

SKIPP from head to toe - (Sports Kinesiology, Injury Prevention and Performance: Concussion to Achilles injury biomechanics)



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Abstract

Sports biomechanists have a role in preventing injury and improving performance. Understanding the mechanisms of injury and risk factors, and introducing interventions to reduce inappropriate forces, are the keys to being a successful injury biomechanist. Concussion is frequent in contact sports and can result in serious outcomes. Our IRB/NZRU/AUT RugbyHealth study reported long term health outcomes for 485 retired players, many who had sustained multiple concussions. Results of our monitoring of rugby players' head impacts with triaxial accelerometers in behind-the-ear patches and instrumented mouthguards, and their concussions, will be presented. At the opposite end of the body, lower limb injuries are frequent, often severe, and can take a considerable time to rehabilitate. Triathletes frequently sustain overuse Achilles injuries due to the high mileage and large lower limb loads during cycling and running. Our prospective study of 76 elite and national level triathletes showed lower limb stiffness was associated with risk of Achilles tendon injury. Stiffness can be measured relatively easily so may be a potential screening tool for athletes. Our studies of rugby players have also shown that functional screening using isokinetic dynamometry, balance and cutting movement assessment may help identify rugby players at risk of ACL or hamstrings injury. Translation of SKIPP knowledge into practical information for coaches, athletes and administrators can help change attitudes and behaviours and help reduce injury risk. The New Zealand SportSmart 10-point plan for injury prevention, and the sport specific adaptations such as RugbySmart and NetballSmart, incorporate best practice from scientific evidence of injury prevention strategies into education programmes. The use of biomechanics information in the technique, environment, screening and warm-up and conditioning points will be outlined.

Professor Patria Hume's bio

Professor Patria Hume focuses her research on improving sport performance using sports biomechanics and sports anthropometry, and on reducing sporting injuries by investigating injury mechanisms and injury prevention methods and using sports epidemiology analyses.

Patria has published over 100 journal articles and over 200 technical reports, a TV/video series on human potential, and educational CDs and resources for SportSmart and coach education programmes. A lot of Patria's research with elite sport is under embargo and is not available outside of the New Zealand elite sport science and medicine community.

She is a Fellow of the International Society of Biomechanics in Sports and is an editorial board member for journals Sports Medicine, Sports Medicine Open, and Sports Biomechanics.

Patria has graduated 21 PhD students and 12 Masters students, and is currently supervising 10 PhD students with topics ranging from injury prevention strategies for rugby league such as instrumented mouth guards and ear patches, to the cause and possible prevention of Achilles tendon injuries in triathletes, to finding ways to improve performance in defence personnel via 3D body scanning and ergonomics approaches.

Patria is the lead researcher for the International Rugby Board long term player health outcomes study that focuses on concussion, and the player clothing and equipment review. She is also the lead researcher of a number of ACC projects focused on sports injury prevention such as the revision of the 10-point plan for injury prevention "SportSmart" which she developed in 1999.

More information here: <http://www.aut.ac.nz/research/professors-at-aut/patria-hume>