The Journal of Eurasia Sport Sciences & Medicine

J Eurasia Sports Sci Med
http://dergipark.gov.tr/jessm

Volume 1, Issue 1
April 2019, 10-23

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Received: 28.02.2019

Accepted: 30.04.2019

ORIGINAL RESEARCH

Differences in Performance Indicators Between Winners and Defeated Female Cadet Wrestlers

Abstract

Freestyle wrestling for women is characterised as complex polystructural acyclic movement activity of high intensity. The aim of this research is to determine the differences in performance between winners and defeated female cadet freestyle wrestlers at European championship for Cadets, held in Sarajevo (Bosnia and Herzegovina) in 2010. The research is based on the analysis of 415 wrestling techniques performed successfully, out of which the female cadet winners have achieved n= 330 (Standing position n= 203, Parterre position n= 127), while the defeated ones achieved n=85 techniques (Standing position n= 64, Parterre position n= 21). The comparison between the winners and the defeated female cadets has been based on several performance indicators by the use of notational analysis of video recordings. Wilcoxon test confirms the differences in performances between winners and defeated female cadet wrestlers in regards to the Standing position ($p<.001$), Parterre position ($p<.001$), scored points in the Standing position ($p<.001$), in the Parterre position ($p<.001$), and for the most of individual wrestling techniques from Standing and Parterre position, in which case the Take Down ($p<.001$)in Standing position technique is the most dominant among the winners, and a turn-over by twisting the opponent with an arm and head ($p<.001$) is the most dominant in Parterre position. The results indicate the differences in the performances between the winners and defeated cadets, which can assist in planning and programming training processes, but as well help in further analysis of different wrestling styles.

Keyword: women, freestyle, notational analysis, victory, loses, competition.

To cite this article; Kajmović, H., Kapur, A., Huremović, D., Kapo, S., & Colakhodzic, E. (2019). Differences in performance indicators between winners and defeated female cadet wrestlers. J Eurasia Sports Sci Med, 1(1), 10-23.

INTRODUCTION

Freestyle wrestling for women is characterised as a complex polystructural acyclic movement activity of high intensity during which a specific „confrontation" between the two individuals takes place, within a limited space and defined time period, in presences of referees, and governed by a specific set of rules which dictate the successfulness of a wrestling competition. The activities during the freestyle wrestling match come as a result of complex and demanding processes, for which reason the performance analysis is to provide with the proper understanding of these complex results. Freestyle wrestling is one of the wrestling styles practiced by women. Since the World Championship in Wrestling for women held in 1987 until the moment when wrestling was officially included as a part of Olympic Games Programme for women in 2014 in Athens (Greece), the freestyle wrestling for women has fought vigorously for gender equality and its repositioning in the Olympic Games programme (Curby & Jomand, 2015). According to the wrestling rules, women wrestlers can compete in all age categories, cadets, juniors and seniors for very objective reasons, such as: protection against injuries, providing with the equal conditions for the female contestants to show their best performances, and to increase the intensity of the match. Freestyle wrestling for women has been described as intermittent physical combat sport requiring technical, tactical and psychological skill, high intensity activity, which produces great strength and muscle power demands on both the upper and lower body, with high anaerobic energy metabolism requirements (Cipriano, 1993; Garcı´a-Pallare´s, 2011; Horswill, 1992; Horswill, et al., 1992; Horswill, et al., 1989; Kraemer, 2001: Sharratt, 1986; Utter, 2002; Yoon, 2002). In wrestling during the match both energy systems, aerobic and anaerobic are present, thus the wrestlers are capable to withstand the strains which occur during the match, but also possess the ability to quickly react during wrestling holds (Callan, et al., 2000; Cinar & Tamer, 1994; Karninčić, et al., 2009). The anaerobic system provides explosive power during the match, while the aerobic system contributes to sustained effort for the duration of the match and to recovery between periods (Callan, et al., 2000). Freestyle wrestling can cause lactate to reach 18 mmol/L and HR to reach 180 bpm (Kraemer, et al., 2001). Arakawa (2015) indicates that the participants are characterized as having great FFMI (fat-free mass divided by height squared, 18.8 ± 0.8 in light and 20.5 ± 0.8 in heavyweight groups) with intensely enlarged circumference especially within the arms (30.0 ± 2.7 cm for upper arms and 24.2 ± 1.5 cm for forearms). These findings suggest that elite female wrestlers have site-specific hypertrophied musculature only in the upper body, despite a general awareness of difficulty in developing upper limb muscles in women. Likewise, Arakawa (2015) concluded that extreme development of fat-free tissue, specifically around the upper body, is an important requirement for female wrestlers to win the worldwide prestigious tournaments. During the wrestling match under such conditions, a connection between the skill technique of wrestlers and selected coordination motor abilities has been confirmed (Sadowski & Gierczuk, 2009).

Podlivaev (2015) affirmed a model for which elite female wrestlers in freestyle wrestling for women should possess the following: a wide range of technical and tactical skills, have a high level of physical fitness, possess tactical skill, and have psychological strength. Model Characteristics Values of Competition Activity in Women's Wrestling are: 1. 0,6–0,8 - Tactical fitness coefficient; 2. 5–6 Number of points gained; 3. 1–2 Number of points lost 4. 0,8–1,2 Effectiveness of attack activity points/min; 5. 20–25 sec. Attack interval (AI); 7. 3–4 Number of hold groups and 8. 4–5 Number of techniques. Cadet wrestlers in a Long-term athlete development process (LTAD) start training for competition when they develop

specific wrestling performance, and can perform technical and tactical holds under the influence of competition requirements such as: introduce wrestling specific strategies, learn to focus through a full practice, increase levels of competition, implement complex coordination and movement training, solid technique in every position and self-motivated (Balyi, et al., 2013; USA-Wrestling, 2019). The performance analysis in wrestling is an interdisciplinary process, which requires an objective explanation of different female cadet wrestlers' behaviour during training and competitions, thus improving the scientific concept of such processes and providing practical assistance in sport with good quality and quantity information. There is a great variety in performance analysis application during training and competition in freestyle wrestling for women, and it represents a very important role in wrestling performance analysis process. There are different technology systems which enable scientists, who study wrestling, to find answers for many questions, which have been a mystery for coaches and athletes as well. For the successful wrestling match, contestants need to develop a high mental, conditional, technical and tactical performance capacities. The analysis of such performances is an objective data gathering method, in which case key elements can be quantified in a valid and consistent manner (International Society of Performance Analysis in Sport - ISPAS, 2013). In regards to the above stated, Miarka (2016) reports that the analysis of technical, tactical and physiological demands in wrestling fights are important because they reveal essential information for the development of contextual training and specific physical preparation of wrestlers. After rule modifications in 2013, wrestling matches showed quicker and more diversified actions, especially in the lighter categories. For the same period, foot/leg techniques were the most effective in female and freestyle wrestling, followed by takedown attacks in World competitions for the period 2009-2011. McGarry, et al., (2013) indicates that the purpose of athlete analysis performance is twofold, first it improves the scientific concept, and secondly it provides with practical assistance in sport by offering quality data. Data collected in this manner and within realistic wrestling match settings will be very beneficial for coaches and athletes in their perception of their and their opponents' strengths and weaknesses. Isik, et al., (2017) have developed a system of following the matches during wrestling competitions, which allows wrestlers to analyse when, where and how they applied a technique; from which side they applied the technique; and how many points they received. Moreover, it will help us obtain permanent results. Thus, the characteristics of the wrestlers can be recorded according to the latest wrestling competition rules. Modern and attractive wrestling considers a high level of technical-tactical efficiency in standing and parterre.

Modern highly-qualified wrestler is characterised by aggressive attack tactics, tendency to technical, physical and psychological superiority over a rival, and the ability to make quick decisions in extreme conditions during the intensive fight (Grigoryan, Lavrichinko & Gomboev, 2011). Determination of technical-tactical parameters is possible with notational analysis. The application of Notational Analysis is to record critical events (movements, situations, interactions, techniques and tactics, even intervention of referees) in which performance can be quantified in a consistent and reliable manner (Lopez-Gonzalez, 2013). Many authors have analysed wrestler performances in different wrestling styles (Greco-Roman, Free style for men and Free style for women) and for different age categories clearly determining which technical-tactical factors are important for success in wrestling, as well as the quality of applied wrestling techniques through scored points (López, 2018; Tünnemann & Curby, 2016; López-González, 2015; Kajmović, et al., 2014; López-González & Bianca, 2013; López-González, et al., 2012; Dokmanac, Karadzic, & Doder, 2012; López-

González, 2011; Tünnemann, 2011). Available research in wrestling have identified the changes in technical-tactical indicators of freestyle wrestlers between the 1996 and 2008 Olympics only in regards to their winning points, also including a third round as a determining round for 68% of wrestlers (Kruszewski, et al., 2011). It has likewise been determined that light weight categories achieve a smaller number of technical points in Standing position, while the greater number of technical points was achieved in Parterre position. Dokmanac, et al., (2012) confirm that in final matches at the World Wrestling Championship in Istanbul 2011, an average number of points achieved by winner is 0,81 points per minute, while the defeated wrestler achieved 0,41 points. The dominated techniques at this competition in Parterre position were gut wrench and lifting the mat, while for the Standing position the dominating ones were Out-of Bounds as opposed to Take downs and Throws. Wrestlers' successfulness in Parterre Position was 70% as opposed to the technique efficiency from a Standing position which was 30%. Tunnemann (2011) analysed the quality of achieved points from the World Championship for Cadets, Juniors and Seniors in 2011, where cadets achieved 7,2 points, juniors 5,9 and seniors 5,0 points. It is obvious that the senior wrestlers achieve smaller number of points due to the greater quality of the wrestlers. The dominant Cadets were those achieving one or two points, while percentagewise achieving 5 points is very low. The aim of this research is to determine the differences between the winners and defeated female cadet wrestlers at the European Championship for Cadets.

METHOD

Sample

The sample for this research was based on the analysis of 415 successfully performed wrestling techniques out of which the winners performed n= 330 (Standing position n= 203 and Parterre position n= 127), and the defeated female wrestler cadets performed n=85 techniques (Standing position n= 64 and Parterre position n= 21). The analysis was conducted in regards to the European Cadet Championship in freestyle wrestling, held in Sarajevo (Bosnia and Herzegovina) in 2010.

Sample of variables

The analysis of performance indicators of winners and defeated cadets was based on the analysis of the following variables according to Shahmuradov (1996):

- Successfully performed technical actions in standing and parterre position
- Scored points (1, 2, 3 and 5) as a result of successfully performed actions in a standing position
- Scored points (1, 2, 3 and 5) as a result of successfully performed actions in a parterre position
- Efficiently performed individual techniques from a standing position
- Efficiently performed individual techniques from a parterre position

Procedures

Data was collected from 103 match video analysis in all 10 categories for 10 female cadet wrestlers (-38 kg, -40 kg, -43 kg, -46 kg, -49 kg, -52 kg, -56 kg,- 60 kg, -65 kg, -70kg), for three two-minute sessions, which were recorded with three cameras by Sony (DCR-SR 35). Each out of the three cameras was positioned so that it was recording fighting areas one by one. In this way, during the video analysis of fights, observers could clearly see fighters,

referees, scorer's table and scoreboard, which allowed them reliable verification of all events on the mat during the fights, rewinding recordings more times in case of certain inconsistencies. All the data were registered in the specially prepared templates for the analysis of every fight in which all the analysed variables were coded.

Reliability testing

In order to ensure a quality level of reliability, O'Donoghue and Mayes (2013) suggest a constant improvement of reliability of data collected using performance analysis systems. Following this concept, the research conducted by (López-González, & Bianca, 2013) had an aim to determine the reliability of a new Time-Motion Analysis (TMA) model based on technical-tactical interactions in the three Olympic wrestling styles: freestyle (FS), female wrestling (FW) and Greco-Roman (GR) from FILA´s World Senior Championships.

Inter-rater reliability tests Cohen´s Kappa and Intra-class Correlation Coefficient (ICC) were used as Agreement Measures in order to assess the categorical and duration data. Resulting values were classified as "substantial" for categorical agreement per style and and "almost perfect" for agreement in duration and score-related actions.

Based on that, the fights in wrestling are evaluated by means of intra-observers and inter-observers with the assistance of using mistake percentage. The research was conducted by two wrestling experts with years of competition and coaching experience. Reliability of intra-observers is based on the concept of reanalysis of 20 random fights. Reanalysis is completed after four weeks, after finalizing the original data. Reliability of inter-observer is secured by reanalysis of all the matches by other analyst. Based on the original data V1 and V2 re-test, mistake percentage is calculated in equation (1) (Hughes, & Franks, 2004):

$$\text{Total \% error} = (V1-V2) / (V_{mean}) \times 100\% \quad (1)$$

Intra-observer percentage errors of reliability ranged from 0.00% to 0.25%, and the inter-observers reliability ranged from 0.00% to 0.38%, which is acceptable to 5%, which is the level of limiting error.

Data analysis

For all the techniques in the Standing position, Parterre position and scored points, frequencies and percentage of values were calculated. In order to determine the difference in the achieved performances between the winners and defeated female cadets wrestlers, Wilcoxon rank test was used (O' Donoghue, 2012, pg. 272-274) at the level of statistical significance of 95%. Wilcoxon test converts the results in ranks and that way performs the comparisons using specific criteria (Field, 2005). An Effect size was likewise calculated

(Effect size–ES) using the following equation: r= Z - score / sqrt (N) (2)

where N represents the number of observations. Interpretation of the Effect size (ES) in range ≥0.1<0.3 is presented as a small effect, ≥0.3<0.5 medium effect and ≥0.5 large effect (Cohen, 1988, 1992). All statistical analysis was performed using SPSS 22.0 (IBM Corporation, New York, USA) Pallant (2007).

FINDINGS

Table 1 presents the performance results of winners and defeated cadets in freestyle wrestling, where a number of performed technical actions in standing position and parterre favours the winners, indicated as well by the results of Wilcoxon test which confirms the existence of differences between the two segments of wrestling fight (Standing position

p<.001 and Parterre position p<.001), in which case the winners are dominating in the per romance of parterre techniques as opposed to the defeated contestants. The effect size (SI) is large.

Table 1. Technical Actions Performed from a Standing Position and Parterre Position of Winners and Defeated Female Wrestler Cadets

	Winners	**Defeated**	**N**	**Z**	**SI**	**p**
Standing position	203 *76,0%*	64 *24,0%*	267 *64,3%*	-8.50	0,52	.000*
Parterre position	127 *85,8%*	21 *14,2%*	148 *35,7%*	-8.71	0.72	.000*
Total	330 *79,5%*	85 *20,5%*	415 *100%*			

**Significant difference at a level of < 0.05*

Table 2 and Table 3 indicate the differences between the awarded points from the referees for the efficient performance of the technique from standing position and parterre. Therefore, the most dominant technique in standing position are the ones where one point was scored, while in parterre the most dominant techniques were the ones where two points were scored. In the standing position the differences in the number of scored three points were confirmed, while in parterre position that was not the case. The Effect size (SI) of the scored points in the standing and parterre position is large.

Table 2. Technical Points of Winners and Defeated Female Cadet Wrestlers in a Standing Positions

	Standing position points					
Points	**Winners**	**Defeated**	**N**	**Z**	**SI**	**p**
1	158 *72,5%*	60 *27,5%*	218 *81,7%*	-6.637	0.45	.000*
2	6 *100%*	0 *0,0%*	6 *2,2%*	-2.449	0.99	.014*
3	41 *95,3%*	2 *4,7%*	43 *16,1%*	-5.947	0.91	.000*
Total	205 *76,8%*	62 *23,2%*	267 *100%*			

**Significant difference at a level of < 0.05*

Table 3. Technical Points of Winners and Defeated Female Cadet Wrestlers in a Parterre Positions

	Parterre position points					
Points	**Winners**	**Defeated**	**N**	**Z**	**SI**	**p**
1	52 *91,2%*	5 *8,8%*	57 *38,5%*	-6.22	0.82	.000*
2	69 *81,2%*	16 *18,8%*	85 *57,4%*	-5.74	0.62	.000*
3	5 *83,3%*	1 *16,7%*	6 *4,1%*	-1.63	0.67	.102
Total	126 *85,1%*	22 *14,9%*	148 *100%*			

**Significant difference at a level of < 0.05*

The results of Wilcoxon test (Table 4) clearly indicates in which wrestling techniques from a standing position the winners differ and dominate over the defeated cadets. Amongst

them one can highlight: Take down, Side throws, Double leg, Push out techniques. The Effect size (SI) is large.

Table 4. Performed Actions of Winners and Defeated Female Cadet Wrestlers in a Standing Position

Techniques	Winners	Defeated	N	Z	SI	p
Take down	144 *70,9%*	59 *29,1%*	203 *76,0%*	-5.96	0.42	.000*
Push out techniques	11 *84,6%*	2 *15,4%*	13 *4,9%*	-2.49	0.69	.013*
Throw with both legs locked	12 *92,3%*	1 *7,7%*	13 *4,9%*	-3.05	0.84	.002*
A Fireman s carry Melnica	9 *90,0%*	1 *10,0%*	10 *3,7%*	-2.53	0.80	.011*
Counterattack in standing position	2 *100,0%*	0 *0,0%*	2 *0,7%*	-1.41	1.00	.157
Pull downs	6 *100,0%*	0 *0,0%*	6 *2,2%*	-2.44	0.99	.014*
Side throws	17 *94,4%*	1 *5,6%*	18 *6,7%*	-3.77	0.89	.000*
Shoulder throw	2 *100,0%*	0 *0,0%*	2 *0,7%*	-1.41	1.00	.157
Total	203 *76,0%*	64 *24,0%*	267 *100,0%*			

**Significant difference at a level of < 0.05*

Table 5 indicates the difference between the winners and defatted cadets in case of successfully applied parterre techniques during the fight, and those are: A turn-over by twisting the opponent with an arm and head, Holding the opponent on the ground, A turn-over by twisting the opponent with an arm and ancle lock, Turning the opponent with the stretcher ride, a head lock and an inside leg vine. The Effect size (SI) is large.

Table 5. Performed Technical Actions of Winners and Defeated Female Cadet Wrestlers in the Parterre Position

Techniques	Winners	Defeated	N	Z	SI	p
A turn-over by twisting the opponent with an arm and head	45 *80,4%*	11 *19,6%*	56 *37,8%*	-4.54	0.61	.000*
A turn-over by twisting the opponent with an arm and ancle lock	13 *92,9%*	1 *7,1%*	14 *9,5%*	-3.20	0.86	.001*
A turn-over with a cross hold of the knees	2 *100,0%*	0 *0,0%*	2 *1,3%*	-1.41	1.00	.157
Holding the opponent on the ground	49 *92,5%*	4 *7,5%*	53 *35,8%*	-6.18	0.85	.000*
Counter dragging through sitting position with the grip under upper arm	2 *40,0%*	3 *60,0%*	5 *3,4%*	-.447	0.19	.655
Turning the opponent with the stretcher ride, a head lock and an inside leg vine	14 *87,5%*	2 *12,5%*	16 *10,8%*	-3.00	0.75	.003*
Gut wrench	2 *100,0%*	0 *0,0%*	2 *1,3%*	1.41	1.00	.157
Total	127 *85,8%*	21 *14,2%*	148 *100%*			

**Significant difference at a level of < 0.05*

DISCUSSION

This research had an aim to study the differences in the performance success between the winners and defeated female cadets in freestyle wrestling, and as such the aim has been fully achieved. Performance effectiveness is defined as obtaining certain technical points for making a technical-tactical combination (Lopez-Gonzalez, 2013). The selected performances indicate the variables which differentiate the winners from the defeated cadets within three two-minute sessions. It is important to note that during the research, the authors were unable to come across a great number of research conducted in case of freestyle female cadets, therefore had to rely on the research conducted on older age groups at different competition levels. Tünnemann, and Curby (2016) point out that it is very important for the coaches to analyse the technical–tactical structure of the winners, when they can compare the technical capacity of their athletes with the top athletes of the weight class, and it is also very important for the planning of the technical-training process as well as for the training concepts of the promising young talents.

General feature of the European Championship for Cadets is a winners' significant domination in scoring difference in all segments of the fight in standing position and parterre position. Similar data were presented in the research conducted by López-González (2011) with an aim to classify the performance of world-class women wrestlers in the frequency and characteristics of their effective Technical-Tactical Combinations (TTC) from the standing position at the highest level of international competition in 2009. They confirmed that the most important factor related to winning a medal was the execution of leg attacks, with several possible endings, with almost non-contact set-up, followed by low-risk attacks launched from a close distance.

In the analysis of European Female Cadet Championship in wrestling, the domination was detected in case of lower fighting stance and redirecting the fight to a parterre position by approaching the opponent from the back while constantly avoiding an attractive grand amplitude throws. By comparing the overall results from Table 2 and Table 3, it is noticeable that a number of technically scored points favours those scored in the standing position, which indicates that the dominating fight was the one performed in the standing position. Therefore, the attempt of defeated contestants was oriented towards the fight in the standing position, since it was clear that the winners have the upper hand in parterre fight. The analysis of achieved technical actions in standing position between the winners and defeated contestants indicates a certain and clear 1,2,3 points advantage of the winners as opposed to the defeated contestants.

In standing position the dominated techniques were those that scored 1 point, while in parterre position those that scored 2 points. The high fighting stance and attractive throwing techniques which bring the highest points were avoided. The fight in medium and low fighting stance had a tendency to be redirected to parterre position.

Tünnemann (2011) designed a scoring analysis of the Cadet World Championships 2011 in Szombathely, in which case shoulder victories were very high (Cadet WC 62 that means 33% of all bouts, Junior WC 60 that means 33% and Senior WC 54 that means 22%). Another proof of the technical-tactical attractiveness at the Cadet World Championship 2011 is the achieved number of technical points per minute. Results indicate that the attention is awarded to the surprisingly good defence actions of World Champion Cadets. Qualitative analysis results of combat behaviour between Senior, Junior and Cadet World

Championships, indicate that cadets reached 8.1 points per bout, juniors 7.5 and seniors 6.8. The seniors scored fewer 3 - and 2-points, and scored more 1-points than the young generation. Participants in the World Championship for Cadets with attack actions achieve average 1.04 points per minute, the junior 1.01 and seniors only 0.86 points per minute.

Technical actions scoring 1 point such as technique Take down, Push out techniques, have proven to be the most efficient techniques. The technique, Take down is one of the safest and useful techniques during the fight. Female contestants opt for these techniques because during its performance they will for sure score the advantage of 1 point, and most importantly by grabbing their opponents from the back they have brought them in a position in which they have the control and ability to perform other much more complex technical actions (turn overs, turn downs, push outs, throws) which can score 1, 2, 3, or 5 points.

Technical actions which bring 2 points and which have been scored by the techniques (turn overs, counter attacks) in this Championship have a low performance frequency. This data indicates that the winners were confident during their fights and did not allow their opponents to use counterattacks against them and thus loose points, neither were they under great pressure from their opponents to use counterattacks and turn overs in order to gain point advantage. This Championship depicted 6 such actions or scored points. This is because cadets possessed mental stability and great caution and focus in performing only safe actions. They were resolved in securing safe points, along with being able to perform under the influence of anger if the things do not go as the have planned, rarely allowing themselves any reckless moves (defying referee decisions, reacting to the opponents provocations such as pinching or small punches during the match which the referee cannot see) which would throw them out of focus of the fight and allow their opponents to gain advantage.

The analysis of results of technical actions in which one scores 3 points (side throws, throws by grabbing both legs, shoulder throws) indicate that the aforementioned techniques are the most efficient for winners as opposed to the defeated contestants. Techniques of side throws are the first choice for winner contestants and those usually include techniques of head and arm grab. As to why do contestants opt for these techniques, the answer lies in that with a proper grab these technique neutralise the ability of the opponents to move thus affecting their coordination and providing with the opportunity to safely conduct the throwing actions.

After a properly conducted throwing technique, the opponent is on the mat lying on her back in a subordinate position which gives additional advantage to ending the fight by declaring „touché“ or to continue the fight by applying parterre techniques.

Technical actions by which one scores 5 points were not performed by either winners nor defeated contestants, because the style of fighting in freestyle wrestling demands great movement dynamic which entails great physical efforts. It is also due to the lack of strength and great risk for their actions to be used against them. Therefore, they do not even try to perform actions of grand amplitude and throwing techniques which require high lifts. It has likewise been determined that cadets often fight in a medium and low stance, trying to grab the leg and around the waist, therefore tackling the opponent to her backs and pushing her out of the wrestling area which would allow them to score 1 point.

López-González (2011) indicated that women wrestlers who participated in the World Championship of 2009 demonstrate organized attack combinations, which can emerge from

the complex interactions regulated through their perceptual processes. Incidentally, the results demonstrated that leg attacks is the main type of offensive skill used by winners. Analysis of competitive activity in women's freestyle wrestling throughout the last two Olympic cycles has shown that simple attacks to the legs and turning-down constitute 74% of the Technical Tactical Actions TTA (Tünnemann, 2012). Performance of grand amplitude throws, which require a certain amount of time of training and entail certain risks, is minimal.

Tünnemann (2011) reports that scoring analysis of the World Freestyle Championship 2011, presented similar results to López, et al., (2012), with leg attacks as the most effective attack of all technical structures, with 0.49 pts/min. The same author demonstrated that these results are not new in freestyle wrestling combats: the World Championships of 2009 and 2010 also presented leg attacks as the main technical structure to achieve attack efficacy, with 0.27 and 0.34 pts/min, respectively.

Tünnemann and Curby (2016) by analysing Scoring Analysis of the Wrestling matches from the 2016 Olympic Games in Rio, have come to the results that freestyle wrestling for women is dominated by leg attacks. It is interesting, but understandable because of the high value of the counterattacks. Likewise, a decrease in the effective application of take downs, throws, turn overs, ankle laces, and "push outs" techniques is noticed when looking at the Olympic cycle. The gut wrench has completely disappeared. The coaches should pay special attention to the decline of throws as a result of rule changes.

Tünnemann (2017) conducted the analysis of the technical-tactical combat behaviour in the wrestling finals of the 2016 Olympic Games Rio in comparison to the 2012 OG London. Women's wrestling bouts are dominated by leg attacks. The high value of the counter-attacks is interesting but quite understandable. The technical and tactical diversity is reflected in the application of take downs, turn overs and ankle lace. In addition to the already mentioned dominance of the leg attacks, the decline of take down, throws, turn over, ankle lace and "push out"- techniques are noticed when looking at the Olympic cycle. Gut wrench have completely disappeared. López (2018) conducted the Scoring Analysis of the Senior World Wrestling Championships-2017, and determined that the quality of wrestling for women is 1.92 pts/m, and a number of 4 points scored equal to 15%. 5 points were not scored. 75% of pointes scored by female wrestlers are 2 points. The standing position is mostly dominant equalling to 71%, followed by parterre position of 22%. Leg attack scored 1.41.pts/m, while in parterre position gut wrenches, ankles laces scored 0.29 pts/min. The parterre position exhibited techniques such as turnovers, reversals and counter-offensive blocks. Counter-offensive take downs in women wrestlers is applicable to a great extent. The decrease in the application of turn-overs in women wrestlers is noticeable.

The analysis of reformed technical actions in parterre position between winners and defeated contestants indicates a certain and clear point advantage where the winners have an advantage of 1, 2, 3 points in regards to the defeated contestants. A domination of technical elements is highly noticeable, which include the turn-overs of the opponents by applying different grabs and attacks from the back of the opponents and domination of the winners while holding the opponents in the position of declaring a „touché"

Technical actions scoring 1 point such as actions of holding someone in a position for declaring „touché" have proven to be efficient parterre techniques which have given an advantage to winners over defeated opponents. The contestants were able to perform these techniques by successfully performing either throws, turn overs or counter turnovers in

parterre position and have brought their opponents into a subordinate position, holding them in a position declaring „touché“ and thus scoring an advantage of 1 point.

Technical actions scoring two points such as: A turn-over by twisting the opponent with an arm and head, turn-over by twisting the opponent with an arm and ancle lock, A turn-over with a cross hold of the knees, gut wrench are dominant technical actions in which winners dominated over defeated contestants at this championship. Techniques of turn over arm head, arm leg, head leg are the most efficient techniques in parterre position used by the contestants. This is because a firm and proper grab in these techniques provides with a great possibility for successful technique performance. Also, because these techniques are very difficult to counterattack and because these techniques provide with an opportunity to develop and use other techniques. Cadets have avoided using technical elements such as lifts form parterre position and other technical elements which would allow them to score more than two points.

Technical actions scoring three points are the techniques of lift and throws from parterre position. The scored results indicate that these techniques have a low efficiency rate, i.e. contestants do not use these techniques because they require a lot of strength for their performance and allow for the possibility of counter attacks. For scoring 3 points in parterre position this is not the case, because the referee cannot give 3 points unless it is connected to some other action (approach from the back + turn over), therefore connected technical actions were not statistically significant.

Similar data was presented Dokmanac, Karadzic, and Doder (2012) stating that the most dominant technique in freestyle wrestling for women was take down during Wrestling World Championship in Istanbul in 2001**.** As to the parterre, the highest number of techniques are classified as other techniques because of the large number of procedures that cannot be classified in any of the predicted group techniques. Comparison between standing and parterre ethnics by style (FW) are observed in women, techniques in the standing position are even more dominant than the presented techniques in parterre position. Analysis of grouped weight category techniques in freestyle wrestling indicated that in the light category take downs are the most common technique. The parterre is represented with 3 techniques, and standing position with 5 techniques. In medium category the most commonly used technique is take down and followed by other techniques in the standing position. Parterre were represented with 3 techniques, and standing position with 5 techniques. In case of heavy category, the parterre was represented by only one technique, while standing position was represented by 5 techniques.

López-González (2015) has confirmed significant correlations between Technical Profile of Top Four Women's Wrestling Teams in the 2014 Senior World Championship and Selected Performance Variables. Regarding the technical groups, three of seven in standing (takedowns, shifts, and defensive blocks) and two of four in parterre (turnover and spins) had at least one significant correlation with some performance variable. Since 2013 significant changes in the wrestling rules were introduced (FILA, 2013), and these changes have effected several wrestling fight segments. These changes have promoted more aggressive wrestling because more aggressive wrestling is required under the modified regulations. Greater anaerobic and aerobic capacities will be required to win (Tunnemann, 2013), and as a result of the application of the new rules it can be stated that the introduction of the new rules were crowned principle of success: The new rules in all three disciplines resulted in a significant increase in victories with technical superiority (ST, SP) at the expense

of point victories. It resulted in an improvement of the performance index and the effectiveness of attacks, which is reflected in the increase of the activity and an enormous improvement in the attack oriented combat behaviour. The number of achieved technical points per bout increased in all three disciplines as the rules changed. The formal appreciation of 2-point ratings lead to a reduction of the 1-point ratings but not to the increase of the 3 - and 5 - point rating values or to an increase of the pins which cannot be seen as an increase of attractiveness (Tunnemann, 2013). Recent analyses developed after 2013 rule modifications (Miarka, 2016), showed that the decisive offensive actions were applied on foot and in parterre situations – especially gut wrenches techniques and derivatives of suplex movements. And finally, one can conclude that female cadets have shown a great level of tactical risk-free fighting, and tactical maturity as a proof of long term training. The differences between winners and defeated wrestlers from the European Championship for Cadets can be explained as insufficient training of the defeated contestants, weak technical-tactical preparation, but as well a lack of experience in young contestants in regards to big competitions.

CONCLUSIONS

The performance analysis of female cadet wrestlers demonstrates a possibility of understanding the technical-tactical effectiveness in wrestling, which is represented as an ability to efficient technique application in standing and parterre position and which is measured by how many times the aim was achieved, the number and quality of scored points, and the circumstances under which all of the above was accomplished during the fight. This research has clearly indicated in which performances the winners differ from the defeated cadets in freestyle wrestling. In the light of wrestling rule modifications which have now occurred several times after this competition, the researchers are given an opportunity to study in detail the performances in regards to both genders, different age categories and different wrestling style, which will provide quality information for the development of wrestling sport, both from practical and scientific aspect. In this way, the expert teams will have an opportunity to plan and programme quality training processes, with an adequate evaluation and analysis of information gathered at competitions so as to make important decision for further preparations and competitions.

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