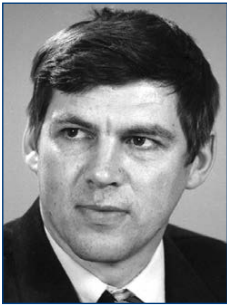


Individualization of judo styles based on 2019 world championship data

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Dr. Hab., Associate Professor **A.A. Polozov**¹

I.V. Yushchenko¹

Dr. Hab., Professor **I.V. Bryzgalov**²

¹Ural Federal University (UrFU), Yekaterinburg

²Yekaterinburg Institute of Physical Culture, Yekaterinburg

Corresponding author: a.a.polozov@mail.ru

Abstract

Objective of the study was to analyze the weight-class-specific differences in the judo styles and techniques, with the 2019 World Judo Championship in Tokyo taken for the case study.

Methods and structure of the study. The study was intended to analyze the technical and tactical toolkits of the 2019 World Judo Championship leaders by the weight classes with the actual specializations and favored techniques, to find the holds typical for different individual fight styles; i.e. prioritize the holds by the weight classes if possible. We respected in our analysis the Y.A. Shulika classification of the basic fight control styles.

Results and conclusion. Our analysis showed that the individual judo training systems need to be customized to the individual anthropometric characteristics due to the simple fact that the response time i.e. muscle extensions/ flexions tend to grow with the growing anthropometric characteristics, including the limb length/ size; associated with the lower movement frequency, slower metabolism, etc. One more training system individualization factor is the specific physicality, gifts and physical qualities with a special role played by strength, speed-pace, coordination and other natural abilities. Generally the technical toolkits in the modern judo tend to fast contract with the weight growth. The individual technical versatility is still important for a competitive progress although the sport leaders were found to heavily score in the top-ranking events by at most two favorite holds in every weight class. Thus we found that the 2019 World Judo Champions scored 48%, 72% and 88% of their total points by one, two or three favorite ("crown") holds, respectively. Our analysis of the 2019 World Judo Championship (men) video replays found domination of strength and strength endurance among the physical qualities critical for success. These physical qualities were found the key for the 14 top holds in 155 actions scored by the refs – versus 43 coordination-dominated actions and 81 speed-pace dominated ones.

Keywords: judo, training, techniques, tactics.

Background. Presently training systems in modern martial arts give a growing priority to individualized technical and tactical skills training models since the traditional institutional and practical training approaches are often weight-class-unspecific and, hence, fail to effectively customize the training service for the individual progress needs and priorities. One of the key aspects for consideration in the training system is the individual anthropometric characteristics (morphological type) [1-3] with its high heritability and, hence, influence on the training system that needs a special sensitivity to this factor. It should be mentioned that the morphological typing attempts for judo were made more than 30 years

ago, and no surprise that their findings need to be updated as required by at least the modern rules of competitions in judo. Note that subject to analysis in this study is only the technical aspect of the training system individualization process – net of the organizational, psychological and a few other aspects.

Objective of the study was to analyze the weight-class-specific differences in the judo styles and techniques, with the 2019 World Judo Championship in Tokyo taken for the case study.

Methods and structure of the study. The study was intended to analyze the technical and tactical toolkits of the 2019 World Judo Championship leaders by the weight classes with the actual specializa-



Table 1. Basic fight control styles

Planned				Reactive/ situational			
Straightforward		Combinational		Active		Passive	
Positional	High-pace	Threats	Footwork	Pressure	Provoke	Open	Hold-back
Power Speed-power	Power Speed-power	High-pace Spurts	Moves Grapples	Dog fight Pacing	Moves Grapples	Dog fight Outpace	Dog fight Outpace

tions and favored techniques, to find the holds typical for different individual fight styles; i.e. prioritize the holds by the weight classes if possible. We respected in our analysis the Y.A. Shulika [7] classification of the basic fight control styles: see Table 1.

Kozina L. [8] offered the following fight control classifier MIRA 2019 prioritizing the key physical qualities: (1) power style dominated by strength and strength endurance (F×t); (2) durable high-pace style dominated by speed and speed endurance (V×t); and (3) mixed style with a special role of the movement coordination skills largely dictated by the nervous system type.

Results and discussion. We analyzed the performances and successes of the 2019 WJC leaders (men) in 147 bouts: see Table 2.

We analyzed 167 holds in total. Note that a judo bout lasts till two holds are scored by some of the competitors. Subject to our analysis were the fight videos available on YouTube for the 60kg, 66kg, 73kg, 81kg, 90kg and 100kg weight classes: see Table 3.

The technical toolkit listed above in Table 3 was

further broken down by the weight classes: see the top-four 60kg competitors' data: Table 4.

Table 5 gives a detailed breakdown of the technical toolkit given in Table 3 by the weight classes, with the top four competitors in each. It gives shares of the same techniques for six-seven bouts of every leader. For example, when a competitor used hold #2 in six bouts out of 12, the hold share was estimated at 6/12 = 0.5.

As demonstrated by Table 5, the shares of one, two and three favorite individual holds were estimated at 48%, 24% and 16% of the total toolkit. Therefore, favorite holds of every leader were found to account for 80% of their total scores – albeit the actual distributions of the techniques by the bouts were found quite irregular: see Table 6.

Furthermore, every technique claims a variety of physical qualities normally dominated by one or two key ones, with the dominance easily detectable by the sports experts having good competitive and/or coaching experiences. Table 7 hereunder gives an account of the techniques classified by the key physical qualities.

Table 2. 2019 WJ Champions: formal results

Результаты ведения поединков, спортсменов занявших призовые места в весовых категориях на Чемпионате Мира по дзюдо 2019 года (г. Токио)

Ход поединков спортсмена занявшего 1 место на Чемпионате Мира 2019 в весовой категории до 73 кг.				Ход поединков спортсмена занявшего 2 место на Чемпионате Мира 2019 в весовой категории до 73 кг.				Чемпионате Мира 2019 в весовой категории до 73 кг.				Ход поединков спортсмена занявшего 3 место на Чемпионате Мира 2019 в весовой категории до 73 кг.											
1-й раунд		2-й раунд		1-й раунд		2-й раунд		1-й раунд		2-й раунд		1-й раунд		2-й раунд									
Спортивная Очки	Очки	Спортивная Очки	Очки	Спортивная Очки	Очки	Спортивная Очки	Очки	Спортивная Очки	Очки	Спортивная Очки	Очки	Спортивная Очки	Очки	Спортивная Очки	Очки								
1-й раунд [-73 кг]: Презарительный раунд				1-й раунд [-73 кг]: Презарительный раунд				1-й раунд [-73 кг]: Презарительный раунд				1-й раунд [-73 кг]: Презарительный раунд											
UNGVARI Máté (Hungary)	0	0	0	ORUJOV Rustam (Azerbaijan)	0	1	0	0	HEYDAROV Hidayat (Azerbaijan)	0	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
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ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
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ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
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ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
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ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Shobhi (Japan)	1	0	0	ORUJOV Rustam (Azerbaijan)	1	1	0	0	HEYDAROV Hidayat (Azerbaijan)	1	0	0	0	IARTCEV Denis (Russia)	1	0	0	0	ALBALI Abdulsalah (Saudi Arabia)	1	0	0	0
ONO Sh																							



Table 3. 2019 World Judo Championship: technical statistics by the weight classes

	Holds	60kg		66kg		73kg		81kg		90kg		100kg		Total	
		Ippon	Wazari	Ippon	Wazari	Ippon	Wazari	Ippon	Wazari	Ippon	Wazari	Ippon	Wazari	Ippon	Wazari
1	Foot sweep	5	2	4	1	2	1	1	2			1	1	13	7
2	Inner hook	2		4	4		1		1	2	2	1	0	9	8
3	Twist	4	4		1	1	2	1	2	2	3		1	8	13
4	Side two-leg hook		1			1					1			1	2
5	Back throw from two knees		3	1	0	1		2	2	9	2	7	6	20	13
6	Front hook	2	1			2	4	1	1	2	1			7	7
7	Shoulder wheel		1		2		1							0	4
8	Scoop throw	1	1		4		1		1			3	1	4	8
9	Rear hook				1	1	1	6	5		1	2	1	9	9
10	Choke	2			0					1				3	0
11	Submission				1	1								1	1
12	Holds		1		0	2	2	1	3		1	1	2	4	9
13	Foot-in-the stomach throw				1		1		1					0	3
14	Hip throw				1			2	1					2	2
	Total	16	14	9	16	11	14	14	19	16	11	15	12	81	86

Table 4. 2019 World Judo Championship: top four in the 60kg weight class

M-60	Name	Bout 1		Bout 2		Bout 3		Bout 4		Bout 5		Bout 6		Bout 7	
		Ippon	Wazari	Ippon	Wazari	Ippon	Wazari	Ippon	Wazari	Ippon	Wazari	Ippon	Wazari	Ippon	Wazari
1	CHKHVIMIANI, Lukhumi (GEO)	3	6		5		3	3			5		3	6	3
2	LUTFILLAEV, Sharafuddin (UZB)	2	1	1	4	1		2		1		1			
3	NAGAYAMA, Ryuju (JPN)	1			1		7	3	5			12	8		
3	SMETOV, Yeldos (KAZ)	10	3	10		6				3		8			

As demonstrated by Table 7, strength and strength endurance are the key physical qualities for success followed by speed-pace and coordination skills. Therefore, we would recommend giving a special priority in the training system to the following techniques depending on the weight class: Table 8.

Conclusion. Our analysis showed that the individual judo training systems need to be customized to the individual anthropometric characteristics due to the simple fact that the response time i.e. muscle extensions/ flexions tend to grow with the growing anthropometric characteristics, including the limb

length/ size; associated with the lower movement frequency, slower metabolism, etc. One more training system individualization factor is the specific physicality, gifts and physical qualities with a special role played by strength, speed-pace, coordination and other natural abilities. Generally the technical toolkits in the modern judo tend to fast contract with the weight growth. The individual technical versatility is still important for a competitive progress although the sport leaders were found to heavily score in the top-ranking events by at most two favorite holds in every weight class. Thus we found that the 2019 WJ Champions scored 48%, 72% and 88% of their total points by one, two or three favorite (“crown”) holds,

**Table 5.** Priority techniques of the top-four competitors in every weight class

M-60	Name / Holds (shares)	1	2	3	4	5	6
1	CHKHVIMIANI, Lukhumi (GEO)	0,55	0,22	0,22			
2	LUTFILLAEV, Sharafuddin (UZB)	0,62	0,25	0,12			
3	NAGAYAMA, Ryuju (JPN)	0,28	0,14	0,14	0,14	0,14	0,14
3	SMETOV, Yeldos (KAZ)	0,33	0,33	0,17	0,17		
M-66							
1	MARUYAMA Joshiro(JPN)	0,71	0,14	0,14			
2	KIM, Limhwan (KOR)	0,85	0,14				
3	VIERU, Denis (MDA)	0,6	0,2	0,2			
3	ABE, Hifumi (JPN)	0,33	0,33	0,14	0,14		
M-73							
1	ONO, Shohei (JPN)	0,37	0,25	0,125	0,125	0,125	
2	ORUJOV, Rustam (AZE)	0,66	0,16	0,16			
3	HEYDAROV, Hidayat (AZE)	0,33	0,16	0,16	0,16	0,16	
3	IARTCEV, Denis (RUS)	0,2	0,2	0,2	0,2	0,2	
M-81							
1	MUKI Sagi (Israel)	0,62	0,25	0,125			
2	CASSE Matthias (Belgium)	0,42	0,28	0,14	0,14		
3	MAISURADZE Luka (Georgia)	0,44	0,22	0,11	0,11	0,11	
3	VALOIS-FORTIER A(Canada)	0,33	0,22	0,22	0,11	0,11	
M-90							
1	VAN T END Noel (Netherlands)	0,42	0,28	0,14	0,14		
2	MUKAI Shoichiro (Japan)	0,66	0,33				
3	MAJDOV, Nemanja (Serbia)	0,42	0,28	0,14	0,14		
3	CLERGET Axel (France)	0,33	0,33	0,16	0,16		
M-100							
1	FONSECA, Jorge (POR)	0,75	0,125	0,125			
2	ILYASOV, Niyaz (RUS)	0,5	0,33	0,16			
3	WOLF, Aaron (JPN)	0,33	0,33	0,16	0,16		
3	KORREL, Michael (NED)	0,42	0,28	0,28			
	Average for all weight classes	0,48	0,24	0,16	0,15	0,08	

Table 6. Key technical toolkit: all weight classes

Holds	Bout statistics						
	1	2	3	4	5	6	7
Foot sweep	4	6	3	0	2	4	1
Inner hook	4	2	3	5	0	3	3
Twist	5	2	2	4	1	4	0
Side two-leg hook	0	2	0	0	0	1	0
Back throw from two knees	4	8	6	4	7	3	0
Front hook	1	2	4	2	2	0	3
Shoulder wheel	1	1	2	0	0	0	0
Scoop throw	3	1	3	2	0	3	0
Rear hook	2	4	3	2	3	4	0
Choke	1	1	1	0	0	0	0
Submission	0	0	0	2	0	0	0
Holds	6	2	1	1	2	1	0
Foot-in-the stomach throw	0	0	1	1	1	0	0
Hip throw	0	1	1	1	0	2	0

respectively. Our analysis of the 2019 World Judo Championship (men) video replays found domination of strength and strength endurance among the physical qualities critical for success. These physical qualities were found the key for the 14 top holds in 155 actions scored by the refs – versus 43 coordination-dominated actions and 81 speed-pace dominated ones.

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Table 7. Dominant physical qualities claimed by the key 14 priority holds of the 2019 WJ Champions

Hold	Strength	Strength endurance	Speed/pace	Coordination skills	Strength	Strength endurance	Speed/pace	Coordination skills
1	1		1		20	20		
2				1				17
3		1		1			21	21
4			1			3		
5	1		1		33	33		
6	1				14			
7	1	1			4		4	
8	1	1			12		12	
9			1			18		
10		1					3	
11	1			1	2			2
12	1	1			13		13	
13			1	1		3		3
14	1		1		4	4		
					102	81	53	43

Table 8. Training service individualization algorithm, with the priority holds versus physical qualities

	Hold/ pin	Special physical qualities	60	66	73	81	90	100
6	Front hook	Strength	■		■			
7	Shoulder wheel	Strength + strength endurance						■
8	Scoop throw	Strength + strength endurance		■				■
12	Hold	Strength+ strength endurance			■	■		
10	Choke	Strength endurance						
1	Foot sweep	Strength + speed	■	■	■		■	
5	Back throw from two knees	Strength + speed				■		
4	Side two-leg hook	Strength/ pace					■	■
9	Rear hook	Strength/ pace				■		
14	Hip throw	Strength/ pace				■		
2	Inner hook	Coordination		■			■	
3	Twist	Coordination + strength endurance	■			■		
11	Submission	Coordination + strength						■
13	Foot-in-the stomach throw	Coordination + speed						

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