

**Supplementary Table 1:** Impacts to the head greater than 10 g in women's rugby league for total impacts recorded and impacts per-player position and per-player group<sup>14</sup> over a competition match season for injury tolerance level,<sup>15, 30, 46, 47</sup> impact severity limits,<sup>24-26</sup> head impact telemetry severity profile<sup>27</sup> and risk weighted cumulative exposure (combined probability)<sup>28</sup> by total impacts recorded, percentage of impacts recorded (%), and median [25<sup>th</sup> to 95<sup>th</sup> interquartile range]. There were no linear impacts above the linear Injury Tolerance (>96g) or the linear severe Injury threshold (>106g)

	Total Player <sup>1</sup>		Forwards <sup>2</sup>		Backs <sup>3</sup>		Hit-Up Forwards <sup>4</sup>		Outside Backs <sup>5</sup>		Adjustables <sup>6</sup>	
	Impacts n= (%)	Median [IQR]	Impacts n= (%)	Median [IQR]	Impacts n= (%)	Median [IQR]	Impacts n= (%)	Median [IQR]	Impacts n= (%)	Median [IQR]	Impacts n= (%)	Median [IQR]
<b>Injury Tolerance</b>												
>5,500 rad/s <sup>2</sup>	302 (18.2)	7,721 [6,268-9,567]	157 (17.1)	7,178 [6,149-8,776] <sup>b</sup>	143 (19.4)	7,493 [6,517-10,483] <sup>a</sup>	140 (19.9)	7,075 [6,138-8,781] <sup>de</sup>	52 (24.5)	7,102 [6,083-9,294] <sup>ce</sup>	110 (14.8)	7,546 [6,693-10,947] <sup>cd</sup>
<b>Injury Severity (Linear)</b>												
<66g	1,635 (98.6)	15 [12-20]	908 (98.7)	14 [17-20] <sup>b</sup>	727 (98.4)	15 [12-20] <sup>a</sup>	692 (98.6)	15 [12-21] <sup>de</sup>	206 (97.2)	15 [12-23] <sup>ce</sup>	737 (98.9)	14 [12-20] <sup>cd</sup>
66-106g	24 (1.4)	74 [71-80]	12 (1.3)	80 [74-85] <sup>b</sup>	12 (1.6)	72 [69-74] <sup>a</sup>	10 (1.4)	77 [74-84] <sup>d</sup>	6 (2.8)	69 [66-74] <sup>c</sup>	8 (1.1)	73 [71-80]
<b>Injury Severity (Rotational)</b>												
<4,600 rad/s <sup>2</sup>	1,246 (75.1)	2,407 [1,599-3,175]	703 (76.4)	2,321 [1,452-3,244] <sup>b</sup>	543 (73.5)	2,483 [1,668-3,159] <sup>a</sup>	516 (73.5)	2,559 [1,738-3,384] <sup>de</sup>	151 (71.2)	2,558 [1,474-3,154] <sup>ce</sup>	579 (77.7)	2,232 [1,427-3,052] <sup>cd</sup>
4,600-7,900 rad/s <sup>2</sup>	287 (17.3)	5,733 [5,007-6,682]	154 (16.7)	5,672 [5,085-6,425] <sup>b</sup>	133 (18.0)	5,755 [4,862-6,818] <sup>a</sup>	129 (18.4)	5,738 [5,085-6,428]	42 (19.8)	6,018 [5,733-6,718] <sup>c</sup>	116 (15.6)	5,548 [4,862-6,827] <sup>d</sup>
>7,900 rad/s <sup>2</sup>	127 (7.7)	10,398 [8,661-12,910]	63 (6.8)	9,666 [8,497-12,590] <sup>b</sup>	63 (8.5)	10,553 [9,297-13,646] <sup>a</sup>	57 (8.1)	9,666 [8,477-12,590] <sup>de</sup>	19 (9.0)	11,615 [8,992-13,646] <sup>ce</sup>	50 (6.7)	10,483 [9,282-12,910] <sup>cd</sup>
<b>Head Impact Telemetry severity profile (HIT<sub>sr</sub>)</b>												
<21	1,258 (75.8)	14.1 [12.5-16.0]	710 (77.2)	14.4 [13.0-16.5] <sup>b</sup>	551 (74.6)	13.2 [11.4-15.3] <sup>a</sup>	537 (76.5)	14.2 [13.0-16.4] <sup>de</sup>	161 (75.9)	13.4 [11.6-16.1] <sup>ce</sup>	558 (74.9)	13.5 [11.8-15.6] <sup>cd</sup>
21-63	365 (22.0)	27.8 [23.1-37.2]	187 (20.3)	27.4 [23.2-34.8] <sup>b</sup>	173 (23.4)	30.0 [23.1-41.5] <sup>a</sup>	148 (21.1)	27.4 [23.2-34.8] <sup>de</sup>	45 (21.2)	32.2 [25.0-38.7] <sup>ce</sup>	170 (22.8)	27.0 [23.1-39.9] <sup>cd</sup>
>63	36 (2.2)	83.1 [74.0-89.5]	23 (2.5)	77.7 [66.3-90.0] <sup>b</sup>	15 (2.0)	93.1 [82.6-102.3] <sup>a</sup>	17 (2.4)	72.5 [64.1-94.4] <sup>d</sup>	6 (2.8)	85.0 [77.2-110.3] <sup>ce</sup>	17 (2.3)	87.0 [66.1-108.7] <sup>d</sup>
<b>Risk Weighted Exposure combined probability (RWE<sub>cr</sub>)</b>												
<0.2500	1,563 (84.2)	0.0008 [0.0003-0.0030]	877 (95.3)	0.0007 [0.0003-0.0029] <sup>b</sup>	686 (92.8)	0.0008 [0.0003-0.0031] <sup>a</sup>	663 (94.4)	0.0009 [0.0004-0.0033] <sup>de</sup>	197 (92.9)	0.0009 [0.0003-0.0447] <sup>cd</sup>	703 (94.4)	0.0006 [0.0002-0.0023] <sup>ce</sup>
0.2500-0.7500	49 (3.0)	0.4257 [0.3456-0.6841]	23 (2.5)	0.4004 [0.3698-0.7069] <sup>b</sup>	26 (3.5)	0.4801 [0.3207-0.6083] <sup>a</sup>	22 (3.1)	0.3936 [0.3698-0.7094] <sup>d</sup>	15 (7.1)	0.8339 [0.6841-0.9889] <sup>cd</sup>	42 (5.6)	0.6907 [0.5073-0.9810] <sup>e</sup>
>0.7500	47 (2.8)	0.9780 [0.8589-0.9942]	20 (2.2)	0.9780 [0.9133-0.9939] <sup>b</sup>	27 (3.7)	0.9889 [0.7903-0.9942] <sup>a</sup>	17 (2.4)	0.9780 [0.9386-0.9947]	10 (4.7)	0.9578 [0.8181-0.9916]	20 (2.7)	0.9848 [0.8074-0.9942]

(1) = 13 player positions; (2) = 6 player positions; (3) = 7 player positions; (4) = 4 player positions; (5) = 4 player positions; (6) = 5 player positions; Significant difference ( $p < 0.05$ ) than (a) = Forwards; (b) = Backs; (c) = Hit-Up Forwards; (d) = Outside Backs; (e) = Adjustables

**Supplementary Table 2:** Impacts to the head greater than 10 g in women’s rugby league for total impacts recorded, impacts per match-half over one season of matches for Head Impact Telemetry severity profile<sup>27</sup> and Risk Weighted Cumulative Exposure (combined probability)<sup>28</sup>. Data are presented as median [25-75<sup>th</sup> interquartile range] and 95<sup>th</sup> percentile.

	Total n=	Head Impact Telemetry system (HITs)		Risk Weighted Exposure combined probability (RWE <sub>CP</sub> )	
		Median [IQR]	95 <sup>th</sup>	Median [IQR]	95 <sup>th</sup>
Total <sup>1</sup>	1,659	15.2 [13.0-20.6]	45.8	0.0009 [0.0003-0.0041]	0.3535
1 <sup>st</sup> half	749 <sup>g</sup>	15.1 [13.0-19.4] <sup>g</sup>	44.7	0.0007 [0.0003-0.0029] <sup>g</sup>	0.4004
2 <sup>nd</sup> half	910 <sup>f</sup>	15.2 [12.9-21.1] <sup>f</sup>	46.9	0.0009 [0.0004-0.0059] <sup>f</sup>	0.3535
Forwards <sup>2</sup>	920 <sup>b</sup>	15.6 [13.4-20.5] <sup>b</sup>	43.1	0.0008 [0.0003-0.0037] <sup>b</sup>	0.2278
1 <sup>st</sup> half	432	15.5 [13.2-19.6] <sup>bg</sup>	45.7	0.0007 [0.0003-0.0028] <sup>bg</sup>	0.3053
2 <sup>nd</sup> half	488	15.5 [13.2-20.6] <sup>bf</sup>	44.0	0.0009 [0.0003-0.0049] <sup>bf</sup>	0.2826
Backs <sup>3</sup>	739 <sup>a</sup>	15.6 [13.4-20.5] <sup>a</sup>	43.1	0.0009 [0.0003-0.0047] <sup>a</sup>	0.5410
1 <sup>st</sup> half	317 <sup>g</sup>	14.5 [12.7-19.8] <sup>ag</sup>	43.3	0.0008 [0.0003-0.0031] <sup>ag</sup>	0.6907
2 <sup>nd</sup> half	422 <sup>f</sup>	13.9 [11.2-21.9] <sup>af</sup>	57.3	0.0010 [0.0004-0.0064] <sup>af</sup>	0.5563
HUF <sup>4</sup>	702 <sup>d</sup>	15.6 [13.4-20.4] <sup>de</sup>	42.3	0.0010 [0.0004-0.0043] <sup>de</sup>	0.3650
1 <sup>st</sup> half	330	15.3 [13.2-19.7] <sup>g</sup>	46.9	0.0010 [0.0005-0.0037] <sup>deg</sup>	0.3884
2 <sup>nd</sup> half	372	15.7 [13.3-21.2] <sup>def</sup>	43.5	0.0010 [0.0004-0.0067] <sup>df</sup>	0.3392
OSB <sup>5</sup>	212 <sup>ce</sup>	14.4 [12.1-20.4] <sup>ce</sup>	48.6	0.0009 [0.0003-0.0072] <sup>ce</sup>	0.7144
1 <sup>st</sup> half	90 <sup>g</sup>	14.1 [12.7-19.9] <sup>dg</sup>	51.3	0.0008 [0.0004-0.0025] <sup>ceg</sup>	0.9578
2 <sup>nd</sup> half	122 <sup>f</sup>	13.8 [10.2-21.9] <sup>f</sup>	58.0	0.0011 [0.0004-0.0181] <sup>cef</sup>	0.4050
ADJ <sup>6</sup>	745 <sup>d</sup>	14.9 [12.4-21.0] <sup>cd</sup>	52.6	0.0007 [0.0003-0.0035] <sup>cd</sup>	0.3437
1 <sup>st</sup> half	329 <sup>g</sup>	15.2 [13.0-19.6] <sup>g</sup>	43.7	0.0005 [0.0002-0.0025] <sup>cd</sup>	0.3207
2 <sup>nd</sup> half	416 <sup>f</sup>	14.2 [12.1-21.6] <sup>df</sup>	52.9	0.0009 [0.0003-0.0053] <sup>d</sup>	0.4128

IQR = Interquartile [25<sup>th</sup> to 75<sup>th</sup>] percentile; 95<sup>th</sup> = 95<sup>th</sup> percentile; HUF = Hit-Up Forwards; OSB = Outside Backs; ADJ = Adjustables; (1) = 13 player positions; (2) = 6 player positions; (3) = 7 player positions; (4) = 4 player positions; (5) = 4 player positions; (6) = 5 player positions; Significant difference ( $p < 0.05$ ) than (a) = Forwards; (b) = Backs; (c) = Hit-Up Forwards; (d) = Outside Backs; (e) = Adjustables; (f) = 1<sup>st</sup> half; (g) = 2<sup>nd</sup> half