINGLE LEG ATTACK	48	TAKE DOWN	44	STEP OUT	32	243
U23	USA	SINGLE LEG ATTACK	74	DOUBLE LEG ATTACK	40	TAKE DOWN	22	289
	IRI	GUT WRENCH	40	SINGLE LEG ATTACK	38	TAKE DOWN	36	268
				STEP OUT				
JPN	SINGLE LEG ATTACK	38	FORWARD BENDING THROW	28	STEP OUT	26	255	
					ANKLE LACE			
						TURN OVER		
U20	USA	SINGLE LEG ATTACK	88	DOUBLE LEG ATTACK	46	ANKLE LACE	44	358
	UWW	SINGLE LEG ATTACK	60	TURN OVER	52	GUT WRENCH	42	340
	KAZ	ANKLE LACE	50	GUT WRENCH	32	TURN OVER	30	245
U17	UWW	GUT WRENCH	58	TAKE DOWN	48	SINGLE LEG ATTACK	32	292
	USA	SINGLE LEG ATTACK	48	TAKE DOWN	44	GUT WRENCH	36	265
	IRI	SINGLE LEG ATTACK	46	TAKE DOWN	42	STEP OUT	33	261

When observing the **frequency of executed actions** (Table 8), the following patterns emerge:

- **Single leg attack** is the **most frequently used technique** across all national teams, appearing **11 times** among the top three techniques per team. The only exception is the **U20 age category**, where single leg attack does **not** appear among the top three techniques.
- **Takedown** ranks **second** with a total of **7 frequencies**. The exception is again the **U20 category**, where this technique is **not among the top three** in any national team.
- **Gut wrench** ranks **third**, appearing **6 times** among the top three techniques. In the **Iranian team (U23)** and the **UWW team (U17)**, this technique occupies the **first position**.

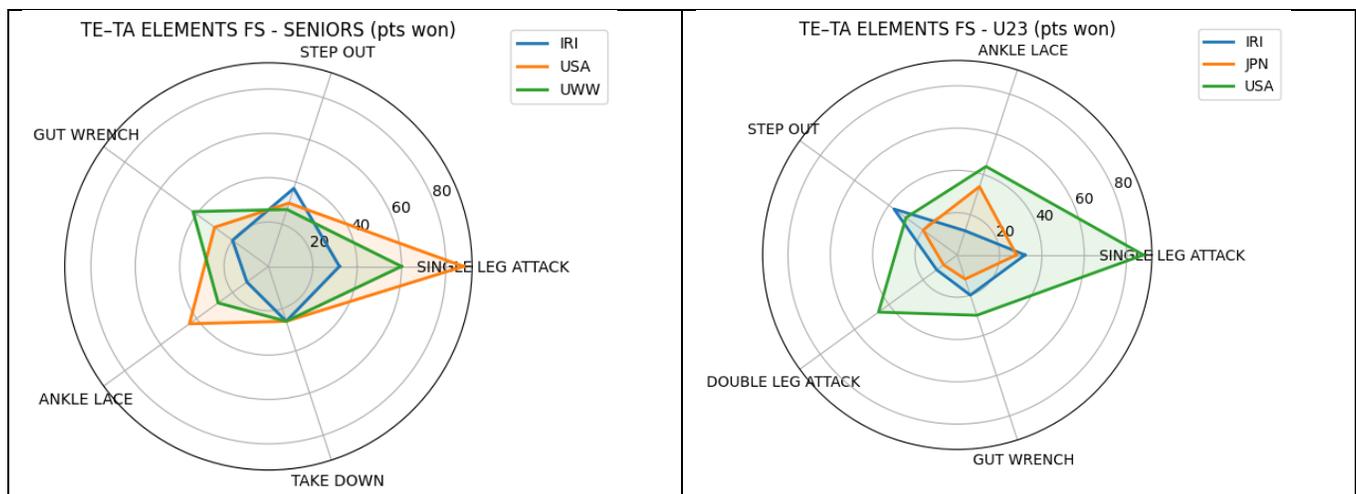
Considering the **total points scored**, the **single leg attack** stands out with **558 points**, followed by **take down** with **274 points**, and **aufrajzer (gut wrench)** with **246 points**.

Table 8. Frequency and points scored for the first, second, and third most used techniques across all age categories.

Sn	Technique	I best technique		II best technique		III best technique		TOTAL frekv.	TOTAL points
		Frek.	Points	Frek.	Points	Frek.	Points		
1.	SINGLE LEG ATTACK	8	444	2	82	1	32	11	558
2.	GUT WRENCH	2	98	1	32	3	116	6	246
3.	DOUBLE LEG ATTACK	1	52	2	86			3	138
4.	ANKLE LACE	1	50			2	70	3	120
5.	TAKEDOWN			4	178	3	96	7	274
6.	FORWARD BENDING THROW			1	28			1	28
7.	STEP OUT			1	38	3	91	4	129
8.	TURN OVER			2	86	2	56	4	142
9.	ACTIVITY TIME					1	29	1	29

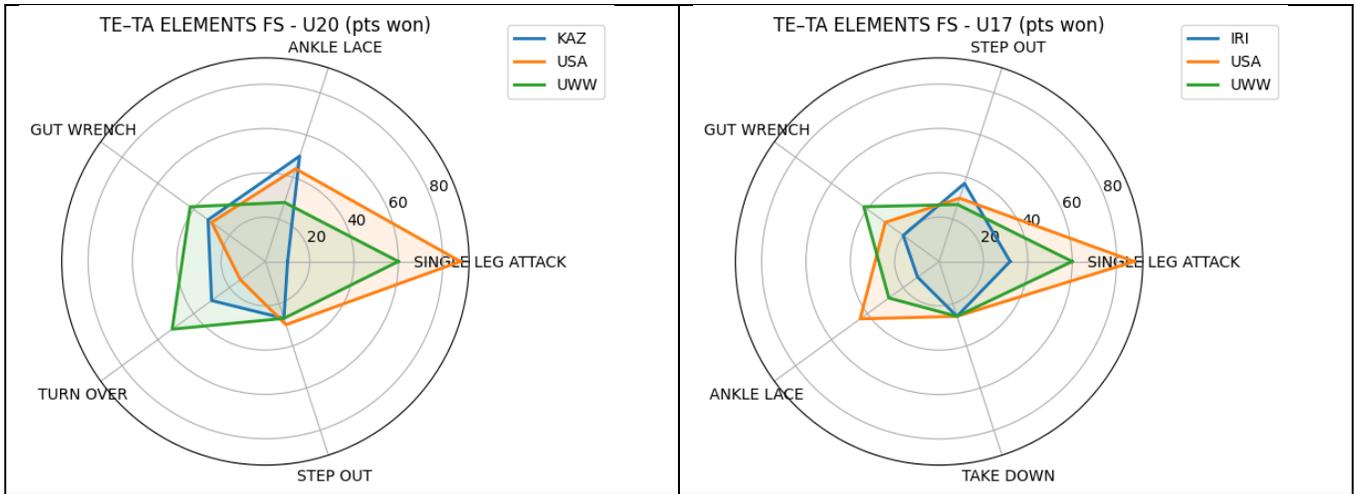
Comparative Analysis of Wrestling Techniques by Age Category

In **Charts 9, 10, 11, and 12** at the end of this chapter, the data are presented **separately by wrestling technique** and for the **three most successful nations** in each age category. This provides a **side-by-side comparative analysis**, allowing clear visualization of how the top teams apply specific techniques across **different age groups**.



Graph 9. Visual Comparison – seniori

Graph 10. Visual Comparison – U23



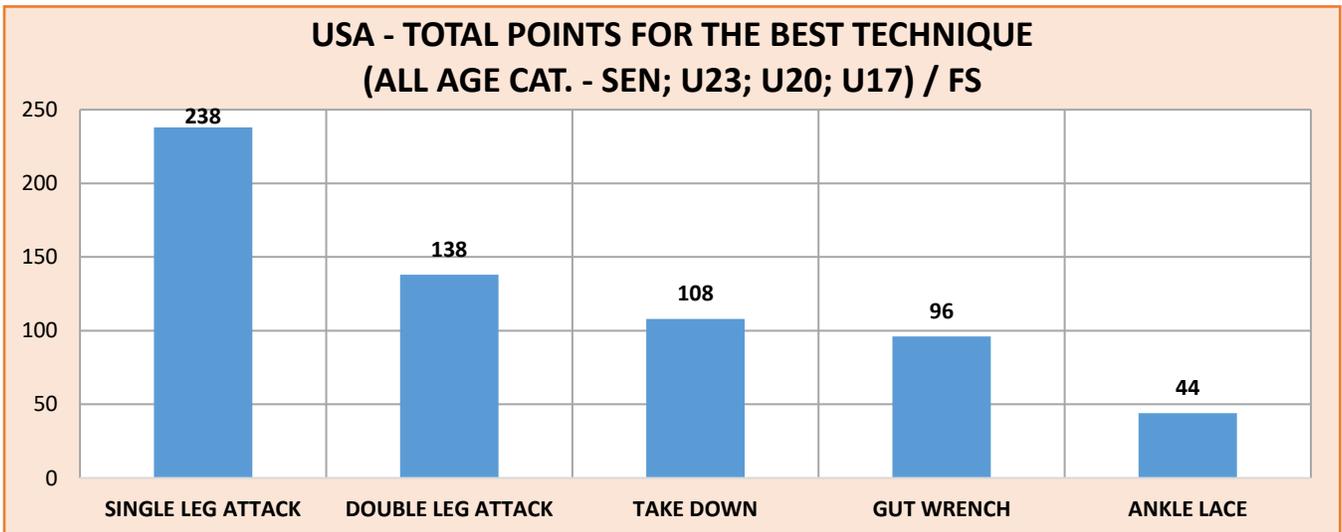
Graph 11. Visual Comparison – U20

Graph 12. Visual Comparison – U17

USA

In three age categories (U23, U20, U17), the highest number of points was scored using the single leg attack, which confirms that it is the most frequently used technique in FS in all ages category. In the senior category, the double leg attack contributed the most points.

For most of the top-performing teams, including the USA, the other techniques among the top three were takedown and gut wrench.



Graph 13. Total Points for Top Techniques (All Age Categories: SEN, U23, U20, U17) – USA

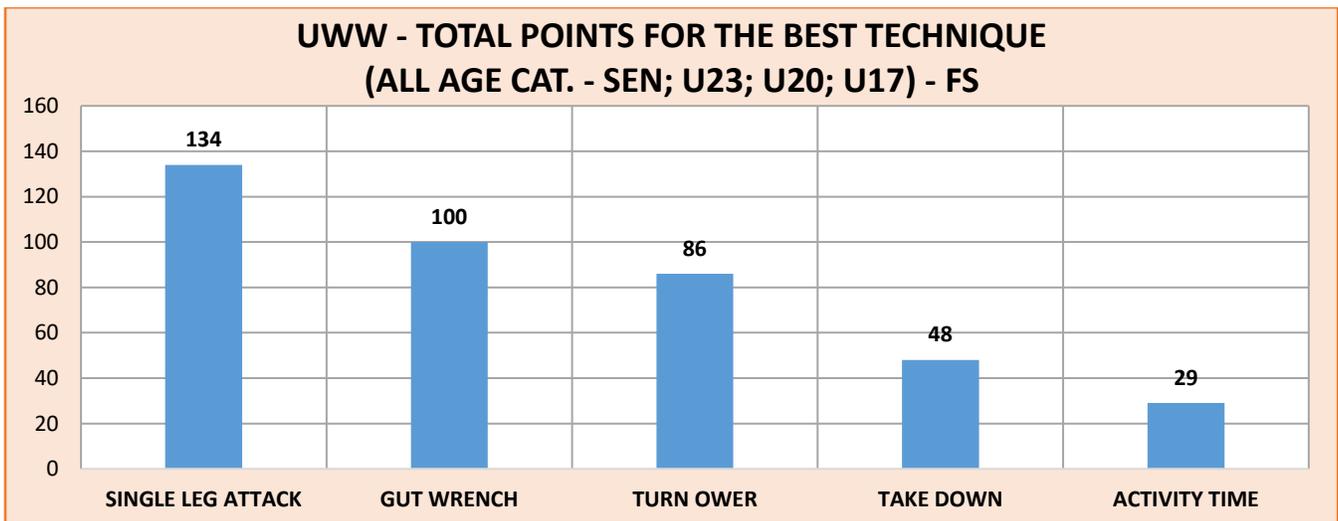
UWW

The data in **Table 14** were analyzed for **58 UWW wrestlers** across the four age categories, while for other countries, **40 wrestlers** were analyzed (10 per category).

Key observations for the **UWW team**:

- **Single leg attack** scored the highest points in **two age categories** (Seniors and U20).
- **Gut wrench** contributed points mainly in the **two youngest age groups** (U20 and U17).
- In the **senior category**, points from **activity time** ranked third.

Compared to the **USA team**, the **double leg attack** is minimally represented for UWW, but **turn over techniques** are significant, reflecting distinct strategic and technical emphases in the **American and Russian freestyle wrestling schools**.



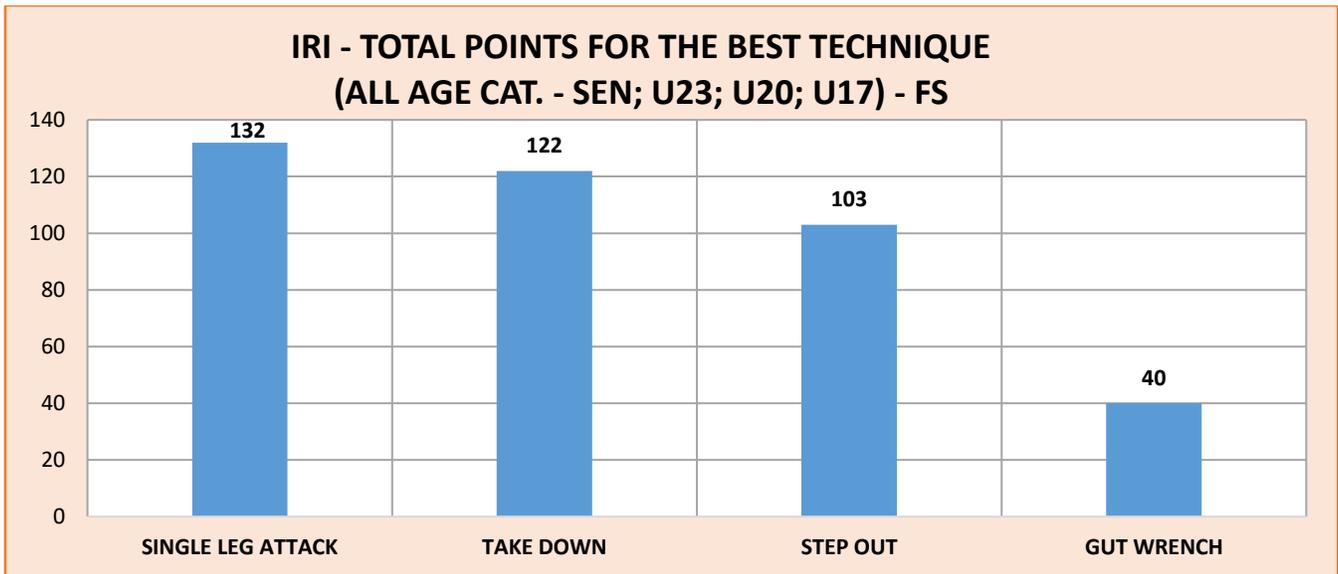
Graph 14. Total Points for Top Techniques (All Age Categories: SEN, U23, U20, U17) – UWW

IRI

The **Iranian national team (IRI)** ranks among the **top three teams** by total points in **three age categories**, although it does **not hold first place** in any single category (**Table 15**).

Key observations:

- The **single leg attack** remains the **dominant technique**, similar to USA and UWW teams.
- **Takedown techniques** also contribute a significant number of points.
- A notable characteristic of IRI wrestlers is their **high number of points from step-outs**, which is less pronounced in other top nations. This reflects a **specialized technical-tactical focus**, emphasizing pushing opponents out of the mat across all match phases.
- Given that IRI wrestlers use a **similar approach in Greco-Roman (GR) wrestling**, it highlights the **consistent tactical preparation** across both wrestling styles in the Iranian wrestling system.



Graph 15. Total Points for Top Techniques (All Age Categories: SEN, U23, U20, U17) – IRI

JPN i KAZ

In all four age categories, the wrestlers from **Japan (U23)** and **Kazakhstan (U20)** appeared among the top three nations once.

- **Japanese wrestlers** distinguished themselves from other nations by scoring a significant number of points with **forward bending throws** and **ankle lace techniques**, which were not widely used by the other top three teams.
- **Kazakhstani wrestlers** showed a different profile: they did **not rely on the most common leg attacks** (single leg or double leg). Instead, they primarily scored with **ankle lace**, **gut wrench**, and **turn over techniques**, indicating a greater emphasis on scoring in the **parterre (ground) position** compared to other nations.

This highlights that Japan’s style focuses more on dynamic throws, while Kazakhstan emphasizes **parterre control and specialized parterre techniques**.

8. Overview of the Percentage Distribution of Points: “All Matches”, “Medal Matches (Final I–II, III–V)”, “All Matches of Winners – Gold Medalists”

The analysis of matches according to the competition phases (“all matches”, “medal matches I–II and III–V”, and “all matches of winners – gold medalists”) in **freestyle wrestling (FS)** showed that the **single leg attack** was the most frequently performed technique across all competition phases and age categories in all 12 analyzed segments (Table 9), with an average of **14.82% of all scored points** across all age categories and in all three separately analyzed competition phases.

Across all age categories, points scored by **takedown** ranked second in frequency, with an average of **13.76% of all scored points** across all age categories and in all three separately analyzed competition phases.

- The highest percentage of points scored using the **single leg attack** in matches wrestled by **gold medalists** was recorded in the **U23 category**, accounting for **17.54% of the total points**.
- The highest percentage of points scored by **takedown** was recorded in the **U23 category in medal matches (I–II and III–V places)**, accounting for **19.01% of the total points**.
- The highest percentage of points scored by **step out** was recorded in the **U23 category in medal matches (I–II and III–V places)**, accounting for **16.67% of the total points**.

Table 9. Overview of the percentage distribution of points: “all matches”, “medal matches (Final I–II, III–V)”, and “all matches of winners – gold medalists”.

AGE CAT.	COMPETITION PHASE	%,	I best technique	%,	II best technique	%,	III best technique
		points		points		points	
SENIOR	ALL MATCHES	15.56	SINGLE LEG ATTACK	10.78	GUT WRENCH	9.68	TAKE DOWN TURN OVER
	MEDAL MATCHES	12.86	SINGLE LEG ATTACK TURN OVER	11.43	DOUBLE LEG ATTACK ACTIVITY TIME	8.57	STEP OUT
	GOLD MEDALISTS	15.54	GUT WRENCH	15.13	SINGLE LEG ATTACK	12.68	TAKE DOWN
U23	ALL MATCHES	15.71	SINGLE LEG ATTACK	10.98	TAKE DOWN	11.11	GUT WRENCH
	MEČEVI ZA MEDALJE	15.07	SINGLE LEG ATTACK	13.33	TAKE DOWN	9.86	DOUBLE LEG ATTACK
	MEDAL MATCHES	17.54	SINGLE LEG ATTACK	13.26	TAKE DOWN	9.75	STEP OUT
U20	ALL MATCHES	14.73	SINGLE LEG ATTACK	10.99	GUT WRENCH	10.58	TURN OVER
	MEČEVI ZA MEDALJE	16.67	STEP OUT	15.09	SINGLE LEG ATTACK GUT WRENCH	13.21	TURN OVER
	ALL MATCHES	17.49	SINGLE LEG ATTACK	11.41	STEP OUT	9.51	GUT WRENCH
U17	ALL MATCHES	15.11	TAKE DOWN	13.47	SINGLE LEG ATTACK	12.80	GUT WRENCH
	MEČEVI ZA MEDALJE	19.01	TAKE DOWN	14.08	TURN OVER	12.68	SINGLE LEG ATTACK
	MEDAL MATCHES	15.83	TAKE DOWN	12.47	SINGLE LEG ATTACK	9.11	TURN OVER DOUBLE LEG ATTACK

GREEN - Highest percentage of points by wrestling techniques (5 highest values)

Based on the data presented in **Table 9**, it can be concluded that **four wrestling techniques were dominant across all phases of the competition**. These techniques are:

- **Takedown** – recorded twice among the most represented scoring techniques, with **19.01% and 15.83%** of the points in **medal matches** and **matches of gold medalists**, respectively.
- **Single leg attack** – also recorded twice among the most represented techniques, with **17.54% and 17.49%** of the points in **medal matches** and **matches of gold medalists**, respectively.
- **Step out** – accounting for **16.67%** of the points in **medal matches**.

When observing the **frequency of executed actions (Table 10)**, it can be noted that, according to the frequencies (considering the three most represented parameters by points for wrestling techniques and other scoring actions), the **single leg attack** was the **most frequently applied technique across all competition phases**, with **12 recorded frequencies**.

In second place was the **takedown**, with **8 recorded frequencies**.

A considerable number of frequencies among the **three most represented techniques** was also recorded for **turnover**, which appeared **6 times**, and the **gutwrench technique**, recorded **7 times**.

Table 10. Overview of the frequency of the 1st, 2nd, and 3rd most frequent techniques for all matches, medal matches, and all matches of the winners.

Rb	TECHNIQUE (ENG)	I best technique	II best technique	III best technique
1.	SINGLE LEG ATTACK	7	4	1
2.	TAKE DOWN	3	3	2
3.	TURN OVER	1	1	4
4.	GUT WRENCH	1	3	3
5.	STEP OUT	1	1	2
6.	DOUBLE LEG ATTACK		1	2
7.	ACTIVITY TIME		1	

9. Execution of Techniques According to Time Parameters (All Matches)

The analysis of technique execution based on **time parameters** was conducted for the **three wrestling techniques that produced the highest number of points in all matches** (Table 11). 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)**.

In the **Senior category**, the highest number of points (**106**) using the **gutwrench technique** was scored in the **second minute of the bout**.

In the **U17 category**, the highest number of points (**174**) using the **gu-wrench technique** was scored in the **first minute of the match**.

The **second most significant wrestling technique** was the **single leg attack**. In the **U23 category**, the highest number of points (**98**) with this technique was scored in the **second minute of the bout**, while in the **U20 category**, **102 points** were scored in the **fourth minute of the match**.

Table 11. Time parameters of technique execution by age categories (all matches).

AGE CAT.	0-360 seconds	1-Nbr. points	I best technique	2-Nbr. points	II best technique	3-Nbr. points	III best technique
SEN	0-60 seconds	94	GUT WRENCH	52	SINGLE LG ATTACK	48	ANKLE LACE
	61-120 seconds	106	GUT WRENCH	88	SINGLE LG ATTACK	80	ANKLE LACE
	121-180 seconds	104	SINGLE LG ATTACK	85	ACTIVITY TIME	64	DOUBLE LEG ATTACK TAKE DOWN
	181-240 seconds	104	SINGLE LG ATTACK	68	TAKE DOWN	54	TURN OVER
	210-300 secondsi	80	SINGLE LG ATTACK	52	ACTIVITY TIME	50	GUT WRENCH
	301-360 seconds	80	SINGLE LG ATTACK	58	TURN OVER	57	STEP OUT
U23	0-60 seconds	84	SINGLE LG ATTACK	70	TAKE DOWN	52	FORWARD BENDING THROW
	61-120 seconds		GUT WRENCH				
	121-180 seconds	98	SINGLE LG ATTACK	96	GUT WRENCH	58	TAKE DOWN
	121-180 sekundi	96	SINGLE LG ATTACK	74	STEP OUT	62	GUT WRENCH
	181-240 seconds	84	SINGLE LG ATTACK	54	STEP OUT	48	TAKE DOWN
	210-300 secondsi	74	SINGLE LG ATTACK	54	TAKE DOWN	46	STEP OUT
U20	0-60 seconds	66	TAKE DOWN	60	SINGLE LEG ATTACK	58	GUT WRENCH
	61-120 seconds	80	SINGLE LG ATTACK	78	GUT WRENCH	62	TAKE DOWN
	121-180 seconds	78	SINGLE LG ATTACK	60	ANKLE LACE	58	TURN OVER
	181-240 sekundi	102	SINGLE LG ATTACK	56	STEP OUT	48	GUT WRENCH
	181-240 seconds	60	GUT WRENCH	58	TURN OVER	56	SINGLE LG ATTACK
	210-300 secondsi	59	STEP OUT	50	SINGLE LG ATTACK	42	TURN OVER

U17	0-60 seconds	174	GUT WRENCH	110	TAKE DOWN	92	SINGLE LG ATTACK
	61-120 seconds	112	GUT WRENCH	102	TAKE DOWN	88	ACTIVITY TIME
	121-180 seconds				SINGLE LG ATTACK		
	121-180 sekundi	88	SINGLE LG ATTACK	78	TAKE DOWN	68	TURN OVER
	181-240 seconds	116	TAKE DOWN	80	SINGLE LG ATTACK	70	TURN OVER
	210-300 secondsi	X	X	X	X	X	X
	301-360 seconds	X	X	X	X	X	X

GREEN - The most points and the best technique by age category

General Conclusion for Time Parameters

As shown in **Figure 16**, the **highest number of points across all four age categories** is scored in the **second minute of the match**. Why is that interesting? The above indicates the beginning of the second round in which the wrestlers try to **raise the rhythm and pace** of the fight and achieve a result in order to reverse the lead of the opponent from the first round.

The **third minute of the match** ranks second in terms of the number of points scored in the **Senior, U23, and U20 age categories**. An interesting finding is that in the **U17 category**, the **lowest number of points is scored in the third minute of the match**.

In the **final minute of the match (6th minute)**, the **highest number of points is scored by Senior wrestlers**. Similarly, in the **U17 category**, more points are scored in the **final minute of the match (4th minute)** compared to the **third minute**. Why is this important? The importance of winning points in the minutes of the fight is characterized by an **increase in the intensity of the fight** and the achievement (and reversal) of results, which is especially visible in the **USA wrestlers**

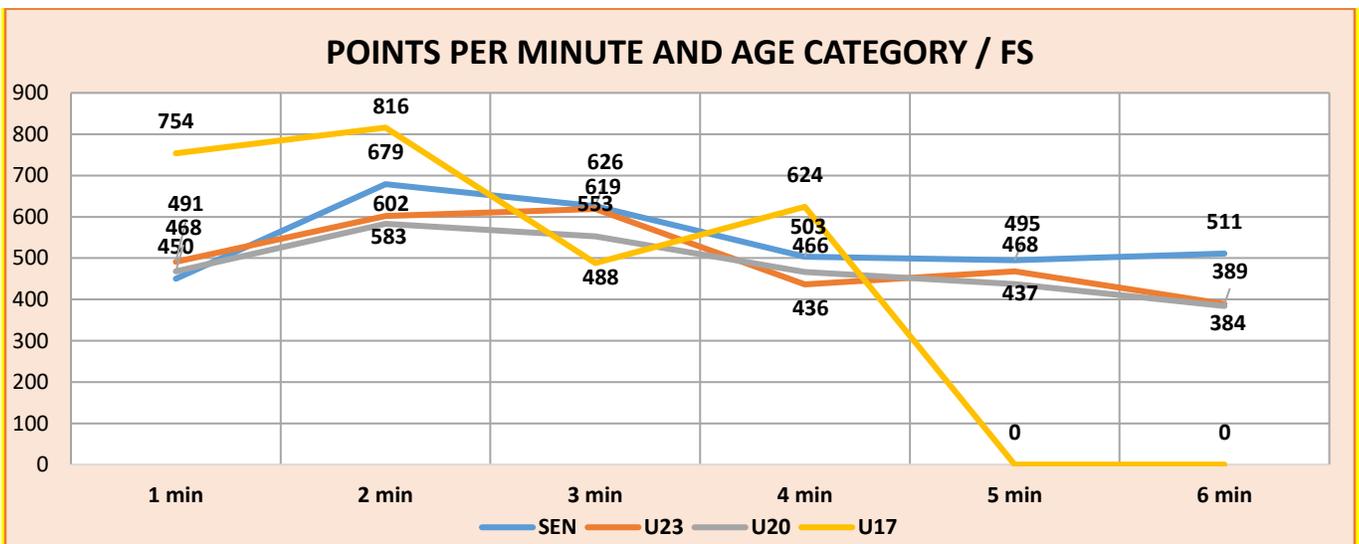


Figure 16. Total points scored per minute of the bout: Senior, U23, U20, and U17.

First Minute of the Match

Across all analyzed segments in the **first minute of the match** (considering the three most successful techniques per minute of the bout), in all **four age categories**, the highest number of points was scored using two wrestling techniques: **single leg attack** and **gut wrench**, each appearing **four times** among the most successful techniques.

The **takedown** technique appeared **three times** among the top techniques.

Additionally, the techniques **ankle lace** and **forward bending throw** each appeared **once** among the three most successful techniques performed in the first minute of the bout.

Second Minute of the Match

Across all analyzed segments in the **second minute of the match** (three most successful techniques per minute of the bout), the highest number of points in all **four age categories** was again scored using the same two techniques as in the first minute: **single leg attack** and **gut wrench**, each appearing **four times** among the most successful techniques.

The **takedown** technique appeared **three times**, while **ankle lace** and **activity time** each appeared **once** among the three most successful techniques in the second minute of the bout.

Third Minute of the Match

Across all analyzed segments in the **third minute of the match**, the highest number of points was scored using only one technique: the **single leg attack**, which appeared **four times** among the most successful techniques.

The techniques **takedown** and **turnover** appeared **twice** each.

Additionally, **ankle lace**, **activity time**, and **double leg attack** each appeared **once** among the three most successful techniques.

A total of **seven different wrestling techniques** appeared among the top three techniques in the third minute of the match, representing the **highest diversity of techniques across all minutes of the bout**, which suggests that wrestlers demonstrate the **highest level of activity and technical creativity during the third minute**.

Fourth Minute of the Match

Across all analyzed segments in the **fourth minute of the match**, the highest number of points was scored using the **single leg attack**, appearing **three times**, while in the **U17 category** the dominant technique was **takedown**.

The **takedown** technique appeared **three times**, while **turnover** and **activity time** appeared **twice** each.

The **gut wrench** technique appeared **once** among the three most successful techniques in the fourth minute of the bout.

Fifth Minute of the Match

Across all analyzed segments in the **fifth minute of the match** (three age categories, excluding U17), the highest number of points was scored using the **single leg attack**, which appeared **three times** among the most successful techniques.

The **gut wrench** technique appeared **twice**.

The following techniques each appeared **once** among the three most successful techniques: **takedown**, **activity time**, **step out**, and **turnover**.

Sixth Minute of the Match

Across all analyzed segments in the **sixth minute of the match** (three age categories, excluding U17), the highest number of points was scored using two techniques: **step out** and **turnover**, each appearing **three times**.

The **single leg attack** appeared **twice**, while **takedown** appeared **once** among the three most successful techniques in the sixth minute of the bout.

10. Most Successful Wrestler (MSW)

Based on the analysis of the most successful champions by age category, data were obtained identifying the wrestlers who were the most successful according to **six key criteria**:

- **Number of points scored** relative to the total match duration
- **Number of points conceded** relative to the total match duration
- **Number of classification points won** relative to the total number of matches
- **Number of classification points conceded** relative to the total number of matches
- **Total duration** of all matches of the champion
- **Total number** of matches of the champion

Among the **four analyzed age categories**, wrestlers from the **USA** proved to be the most successful in **three categories (Seniors, U20, and U17)**. The only exception was the **U23 category**, where the most successful wrestler was from **Japan** (Table 12).

According to the **MSW index analysis**, the best freestyle wrestler (**FS**) was the **U23 champion Yoshida Arash (JPN)** with an **MSW index of 7.59**.

This wrestler competed in **five matches** with a **total duration of 13.58 minutes**, during which he scored **57 technical points** and conceded only **4 points**.

He also won **21 classification points**, losing only **2 classification points**, which indicates that **four matches were won by technical superiority**, while **one match was won by fall (pin)**.

Table 12. Overview of the most successful wrestler (**MSW**) by age categories.

AGE CATEGORY	NAME AD SURNAME	NAT	WEIGHT CAT	MSW INDEX
SENIOR	VALENCIA ZAHID	USA	86 kg	6.82
U23	YOSHIDA ARASH	JPN	97 kg	7.59
U20	BLAZE MARCUS GLENN	USA	61 kg	5.86
U17	SANCHEZ SAMUEL REYES	USA	51 kg	7.00

11. Champions / Points Scored and Conceded

Table 13 presents, by age category, the techniques that champions used to score the highest number of points in each category. These techniques are classified as the **first most successful technique**, **second most successful technique**, and **third most successful technique**.

Considering all four age categories, champions in the **Senior category** scored the highest proportion of their points using the **gut wrench** technique (**16.00%**).

In the **U23** and **U20** categories, champions scored the highest number of points using the **single leg attack** technique (**16.22%** and **19.85%**, respectively).

In the **U17 category**, champions scored the highest number of points using the **takedown** technique (**16.81%**).

Percentage (%) of Points Scored by Champions

Table 13 presents data by age categories and the points scored by champions through wrestling techniques and other scoring actions, organized into **three levels of values expressed as percentages (%)**.

First dominant technique

Across all four age categories, champions scored the highest proportion of their points using the **single leg attack**, ranging from **15.53% in the Senior category** to **19.85% in the U20 category**.

Second dominant technique

Across all four age categories, champions in **three age groups** scored a significant proportion of their points using the **takedown** technique, ranging from **12.24% in the Senior category** to **16.81% in the U17 category**.

Third dominant technique

Across all four age categories, champions in **three age groups** scored a considerable proportion of their points using the **gut wrench** technique, ranging from **9.28% in the U17 category** to **16.00% in the Senior category**.

Table 13. Overview of the frequency of the 1st, 2nd, and 3rd most successful techniques according to points scored.

AGE CAT.	POINTS SCORED	1.-%	I best technique	2.-%	II best technique	3.-%	III best technique
SENIORI	POINTS SCORED	16.00	GUT WRENCH	15.53	SINGLE LEG ATTACK	12.24	DOUBLE LEG ATTACK
							TAKE DOWN
U23	POINTS SCORED	16.22	SINGLE LEG ATTACK	12.61	TAKE DOWN	9.91	GUT WRENCH
U20	POINTS SCORED	19.85	SINGLE LEG ATTACK	9.69	GUT WRENCH	9.20	TAKE DOWN
							TAKE DOWN HEAD TO HEAD
U17	POINTS SCORED	16.81	TAKE DOWN	13.91	SINGLE LEG ATTACK	9.28	GUT WRENCH

Champions / Points Conceded

Table 14 presents, by age category, the techniques through which champions **conceded the highest number of points** in each category. The techniques are classified as the **first most significant technique**, **second most significant technique**, and **third most significant technique**.

Considering all four age categories:

- In the **Senior category**, champions conceded the highest proportion of points through the **takedown** technique (**15.63%**).
- In the **U23 category**, champions conceded the highest proportion of points through the **single leg attack** (**26.09%**).
- In the **U20 category**, champions conceded the highest proportion of points through the **step out** technique (**26.55%**).
- In the **U17 category**, champions conceded the highest proportion of points through **turnover** and **step out** (**13.89%** each).

Percentage (%) of Points Conceded by Champions

Table 14 presents data by age category on points **conceded by champions** due to wrestling techniques and other scoring actions, classified into **three dominance levels** and expressed as **percentages (%)**.

First dominant technique

Across all four age categories, champions **conceded the largest proportion of points** through the **step out** technique, ranging from **10.35% (Seniors)** to **26.55% (U20)**.

Second dominant technique

Across all four age categories, champions **conceded a significant proportion of points** through the **single leg attack**, ranging from **12.50% (Seniors)** to **26.09% (U23)**.

Third dominant technique

Across all four age categories, champions **conceded a considerable proportion of points** through the **takedown** technique, ranging from **11.11% (U17)** to **15.63% (Seniors)**.

Table 14. Overview of the frequency of the 1st, 2nd, and 3rd most significant techniques based on points conceded.

AGE CAT	POINTS CONCEDED	1.-%	I best technique	2.-%	II best technique	3.-%	III best technique
SENIORI	POINTS CONCEDED	15.63	TAKE DOWN	12.50	GUT WRENCH	10.35	STEP OUT
					SINGLE LEG ATTACK		
					SUPLEX THROW		
U23	POINTS CONCEDED	26.09	SINGLE LEG ATTACK	17.39	TAKE DOWN	15.94	STEP OUT
U20	POINTS CONCEDED	26.55	STEP OUT	10.69	TURN OVER	8.85	GUT WRENCH SUPLEX THROW
U17	POINTS CONCEDED	13.89	STEP OUT	12.50	ACTIVITY TIME	11.11	TAKE DOWN
			TURN OVER				DOUBLE LEG ATTACK
							FRONT HEAD LOCK

Frequency of Techniques Executed by Champions

Points Scored

Based on **frequencies** (considering the **three most frequently scoring** wrestling techniques and other point-scoring actions), across all age categories, the **gut wrench** was the **dominant technique in the parterre position**, through which champions scored points in all of their matches, with **4 recorded occurrences**.

For techniques in the **standing position**, champions scored the highest number of points using **takedown** and **single leg attack**, each appearing **4 times** among the most frequently scoring techniques (**Table 15**).

Table 15. Overview of the frequency of the 1st, 2nd, and 3rd most executed techniques in all matches of gold medalists – **Points Scored**

POINTS SCORED	WRESTLING TECHNIQUE	I - most frequently used technique	II - most frequently used technique	III - most frequently used technique
	GUT WRENCH	1	1	2
	SINGLE LEG ATTACK	2	2	
	TAKE DOWN	1	1	2
	DOUBLE LEG ATTACK			1
	TAKE DOWN HEAD TO HEAD			1

Points Conceded

Based on **frequencies** (considering the **three most frequent results** by points scored and conceded), across all age categories, champions **conceded the most points through the step out technique** in all of their matches, with **4 recorded occurrences**.

The second most frequent source of points conceded was the **takedown**, with **3 recorded occurrences** across all age categories (**Table 16**).

Table 16. Overview of the frequency of the 1st, 2nd, and 3rd most executed techniques in all matches of gold medalists – **Points Conceded**

POINTS CONCEDED	WRESTLING TECHNIQUE	I - most frequently used technique	II - most frequently used technique	III - most frequently used technique
	TAKE DOWN	1	1	1
	SINGLE LEG ATTACK	1	1	
	STEP OUT	2		2
	TURN OVER	1	1	
	SUPLEX THROW		1	1
	GUT WRENCH		1	1
	ACTIVITY TIME		1	
	DOUBLE LEG ATTACK			1
	FRONT HEAD LOCK			1

KEY CONCLUSIONS

1. **Wrestling efficiency (WQ) decreases with increasing age group.** Wrestlers in the **U17** category demonstrated the **highest efficiency** (points per minute) – WQ/min **3.09**, with a statistically significant decline to the **Senior** category – WQ/min **1.99**. From U20 onwards (U20, U23, Seniors), match intensity remains relatively stable, indicating a transition from a high-tempo, throw-oriented wrestling style toward a more controlled and strategically focused approach.
2. **Standing position remains dominant across all age categories.** In all age categories, the majority of points are scored from the standing position. In the **U17** category, the largest proportion of points came from standing techniques, accounting for **37.40%** of all points.
3. **Technical points decrease with age.** The share of points scored through technical actions declines with age, from **85.86% in U17** to **80.85% in Seniors**. The minimal deviation from the average is observed in U17, where only **17.43% of points** were scored through non-wrestling actions.
4. **Differences between age categories in wrestling techniques.** Four wrestling techniques stand out as contributing the highest proportion of points across all categories. Deviations from the average are minimal, except in **U17**, where the **takedown** technique accounts for a higher proportion (**15.11%**).
5. **Scoring the first point significantly influences match outcome.** Across all age categories, wrestlers who scored the first point had a **significantly higher probability of winning (79.5%**, or 15 times greater odds of victory).
6. **Analysis of match time parameters by minute.** Three wrestling techniques dominate in terms of points scored in individual minutes of the match. The **single leg attack** was the most frequent scoring technique, appearing **13 times** as the highest-scoring technique across all four age categories. The **gut wrench** appeared **6 times**, and the **takedown** appeared **3 times** among the top frequencies. These findings suggest that coaches should integrate these data into training plans and tactical preparations.
7. **Characteristics of champion performance.** Analysis of champions' results indicates that victories are primarily achieved through the **single leg attack**, as well as **takedown** and **gut wrench** techniques. The points most frequently conceded by champions were primarily due to the **step out** technique. Among wrestling techniques, champions lost the most points from **single leg attacks** and **takedowns**. These insights can be used to develop a **technical-tactical model of wrestling performance** aligned with the strategies of top athletes.

RECOMMENDATIONS FOR UWW AND WRESTLING COACHES

Strategic Implications for UWW

- **Competition analysis** should be integrated into coach education programs to support evidence-based decision-making.
- These and similar analyses can serve as valuable tools for modifying wrestling rules, particularly to **reduce points for passivity** and **increase the attractiveness and effectiveness of freestyle wrestling (FS)**.
- Data from such analyses can also be used to **prevent injuries** and enhance athlete safety during matches.

Long-Term Wrestler Development

Results confirm that competitive development in FS follows a **non-linear trajectory**, with a clear transitional phase around age 20. Training models should be **adapted to the specific demands of each age and weight category**, rather than prematurely applying senior-level expectations (e.g., early technical closure in U17).

Coaching Focus by Age Category

- **U17** – Encourage offensive initiative and high-intensity wrestling; accept variability and mistakes as part of development and avoid premature specialization; focus on **technical diversity** rather than match control.
- **U20** – Gradually reduce unnecessary points conceded and develop **match control skills**.
- **U23** – Refine the **efficiency of key techniques (special techniques)** and emphasize control of match rhythm and tempo.
- **Seniors** – Focus on **precision, timing, and efficiency**; leverage opportunities to score the first point; maintain balance between dominance in standing position and maximum efficiency in par terre techniques. Special attention should be given to **reaction speed**, particularly for defending against the **single leg attack**.

Training Focus

- **Scoring the first point** – Practice pre-planned attacks targeting single or double legs in the **first 30–40 seconds** of the match.
- **Mat control and step-out situations** – Use marked smaller circles on the mat to simulate space control; restrict the mat to the inner circle (approx. 7 m) and consider a wrestler outside the circle if they step into the passivity zone.
- **Perfection in dominant techniques** – Increase repetitions and individual practice of special techniques in both standing and par terre positions.
- **Managing score and match rhythm** – Conduct training bouts with pre-defined scores (e.g., 4:0 or 1:1) to simulate defensive and offensive strategies under different scenarios.
- **Minimizing technical errors** – Use video analysis to identify critical mistakes (e.g., lowering the body, foot placement for defense) and focus training specifically on correcting these points.

Training Methodology

- **Highly specific sparring with tournament simulation** – Simulate tournaments **once every two weeks** in training to enhance stress adaptation and match simulation. Include **rest periods between bouts** of 20 minutes (can be shortened to 12–15 min as overload training).
- **Targeted tactical micro-analysis** – Simulate attacks or defenses based on microanalysis of specific opponents.
- **Individualized technical program** – Adapt techniques and training load according to each wrestler's abilities.
- **Energy efficiency and recovery** – Include active recovery after simulations (light running, skipping, treadmill, stretching with bands), short pool sessions, sauna, and massage.

Development of Key Technical Segments

- **Priority techniques across all age categories:**
 - Single leg attack
 - Gut wrench
 - Takedown
 - Step-out
 - Turnover
- Training should focus on **increasing execution success**, multiple entries and throws of the same technique (special techniques), linking techniques into **combinations**, and chaining two techniques in a single action.

First-Point Training

Since the **first point significantly increases the probability of victory**, it is recommended to:

- **Planned initial attacks in the first minute** – Peak intensity should occur between **45–75 seconds**.
- **Start strategies** – Develop plans for different opponent types (taller, shorter, faster, stronger, counter-specialists).
- **Simulate opening situations** – Practice the first 15 seconds repeatedly (10–20 times) focusing on hand and leg activity and preventing opponent scoring.
- **Develop aggressive hand and clinch control** – Maximize time spent in **offensively favorable and defensively challenging positions**.

Standing Position and Mat Control

With age, the **importance of standing wrestling increases**. Recommended training focus:

- **Footwork and distance control** – Emphasize reaction speed, leg coordination, agility, and correct foot positioning, especially in younger categories.

- **Step-out tactics** – Practice circular techniques returning to the center, and offensively move the opponent out of the circle with low center of gravity and coordinated hand-leg work.
- **Situational sparring on reduced mat space** – e.g., 5–7 m diameter to avoid including passivity zones.
- **Master key standing techniques** – single leg attack, takedown variations, and throws.

Parterre Development

- Par terre still contributes ~35% of points.
- Each wrestler should have **at least two well-practiced par terre techniques (special techniques)**.
- Defending against gut wrench must be combined with **adequate movement** and maximum **static and dynamic strength development**.
- Focus on **static and isometric strength development**, especially in U17.

Age-Specific Conditioning

- **U17** – General motor development, speed, and agility
- **U20** – Maximum strength and explosiveness
- **U23** – Specific endurance and strength
- **Seniors** – Optimize **energy efficiency** and recovery between matches and tournaments

Tactical Education

Introduce systematically:

- Video analysis
- Individual tactical planning
- Opponent analysis
- Match strategy planning based on available data
- Integration of **AI tools** to prepare strategies against specific opponents

Long-Term Development Organization

- Training system should progress from **technical breadth to tactical efficiency**.
- Avoid **prematurely imposing senior-level models** on younger categories (especially U17).
- Enable **individualization** according to each wrestler's characteristics and weight category.

Training Process Organization

- Gradual **load progression** from U17 to Seniors
- Balanced **technical, tactical, conditioning, and strength training**
- **Individual development plans** for each wrestler
- Continuous **performance evaluation** throughout the wrestler's career

Role of the Coach

The coach must:

- Monitor athlete readiness via various testing methods
- Plan long-term athlete development
- Individualize training as much as possible
- Continuously analyze performance of both the wrestler and opponents
- Support **psychological stability** before, during, and after competitions, year to year
- Continuously improve in all aspects of training and competition