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Assessment of Sprint Speed in Junior Women's Rugby 7's Players

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Abstract: *The aim of this study is to evaluate the sprint speed of junior female rugby 7`s players over different distances, both with and without the ball. We hypothesize that there are statistically significant differences between the results obtained in speed tests with the ball and without it. Also, we assume that there are differences between the sprint speed of the players depending on their position. In this sense, we evaluated 22 junior female rugby 7`s players, with an average age of 15,40 ± 1,33 years (165,50 ± 5,69 cm, 63,07 ± 9,94 kg, 18,44 ± 6,31 kg fat mass, 42,34 ± 4,48 kg muscle mass, 25,26 ± 2,67 kg skeletal muscle mass), all participants in the Romanian National Women's Rugby Sevens Championship. The sprint speed was measured using the Witty Sem automated timing system, with sensor gates placed at 10, 20, and 40 meters. Each player covered the 40-meter distance four times, twice with the ball and twice without it, recording the best times achieved. The results of the statistical analysis highlight significant differences in sprint speed with and without the ball ($p<0.05$), as well as between the 0-20 m and 20-40 m distances, both with and without the ball ($p=0.000$). The results confirm the fact that there are statistically significant differences between forwards and backs in terms of the sprint speed of the athletes ($p<0,05$).*

Keywords: *rugby 7's, junior, women, sprint speed.*

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Introduction

Rugby Sevens is one of the most spectacular forms of rugby, thanks to its moments of maximum intensity and the fast-paced transitions between phases of play. Female Rugby Sevens players possess excellent peripheral vision, a playing style characterized by precision and speed of execution, as well as high levels of agility and sprint speed (Dobbin et al., 2019; Valenzuela et al., 2018; Jones et al., 2016).

Rugby is a demanding sport where players frequently alternate between high-intensity bursts of activity and brief periods of lower intensity (Di Corrado et al., 2014; McAuliffe et al., 2021). In rugby, improving players' physical abilities is essential for executing technical and tactical actions, since matches demand numerous explosive movements, including rapid direction changes, sprints, jumps, accelerations, and decelerations (Freitas et al., 2021a; Pereira et al., 2018; Freitas et al., 2022; Martinaș et al., 2023; Sheppy et al., 2020).

Rugby Sevens is a fast-paced sport played by agile athletes. Their performance is directly influenced by their physical abilities. Speed, power, explosive strength, reaction time, and execution speed are key factors in sports performance. To improve them, applying the best training methods is essential. (Jones et al., 2016; Misseldine et al., 2021).

To achieve optimal physical performance in rugby, experts emphasize speed, reaction time, and agility as key motor skills for effective play (Clarke et al., 2017; Freitas et al., 2021b; Coghetto et al., 2023). Ball possession is also crucial for a team's success. A player's ability to maintain control and advance the ball is essential for scoring (Chiwaridzo et al., 2021).

To handle game situations and make the best decisions, junior rugby players need key skills for performance. These include sprint speed, acceleration speed, and speed of decision-making. Experts recommend assessing these skills outdoors for a more realistic evaluation (Clarke et al., 2017; Zabaloy et al., 2021).

The identification of the motor potential of female Rugby Sevens players can be achieved through physical and technical tests focused on analyzing specific skills and abilities (Dobbin et al., 2019; Lepciuc et al., 2021; Nolan et al., 2023).

Monitoring the physical fitness of young athletes is essential for their development and training effectiveness. Sports scientists use various tests to assess anthropometric traits and physical qualities in young rugby players (Alonso-Aubin et al., 2021; Harty et al., 2019). These evaluations help

analyze strengths and weaknesses, identify and develop talent, and assess training program effectiveness during the junior stage (Müller et al., 2021).

Specialized literature emphasizes that running speed can be effectively improved during the junior period through specific training (Jones et al., 2018; Till et al., 2017). In a study conducted in Romania on a junior women's Rugby Sevens team, the players improved their 10-meter sprint time after 10 weeks of a 14-week specific training program (Vizitiu et al., 2020).

Studies in the field also highlight the importance of speed in the selection process for national teams, with specialists focusing on the long-term development of female athletes (Müller et al., 2024).

A review of the specialized literature on the sprinting ability of rugby players highlights its importance as a key determinant in the game. The findings can serve as a benchmark for coaches in selecting capable and qualified players for different levels of play. This aspect distinguishes beginner and amateur teams from professional and elite ones. Additionally, the reviewed articles compare various population groups based on playing level and nationality across different rugby leagues (Turiman et al., 2022).

Studies comparing rugby players by position, "back" and "forward," found that back players covered greater distances during the game and achieved the best results in the 40m sprint assessment. Additionally, the literature review emphasizes the need for more studies involving a larger number of female rugby players across different playing levels (Turiman et al., 2022).

Literature review

Sprint speed

There are few studies in the specialized literature analyzing junior rugby players, most of which focus on their anthropometric data and movement speed over distances such as 5, 10, 20, and 30 meters (Müller et al., 2022). Some authors have shown that greater success in ball carrying is associated with 30m sprint speed (Coghetto et al., 2023).

Speed and acceleration are commonly evaluated in rugby players and are considered key elements of player performance (Till et al., 2017). The sprint performance of rugby league players is typically assessed over 10, 20, and 40 meters, providing insights into acceleration over the first 10 meters and maximum speed achieved between 10 and 40 meters (Dempsey et al., 2018).

Müller et al. (2022) assessed the running speed over 20, 30, and 40 meters, as well as maximum aerobic speed and oxygen consumption, in junior women's Rugby Sevens players in Brazil. They found that the anaerobic speed reserve over the 20-meter distance was lower compared to the results from the 30-meter distance.

Specialized literature emphasizes the development of acceleration speed, running speed, and decision-making speed, as these are crucial for achieving athletic performance. Experts have concluded that subjective assessments of running speed should be conducted over distances greater than 30 meters (Dobbin et al., 2019; Akumba & Moses, 2022; Carreras et al., 2013; Nolan et al., 2023; Bellinger et al., 2021).

Position in the field

Female rugby players require specific morphological and motor adaptations, which vary by their level of play and position. Key motor skills for female rugby players include sprint speed, execution speed, reaction time, agility, strength, precision, change of direction, and endurance. These skills develop with age and are influenced by the specific demands of each playing position (Gabbett et al., 2009; Till & Baker, 2020; Freitas et al., 2023).

International literature includes studies analyzing the somatic and motor development of rugby sevens players based on their field positions (Quarrie et al., 2013). These studies have found that backs recorded the highest running speeds and covered the greatest total distance, while forwards were more involved in activities requiring static effort, such as physical contacts (Cunningham et al., 2016).

Studies have highlighted that rugby forwards recorded higher weight values than backs, while backs achieved better results in running speed assessments (Jones et al., 2018; Scantlebury et al., 2022).

Speed with and without the ball

A study on senior rugby players evaluated sprint speed with and without the ball. Players performed three attempts for each test: running with the ball in both hands, running with the ball in the right hand, running with the ball in the left hand, and running without the ball, over a distance of 20 meters. The study concluded that running with the ball caused the greatest reduction in sprint performance, and the results suggested that to maximize speed, players should run with the ball in one hand (Grant et al., 2003).

Another study analyzed sprint speed without the ball, with the ball in one hand, and with the ball in both hands in beginner and experienced rugby

players, both girls and boys. The findings indicated that while there were performance differences in the last 20 meters of the 30-meter sprint, these differences were not related to experience or gender (Walsh et al., 2007).

A similar study on international rugby players analyzed sprint performance based on their position. Players performed sprints with the ball in one hand, in two hands, and without the ball. The findings showed that backs achieved better results than forwards in all sprint speed tests. Additionally, sprint performance without the ball was superior, with only small differences between running with the ball in one hand and in two hands. The decrease in speed when carrying the ball in two hands was much lower in international players compared to amateur club players (Barr et al., 2015).

The novelty and importance of the study

In our country, studies on the physical and motor development of junior Rugby Sevens players are limited, as the field is still emerging and developing. At the junior level, the number of women's Rugby Sevens teams has significantly increased in recent years, highlighting the need for research to assess the current level of player development. Additionally, it is important to report the findings to the international specialized literature.

International literature highlights speed as a key factor in the individual and collective performance of female rugby players. Therefore, we consider it necessary to investigate this parameter. A well-developed speed can provide advantages on the field, such as overcoming opponents, exploiting open spaces, executing counter-attacks, and enhancing defensive efficiency.

It is also necessary to analyze this parameter according to the position of the players, because although at this age the players have a multilateral training, they should specialize according to their physical abilities and anthropometric characteristics.

Considering the fact that in the game of rugby 7 the movement on the field and the scoring of points is done with the ball carried in the hands, it is essential to evaluate the speed with the ball carried.

Thus, the constant evaluation of the training level of female rugby players is of real importance both for the coaches and for the constant adaptation of the training programs. It is also essential for the continuous selection process for the national team.

After reviewing the specialized literature, we found very few studies focusing on the sprint speed evaluation of junior rugby players. To date, no studies have been identified that examine sprint speed while carrying the ball

or compare sprint performance based on player positions, such as backs and forwards. However, some studies have focused on male junior rugby players and female senior rugby players.

Thus, understanding the strategies for identifying and developing female rugby players is essential for improving the national competitive level, even at the junior level.

The theoretical foundation of the article was made with the help of scientific articles relevant to the subject and recent studies in the field of rugby.

Methodology

The purpose of the research is to evaluate the sprint speed of junior female rugby 7`s players over different distances, both with and without the ball, but also depending on their position, to check the current level of the team in the study, in accordance with the international specialized literature.

Hypothesis:

Hypothesis 1. We hypothesize that there are statistically significant differences between the results obtained in speed tests with the ball and without it.

Hypothesis 2. Additionally, we expect players to accelerate in the second part of the distance, showing significant differences in results over the 0-20 m and 20-40 m intervals.

Hypothesis 3. Also, we assume that there are differences between the sprint speed of the players depending on their position.

Materials & methods

Subjects: we evaluated 22 junior female rugby sevens players, members of a rugby team from the Moldova region, participating in the Romanian National Women's Rugby Sevens Championship. The team selection was based on the players' experience, seniority in the game, and their performance at the national level. We mention that all the athletes were in good medical condition.

In table 1 we find the descriptive analysis of the physical development indices of the rugby players from the entire team, but also according to their position.

Table 1. Descriptive analysis of the physical development of female rugby players

	Team (N=22)			Forwards (N=7)			Backs (N=15)		
	Mean	±	S.D.	Mean	±	S.D.	Mean	±	S.D.
Age (years)	15,40	±	1,33	15,71	±	1,38	15,26	±	1,33
Height (cm)	165,50	±	5,69	165,85	±	6,96	165,33	±	5,27
Weight (kg)	63,07	±	9,94	68,17	±	12,20	60,69	±	8,09
Fat mass (kg)	18,44	±	6,31	22,27	±	7,54	16,66	±	4,96
Muscle mass (kg)	42,34	±	4,48	43,55	±	5,23	41,78	±	4,16
Skeletal muscle mass (kg)	25,26	±	2,67	25,98	±	3,12	24,92	±	2,47

Procedure

We mention the fact that written informed consent was obtained from the legal guardians of the players. The research adheres to ethical standards and was approved by the Scientific Research Ethics Committee. Data collected from athletes was provided to coaches for use in training planning.

The evaluation of the athletes was carried out in October 2024, they being in the competition period.

Linear sprint speed tests

Sprint speed was measured using the Witty Sem automated timing system, with sensor gates placed at 0, 10, 20, and 40 meters. The Witty Sem Microgate timing system used for the evaluation included four reflectors, four photocells, eight tripods for sensor placement, and one Witty timer. All gates were positioned 50 cm above the ground, with the start line placed 50 cm behind the first gate to minimize false signals.

Before sprinting, participants performed a standardized warm-up, including dynamic mobility exercises, jogging, and progressively intense running. They also completed bodyweight lunges and squats as part of their preparation. All players were familiarized with the testing protocol before the trial.

The evaluation took place on an outdoor grass rugby field under optimal weather conditions. Players wore appropriate rugby attire, including a shirt, jersey, leggings, and rugby cleats. Each player completed the 40-meter distance four times, twice with the ball and twice without it, recording their best times. They were assessed in alphabetical order, running the four distances with a four-minute passive recovery break between each. The first

two sprints were completed without a ball, while the final two were performed with the ball carried in one hand.

Sprints were initiated without a starting signal, and the automatic timer activated upon detecting movement at the first sensor gate. Players were instructed to run at maximum speed, ensuring they crossed the final sensor gate without decelerating beforehand.

Sprint speed has also been assessed in other specialized studies on female rugby players over distances of 10, 20, and 40 meters, which served as the rationale for selecting this test in the present study (Clarke et al., 2017; Müller et al., 2024).

The evaluation of sprint speed while carrying the ball has been conducted among senior rugby players (Barr et al., 2015; Grant et al., 2003); however, no studies have been identified at the junior level to date.

Height and body analysis

The body analysis of the players was carried out with the Tanita MC-180 analyzer, which provided us with data on their weight, fat mass, muscle mass and skeletal muscle mass. We mention the fact that the data on the body analysis were only used in the description of the athletes, other statistical tests on possible correlations could become a future direction of research.

The body analysis was conducted indoors in the changing room before the warm-up. First, the players' height was measured, followed by body composition analysis, performed without shoes or jewellery. Each evaluation lasted approximately one minute and followed this procedure: During the first 10 seconds, the athlete stepped onto the analyzer, ensuring her soles covered the four electrodes while maintaining an upright posture with arms at her sides and looking straight ahead. Over the next 40–50 seconds, she gripped the control unit handles with all fingers, extended her arms forward to chest level, and held this position. At the conclusion of the analysis, she returned the handles to their support and stepped off the analyzer (Ungurean et al., 2023; Scantlebury et al., 2022).

Data analysis

To test the proposed hypotheses, the results obtained by the players were statistically analyzed with the help of the IBM SPSS Statistic V20 program, using the following tests:

- Descriptive analysis to highlight the signs of the physical development of the entire team, taking also into account their position in the game.

- Shapiro Wilk test to check the distribution of values in terms of normality

- Paired Samples T Test to identify the differences between the results obtained in the evaluation of speed with and without ball, and also to show the differences between the results obtained over the 0-20 m and 20-40 m intervals.

- Independent Samples T test to highlight the differences between backs and forwards.

Variables

Statistical analysis was performed according to the research variables. Thus, the independent variables invoked were carrying the ball and the position of the players, and the dependent variables being represented by the sprint speed over the distances of 10, 20, 40 and 20-40 m.

Results

The data obtained after applying the Shapiro Wilk test state that the data obtained by the players in the evaluation of the movement speed both with the ball and without it are normally distributed, $p>0.05$, according to table 2.

Table 2. Evaluation of the normality of data distribution

	Mean		Std. Dev.	p
10 meters sprint (s)	1,82	±	0,14	0,714
10 meters sprint (s) with ball	1,85	±	0,15	0,850
20 meters sprint (s)	3,39	±	0,26	0,614
20 meters sprint (s) with ball	3,44	±	0,29	0,222
40 meters sprint (s)	6,52	±	0,58	0,312
40 meters sprint (s) with ball	6,60	±	0,60	0,194
20 - 40 meters sprint (s)	3,12	±	0,32	0,208
20 - 40 meters sprint (s) with ball	3,17	±	0,32	0,207

Testing Hypothesis 1

In what follows, in order to identify the differences between the values of the sprint speed on the distances of 10, 20 and 40 meters with and without the ball obtained by the athletes, we applied the statistical test Paired Samples T test. Thus, in table 3, we notice that there are statistically significant differences among the sprint speed values with the ball and those without the ball, $p<0.05$. Also, statistically significant differences were identified between the speed obtained over the distance from 20 to 40 m with and without the ball, $p=0.001$.

Table 3. Statistical differences between sprint speed with and without the ball

		Mean		Std. Dev.	p
Pair 1	10 meters sprint (s)	1,82	±	0,14	**0,005**
	10 meters sprint (s) with ball	1,85	±	0,15	
Pair 2	20 meters sprint (s)	3,39	±	0,26	**0,011**
	20 meters sprint (s) with ball	3,44	±	0,29	
Pair 3	40 meters sprint (s)	6,52	±	0,58	**0,003**
	40 meters sprint (s) with ball	6,60	±	0,60	
Pair 4	20 - 40 meters sprint (s)	3,12	±	0,32	**0,001**
	20 - 40 meters sprint (s) with ball	3,17	±	0,32	

Testing Hypothesis 2

Since we wanted to analyze the differences between the speed values obtained on the first 20 meters and on the second part of the 40 m distance, both with and without the ball, we used the Paired Samples T test, the data obtained suggesting that there are differences statistically significant between the first 20 meters and the second part, p=0.000 (table 4). We notice that the players obtained better speed values in the second part of the distance, both in terms of evaluating the speed without the ball (3.12 ± 0.32 s) and in terms of evaluating the speed with the ball carried (3.17 ± 0.32 s), and this can be explained because athletes accelerate in the first 20 meters and reach the maximum speed in the second part of the run.

Table 4. Statistical differences between 20 m sprint and 20- 40 m sprint with and without the ball

		Mean		Std. Dev.	p
Pair 1	20 meters sprint (s)	3,39	±	0,26	**0,000**
	20 - 40 meters sprint (s)	3,12	±	0,32	
Pair 2	20 meters sprint (s) with ball	3,44	±	0,29	**0,000**
	20 - 40 meters sprint (s) with ball	3,17	±	0,32	

Testing Hypothesis 3

In order to identify the differences between backs and forwards in terms of sprint speed without the ball, we applied the Independent Samples T test, the results suggest that the backs obtained better results on all evaluated distances, statistically significant differences were identified among the two groups ($p<0.05$), according to table 5.

Table 5. Statistical differences between forwards and backs in sprint speed without ball

	Position	Mean		Std. Dev.	p
10 meters sprint (s)	Forwards	1,95	±	0,12	**0,002**
	Backs	1,76	±	0,10	
20 meters sprint (s)	Forwards	3,62	±	0,26	**0,003**
	Backs	3,29	±	0,18	
40 meters sprint (s)	Forwards	7,00	±	0,66	**0,005**
	Backs	6,29	±	0,39	
20 – 40 meters sprint (s)	Forwards	3,36	±	0,38	**0,010**
	Backs	3,00	±	0,21	

Regarding the sprint speed with the ball carried, according to table 6, statistically significant differences were identified between the results obtained by the forward and back players ($p<0.05$), with the back players having better results on all evaluated distances.

Table 6. Statistical differences between forwards and backs in sprint speed with ball

	Position	Mean		Std. Dev.	p
10 m sprint (s) with ball	Forwards	1,98	±	0,15	**0,006**
	Backs	1,80	±	0,11	
20 m sprint (s) with ball	Forwards	3,68	±	0,31	**0,004**
	Backs	3,32	±	0,19	
40 m sprint (s) with ball	Forwards	7,11	±	0,68	**0,005**
	Backs	6,37	±	0,40	
20 – 40 m sprint (s) with ball	Forwards	3,43	±	0,37	**0,005**
	Backs	3,04	±	0,21	

Discussions

Sprint speed

Given the limited specialized literature on junior female rugby, we have summarized the most significant findings in Table 7, including results for both female rugby players and male junior rugby players.

For the 10 m sprint speed without the ball, the overall team performance was superior to the results reported in other studies (Müller et al., 2021; Müller et al., 2024; Clarke et al., 2017). Additionally, the results obtained by the athletes in our study were comparable to those of junior male rugby players, as shown in Table 7.

Over the 20 m distance, our female athletes outperformed the findings from the specialized literature (Müller et al., 2021) but had lower results compared to junior male rugby players, as indicated in Table 7.

For the 40 m sprint, the average performance of the athletes in this study was lower than that reported in previous studies (Clarke et al., 2017). Furthermore, junior male rugby players achieved better results than the female athletes in our study, as highlighted in Table 7.

Table 7. Review of literature on sprint speed in junior rugby players

Study	Playing level	Group	10 m		20 m		40 m	
			Mean	S.D.	Mean	S.D.	Mean	S.D.
Our study	Junior female U16		1,82	0,14	3,39	0,26	6,52	0,58
Müller et al., 2021	Junior female U15	Intervention post	2,07	0,04	3,56	0,10		
		Control post	2,18	0,16	3,80	0,34		
Müller et al., 2024	Junior female U17	National team	1,87	0,08				
		Intervention group	2,02	0,12				
Clarke et al., 2017	Junior female		1,88	0,09			6,00	0,28
	Junior male		1,67	0,06			5,18	0,20
Till et al., 2015	Junior male U16		1,81	0,07	3,12	0,11		
	Junior male U17		1,81	0,06	3,12	0,10		
	Junior male U18		1,80	0,06	3,09	0,11		
Jones et al., 2018	Junior male U18	School	1,84	0,11	3,15	0,18	5,67	0,31
		Academy	1,82	0,08	3,10	0,13	5,52	0,27
Gabbett et al., 2009	Junior male U16	Elite	1,81	0,08	3,11	0,12	5,56	0,22
		Sub-elite	1,94	0,11	3,28	0,18	5,83	0,35
Chiwaridzo et al., 2021	Junior male U18		2,00	0,01	3,30	0,20	5,60	0,30
Dobbin et al., 2019	Junior male	Youth	1,83	0,11	3,16	0,16		
		Academy	1,84	0,11	3,15	0,16		
Darrall-Jones et al., 2016a	Junior male U18		1,80	0,06	3,11	0,09	5,57	0,18

Position in the field

Since we have not yet identified studies in international literature that focus on evaluating sprint speed based on players' positions, we were unable to present the data we obtained. Instead, in Table 8, we included data from specialized literature on junior male rugby players and senior female rugby players.

As shown in Table 8, we observe that in all the articles reviewed, back players achieved better results than forwards across all evaluated distances (10, 20, and 40 meters).

The absence of studies in this area could be considered a limitation of the current research but also presents an opportunity for future investigation.

Table 8. Literature review of the sprint speed of rugby players depending on their playing position

Study	Playing level	Position	10 m		20 m		40 m	
			Mean	S.D.	Mean	S.D.	Mean	S.D.
Our study	Junior female U16	Back	1,76	0,10	3,29	0,18	6,29	0,39
		Forward	1,95	0,12	3,62	0,26	7,00	0,66
Darrall-Jones et al., 2016b	Junior male U16	Back	1,77	0,08	2,99	0,15	5,45	0,41
		Forward	1,88	0,12	3,21	0,18	5,87	0,30
	Junior male U18	Back	1,79	0,06	3,02	0,10	5,34	0,17
		Forward	1,84	0,06	3,14	0,10	5,63	0,21
Gabbett et al., 2009	Junior male U16 Elite	Back	1,76	0,09	3,03	0,12	5,40	0,22
		Forward	1,85	0,06	3,18	0,09	5,69	0,17
	Junior male U16 Sub-elite	Back	1,88	0,07	3,18	0,09	5,62	0,15
		Forward	2,06	0,09	3,50	0,16	6,28	0,31
Jones et al., 2016	Senior female	Back	1,87	0,09	3,36	0,18	6,13	0,25
		Forward	2,01	0,17	3,60	0,26	6,59	0,61
Scantlebury et al., 2022	Senior female	Back	1,98	0,11	3,46	0,20	6,34	0,44
		Forward	2,12	0,14	3,72	0,27	6,91	0,61

Speed with and without the ball

After reviewing the specialized literature, we found no studies that address the differences in sprint speed between junior female rugby sevens players with and without the ball. Therefore, the only relevant data identified pertains to senior players, where sprint speed was evaluated in three conditions: without the ball, with the ball carried in both hands, and with the ball carried in one hand.

As shown in Table 9, over a 10-meter distance, sprint speed without the ball produced the best results. However, the differences between sprinting without the ball and sprinting with the ball in one hand were not significant.

Although the players in the current study belong to a lower age category, we observe that their average sprint times are comparable to those of senior players (Walsh et al., 2007; Barr et al., 2015). This can be attributed to the fact that the studies available are somewhat outdated, and rugby has evolved significantly in recent years, particularly in terms of game spectacle, speed of play transitions, and overall game intensity.

Table 9. Literature review on sprint speed with and without the ball in rugby players on 10 metres

Study	Playing level	Position/ group	Without ball			Under one arm			In both hands		
			10 m								
			Mean		S.D.	Mean		S.D.	Mean		S.D.
Our study	Junior female U16		1,82	±	0,14	1,85	±	0,15			
		Forward	1,95	±	0,12	1,98	±	0,15			
		Back	1,76	±	0,10	1,80	±	0,11			
Walsh et al., 2007	Senior male	Beginners	1,87	±	0,08	1,87	±	0,08	1,91	±	0,10
		Experienced	1,87	±	0,08	1,88	±	0,10	1,88	±	0,12
	Senior female	Beginners	2,13	±	0,16	2,19	±	0,17	2,20	±	0,16
		Experienced	2,03	±	0,12	2,03	±	0,09	2,04	±	0,10
Barr et al., 2015	Senior male		1,82	±	0,08	1,81	±	0,09	1,81	±	0,09
		Forward	1,85	±	0,08	1,86	±	0,09	1,85	±	0,09
		Back	1,78	±	0,06	1,76	±	0,06	1,77	±	0,66

No studies were identified in the literature regarding sprint speed with and without the ball over a 20-meter distance for female junior rugby players. Therefore, the only available data pertains to senior players, where sprint speed with and without the ball was evaluated. The results from these studies showed significantly better performance compared to the average results obtained by the players in our study, as shown in table 10.

Table 10. Literature review on sprint speed with and without the ball in rugby players on 20 metres

Study	Playing level	Position/ group	Without ball		Under one arm		In both hands	
			20 m					
			Mean	S.D.	Mean	S.D.	Mean	S.D.
Our study	Junior female U16		3,39 ±	0,26	3,44 ±	0,29		
		Forward	3,62 ±	0,26	3,68 ±	0,31		
		Back	3,29 ±	0,18	3,32 ±	0,19		
Grant et al., 2003	Senior male		2,57 ±	0,15	2,60 ±	0,16	2,62 ±	0,16

Sprint speed is a key factor explored in the specialized literature; however, there are limited references specifically addressing female junior rugby players.

Considering the reported differences in movement demands based on player positions in rugby 7s, coaches should factor in the varying tactical, technical, and physiological characteristics of forwards and backs when designing training plans.

Sprint speed with the ball carried is an essential element in the game of rugby, because this aspect can be found in most decisive phases of the game, such as overcoming opponents and scoring points.

The results of this research provide athletes and coaches with attributes that can be applied as parameters in the selection process for the national team. According to the literature, it is well established in sports science that strength, speed, power and aerobic capacity are important for rugby performance. Thus, from the perspective of practical application, it is possible for coaches to focus their efforts on specific aspects, optimizing the training process. To improve sprint speed, repeated speed exercises with and without a balloon are recommended (Lepciuc et al., 2021; Vizitiu et al., 2020).

Research limits and future research directions

This study has certain limitations, including the lack of information on the athletes' training routines and lifestyles, as well as the absence of national and international studies on junior rugby 7s players for accurate result comparison.

Since no studies have been conducted in our country to evaluate junior female rugby 7's players, we consider this study to be a pilot project that can contribute to the advancement of our field. Although the number of subjects was limited, the study could be expanded nationally to provide a more comprehensive assessment of the performance level of female rugby players in our country.

In addition to evaluating sprint speed, other essential aspects of rugby performance could also be explored, such as strength, aerobic capacity, power, technical skills, and agility. A future research direction could involve identifying correlations between specific somato-functional and motor parameters, as well as a conducting a more detailed analysis of position-specific specialization among players.

Future studies are crucial for analyzing female athletes' performance during matches and examining the training methods and routines of young female rugby sevens players in Romania. Additionally, gaining insights into strategies for identifying and developing female rugby players is key to enhancing the national competitive level.

Therefore, the continuous assessment of female rugby players' training levels is crucial for coaches to adapt training programs effectively. Additionally, it plays a key role in the ongoing selection process for the national team.

Conclusions

The aim of this work was to analyze the sprint speed of junior women's 7 rugby players, at different distances, with and without a ball. The results show that there are differences between sprinting with and without the ball, with better times recorded for running without the ball. This finding is also supported by the specialized literature, confirming the first proposed hypothesis. We believe this aspect should be explored in more detail in future studies, as improving sprint speed while carrying the ball is crucial for rugby players. This is a common situation in the game, often leading to a try being scored.

Additionally, the sprint speed in the first 20 meters and the second part of the run was analyzed. It was noted that, both with and without the ball, players recorded better results in the second part of the sprint. This can be explained by the fact that players accelerate in the first 20 meters and reach their maximum speed in the second part, thus confirming hypothesis 2.

Regarding the evaluation of sprint speed with and without the ball based on playing position, the results show differences between forwards and backs. Backs achieved better results at all distances, which is consistent with findings in other studies in the field, thereby confirming the third hypothesis.

Although female rugby 7s players are generally versatile and exhibit well-rounded motor development, certain characteristics must be considered when assigning positions. This aspect should also be studied in our country on a larger sample, taking into account various motor skills, such as reaction time, agility, strength, endurance under maximum intensity efforts, and somatic development.

Authors contributions

All authors have equal contribution.

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