Injury Epidemiology and Prevention in Youth Rugby Union

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Word Count: 800

Figures: 1

References: 8

Keywords: Rugby, Injury, Prevention, Youth, Implementation

What did I do?

This mixed-methods thesis assessed the implementation and effectiveness of the *Activate injury prevention exercise programme* in English schoolboy rugby union. *Activate* is a rugby-specific warm-up designed to be used three times per week prior to training and games[1].

Initially, I conducted a systematic review investigating the implementation of rugby injury prevention strategies[2] to inform and develop the following research questions (figure 1):

- What are the knowledge, perceptions and awareness of schoolboy rugby coaches towards injury prevention, risk and *Activate?*
- Does attending an *Activate* workshops change these perceptions and affect *Activate* implementation?
- What barriers and facilitators are there to coaches implementing *Activate*?
- Is *Activate* effective in reducing injury risk in schoolboy rugby?

I co-authored the Youth Rugby Injury Surveillance and Prevention Project, to further understand the risk, types and mechanisms of injury in schoolboy rugby, providing epidemiological data to support the thesis[3].

Why did I do it?

Rugby Union has come under intense scrutiny due to the associated injury risk and the prevalence of injuries, such as concussion[3]. Various preventative strategies have been developed with one breakthrough being *Activate*. In 2015, *Activate* efficacy was assessed in a randomised controlled trial, reporting a 72% reduction in match injury incidence and 59% lower match concussion incidence for those using the programme three times per week[1]. In 2017, *Activate* was endorsed and disseminated by World Rugby (international governing body) and the Rugby Football Union (RFU; English governing body). However, efficacious interventions often do not have their intended effect in the applied-setting[4]. As such, there was a need to assess if and how *Activate* was being implemented in the 'real-world' and the effectiveness to reduce injury risk.

How did I do it?

I conducted a systematic review investigating the implementation of rugby injury prevention strategies to inform subsequent studies[2]. Articles were evaluated against the RE-AIM (reach, effectiveness, adoption, implementation, maintenance) framework, evaluating the reporting and assessment of implementation determinants.

Next, I invited coaches and players to complete a baseline survey investigating their perceptions towards injury risk, awareness of *Activate* and current injury prevention behaviours[5].

The RFU developed free *Activate* coach workshops as part of their dissemination strategy. The workshops were based upon constructs of the Health Action Process Approach (HAPA) model, specifically targeting improving self-efficacy. However, there was a need to assess the workshop's effect on attendees' perceptions and *Activate* behaviour[6].

A qualitative approach, through semi-structured interviews, was used to gain feedback from coaches exploring the barriers and facilitators to using *Activate*[7], with constructs of the HAPA model guiding interview themes and questions.

Finally, *Activate* effectiveness was assessed in a pragmatic study, assessing whether team weekly adherence and individual player exposure was associated with lower injury risk[8].

What did I find?

The systematic review highlighted the focus of rugby injury prevention research on intervention efficacy or effectiveness, with minimal reporting or assessment of intervention adoption, implementation, and maintenance[2].

Poor *Activate* implementation was highlighted through baseline surveys, with only 13% of players aware of *Activate*[5]. Coaches reported good *Activate* adoption during the season (76%), suggesting coaches made the decision whether to use *Activate*. Coaches generally did not implement *Activate* as intended, with a median adherence of two sessions per week and shortening the programme's duration.

Attending a pre-season *Activate* workshop did not change coaches' perceptions towards injury risk or prevention[6]. However, attendees had significantly greater *Activate* adoption and adherence during the season than non-attendees, associated with improvements in self-efficacy, supporting the use of a workshop to target behaviour change.

When interviewed, coaches reported positive perceptions towards *Activate*. However, none implemented *Activate* as designed, often selecting only a few exercises or gamifying the programme[7]. Some coaches adapted *Activate* to make it suitable for multiple sports, reflective of the school sport context, whilst others asked players to deliver *Activate* themselves, despite players being largely unaware of the programme.

Teams adopting *Activate* had a reduction in match and training injury incidence (23% and 59% respectively)[8]. A positive dose-response relationship existed between adherence and injury incidence, with the greatest effect found when completing *Activate* three times per week (match incidence 21.7/1000h) versus one-two times (28.8/1000h) or less than once per week (31.3/1000h).

What is the most important clinical impact / practical application?

This body of work showed *Activate* is effective at reducing injury risk in schoolboy rugby union, especially when used thrice weekly, and the programme should be further advocated for use in this population. A quarter of coaches were unaware of *Activate* and consideration should be given to maximising awareness. Workshops significantly improved coach behaviour, but are no longer being offered by the RFU. Making workshops available and accessible (online or pre-recorded) would likely aid implementation, although removal of the practical element may hinder self-efficacy development. Coaches heavily adapted the programme to improve player buy-in, but despite this *Activate* was effective at reducing injury risk.

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Acknowledgements

I wish to thank my supervisors Dr Carly McKay and Professor Keith Stokes for their guidance over the course of this journey. Thank you to all my co-authors, students and staff from the Centre for Health and Injury and Illness Prevention in Sport (Chi^{2}PS) at the University of Bath. I am extremely grateful to the Rugby Football Union for funding my PhD. Lastly, I dedicate this work to my family for their unconditional support.

Figure Legend

Figure 1. Flow chart outlining thesis studies and their relation to each other [reference].

NOTE: HAPA: Health Action Process Approach Model. RE-AIM: Reach, Effectiveness, Adoption, Implementation, Maintenance Framework.