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ANALYSIS OF SERVES OF THE ESTONIAN NATIONAL VOLLEYBALL TEAM IN THE FINAL TOURNAMENT OF THE EUROPEAN CHAMPIONSHIP 2021 AND COMPARISON WITH THE FINAL TOURNAMENT OF THE EUROPEAN CHAMPIONSHIP 2019

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ABSTRACT

The aim of this study was to compare the tactics and proficiency of the Estonian men team's games in the finals of the European Championships in 2019 and 2021. A total of ten games were analysed (five games of the 2019 tournament and five games of the 2021 tournament). The data were collected by video analysis and were entered into the Excel program where further analysis was performed. Additional statistical data processing was performed using the chi-squared test. A difference was revealed between the tournaments in using serve types. While in the in the tournament of 2021, more jump power serves were used compared to the tournament of 2019, in 2019 more jump float serves were used compared to the tournament of 2021. In terms of jump power serves, the team was more proficient in the tournament of 2021 and in jump float serves in the tournament of 2019. Although the use of rapidly falling power serves was the lowest in both tournaments, the results of the study showed that the use of rapidly falling power serves proved successful in both tournaments in terms of aces.

In the tournament of 2019, the highest number of serves were delivered from zone 9 and in the tournament of 2021 from zone 6. In 2021, the use of different zones was more varied than in 2019 when most serves were played from zone 9. In the 2021 tournament, the percentage of both jump power serves and jump float serves towards the middle zones was higher than in the tournament of 2019. The percentage of positive jump float serves delivered towards both middle and back zones was higher in the tournament of 2019 than in the tournament of 2021. The jump power serves performed in 2021 were more proficient

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than in the tournament of 2019. The percentage of points gained after positive serves was higher in the tournament of 2021 than in the tournament of 2019. In both tournaments, most serves were directed towards the players. Although the percentage of serves directed between the players and towards the outlines was low in both years, the study found that the serves directed to these parts of the court were more difficult for the opponents to receive than the serves directed towards the players.

Keywords: *volleyball; serve; reception zones*

INTRODUCTION

Video analysis is nowadays used by nearly all volleyball teams to assess the proficiency of the game. Video analysis makes it possible to review the progress of the entire game and to concentrate on both tactical and technical strengths and weaknesses of the team [14].

A volleyball game always begins with a serve. Serve is the only element of the team game that the player performs entirely alone without depending on anyone else, neither the opponents nor the player's own team.

The aims of the serve are either directly gaining of points or contributing to gaining of points [7]. The significance of the serve in international elite men's volleyball is very high. In addition to resulting in aces, a good serve can paralyse the opposing team's defence and attack, i.e., the opponent cannot use all the options for preparing for the attack [9].

In the case of elite players, six different serving techniques are distinguished depending on the trajectory of the ball: strong jump serve, short jump serve (jump topspin serve), jump float serve, short jump float serve, float serve without jump, and short float serve without jump. Jump power serve and jump float serve, however, are used most often. According to the study of Häyrinen et al. in men's international top volleyball the proportion of using jump power serve was 54–65% [6]. The studies by Stamm et al. revealed that in the 2015 European men's championship the most often used serve was float serve with 39% [15]. Jump power serve is one of the most hazardous elements of attack in volleyball. Players who know how to use this element have good opportunities to gain points by serving. In its technical performance, the jump power serve resembles the spike. Effective jump serve requires good throw of the ball forward, concrete momentum steps and hitting the ball as high as possible [1]. The ball is hit with the wrist; therefore, it starts rotating [1]. The higher the point of hit, the greater the downward angle that the player can give to the ball at the

moment of hitting, and the more difficult it also is to receive the serve [15]. In men's elite volleyball, jump power serve is the most frequently used serve type. According to the study of Přidal and Hančák, high-quality jump serve is an indicator of game results. The winning teams participating in their study gained more points with the jump serve and made fewer serve errors compared to the losing teams [13]. At the same time, to make reception by the opposing team more difficult, it is necessary to vary serve types and the zones from which serves are delivered [12].

Considering all the above, the aim of the paper was to compare the tactics and proficiency of the Estonian men's team's games in the finals of the European Championships in 2019 and 2021.

The current study analyses the serves of the men's national team in the European Championships of 2019 and 2021. The analysis is based on the videos of the games; to record the results, the Microsoft Excel program was used. A total of ten games were analysed; five of them from the European Championship of 2019: with the Netherlands, Poland, Montenegro, Ukraine and Czechia. The other five games were played in the European Championship of 2021 with France, Germany, Croatia, Slovakia and Latvia.

The following tasks were set for the study:

1. To identify and compare the use and proficiency of serve types based on the six-point scale of Data Volley.
2. To identify and compare the distribution and proficiency of serving and reception zones.
3. To find the directions and proficiency of serves depending on the positions of receivers on the court.

MATERIAL AND METHODS

The authors of the current study wished to identify the main tactics of the Estonian men's national volleyball team, and how Estonians' serves and the further course of the game differed due to serves between the European Championships of 2019 and 2021. In both tournaments, five games were played. In each game, Estonians' serves were analysed both according to the team and individually. In 2019 the games took place in the Netherlands and 2021 in Tallinn, Estonia. The members of the Estonian national volleyball team performed 791 serves in both tournaments in total – 374 in 2019 and 417 in 2021. A total of 37 sets were played, 17 of them in 2019 and 20 in 2021.

In 2019, Estonians played against the following teams: Poland, Montenegro, Czechia, the Netherlands and Ukraine, and in 2021: Latvia, Slovakia, Germany, Croatia, and France. In 2021 the team of European Championship consisted of 15 men, in 2019 – of 14. In 2019, the team had one more player in the corner position than in 2021.

In the study, the proficiency of serve was assessed according to the scale of DataVolley 2007 [4]. The data were entered into the Excel program where further analysis was performed. In addition, statistical data processing was performed using the chi-squared test. For assessment and analysis of the serve, the following indicators were observed:

- Type of serve – whether jump float serves, jump power serves or rapidly falling power serves were more proficient.
- Proficiency of serve according to the six-point scale of Data Volley 2007.
- Zone of delivery of serve and zone of reception – the zones of delivery are divided into five; the extent of each zone is 1.8 m. Reception zones are separately divided into three reception lines and nine reception zones.
- Proficiency of serves according to the whole team.
- Serves delivered towards the players, between the players, to the outlines or towards the libero. Serves were also assessed according to the positions of the players on the court where they were directed – towards the players, between the players, to the outlines or towards the libero.
- Proficiency of serves after timeouts.

RESULTS AND DISCUSSION

Serve types and comparison of serve types used in the European Championships of 2019 and 2021 are shown in Tables 1 and 2. In the European Championship of 2019, the team performed 374 serves in total, 268 of which were jump power serves and 93 jump float serves. In addition, the team also performed 13 rapidly falling power serves (Table 1). Thus, 72% of all the serves performed by the Estonians were jump power serves. This is similar to the results of the study by Ciufarella et al. of the Italian volleyball male Top League during the 2008–2009 regular season [3] where the percentage of jump power serves was 69.9%. The percentage of jump float serves in the tournament of 2019 was 25%, and rapidly falling power serves were used in 3% of serves (Table 1).

Table 1. Number and percentage of serve types in the European Championship of 2019.

Serve types 2019	power serve	rapidly falling power serve	float serve	TOTAL
Estonia vs Montenegro	60	5	11	76
Estonia vs Poland	73	1	15	89
Estonia vs Netherlands	64	1	19	84
Estonia vs Czechia	41	4	32	77
Estonia vs Ukraine	30	2	16	48
TOTAL	268	13	93	374
Percentage	72%	3%	25%	100%

Table 2. Number and percentage of serve types in the European Championship of 2021.

Serve types 2021	power serve	rapidly falling power serve	float serve	float serve without jump	TOTAL
Estonia vs Latvia	80	4	8		92
Estonia vs Slovakia	87	6	17	1	111
Estonia vs Germany	38	5	15		58
Estonia vs Croatia	77	5	19		101
Estonia vs France	48	2	5		55
TOTAL	330	22	64	1	417
Percentage	79%	5%	15%	0%	100%

In the European Championship of 2021, the team performed 417 serves in total, 330 of which were jump power serves and 64 jump float serves. In addition, 22 rapidly falling power serves were performed. As much as 79% of Estonians' serves were jump power serves, 15% jump float serves and 5% rapidly falling power serves (Table 2). The percentage of jump power serves in 2021 was at a similar level to the percentage of jump power serves in the study by Kitsiou et al. of male elite players of National Teams competing in the final phase of the World League 2018 [8] where it was 75.4%. In addition, one standing float serve was performed, which is rare in present-day men's elite volleyball. According to the study of Palao et al. [11], standing float serve is used in 0–4% of cases in present-day men's elite volleyball. In our study, the standing serve was performed in order to surprise the opponent immediately after the signal of setting the ball into play. There was a statistically significant difference ($p = 0.003$) between the serve types used in the two tournaments. In the earlier tournament, Estonians served in total 43 serves fewer than in 2021. Our study revealed

clearly that in 2019 the float serve was used more often than in 2021. In 2019 when the total number of serves was lower, float serves constituted 25% of serves, and in 2021 the proportion of float serves was 15%. In comparison, in the games of group B in the 2015 European Championship, the percentage of float serves was 39 [15]. As for power serves, the difference between the two years was smaller. In 2019, 268 power serves were performed (72% of all serves) and, in 2021, 330 power serves (79% of all serves). In addition, we can see that, to surprise the opponents, rapidly falling power serve was used in 3% of all serves in 2019 and in 5% of all serves in 2021.

Table 3. Proficiency of serves according to serve types in the tournament of 2019.

	Proficiency of serves in 2019			
Serve type	power serves	float serves	rapidly falling power serves	total
Number of serves	268	93	13	374
Percentage of errors	24%	10%	15%	20%
Negative	46%	54%	46%	48%
Positive	22%	29%	23%	24%
Service aces	8%	8%	15%	8%

Table 4. Proficiency of serves according to serve types in the tournament of 2021.

	Proficiency of serves in 2021				
Serve type	power serves	float serves	rapidly falling power serves	float serve without jump	total
Number of serves	330	64	22	1	417
Percentage of errors	21%	5%	5%	0%	18%
Negative	43%	69%	64%	100%	48%
Positive	28%	22%	14%	0%	26%
Service aces	8%	5%	18%	0%	8%

Considering all the serves performed in 2019, the percentage of errors in serves was 20% (Table 3), and, in 2021, the percentage of errors was 18% (Table 4) of all the serves of the Estonians. The proportion of service aces was the same in both years, remaining at 8%. According to Lopez's study [9], at men's volleyball Olympic tournament, 6% of all serves were aces, and the proportion of serve errors was 17%. In our study, the opponent could use all attack combinations (negative) equally in both years, in 48% of cases. Out of all serves, the opponents

could not use all the attack combinations (positive) in 24% of cases in 2019 and in 26% in 2021. While studying the serve types separately, the research revealed that, in the tournaments of both years, the percentage of errors was clearly the highest in the case of jump power serves. In 2019, errors made up 24% and, in 2021, 21% of all the Estonians' jump power serves. In the studies of Ciuffarella et al. [3] and Stamm et al. [15], the percentage of errors in jump power serves was between 21–25%. In the current study, the results were in the same range. Stamm et al. [15] have also pointed out that, when performing a jump power serve, the player takes a conscious risk to serve more strongly and hazardously to paralyse the opponents' reception. This accounts for the great number of errors at power serves. Service aces were performed with jump power serves in 8% of cases in both years. In jump float serve, the speed of the serve is much lower compared to the jump power serve, but the use of the jump float serve results in a smaller number of errors than in jump power serves [13]. This tendency could also be noticed in our study. In 2019, the percentage of errors in jump float serves was 10% and in 2021 5%. Such a difference between the two tournaments resulted from the fact that in 2019 the players took greater risks at float serves, which can be seen from the percentage of service aces which was the same in jump float serves and jump power serves (8%). In the tournament of 2021, the percentage of aces from jump float serves was 5%. The opponents had the opportunity to use all attack combinations after jump power serves in 46% of cases in 2019 and in 43% in 2021. The percentage of negative serves from jump float serves was 54% in 2019 and 69% in 2021. It can clearly be seen that the percentage of negative serves is higher in the case of jump float serves than in jump power serves. The percentage of negative serves from jump power serves remained in the same range in both years. In float serves, however, it could be seen that jump float serves caused more problems for the opponents in 2019 than in 2021. Likewise, the percentage of positive float serves (serves after which the opponent could not use all attack combinations) was higher in 2019 than in 2021 – 29% and 22% of positive jump float serves respectively. In the case of jump power serves, the tendency was the opposite – in 2021 the percentage of positive serves was higher (28%) than in 2019 (22%). Considering the results of earlier studies where the opponent could not use all the directions of attack, it can be seen that the results have been much better than in the current study. In the study of the 2015/2016 season of the Selver Tallinn volleyball club, Tiit [16] found that the percentage of positive jump power serves during the season was 39.9%. In the study of Stamm et al., the percentage of positive serves was also 39%, while the percentage of positive serves was the same

for float serves and jump power serves [15]. Concerning rapidly falling power serves, it can be seen that fewer serves of this type were performed. In terms of results, however, it turns out that the percentage of service aces was higher (15% in 2019 and 18% in 2021) than in the case of jump float and jump power serves. Although the number of performances remains between 3–5% of all serves, it turns out that the use of rapidly falling serves has proved successful for surprising the receivers of the opposite team and gaining service aces.

Table 5. Distribution and proficiency of serves to the libero.

	Serves to the libero (float serves) 2021				**Serves to the libero (float serves) 2019**			
	negative	positive	aces	total	negative	positive	aces	total
Number	6	3	0	9	12	4	1	17
Percentage	67%	33%	0%	100%	70%	24%	6%	100%
Percentage of points from numerical value	17%	33%		22%	17%	25%		18%
	Serves to the libero (power serves) 2021				**Serves to the libero (power serves) 2019**			
	negative	positive	aces	total	negative	positive	aces	total
Number	40	25	3	68	37	16	4	57
Percentage	59%	37%	4%	100%	65%	28%	7%	100%
Percentage of points from numerical value	35%	48%		38%	24%	44%		28%

Fernandez et al. have said in their study that libero's contribution to the reception of serves favours the build-up of attacks by the receiving team. An essential aspect of proficiency of serve is directing the serves to the players whose reception capacity is lower [5]. While in float serves, it is easier for the server to direct the serves to a certain position than in jump power serves, the role of the libero in the reception of float serves should definitely be smaller than in jump power serves. In the current study that was so, but considering the proportion of float serves to the libero in both years, it can be seen that in 2021 the libero could be avoided better with jump float serves than in 2019 (Table 5). Jump float serves to the libero constituted 18% of all float serves in 2019 and 14% in 2021. After jump float serves to the libero, the opponent could use all attack combinations in 71% of cases in 2019 and in 67% of cases in 2021 (Table 5). Directing of float serves to the libero granted a point to the team under study from 24% of all the

jump float serves directed to the libero in 2019 and from 22% in 2021. In the case of jump power serves, the percentage of serving to the libero was 21% in both years, and the share of serves after which the opposite team could use all attack combinations after reception by the libero was 65% in 2019 and 59% in 2021 (Table 5). Jump power serves to the libero secured the team under study a point from 35% of all jump power serves to the libero in 2019 and from 42% in 2021. Considering the percentage of positive serves among jump power serves to the libero (Table 5), we can see that in 2021 the share of positive serves was greater than in the earlier year, and more points were gained after both negative (35%) and positive serves (48%).

Table 6. Proficiency of serves after timeouts

	2019	2021
Total of timeouts	17	27
Percentage of errors	12%	33%
Percentage of positive serves	24%	30%
Percentage of negative serves	59%	37%
Percentage of service aces	6%	0%
Percentage of points	18%	19%

Timeouts lower considerably the performance of the serving player, decreasing the proficiency of the serve and gaining of direct points [2]. The current study revealed that, in the tournament of 2021, the players erred more after timeouts than in the tournament of the earlier year (Table 6). This may have been caused by the risky tactics earlier envisaged by the coach and the low readiness to deliver the serve into the bounds of the court after the timeout. As for the percentage of positive and negative serves, we can see that in 2021 greater risks were taken after timeouts than in 2019, but the percentage of points gained after serves remained at a similar level in both years.

The study revealed that the greatest number of serves were performed as jump power serves. Jump power serves predominated in both years. In the in the tournament of the European Championship in 2021 more jump power serves were used than in the tournament of 2019. The share of jump float serves was greater in the tournament of 2019, constituting a quarter of all the serves of the tournament. In comparison, in 2021, the jump float serve was used only in 15% of all the serves of the tournament. The use of rapidly falling power serve was occasional in the tournaments of both years. The use of standing float serve has almost disappeared from present-day elite volleyball, and Estonians

performed only one standing float serve during the two tournaments. There was also a statistically significant difference ($p = 0.003$) between the serve types used in the two tournaments.

The jump power serves were performed more proficiently in the tournament of 2021. In jump float serves, the team was more proficient in the tournament of 2019.

There was a statistically significant difference between the zones from which the serves were placed ($p = 0.000$). Considering all the serves, the highest number of serves in the tournament of 2019 were placed from zone 9 and in the tournament of 2021 from zone 6. In the tournament of the earlier year, the majority of serves were performed from zone 9 or zone 6. The proportion of other zones from which the serves were placed remained below 10%. In 2021, the zones from which the serves were placed (considering all the serves) were more varied; only serving zone 5 was used in less than 10% of cases.

The comparison of the two years reveals that in the tournament of 2021 the percentage of points gained after positive serves was higher than in the tournament of 2019. In both tournaments, most serves were directed towards the players. While in the case of jump power serves, the share of serves directed towards the players remained at the same level in both years, in the case of jump float serves, a greater percentage of jump float serves were directed towards the players in the tournament of 2021 than in 2019. About jump power serves, the study revealed that the serves directed between the players were more proficient in the tournament of 2021 than in 2019. Although the percentage of serves directed between the players and towards the outlines was low in both years, the study found that the serves directed to these parts of the court were more difficult for the opponents to receive than the serves directed towards the players.

There was a statistically significant difference ($p = 0.003$) between the serve types used in the two tournaments. In 2019, jump float serves were used more often than in the tournament of 2021, and in 2021 jump power serves were used more often compared to the tournament of 2019. Likewise, rapidly falling serves were used more often in the tournament of 2021 than in 2019.

In the tournament of 2019, the team under study was more proficient in jump float serves, and in 2021, it was better in jump power serves.

There was a statistically significant difference between the two tournaments in the distribution of zones from which the serves were placed ($p = 0.000$). In the tournament of 2019, the highest number of serves were placed from zone 9 and in the tournament of 2021 from zone 6. In jump power serves, the zones from which the serves were placed were more varied in the tournament of 2021

than in the tournament of 2019. As for jump float serves, the zones from which the serves were placed varied more greatly in the tournament of 2019.

As for the central line of the reception line, the distribution of serves differed statistically significantly between the two years ($p = 0.001$). More jump power serves directed into the zones of the central line were performed in the tournament of 2021 than in the tournament of 2019, and in 2021 more jump float serves were performed into the zones of the central line.

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