

Institution: University of Bath		
Unit of Assessment: C24		
Title of case study: Reducing injuries in youth and adult rugby union: Activate is rugby's global injury prevention exercise programme		
Period when the underpinning research was undertaken: 2012-2017		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Keith Stokes	Professor, previously Head of Department and Senior Lecturer	February 2002 - present
Grant Trewartha	Reader, previously Senior Lecturer	September 2001 – August 2016
Carly McKay	Senior Lecturer, previously Lecturer	April 2015 - present
Sean Williams	Lecturer	January 2015 - present
Simon Roberts	Research Fellow, previously Research Associate	December 2000 - present
Period when the claimed impact occurred: 2017 – present		
Is this case study continued from a case study submitted in 2014? No		
1. Summary of the impact		
<p>Rugby union is a contact sport with one of the highest injury rates. University of Bath researchers developed a rugby-specific injury prevention exercise programme (Activate) and evaluated it using a randomised control trial, demonstrating a reduction in injuries of up to 72% in youth and up to 60% in adult community rugby union. England has the largest rugby playing population in the world with 382,000 registered players (World Rugby, 2016), and in September 2017, the governing body, (Rugby Football Union, RFU) launched Activate as the key pillar of its injury prevention strategy, including coach education and open access resources. The international governing body, World Rugby, adopted Activate in September 2019, and invested GBP750,000 in a global roll out which, as of November 2020, spans 18 unions across 5 continents.</p>		
2. Underpinning research		
Rugby union is a sport with a high prevalence of injuries		
<p>Rugby union is one of the most popular team sports in the world and being a contact sport, has one of the highest injury rates. In English schoolboy rugby, there is one injury causing the player to be absent for 24 hours or longer for every two team games (Journal article 1) and in adult community rugby, one injury causing the player to be absent for longer than 7 days every two team games (Journal article 2). England comprises the world's largest playing population and therefore a large number of players are exposed to a risk of injury while playing.</p>		
Understanding injury rates and risk factors for injury in community rugby union		
<p>This programme of research conducted at the University of Bath comprised of the Community Rugby Injury Surveillance Project (CRISP) from 2012 to 2017 (Grants 1, 2 and 3), led by Professor Keith Stokes (Professor 2002 to present; RFU Medical Research Lead, 2018 to present) with Dr Grant Trewartha (Reader, 2001 to 2017), Dr Carly McKay (Senior Lecturer 2015 to present), Dr Sean Williams (Lecturer 2015 to present) and Dr Simon Roberts (Research Fellow, 2008 to present). The aims of this project were to further understand injury rates in schools and community adult rugby, identify risk factors and implement injury reduction interventions. Our early studies revealed that injuries were most common in the lower limb, shoulder and head (concussion) and that injury prevention should target these areas (Journal</p>		

articles 1 and 2). We also identified that players who were most proficient at movement control tasks (balance, flexibility and strength), had a lower injury risk (Journal article 3).

Developing an injury prevention exercise programme for community rugby union

In 2014, our researchers convened and hosted an expert panel comprising international clinical experts (Mrs Kate Davis, RFU; Mr Richard Mack, Bath Rugby; Dr Mike England, RFU), researchers (Professor Carolyn Emery, University of Calgary; Professor Evert Verhagen, Amsterdam University) and strength and conditioning experts (Mr Des Ryan, Arsenal Football Club) to develop injury prevention warm-up programmes specific to rugby. The programmes incorporated evidence-based exercises from previous injury prevention studies with additional exercises appropriate to rugby union, particularly strengthening exercises relating to the neck and shoulder areas. This work developed into pilot randomised control trials (RCTs) during the 2014-15 rugby season assessing how well a rugby-specific movement control warm-up could be incorporated into school and adult club environments.

This programme reduces overall injuries by up to 72%, concussions by up to 59%, and soft-tissue injuries by up to 40%

These studies were followed by cluster randomised control trials (RCTs) (Journal articles 4, 5, 6) in the 2015-16 season to assess the efficacy in reducing match injuries, involving 3,188 youth players and over 2,000 adult players. Both youth (Journal article 5) and adult (Journal article 6) studies demonstrated that the inclusion of our injury prevention programme reduced match injuries, specifically in concussions and injuries to the lower limb. Most notably, there was a 72% reduction in overall injuries and a 59% reduction in concussions in youths, when the programme was conducted at least three times per week. For adults there were reductions in lower limb injuries by 40% and the incidence of concussions by 60%, with the latter finding attributed to specific neck strengthening exercises included in the programmes.

3. References to the research

Peer reviewed conference abstract

1. Hislop, M, Stokes, K, Williams, S, Kemp, SPT, England, M & Trewartha, G 2017, 'An epidemiological study of match injuries in youth rugby union', *British Journal of Sports Medicine*, vol. 51, no. 4, 121. <https://doi.org/10.1136/bjsports-2016-097372.121>

Peer reviewed journal articles

2. Roberts, SP, Trewartha, G, England, M, Shaddick, G & Stokes, KA 2013, 'Epidemiology of time-loss injuries in English community-level rugby union', *BMJ Open*, vol. 3, no. 11, e003998. <https://doi.org/10.1136/bmjopen-2013-003998>
3. Attwood, M, Roberts, S, Trewartha, G, England, M & Stokes, K 2018, 'Association of the Functional Movement Screen™ with match-injury burden in men's community rugby union', *Journal of Sports Sciences*, vol. 37, no. 12, pp. 1365-1374. <https://doi.org/10.1080/02640414.2018.1559525>
4. Hislop, MD, Stokes, KA, Williams, S, McKay, CD, England, M, Kemp, SPT & Trewartha, G 2016, 'The efficacy of a movement control exercise programme to reduce injuries in youth rugby: a cluster randomised controlled trial', *BMJ Open Sport & Exercise Medicine*, vol. 2, no. 1, e000043. <https://doi.org/10.1136/bmjsem-2015-000043>
5. Hislop, MD, Stokes, KA, Williams, S, McKay, CD, England, ME, Kemp, SPT & Trewartha, G 2017, 'Reducing musculoskeletal injury and concussion risk in schoolboy rugby players with a pre-activity movement control exercise programme: a cluster randomised controlled trial', *British Journal of Sports Medicine*, vol. 51, no. 15, 097434, pp. 1140-1146. <https://doi.org/10.1136/bjsports-2016-097434>
6. Attwood, M, Roberts, S, Trewartha, G, England, M & Stokes, K 2018, 'Efficacy of a movement control injury prevention programme in adult men's community rugby union: a cluster randomised controlled trial', *British Journal of Sports Medicine*, vol. 52, no. 6, 290, pp. 368-374. <https://doi.org/10.1136/bjsports-2017-098005>

Grants

1. Dr Keith Stokes (Principal Investigator), Dr Grant Trewartha, Dr Gavin Shaddick (Department of Mathematical Sciences, University of Bath). Community Rugby Injury Surveillance Project (CRISP). Rugby Football Union/Injured Players Foundation. 2012-2017. GBP283,000.
2. Dr Grant Trewartha (Principal Investigator), Dr Keith Stokes. The role of functional movement control training to reduce injury risk in youth rugby players. Rugby Football Union. 2013-2016. GBP178,720.
3. Dr Keith Stokes (Principal Investigator), Dr Grant Trewartha, Dr Simon Roberts. Injury Prevention in adult community rugby players: implementing an injury prevention programme. The PPEF (Private Physiotherapy Educational Foundation). 2014-2016. GBP29,257.

4. Details of the impact

The underpinning research has resulted in the Rugby Football Union (RFU) – comprising the world's largest community playing population – and the world governing body for rugby union (World Rugby), adopting and disseminating this specific injury prevention programme (termed: Activate) as their primary evidence-based injury prevention programme for community-level rugby. The World Rugby Website states:

“Research co-led by England Rugby and the University of Bath in England has shown that the Activate programme can reduce the risk of soft-tissue injuries by 26 and 40 per cent [26% and 40%] and concussion risk by 29 and 60 per cent [29% and 60%] in youth and adult rugby players, respectively” (supporting evidence 11).

Both bodies have invested significantly in producing online resources and training coach educators in delivering face-to-face workshops to ensure the highest quality of delivery and impact on the game.

Prior to this research, RFU and World Rugby guidance on concussion lacked any preventative measures

Before Activate, the injury prevention advice and resources provided by the RFU to the community playing population were largely generic, not specific to rugby union and without a sound evidence base. As RFU Player welfare manager, Rachel Faull-Brown notes:

“Prior to this work being carried out, England Rugby’s player welfare programme for community rugby was not able to provide specific evidence-based guidelines for injury prevention to this playing population...As a result of the studies carried out in the adult male and school age players, we have invested resources to create web-based content of the injury prevention exercise programme including instructional videos” (supporting evidence 4).

Informing the RFU’s approach to injury prevention in the community game

The evidence-based exercise intervention developed through the research led to a collaborative strategy between the RFU and our researchers between 2016 and 2017 to produce written exercise instructions and user guides. Both parties also worked with a partner media production company to create publicly available video resources of the warm-up programme, branded as ‘Activate’.

The RFU created a dedicated web page with links to videos and downloadable guides to the exercise programmes, situated within the RFU RugbySafe web content (supporting evidence 1). In September 2017, Activate resources were provided to all registered users on the central RFU ‘Game Management System’ which includes club coaches, management and medical staff at every registered rugby union club and school in England. The Activate resources are now freely available to anyone who accesses the web page. Activate is also embedded into the RFU coaching award content (supporting evidence 2) and the RFU’s ‘Rugby Aware’ workshop resource which promotes the core values of rugby union and which clubs and schools can deliver to their own staff, players and parents (supporting evidence 3).

In light of previous evidence by other research groups showing a greater implementation of injury prevention programmes in team with coaches who attended a face-to-face workshop (Steffen et al., 2013), Dr McKay, worked with RFU colleagues to design an Activate workshop which all 120 RFU community rugby coaches were trained to deliver to school and club coaches in England. Between 2017 and 2018, 151 free workshops were delivered to 2,700 coaches across England (supporting evidence 4). This has now been successfully disseminated, with 72% of coaches having heard of Activate as of September 2018 (supporting evidence 5).

Further dissemination via mass-media

A press release in May 2017 led to mass-media coverage of Activate, resulting in 242 news items (supporting evidence 10). This included interviews on BBC Breakfast (reach: 4,896,833), Radio 5 Live (1,592,333), BBC Radio 1 (3,159,833), Radio 4 Today (2,999,550), World Service Breakfast (421,833) and BBC News online (1,916,376). Activate was also chosen by the Universities UK, 'Made at Uni - UK's Best Breakthroughs'; to demonstrate how University research has improved everyday life.

International impact on rugby injury prevention

In November 2017, Stokes, McKay and Roberts presented Activate at the World Rugby Medical Commission Conference. World Rugby (the World governing body) has since adopted Activate as its core injury prevention strategy (supporting evidence 6). Launched in September 2019 (supporting evidence 6), with GBP750,000 investment for global dissemination.

In 2017, Dr Mike Hislop was employed as World Rugby's Technical Services Researcher to oversee global dissemination of Activate. As of November 2020, Dr Hislop has coordinated educator training programmes in 18 unions across Africa, North America, Oceania, Asia and Europe, attended by approximately 80 members of the World Rugby Training and Education workforce. The online content has already been accessed by approximately 16,000 different users from 105 countries (supporting evidence 7). Activate has already been adopted by Scottish Rugby (supporting evidence 8), and adoption of activate by a coach in the USA has shown a reduction in injuries from 18 injuries across 31 rugby players in 2017 (pre-Activate), to 9 injuries across 36 rugby players in 2018 (post-Activate) (supporting evidence 9).

5. Sources to corroborate the impact

1. Activate web page – located within RFU RugbySafe:
<https://www.englandrugby.com/participation/coaching/activate> (accessed 27 February 2020)
2. England Rugby coaching award – Activate:
https://rise.articulate.com/share/IMbX_hue4qrbzu7zHGQlir0zvhSlycmr#/lessons/jy2GmNgImvkJX93baRuuwuyYF4K7ml5D (accessed 27 February 2020).
3. RFU Rugby Aware. PowerPoint presentation – slides 32-33. Webpage:
<https://www.englandrugby.com/participation/playing/player-welfare-rugby-safe/rugby-aware> (accessed 27 February 2020).
4. Letter from Player Welfare Manager, Rugby Football Union, (14 January 2020).
5. The effect of a workshop on coaches' adoption and adherence to the Activate injury prevention exercise programme. IOC World Conference in Prevention of Injury and Illness in Sport, Monaco 202. Craig Barden, Oral presentation. (Postponed to 2021 due to COVID-19)
6. World Rugby press release for Activate launch, (9 September 2019).
7. Letter from Head of Technical Services, World Rugby, (12 January 2021).
8. 'Rugby Right' Activate Warm-up routine – Scottish Rugby Union, (accessed 27 February 2020).

Impact case study (REF3)

9. 'Real-World Observations from a First Season of the Rugby Union "Activate Programme" for Injury Risk Reduction in a U19 Men's Team in North Carolina, USA'. Short communication in 'Sports Injuries and Medicine' Journal, Claude Hughes, July 2018.
10. Activate media evaluation – compiled by University of Bath Media and PR manager in 2019, focusing on coverage since 2017 including BBC TV and Radio, print media including Guardian and social media.
11. World Rugby Website - <https://www.world.rugby/news/447540>
(accessed February 2021)