Leicester Tigers
Sports Science

Injury and Performance Prediction and Influence

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Introduction

Background	• What is rugby union? • Why do we need to monitor our players? • What do we need to measure?
What are we doing?	• What data do we collect? • How do we manage our data? • How do we analyze our data? • What do we report?
What does the future hold?	• How do we move forwards? • What else could we monitor?

Background

What is rugby union?

- 2 teams of 15 players (with 8 substitutes)
- Aim is to score points via putting the ball over the 'try line' or kicking the ball over the posts
- Run with the ball, pass backwards or kick in attack
- Tackle in defence
- Running and collisions


Try


Maul


Scrum


Ruck

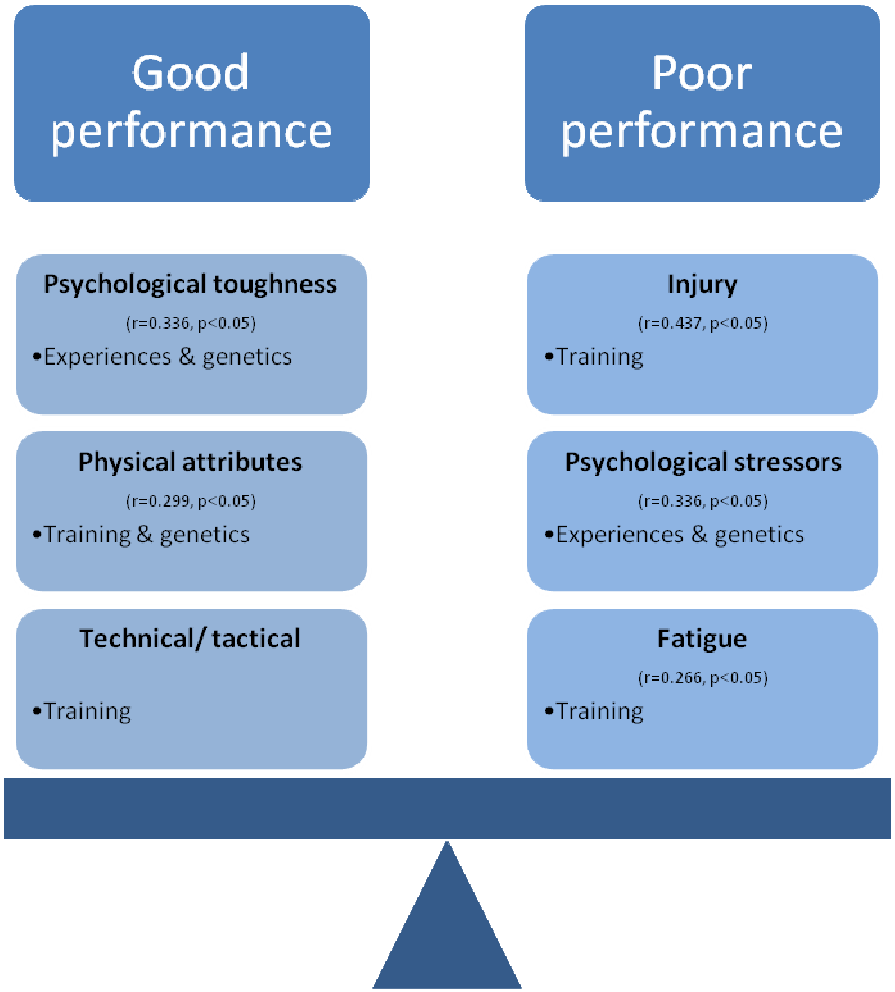

Tackle


Line out

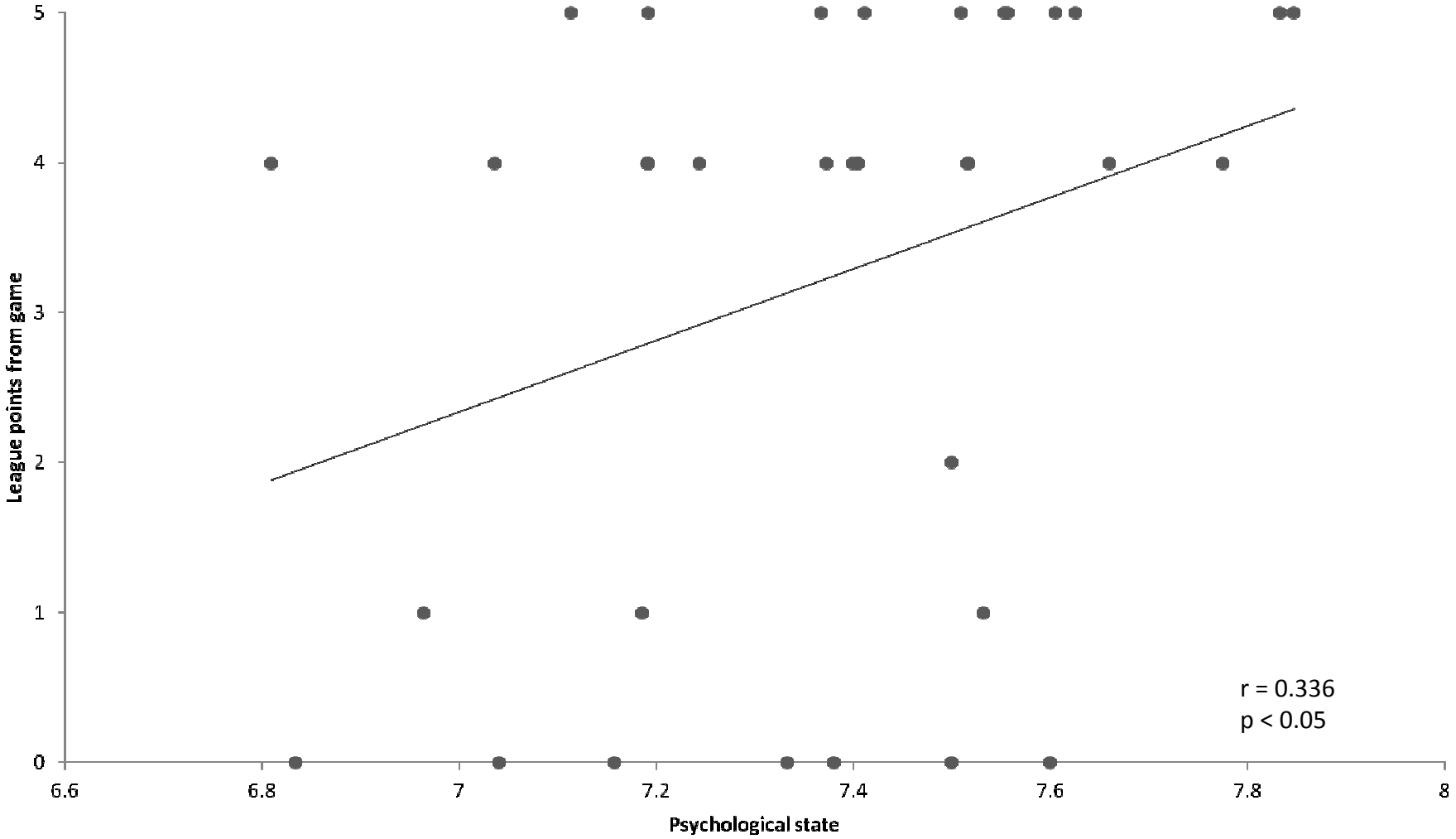
What is rugby union?

Position	Collisions									Running													Combined					Decelerations			
	Working scrums	Working tackles	Working carries	Working rucks/ mauls	Line out landings	Total working collision elements	Total working collision elements per minute	Total working collision elements W:R	Frequency of total working collision elements (s)	Total distance (m)	Distance < 3.6 m.s-1 (m)	Distance 3.6-5 m.s-1 (m)	Distance 5-6.7 m.s-1 (m)	Distance > 6.7 m.s-1 (m)	Total distance >3.6 m.s-1 (m)	Time spent > 3.6 m.s-1 (min)	Maximum 10 min running intensity (m.min-1)	Total running elements > 5.6 m.s-1	Total running elements > 5.6 m.s-1 per minute	Total running elements > 5.6 m.s-1 W:R	Frequency of total running elements > 5.6 m.s-1 (s)	Total working collision and running elements > 5.6 m.s-1	Total working collision and running elements > 5.6 m.s-1 per minute	Total working collision and running elements > 5.6 m.s-1 W:R	Frequency of total working collision and running elements > 5.6 m.s-1 (s)	Mean recovery speed (m.s-1)	Decelerations from 3.6 m.s-1	Decelerations from 5 m.s-1	Decelerations from >5 m.s-1	Total Decelerations
1	28	12	8	45	1	93	1.2	12	52	6257	5456	587	210	5	802	3	80	9	0.1	132	533	102	1.3	11	47	2.3	413	76	24	513
2	29	15	6	60	0	110	1.4	10	44	6843	5029	1412	401	1	1814	7	93	12	0.2	99	400	122	1.5	9	39	3.2	384	132	30	546
3	29	8	10	46	0	93	1.2	12	52	6257	5456	587	210	5	802	3	80	9	0.1	132	533	102	1.3	11	47	2.3	413	76	24	513
4	32	21	15	51	7	119	1.5	9	40	6924	5370	1314	222	18	1554	6	90	7	0.1	170	686	126	1.6	9	38	2.9	280	70	18	368
5	28	19	15	66	7	128	1.6	8	38	6924	5370	1314	222	18	1554	6	90	7	0.1	170	686	135	1.7	8	36	2.9	280	70	18	368
6	32	21	9	43	11	105	1.3	10	46	7229	5826	976	361	66	1403	5	100	12	0.2	99	400	117	1.5	9	41	2.7	417	132	84	633
7	28	26	18	57	2	129	1.6	8	37	7229	5826	976	361	66	1403	5	100	12	0.2	99	400	141	1.8	8	34	2.7	417	132	84	633
8	32	32	25	47	3	136	1.7	8	35	7229	5826	976	361	66	1403	5	100	12	0	99	400	141	2	8	34	3	417	132	84	633
9	0	15	7	15	0	37	0.5	31	130	8324	5948	1746	605	25	2376	9	102	12	0.2	99	400	42	0.5	28	114	3.8	466	184	82	732
10	0	16	9	11	0	36	0.5	32	133	7077	5482	1060	500	35	1594	6	95	13	0.2	91	369	40	0.5	29	120	2.9	282	95	56	433
11	0	10	11	23	0	44	0.6	26	109	8262	6519	873	617	253	1743	6	105	30	0.4	39	160	63	0.8	18	76	2.9	162	67	90	319
12	0	23	13	26	0	62	0.8	18	77	8572	5940	1677	755	199	2632	9	103	32	0.4	37	150	81	1.0	14	59	4.0	600	253	149	1002
13	0	19	15	30	0	64	0.8	18	75	9512	7669	1118	647	79	1843	6	114	22	0.3	54	218	71	0.9	16	68	3.1	682	229	118	1029
14	0	10	10	21	0	41	0.5	28	117	8262	6519	873	617	253	1743	6	105	30	0.4	39	160	61	0.8	19	79	2.9	162	67	90	319
15	0	12	10	31	0	53	0.7	22	91	7809	6555	745	374	134	1254	4	95	20	0.3	59	240	63	0.8	18	76	2.6	205	63	103	371

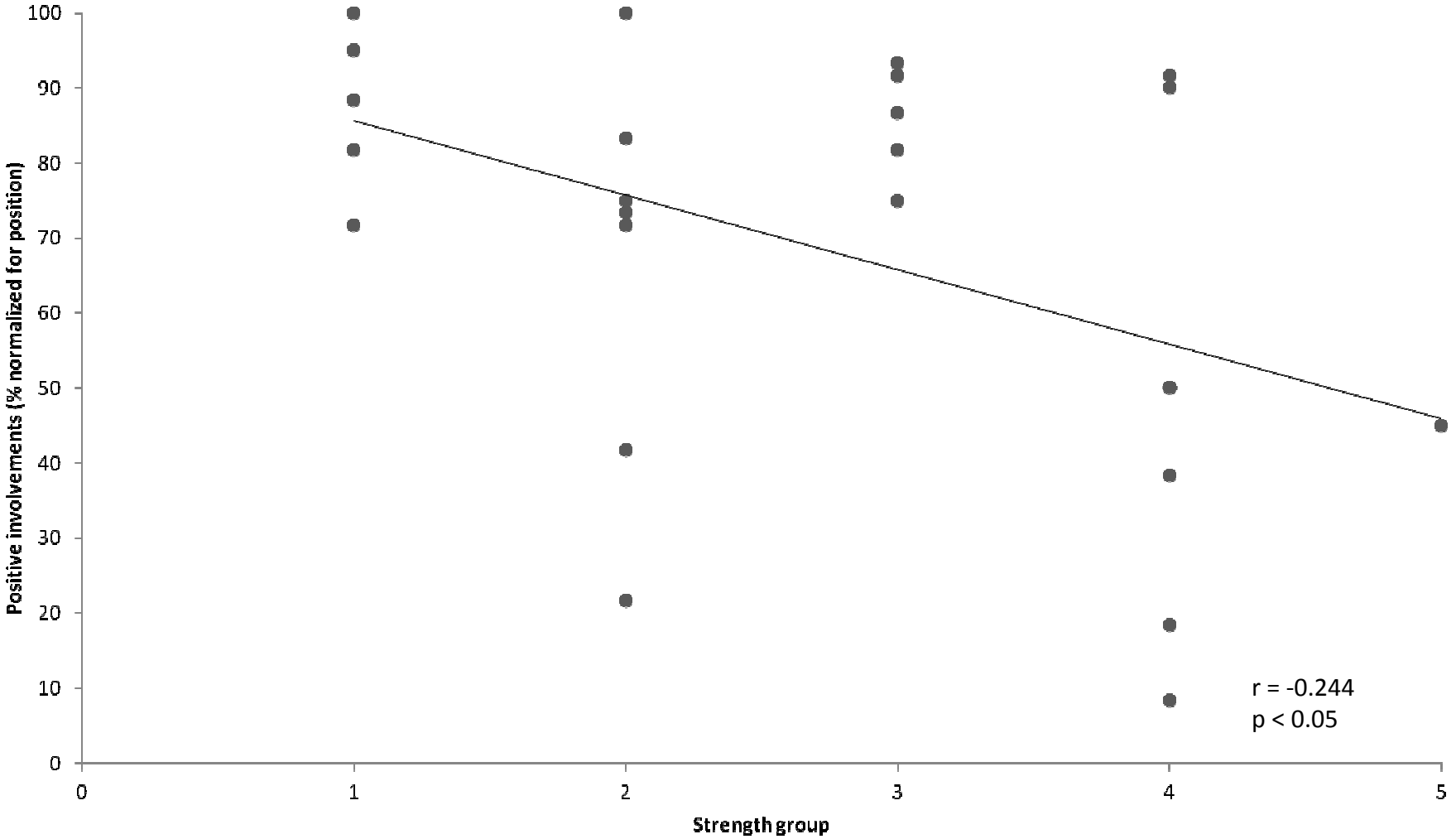
Why do we need to collect data on players?



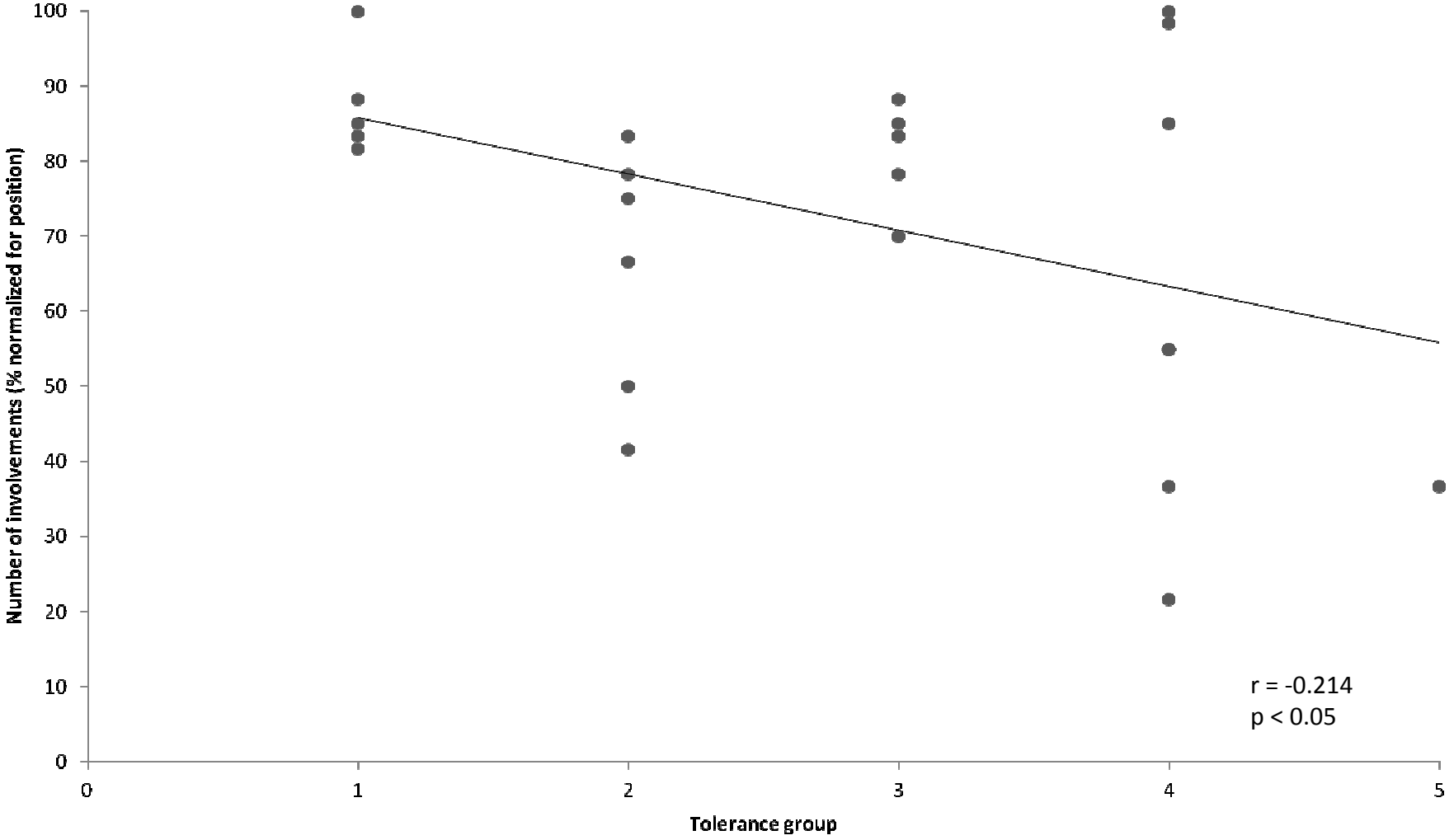
Team performance and psychological state



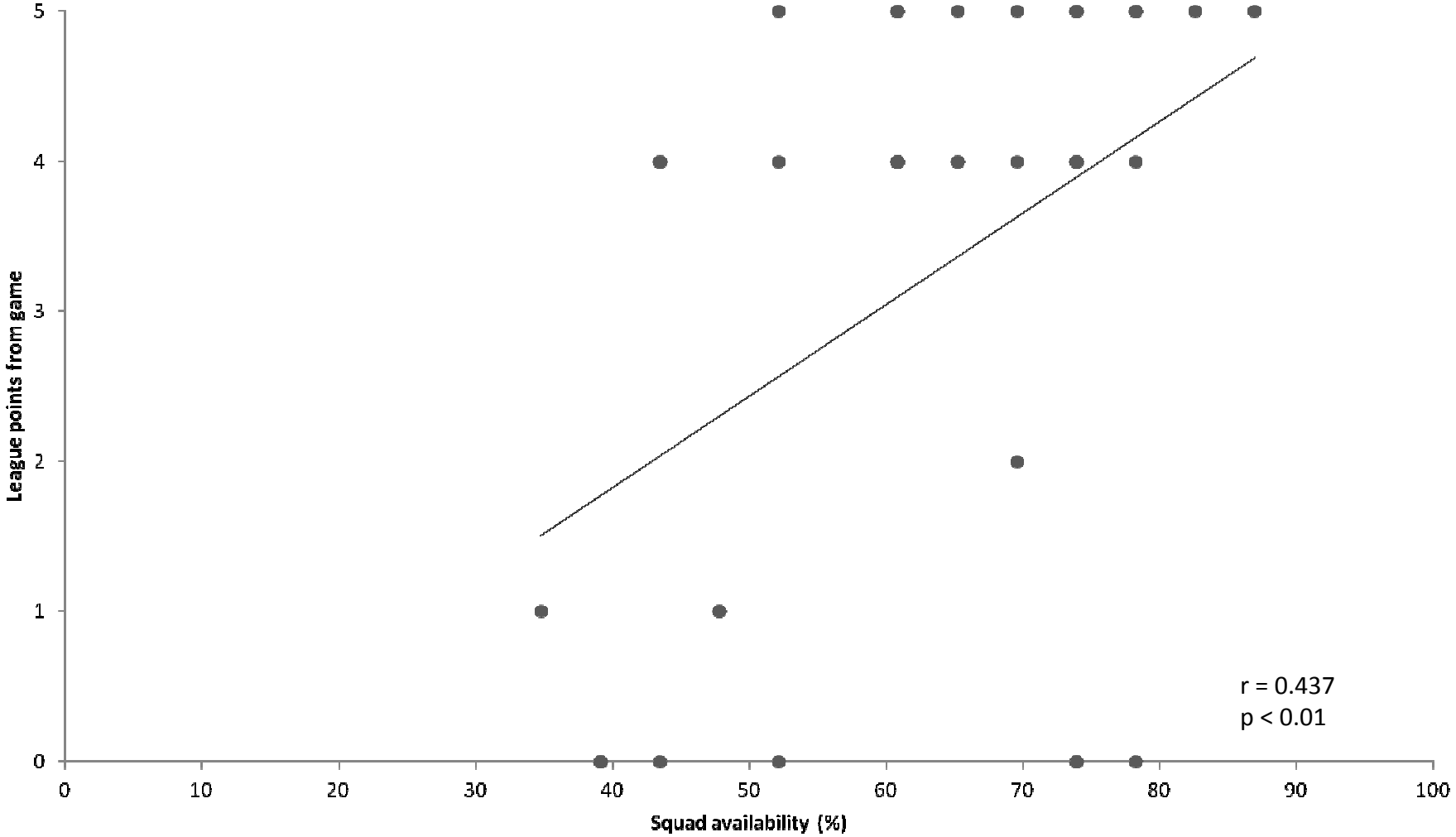
Individual performance and athletic ability



Individual performance and athletic ability



Team performance and key player availability



Matt Hampson Foundation

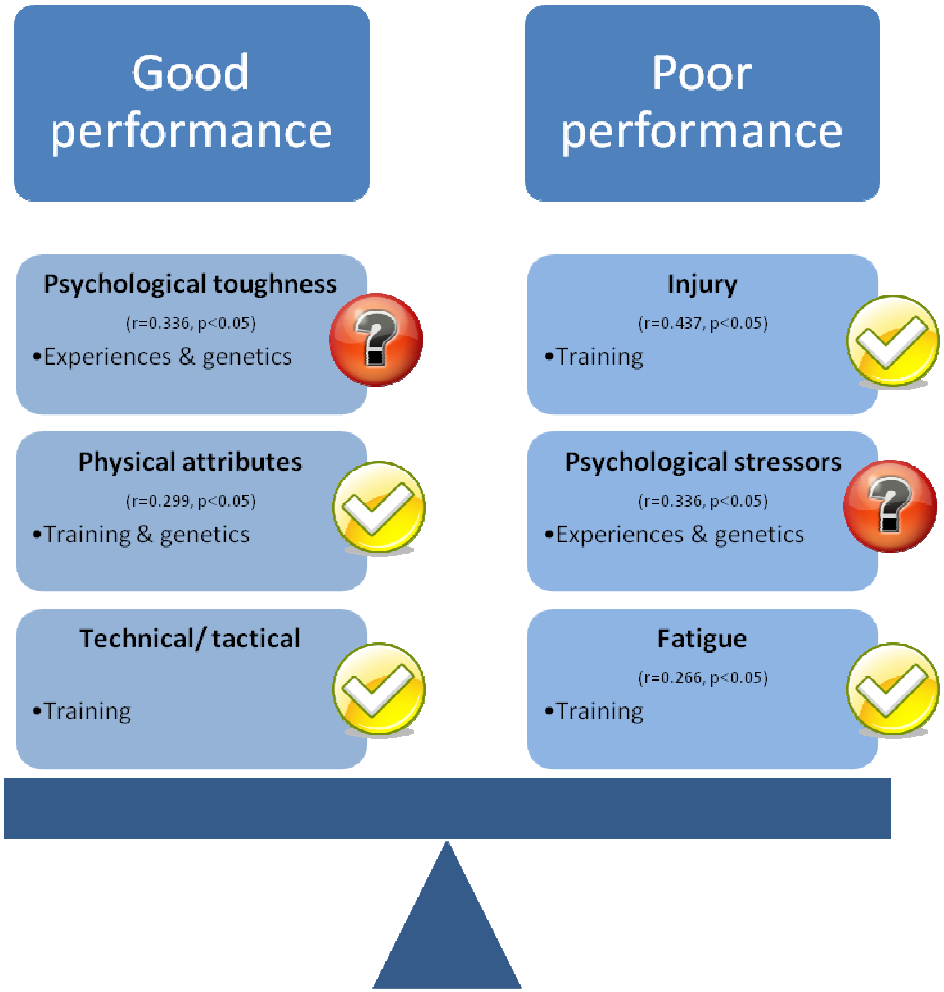
Matt Hampson is a former English rugby union prop who became paralysed from the neck down after a scrummaging practice accident for England under 21 on 15 March 2005.

He founded the Matt Hampson Foundation in 2011 with the aim of providing advice, support, relief and/or treatment for anyone suffering serious injury or disability which has arisen from any cause, but in particular from participation in or training for any sport, sporting activity or other form of physical education or recreation.

MATT HAMPSON FOUNDATION

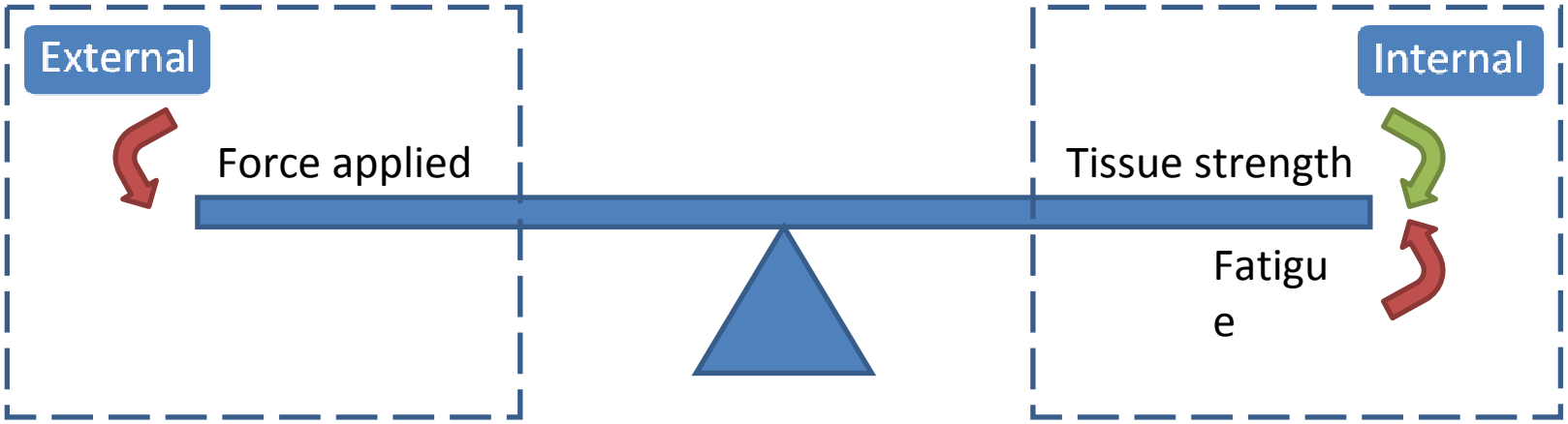
Inspiring and supporting young people seriously injured through sport.

What can we affect?



When does an injury occur?

When force exerted on a tissue is greater than that which it can withstand.



How can we affect strength and fatigue?

The purpose of any training program is to provide a stimulus for sports-specific adaptation resulting in improved skill and/ or athletic performance.

How do we adapt to the stimulus?

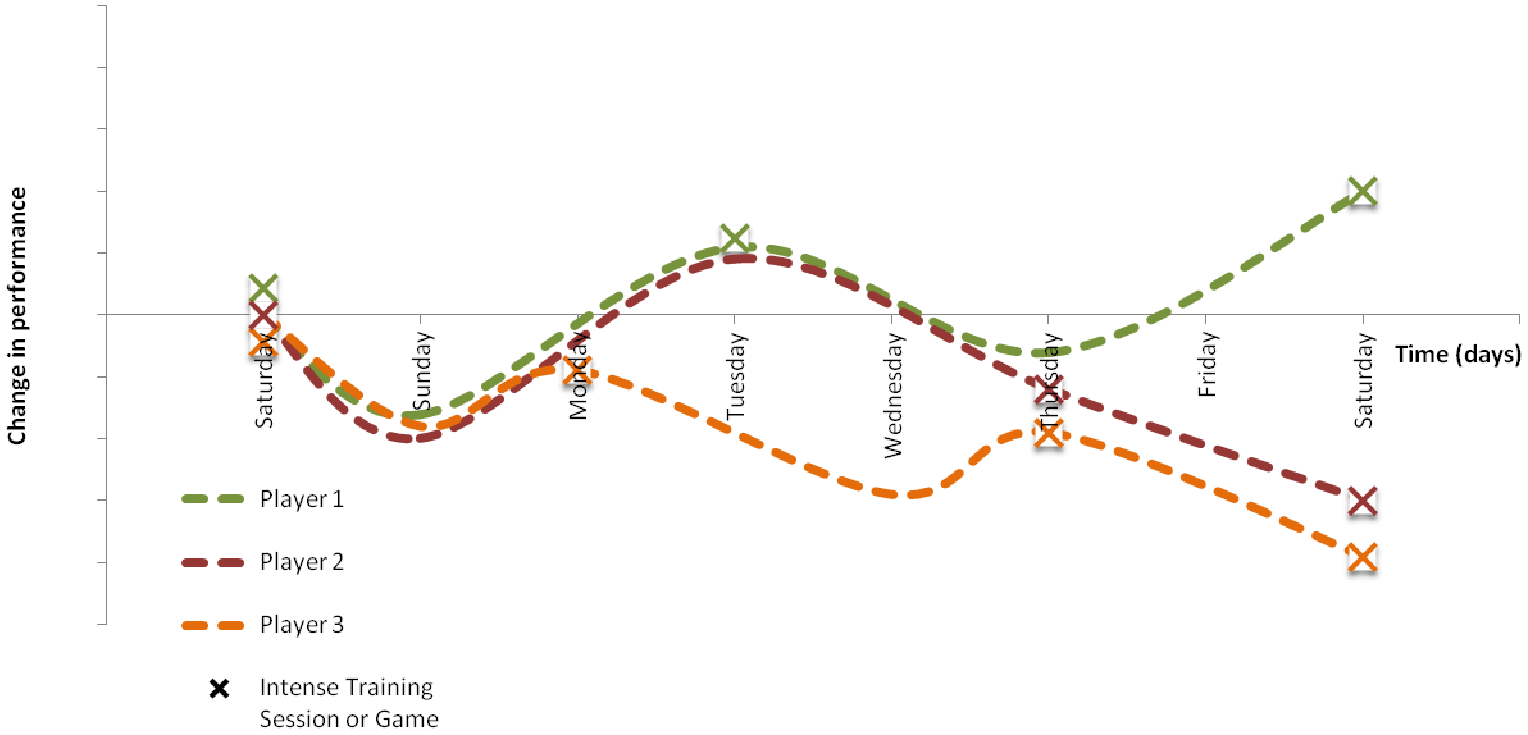


Figure 1 Schematic demonstrating player 1 (green) who trains at the right time, resulting in increased performance; and players 2 (red) and 3 (orange) who leave too long, and not enough time between training sessions respectively, both resulting in decreased performance.