

PLAYER-SURFACE INTERACTIONS: BIOMECHANICAL STUDIES

This article presents the content and outcomes of the 3rd workshop of the SportSURF network, held at the University of Exeter on the 22nd November 2006. The workshop was hosted by Dr Sharon Dixon, a core member of SportSURF, and biomechanics lecturer in the school of sport and exercise science at the University of Exeter.

The workshop packed in a full day of informative presentations and lively discussion and debate. Dr Darren Stefanyshyn, from the human performance laboratory at Calgary University in Canada, was an invited speaker and gave the keynote presentation titled "Player-Surface Interactions: Injury and Performance".

36 delegates from 6 countries attended, from academic and practitioner backgrounds, and several also contributed by giving short presentation of their own research work in this area.

Session 1 - Keynote Presentation - Dr Stefanyshyn

Dr Stefanyshyn is a world leading biomechanics researcher, he is the chairperson elect for the Footwear Biomechanics group of the International Society of Biomechanics and his main research interests include:

- Lower extremity biomechanics with emphasis on mechanical energy aspects of human movement.
- The influence of mechanical energy aspects on athletic performance.
- Biomechanical and mechanical energy influences of athletic equipment.
- The mechanics of knee injuries during running and cutting movements.

Darren's presentation covered both injury related research and performance related research. He demonstrated a link between injury propensity and type of shoes and body loadings (knee specifically) and concluded that the type of surface can and does have a significant effect on injury patterns. The performance related research focussed on energy conversion into optimised muscular output. He stated that whilst there had been much useful research in the 70s and 80s that in the last 20 years little progress appears to have been made into prediction or modelling of the mechanical properties of shoes and surfaces with or to injury and performance in a conclusive manner.



This article was prepared by Dr Paul Fleming & Dr Colin Young
Photographs from Laurence Gale – Pitchcare.com

Session 2 - Open Presentations

1. Daniela Strauss (University of Leeds)
 - Player Interactions on Tennis Surfaces
2. Rudy Verhelst (University of Gent)
 - Experimental research on the ground reaction force when performing a drop jump on different kinds of artificial turf
3. Dr Kenneth Maijer (Universiteit Maastricht)
 - The Biomechanics of Running on Artificial Turf
4. Dr Sharon Dixon & Dr Vicky Stiles (University of Exeter)
 - Biomechanical and Engineering Approaches to Sports Surface Testing



The open presentations stimulated many questions. Copies of all the presentations given at this workshop are available for download on our website www.sportsurf.org/workshop3.php.

Session 3 - Discussion and Summary

The discussion session raised many important questions and debate. In particular these were on aspects of injury at community and youth level, the appropriate level of limits of play performance for surfaces, the role of shoes and their selection by sport players, and the lack of good quality data to help inform decisions and conclusions.

Dr Paul Fleming, the network manager, attempted to sum up the key 'gaps in knowledge and future research needs'. The primary ones stated by him at the end were:

1. Lack of comprehensive injury studies
2. Body measurements can be related to injury
3. Biomechanical measurements are showing deficiencies in mechanical tests.
4. New assessment tests are needed, more player/shoe/surface oriented - appropriate loading/activity conditions
5. Many variables, and biomechanical experimental programmes are relatively complex and need to (can we) normalise in some way?
6. Modelling of the load rate, peak pressures, knee moments, and whole integrated system is required
7. Interdisciplinary research approach needed
8. Extensive injury related study is needed (ideally prospective)

This was the third in a series of workshops run by the SportSURF network. Details of future events will be posted on the website when they become available. On the 17th & 18th September 2007 an international conference will be hosted by SportSURF at Loughborough University. If you would like to participate in the conference please contact C.Young@sportsurf.org.

For more information on the SportSURF network, or to become a member, please visit our website www.sportsurf.org or contact the network coordinator Dr Colin Young C.Young@sportsurf.org.

SPORTSURF BACKGROUND

SportSURF was set up in May 2005. The organisation comprises a core committee from several leading Universities and SAPCA who are responsible for carrying out research and development.

The specific aims and objectives of this new organisation are:

- To advance the science and understanding of player-surface interactions and innovate the better engineering of surfaces to benefit play and end users health.
- To create a new interdisciplinary sports surfaces community.
- To host stimulating meetings/workshops open to all interested parties/stakeholders including a new conference dedicated to this subject area.
- To transfer ideas, techniques, models and technology between researchers and practitioners. To produce multidisciplinary research proposals.
- To disseminate network outcomes widely.

Membership of the network is open to any individual or organisation interested in the provision, management, maintenance and effects on the users of the full range sports surfaces, including sports governing bodies. Initially membership is free and members will be kept informed through its dedicated web site and twice yearly newsletter.

The network's objectives will be achieved by a variety of activities. These will include regular focussed workshops, research seminars and project case studies.

Currently the network has over 140 expert members from around the world. The membership includes many leading research institutes, sports governing bodies, surface manufactures and other leading organisations/individuals.