

Central Lancashire Online Knowledge (CLoK)

Title	Profiling head accelerations using triaxial accelerometry during 'bodies in front' training play: A preliminary study of the sport of rugby league
Type	Article
URL	https://clock.uclan.ac.uk/18538/
DOI	https://doi.org/10.1136/bjsports-2016-097270.19
Date	2017
Citation	Atkins, Stephen, Bentley, Ian, Hurst, Howard Thomas, Richardson, Cassandra and Sinclair, Jonathan Kenneth (2017) Profiling head accelerations using triaxial accelerometry during 'bodies in front' training play: A preliminary study of the sport of rugby league. British Journal of Sports Medicine. ISSN 0306-3674
Creators	Atkins, Stephen, Bentley, Ian, Hurst, Howard Thomas, Richardson, Cassandra and Sinclair, Jonathan Kenneth

It is advisable to refer to the publisher's version if you intend to cite from the work.
<https://doi.org/10.1136/bjsports-2016-097270.19>

For information about Research at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the <http://clock.uclan.ac.uk/policies/>

PROFILING HEAD ACCELERATIONS USING TRIAXIAL ACCELEROMETRY DURING ‘BODIES IN FRONT’ TRAINING PLAY: A PRELIMINARY STUDY OF THE SPORT OF RUGBY LEAGUE

1 Stephen J Atkins, 2 Ian Bentley, 2 Howard T Hurst, 2 Mark E Mark E, 3 Cassandra Richardson, 2 Jonathan K Sinclair.*

1 School of Health Sciences, University of Salford, England; 2 Centre for Applied Sport and Exercise Sciences, University of Central Lancashire, England; 3 School of Psychology, University of Central Lancashire, England

10.1136/bjsports-2016-097270.19

Objective; To provide unique descriptive information on head accelerations, both linear and rotational, during ‘bodies in front’ training play.

Design A convenience sample were tested using a cross-sectional design. Players wore a triaxial accelerometer (XPatch, X2 Biosystems, Seattle) during two sessions of training gameplay (session duration 142 ± 26 min). Accelerometers were affixed on the left side of the head, at a point approximate to the external occipital protuberance. Setting Testing was undertaken at an elite performance training centre.

Participants 20 elite, professional, rugby league players.

Main outcome measures; Minimum recordable accelerations were set at 10 g (linear acceleration) and 25 rads s⁻² (rotational acceleration).

Results; A total of 1256 recorded ‘hits’ were analysed, excluding evident artefacts. No player was reported to have suffered a concussion. Player ‘loading’ was 46 ± 33 hits per session (range 7– 170). Average linear (14.9 ± 8.8 g) and rotational (532 ± 347 rads s⁻²) accelerations were not significantly different between training sessions ($P > 0.05$). Frequency of hits are summarised in the table below

Linear acceleration (g)	Cumulative%	Rotational acceleration (rads s ⁻²)	Cumulative%
10–20	92.6	25–500	64.7
21–40	5.4	501–1000	27.5
41–60	0.7	1001–2000	5.4
61–80	0.5	2001–3000	1.6
81–100	0.4	3001–4000	0.8
>101	0.4	>4001	0

Conclusions; The majority of head accelerations occurred within lower ‘sub-concussive’ zones. This confirms existing research findings from other sports. Whilst few accelerations occurred in higher zones, there were a number of very high loading impacts observed in ‘hit up forward’ positions. Our research confirms the suitability of using portable accelerometers in determining head accelerations in full-contact, ‘armourless’, invasion games. Competing interests None.