

## Lowering the legal height of the tackle:

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### The six year process, and that's just to get here

RFU announced that they would be lowering the height of the tackle across all community rugby in the country from the current level of the shoulder, right down to the waist.

This follows the precedent set by France in 2019, in a trial they **successfully** implemented after tragic deaths caused by head impact in tackles in 2018. Since France led the way, and subsequently New Zealand has followed (albeit with a change to sternum height, not waist height), it is becoming increasingly clear that this is going to happen more and more globally, first in community rugby and potentially in all rugby.

### First impressions

Let me start by giving my overall impression of the change.

I think this is a positive move, and certainly support the initiative, as I know that World Rugby does. I think that over time, more countries will make similar changes, and I believe it would be enormously helpful to see some trials where the height is reduced to the waist, some to the sternum, and also to see how these changes work in conjunction with other law changes that are focused on the ball carrier.

This will help with the "calibration" of the response by World Rugby and other stakeholders. There is no doubt in my mind that that sport needs to take seriously ways of keeping the head out of the game; the question is how best to do this, and to understand that every change creates a set of tradeoffs, and these need to be understood.

For example, when you lower the height to the waist, rather than the sternum, you create a potential set of problems related to the ball carrier's body position, that the sternum height would avoid, at least to some degree. But you might not get the same safety result from the sternum as the waist because it may be too small a change and the risk of head impacts for a 10cm execution error remains. Plus, there are game-related changes to consider - lower tackles allow for more offloads, and probably more evasive running, but make mauls and tight tackle situations more difficult to execute and officiate.

The debate for me is therefore less about whether to lower the tackle height, but rather how much it needs to be lowered? It's a question of degree, not concept. As I explain below, there is an argument **for** sternum and against waist, and there is an argument **in favour of waist** rather than sternum.

In an ideal (perhaps theoretical) world, I'd take half the players and do a sternum height trial, while the other half the players do a waist high trial, and then compare concussion rates (desired outcome) as well as the changes in a set of unintended or second-order consequences. Or, I'd find a point between the sternum and the waist, and make that the height. Perhaps the bottom half of the ball in a normal carrying position sets the upper limit?

But such ideals are not always possible. What to do then? Nobody can predict everything, and so a range of trials is the only way to truly appreciate how all these things interact, which will then allow the sport to decide on the best approach.

What works best on concussion risk, and what creates the most 'palatable' second order consequences? What is certain, though, is that there can't be no change.

Unsurprisingly, the reaction to the England decision on social media has been mixed, and many are very unhappy about a range of things, ranging from lack of consultation to the unnecessary scale of the change, and ultimately the fundamental principle behind the change.

I can't address all those things, because I don't know the specific inner workings of the RFU as they debated and considered this decision. However, I can speak a little about the principles and rationale for the change, so this is a post with some background offered in support of the changes they have made.

If it feels lengthy, that's because there's a lot that has happened over six years to get to this point, and since I've seen so many people saying this is an impulsive knee-jerk reaction, I figure it's worth explaining just how much has happened and just how **not** a knee jerk this is. So here goes...

### Way back to 2015 - a six year process

Let's begin in 2015, because that is the "beginning" of this story. The sport had, over the last five years, implemented a number of measures to help identify and manage concussions more effectively. These ranged from head injury protocols in the elite game to education campaigns in the community game, all designed at ensuring that a concussed (or potentially concussed) player was removed at the time of the injury.

What had not been done was to consider how head injuries happen, and what might be done to prevent them in the first place? As they say in the injury epidemiology field, the best injury is the one that never happens. So prevention became the focus in about 2015, which is particularly important because everyone in the sport had recognized that the head injury problems were growing, and that if the sport could reduce the number, then it would face an existential challenge (which now takes the form of not one, but two lawsuits, one from the elite game, and one [from the amateur game and youth players, which was announced, not without some irony, yesterday](#). If your response to the change is to say "This is not needed", I would offer you that lawsuit as Exhibit A.

One of the necessary approaches to this problem was to create a spectrum of risk, in order to identify sets of behaviours that are more likely to cause a head injury. For instance, which type of tackle has the highest risk? Which direction of tackle causes head injuries at the highest rate? What are the body positions of the tackler and the ball carrier when a head injury is more likely? Where is head contact happening with the highest HIA rate?

That's the project I began with some colleagues at World Rugby in 2015. We had 611 head injuries in the elite game, 464 of which came in tackles, and we coded as much detail around the tackle as we could in order to understand what set of behaviours we wanted more of, and what we wanted less of?

I've written numerous articles on this, as well as a range of tweet threads, so I'll just steer you to those for now, and save making this a 45 minute read! Here's one that [explains the great paradox about the risk to the tackler, and why lowering height is the desired action](#). Here's another that explains how the [intention once the data was obtained was to nudge the height down](#), rather than change the law (this was back in 2016, more on this below). Or you can read the [actual publications here](#) and [here](#)

The point is that since 2016, this conversation has been happening pretty much nonstop. We identified from that set of studies that an upright tackler, whose head was in proximity with the head or shoulder of a ball carrier, was much more likely to be injured than a tackler who was bent, and whose head was at the level of the torso, waist and upper leg.

The relative risk was significantly higher for these high contacts - overall, a **head injury was 4.3 times more likely if the tackler's head was at or near the ball carrier at a height above their sternum, than if it was below the ball carrier's sternum**. The safest place for the tackler's head was the ball carrier's torso, followed by the upper leg, then the waist. You can see one example of that risk spectrum in the figure below this email. This shows the rate of HIAs to the tackler specifically, per 1000 tackles of each type.

It should be quite clear to you from this summary that if you want to reduce head injury risk to the tackler, you would want to shift the behaviour from the right to the left, and see more tackles below the blue line at the sternum in the summary figure on the bottom left. This protects BOTH the tackler and the ball carrier, something that still seems to elude many people who weigh in on this subject.

In any event, we have replicated this study **seven** times since 2016. First, [in Rugby League, where the mechanism of head injury is identical](#). Then, driven by doubt and skepticism from coaches, I did the same analysis in Under 20 rugby at two world cups, in professional rugby in 2020, again in professional rugby in 2021/22, in women's rugby in 2022, and in community rugby league in 2021/22 (that paper has just been submitted for review). A set of 464 tackles has grown and we now **know what head injury looks like in over 1000 injury tackles and about 10000 non-injury tackles**. It's a pretty solid foundation.

**Every single one of these studies showed the same thing - lower tackles are safer than higher tackles**. You want the tackler's head away from the ball carrier's head and shoulders. The relative risk of tackles where the head is above the shoulder (but still legal) is consistently 3 times or more greater than when it is below that line. We can create a three-zone system for risk:

- There is a red zone at the head and shoulder (above sternum), with highest risk
- There is a green zone between the torso and the waist, where HIA risk is lowest

- There is an orange zone from the waist down to the ground, where knee impacts in particular create higher risk (but not as high as the head)

I want to point out that the red zone above doesn't have to mean illegal tackles. In fact, most tackles in the red zone are legal, because they involve contact at the torso or on the sternum of the ball carrier, but the head of the tackler is in proximity with the head or shoulder of the ball carrier in order to make this tackle. So it's the head positions that matter, and the situation where two heads are sharing airspace is the most dangerous one (but legal in most instances). You should therefore be asking, how do you change legal behaviour by the tackler?

More to the point, and in reaction to the comments in response to the RFU decision, this is not guesswork and nor is it a 'knee-jerk reaction' to something new. The sport has in fact been traveling towards this understanding for six years.

### The action

Now consider the action. When the data first came out, in the elite game, World Rugby convened a group of current coaches and former players, along with match officials and external medical folk, to discuss the results and to decide on how best to act. Over the course of two days in Dublin, and months after, I presented these results, with the ultimate question to those experts "What should we do about this?"

It was out of that meeting that the approach to head contact in the elite game came about. The coaches said to us, and **this bit is important**: "*You have two options to get players to tackle lower. You can lower the height of the tackle in law, or you can apply the current law more strictly so that they react to the 'punishment' by changing their behaviour and tackling lower*".

In the former, players would be forced to tackle lower by a literal change in the law. In the latter, the change would be made in response to application of existing law. It [would be more subtle, a nudge rather than a shift](#).

What the coaches and rugby experts then said, and **this is really important**, is that we shouldn't lower the legal height of the tackle immediately, and definitely not in the elite game. That was something we should look at trialling in the community game at some point in the future.

Instead, the coaches recommended, apply the current high tackle law more harshly, send players off for head contact, so that a message would be sent by sanction that would change behaviour to reduce height and thus reduce risk. Those of you who follow rugby will know what happened next - the zero tolerance approach in 2017, then a head contact sanction framework in 2019/20, and then [the Head Contact Process](#) of '21-'23 have all been implemented in the elite game, to a chorus of criticism and unhappiness not only from spectators and some media, but also from coaches and players who don't want to see players sent off.

Meanwhile, the effect has probably been minimal, and compromised by implementation and buy-in. Has the increase in red cards caused a change in behavior? Barely, I suspect. Or very slowly. At first it was because application was poor, and referees were inconsistent in applying the sanction (probably because they're only human and there was a mass pile on them by coaches, fans and media every time they gave one). That's why the HTSF and HCP were introduced.

There remains major opposition to the concept, however. It has sometimes felt like people reject the concept or idea based on failure of implementation.. It's understandable that people don't want to see red cards, but ultimately, it has undermined any chance of real behaviour change because it has allowed a culture to develop where red cards are too often excused as accidents, something that cannot be coached or modified with interventions.

As a result, the sanction message has been diluted by a kind of rationalisation that they're unavoidable accidents, rugby incidents, something we should accept in the game. Those red cards also too rare - at a global rate of 1 every 8 matches (the rate in 2021/22), the disincentive is probably too small to drive behaviour change, particularly when the incentive to tackle higher and dominate the collision while simultaneously stopping ball movement is so high.

Simply put, the attempt to nudge behaviour has been compromised by potentially being too delicate, and possibly because the incentive balance hasn't changed enough - the idea was to make the cost of a high tackle so high that coaches and players would not longer 'pay it', but in reality, the rewards for tackling high

(dominance, stopping the ball) are so large that red cards, even at one every 8 matches or 2000 tackles, is not a steep enough price to drive true change.

I wouldn't give up on this approach just yet - if consistency can be achieved, and the message holds firm, it may yet cause change, but the reaction to red cards, including the push to lighten sanction to a 20 min red card only, do not fill me with massive confidence that the sport has embraced the need for change. Instead,

direct head contact that causes HIAs at a rate 232 times greater than non-head contact has been framed as an "unavoidable outcome", a "rugby incident".

And believe me, I'm sympathetic to this argument because players are not making these head high head contact tackles on purpose. A red card is not a judgment of a player's character or moral fiber. They are, frequently, the result of technical errors or errors in decision-making. But the latest evidence we have is that when a red card is given for a tackle causing head contact, the risk of a head injury is 232 times higher overall, almost 800 times higher for the ball carrier, and 40 times higher for the tackler. That cannot be left unchecked, knowing what we know. The paradigm around cards needs to change, because issuing them in the current climate seems to be creating negative outcomes without the desired positive behaviour change.

So where does that leave us, you might wonder? Well, it brings us back to what those coaches suggested in a Dublin conference room in 2016 - look at trials lowering the legal height of the tackle in community rugby. But first, a detour via France...

### **The French Connection**

In 2018, French rugby lived through tragedy, in the form of the deaths of four young players, all a result of direct head impact (to ball carriers) during play. In December that year, an emergency meeting was convened, with the Minister of Sport in France searching for answers and workable solutions. We attended that meeting in a hotel room alongside the Paris Opera house, and shared the results and concepts I've summarized above.

The outcome was driven French decisiveness, and a lower height law change implemented immediately, where in all community rugby below what they consider elite and sub-elite levels in France, the legal height was lowered to the waist, just as it was by the RFU yesterday.

My main memory from that meeting, and subsequent discussions, was the debate around whether the height should be lowered to the sternum, or further, to the waist? They eventually chose waist, in part because they felt a bigger change would be needed to create any effect at all. They were well aware that the safest place for the tackler's head was the torso of the ball carrier (the green zone described above), and that going to the waist meant inviting the prospect of orange zone impacts, while taking out the green zone, but they felt that the change to the sternum would not push the tackler low enough at a time when they wanted (needed) to see real change.

In part, this was because many tackles already target the sternum (because it's legal), and then when they go wrong on the high end, direct head impact is the result. By lowering the height all the way to the waist, they were building in some safety, a margin for error that meant a 'miss' on the high side would actually be quite safe, while a miss on the low side (to the upper leg) would also be relatively safe.

We could see the rationale behind this, and so World Rugby readily approved that trial, particularly when the French also proposed a creative and quite daring "partner law change" that would regulate the actions by ball carrier. That is, they said that the ball carrier would not be permitted to drop their height into contact, or to bend down and lead with the head. In their words, the "defender must be able to tackle the ball carrier and so have access to his pelvis".

The reason this was particularly interesting to us is that a trial that had been run the year before, in England, had found higher tackler concussion risk when the height of the tackle was the sternum, and this was likely in part because the interaction between the ball carrier and tackler was not managed in that trial.

For that, let's leave France, head back across the Channel and understand that particular trial because it offers us important lessons.

### **The England Championship trial - a negotiation that arrived at more risk**

The premise of the Championship trial was to lower the height to the sternum. You'll recall that in our 2016 meeting, the expert rugby group had suggested trials that lowered height outside of the top level of rugby, and the RFU embarked on this one in 2017 because there was already a feeling that the sanction-driven changes in the elite game were not producing the desired results (again, this is important).

The problem with this study was its implementation, because straight away, a number of challenges came up, and negotiating those was very, very difficult. The coaches didn't want the trial, and against a wider backdrop of cynicism about the benefits of lower tackles, resisted the concept or strategy. It didn't matter how many times we tried to explain how risk (or propensity) was a function of the rate of head injuries, not the number. The coaches would say "*I see a lot more head injuries from low tackles, therefore low tackles are more dangerous*".

This is fundamentally wrong, a misunderstanding of how risk works as a rate (more car accidents than motorbike accidents does not mean cars are more dangerous than bikes, for example). However, if I had a bitcoin (at peak prices) for every time I had to explain this to coaches, I'd be writing this from my villa in Tuscany, rather than a Cape Town coffee shop...

The upshot of this is that the RFU trial became a kind of "hostage negotiation", where every attempt to introduce law change was challenged, and the compromises reached sowed confusion and misunderstandings, rather than real behaviour change. It meant that instead of being for a full season in their second tier competition, the trial was wedged into a Cup competition that happened midway through the season. Different players, different focus, and a requirement to shift behaviour midway through a season. The coaches and players would tackle one way for a few months, then shift to a law change for 8 weeks, then back to normal to complete the season. Given that any intervention needs time to be "embedded", a period for adaptation, this was a major red flag before it began. But it was the only way to get something done. In hindsight, perhaps nothing would have been better than something!

More concerningly, and relevant to this story, was the negotiations and discussions about what to do when the ball carrier went into contact bent, and at a low height, leading with their head. This often happens near try-lines, and also in so-called pick and go situations. Even in the wider elite game, this issue came up a lot. People would protest harsher sanctions, saying "*It is impossible for the tackler to avoid head contact if the ball carrier is in a pick and go move*".

The thing is, if you watched rugby any time between 2010 and 2017, long before the high tackle and head contact focus came along, you'd see 30 to 50 of these situations every match, and they were never an issue. Almost always, the ball carrier would duck down, lead with their head into the tackler, who typically stayed upright and 'soaked' the player. This situation would produce head contact, so strictly speaking, it has always been a 'high tackle', but they were never sanctioned, and nor would they be with a zero tolerance directive or a law change. They involve a bent ball carrier against an upright tackler, and head contact from the ball carrier's head to the tackler's torso or arms, in a wrap tackle.

We know that the risk from these is low, and so there's no need, even from a risk perspective, to act on these. They were never penalised, not before 2017, not since, but they became the focal point of dispute. In the attempts to navigate this issue, I believe a perception was created that the tackler had to be lower than the ball carrier, no matter what the ball carrier did.

This was, in my opinion, an imagined or exaggerated problem, but it became crucial, because the response by coaches and players to lowering tackle height was to forget that these ball carrier induced head impacts have always been quite common. Instead, tacklers began reacting to the ball carrier in what became a 'race to the ground' while still trying to 'hit' the opponent in a dominant tackle. As a result, a lot of dangerous tackles were created where tacklers were trying to contact ball carriers low, the result being that two heads were still sharing airspace, but with both players charging into each other low to the ground. An image of elephant bulls fighting for territory comes to mind.

It needn't have been like this. A tackler who remains upright and "high" could safely and legally execute a tackle on a bent ball carrier, even with the lower tackle height trial, but this happened less and less often, replaced instead by something we can predict would increase risk. This was, in hindsight, confusion created by consultation and the attempts to get buy in. A simple instruction would have worked better, but the road to hell, as they say, is paved with good intentions...

Ultimately, the trial didn't work, and unfortunately, this fed a narrative that lowering the height was doomed to failure. It took courage and creativity from France to show the way...

## Focus on the ball carrier and tackler

The French solution, as I mention above, was to stop the ball carrier from dropping into contact by creating a law for that player too. And it worked. They have presented data to us on two occasions now, and the **picture is very positive**. Their concussion rate, measured as blue cards issued by referees for clear concussions, has dropped by almost 30%. The subjective feedback of coaches and players has been very positive, and the game has changed in ways that they are very happy about. They are reporting more tries, more passes, more offloads, faster ruck speeds, and overall, a better product, all because tackling below the waist frees tacklers up to be more evasive, and quicker with passes and ball placement.

What has also happened is that the game has become more evasive. Ball carriers are no longer allowed to drop down and charge into a tackler, so they have sought other solutions to the problem of being tackled. This means they are more evasive, and we know from some analysis I've just done on community rugby league that when a ball carrier tries to be evasive, the risk of a head injury to both the tackler and that ball carrier are way lower than when the ball carrier seeks contact. In fact, a **ball carrier who takes no evasion or who looks to bump or charge a tackler increases head injury risk three to four-fold**.

Initially, and importantly, these changes were not immediate and obvious. They took time. The number of high tackle penalties was very high for the first few months. Frustration grew, not unsurprisingly. As one coach said, *"You have to take the medicine, and it'll be unpleasant at first, but then it'll start to work"*.

Also, the number of penalties against a ball carrier for dropping low into a tackle was high. No reduction in concussion rates was seen. But the FFR had the courage of their convictions to stick with it, and by the second season, the positive benefits had emerged, and the concussion rate was heading down, while the shape of the game was improving. Covid disrupted this, but they are firmly committed to continuing because the results are so positive.

The key lessons I'd draw from their case study are:

- **It takes time.** Behaviour changes means undoing what has become habit or instinct, and people must consciously, then sub-consciously adapt to the new thing. You can't do this for a few months and assess it. We had previously learned this in a trial in Stellenbosch, by the way. That trial lowered the height to the armpit, and also found no effect in the first six months. That happened only later. There is always a period of 'rejection' of change, then adaptation, then successful implementation. You won't see anything until the third stage, and in fact, things may get worse before they improve. The RFU thus needs to commit to this trial for two years, minimum.
- **It takes clarity and conviction.** Dare I say courage? I don't think you can navigate this stuff with extensive dialogue and consultation. It's too complex, and so for one thing, you'd be consulting with people who have only a fraction of the knowledge necessary to make constructive suggestions. The FFR came in for some criticism, but they held firm on the evidence and the principle. If unions relent in the face of criticism, nothing will ever change.
- **It takes some compromise, and a positive attitude towards change.** Things will be worse before they're better, and maybe they'll end up different too. What impressed me from France was their recognition of this reality, and the positive attitude they had to it. To them, it was an opportunity to get more young kids playing a game they were more interested to see. Yes, there are a dozen problems and threats, and if you raised these, everyone was aware of them. But they were positive about change, and made a choice to seek the upside of this change. Even today you ask them whether it was a problem to implement, they will respond very positively, because they had a solution focus, not a problem focus. Some people will give you ten reasons why something won't work, whereas the French were looking for ten new ways to make it work better. I see the flipside of that on social media now, which is a great barrier to change.

## Back to England for future focus

So where does that leave the RFU's latest decision? To repeat, I think the lowering of height is necessary. I am not particularly wedded to a waist high trial compared to a sternum high trial, and I can see the pros and cons of each.

To go as low as the waist means you are asking tacklers to target an area at the waist, which is the orange zone. But, it is close to two green zones - torso and leg. In contrast, if you target the sternum, you're focused on a larger green zone, but with a red and orange zone waiting for errors high and low,

respectively. The choice, then, is whether you target orange with the errors being safer, or do you target green, with errors being red and orange? You also create second order effects that will differ between the two height changes.

So there's no right or wrong answer here. I get why there is some concern and consternation. But ultimately, having now watched and been immersed in the resistance of the elite game to lowering tackle height when a softer approach is used, my personal feeling is that sending a stronger message by going right down to the waist might be what it takes to cause change. You can always do this for a few years, and then slowly inch it back up within a new context for tackles in the sport. Going straight to sternum would potentially negate any changes, and you'd end up having to go lower and lower. This feels like a more effective way of getting to the desired location. The sport sometimes feels resistant to 'nudges', despite our desire to achieve them.

The RFU have also created a policy around ball carrier behaviour, saying that they will encourage ball carriers to not drop low into contact, instead advocating for more evasion from the ball carrier. Whether "encouragement" will achieve this, as opposed to law change, remains to be seen, but if they get the wording of law right, along with advice to officials and coaches (they have committed to this) then the trial has the same chance as the French one of working.

Incidentally, the other way to write this lower height law, if you decide not to create a law for ball carriers, might be something like this:

*If the tackler makes contact with the ball carrier using their shoulder, arm or head, then contact on the ball carrier's body must be below the waist. If contact from the tackler's body to the ball carrier's head is on the tackler's torso, waist or upper leg, then the contact may be to the ball carrier's head., if the ball carrier has created the head contact through their actions prior to contact*

This wording would allow for those "high tackles" that are actually safe, and which are initiated by the bent ball carrier. I think either could work, and both obey the principle that you don't want forceful tackles when heads share airspace.

As for what the future holds, with France, New Zealand and now England all implementing height variations in the community game, there will be opportunities to learn and potentially adapt as we move forward. That alone makes them worth trying. It may well turn out that at the waist, the concussion reduction benefit is smaller than it would be at the sternum, and that head-knee impacts become recognized as high risk. But it may also transpire that a sternum height doesn't move the tackler's head far enough away from the highest risk zone. Or that a law for ball carriers is the crucial ingredient to make this work. We will only know if it is explored, and the criticism of the RFU for acting without evidence is unfair, because all they're doing, like the FFR before them, is applying the existing evidence as far as they can, in order to gain more evidence.

I suspect that eventually, similar changes will happen in the elite game. To repeat, the data is so clear - if the head of the tackler is in proximity or contact with the ball carrier above their shoulder, the risk is 4x higher. When there is direct head contact that warrants a red card, the risk is 232x higher. That's simply too high, and the message is clear - get the head out of the game.

That's a summary of it. Yep, summary, because if you think you can understand how this decision was reached in a tweet, or even in 60 seconds, you're doing the body of work from dozens of people, over years, a huge disservice. It is, as usual, a little more complicated than that!

Thanks for reading

Ross Tucker