Ken Quarrie

Senior Scientist, New Zealand Rugby

Research specialisation: Injury Prevention and risk management

Experience: Dr Ken Quarrie is the Senior Scientist for New Zealand Rugby, a member of three World Rugby Advisory Groups, and a Research Associate at AUT University.

Following the completion of a degree in physical education at the University of Otago in 1989, Ken undertook a master's degree examining the biomechanics of rugby scrummaging. In 1993, an opportunity to be involved in the Rugby Injury and Performance Project (RIPP) presented itself, and Ken has been studying aspects of rugby performance and injury management ever since. RIPP was one of the first major prospective studies examining risks of injury among rugby players.

In 2000, Ken was appointed as the inaugural Injury Prevention Manager for New Zealand Rugby and was responsible, in partnership with the Accident Compensation Corporation, for developing and managing a nationwide injury prevention programme, entitled 'RugbySmart'. The main goal of the programme was to reduce the incidence of permanently disabling injuries resulting from rugby. Since 2000, there has been an 89% reduction in scrum-related spinal injuries, and a reduction of 56% in all injuries resulting in permanent disablement. The success of RugbySmart has seen it since copied in a number of countries around the world, including South Africa, Australia and Japan. In 2008, Ken completed a PhD in the epidemiology of rugby injuries at AUT. Since 2007, Ken has focused on analysing player performance and team strategies and tactics. As such, he provides a range of analyses and reports to high performance coaches and staff within New Zealand Rugby.

Research overview: With respect to injury and risk management, Ken has published academic papers on preventing cervical spine injuries, the effect of compulsory mouth-guard use on reducing dental injuries, risk factors for injuries among club players, the types and risks of tackles in professional rugby, shoulder injury mechanisms, managing player loads, and the acceptability of risks in children's sport. On the performance side of the ledger, he has published papers on the fitness characteristics of club players, changes in match activities and player size in international rugby from 1972 to 2004, the physical demands of international rugby, agent-based modelling for the development of moves, and a paper ranking the ability of goal kickers in international rugby. He is currently taking a special interest in issues regarding concussion management.

Research publications:

Tucker R, Raftery M, Kemp S, Brown J, Fuller G, Hester B, Cross M, **Quarrie** K. Risk factors for head injury events in professional rugby union: a video analysis of 464 head injury events to inform proposed injury prevention strategies. *Br J Sports Med* 2017; 51(15).

Quarrie KL, Raftery M, Blackie J, Cook CJ, Fuller CW, Gabbett TJ, Gray AJ, Gill N, Hennessy L, Kemp S, Lambert M, Nichol R, Mellalieu SD, Piscione J, et al. Managing player load in professional rugby union: a review of current knowledge and practices. *Br J Sports Med* 2017;51(5):421-427.

Quarrie KL, Brooks JHM, Burger N, Hume PA, Jackson S. Facts and values: on the acceptability of risks in children's sport using the example of rugby — a narrative review. *Br J Sports Med* 2017;51(15):1134-1139.

Hume PA, Theadom A, Lewis GN, **Quarrie** KL, Brown SR, Hill R, Marshall SW. A Comparison of Cognitive Function in Former Rugby Union Players Compared with Former Non-Contact-Sport Players and the Impact of Concussion History. *Sports Med* 2017;47(6):1209-1220.

Usman J, McIntosh AS, **Quarrie** KL, Targett S. Shoulder injuries in elite rugby union football matches: Epidemiology and mechanisms. *J Sci Med Sport* 2015;18(5):529-33.

Quarrie KL, Hopkins WG. Evaluation of goal kicking performance in international rugby union matches. *J Sci Med Sport* 2015;18(2):195-8.

Ken Quarrie
Senior Scientist, New Zealand Rugby
New Zealand Rugby House
100 Molesworth Street
Wellington 6011
New Zealand
Ken.Quarrie@nzrugby.co.nz

RUGBY CODES RESEARCH GROUP – MEMBER

Smart D, Hopkins WG, **Quarrie** KL, Gill N. The relationship between physical fitness and game behaviours in rugby union players. *Eur J Sport Sci* 2014;14 Suppl 1:S8-17.

Quarrie KL, Murphy IR. Towards an operational definition of sports concussion: identifying a limitation in the 2012 Zurich consensus statement and suggesting solutions. *Br J Sports Med* 2014;48(22):1589-91.

Quarrie KL, Hopkins WG, Anthony MJ, Gill ND. Positional demands of international rugby union: evaluation of player actions and movements. *J Sci Med Sport* 2013;16(4):353-9.

Lauren MK, **Quarrie** KL, Galligan D. Insights from the Application of an Agent-Based Computer Simulation as a Coaching Tool for Top-Level Rugby Union. *International Journal of Sports Science and Coaching* 2013;8(3):493-504.

Castinel BH, Adam P, Milburn PD, Castinel A, **Quarrie** KL, Peyrin JC, Yeo JD. Epidemiology of cervical spine abnormalities in asymptomatic adult professional rugby union players using static and dynamic MRI protocols: 2002 to 2006. *Br J Sports Med* 2010;44(3):194-9.

Gianotti SM, **Quarrie** KL, Hume PA. Evaluation of RugbySmart: a rugby union community injury prevention programme. *J Sci Med Sport* 2009;12(3):371-5.

Quarrie KL, Hopkins WG. Tackle injuries in professional Rugby Union. *Am J Sports Med* 2008;36(9):1705-16.

Quarrie KL, Hopkins WG. Changes in player characteristics and match activities in Bledisloe Cup rugby union from 1972 to 2004. *J Sports Sci* 2007;25(8):895-903.

Quarrie KL, Gianotti SM, Hopkins WG, Hume PA. Effect of nationwide injury prevention programme on serious spinal injuries in New Zealand rugby union: ecological study. *BMJ* 2007;334(7604):1150.

Fuller CW, Molloy MG, Bagate C, Bahr R, Brooks JH, Donson H, Kemp SP, McCrory P, McIntosh AS, Meeuwisse WH, **Quarrie** KL, Raftery M, Wiley P. Consensus statement on injury definitions and data collection procedures for studies of injuries in rugby union. *Br J Sports Med* 2007;41(5):328-31.