



Injury Surveillance Studies

2024 Rugby Europe Championship (Men)

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1. INTRODUCTION

Understanding the incidence and nature of the injuries sustained during the practice of rugby is key in order to clarify the risks posed to players. Due to its nature as a contact sport, rugby, like ice hockey, lacrosse, and American football, has a higher injury incidence than non-contact sports. Through Injury Surveillance Studies in various competitions, it is possible to gain an understanding of how, where and when injuries happen, which is a fundamental requirement to advance player welfare standards across all ages, levels, formats and settings of the game.

Several Injury Surveillance Studies have been implemented previously in 15-a-side World Rugby Competitions^[1-4], as well as the Injury Surveillance Studies that have been conducted in the Rugby Europe Championship 2023 and the Rugby Europe Super Cup 2023.

Rugby Europe is committed to implementing injury surveillance studies at all major Rugby Europe tournaments and to disseminate the results within the Rugby community.

The aims of these studies are:

- To record and analyze injuries sustained by men and women at the men's and women's Rugby Europe Competitions.
- To identify injury trends.
- To bring injury-related areas of concern to the attention of Rugby Europe's Chief Medical Officer and when appropriate to World Rugby's Chief Medical Officer.

This report continues the on-going study of Rugby Europe competitions by reporting injuries sustained during the men's 2024 Rugby Europe Championship.

2. METHODS

This study was conducted in accordance with the definitions and protocols described in the World Rugby approved consensus statement on definitions and procedures for injury surveillance studies in Rugby^[5].

The definition of injury was: 'Any match injury sustained during the 2024 men's Rugby Europe Championship that prevents a player from taking a full part in all normal training activities and/or match play for more than one day following the day of injury'. A recurrent injury was defined as 'An injury (as defined above) of the same type and at the same site as an index injury and which occurs after a player's return to full participation from the index injury'.

Specific injuries were classified using the OSICS 10 coding system^[6]. The study also recorded the injury location, type and cause together with the event leading to the injury.

The injury severity was determined by the number of days a player was injured: a player was deemed to be injured until he/she could undertake full, normal training and be available for match selection whether he/she was actually selected. Medical staff were required to make an informed clinical judgment about a player's fitness to train/play on those days when players were not scheduled to train or play. Injured players were followed up after each tournament to obtain their return-to-play date: the return-to-play dates for players with injuries that remained unresolved 3 months after the final match in the Rugby Europe Super Cup were defined on the basis of the player's medical staff's judgment and prognosis. The complete lists of categories and sub-categories used for categorizing injury location and injury types are provided in the Rugby consensus publication^[5].

Only match injuries resulting in > 1 day of absence from training or match-play were recorded in this study. Non-match-play injuries were not included in this injury surveillance study.

3. DATA COLLECTION

Prior to the tournament, the purpose of the epidemiological study was outlined to each participating team. The player's anthropometric information was recorded: (playing position [back, forward]; date of birth; body mass [Kg]; stature [cm]); players joining a country's squad at a later date were added to the list of players and the anthropometric data recorded at the time the player joined the squad.

Team medical staff prospectively recorded injuries sustained during each match. Detailed information about each injury (date of injury, date of return to play, location and type of injury, cause of injury, event leading to injury) was also recorded by team medical staff. Injuries were understood to be resolved when an injured players returned to play/training.

Belgium, Germany, Georgia, Netherlands, Poland, Portugal, Romania, and Spain were involved in the Men's Rugby Europe Championship (REC) 2024.

4. RESULTS

All participating teams reported data in accordance with the definitions and protocols described in the World Rugby approved consensus statement on definitions and procedures for injury surveillance studies in Rugby^[5].

4.1. Players' anthropometric data

Table 1 summarises the numbers and anthropometric data for players, categorised as backs, forwards and all players, taking part in REC 2024. Table 1.1 summarises anthropometric data within players' grouped positions.

The total sample population for the study was 296 players (132 backs; 164 forwards). The mean age was 26,0 years (backs: 25,9 years; forwards: 26,2 years; $p = 0,568$). The average stature for all players

was 185,6 cm; forwards (188,1 cm) were significantly taller than backs (182,3 cm) ($p=0,043$). The average body mass for all players was 99,8 kg; forwards (109,0 kg) were significantly heavier than backs (88,4 kg) ($p<0,001$).

Table 1. Players' anthropometric data			
Measure	Mean (\pm standard deviation)		
	Backs	Forwards	All players
Players (n)	132	164	296
Stature (cm)	182,3 (6,2)	188,1 (6,8)	185,6 (7,1)
Body Mass (kg)	88,4 (10,1)	109,0 (12,1)	99,8 (15,3)
Age (years)	25,9 (4,4)	26,2 (4,3)	26,0 (4,3)

Table 1.1. Players' anthropometric data						
Measure	Mean (\pm standard deviation)					
	Front Row	Second Row	Third Row	Halves	Inside backs	Outside backs
Players (n)	73	45	46	52	33	47
Stature (cm)	184,5 (5,8)	193,3 (5,6)	188,8 (5,6)	180,6 (6,8)	185,9 (5,3)	181,8 (5,0)
Body Mass (kg)	110,3 (13,3)	113,1 (9,7)	103,0 (10,0)	85,8 (11,4)	94,6 (9,6)	86,9 (6,7)
Age (years)	26,6 (4,2)	25,8 (4,4)	25,8 (4,2)	26,2 (4,8)	26,4 (4,2)	25,1 (3,9)

4.2. Match injuries

4.2.1. Injury incidence

Table 2 summarises the match injury frequency, exposure and incidence for players, categorised as backs, forwards and all players, taking part in REC 2024.

The total number of injuries sustained was 45 (backs: 20; forwards: 25) and the total match exposure was 800,0 player-hours (backs: 373,0; forwards: 427,0). The overall match incidence was 56,3 injuries/1000 match hours (backs: 53,6; forwards: 58,5).

Table 2. Match injury frequency, exposure, and injury incidence			
Measure	Backs	Forwards	All players
Injuries (n)	20	25	45
Exposure (player-match-hours)	373,0	427,0	800,0
Incidence (95% confidence interval)	53,6 (30,8-76,5)	58,5 (36,3-80,8)	56,3 (40,3-72,2)

4.2.2. Injury severity

Table 3 summarises the mean and median match injury severity data for players, categorised as backs, forwards and all players, taking part in REC 2024.

The mean severity of all injuries sustained was 47,0 days missed (backs: 57,0 days; forwards: 39,1 days). The median severity of all injuries sustained was 15,0 days for all players (backs: 24,5 days; forwards: 13,0 days). There were no significant differences between backs and forwards for either the mean (p= 0,440) or median severities (p=0,301).

Table 3. Mean and median match injury severity (days lost)			
Measure	Severity (95% Confidence interval), days		
	Backs	Forwards	All players
Mean (95% confidence interval)	57,0 (17,6-96,3)	39,1 (10,2-67,9)	47,0 (24,2-69,9)
Median (95% confidence interval)	24,5 (15,0-43,0)	13,0 (12,0-21,0)	15,0 (13,0-29,0)

Table 4 summarises the proportion of match injuries by time-loss data for players, categorised as backs, forwards and all players, taking part in REC 2024.

Moderate severity (8-28 days) injuries were the most common representing 48,9% of all injuries, followed by severe (29-90 days) with 22,2%, minor (2-7 days) with 15,6% and major (> 90 days) with 13,3%. Forwards sustained more moderate (8-28 days) injuries, while the backs sustained more severe (29-90 days) and major (> 90 days) injuries.

Table 4. Proportion of match injuries by time-loss category

Measure	%		
	Backs	Forwards	All players
Minor (2-7 days)	20,0	12,0	15,6
Moderate (8-28 days)	30,0	64,0	48,9
Severe (29-90 days)	30,0	16,0	22,2
Major (>90 days)	20,0	8,0	13,3

4.2.3. Injury burden

The total days-absence resulting from match injuries sustained during the REC 2024 was 2116 days-absence (backs: 1139; forwards: 977).

Injury burden, which is equal to injury incidence x mean severity, is an important ISS output measure, as it provides an overall indication of the risk of injury^[7,8]. The injury burden in the REC 2024 was 2646 days lost/1000 player-hours (backs: 3055; forwards: 2287 days lost).

4.2.4. Injury location

Table 5 summarises the proportion of match injuries by injury location data for players, categorised as backs, forwards and all players, taking part in REC 2024. The most common anatomic location for all players was the head/neck with 40,0%, followed by lower limb (35,6%) and upper limb (17,8%). Head/face was the most common specific injury location with 37,8% followed by shoulder/clavicle and knee (11,1%). For backs, the most frequent injury location was the head/face (30,0%) followed by the knee (15,0%) and posterior thigh (15,0%); For forwards the most common were the head/face (44,0%) followed by the shoulder/clavicle (12,0%).

Table 5. Proportion of match injuries by injury location

Measure	% (95% Confidence interval)		
	Backs	Forwards	All players
Head / Neck	30,0 (9,9-50,1)	48,0 (28,4-67,6)	40,0 (25,7-54,3)
Head/face	30,0 (9,9-50,1)	44,0 (24,5-63,5)	37,8 (23,6-52,0)
Neck/cervical spine	-	4,0 (0,0-11,7)	2,2 (0,0-6,5)
Upper limb	20,0 (2,5-37,5)	16,0 (1,6-30,4)	17,8 (6,6-29,0)
Shoulder/clavicle	10,0 (0,0-23,1)	12,0 (0,0-24,7)	11,1 (1,9-20,3)
Upper arm	-	-	-
Elbow	-	4,0 (0,0-11,7)	2,2 (0,0-6,5)
Forearm	-	-	-
Wrist/hand/fingers	10,0 (0,0-23,1)	-	4,4 (0,0-10,4)
Trunk	5,0 (0,0-14,6)	-	6,7 (0,0-14,0)
Ribs/upper back	5,0 (0,0-14,6)	8,0 (0,0-18,6)	2,2 (0,0-6,5)
Abdomen	-	8,0 (0,0-18,6)	4,4 (0,0-10,4)
Low back	-	-	-
Sacrum/pelvis	-	-	-
Lower limb	45,0 (23,2-66,8)	28,0 (10,4-45,6)	35,6 (21,6-49,6)
Hip/groin	-	-	-
Thigh, anterior	10,0 (0,0-23,1)	8,0 (0,0-18,6)	8,9 (0,6-17,2)
Thigh, posterior	15,0 (0,0-30,6)	-	6,7 (0,0-14,0)
Knee	15,0 (0,0-30,6)	8,0 (0,0-18,6)	11,1 (1,9-20,3)
Lower leg	-	4,0 (0,0-11,7)	2,2 (0,0-6,5)
Ankle	5,0 (0,0-14,6)	8,0 (0,0-18,6)	6,7 (0,0-14,0)
Foot/toe	-	-	-

4.2.5. Injury type

Table 6 summarises the proportion of match injuries by injury type for players, categorised as backs, forwards and all players, taking part in REC 2024.

The most common injury types were joint/ligament injuries with 33,3%, followed by the muscle/tendon (28,9%) and central/peripheral nervous system (26,7%). Forwards sustained more joint/ligament injuries (40,0%) than backs (25,0%) while backs presented more muscle/tendon injuries (45,0%) than forwards (16,0%). The most common specific injury types sustained by backs were muscle strain/cramp (30,0%) and sprain/ligament (25,0%). Concussion (36,0%) and sprain/ligament (32,0%) were the most common specific injuries presented by the forwards.

Table 6. Proportion of match injuries by injury type

Measure	% (95% Confidence interval)		
	Backs	Forwards	All players
Bone	10,0 (0,0-23,1)	4,0 (0,0-11,7)	6,7 (0,0-14,0)
Fracture	10,0 (0,0-23,1)	4,0 (0,0-11,7)	6,7 (0,0-14,0)
Other bone injury	-	-	-
C/PNS	15,0 (0,0-30,6)	36,0 (17,2-54,8)	26,7 (13,8-39,6)
Concussion	15,0 (0,0-30,6)	36,0 (17,2-54,8)	26,7 (13,8-39,6)
Nerve injuries	-	-	-
Joint (non-bone) / ligament	25,0 (6,0-44,0)	40,0 (20,8-59,2)	33,3 (19,5-47,1)
Dislocation / subluxation	-	4,0 (0,0-11,7)	2,2 (0,0-6,5)
Meniscus / Disc Injury	-	4,0 (0,0-11,7)	2,2 (0,0-6,5)
Sprain/ligament	25,0 (6,0-44,0)	32,0 (13,7-50,3)	28,9 (15,7-42,1)
Other	-	-	-
Muscle / tendon	45,0 (23,2-66,8)	16,0 (1,6-30,4)	28,9 (15,7-42,1)
Haematoma/bruise	15,0 (0,0-30,6)	-	6,7 (0,0-14,0)
Muscle strain/cramp	30,0 (9,9-50,1)	16,0 (1,6-30,4)	22,2 (10,1-34,3)
Tendon injury/tendinopathy	-	-	-
Other	-	-	-
Skin	5,0 (0,0-14,6)	4,0 (0,0-11,7)	4,4 (0,0-10,4)
Abrasion	5,0 (0,0-14,6)	4,0 (0,0-11,7)	4,4 (0,0-10,4)
Laceration	-	-	-
Other types	-	-	-
Visceral	-	-	-
Other	-	-	-

C/PNS: Central and Peripheral Nervous System

4.2.6. Most common and highest risk injuries

Table 7 identifies the most common match injuries by injury diagnosis for players, categorised as backs, forwards and all players, taking part in REC 2024.

The most common injury was concussion (all players: 26,6%; backs: 15,0%; forwards: 36,0%).

Table 7. The four most common injury diagnoses reported for backs, forwards and all players (% of all reported match injuries)

Backs		Forwards		All players	
Injury	%	Injury	%	Injury	%
Concussion	15,0	Concussion	36,0	Concussion	26,6
Hamstring strain	10,0	Ankle sprain	8,0	Hamstring strain	6,7
ACL rupture	10,0			Quadriceps strain	6,7
Quadriceps strain	10,0			Ankle sprain	6,7

Table 8 summarises the injuries with greatest burden for players, categorised as backs, forwards and all players, taking part in REC 2024.

The injuries with the greatest burden across all players were ACL rupture (23,6%) and pubic symphysis injury (15,1%). For backs, ACL rupture (48,2%) and infraspinatus tendon injury (14,7%) were responsible for the greatest time loss while pubic symphysis injury (32,8%) and anteroinferior instability of shoulder (18,7%) caused the greatest burden for forwards.

Table 8. The four injury diagnoses with greatest burden reported for backs, forwards and all players (% of all reported days lost to match injuries)

Backs		Forwards		All players	
Injury	%	Injury	%	Injury	%
ACL rupture	48,2	Pubic symphysis injury	32,8	ACL rupture	23,6
Infraspinatus tendon injury	14,7	Anteroinferior instability of shoulder	18,7	Pubic symphysis injury	15,1
LCL strain/ rupture	8,8	Concussion	12,5	Anteroinferior instability of shoulder	8,6
Quadriceps strain	7,5	Cervical Disc sprain	8,6	Concussion	8,1

4.2.7. Injury onset

Table 9 summarises the proportion of match injuries by nature of onset data for players, categorised as backs, forwards and all players, taking part in REC 2024.

Acute injuries were the most frequent for both the overall sample and by playing position.

Table 9. Proportion of reported match injuries by nature of onset			
Measure	% (95% Confidence interval)		
	Backs	Forwards	All players
Acute	85,0 (69,4-100,0)	96,0 (88,3-100,0)	91,1 (82,8-99,4)
Gradual	15,0 (0,0-30,6)	4,0 (0,0-11,7)	8,9 (0,0-17,2)

4.2.8. Cause of injury onset

Table 10 summarises the proportion of match injuries by cause of onset data for players, categorised as backs, forwards and all players, taking part in REC 2024.

Contact mechanism represented 73,3% of all injuries while non-contact was 26,7%. Contact injuries were more common for forwards (80,0%) than backs (65,0%).

Table 10. Proportion of reported match injuries by cause of onset			
Measure	% (95% Confidence interval)		
	Backs	Forwards	All players
Contact	65,0 (44,1-85,9)	80,0 (64,3-95,7)	73,3 (60,4-86,2)
Non-contact	35,0 (14,1-55,9)	20,0 (4,3-35,7)	26,7 (13,8-39,6)

4.2.9. Match events leading to injury

Table 11 summarises the match events causing the injuries suffered by players, categorised as backs, forwards and all players, taking part in REC 2024.

The most common match event leading to injury was tackling (33,3%), followed by running (22,2%), being tackled (17,8%) and ruck (15,6%). For backs, the most common match events leading to injury were tackling (30,0%) and running (30,0%), followed by being tackled (20,0%). For forwards, tackling (36,0%) also represented the event leading to most injuries followed by ruck (20,0%), being tackled (16,0%) and running (16,0%).

Table 11. Proportion of reported match injuries by match event leading to injury

Measure	% (95% Confidence interval)		
	Backs	Forwards	All players
Collision	10,0 (0,0-23,1)	-	4,4 (0,0-10,4)
Kicking	-	-	-
Lineout	-	4,0 (0,0-11,7)	2,2 (0,0-6,5)
Maul	-	4,0 (0,0-11,7)	2,2 (0,0-6,5)
Ruck	10,0 (0,0-23,1)	20,0 (4,3-35,7)	15,6 (5,0-26,2)
Running	30,0 (9,9-50,1)	16,0 (1,6-30,4)	22,2 (10,1-34,3)
Scrum	-	4,0 (0,0-11,7)	2,2 (0,0-6,5)
Tackled	20,0 (2,5-37,5)	16,0 (1,6-30,4)	17,8 (6,6-29,0)
Tackling	30,0 (9,9-50,1)	36,0 (17,2-54,8)	33,3 (19,5-47,1)
Other/Not known	-	-	-

4.2.10. Time of injury

Table 12 summarises the proportion of reported match injuries by period of match for players, categorised as backs, forwards and all players, taking part in REC 2024.

The highest number of match injuries sustained by all players happened during the second half (57,1%), with the 3rd quarter (39,3%) the most common period.

Table 12. Proportion of reported match injuries by time during match

Measure	% (95% Confidence interval)		
	Backs	Forwards	All players
First half	50,0 (28,1-71,9)	44,0 (24,5-63,5)	42,9 (28,4-57,4)
First quarter	20,0 (2,5-37,5)	16,0 (1,6-30,4)	21,4 (9,4-33,4)
Second quarter	30,0 (9,9-50,1)	28,0 (10,4-45,6)	21,4 (9,4-33,4)
Second half	50,0 (28,1-71,9)	56,0 (36,5-75,5)	57,1 (42,6-71,6)
Third quarter	20,0 (2,5-37,5)	36,0 (17,2-54,8)	39,3 (20,1-47,7)
Fourth quarter	30,0 (9,9-50,1)	25,0 (8,0-42,0)	17,6 (6,5-28,7)

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