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Getting tough on concussion: how welfare-driven law change may improve player safety—a Rugby Union experience

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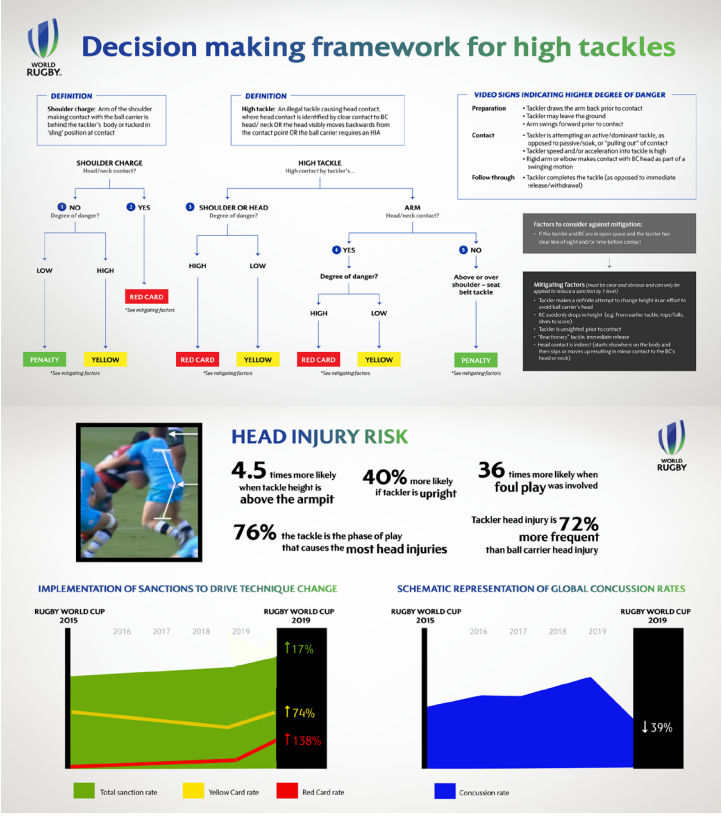

Figure 1 Upright, high-risk tackle position (blue player), head injury risk profile, schematic representation of sanction implementation for high tackles and schematic of global concussion rates. BC, ball carrier.

In 2016, World Rugby completed a large-scale study determining the risk factors for head injury in elite rugby.[1–3] The findings (figure 1) presented a challenge to the game as the traditional safety measures targeted protection of the ball carrier, but this research identified that the tackler was at greater risk of head injury.

RESEARCH-DRIVEN RULE CHANGE

World Rugby presented these novel data to game experts (players, coaches and administrators) in late 2016 and asked them how the sport might reduce game head impact. When presented with the data, the expert group recommended lowering the tackle height to protect both tacklers and ball carriers. The experts identified three methods for lowering tackle height: an increased sanction focus, improving tackle technique through coach intervention and law change to lower tackle height.

The unanimous recommendation from this group was a more stringent sanctioning of illegal high-contact tackles.

In January 2017, World Rugby did not change the legal definition of a high tackle but increased sanctions for head contact observed by match officials. These sanctions included on-field penalties for any accidental and reckless head contact during tackles, plus more severe sanctions, yellow card (10 min temporary removal) and red card (permanent removal). These directives punished already illegal behaviour more harshly and initially had the desired effect of raising media commentary and public awareness of illegal head contact.

INCREASING THE FOCUS ON CURRENT SANCTIONS

At the end of 2017, the first year of this increased sanction focus, World Rugby confirmed that all monitored competitions (six major professional elite adult competitions and international matches) had issued more on-field high-tackle penalties per game (average 58% increase). Issuing of more severe sanctions (yellow and red cards) was noted in all but one of these monitored competitions.

Yellow cards, issued for mid-danger tackle offences with an example being a high tackle, arm-to-head with low level of danger, increased by 41%, and red cards, issued for high-danger tackles such as a shoulder charge direct to head at high speed, increased over eightfold.

For the first time since 2012, concussion rates in 2017 did not rise in those competitions where referees had issued a higher rate of yellow and red card sanctions, despite robust medical and public scrutiny. In the single competition where the rate of cards issued had in fact decreased, concussion rates continued to climb.[4]

In 2018, the second season of our increased sanction focus, we noted intracompetition and intercompetition inconsistencies for the awarding of high-tackle sanctions, particularly in the issue of yellow and red cards. This led to general media criticism, which we recognised could potentially undermine this increased sanction intervention.

HIGH TACKLE SANCTION FRAMEWORK (HTSF)

In order to improve sanction-issuing consistency, World Rugby introduced the HTSF[5] at the U20 World Championship in June 2019. The HTSF is a decision-making flowchart for

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Table 1 Pattern of concussion and in-game head contact sanctions at the 2015 and 2019 RWCs and across global competitions in 2018

	2015 RWC	2018 Monitored competitions	2019 RWC	Change from 2018 global to 2019 RWC
Total matches	48	749	45	
Concussion incidence (concussions per 1000 player hours)	12.5	17.0	12.2	↓ 28%
Total concussions in tackles	18	387	14	
Average tackle number (tackles per match)	180	195	180	
Tackle concussion per 1000 tackles (propensity)	2.1	2.7	1.7	↓ 37%
Total sanctions rate (Pen, YC and RC per 10 matches)	12.1	13.9	16.2	↑ 17%
YC rate (YCs per 10 matches)	2.5	1.8	3.1	↑ 74%
RC rate (RCs per 10 matches)	None given	0.5	1.1	↑ 138%
Ratio of sanctions to cards issued (sanctions per card)	4.8	6.1	3.8	–38%

Compared with 2018 global data, RWC 2019 shows a reduction in concussion and, in particular, 'tackle' concussions and an increase in sanctions, particularly yellow and red card sanctions for high tackles.
RC, red card; RWC, Rugby World Cup; YC, yellow card.

match officials and judicial officers that supports consistent application of high-tackle sanctions and guides correct identification of the severity of the high tackle. It allows fans, players, coaches, referees and judicial officers to analyse in-play decisions using a shared, straightforward logical process.

Following success in June, the Executive Committee of World Rugby supported the introduction of the HTSF in the highest profile rugby competition, Rugby World Cup (RWC) in Japan in September 2019. Introducing the HTSF at RWC 2019 led to widespread awareness and intense global media precompetition focus and discussion. This publicity created a greater understanding of the desired tackle behaviour changes.

Getting tough on concussion

At the 2019 RWC, there was a 74% increase in head contact yellow cards and a 138% increase in red card sanctions for head contact compared with the 2018 global rugby average (table 1). On analysis of RWC 2019, concussion rates had reduced by 28%, with tackle concussions decreasing by 37% compared with the global average of 2018. Comparison of concussion rates across competitions and years is possible because of the standardised operational definition employed within all elite rugby competitions.[6]

On reflection, we acknowledged that in-game high-tackle penalties had failed to influence behaviour change, even though these in-game penalties had increased significantly (58%), as described previously. In practical terms, this increase was equivalent to only one extra high-tackle penalty every second game, a sanction too infrequent and lenient to alter behaviour.

Key lessons from Rugby Union

In 2019, England Rugby trialled a tackle-height law change in a second-tier competition.[7] This trial law change was evaluated by researchers who found no effect on overall concussion rates. As predicted by the Expert Group in 2016, the research team identified numerous practical challenges with this law change intervention. The research team also identified implementation and compliance issues that contributed to England Rugby abandoning the trial law.

In 2016, the expert opinion was that concussion incidence would decrease only by changing behaviour to lower the tackle height and to make players more responsible for their role in avoiding head contact in rugby. The Expert Group identified that a sanction focus was most likely to achieve behaviour change to lower the tackle height. Our experience since 2016 supports that to achieve this behaviour change, sanctions (use of cards) must be severe and frequent, particularly in the highest-risk game situation, the tackle.

Our rugby experience has reaffirmed that successful injury prevention depends not only on the intervention itself but also on the implementation of, and compliance to, that intervention. Supporting a prevention strategy should include a strong awareness campaign, a visible system that supports consistent application of the intervention (in this instance, HTSF) and open support by the sport's governing body.

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Competing interests ECF, MR and RT are employed by World Rugby; they performed the research, analysis and manuscript preparation in the course of their duties.

Patient consent for publication Not required.

Ethics approval The research plan for this study was approved by the World Rugby Research Ethics committee. Players had provided written informed consent for all data gathered as part of the World Rugby concussion management programme to be used for research in a deidentified manner.

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