

Video game technology aids horse rider assessment

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Horse riders' balance, symmetry and poor posture could be improved thanks to an innovative body suit that works with motion sensors, commonly used by movie makers and the video games industry.

New research by Elizabeth Gandy, a senior lecturer in the University of Sunderland's Department of Computing, Engineering and Technology, uses inertial [motion sensors](#) worn in the Xsens™ MVN body suit and is now showing promising results as a method of assessing rider asymmetry

and lower back pain and injury risk.

The research has been supported by funding from the University's Faculty of Applied Sciences Digital Innovation research beacon and has now been published in the Sports Technology journal titled: 'A preliminary investigation of the use of inertial sensing [technology](#) for the measurement of hip rotation asymmetry in horse riders'.

Elizabeth said: "Lower back pain affects around one-third of the UK adult population and studies have reported that some of the highest injury rates are to be found in equestrian sports. Despite this, limited scientific research has been carried out into the effects of asymmetry and poor posture on rider health.

"The incorporation of inertial motion sensors into a body-worn suit is an emerging technology, which provides a non-constraining alternative to video capture for motion analysis. Examples include medical research and applications within the video game and film industries."



To evaluate the potential of this technology for rider assessment, Elizabeth and colleagues, in collaboration with research associates from the Saddle Research Trust, carried out a postural analysis of 12 riders wearing the XsensTM MVN inertial motion capture suit. Hip angle rotation was measured and software developed to customise the analysis of the data for rider analysis. Results revealed the presence of asymmetry in all of the 12 riders studied, with up to 27° difference between left and right hips, 83 per cent with greater external rotation of the right hip.

"This preliminary study has demonstrated that the use of the inertial motion sensor suit provides an efficient and practical method of

assessing riders during a range of movements," explained Elizabeth. "Furthermore, the technology could potentially provide a tool to meet the needs of riders and coaches, for assessment within training and competitive environments."

The MNV Biomech is a 3D human kinematic, camera-less measurement system, with integrated small tracking sensors placed on the joints, which can communicate wirelessly with a computer to capture every twist and turn of the body and is displayed as an avatar and a 3D set of data on screen.

From biomechanics, sports science, nurse training, rehabilitation and ergonomics are just some of the areas the University of Sunderland's researchers and students are now exploring since investing in the hi-tech suit in 2011, developed by Dutch company Xsens.

Previously used to create the animated alien in the science fiction movie 'Paul', the suit works with sensors and can be used in most environments, both internal and external. Previous technology at the university meant any 3D motion capture data had to be recorded via fixed cameras in a lab.

The full results of the Elizabeth's study will be presented at the second Saddle Research Trust International Conference, to be held in Cambridge on 29th November 2014 at Anglia Ruskin University.

Provided by University of Sunderland

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