

Comparative analysis of the levels of difficulty of spins in the competitive programmes of women's singles figure skating representatives in the 2022-2023 season

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PhD, Associate Professor **E.V. Zhgun**¹**L.V. Kuznetsova**¹**D.A. Kosheleva**²¹The Russian University of Sport «GTSOLIFK», Moscow²Olympic Reserve Sports School "Olympus", Obninsk

Corresponding author: elena.zhgoon@gmail.com

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Abstract

Objective of the study was to determine the content of features and levels of complexity of rotations in the competitive programs of women's single figure skating in the 2022-2023 season.

Methods and structure of the study. At the 58th Congress of the International Skating Union (ISU), held on May 4, 2022 in Lausanne (Switzerland), the requirements of the competition rules for the difficulty levels of elements in figure skating were traditionally updated. The changes adopted were the most significant since the beginning of the modern judging system for awarding difficulty levels in spins and came into effect from the 2022-2023 season. For the first time, a separate group was allocated, consisting of six additional traits to achieve a maximum fourth level of difficulty (level 4), and Previously, it was enough to fulfill any features from the list. In accordance with the requirements for the content of programs in figure skating, in the short and free programs of single skating, the execution of three different rotations is prescribed, and therefore, in order to comply with the requirement prohibiting the counting of repeated features, in all three rotations it is necessary to show mastery of three features from list of those required to obtain the highest possible level 4. Thus, many athletes were faced with the task of mastering new complex variations for all rotations of high coordination complexity.

Results and conclusions. The article presents the results of a comparative assessment and analysis of the frequency of use (%) of mandatory features for level 4 rotations in free programs of representatives of women's single skating in the 2022-2023 season. at the I and II stages of the Grand Prix among juniors, in the Final of the Grand Prix series among adults and juniors, as well as at the Russian Championship.

Keywords: *single figure skating; free programs; coordination complexity of rotations; features used to evaluate difficulty levels.*

Introduction. The level of technical preparedness of the leading representatives of women's single skating is steadily growing, which is reflected in all components of the assessment, and the density of results is so high that every hundredth of a point often affects the position of athletes in the final standings. In the Women's Grand Prix Series Final in the 2022-2023 season. the difference between 2nd and 3rd places was 0.88 points, and between 3rd and 4th places – 0.34 points. At the Russian Championships 2023, the difference between 1st place (249.74 points) and 2nd place (247.32 points) in women's single skating was more significant, but also small, and amounted to 2.42 points. The difference in the base value of three level 3 spins and three level 4 spins can be up to 1 point, de-

pending on the type of spins. It should be emphasized that even leading figure skaters are not always able to perform spins to the highest possible level in competitive programs, as happened at the above-mentioned Russian Championship. In the short program, Elizaveta Tuktamysheva, who took 2nd place, performed one of the three rotations only at level 3, and for Sofia Muravyova, who took 3rd place, two of the three rotations did not reach the maximum level 4, and were determined to be performed at level 3. The winner of the free program Kamila Valieva's program also 2 spins out of three did not reach the maximum level, remaining at level 3. In the Final of the Grand Prix series among adults, even the winner Kaori Sakomoto in the short program also had a spin jump at level 3 (FCSp3).



The junior girls perform rotations much more consistently, both in the short and free programs of the Grand Prix Finals; the skaters who were among the top three performed all rotations at level 4.

Objective of the study was to determine the content of features and levels of complexity of rotations in the competitive programs of women's single figure skating in the 2022-2023 season.

Methods and structure of the study. Based on the data obtained from official competition protocols, details of judges' scores and video recordings of the performance of 106 free programs at the I and II stages of the Grand Prix among juniors, in the Final of the Grand Prix series among adults and juniors, as well as at the Russian Championship among women, an analysis was carried out 318 spins performed by competitors in the 2022-2023 season.

Results of the study and discussion. Based on the results of the first season, which was held according to the updated requirements, it was necessary to identify a tendency to use traits of difficulty levels in rotations in women's single skating to determine a further strategy for constructing the training process in terms of choosing the most rational traits for performance for learning. In the group of rotation elements, at the above competitions, a total of 721 features of difficulty levels were presented: at the first stage of the Grand Prix 2022 (juniors) (Courchevel) - 361 features (32 participants); at the II stage of the Grand Prix 2022 (juniors) (Ostrava) - 404 features (35 participants); at the Grand Prix Series Final 2022 (juniors) (Turin) - 77

traits (6 participants); at the Grand Prix Series Final 2022 (adults) (Turin) - 78 traits (6 participants) and at the Russian Championship 2023 - 205 traits (17 participants).

The dynamics of two indicators were studied: the frequency of use of a trait (frequency of use, %) - the percentage ratio of the number of uses of a trait to the total number of used traits, and the level of reliability of trait execution (reliability, %) - the number of scored traits from all attempts to execute it, expressed as a percentage. Of the identified 6 traits required to obtain level 4, the most frequently performed were "complex variation of jump approach" (41.1% of the studied traits), "change of edge" (34.8%), which on average were scored in 90% and 86 % of cases, respectively, "difficult exit" was performed in 25.5% and was counted in 89% of cases. The traits "obvious increase in speed" and "rotation in both directions" are practically not used (Table 1), however, they are performed only by athletes who have good command of these movements.

The performance of the remaining features of the difficulty levels had the following distribution: the feature "at least 8 revolutions without any changes of position/variation, leg and edge (leave, tilt, complex variation of any basic position or, for combinations only, not a basic position)" was performed in 26 .1% of cases; "an obvious change in the position of leaning back - to the side" - 19.5%, "change of legs with a jump" in women's skating was performed the least number of times of all possible features - in 1.6% of

Table 1. Frequency and reliability of execution of the required six traits to obtain level 4 in rotations in the 2022-2023 season, %

Name of traits	I Stage Grand Prix 2022 (juniors)		II Stage Grand Prix 2022 (juniors)		Grand Prix Final 2022 (juniors)		Grand Prix Final 2022 (adults)		Russian Championship 2023 (adults)	
	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability
Complex jump approach variation	7,8	85,7	7,2	96,6	7,8	100	9	85,7	9,3	84,2
Changing rib	6,1	50	6,4	88,5	7,8	100	7,7	100	6,8	92,9
Difficult exit	3,9	92,9	3,7	86,7	6,5	100	5,1	75	6,3	92,3
Difficult position change on the same leg	4,7	88,2	3,2	100	5,2	100	1,3	100	1,5	100
Clear increase in speed	0,3	100	1	100	-	-	1,3	100	0,5	100
Rotation in both directions	-	-	-	-	-	-	-	-	1	100

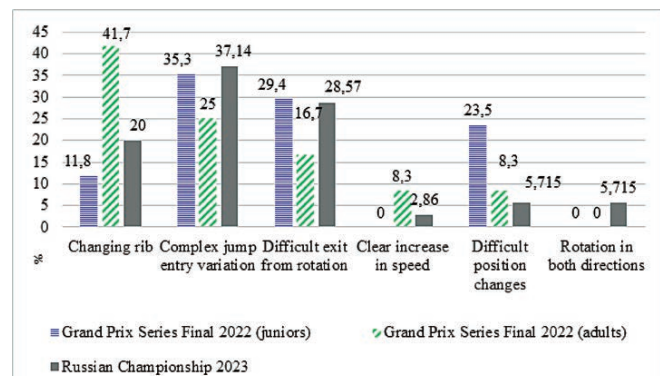
Table 2. Frequency and reliability of execution of traits of difficulty levels in rotations in the 2022-2023 season, %

Name of traits	I Stage Grand Prix 2022 (juniors)		II Stage Grand Prix 2022 (juniors)		Grand Prix Final 2022 (juniors)		Grand Prix Final 2022 (adults)		Russian Championship 2023 (adults)	
	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability
8 turns	3,6	84,6	5,5	91	5,2	100	6,4	100	5,4	100
An obvious change in the position of leaning back - to the side	5,3	57,9	6,2	96	2,6	100	-	-	5,4	100
Difficult entry into rotation	3,6	30,8	1,5	83,3	2,6	50	-	-	1	50
Change of legs with a jump	-	-	0,3	100	-	-	1,3	100	-	-
Jump while spinning without changing legs	1,4	80	0,5	100	-	-	-	-	0,5	100

cases. Almost all features are counted in more than 88% of executions, except for the complex entry into rotation, the execution of which was counted in only 53% of executions (Table 2).

Complex variations of positions are performed in the range from 2.34% of cases (“Standing” position - UF, leaning the body forward) to 8.78% (“Libela” - CF, leg grip, shoulders parallel to the ice). The stability of execution ranges from 76.2% for the “Libela” position – CU (shoulders turned up) to 98.56% in the “Standing” position – UF (body bending forward). Detailed data on the performance features of the remaining complex variations are presented in Table 3.

The figure shows the results of a comparative assessment of the use of additional features for level 4 spins performed in free programs of juniors and adults in women’s single skating in the 2022-2023 season, which showed that the maximum percentage of execution was achieved when performing the “change of edge” feature in rotations in the Final of the Grand Prix series among adults, where the strongest foreign single figure skaters participated. When performing this trait, there is a strong correlation between the number of attempts and the success of their execution ($r=0.8$). Attempts to perform a complex variation of a jump entry are scored least often; the relationship is negative ($r=-0.72$). There is no relationship observed between the number of attempts to perform the remaining four additional features for level 4 and their successful execution ($r<0.36$).



The ratio of executed features in rotations required to obtain level 4 (in %) relative to all executed features at the studied competitions of the season

Russian figure skaters most successfully perform the trait “complex variation of jump entry,” which is also the most successful among leading foreign juniors.

Conclusions. When choosing a strategy for teaching the traits of difficulty levels for spins, you should rely on the following experience of athletes: of the 6 required traits for obtaining a level 4 spin, the most successfully implemented were the change of edge, a complex variation of jump entry, a complex exit from a spin and a complex change of position. Explicit acceleration in rotation and change in direction of rotation are extremely rare. This is due to the frequent obvious loss of quality of performance, which immediately leads to the fact that technical specialists do not



Table 3. Frequency and reliability of execution of the trait "Complex position variations" in rotations in the 2022-2023 season, %

Name of traits	I Stage Grand Prix 2022 (juniors)		II Stage Grand Prix 2022 (juniors)		Grand Prix Final 2022 (juniors)		Grand Prix Final 2022 (adults)		Russian Championship 2023 (adults)	
	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability	Execution frequency	Reliability
"Standing" (body tilt forward – UF)	3,8	92,8	3,5	100	2,6	100	1,3	100	0,5	100
"Standing" (free leg above 90° – US)	5,5	90	6,2	92	5,2	100	7,7	83,3	6,8	100
"Billman" (UB)	4,4	100	5,4	91,3	6,5	100	5,1	100	6,8	100
"Standing" (UL, with leg hold)	6,9	80	6,2	100	5,2	100	5,1	100	7,3	93,3
"Sitting" (leg forward, body in fold - SF)	6,9	92	7,7	87,1	7,8	83,3	6,4	60	4,9	70
"Sitting" (leg to the side, body turn - SS)	6,9	88	6,7	85,2	2,6	100	7,7	100	4,9	60
"Sitting" (with leg back – SB)	7,2	88,5	6,9	82,1	6,5	80	6,4	100	4,4	88,9
"Libela" (CU, shoulders turned up)	3	72,7	3	83,3	3,9	100	5,1	25	4,4	100
"Libela" (CS, leg grab, shoulders vertical)	3,3	91,7	4,2	76,5	5,2	100	7,7	100	4,9	90
"Libela" (CF, leg grab, shoulders parallel to the ice)	7,8	82,1	8,4	88,2	10,4	75	9	71,4	8,3	82,4
Non-basic position	5	100	4,5	94,4	5,2	100	5,1	100	6,3	92,3

count the line and reduce the level of rotation accordingly; At the same time, participants lose points in the evaluation of the quality of execution of the element (GOE). Representatives of Russia possess the entire arsenal of traits identified to achieve level 4, which was successfully confirmed by the results of the Russian Championship. The largest number of errors were made when performing a difficult entry into the rotation, which leads to the loss of the maximum possible level 4. Taking into account the trends in the development of criteria for assessing the level and quality of rotations of competitive programs of figure skaters, it is possible to conclude that such a feature as uniqueness will appear in the next Olympic cycle or the originality of a complex variation of spin positions.

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